UNIVERSITY OF GHANA

DETERMINATION OF ANOMALOUS GOLD TARGETS BY USE OF GEOCHEMICAL EXPLORATION AND MULTIVARIATE STATISTICS METHODS IN CHIRANO GOLD MINING AREA OF THE WESTERN REGION, GHANA

BY

EMMANUEL KOFI BAAKU
(10357338)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MSC MINERAL EXPLORATION DEGREE

OCTOBER, 2013

DECLARATION

I certify that this dissertation reports the original work done by me during my University project for Master of Science in Mineral Exploration and that works quoted from other researchers are duly referenced. This dissertation has not been presented elsewhere in whole or in part for the award of a degree.

Signature: .... Date...

Student: Emmanuel Kofi Baaku (10357338)

Signature: .... Date...

Principal Supervisor: Prof. Prosper Nude

Signature: .... Date...

Supervisor: Dr Sandow Mark Yidana

ABSTRACT

The main aim of this dissertation was to identify pathfinder elements for gold and generate new gold targets for further exploration at Chirano Gold Mining Area. A geochemical data was generated from 521 soil samples which were analysed for 51 elements and evaluated using multivariate statistical methods. Principal Components and Factor Analyses were used to reduce the data into two groups and Cluster Analysis conducted to find element associations hence pathfinders for gold. Anomalous trends were determined on Ranked Variable Maps and Gridded Maps and used in selection of targets. Soil samples taken from the study area were analysed by ICP-AES (inductively coupled atomic emission spectrometry) for trace elements/base metals and ICP-MS (inductively coupled mass spectrometry) for gold. In order to guide in the determination of anomalies and identification of pathfinders for gold, descriptive statistics, correlation matrices, probability plots, ranked variable maps and gridded maps were made. Ranked variable maps and gridded maps created in IoGAS showed that elements such as La, Mg, Mn, Ba, Th and Ti have strong anomalies whiles Ca, Cd, In, Sn, S, Sc, Sr, V, Zr and Y have weak to moderate anomalies that correlate with the Chirano Shear Zone. Gold mineralization along the Bibiani shear zone, on the other hand, was clearly marked by strong anomalies of As, Cs, Sb and W and also weak to moderate anomalies of Na, Cd, S, Sc, Sr, V and Zr. Others such as Bi, Li, Re, Se, Ta, Te, Sc, U, B and Li were not anomalous in the project area. B and Li were depleted whiles Ta had high but localized values. Principal Components, Factor and Cluster Analyses were conducted in Minitab software. The first six Principal Components extracted 55.8 % of the explained variance in the variables. The first principal component extracted 21.3% of variability with large positive loadings from Ag, Al, Fe, Sc, Th, U, V, Zr, In and Sn which were linked to the underlying felsic intrusive rocks such as tonalite, granodiorite and quartz-feldspar porphyry. The second principal component also extracted 10.2% of variance and had

large negative loadings from Cu, Ni, Zn, Ba, Co, La, Mg, Mn, Sr, Ca and Cd which were linked to the underlying mafic rocks such as basalts, dolerites and diorites. Cluster Analysis also reduced the whole data to six clusters. The first cluster or the gold group consisted of Au, Mo, W, Re, B, Ta, Ce, Tl, Y and Be. Pathfinders for gold in the area under investigation were identified as Mo, W, Re, B, Ta, Ce, Tl, Y and Be. Twenty gold targets were identified including thirteen from Chirano North Gold project and seven from the Chirano Mining Lease. These targets must be ranked according to priority for further exploration work, preferably RC drilling.

ACKNOWLEDGEMENTS

Many thanks to Madam Kirmat Noormohamed (former Exploration Manager for Chirano Gold Mines) and Mr Hugh Stuart (former Director of Exploration for Red Back Mining Inc) for granting me the time and sponsorship to pursue MSc in Mineral Exploration and also allowing me to use part of the department's data during my dissertation work. My thanks also go to all the staff of CGML Exploration Department who assisted me in diverse ways to make this project a reality.

I wish also to thank Mrs Charity Baaku (my wife) and my children Wendell, Wendy and Cyril for their material, moral and spiritual support.

My immense gratitude goes to all the lecturers of the Department of Earth Science at the University of Ghana, Legon especially Prof. Banoeng-Yakubo, Prof. Asiedu, Prof. Atta-Peters, Prof. Akabzaa, Prof. Nyame, Dr Kutu, Dr Armah, Dr Manu and Dr Sakyi. I am also grateful to Dr Richard Afenu of the Minerals Commission of Ghana and Dr Daniel Boamah of the Geological Survey Department of Ghana. Finally, I salute my dissertation supervisors, Prof. Prosper Nude and Dr Sandow Mark Yidana for their guidance and suggestions.

God bless you all.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND

As population expands, traditional reliance on wildlife resources for food may need to be supplemented by other economic activities. Given the favourable geology which nature has provided us, we may wish to turn to another resource from the land to contribute to our livelihood i.e. the mineral resources. Exploration and exploitation of these resources have the potential to provide many employment opportunities (both direct and indirect), education, training, business and investment opportunities and infrastructure improvements in the communities.

In Ghana, the mining sector's contribution to gross domestic product increased from 1.3 % in 1991 to more than 5 % in recent years. Export earnings averaged 35% and the sector was one of the largest contributors to Ghana government revenue through the payment of mineral royalties, employee income taxes, property tax, transaction tax, excises tax, import duties, export duties, user taxes and corporate taxes (Ghana Chamber of Mines, 2005).

According to Aryee (2009), about US$10 billion have been invested in the mining sector (1983-2009) which has become the highest gross foreign exchange earner since 1999. Now about 45 % (15 % in mid 1980s) of Ghana's gross foreign exchange earnings come from mining. Also, 7 % of Ghana's total corporate tax earnings, 12 % of government revenue and 6 % of gross domestic products (GDP) (1.3 % in mid 1980s) are from mining. About 20,000 people are employed in large scale mining and about 500,000 in small scale mining (Aryee, 2009). In order to replace the mined out reserves, new gold deposits need to be discovered.

Area selection is a crucial step in mineral exploration. Selection of the best, most prospective area will assist in making it not only possible to find ore deposits but to find them easily, cheaply and quickly. The target generation phase involves investigations of the geology through mapping, geophysics and conducting geochemical or intensive geophysical testing of the surface and subsurface geology. In some cases, for instance in areas covered by soil, alluvium and platform cover, drilling may be performed directly as a mechanism for generating targets.

1.2 PROBLEM STATEMENT

Exploration for gold in the Chirano North gold project, located north of Chirano Gold Mines, failed to produce favourable results because pathfinders for gold were not identified and good targets could not be selected for further exploration work. As a result, high potential deposits have either received little attention or have remained unexploited.

1.3 SCOPE AND OBJECTIVES

The main aim of this work was to identify pathfinder elements for gold and to generate gold targets for further exploration at Chirano Gold Mines, Ghana. The gold deposits are being mined out and therefore new ones must be found to increase the ore reserve base of the company hence the mine life. To achieve these, soil samples from the study area would be analysed for concentrations of constituent elements to generate a geochemical database which could be evaluated to find elemental associations and determine anomalous trends which could point to the occurrence of economic gold deposits.

1.4 JUSTIFICATION

Previous exploration in the area concentrated on gold and samples were analysed for only gold. It was not possible to establish any linkage between gold and other elements. It is therefore necessary to conduct multi-element geochemical analysis on all soil samples taken in the area in order to determine any anomalous trends and to identify element associations and pathfinder elements for gold. These would aid in generating possible gold targets for exploration and increase the ore reserve base of Chirano Gold Mines Limited and prolong the mine life of the company.

1.5 STUDY AREA

1.5.1 LOCATION

The Chirano Gold Mining Area is located in the Bibiani District of the Western Region of Ghana. The project is centred at 569000 E, 702500 N (Universal Traverse Mercator, Zone 30, WGS 84, Northern Hemisphere) and located on the Wiawso Sheet 0603D1-1 (1:50000) and Wiawso Sheet 0603D1 (1:100000) of the Ghana Survey Map Series. From Accra, access to the property is through Kumasi, the Ashanti Regional capital through Bibiani, Sefwi Bekwai and Ntrentreso to Chirano Gold Mines (Figs. 1.1 and 1.2).

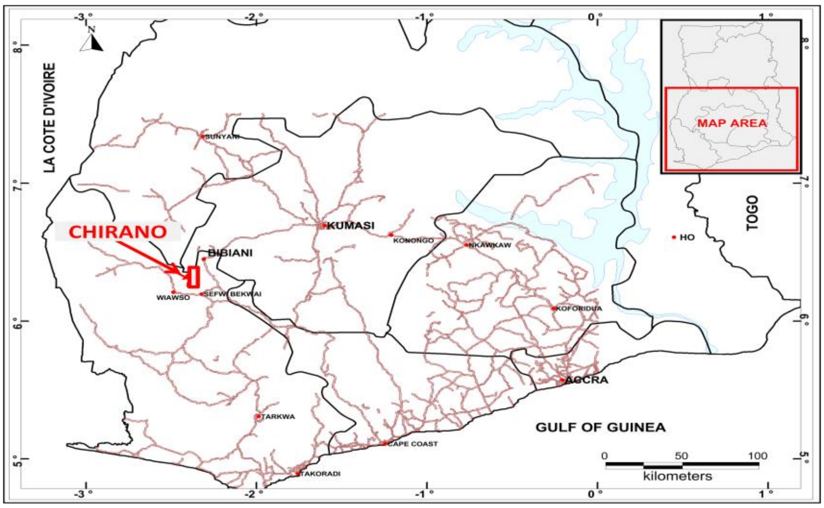

Fig. 1.1: Location Map of Chirano in south-western Ghana

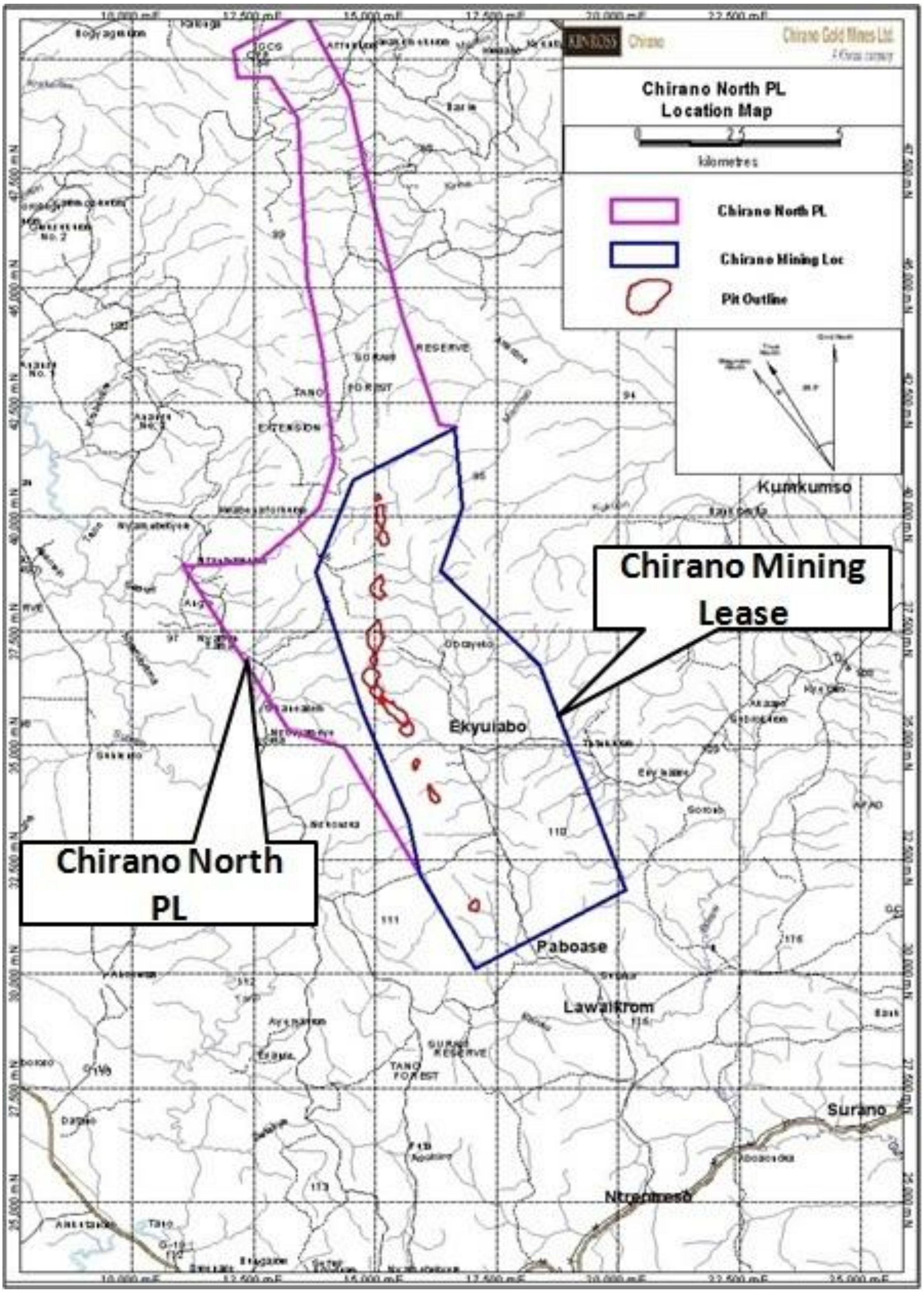

Fig. 1.2: Location Map of Chirano Gold Mining Area: Chirano Mining Lease and Chirano North PL

1.5.2 Relief and Drainage

The area falls within the physiographic region of a forest-dissected plateau which is characterized by a fairly undulating relief. Topographic heights are generally 150 – 200 m, with hills occasionally reaching elevations of 700 m above sea level. The area is drained by several tributaries of Ankobra and Tano rivers which form a dendritic pattern (Benneh and Dickson, 1988).

1.5.3 Climate and Vegetation

A wet semi-equatorial type of climate is experienced in the area. This climatic type is characterized by two rainfall maxima of May-July and September-October with mean annual rainfall of 1500 mm, mean monthly temperature of 26 - 30 °C and mean monthly noon relative humidity vary from 70 % to 80 %. The climax vegetation; the vegetation which established itself in the area under the given climatic conditions is moist semi – deciduous forest type with most of the trees being evergreen all year round. However, extensive logging and farming activities coupled with indiscriminate bush burning have now turned this primary forest into a secondary forest of stunted trees, shrubs and tall grasses (Benneh and Dickson, 1988). Fig. 1.3 shows the rainfall recorded in 2010 and 2011 by the Environmental Department of Chirano Gold Mines Limited from observation points located in and around the mines.

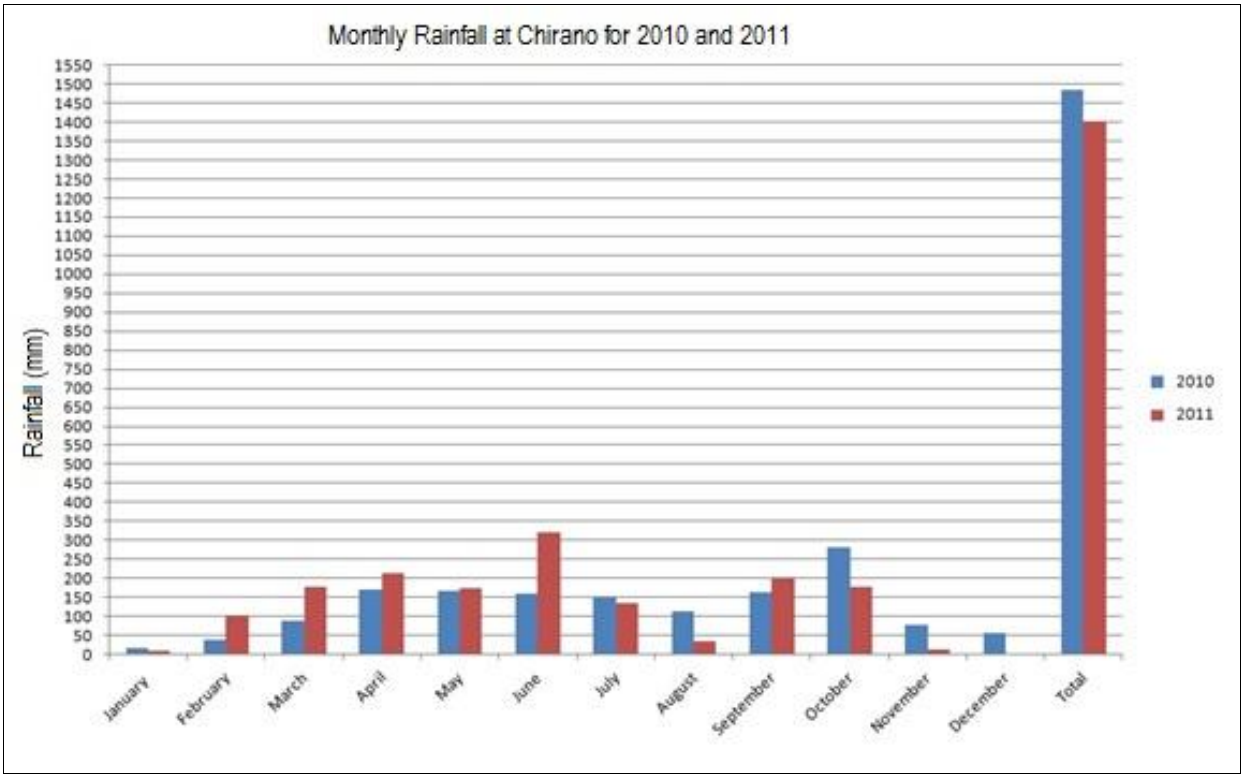

Fig. 1.3: Rainfall distribution at Chirano – 2010 & 2011. Courtesy of Environmental Department of Chirano Gold Mines Ltd – 2011Annual Report

CHAPTER TWO

LITERATURE REVIEW

2.1 GEOLOGICAL SETTING AND PREVIOUS EXPLORATION WORK

2.1.1 REGIONAL GEOLOGY

The Chirano area lies within the Paleoproterozoic Birimian rocks of south western Ghana and straddles the contact between the Sefwi volcanic belt to the west and the sedimentary Kumasi Basin to the east (Figs. 2.1 and 2.2) (Davis et al., 1994). The Birimian rocks comprise of successions of metasedimentary and volcanoclastic rocks which five northeast trending meta-volcanic belts (Hirdes et al., 1992) separate. Along the contact between the Sefwi Belt and Kumasi basin is found an inlier of younger Tarkwaian sedimentary rocks comprising of argillites, siltstones, sandstones and conglomerates up to 2 km wide (Leube et al., 1990). Immediately west of the contact is an elongated granitic intrusion, which acts as lithological and structural control for some of the Chirano Gold deposits (Hayden, 2004). Generally, structural features trend NE – SW in southwestern Ghana but sections around the Chirano district follow a north-south trend (Fig. 2.1). This change in orientation of the belt-basin contact is an important feature for dilation and the localization of mineralization (Allibone et al., 2004).

Paleoproterozoic rocks that host extensive gold mineralization in southwest Ghana are related to two orogenic cycles between ca. 2250 and 2088 Ma (Boher et al., 1992; Taylor et al., 1992; Davis et al., 1994; Oberthür et al., 1998; Allibone et al., 2002a). Mafic volcanic rocks, hypabyssal intrusions and minor amounts of related volcaniclastic rocks were erupted and emplaced between ca. 2250 and 2150 Ma during the Eburnean 1 orogeny. These are the oldest rocks known to date in southwest Ghana and neighbouring Cote D’Ivoire (Hirdes et al., 1996). The Eburnean 1 orogeny also involved granitoid plutonism between ca. 2205 and

2130 Ma (Boher et al., 1992; Hirdes et al., 1992; Oberthür et al., 1998) and greenschist-amphibolite facies metamorphism at ca. 2150 Ma (Boher et al., 1992). Igneous rocks erupted and emplaced during the Eburnean 1 orogeny probably formed basement to widespread turbiditic and fluvial sedimentary rocks deposited between ca. 2130 and 2116 Ma (Taylor et al., 1992; Davis et al., 1994; Oberthür et al., 1998; Allibone et al., 2002a). Older igneous rocks and these younger sedimentary rocks were affected by the Eburnean 2 orogeny, which involved further metamorphism, granitoid magmatism, and complex multiphase deformation between ca. 2116 and 2088 Ma (Hirdes et al., 1992; Davis et al., 1995; Oberthür et al., 1998; Allibone et al., 2002a). Mafic igneous rocks of the Eburnean 1 orogeny and the younger sedimentary rocks have both been included in the Birimian Supergroup (Junner, 1935; Leube and Hirdes, 1986; Leube et al., 1990). Recent radiometric dating (Boher et al., 1992; Hirdes et al., 1992; Taylor et al., 1992; Davis et al., 1994; Oberthür et al., 1998) demonstrated that the Birimian Supergroup, as currently defined, includes these two broad groups of rocks.

Deposition of fluvial sedimentary rocks (Tarkwaian Group) coincided with the initial deformation of the Birimian sedimentary rocks early in the Eburnean 2 orogeny but before emplacement of younger granitoids at ca. 2116 Ma. The prominent northeast-striking structural fabric of the Paleoproterozoic rocks in southwest Ghana (Figs. 2.1 and 2.2) is defined by numerous major thrust faults that separate belts of older Birimian mafic igneous rocks from basins of younger Birimian turbiditic sedimentary rocks. These thrust faults formed during northwest-southeast–directed compression early in the Eburnean 2 orogeny and imbricate slices of Birimian mafic igneous basement with younger Birimian turbiditic sedimentary rocks at scales ranging from a few 100 meters to 100s of kilometres (Eisenlohr and Hirdes, 1992; Allibone et al., 2002a).

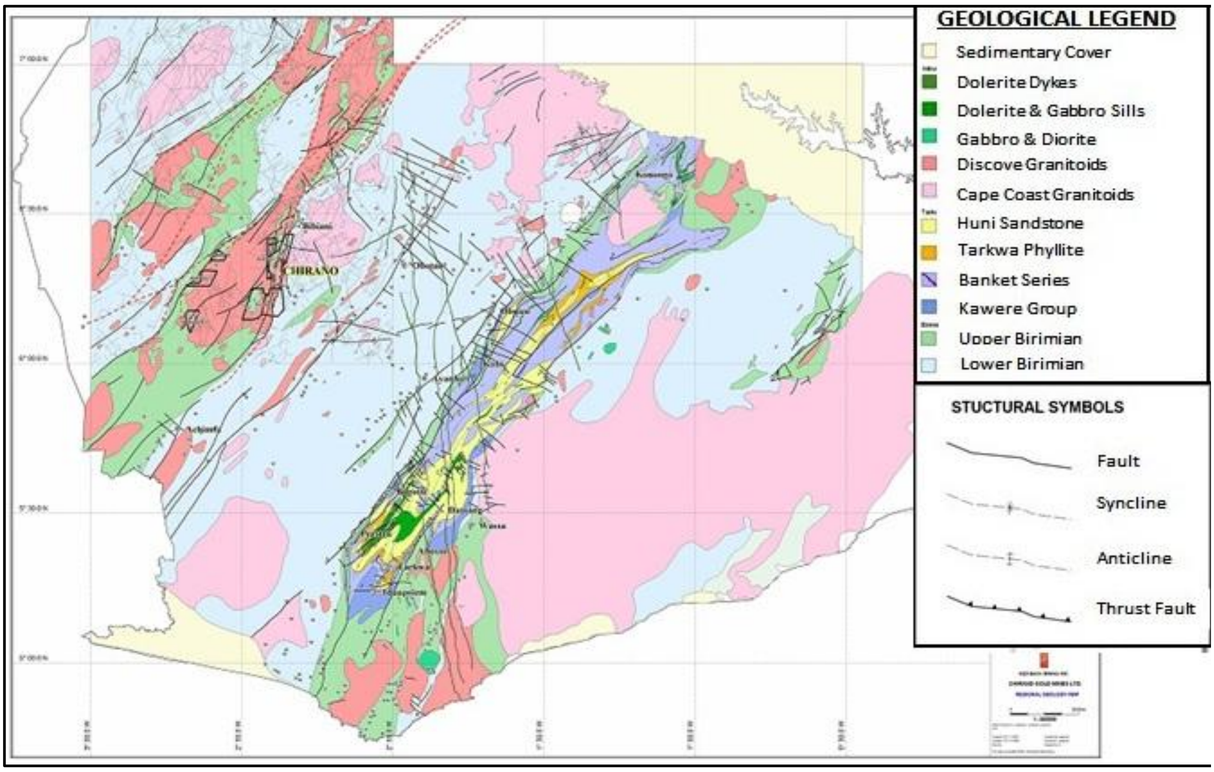

Fig. 2.1: Geology of Southwest Ghana (after Red Back Mining Inc., 2006)

Tarkwaian Group fluvial sedimentary rocks are generally confined to belts of Birimian mafic igneous rocks where they occur in unconformable stratigraphic contact or as imbricated fault-bounded slices (Leube et al., 1990). The location of epigenetic gold mineralization formed at ca. 2098 to 2086 Ma (Davis et al., 1995; Oberthur et al., 1998) at Ashanti and Bogoso was controlled by a minor sinisteral wrench event late in the Eburnean 2 orogeny (Allibone et al., 2002a, b).

2.1.2 Local Geology

Mafic rocks of Sefwi Volcanic belt such as basalts, dolerites and gabbros exist in the western part of the Chirano Mining Lease and that of Chirano North Gold project and were intruded by Chirano granites including tonalites, quartz-feldspar porphyry and granodiorites. In addition, there are diorites and gabbros. To the east are Tarkwaian sediments comprising of mudstones, siltstones, arkosic sandstones and polymitic conglomerates. A fault, known as the

Chirano Shear Zone (CSZ) marks the contact between the Tarkwaian sedimentary rocks and the Sefwi volcanic rocks. To the east of the Tarkwaian sediments are the Kumasi Basin metasediments mainly phyllites, greywackes and schists. The Bibiani Shear Zone (BSZ) is the fault contact between the Tarkwaian sediments and the Kumasi Basin sediments (Allibone et al., 2004).

Majority of large gold deposits in Ghana lie on or within a few hundred metres of a major belt – basin margin (Hayden, 2004) which coincide with very large faults, probably major thrusts that may have at least local, later, smaller, strike slip movement as well. The gold deposits are not necessarily in the main margin fault itself but may be in a splay fault or parallel fault a few hundred metres from the main fault (Hayden, 2004). There are currently only two major gold occurrences in Ghana on the eastern margin of the Sefwi Belt namely the Bibiani and Chirano deposits. The exposed belt margin is 250 km long and generally trends northeasterly; however, both Bibiani and Chirano lie on a 35 km long section of the margin that has a north-south strike. Ahafo deposit is the only major deposit currently known on the western margin of the Sefwi Belt (Hayden, 2004).

BSZ, CSZ and their splay structures are the main structural controls on localization of gold within the Chirano and Bibiani districts (Allibone et al., 2004). Recent exposures in pits and road cuts in the Chirano Mine area have shown that gold is hosted in sheared, brecciated, veined and hydrothermally altered basalts, dolerites, quartz veins and granites (Stuart, 2007). A strong correlation was established between the presence of fine-grained disseminated pyrite + silica + albite + ankerite + sericite and the concentration of gold in the altered rocks (Stuart, 2007).

The relatively minor felsic intrusions present are usually distinguished by high radiometric potassium content. There are no isotopic age-dates reported for intrusives within the area. Similar intrusives further south yielded a U/Pb date (on zircon and monazite) of about 2180 Ma which suggest the intrusives are probably coeval with volcanic activity in the belt (Kurtsen et al., 1992). Akwaaba is the only deposit where CSZ marks the FW contact of the ore body and there is no clear HW fault. The Chirano Shear Zone (CSZ) dips 70º to 80º towards the west. The granites however are thinner than what was depicted on earlier regional maps (CGML Exploration Team, 2008). Fig. 2.3 is a vertical section through 31595 mN showing the rock types.

The other gold deposits in Chirano occur within 200 m to the west of the Chirano Shear and comprise of fractured and altered granites or mafic rocks including quartz veins, quartz stockworks and mineralised shear zones and breccias. The geometry and shape of the deposits range from tabular (Obra), pipe-like (Tano) to multiple parallel lodes (Paboase). The mineralised zone thickness ranges from a few metres to over 70 m. Most of deposits dip very steeply towards the west or southwest and plunge very steeply (Hayden, 2004).

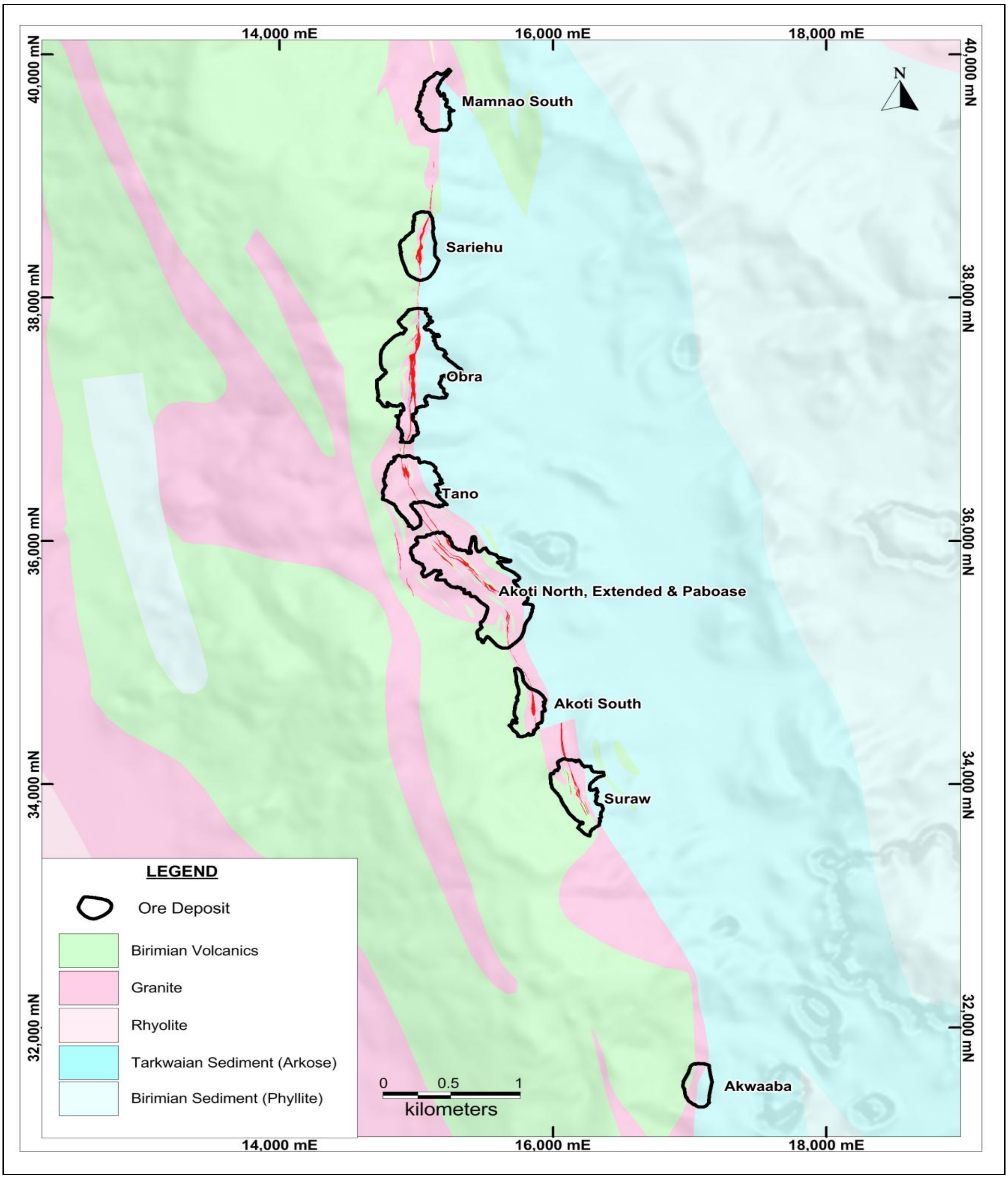

Fig. 2.2: Geological Map of Chirano Area showing locations of the gold deposits

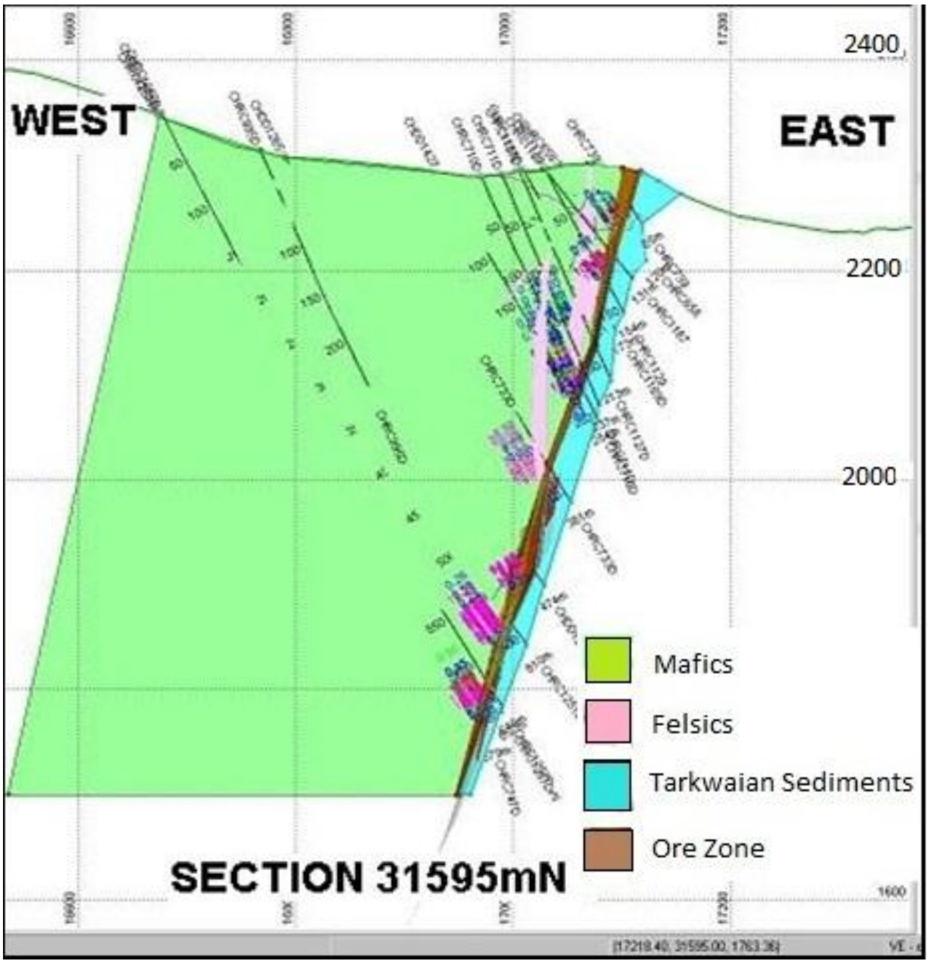

Fig. 2.3: Vertical Section through 31595 mN at Akwaaba (Chirano Local Grid)

2.2 CHOICE OF VARIABLES AND CLASSIFICATION OF RESEARCH

Variables are things that we measure, control or manipulate in research. They differ in many respects, most notably in the role they are given in our research and in the type of measures that can be applied to them. Regardless of their type, two or more variables are related if in a sample of observations, the values of those variables are distributed in a consistent manner. In other words, variables are related if their values systematically correspond to each other for these observations. For example, Height is related to Weight because typically tall individuals are heavier than short ones; Intelligence Quotient (IQ) is related to the Number of Errors in a test, if people with higher IQ make fewer errors (Hill and Lewicki, 2007).

Empirical research can be classified as either correlational or experimental. In correlational research, we do not influence any variables but only measure them and look for relations (correlations) between some set of variables, such as blood pressure and cholesterol level. In experimental research, we manipulate some variables and then measure the effects of this manipulation on other variables; for example, a researcher might artificially increase blood pressure and then record cholesterol level. Data analysis in experimental research also comes down to calculating correlations between variables, specifically, those manipulated and those affected by the manipulation. Independent variables are those that are manipulated whereas dependent variables are only measured or registered (Hill and Lewicki, 2007).

A visual examination of a data using a histogram (a graph that shows the frequency distribution of a variable) is the best test for normality. The exact shape of the normal distribution (the characteristic bell curve) is defined by a function which has only two parameters: mean and standard deviation. A characteristic property of the Normal distribution is that 68 % of all of its observations fall within a range of ±1 standard deviation from the mean, and a range of ±2 standard deviations includes 95 % of the scores. In other words, in a Normal distribution, observations that have a standardized value of less than -2 or more than +2 have a relative frequency of 5 % or less. Standardized value means that a value is expressed in terms of its difference from the mean, divided by the standard deviation (Hill and Lewicki, 2007).

2.3 SAMPLING PROCEDURE

Geochemical surveys these days have become an integral part of mineral exploration particularly in the search for different metallic deposits for Au, Cu, Pb and Zn (Fletcher, 1997). Geochemical surveys for mineral exploration are based on the systematic sampling and trace analysis of a wide range of naturally occurring materials such as rocks, soils, stream sediments, groundwater, surface water, organic materials and gases with a view to detecting anomalies related to concealed mineral deposits (Webb and Thompson, 1977). The exploration programme is dependent on choice of material type to be sampled, quantity of samples to be taken, cost of samples collection and preparation and cost of samples analysis. After choosing the exploration method, a decision is made about the objectives of the exploration programme. According to Butt and Smith (1980), regolith units form the dominant sampling media for geochemical exploration in the initial stages of most programmes in those areas where bedrock has very restricted outcrop or is completely concealed beneath surficial regolith units. During all geochemical sampling programs all jewellery, particularly rings must be removed when sampling for low level gold, silver and platinum group elements (McQueen, 2004).

Soil sampling is generally recommended in areas of residual soil over saprock, areas with soil developed on in situ regolith and areas with soil developed over transported regolith that is less than 5m thick. One needs to decide on sample spacing, soil horizon to be sampled (the depth of sampling), soil fraction to be sampled and analysed (generally either bulk soil or a particular size fraction) and also the method of sample digestion and analysis (McQueen, 2004). Soil samples are generally collected on a rectangular grid pattern and generally, the spacing of sample sites is closer along cross-lines as compared to the spacing between adjacent cross-lines (McQueen, 2004). Theoretically, the sampling lines are oriented normal or at a high angle to the expected longer dimension of the target but the orientation of a geochemical dispersion pattern is generally not well known, if at all, before sampling. The optimum spacing between sampling lines and sample sites depends on the purpose of exploration and the expected size of the dispersion halo to be detected. The aim is to obtain at least 2 samples from the anomaly on a sampling line. Common sample spacing for reconnaissance soil sampling is 400 m by 400 m or 200 m by 400 m. For detailed anomaly detection, samples are commonly collected at 100 m on 200 m spaced lines with infill sampling down to 50 m on 100 m spaced lines. Sample sites are located with a geographic positioning system (GPS) receiver and entered into database or geographic information systems (GIS) platform (McQueen, 2004).

2.4 SUITABLE ANALYTICAL METHODS

Analytical laboratories speak with clients regarding trace metals analysis and they usually ask which detection limit is required but usually not what the sample matrix or sample composition is. Information on the sample matrix is very important for the analyst who will be digesting the sample because the digestion technique used is crucial to the success of the project (Evans Analytical Group, 2009). If the sample is not digested properly, essential information may be lost; a digestion technique which is too mild will not completely destroy the matrix and analytes of interest may not make it into solution resulting in low values. On the other hand, a technique which is too aggressive will destroy the matrix and may also destroy the analytes of interest (Evans Analytical Group, 2009).

The sample digestion method will depend to some extent on the elements being targeted and their host phases. A strong acid digest is most suitable for all round multi-element detection where the target and pathfinder elements are both weakly and strongly bound in ferruginous and weathered lithic components (ALS, 2012). Aqua regia is commonly used because it will dissolve elemental gold as well as breakdown iron and manganese oxides, oxy-hydroxides, carbonates, sulphates, sulphides and many types of clay. It will not release elements or minerals included within quartz (including silcrete) or other insoluble silicates or dissolve resistant minerals such as chromites, rutile, cassiterite, ilmenite and zircon.

According to ALS (2012), near total digestion of samples, including the silicates but not resistates, can be achieved with a multi-acid digest of hydrofluoric-perchloric-nitric acids. There is also a range of partial leach and selective extraction methods designed to target elements weakly bound to specific materials, for example, mobile metal ions (MMI), Regoleach and Enzyme Leach (ALS, 2012). These digestions have the advantage of producing solutions with very low total dissolved solids, which increases the sensitivity and detection limit of the analytical method. This is probably their main advantage.

ALS Minerals offers a wide range of multi-element and single-element methods that can satisfy the requirements of today's exploration geochemists, both technically and economically. Method selection can be the key to achieving exploration success. Sample types along with target commodity and pathfinder elements determine the best choice. Stream sediments and soils typically require methods with the lowest possible detection limits for pathfinder elements. The Inductively Coupled Plasma Mass Spectrometry (ICP MS) and Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP AES) methods are used on rocks and drill cores where the subtle patterns in the ultra-trace elements require the best possible detection limits for delineation.

Detection Limits for 51 elements by aqua regia, ICP-MS and ICP-AES at ALS Minerals are shown in Table 2.1. The analytical methods include different sample decomposition procedures such as aqua regia and multi-acid digestions, fusions and selective leaches. The instrumental analytical techniques include inductively coupled plasma with atomic emission spectroscopy or mass spectroscopy, atomic absorption, x-ray fluorescence and infrared spectroscopy (ALS, 2012).

Table 2.1: Detection Limits for 51 elements by aqua regia, ICP-MS and ICP-AES by courtesy of ALS Minerals. Ranges are stated in ppm except where stated otherwise

Analyte	Range	Analyte	Range	Analyte	Range	Analyte	Range
Ag	0.01-100	Cs	0.05-500	Mo	0.05-10000	Sr	0.2-10000
Al	0.01-25%	Cu	0.2-10000	Na	0.01%-10%	Ta	0.01-500
As	0.1-10000	Fe	0.01%-50%	Nb	0.05-500	Te	0.01-500
Au	0.2-25	Ga	0.05-10000	Ni	0.2-10000	Th	0.2-10000
B	10-10000	Ge	0.05-500	P	10-10000	Ti	0.005%-10%
Bo	10-10000	Hf	0.02-500	Pb	0.2-10000	Tl	0.02-10000
Be	0.05-1000	Hg	0.01-10000	Rb	0.1-10000	U	0.05-10000
Bi	0.01-10000	In	0.005-500	Re	0.001-50	V	1-10000
Ca	0.01%-25%	K	0.01%-10%	S	0.01%-10%	W	0.05-10000
Cd	0.01-1000	La	0.02-10000	Sb	0.05-10000	Y	0.05-10000
Ce	0.02-500	Li	0.1-10000	Sc	0.1-10000	Zn	2-10000
Co	0.1-10000	Mg	0.01%-25%	Se	0.2-1000	Zr	0.5-500
Cr	1-10000	Mn	5-50000	Sn	0.2-500		

2.5 EVALUATION OF DATA AND PRESENTATION OF RESULTS

Grunfeld (2005) stated that several methods are combined and the choice of techniques depends on the characteristics of data as well as the purpose of study. One critical issue is dealing with extreme data values or outliers in the initial stages of analysis. Another common problem is that integrated analysis of several geochemical datasets is not possible without interpolating the point data into surfaces. Finally, separation of anthropogenic influences from natural geochemical background in the surface materials is an issue of great importance for environmental studies (Grunfeld, 2005). Extracting useful knowledge from data is still a complicated and nontrivial process. In this context, visualization offers powerful means of analysis that can help to uncover patterns and trends hidden in unknown data (Blaser et al., 2000). Visualization can mean different things to different audiences and can be associated with animation, pictures, maps, plots and colours. Traditionally, the term visualization has been used to describe the process of graphically conveying or presenting results. However, it has also been argued that the original definition of the term refers to attempts to build a mental image of something, rather than merely representing graphical results on a computer screen (Blaser et al., 2000).

A key task in working with data is to verify the information before proceeding (Minton et al., 2011). In this case, geochemical data required detailed verification. Quality control steps include visual examination of data, removing standards and duplicates, merging assay data with locations and performing statistical analysis. Geochemical anomalies are geochemical features different from what is considered normal and can be the result of unusual or uncommon processes concentrating particular elements such as an ore forming process, weathering and element dispersion from an unusual element concentration such as an orebody, element accumulation or concentration by common processes acting over long periods, artificial contamination of sites or samples and analytical noise or error due to poor precision of the analytical method, particularly for element concentrations close to the detection limit (Minton et al., 2011).

Univariate statistical methods involving observations with only one variable, which can be used to organise and extract information from a set of values for a single element, are histograms, frequency curves and box and whisker plots (McQueen, 2002). The normal probability plot is a graphical technique for assessing whether or not a data set is approximately normally distributed (Chambers, 1983). For the probability axis the raw data are transformed to standard normal values or Z-scores where the mean is 0 and standard deviation is 1 (Amor, 2011). Equation 2.1 shows how the Z-score is calculated where X_i represents a value in the data, μ the mean of the data and δ the standard deviation.

$$Z_i = (X_i - \mu)/\delta \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \; 2.1$$

The box-and-whisker plot is an exploratory graphic, created by John W. Tukey, used to show the distribution of a dataset at a glance. The interquartile range (IQR) is the width of the box in the box-and-whisker plot, which is the difference between the third Quartile (Q_3) and the first Quartile (Q1) (Larsen et al. (1978). In descriptive statistics, a box plot is a convenient way of graphically depicting groups of numerical data through their quartiles. Box plots may also have lines extending vertically from the boxes (whiskers) indicating variability outside the upper and lower quartiles. The spacings between the different parts of the box help indicate the degree of dispersion (spread) and skewness in the data and identify outliers. In addition to the points themselves, they help in estimating various L-estimators, notably the interquartile range, mid-hinge, range, mid-range, and tri-mean. Box plots are drawn either horizontally or vertically (Larsen et al. (1978).

A box-and-whisker plot can be useful for handling many data values. They allow people to explore data and to draw informal conclusions when two or more variables are present. It shows only certain statistics rather than all the data. Five-number summary is another name for the visual representations of the box-and-whisker plot. The five-number summary consists of the mean, median, the quartiles, the smallest and greatest values in the distribution. Immediate visuals of a box-and-whisker plot are the centre, the spread and the overall range of distribution (Nord, 1995). The first step in constructing a box-and-whisker plot is to arrange the data from the least to the greatest and find the median, the lower quartile and the upper quartile of the given set of data (Nord, 1995).

Elements such as silver (Ag), copper (Cu), Lead (Pb), zinc (Zn), cobalt (Co), nickel (Ni), arsenic (As), antimony (Sb), tellurium (Te), selenium (Se) and mercury (Hg) serve as geochemical pathfinders in the exploration for gold (Boyle, 1979). The Archean gold ores are typically enriched in gold with variable enrichment in Ag, As, tungsten (W), Sb, bismuth (Bi) and Pb (Philip, 1983; Robert, 1983; Groves, 1993). Geochemical anomalies are commonly exposed in more than one element and the source or process that has generated the anomaly has an association of elements. Different ore deposit types typically have specific element associations of target and pathfinder elements hence element associations can be used to advantage by taking a multi-element approach to anomaly detection (McQueen, 2002). If the anomalies of a good number of these elements coincide to substantiate the geological evidence, there appear to be reasonable chance of locating gold (Sander Raju, 2008).

The most commonly used multivariate techniques for studying regional geochemistry are principal component analysis (PCA), cluster and factor analysis and different types of regression analysis. The predominant element associations or geochemical processes in multi-element data can be identified with PCA and factor analysis, sample associations can be detected with cluster analysis and inter-element and inter-sample relationships can be studied with regression analysis. Data from the real world rarely match the idealized models of parametric statistics and the data values are often transformed to counteract the effect of outliers. Methods requiring a multivariate normal distribution are especially vulnerable when used with geochemical data and will often deliver unstable and faulty results (Riemann et al. 2001). PCA can be used for data compression, multivariate outlier detection, deciphering a correlation matrix, identifying underlying factors and detecting intrinsic correlation. PCA transforms a set of correlated variables into uncorrelated quantities which could be interpreted as independent factors. A hands-on how-to approach PCA can be found in Stevens (1986) and more detailed technical descriptions are provided in Cooley and Lohnes (1971).

PCA also defines a sequence of orthogonal factors which successively absorb a maximal amount of the variance of the data. PCA % stands for the proportion of the total variance extracted by the factor. To simplify matters, you usually start with the correlation matrix, where the variances of all variables are equal to 1.0. Therefore, the total variance in that matrix is equal to the number of variables. As we extract consecutive factors, they account for less and less variability. The decision of when to stop extracting factors basically depends on when there is only very little random variability left (Hill and Lewicki, 2006). The nature of this decision is arbitrary; however, various guidelines have been developed. For data compression, only the components having the largest variances are retained. Predominant element associations or geochemical processes in multi-element data can be identified with PCA and factor analysis.

Factor analysis is an appropriate method for establishing element associations (Nude et al. 2012). Factor analysis can simplify a complex data set by identifying one or more underlying factors or processes that might explain the dimensions associated with data variability (Howarth and Govett, 1983). Mineralization processes are almost always multi-element events and the resultant chemical patterns are also multi-element and should be treated as such. Birke and Rauch (1993) and Kramar (1995) have reported the use of multivariate statistical methods to distinguish anomalies caused geologically and by natural features of the environment from those due to anthropogenic effects. The analytical technique used, sample type, prospecting scale, survey patterns, sampling density, as well as spatial distribution of the data is important.

Multivariate cluster analysis was used by Bam et al (2011) for some major and trace elements distribution in an unsaturated zone in Densu River basin of Ghana. Nude et al. (2012) used multivariate statistical analysis to define gold relationships with other trace elements to determine possible pathfinder elements from soil geochemical data.

Grunsky and Smee (2003) pointed out that the development of low-cost, rapid multi-element analytical techniques has generated large geochemical databases in many exploration computer programs. When a sampling programme consists of several thousand samples, the resulting data matrix is enormous and effective interpretation using all the elements individually becomes burdensome. However, the application of multivariate statistical techniques can extract geochemical patterns related to the underlying geology, weathering, alteration and mineralization. Imaging the results over topography enhances the interpretation of these patterns (Grunsky and Smee, 2003). Cluster analysis methods fall into two distinct groups namely hierarchical and non-hierarchical methods. Hierarchical clustering may be performed by both agglomerative and divisive methods. The results of both hierarchical procedures can be displayed in a two-dimensional diagram known as a dendrogram or tree diagram in which the objects are joined according to their similarities into successively larger clusters (Du Toit et al., 1986). When the number of individuals being measured is relatively large, numerical classification techniques such as cluster analysis can become valuable statistical tools to classify individuals according to their similarities (Crossa, 1990). Cluster analysis is a convenient method for identifying homogenous groups of objects called clusters. Objects or observations in a specific cluster share many characteristics but are very dissimilar to objects not belonging to that cluster (Mooi and Sarsdedt, 2011). After deciding on the clustering variables (Fig. 2.4), decision is made on the clustering procedure to form the groups of the objects (Wedel and Kamakura, 2000).

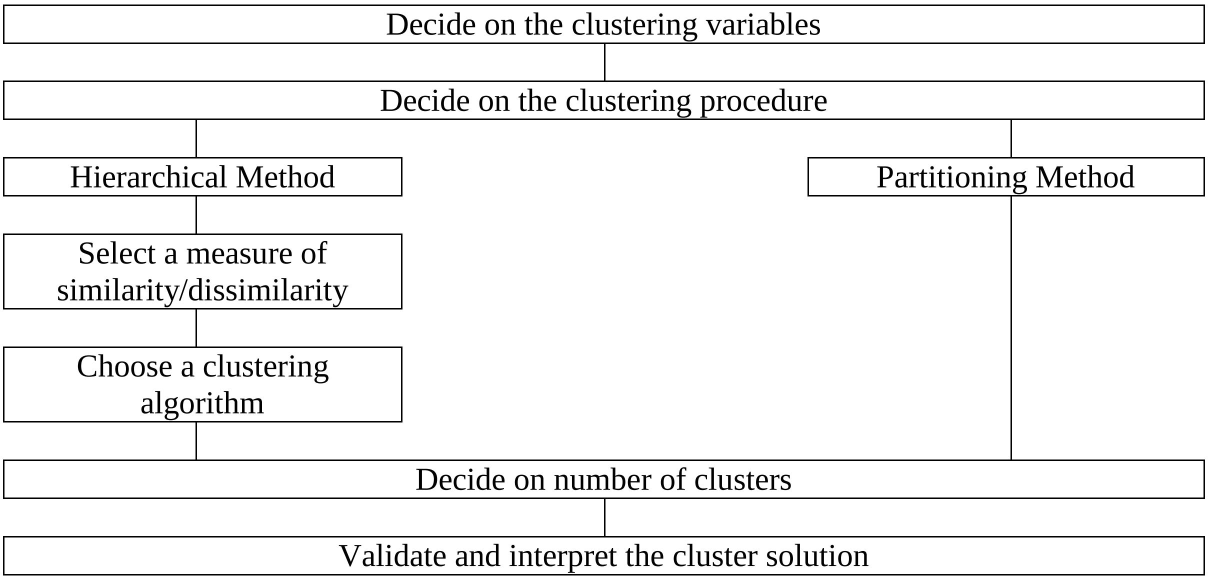

Fig. 2.4: Steps in Cluster Analysis by courtesy of Wedel and Kamakura (2000).

Non-hierarchical classification groups objects into a predetermined number of clusters or classes with the objective of minimizing the within-cluster variability while maximizing the between-cluster variability (Johnson and Wichern, 1992; Everitt, 1993).

Partitioning or divisive methods divide the data set into a number of groups predesigned by the user. Progressively, one large cluster comprising all of the data is divided into two smaller clusters and the process is repeated until all clusters have been divided. Other hierarchical methods are agglomerative and work in the opposite direction by first finding the clusters of the most similar items and progressively adding less similar items until all items have been included into a single large cluster. Cluster analysis can be run in the Q-mode in which clusters of samples are sought or in the R-mode where clusters of variables are desired.

Dendrogram is a convenient way of depicting pair-wise dissimilarity between objects, commonly associated with the topic of cluster analysis (Dylan, 2012). The dendrogram lists all of the samples and indicates at what level of similarity any two clusters were joined. The x-axis is some measure of the similarity or distance at which clusters join and different programs use different measures on this axis (Holland, 2006).

K-means is the most popular partitioning method and requires the analyst to specify the number of clusters to extract. A plot of the within groups sum of squares by number of clusters extracted can help determine the appropriate number of clusters. The analyst looks for a bend in the plot similar to a scree test in factor analysis (Everitt and Hothorn, 2006).

During measurement of geochemical data, it is common practice to express major elements as weight % and trace elements as parts per million (ppm) or parts per billion (ppb) but it is not a good idea to mix major elements with elements reported without oxides. It is better to convert to moles and then evaluate. The information can be presented spatially as bubble plots or interpolated images (Grunsky, 2007). Multi-element geochemistry is to be used initially to map the footprint of the hydrothermal system, recognise the areas that have the potential and discard the areas that do not have. In the main Chirano environment, the footprint of the mineralized system is best mapped by Au, W, As and Sb. Mo, Bi and Te may also form discrete zones deeper in the system, but are not anomalous in every gold system (Halley, 2010). The purpose of visual presentation of data is to provide the scientist with insights into data behaviour not readily obtained by non-visual methods (Thompson,1992) and to present the data to the user in a way that promotes the discovery of inherent structure and patterns and prompts the generation of research questions (Gahegan, 2000a).

Morsy (2000) conducted cluster and factor analysis on geochemical data from stream sediments from the Miocene Lead-Zinc deposit near Gabal El-Rusas in Eastern Desert, Egypt. Cluster analysis classified the data into two groups – the background and mineralized samples groups. R-mode factor analysis also revealed three dominant factors. The first was made up of Pb and Zn and closely related to the Lead- Zinc occurrences whiles the other two were linked to adsorption and co-precipitation of cobalt and nickel in manganese- iron hydroxides. At Chikkasiddavanahali, gold showed positive correlation with arsenic, palladium, silver and antimony. Wherever samples showed higher concentrations of these elements, gold anomalies were found, hence, they were used as a direct tool for identifying gold bearing zones (Sander Raju, 2008).

Banoeng-Yakubo et al., (2009) applied Q and R-mode multivariate statistical analyses to groundwater chemical data from boreholes and wells in the northern section of the Volta Region in Ghana to determine the processes that affect the hydrochemistry and the variation of these processes in space among the Buem formation, Voltaian system and the Togo series that underlie the area. The analyses revealed three zones in the groundwater flow system: recharge, intermediate and discharge regions. R-mode HCA and factor analysis using varimax rotation and Kaiser Criterion determined that the significant sources of variation in the hydrochemistry in the area was controlled by the weathering of silicate and carbonate minerals, as well as the chemistry of infiltrating precipitation (Banoeng-Yakubo et al., 2009).

Results from a geochemical survey carried out on stream sediments from Wadi Haimur area, South-eastern desert of Egypt were treated with multivariate statistical methods to produce four geochemical suits and the presence of epithermal gold and also to identify Ag, As, Sb and Ba as pathfinder elements for gold (Ramazanov and Ali, 2011).

Multivariate statistical methods were applied to hydrochemical data obtained from the Voltaian Basin of Ghana in order to highlight the major groundwater types and the evolution of groundwater from recharge areas to discharge areas in the groundwater flow regime. Q-mode hierarchical cluster analysis distinguished four major hydrochemical types: calcium bicarbonate [$Ca(HCO_3)_2$] low salinity fresh groundwater in the south of the basin, through sodium bicarbonate [$NaHCO_3$] low to intermediate salinity fresh groundwater types, to saline-brackish [NaCl] groundwater types in the north of the basin (Yidana et al., 2011).

Groundwater quality study of the Birimian, Cape Coast granitoid and the Densu River was carried out using Water Quality Index (WQI) and multivariate statistics with the aim of determining their suitability for drinking and irrigation. The results showed that the Cape Coast granitoid generally had elevated values of dissolved ions as compared to the Birimian and surface waters. Cluster and Principal Component Analysis with varimax rotation were also used as a complementary tool to help organize and interpret the chemical analysis. Four principal components with eigenvalues greater than unity accounted for 73.16% of the variability in the data. The factor score plot also separated the polluted areas and identified areas with potential deteriorating water quality (Gibrilla et al., 2011).

Nude et al. (2012) conducted multivariate statistical analysis on multi-element soil geochemical data from Koda Hill – Bulenga in Wa–Lawra gold prospect in Northwest Ghana with the objectives of defining the relationship of gold with other trace elements and to identify pathfinders for gold. Factor analysis reduced the data to three main components, which were linked to primary dispersion from underlying rocks and secondary processes such as laterization. Cluster analysis identified lead, copper, arsenic and silver as pathfinders for gold (Nude et al., 2012).

CHAPTER THREE

METHODOLOGY

3.1 FIELD METHODS

The sampling was carried out by geologists and field technicians from the Exploration Department of Chirano Gold Mines Ltd, including the author of this dissertation. A total of 521 soil samples were taken from the research area including 156 from Chirano North Gold Project (on a grid of 800 m by 200 m) and 365 from the Chirano Gold Mining Lease (on a grid of 400 m by 200 m) (Fig.3.1).

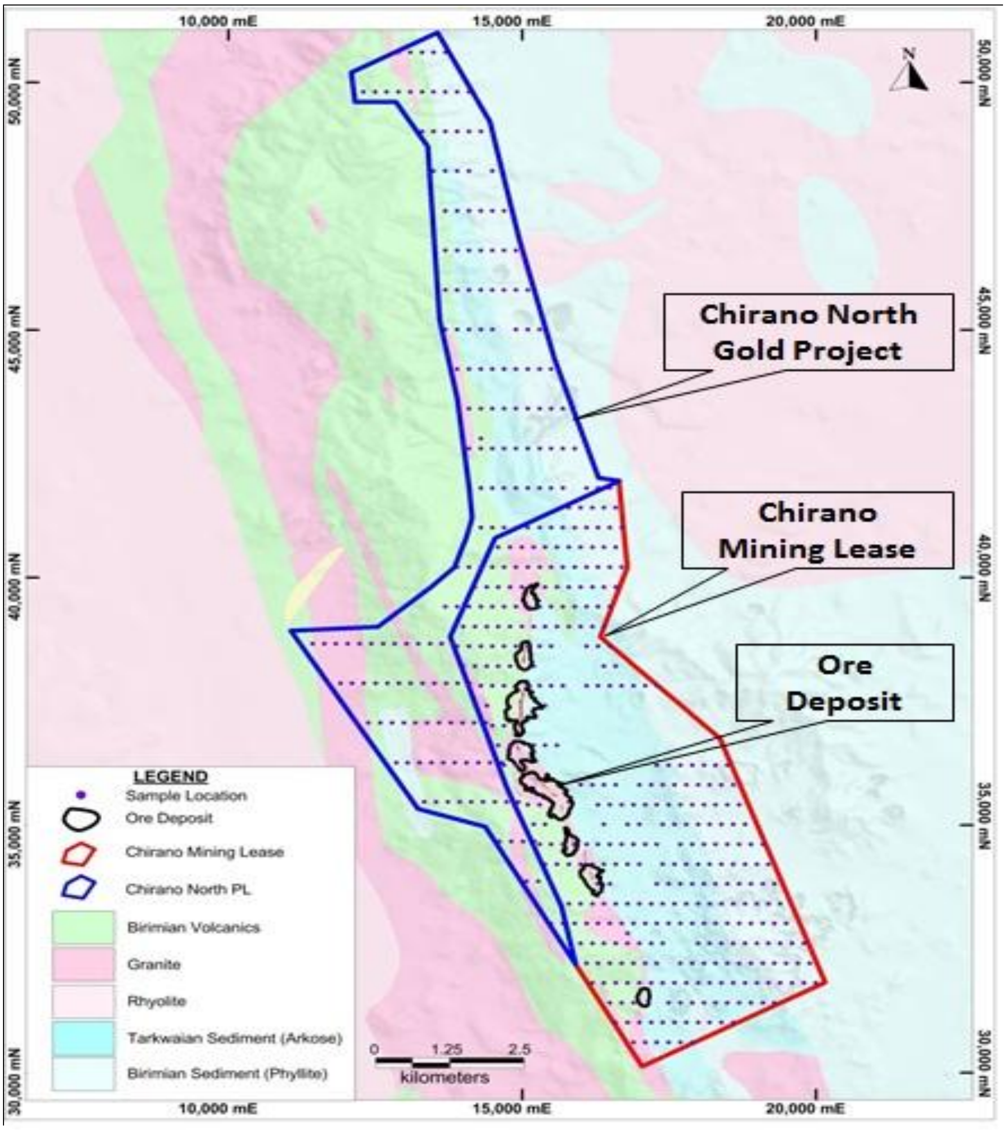

Fig. 3.1: Geological Map of Chirano showing locations of soil samples; represented by horizontal arrangement of dots.

The Chirano Local Grid North was obtained by subtracting 34.4° from the Magnetic North. This transformation included 6° magnetic declination and anticlockwise rotation through 28.4° (Fig. 3.2). Points plotted in UTM (WGS 84) grid were transformed into the Chirano Local Grid-metric by inputting two common points as shown in Table 3.1. The sampling grid and sample identity numbers were generated on a computer followed by line-cutting and pegging of sampling positions. The coordinates and sample numbers were written with a permanent marker on flagging tapes attached to the pegs. Samples weighing 2 to 3 kg were collected from about 50 cm depth usually in the B-horizon and placed in calico bags which were labeled with the predefined identity numbers. Duplicate samples were taken after every 25 sample thus at the location of the 25th sample, a larger hole was dug and 5 to 6 kg of sample taken, mixed thoroughly on a plastic sheet and then divided into 2 samples.

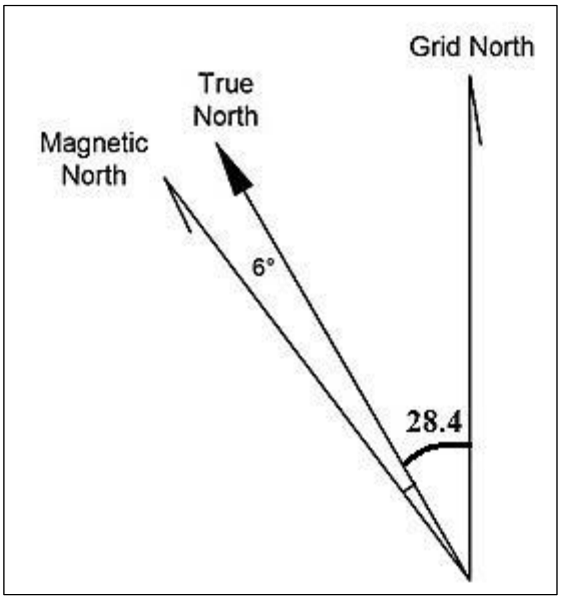

Fig. 3.2: Orientation of Chirano Local Grid North, Magnetic North and the Geographic North

Table 3.1: Grid Transformation Table – UTM to Chirano Local Grid

POINTS	UTM EAST	UTM NORTH	LOCAL EAST	LOCAL NORTH
P1	568247.65	699529.75	15086.59	38559.73
P2	567065.39	694749.19	16338.48	33797.21

The samples were then transported to the base station, checked and prepared for shipment to the assay laboratory. Standards or blanks were inserted after every 50 samples for the purpose of quality assurance and quality control. Standards of specific grades were bought from Oxide Rock-Labs. Umpire check samples and triplicates were also sent to referee laboratories (secondary laboratories) such as Genalysis Laboratories Pty (Perth – Australia) and SGS Tarkwa to check the efficiency of the primary laboratory which analysed the soil samples.

3.2 SAMPLE ANALYSIS

Each sample was analysed for 51 geochemical elements (Appendix A and B). The samples were oven dried at a temperature of 110 ºC for 6 to 12 hours and pulverized into pulps by ALS Chemex – Kumasi and forwarded to ALS Chemex – Vancouver, Canada where they were analysed by ICP-AES for trace elements/base metals and ICP-MS for gold. The Laboratory has Exploration Sample Preparation and Ore Grade Sample Preparation sections, which have their own dedicated equipment including drying oven, crushers, pulverisers, splitters and a quality control (QC) station. The purpose of sample preparation is to produce a homogeneous sub-sample that is fully representative of the original field material and at the same time, suitable for laboratory analysis. Samples were prepared as one batch and the sequence was not broken to prepare other batches. The crushing and grinding equipment was cleaned with barren material before and after each batch. After grinding each sample, the equipment was vacuum cleaned. Random size analysis was conducted to monitor the conformance of the grinding product (pulp) to a minimum of 90 % passing 75 microns.

All samples received by the laboratory were logged into the ALS GEMS system using bar codes. The initial weights of the samples were captured and reported. Sample identification, quality control measurements for grinding, weighing, pulp and bulk storage, sample retrieval and disposal were performed by scanning the bar codes for easy identification and location of samples within the laboratory. The exploration department at Chirano Gold Mines run its own Quality Assurance Quality Control (QAQC) checks through the Century Systems database for the results.

3.3 EVALUATION OF DATA AND PRESENTATION OF RESULTS

3.3.1 DESCRIPTIVE STATISTICS

Descriptive statistics such as arithmetic mean, median, standard deviation, minimum, maximum, kurtosis and skewness were determined for the data and presented in Appendix B. Frequency distribution diagrams such as histograms (fitted with the normal curve), scatter plots, probability plots and box plots were generated.

A histogram fitted with the normal distribution curve was generated for each of the geochemical elements tested for. The Normality Test in Minitab software was used to generate the histograms, which helped in visualizing the peakedness and skewedness and to test if the data is normally distributed.

The purpose of the scatter plot is to identify the type of relationship between two variables. The data was displayed as collection of points using Cartesian coordinates. The position of each point was determined by the value of one variable on the horizontal axis and the value of the other variable determined the position on the vertical axis. A line of best fit or trend line could be drawn to study the relationship between the variables. The data was plotted against a theoretical normal distribution in such a way that the points should form an approximate straight line. Departure from this straight line indicates departure from normality. Sample quantiles were plotted on the vertical axis whiles the theoretical quartiles were plotted on the horizontal axis.

The first step in constructing a box-and-whisker plot (Fig. 3.3) was to first find the median, the lower quartile and the upper quartile of the given set of data. The interquartile range (IQR) which is the difference between the upper quartile and the lower quartile was then calculated. In the next step, the values in the set were ordered or arranged in ascending order and the minimum, maximum, median, lower quartile and upper quartile were marked. The box goes from the lower quartile to the upper quartile and the whiskers are drawn to the endpoints.

3.3.2 RANKED VARIABLE MAPS

The samples were plotted according to their geographic locations and for each element at a time. Circular shaped symbols were used to represent each element at every sample location. The colour and size of the symbol depended on the ranked data values whereby ranges of values were represented by different sizes and colours in order to show trends and associations. IoGAS software was used to plot the Ranked Variable maps (or Bubble Plots).

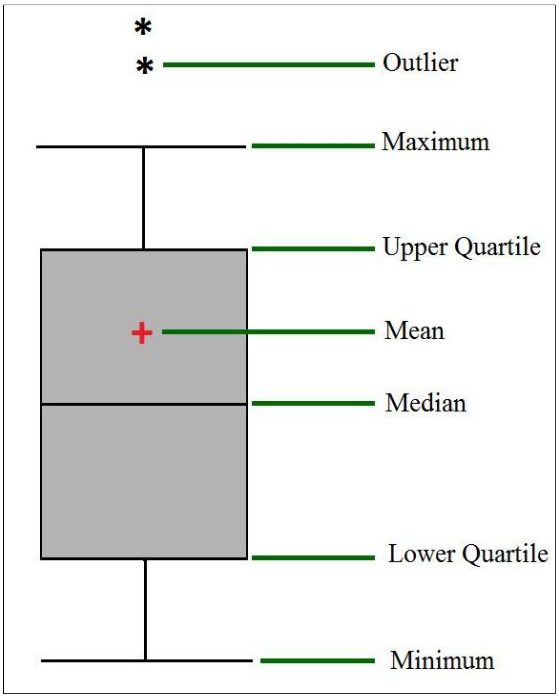

Fig. 3.3 Illustration of the various parts of a box plot (box and whisker)

3.3.3 Gridded maps

Gridded maps were generated using the ioGAS optimised interpolation algorithm. Gridded maps are interpolations of data points which are displayed as gridded raster images and used in identifying anomalous haloes and trends in data sets. The data was imported and the variables were selected and taken through pre-gridding operations in order to choose cell size, search radius, maximum smoothing radius and colouring (whether unequal bins e.g. 30/60/80/95/98/99/100 or equal bins (rank). The spectrum colour, shading direction, shading brightness and no data colour were then chosen. A choice between minimum curvature (contour or step) and kriging (ellipse or not ellipse) was made. Ordinary kriging with ellipse whose major search axis was 3000 and minor search axis was 2000 was chosen. The major axis was oriented at 360º using not more than 4 nearest neighbours in four sectors. The variogram was fitted at 335º to produce the desired visualization.

3.3.4 Principal Components and Factor Analysis

The data was normalized so that each variable has a mean of 0 and standard deviation of 1, because the raw data was found to be generally non-normally distributed. The Minitab 15 worksheet containing the data was opened and variables selected. The number of components, type of matrix (correlation, covariance), graphs to be plotted (score plot, scree plot, loadings plot) and storage tables for calculation results were selected and the program run. Varimax rotation was then applied to the loadings. Rotation serves to make the output more understandable by attaining a simple structure where items load most strongly on one factor and much more weakly on the other factors. Varimax rotation is an orthogonal rotation of the factor axes to maximize the variance of the squared loadings of a factor on all the variables. Each factor will tend to have either large or small loadings of any particular variable and make it as easy as possible to identify each variable with a single factor.

3.3.5 Cluster Analysis

Minitab 15 software was used to analyse the data for clusters. The data needed to be rescaled and normalized before the clustering process because some of the variables were measured in different scales such as parts per million (ppm), parts per billion (ppb) and per cent (pct.). The distributions in all the variables were generally non-normal when the histograms and probability plots were inspected. The data was prepared in Excel as a spreadsheet and imported into Minitab 15 and saved as a Minitab worksheet. Multivariate cluster analysis was then conducted on the 51 elements (variables) from 521 samples (observations) whose geographic locations were included in the data. At the beginning of the process, the appropriate variables were selected for clustering and the clustering procedure decided upon.

Hierarchical clustering of the variables using agglomerative method was conducted. In the first step, each variable started as a separate single member cluster. In the second step, two nearest members were joined according to the linkage method defined by Ward and Correlation as the distance measure (similarity/dissimilarity measure). The process involves the calculation of distances between initial clusters (individual variables), fusion of the two most similar clusters followed by recalculation of the distances until all variables eventually fall into one cluster. The inter-cluster linkage distance defined by Ward's method was based on the sum of squares between the clusters, summed over all variables and similar to Pythagoras theorem. Equation 3.1 shows how the Euclidean distance was calculated between objects p and q in a two dimensional Euclidean plane whereby $p = (p_1, p_2)$ and $q = (q_1, q_2)$.

$$d(p,q) = \sqrt{[(p_1 - q_1)^2 + (p_2 - q_2)^2]} \quad \text{..} \; 3.1$$

3.3.6 TARGET GENERATION

Lineaments and anomalous trends were marked on gridded maps for the various geochemical elements especially gold (Au), arsenic (As), barium (Ba), cesium (Cs) lanthanum (La), magnesium (Mg), molybdenum (Mo), antimony (Sb), thorium (Th), titanium (Ti), tungsten (W) and zircon (Zr).

The gridded map of each element was displayed in MapInfo and line segments digitized to represent identified anomalous trends, using different colours for different elements. The maps containing the line segments were then overlain and areas of intersection or high concentration were circled to form targets for further investigation. The lines were drawn at boundaries between highs and lows or where a high anomaly was truncated abruptly. Figure 3.4 shows how lineaments and anomalous trends were marked on the gridded map for magnesium (Mg).

In the absence of computers, the lines could be drawn on a transparent sheet laid on each map in turns whereby a different coloured pencil is employed for a different geochemical element.

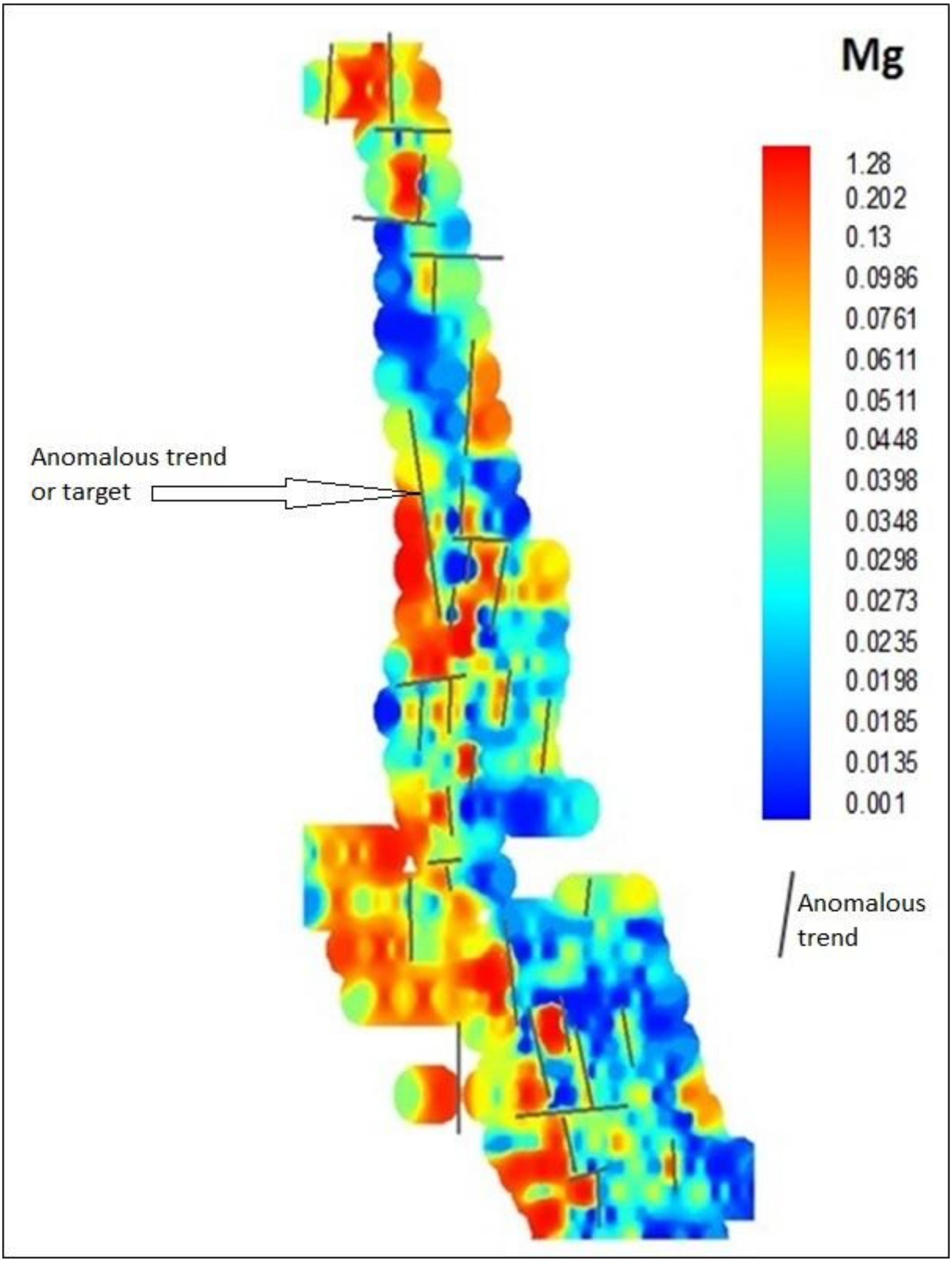

Fig. 3.4: Line segments drawn on the gridded map of Mg to mark anomalous trends

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 GENERATION OF DATA

The 521 soil samples were analysed for concentrations of 51 elements: (Au, As, Cu, Ni, Pb, Zn, Ag, Al, Ba, Co, Cr, Cs, Fe, K, La, Mg, Mn, Mo, Rb, S, Sb, Sc, Sr, Th, Ti, U, V, W, Zr, Ca, Na, Cd, In, Sn, Bi, Ce, Ga, Hf, Nb, P, Se, Te, Y, Be, Ge, Li, Re, Ta, Tl, Hg, B). The geochemical data generated could be found in Appendix - A whiles the Summary Statistics can also be found in Appendix - B. The data produced is in itself a great assert and could be evaluated in future using any method to identify pathfinders for gold and also to determine anomalous trends or to explore for other precious metals.

4.2 DESCRIPTIVE STATISTICS

Descriptive statistics of the analytical results of the 51 elements (Appendix B) showed that the data was generally non-normal. It was noted that high kurtosis and skewness values pointed to the fact that the raw data deviated far from a normal distribution. High kurtosis and high skewness values were due to outlier values. The data was therefore standardized in order to get a normal distribution and provide a data suitable for multivariate statistical analysis. In fact, no data set is exactly normally distributed, instead, it is only necessary for the data to be near normal (Shapiro, 1990).

4.2.1 Box Plots And Histograms

The box plots for the raw data are in Figures 4.1, 4.2 and 4.3. The median for the recorded concentrations of each element is indicated by a black horizontal centre line and the mean by a red cross. The lower and upper quartiles are marked by the bottom and the upper part of the inter-quartile range box respectively. The black vertical line below the box represents the first quartile while that above the box represents the fourth quartile. The extreme values or outliers are represented by circular symbols. Some elements were measured on different scales hence values of greater magnitude overshadowed those of small magnitude. The data needed to be standardized so that all the variables can be compared on the same scale.

Box plots for the standardized data (Figs. 4.4 and 4.5) where all elements have the mean of 0 and standard deviation of 1 showed how the minimum and maximum values for the various variables were evenly distributed around their means. All outliers (Figs. 4.4 and 4.5) are represented by black × symbols. The bottom half of each box showed the second quartile and upper part showed the third quartile.

Au, Cr and As (Figs. 4.4 and 4.5) have narrow inter-quartile range (IQR) boxes and are positively skewed which implies that a higher number of samples have similar concentrations. V, Mn, Co, Sc, Zr and Ga have wide IQR boxes and are positively skewed which implies that the variability in the concentrations found in the IQR is great. It was also noted that Cu, Ni, Zn and Ce have wide ranges and are normally or near – normally distributed. On the other hand, P and Ba have moderately narrow ranges and are normally distributed.

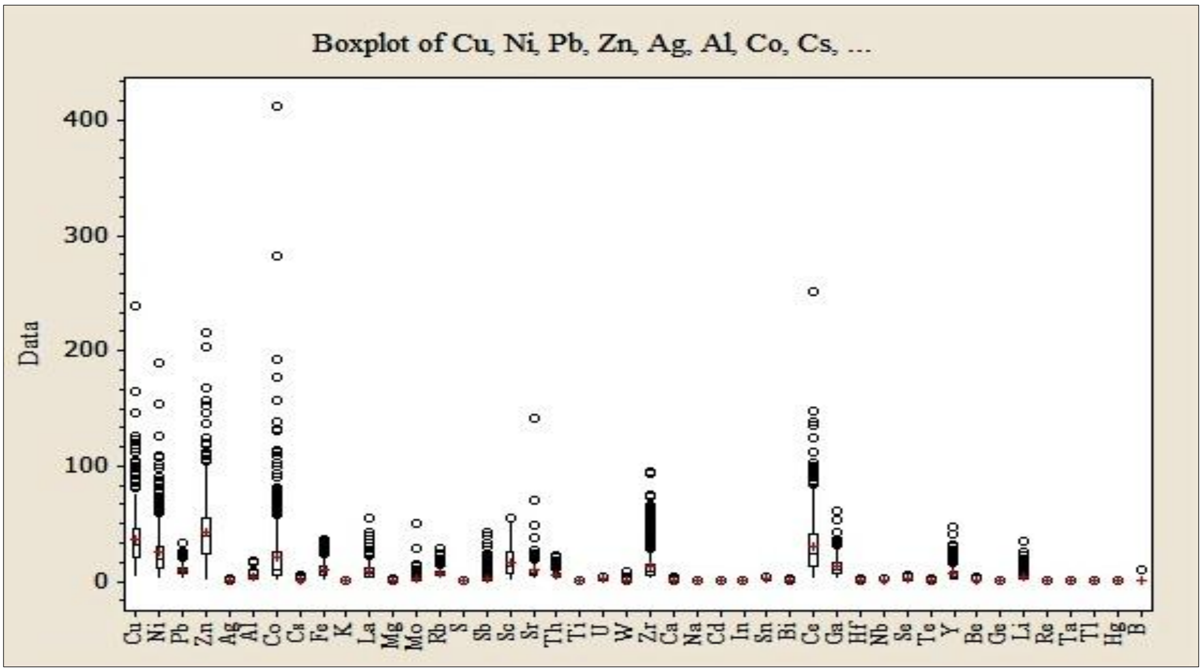

Fig. 4.1: Box plots of Cu, Ni, Zn, Ag, Al, Co, Cs, Fe, K, La, Mg, Mo, Rb, S, Sb, Sc, Sr, Th, Ti, U, W, Zr, Ca, Na, Cd, In, Sn, Bi, Ce, Ga, Hf, Nb, Se, Te, Y, Be, Ge, Li, Re, Ta, Tl, Hg and B. The raw data values, irrespective of their units of measure, fall within the range of 0 to 450.

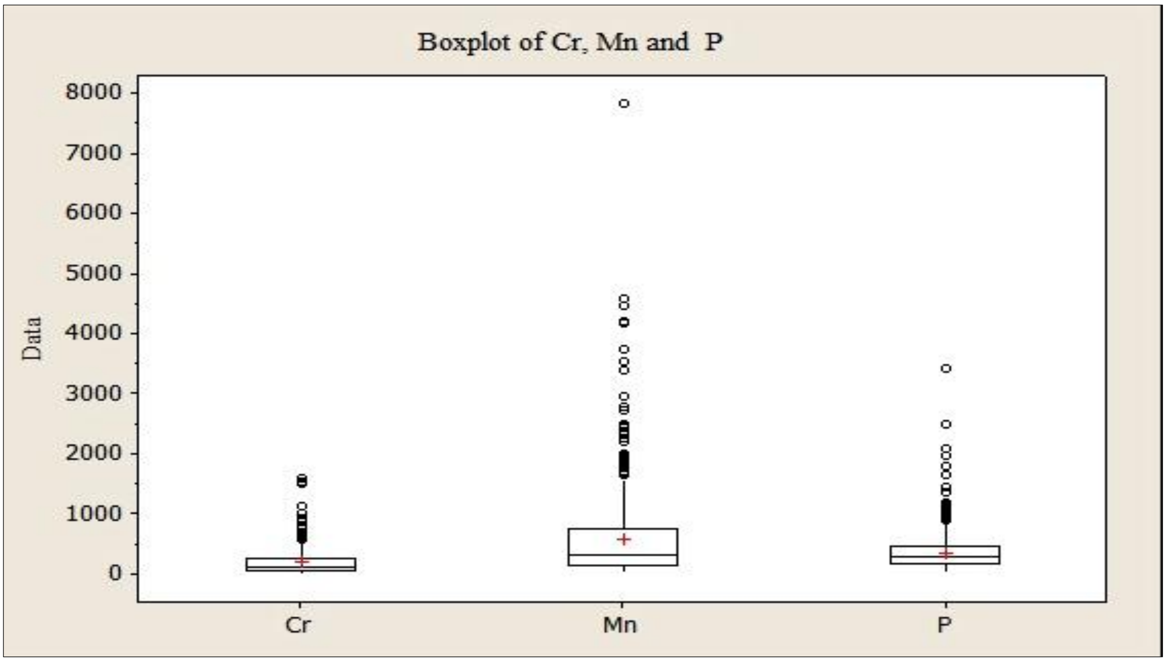

Fig. 4.2: Box plots of Cr, Mn and P. The raw data values, irrespective of their units of measure, fall within the range of 0 to 8000.

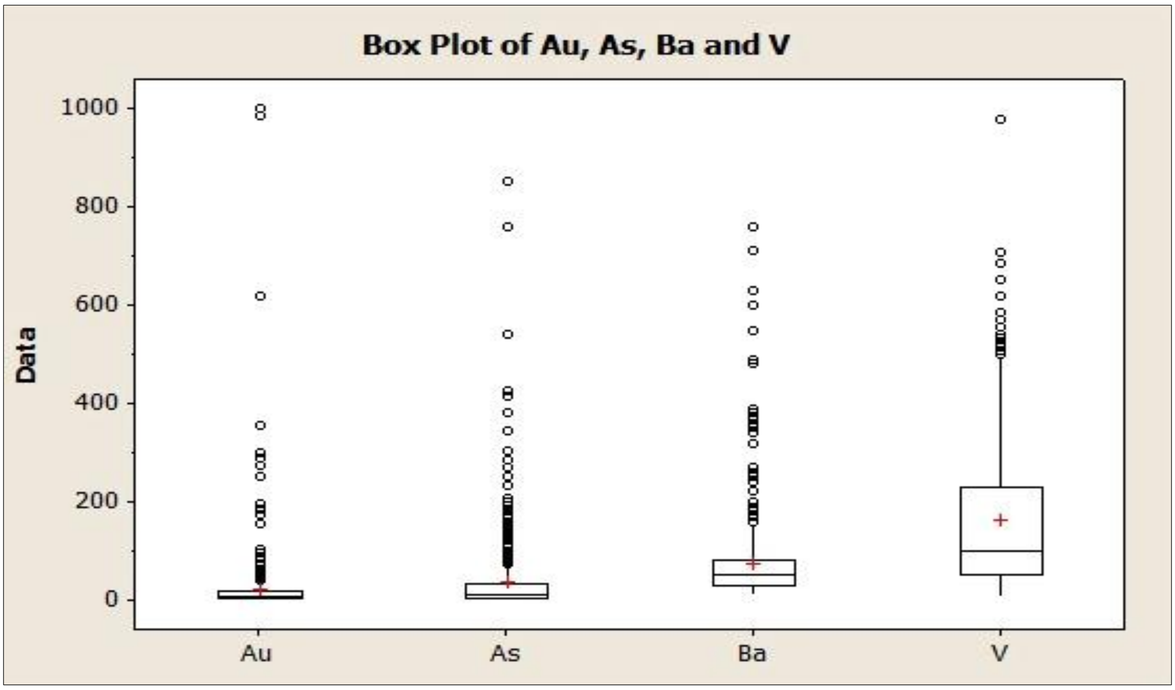

Fig. 4.3: Box plots of Au, As, Ba and V. The raw data values, irrespective of their units of measure, fall within the range of 0 to 1000.

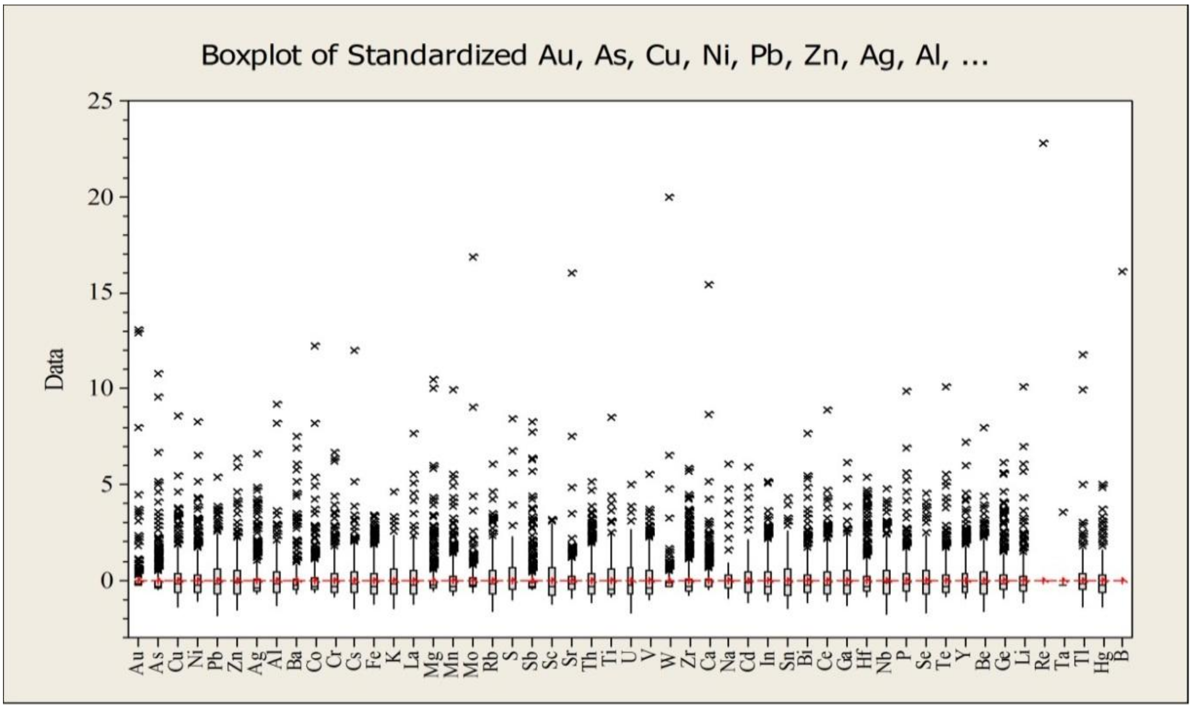

Fig. 4.4: Box plots of standardized values for Au, As, Cu, Ni, Pb, Zn, Ag, Al, Ba, Co, Cr, Cs, Fe, K, La, Mg, Mn, Mo, Rb, S, Sb, Sc, Sr, Th, Ti, U, V, W, Zr, Ca, Na, Cd, In, Sn, Bi, Ce, Ga, Hf, Nb, P, Se, Te, Y, Be, Ge, Li, Re, Ta, Tl, Hg, B.

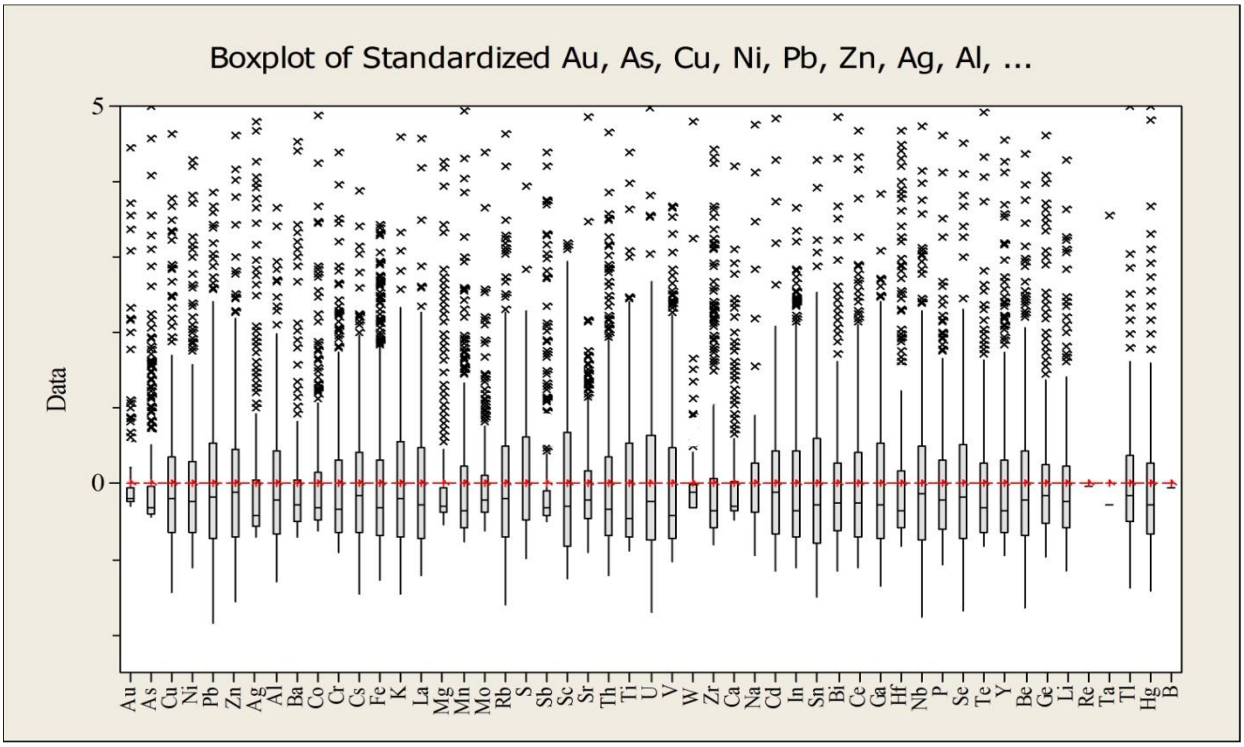

Fig. 4.5: Box plots of standardized values for the 51 elements with all outliers above 5 data units clipped.

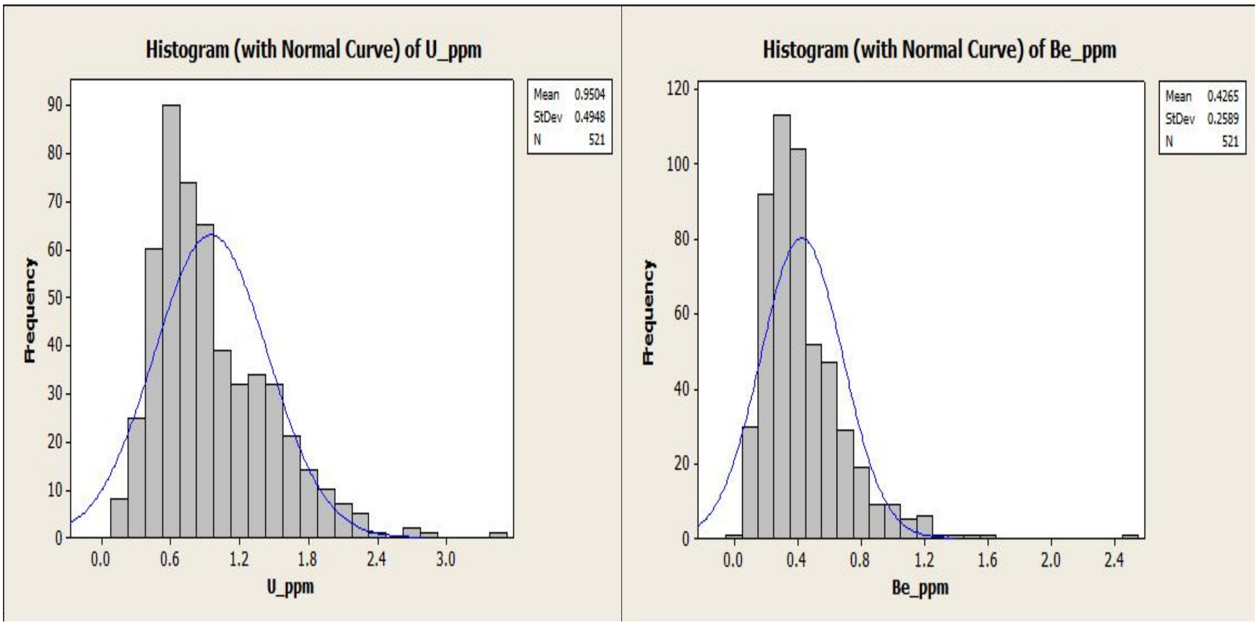

Fig. 4.6: Histogram of U and Be fitted with Normal Curve.

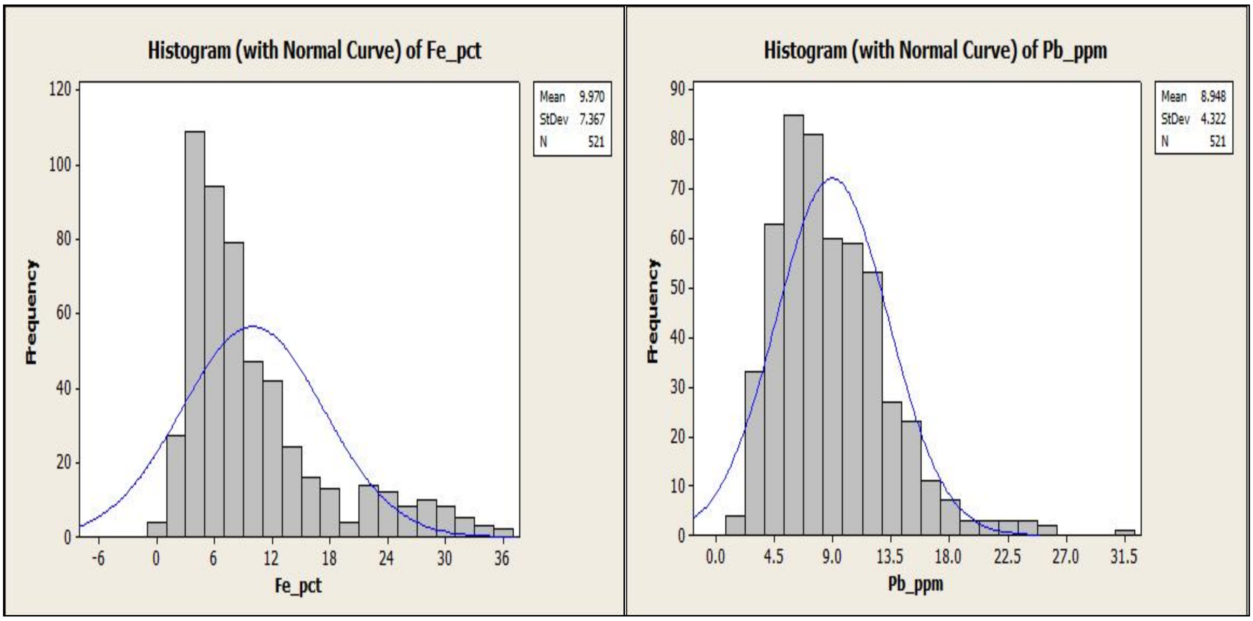

Fig. 4.7: Histogram of Fe and Pb fitted with Normal Curve.

4.2.2 SCATTER PLOTS

Results from the scatter plots of Au against all the measured elements showed that As, La, Sb, Mo, Ce, W, Tl, Y, Zn and Cu have slight, almost negligible linear correlations with Au. The correlation is almost negligible but slightly positive between Au and As, La, Sb and Ce (Figs. 4.8a and 4.8b). W and Mo also have negligible but slightly positive linear correlations with Au but most of the points clumped together near zero whereas the other points plotted far apart as outliers (Fig. 4.9a). However, B and Ta have no linear correlation with Au (Fig. 4.9b). The slight negative linear correlations recorded for B and Ta were due to the presence of a cluster of very remote outliers (Fig. 4.9b).

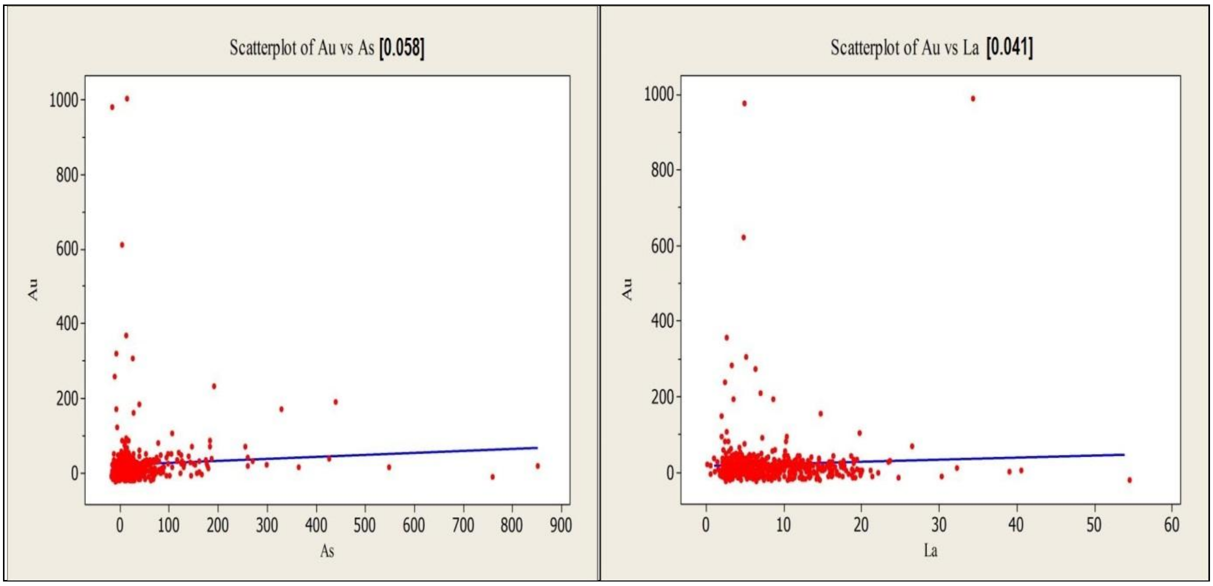

Fig. 4.8a: Scatter Plots for Au against As and La: Slight, almost negligible positive correlation

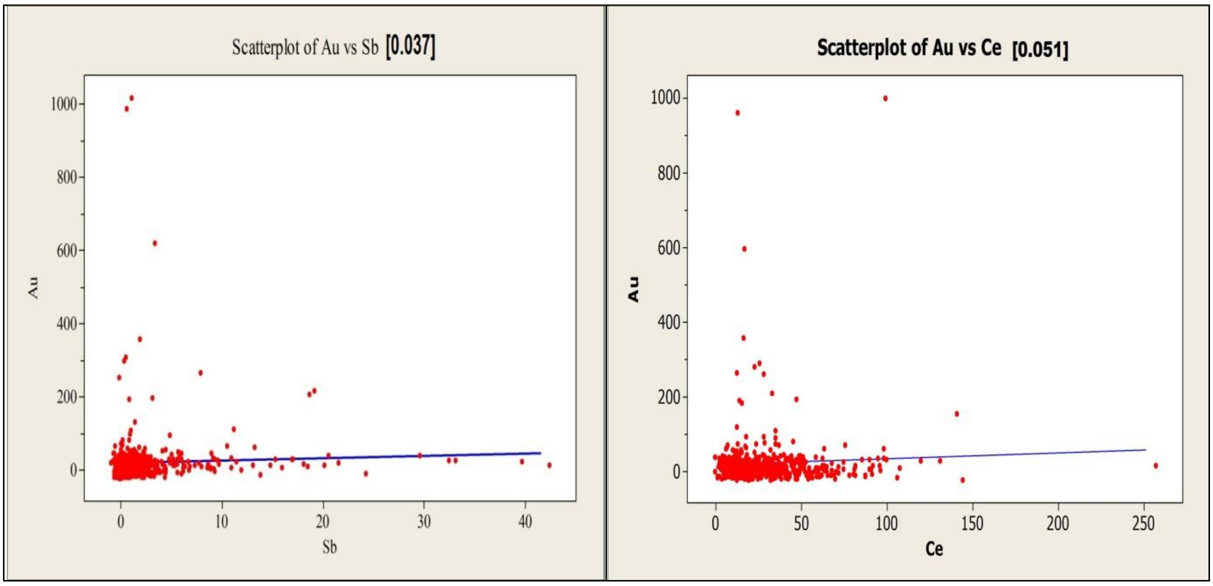

Fig. 4.8b: Scatter Plots for Au against Sb and Ce: Slight, almost negligible positive correlation

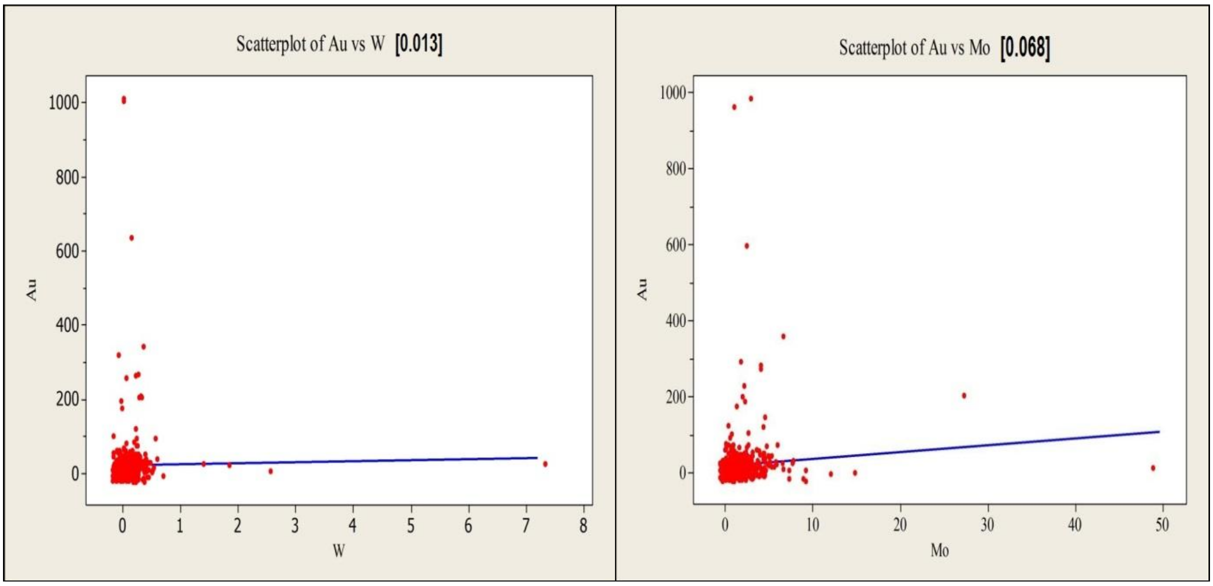

Fig. 4.9a: Scatter Plots for Au against W and Mo: Negligible but slightly positive linear correlations. Most of the points clumped together near zero

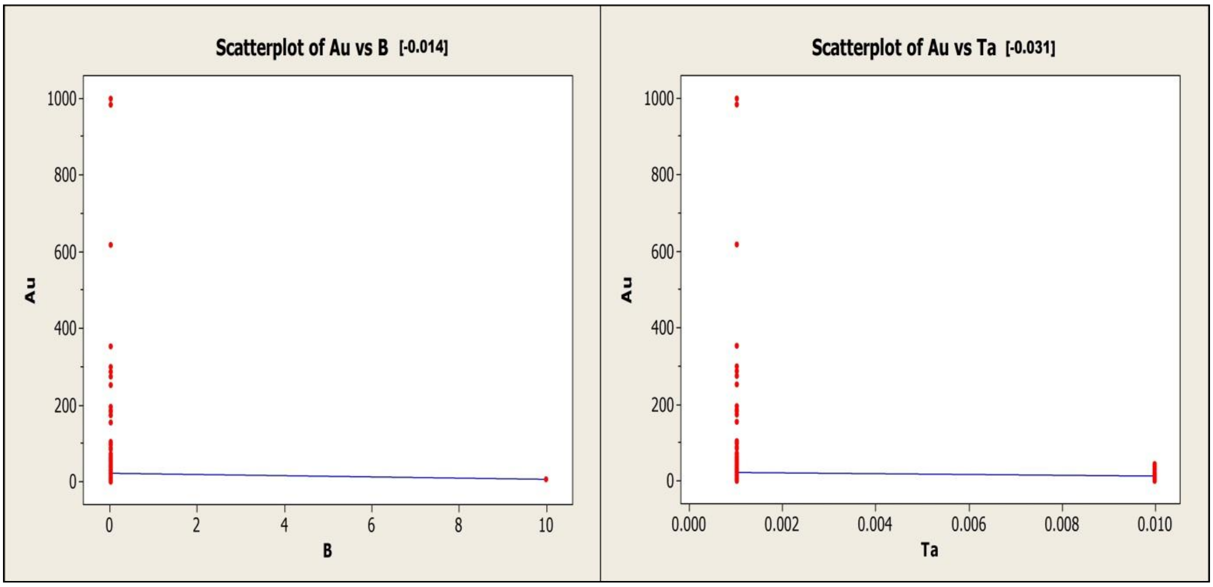

Fig. 4.9b: Scatter Plots for Au against B and Ta: No correlation

4.2.3 Probability Plots

Results from this research show that gold has a background of < 75 ppb and four breaks, which imply there are three populations: 75 – 110 ppb, 150 – 200 ppb and 250 – 300 ppb. There are a few outliers around 600 ppb and 1000 ppb (Fig. 4.10).

Arsenic has a background of < 25 ppm and three breaks which imply there are two populations: 25 – 200 ppm and 200 – 425 ppm. There are a few outliers around 550 ppm, 750 ppm and 850 ppm (Fig. 4.11). The contact between the background anomaly and lower population (25 – 200 ppm) maps the CSZ whiles that between the lower and higher populations (200 – 425 ppm) maps the BSZ.

Gold values in the range of 75 – 300 ppb forms a near normal distribution. The background and outlier values could be discarded and values between the first and fourth breaks considered being anomalous and their occurrence due to mineralization processes. Significant gold intercepts in the research area would have a cut-off grade of 75 ppb and values greater than 300 ppb would be attributed to nugget effect.

4.3 PRINCIPAL COMPONENTS AND FACTORS

Eigenvalues were generated for the 51geochemical elements to help in data reduction. The eigenvalues of the correlation matrix equals the variances extracted by the principal components. Results from the Principal Components Analysis (PCA) are shown in Table 4.1 where the variances of the new factors extracted and the proportions of the total variance extracted are listed. The principal components are linear combinations of the original variables that account for the variance in the data. The maximum number of components extracted always equals the number of variables. The eigenvectors, which comprised of coefficients corresponding to each variable, were used to calculate the principal scores and indicate the relative weight of each variable in the component.

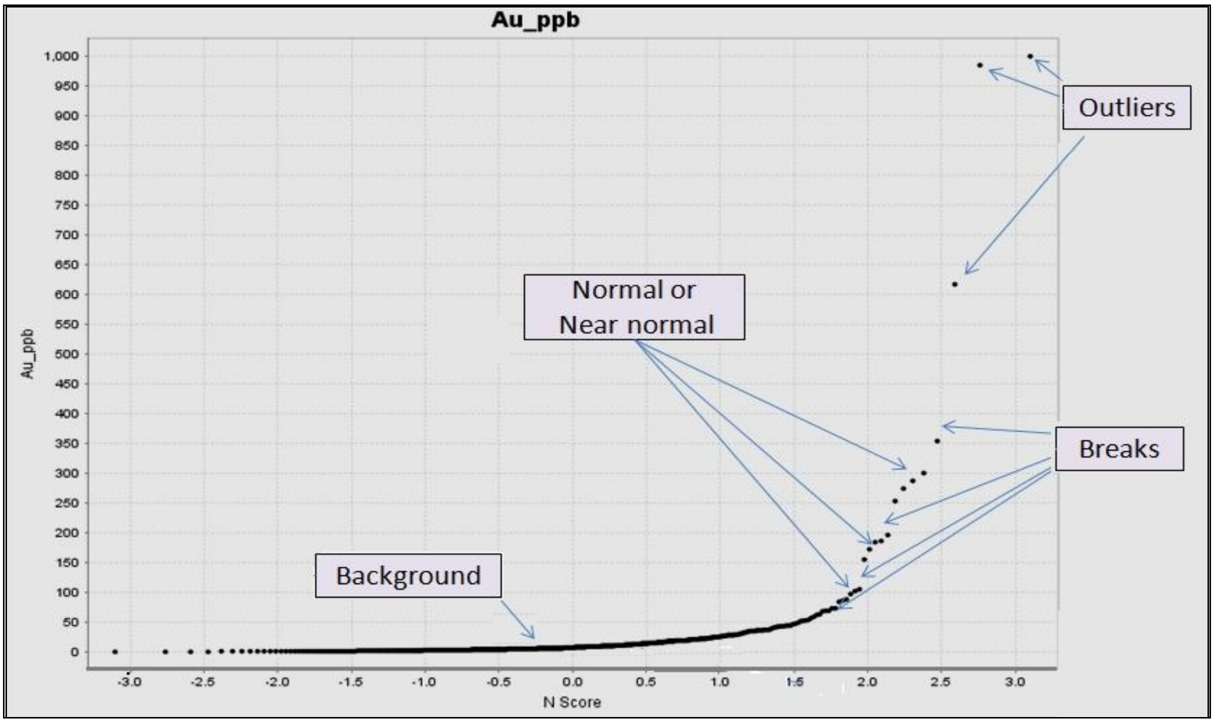

Fig. 4.10: Probability Plot for Au

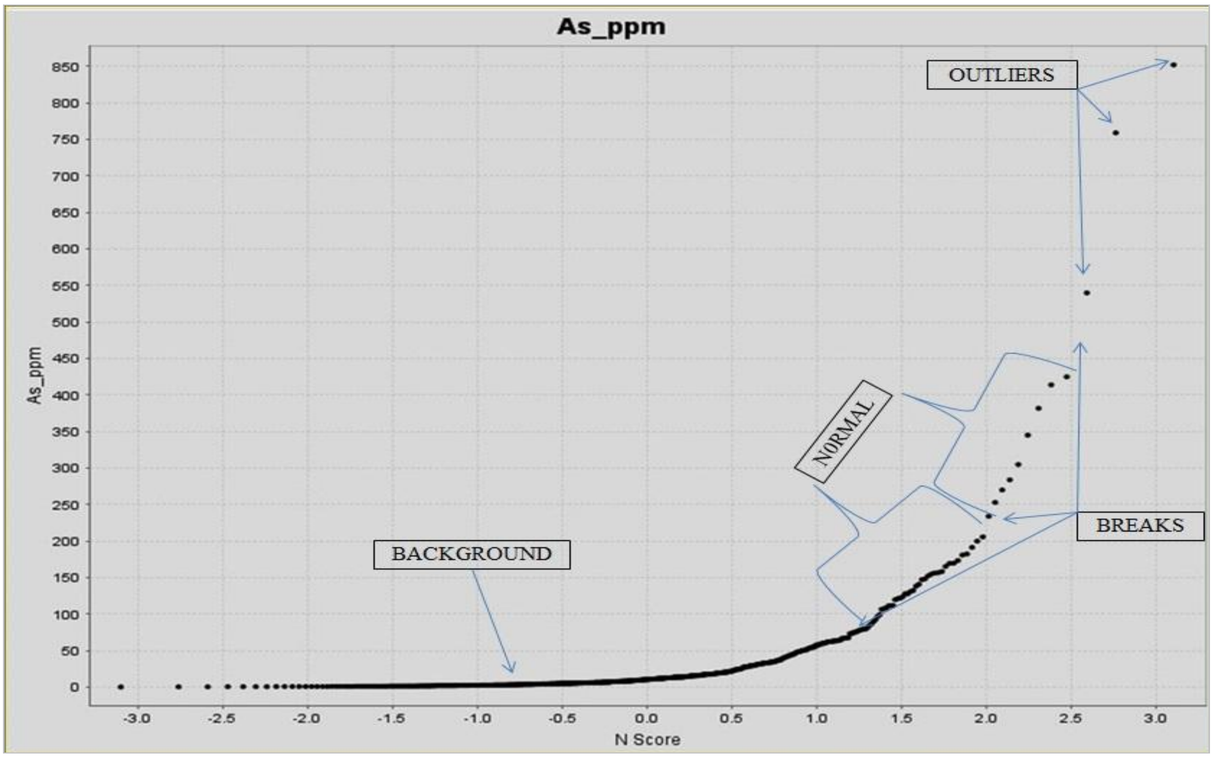

Fig. 4.11: Probability Plot for As

The bigger the absolute value of the coefficient, the more important the corresponding variables in constructing the component. The variables were standardized in order to obtain the correct component score. PCA of the measured elements revealed six main components (Table 4.1) which together extracted 55.8 % of the total variance. The six components extracted corresponds to all factors with eigenvalues greater than or equal to 2 (Table 4.1, Fig. 4.12).

Factor 1 (PC1) accounted for 21.3 % of the total variance with large positive loadings from Ag, Al, Fe, Sc, Th, U, V, Zr, In and Sn which are linked to the underlying felsic intrusive rocks such as tonalite, granodiorite and quartz-feldspar porphyry. Factor 2 (PC2) extracted 10.2% and had large negative loadings from Cu, Ni, Zn, Ba, Co, La, Mg, Mn, Sr, Ca and Cd which are linked to the underlying mafic rocks such as basalts, dolerites and diorites. PC3 (8.5%) with large negative loadings from Bi, Ga, Hf, Nb, P, Se, Te, Ge and Hg. PC4 (6.6%) with large negative loadings from As, Ni, K, Sb, Na and Cd but positive from Ti and Sn also have their sources from the Birimian metasediments such as phyllite, schist and greywacke. The score plot (Fig. 4.13) showed the first component plotted against the second component.

Usually, in extracting factors, several solutions are examined with more or fewer factors and one that makes the best sense is chosen. In this research, all factors extracting variances ≥ 2 were chosen and these conform to the outcome of the Scree Test (Fig. 4.12) which extracted six factors; PC1 to PC6. The Scree Test which is a graphical method proposed by Cattell (1966) suggests plotting Eigenvalues against principal components and to find the place where the smooth decrease of Eigenvalues appear to level off to the right of the plot. To the right of this point is factorial scree or debris. The Kaiser criterion (Table 4.1) extracted too many factors; PC1 to PC13. The Kaiser Criterion allows only factors with Eigenvalues greater than 1 to be retained (Kaiser, 1960).

The loadings (Fig. 4.14) of the first five principal components, PC1 to PC5 (Table 4.2) are correlation coefficients between the variables and factors that provide information about the loadings of the first two principal components.

The sorted Varimax rotated loadings for the first three factors (Table 4.3) showed that Ge, Ga, Hg, Te, Hf, Nb and Bi contributed mainly to Factor 1 with minor loadings from P and Se and also very minor loadings from Ta, As, Sb, Cr, W and Ag in the opposite direction. Factor 2 had major contributions from Ba, Mn, Co and Cd with minor loadings from Zn, Cu, Mg, Ni, Ca and La and minor loadings from Zr and Th in the opposite direction. Factor 3 had large negative loadings from Fe and In; with minor negative loadings from V, Zr and Th. Au and Mo are associated with both factors.

Table 4.1: Eigenvalues of the 51 elements

	Eigenvalues	Proportion	Percent (%)	Cumulative (%)
PC1	10.884	0.213	21.30	21.30
PC2	5.206	0.102	10.20	31.50
PC3	4.347	0.085	8.50	40.10
PC4	3.372	0.066	6.60	46.70
PC5	2.476	0.049	4.90	51.50
PC6	2.197	0.043	4.30	55.80
PC7	1.803	0.035	3.50	59.40
PC8	1.408	0.028	2.80	62.10
PC9	1.288	0.025	2.50	64.70
PC10	1.146	0.022	2.20	66.90
PC11	1.139	0.022	2.20	69.10
PC12	1.115	0.022	2.20	71.30

Table 4.1 (cont'd)

	Eigenvalues	Proportion	Percent (%)	Cumulative (%)
PC13	1.014	0.022	2.20	73.30
PC14	0.964	0.019	1.90	75.20
PC15	0.921	0.018	1.80	77.00
PC16	0.913	0.018	1.80	78.80
PC17	0.822	0.016	1.60	80.40
PC18	0.749	0.015	1.50	81.90
PC19	0.745	0.015	1.50	83.30
PC20	0.649	0.013	1.30	84.60
PC21	0.643	0.013	1.30	85.90
PC22	0.617	0.012	1.20	87.10
PC23	0.587	0.012	1.20	88.20
PC24	0.528	0.010	1.00	89.30
PC25	0.500	0.010	1.00	90.30
PC26	0.460	0.009	0.90	91.20
PC27	0.452	0.009	0.90	92.00
PC28	0.377	0.007	0.70	92.80
PC29	0.351	0.007	0.70	93.50
PC30	0.311	0.006	0.60	94.10
PC31	0.305	0.005	0.50	94.70
PC32	0.279	0.005	0.50	95.20
PC33	0.265	0.005	0.50	95.70
PC34	0.234	0.005	0.50	96.20
PC35	0.221	0.004	0.40	96.60
PC36	0.204	0.004	0.40	97.00
PC37	0.194	0.004	0.40	97.40
PC38	0.184	0.004	0.40	97.80
PC39	0.173	0.003	0.30	98.10
PC40	0.165	0.003	0.30	98.40
PC41	0.137	0.003	0.30	98.70
PC42	0.110	0.002	0.20	98.90
PC43	0.098	0.002	0.20	99.10
PC44	0.092	0.002	0.20	99.30
PC45	0.076	0.001	0.10	99.50
PC46	0.068	0.001	0.10	99.60
PC47	0.065	0.001	0.10	99.70

Table 4.1 (cont'd)

	Eigenvalues	Proportion	Percent (%)	Cumulative (%)
PC48	0.046	0.001	0.10	99.80
PC49	0.040	0.001	0.10	99.90
PC50	0.033	0.001	0.10	99.90
PC51	0.027	0.001	0.10	100.00

Table 4.2: Loadings for the first five Principal Components

Variable	PC1	PC2	PC3	PC4	PC5
Au	-0.005	0.024	-0.002	-0.015	-0.035
As	0.046	-0.015	0.136	-0.445	-0.067
Cu	0.116	-0.238	0.055	-0.148	-0.131
Ni	0.065	-0.236	0.093	-0.230	-0.203
Pb	0.195	0.023	0.089	-0.115	-0.004
Zn	0.141	-0.214	0.082	-0.179	-0.152
Ag	0.217	0.092	0.167	-0.076	-0.016
Al	0.224	-0.051	0.055	0.059	0.059
Ba	0.008	-0.342	-0.052	0.058	-0.094
Co	0.051	-0.303	-0.013	0.085	-0.121
Cr	0.192	0.040	0.166	-0.071	-0.071
Cs	-0.006	-0.053	-0.023	-0.171	0.190
Fe	0.268	0.053	0.142	-0.054	-0.053
K	-0.094	-0.093	-0.029	-0.243	0.171
La	-0.027	-0.219	-0.042	0.149	0.089
Mg	-0.007	-0.286	-0.015	0.083	-0.045
Mn	0.061	-0.313	-0.028	0.110	-0.095
Mo	0.116	0.062	0.057	-0.108	-0.015
Rb	-0.066	-0.111	-0.025	-0.109	0.262
S	0.148	0.011	0.085	0.032	0.110
Sb	0.067	0.025	0.145	-0.391	0.028
Sc	0.251	-0.084	0.038	0.080	-0.071
Sr	-0.042	-0.212	-0.059	-0.026	0.019
Th	0.252	0.124	0.082	0.113	0.078
Ti	0.178	-0.158	-0.004	0.250	-0.045
U	0.231	0.064	0.072	0.053	0.033
V	0.271	0.020	0.113	0.091	-0.031
W	0.014	0.014	0.055	-0.158	-0.039

Table 4.2 (cont'd)

Variable	PC1	PC2	PC3	PC4	PC5
Zr	0.244	0.133	0.108	0.044	0.066
Ca	-0.012	-0.230	-0.048	0.089	-0.021
Na	-0.052	-0.054	0.000	-0.293	0.106
Cd	0.077	-0.296	-0.020	-0.083	-0.190
In	0.280	0.045	0.111	0.047	0.032
Sn	0.224	-0.003	0.027	0.213	0.080
Bi	0.115	0.058	-0.287	-0.120	-0.097
Ce	0.030	-0.149	0.077	-0.038	0.400
Ga	0.168	-0.001	-0.310	-0.045	0.134
Hf	0.143	0.056	-0.325	-0.074	0.022
Nb	0.136	0.061	-0.277	-0.021	-0.031
P	0.104	-0.022	-0.209	-0.111	0.075
Se	0.114	0.003	-0.226	-0.134	0.015
Te	0.110	0.034	-0.338	-0.092	-0.124
Y	0.024	-0.135	0.057	0.019	0.394
Be	0.060	-0.129	-0.001	-0.014	0.409
Ge	0.132	-0.001	-0.280	0.024	0.051
Li	-0.011	-0.136	0.096	0.018	0.125
Re	-0.002	-0.014	-0.001	-0.054	-0.028
Ta	0.073	-0.038	-0.121	0.055	0.089
Tl	0.089	-0.103	0.007	-0.045	0.272
Hg	0.143	0.028	-0.308	-0.073	0.011
B	0.001	0.022	-0.046	-0.039	0.039

Table 4.3: Sorted Varimax Rotated Loadings for the first 3 factor

Variable	Factor1	Factor2	Factor3	Communality
Hf	**0.357**	-0.034	-0.016	0.129
Te	**0.356**	-0.019	0.022	0.128
Ga	**0.350**	0.027	-0.034	0.124
Hg	**0.340**	-0.006	-0.018	0.116
Bi	**0.312**	-0.040	-0.006	0.099
Nb	**0.310**	-0.038	-0.030	0.099
Ge	**0.309**	0.021	-0.013	0.096
Se	**0.252**	0.015	-0.018	0.064
P	**0.231**	0.038	-0.011	0.055
Ta	0.137	0.049	-0.013	0.021
As	-0.109	0.026	-0.090	0.021

Table 4.3 (cont'd)

Variable	Factor1	Factor2	Factor3	Communality
W	-0.044	-0.010	-0.036	0.003
B	0.044	-0.022	0.012	0.003
Ba	0.032	**0.335**	0.077	0.119
Mn	0.031	**0.318**	0.014	0.103
Co	0.015	**0.307**	0.015	0.095
Cd	0.031	**0.305**	-0.007	0.094
Mg	-0.005	**0.278**	0.066	0.082
Cu	-0.021	**0.257**	-0.081	0.073
Ni	-0.075	**0.246**	-0.050	0.068
Zn	-0.035	**0.239**	-0.118	0.073
Ca	0.027	**0.222**	0.072	0.055
La	0.017	**0.208**	0.082	0.050
Sr	0.027	0.199	0.101	0.050
Ti	0.062	0.189	-0.130	0.057
Ce	-0.068	0.153	-0.029	0.029
Y	-0.051	0.138	-0.018	0.022
Be	0.016	0.138	-0.029	0.020
Li	-0.101	0.133	-0.001	0.028
Tl	0.021	0.119	-0.064	0.019
Rb	-0.008	0.095	0.090	0.017
Cs	0.016	0.050	0.024	0.003
Au	0.001	-0.025	0.001	0.001
Fe	-0.027	0.004	**-0.307**	0.095
In	0.005	0.012	**-0.304**	0.093
V	-0.002	0.036	**-0.292**	0.086
Zr	-0.001	-0.081	**-0.287**	0.089
Th	0.026	-0.070	**-0.283**	0.085
Ag	-0.068	-0.045	-0.277	0.084
U	0.024	-0.016	-0.249	0.063
Cr	-0.079	0.001	-0.245	0.066
Sc	0.054	0.132	-0.226	0.071
Pb	-0.007	0.017	-0.215	0.046
Al	0.031	0.094	-0.214	0.056
Sn	0.059	0.047	-0.213	0.051
S	-0.022	0.02	-0.169	0.029
Mo	-0.006	-0.037	-0.138	0.021
Sb	-0.108	-0.008	-0.120	0.026
K	-0.014	0.072	0.113	0.018
Na	-0.023	0.043	0.057	0.006
Re	0	0.013	0.005	0

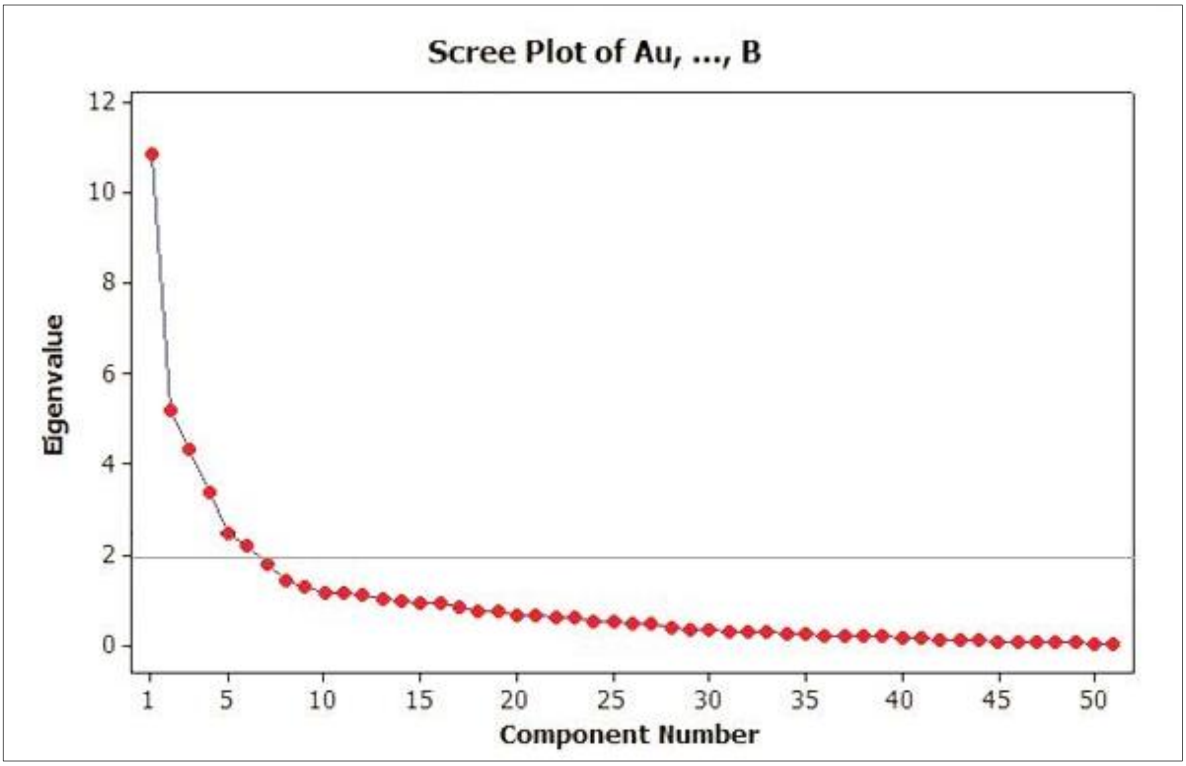

Fig. 4.12: Scree Plot of the measured 51 elements. Eigenvalues plotted against Components.

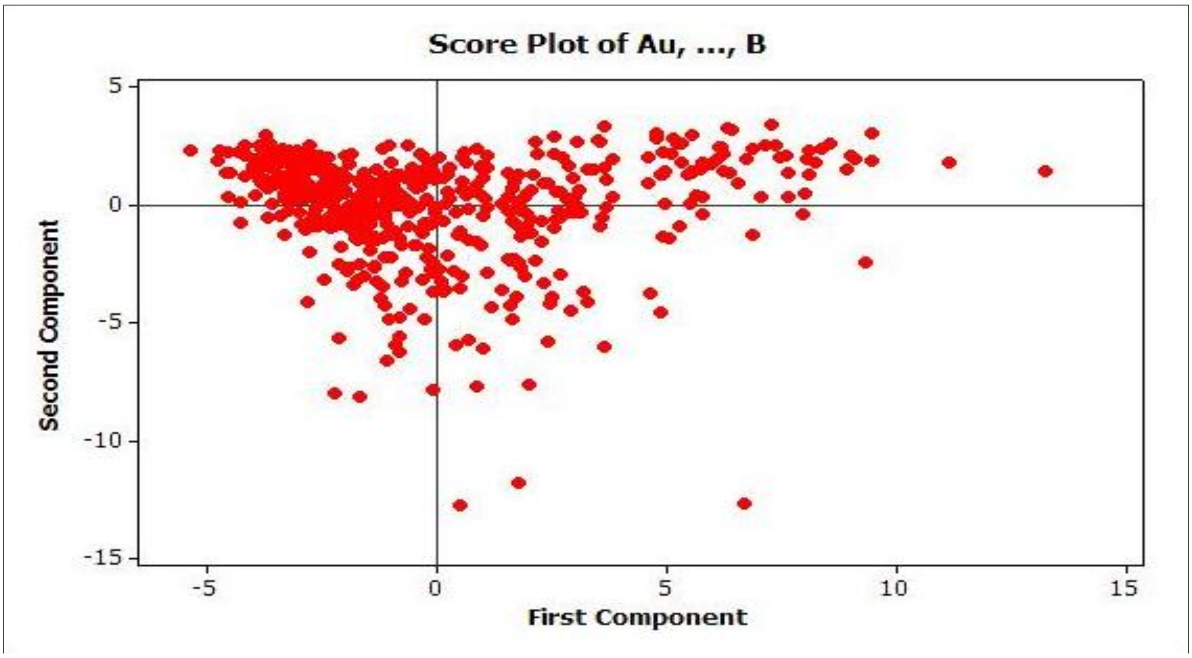

Fig. 4.13: Score Plot for the first and second components (PC1 against PC2)

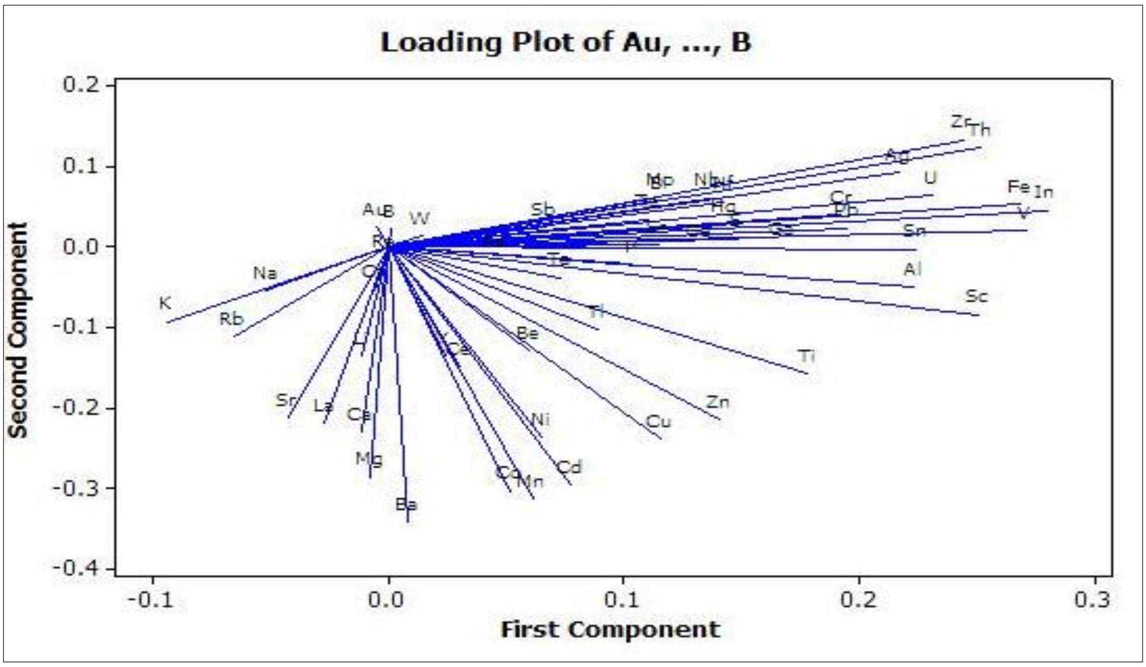

Fig. 4.14: Loadings Plot for the first and second components (PC1 against PC2); Unrotated

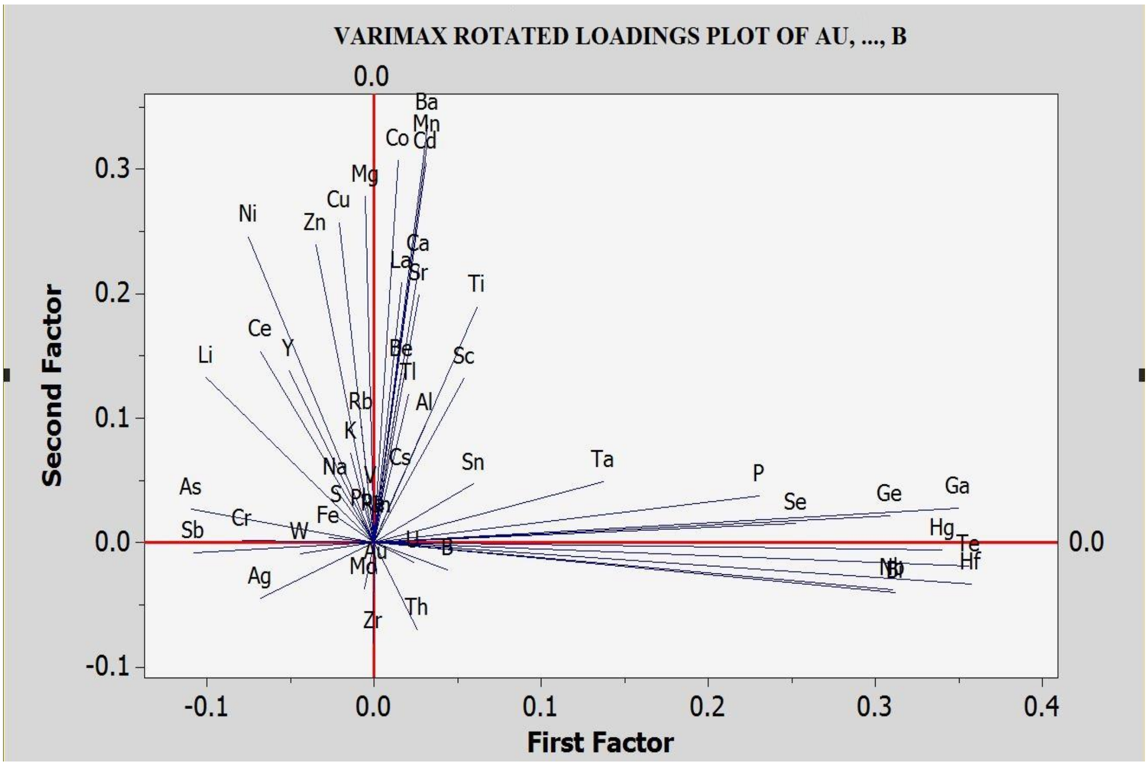

Fig 4.15: Loadings Plot for the first and second components (PC1 against PC2); Varimax rotated. The red lines represent the vertical and horizontal axes.

4.4 CLUSTERS OF ELEMENTS

The resultant dendrogram or tree (Fig. 4.16) from the hierarchical cluster analysis of the 51 geochemical elements was examined at a cut-off point of 2.0 linkage distance to produce six clusters. Cluster 1 or the gold group was made up of Au, Mo, W, Re, B, Ta, Ce, Y, Be and Tl. The pathfinders for gold in the research area are therefore Mo, W, Re, B, Ta, Ce, Y, Be and Tl. The most suitable pathfinders for gold in the study area are Mo and W because from the dendrogram (Fig. 4.16) it was noted that the gold cluster consisted of three sub-clusters which joined at a distance of 1.7 and similarity of 15.03. Mo and W joined at a linkage distance of 0.93 with a similarity measure of 53.71 before joining to Au at a distance of 0.97 with a similarity measure of 51.71 to form the first sub-cluster. The first sub-cluster (Au, Mo, W) joined to the second sub-cluster of Re, B and Ta at a distance of 1.06 with a similarity measure of 47.00. The third sub-cluster of Ce, Y, Be and Tl formed at a linkage distance of 0.83 and similarity measure of 58.52.

Cluster 2 or the arsenic group (As, Cu, Ni, Zn, Sb and Cd) formed at a linkage distance of 0.5 and similarity measure of 34.05. The other clusters include Cluster 3 (Pb, Ag, Al, Cr, Fe, S, Sc, Th, Ti, U, V, Zr, In, Sn); Cluster 4 (Ba, Co, La, Mg, Mn, Sr, Ca, Li); Cluster 5 (Cs, K, Rb, Na); Cluster 6 (Bi, Ca, Hf, Nb, P, Se, Te, Ga, Hg).

4.5 ANOMALOUS HALOES AND TRENDS

Trends and patterns which were inherent in the data were successfully visualized when Ranked Variable or Bubble Plot maps and Gridded maps were produced for all the geochemical elements tested for.

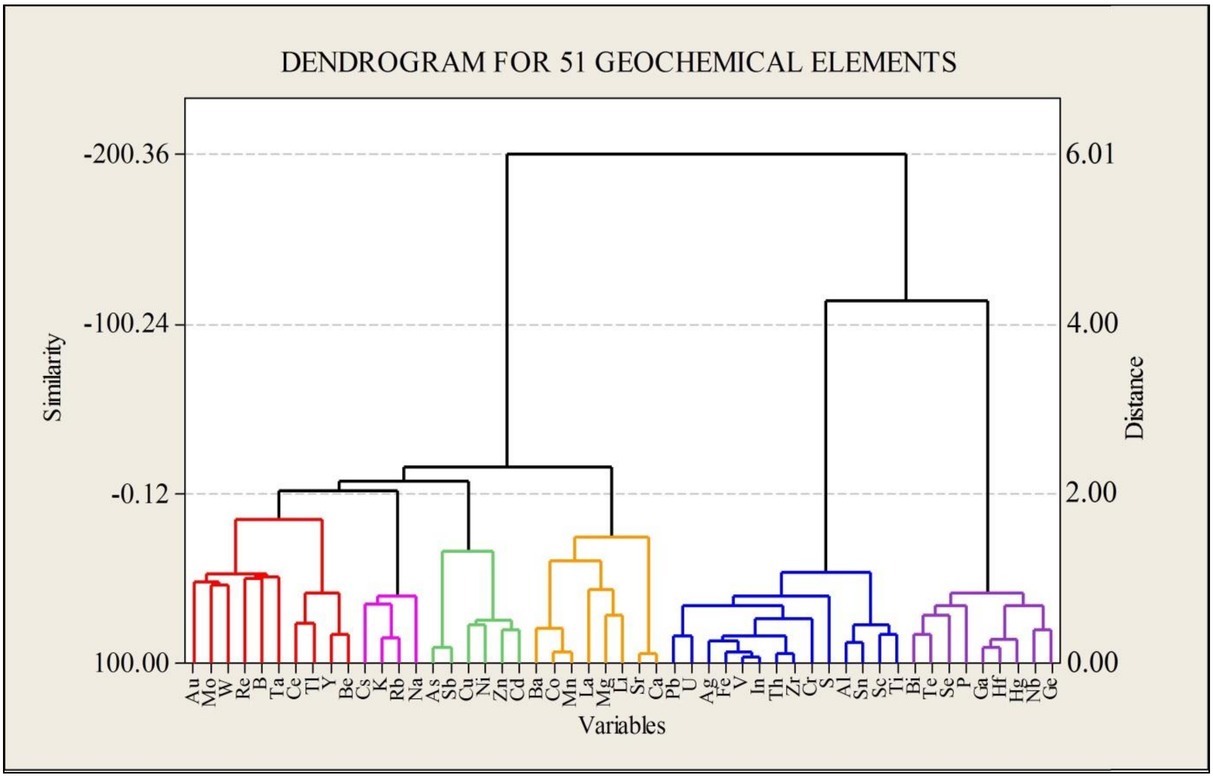

Fig. 4.16: Dendrogram of 51 geochemical elements showing 6 clusters

4.5.1 Ranked Variable Maps

Ranked variable maps for As, Sb, Cs, W and Zr have higher concentrations at the eastern part of the map and lower concentrations at the western part and the boundary between them coincides with the BSZ. Ranked variables maps for As and Sb are shown in Figure 4.17. Small circular symbols represent low values and bigger symbols represent higher values. Individual samples, which have significantly high concentrations in any element, could be seen easily and followed up. Maps for Mg, Ba, La, Ti, Th and Mo (Fig. 4.18) also marked CSZ.

4.5.2 Gridded Maps

Gridded maps helped in identifying anomalous haloes and trends. After inspection, anomalies and trends were identified in some of the elements. Ba, La, Mg, Ti, Th and Mo have strong anomalies that are associated with gold mineralization along the Chirano Shear Zone (CSZ). The map of Ba, Th, Mo and Ti are shown in Figure 4.19. The boundary between the highs (Red and Yellow) at the western part of the map and the low (Green and Blue) in the eastern part approximately marks the CSZ along which known deposits at Chirano are located.

On the other hand, As, Cs, Sb, W and Zr have strong anomalies that are associated with gold mineralization along the Bibiani Shear Zone (BSZ). The maps of As, Sb, Cs and W are shown in Figure 4.20. The boundary between the highs (Red and Yellow) now at the eastern part of the map and the lows (Green and Blue) at the western part approximately marks the BSZ along which a few good drill hole intersections were made towards the south. Ta, Y, Ce and B have localized anomalies.

Though localized, the anomalies in Ta and Y (Fig. 4.21) are big and long enough, approximately 1000 m to 5000 m, to be considered for drill targeting. Both Ta and Y are pathfinders for gold in the area therefore should be treated seriously.

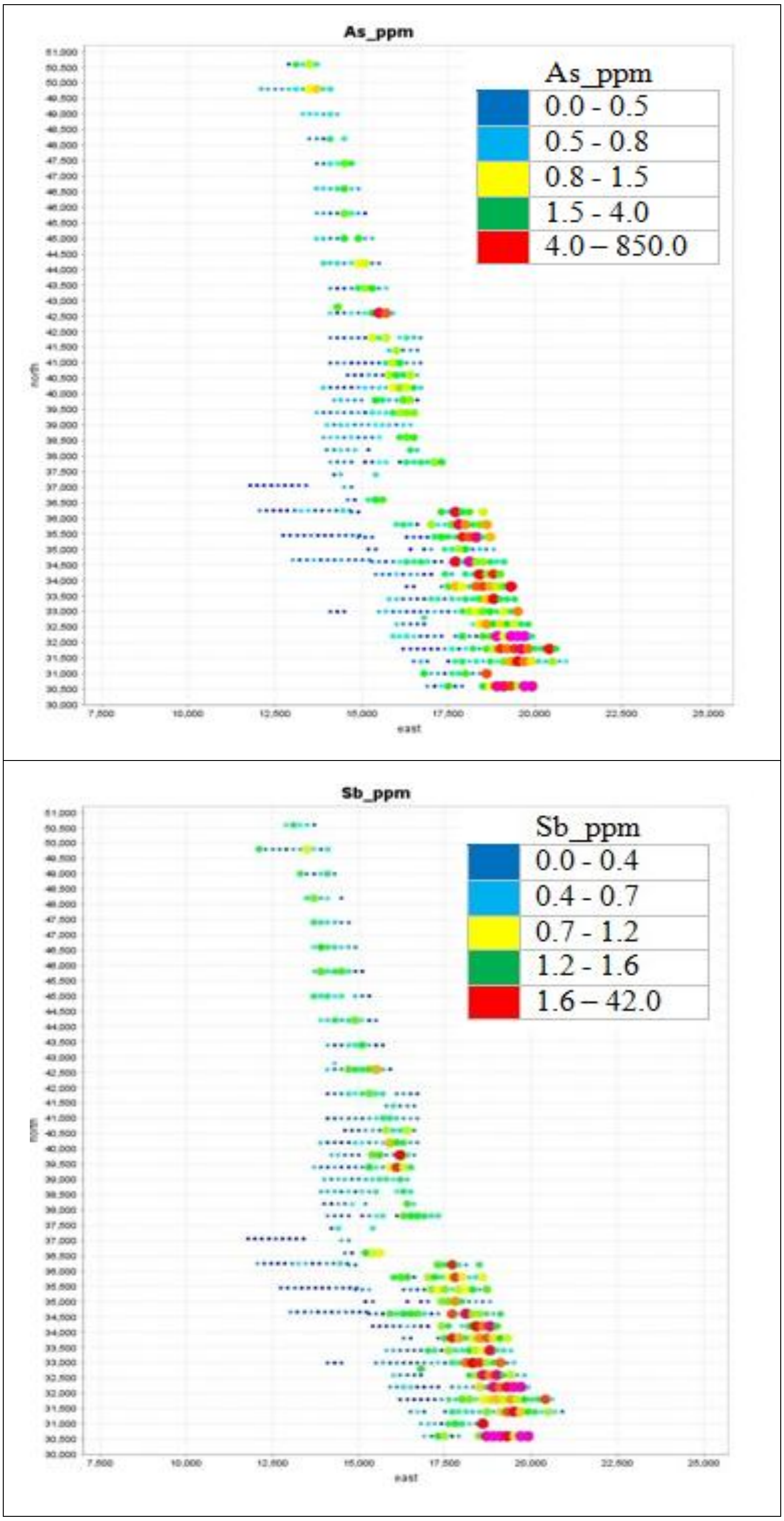

Fig. 4.17: Ranked Variable Map of As and Sb: The boundary between lows at the western part and the highs at the eastern part marks the BSZ.

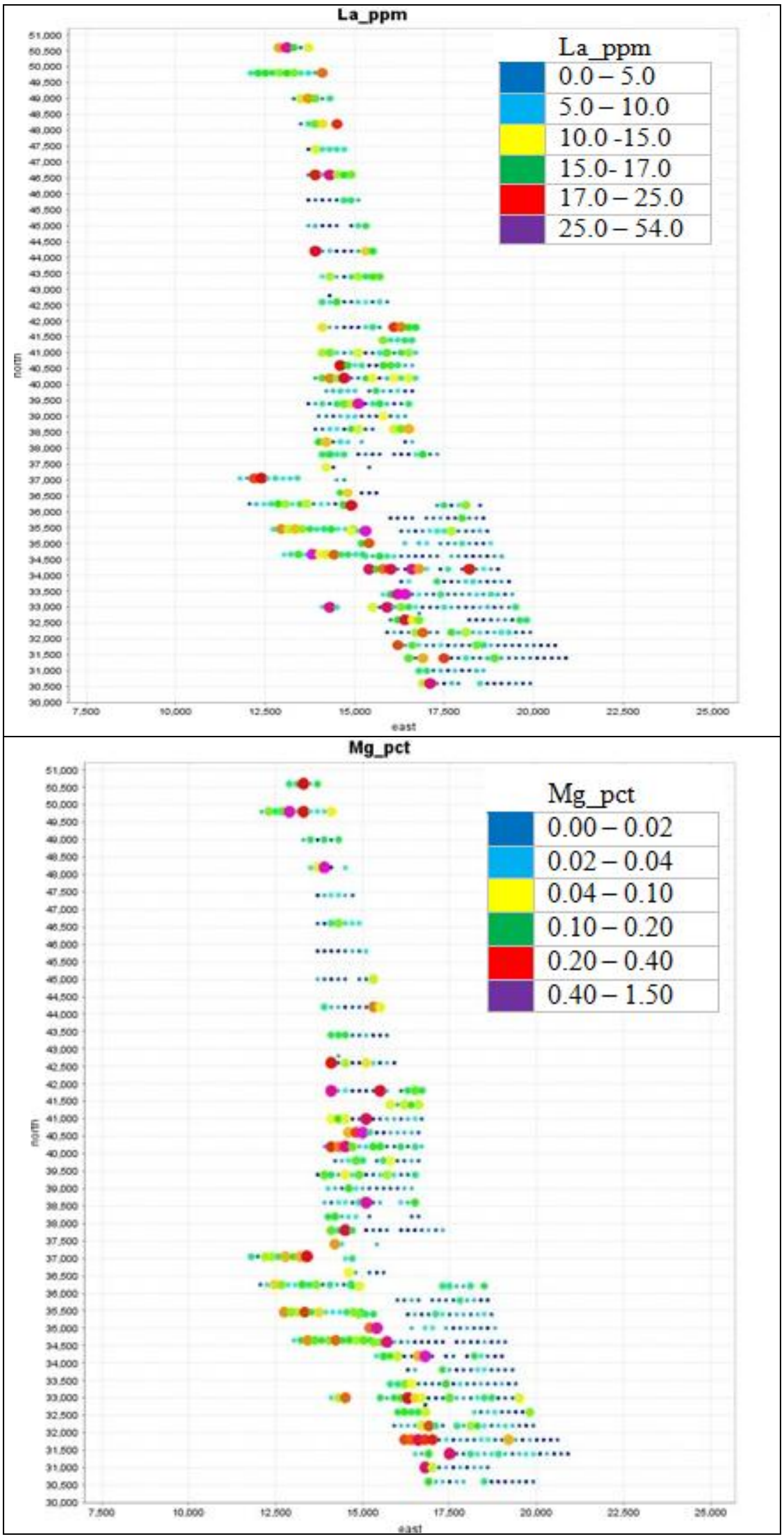

Fig. 4.18: Ranked Variable Maps of La and Mg: The boundary between lows at the eastern part and the highs at the western part marks the CSZ.

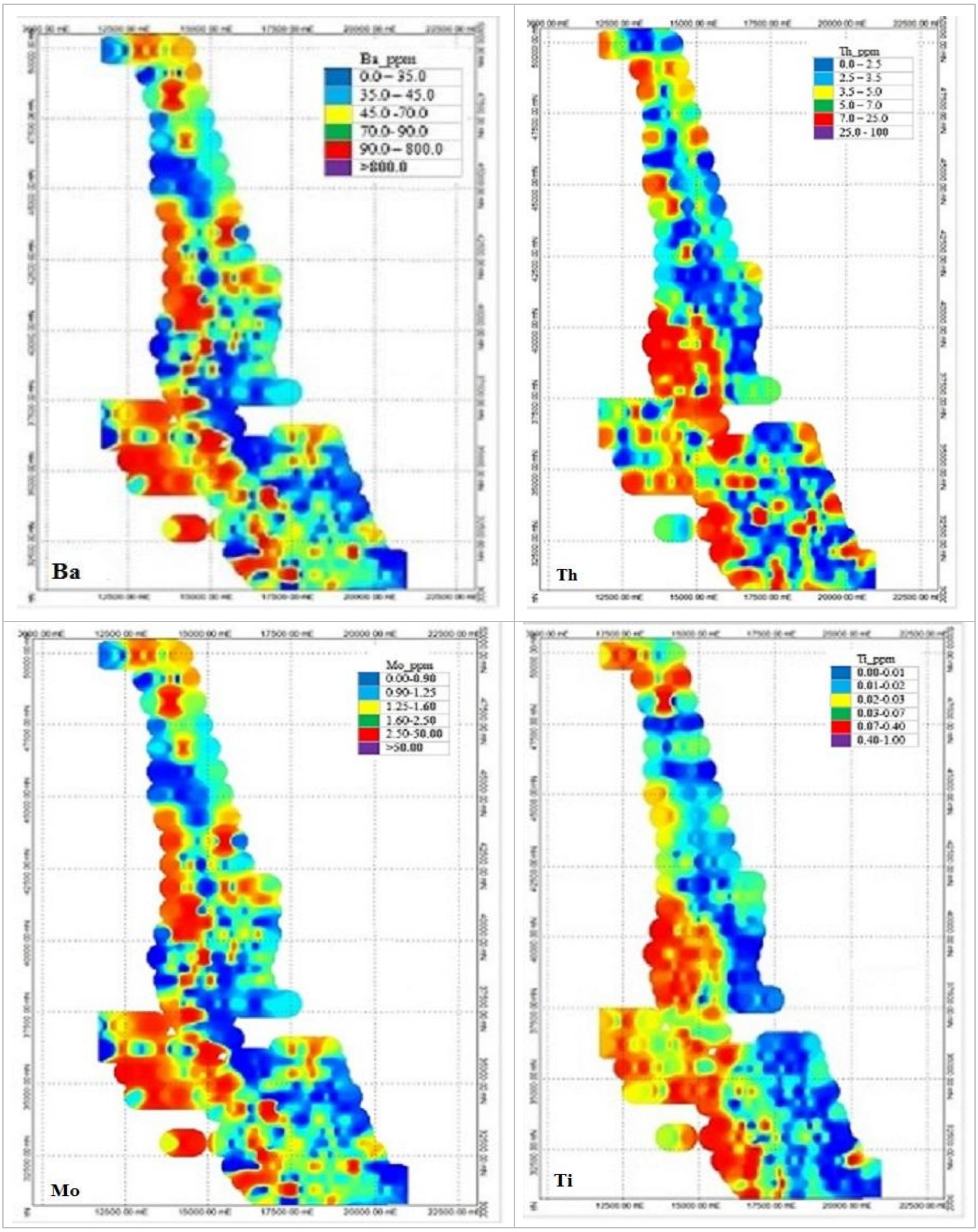

Fig. 4.19: Gridded maps of Ba, Th, Mo and Ti: The boundary between the highs (red and yellow) and lows (green and blue) clearly marks gold mineralization along the CSZ.

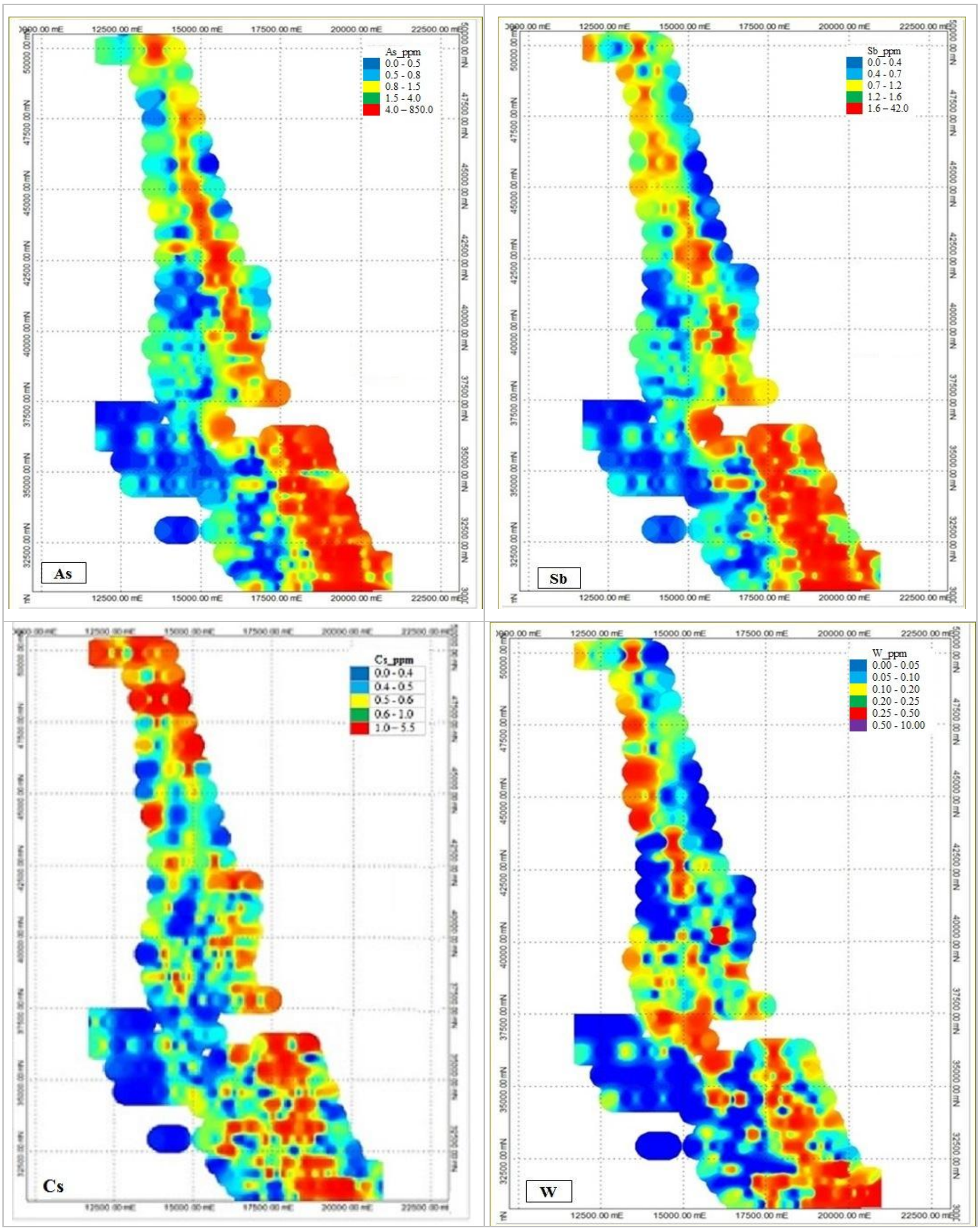

Fig. 4.20: Gridded maps of As, Sb, Cs and W: The boundary between the highs (red and yellow) and lows (green and blue) clearly marks gold mineralization along the along BSZ

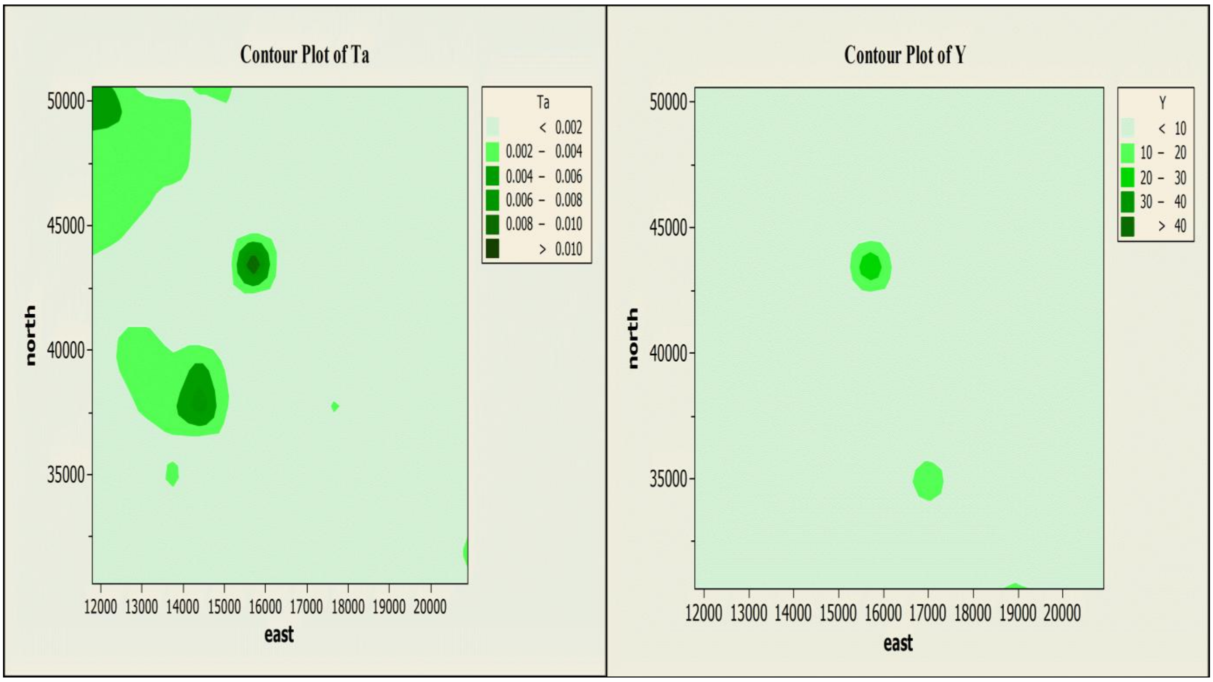

Fig. 4.21: Gridded maps of Ta and Y, which have localized anomalies

4.6 TARGETS GENERATED

A total of 20 targets (Figs. 4.22, 4.23) were identified and these include 13 from Chirano North PL and 8 from the main Chirano ML. Line segments were drawn on the map to represent anomalous trends usually at the boundary between highs and lows and each element was represented by a different colour (Fig. 4.22).

Known deposits at Chirano occurred where most trend lines converged or intersected, so, similar intersections were selected by circling them (Figs. 4.22 and 4.23). Some targets selected fall along the Chirano Shear Zone (passing North - South, approximately through the centre of the area) and the Birimian Shear Zone (which passed Southeast - Northwest) at the eastern part of the area). A third group of selected targets occurred far west of CSZ (Fig. 4.19).

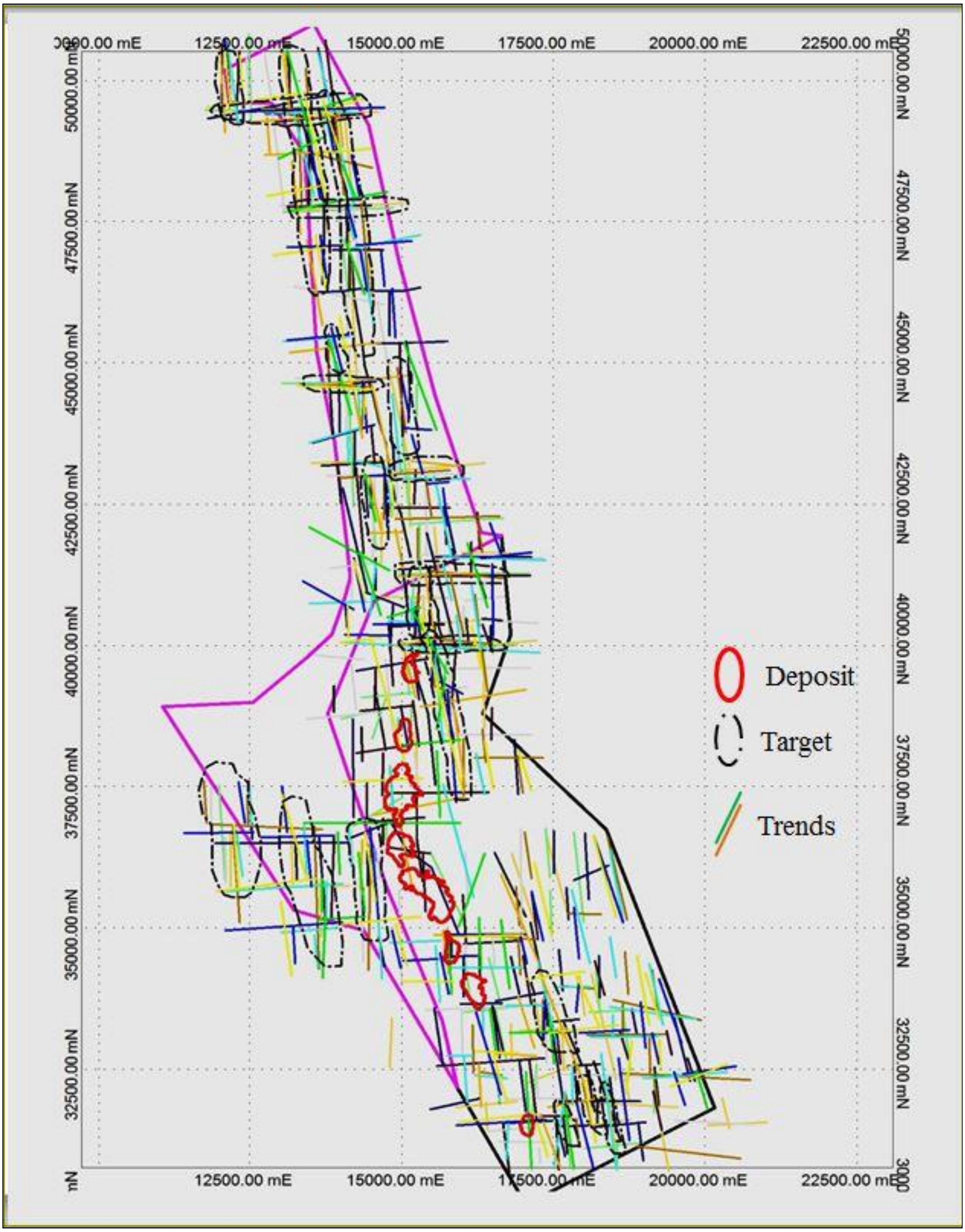

Fig. 4.22: Overlay of line segments representing anomalous trends from various elements and black irregular shapes marking selected targets. Known ore deposits are shown by red irregular shapes.

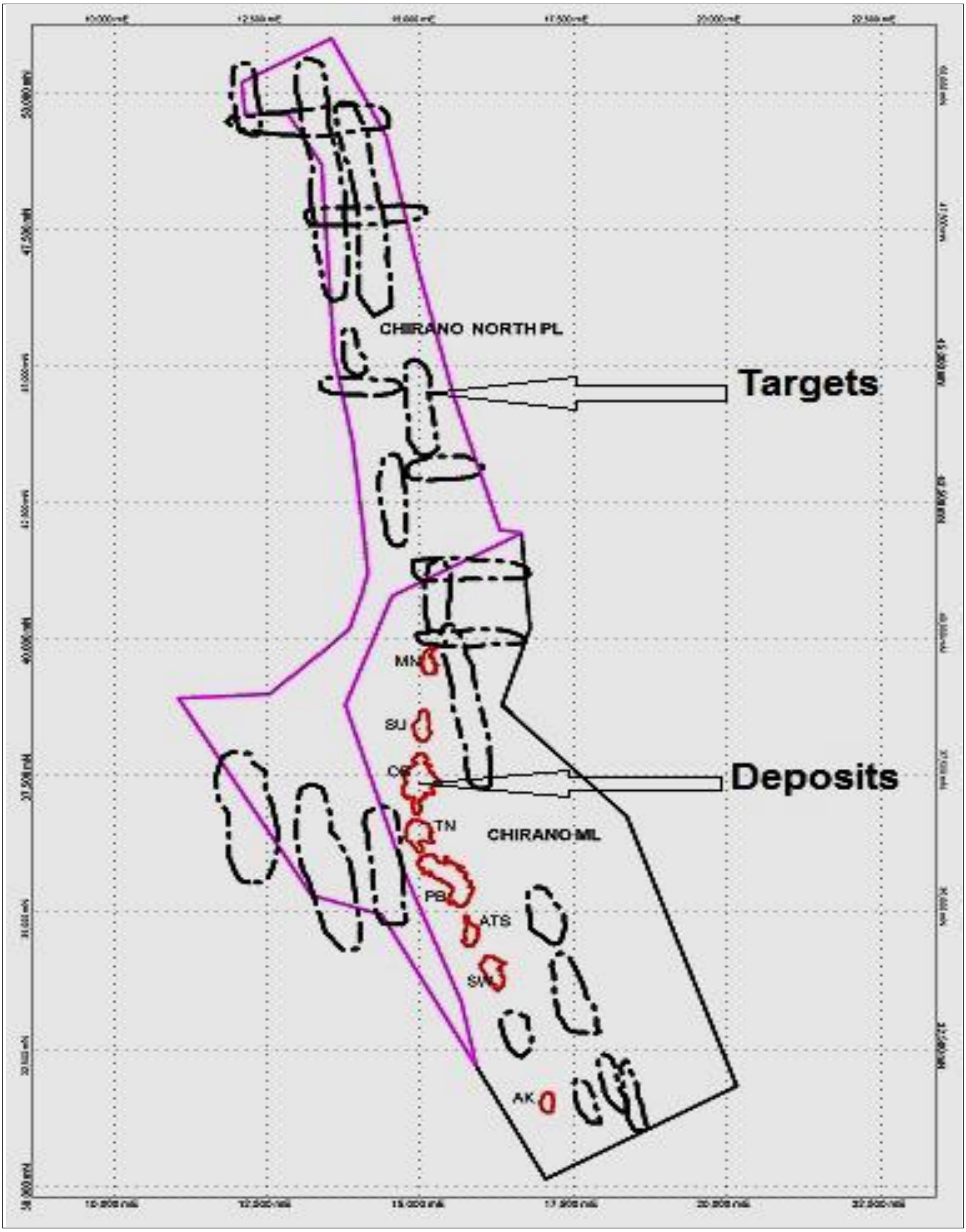

Fig 4.23: Final selection of targets. The thick black irregular shapes made with broken lines mark the selected targets. Known ore deposits or producing pits are shown by the red irregular shapes.

The major findings in this study are summarized as follows:

- The pathfinder elements for gold were identified to be Mo, W, Re, B, Ta Ce, Y, Be and Tl in the Chirano area by Cluster Analysis.
- Element associations were determined and similar elements classified into six groups namely Au, As, Pb, Ba, Cs and Bi groups using Cluster Analysis.
- Patterns and trends were identified in the data; the first group conforms to the location of the Chirano Shear Zone with its associated gold mineralization whereas the second conforms to the location of the Bibiani Shear Zone with its associated gold mineralization.
- Twenty gold targets were identified and selected for drill testing.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

This study has investigated soil geochemical elements from Chirano Gold Mining area in south-western Ghana. Multivariate Statistics methods namely Principal Component Analysis and Cluster Analysis were used to determine element associations and identify pathfinder elements for gold. Anomalous haloes and trends were identified on Ranked Variable maps and Gridded maps in order to select new gold targets for further exploration.

The most obvious finding which emerged from this study was that after agglomerative hierarchical cluster analysis, the elements were grouped and the gold group made up of Au, Mo, W, Re, B, Ta, Ce, Y, Be and Tl which constituted the pathfinders for gold in the research area. The second major finding was that twenty gold targets were identified and selected for follow up exploratory work. The results of the study also showed from the ranked variable and gridded maps that La, Mg, Mn, Ba, Th and Ti have strong anomalies that are associated with gold mineralization along the Chirano Shear zone. The Bibiani Shear located in the eastern portion of the project area and trending grid north is marked clearly by strong anomalies of As, Cs, Sb and W. Although this study did not find gold deposits, it made selection of gold targets easier and faster.

This study has indicated that, generally, multivariate statistical approach to geochemical analysis and exploration for gold is effective and useful, especially, in determining principal components, finding elemental associations and thereby identifying pathfinders for gold.

The only limitations are multivariate techniques are complex and involve high level of mathematics that require an expensive computer program to analyse the data, running the program is fairly straight forward but the results are not always easy to interpret and a large data is needed to have more confidence in the results.

5.2 RECOMMENDATIONS

Targets generated in this research should be ranked according to priority and test drilled with Reverse Circulation (RC) rigs. Significant intercepts from the RC drilling program should be followed up with diamond core drilling.

Future geochemical evaluations in the Chirano North area with the aim of locating gold, could be limited to Au, Mo, W, Re, B, Ta, As, Cu, Ni, Zn, Sb, Cd, Ba, Co, La, Mg, Mn, Sr, Ca, Li, Cs, K, Rb, Na, Ce, Y, Be and Tl all of which fell in the first sub-cluster that contains gold. This approach will help save time and money.

It is also recommended that spectral data should be collected from RC chip samples and diamond cores using the Terraspec owned by the Exploration Department of Chirano Gold Mines to be analysed with the Spectral Geology software to map out mineral alterations associated with gold mineralization.

Noted softwares for multivariate geochemical analysis include RGR (GSC Applied Geochemistry EDA Package), Cluster, Fistica, MASS, E1071, Kohonen, NNET, Random Forest, GSTAT (Geostatistical modelling, prediction and simulation), STATISTICA, Origin Lab, gTree, Minitab and ioGAS.

REFERENCES

Allibone, A.H., McCuaig, T.C., Harris, D., Etheridge, M. A., Munroe, S., Byrne, D., Amanor, J and Gyapong, W (2002a) Structural controls on gold mineralization at the Ashanti gold deposit, Obuasi, Ghana: Society of Economic Geologists Special Publication 9: 65 – 93.

Allibone, A.H., Teasdale, J., Cameron, G., Etheridge, M.A., Uttley, P., Soboh, A., Appiah-Kubi, J., Adanu, A., Arthur, R., Mamphey, J., Odoom, B., Zuta, J., Tsikata, A., Pataye, F., Famiyeh, S., and Lamb, E (2002b) Timing and Structural controls on gold mineralization at the Bogoso gold mine, Ghana, West Africa: Economic Geology, 97: 949 – 969.

Allibone, A., Hayden, P., Cameron, G., Duku, F (2004) Paleoproterozoic gold deposits hosted by albite and carbonate-altered tonalite in the Chirano district, Ghana, West Africa, Economic Geology, 99:479-497

Amor, S (2011) Data presentation and Interpretation, requirements for geochemical exploration, consultant, Burlington, Ontario, www.dirtbagger.com

ALS Minerals Services schedule (2012) http://www.alsglobal.com/minerals/downloads/als-minerals-service-schedules.aspx, 1:15

Aryee B. N. A (2009) UN Commission on Sustainable Development – CSD 18; Developing and implementing Mining sector policies and strategies towards achievement of Sustainable Development–The Ghana Case, 1:11

Bam, K. E., Akiti, T. T., Osae, S.D., Ganyaglo, S. Y and Gibrilla, A. (2011) Multivariate cluster Analysis of some major and trace elements distribution in an unsaturated zone, Densu river basin, Ghana. African Journal of Environmental Science and Technology, 5: 155 – 167.

Banoeng-Yakubo, B., S. M. Yidana., E. Nti (2009) Hydrochemical analysis of groundwater using multivariate statistical methods — the Volta region, Ghana: KSCE Journal of Civil Engineering 13 (1): 55-63

Benneh, G., and Dickson, K. B (1988) A new Geography of Ghana - revised edition, Pergamon Press, Oxford, UK.

Blaser, A.D., Sester, M. & Egenhofer, M. J. (2000), Visualization in an early stage of the problem solving process in GIS. Computers and Geosciences, 26: 57 – 66

Birke, M and Rauch, U (1993) Environmental aspects of the regional geochemical survey in the southern part of East Germany, Journal of Geochemical Exploration, 49: 35-61

Boher, M., Abouchami, W., Michard, A., Albarede, F., and Arndt, N.T (1992) Crustal growth in West Africa at 2.1 Ga: Journal of Geophysical Research, 97: 345–369

Boyle, R. W (1979) The geochemistry of gold and its deposits, Geological Survey of Canada, 280:584

Boyle, R. W (1984) Geochemical methods for the discovery of blind mineral deposits, Journal of Geochemical Exploration, 20: 223 – 302.

Butt, C.R.M and Smith, R.E (1980) Conceptual models in Exploration Geochemistry, Australia, Development in Economic Geology, 13 Elsevier, Amsterdam, p. 275 (Also, Journal of Geochemical Exploration, 12: 89-365

Cattell, R. B (1966) The Scree Test for the number of factors, Multivariate Behavioural Research, 1 (2) 245 – 276

CGML Exploration Team (2008), Annual Geological Report

Chambers, J. M (1983) Graphical Methods for data analysis - Wadsworth International Group, Belmont, Calif, 333 – 343

Cooley, W. W and Lohnes, P. R (1971) Multivariate Data Analysis, Wiley, New York, NY

Crossa, J (1990) Statistical Analysis of multi-location trials, Advances in Agronomy, 44: 55-85

Davis, D.W; Hirdes, W; Schaltegger, E and Nunoo, E.A (1994) U/Pb age constraints on deposition and provenance of Birimian and gold bearing Tarkwaian sediments in Ghana, West Africa. Precambrian Research, 67: 89–107

Davis, D.W., Hirdes, W., Oberthur, T., Ledtke, G., Loh, G., and Konan, G (1995) U-Pb age constraints on 2.1 Ga orogeny and gold mineralization in West Africa [abs.]: Precambrian 95, an international conference on tectonics and metallogeny of early/mid Precambrian orogenic belts, Montreal, September, 1995 Program with Abstracts.

Du Toit, S. H. C; Steyn, A. G. W and Stumpf, R. H(1986) Graphical exploratory data analysis' New York Springer – Verlag, 314.

Dylan (2012) A Graphical Explanation of how to interpret a dendrogram, 1-2

Eisenlohr, B. N and Hirdes, W (1992) The structural development of the early Proterozoic Birimian and Tarkwaian rocks of south-western Ghana, West Africa: Journal of African Earth Sciences, and the Middle East, 14: 313–325.

Evans Analytical Group (2009) Digestion Techniques for Difficult Sample Matrices

Everitt, B. S (1993) Cluster Analysis, 3

Everitt and Hothorn (2006) A Handbook of Statistical Analysis using R

Fletcher, W. K (1997) Stream sediment geochemistry in today's exploration world, In: Gubins, A. G (Ed.), Proceedings of Exploration 97 – 4th Decennial International Conference on Mineral Exploration, 249-260

Gahegan, M (2000a) The case for inductive and visual techniques in the analysis of spatial data. Geographical Systems, 7: 77-83

Ghana Chamber of Mines (2005) The impact of mining on local economy. Annual report of the Chamber of Mines, Accra, Ghana

Gibrilla, A., Bam, E.K.P., Adomako, D., Ganyaglo, S., Osae, S., Akiti, T. T., Achoribo, E., Ahialey, E., Ayanu, G and Agyeman, E.K (2011) Application of Water Quality Index (WQI) and Multivariate Analysis for Groundwater Quality Assessment of the Birimian and Cape Coast Granitoid Complex, Densu River Basin of Ghana: Water Quality Expo Health.

Groves, D.I (1993) Miner Deposita, 28: 366 - 374

Grunfeld, K (2005) Visualization, Integration and Analysis of multi-element Geochemical Data – Doctoral dissertation, Karlstad University,1 – 4 and 9 – 12

Grunsky, E. C., Smee, B. W (2003) Enhancement in the Interpretation of Geochemical Data using Multivariate Methods and Digital Topography (Source –Association of Exploration Geochemists Newsletter).

Grunsky, E. C (2007) Geochemical Data Evaluation and Interpretation - Geological Survey of Canada, 1: 23 – 25

Grunsky, E. C (2007) Geological Survey of Canada, Exploration Geochemistry – Basic Principles and Concepts, Exploration 07

Halley, S (2010) Regional Soil Geochemistry; a consultant report to Chirano Gold Mines - Exploration Department

Hayden, P (2004) Controls on the location of hydrothermal gold deposits in Ghana, 1-7

Hill, T and Lewicki, P (2006) Statistics: Methods and Applications: A Comprehensive Reference for Science, Industry and Data Mining, 234

Hill, T and Lewicki, P (2007) Statistics: Methods and Applications: A Comprehensive Reference for Science, Industry and Data Mining

Hirdes, W., Davis, D.W and Eisenlohr, B.N (1992) Reassessment of Proterozoic granitoid ages in Ghana on the basis of U/Pb zircon and monazite dating: Precambrian Research, 56:89–96.

Hirdes, W., Davis, D.W., Ledtke, G., Konan, G (1996) Two generations of Birimian (Paleoproterozoic) volcanic belts in north-eastern Cote d'Ivoire (West Africa): consequences for the 'Birimian controversy'. Precambrian Research, 80:173–191.

Holland, S. M (2006) A Graphical Explanation of how to Interpret a Dendrogram, Department of Geology, University of Georgia, Athens, GA 30602-2501

Howarth, R. J and Govett, G. J. S. (1983) Handbook of Exploration Geochemistry, 2: Statistics and Data Analysis in Geochemical Prospecting, Elsevier, Amsterdam

Johnson, R. A and Wichern, D. W (1992) Applied Multivariate Statistical Analysis, 3: 642

Junner, N.R (1935) Gold in the Gold Coast: Gold Coast Geological Survey Memoir 4: 67

Kaiser, H. F (1960) The Application of Electronic Computers to Factor Analysis, Educational and Psychological Measurements, 20 (1) 141 – 151

Kramar, U (1995) Application of limited fuzzy clusters to anomaly recognition in complex geological environments. Journal of Geochemical Exploration, 55: 81-92

Kurtsen, M., Leube, A and Hirdes, W (1986) The Birimian Supergroup of Ghana, Depositional environment, structural development and conceptual model of an early Proterozoic suite, Ghana - German mineral prospecting project. Geological Survey of Ghana Report

Larsen, W. A., McGill, R., Tukey, J. W (1978) Variations of Box Plots: The_American Statistician 32 (1): 12–16. Doi: 10.2307/2683468. JSTOR 2683468

Leube, A and Hirdes, W (1986) The Birimian Supergroup of Ghana: Depositional environment, structural development, and conceptual model of an Early Proterozoic suite: Hanover, Federal Institute for Geosciences and Natural Resources (BGR), unpublished report 99529, 260

Leube, A., Hirdes, W., Mauer, R., and Kesse, G.O (1990) The Early Proterozoic Birimian Supergroup of Ghana and some aspects of its associated gold mineralization: Precambrian Research, 46:139–165.

McQueen, K, C (2002) Identifying geochemical anomalies, CRC LEME 2002, 1: 7

McQueen, K, C (2004) Recommended procedures for geochemical sampling and analysis, The CRC LEME legacy – A guide for mineral exploration through the regolith in the Curnamona Province, South Australia, Explorers' guide series, appendix 6

Minton, T., Tinnion, R and Hollyer, G (2011) Integration of Geology, Geophysics, Geochemistry and Imagery for Mineral Exploration applications

Mooi, E and Sarsdedt, M (2011) A Concise Guide to market research

Morsy Mohamed, A (2000) Application of Multivariate Statistics to study stream sediment data from the vicinity of Lead-Zinc occurrences at Gabal-Rusas area, Eastern Desert, Egypt, in International Archive of Photogrammetry and Remote Sensing – Amsterdam, 33(B7): 901-904

Nord, J (1995) Jen's Box-and-Whisker Plot Instructions, Jennifer Nerd's little notch in the woods

Nude, P. M., Asigri, J. M., Yidana, S. M., Arhin, E., Foli, G. J. M and Kutu, G. J. M (2012) Identifying Pathfinder Elements for Gold in Multi-Element Soil Geochemical Data from the Wa - Lawra Belt, Northwest Ghana: A Multivariate Statistical Approach. International Journal of Geosciences, 1:64 – 69

Oberthur, T., Vetter, U., Davis, D.W., and Amanor, J.A (1998) Age constraints on gold mineralization and Paleoproterozoic crustal evolution in the Ashanti belt of southern Ghana: Precambrian Research, 89:129–143

Philips, N and Groves, I. D (1983) Geol. Soc. Aust. J., 30: 25 - 39

Ramazanov V. G and M. H. Ali M. H (2011) Stream Sediments Geochemical Investigations for Gold and Associated Elements in Wadi Haimur Area, South-eastern Egypt, 5(1): 149 -157.

Riemann, C and Fizmoser, P (2001) Normal and lognormal data distribution in Geochemistry: death of a myth. Consequences for the statistical treatment of geochemical and environmental data, Environmental Geology, 39: 1001-1014 Robert, K (1983) Can. Inst. Min. Metall., 27: 48 – 81

Robert, K (1983) Can. Inst. Min. Metall., 27: 48 – 81

Rose, A. W, Hawkes, H. E and Webb, J. S (1979) Geochemistry in Mineral Exploration - Harper and Row, New York, 315

Sander Raju, P. V (2008) Role of pathfinder elements in gold exploration in Chitradura schist belt, Current Science, 95(3)

Shapiro, S (1990) How to test normality and other distribution assumptions, Milwaukee, WI: American Society for Quality, 1:5

Stapel, E (2010) Box and Whisker Plots: Quartiles, Boxes and Whiskers, http://www.purplemath.com/modules/boxwhisk.htm (accessed 05/16/2013).

Stevens, J (1986) Applied multivariate statistics for the Social sciences, Lawrence Erlbaum Association, New Jersey

Stuart, H (2007) Annual Geological Report by Red Back Mining Inc., 1: 2 – 3

Taylor, P.N., Moorbath, S., Leube, A., and Hirdes, W (1992) Early Proterozoic crustal evolution in the Birimian of Ghana: Constraints from geochronology and isotope geochemistry: Precambrian Research, 56:97–111.

Thompson, J. M (1992) Visual Representation of data including graphical exploratory data analysis, In: Hewitt, C. N. (Ed) Methods of environmental data analysis. Elsevier Applied Science, London, 213-258.

Webb, J. S and Thompson, M (1977) Analytical Requirements in Exploration Geochemistry, Pure and Applied Chemistry, 49:1507-1518

Wedel, M and Kamakura, W.A (2000) Market Segmentation: Conceptual and Methodological Foundations, Norwell, MA: Kluwer Academic Publishers, 2:382.

Yidana, S.M., G. B. Yiran., P .A. Sakyi., P. M. Nude and B. Banoeng-Yakubo (2011) Groundwater Evolution in the Voltaian Basin, Ghana – An application of multivariate statistical analyses to hydrochemical data.

APPENDIX A: Geochemical Data

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
1	30600	16900	1	6.5	25.8	11.3	12.3	52	0.01	2.09	120	24.6	95	0.51	5.97	0.13	14.5	0.07	541	1.28	21.1	0.01	0.71	9.1	5.2	5.1	0.043	1.19
2	30600	17100	6	1	5.6	3.9	2.5	15	0.01	0.61	70	2.4	7	0.2	0.94	0.07	22.3	0.03	114	1.49	5.4	0.001	0.35	0.8	3.6	2.5	0.001	0.32
3	30600	17300	2	14.2	25.7	14.7	10.1	31	0.17	3.05	60	2.9	130	0.74	12.15	0.13	4.9	0.03	100	5.84	10.5	0.02	2.16	12.1	6.9	5.9	0.01	0.98
4	30600	17500	2	41.9	44.5	19.6	15.1	99	0.32	1.92	70	8.5	246	0.28	25.9	0.06	1.8	0.01	522	7.27	4.1	0.04	4.07	10	2.9	7	0.019	1.34
5	30600	17700	4	1.8	10	5.7	4.4	16	0.02	1.02	70	3.7	35	0.32	3.86	0.03	6.3	0.03	130	0.49	5.7	0.001	0.16	4.9	4.8	3.1	0.025	0.53
6	30600	17900	4	4.5	9.4	7.2	4.4	11	0.01	1.13	50	3.5	52	0.7	2.88	0.05	4.5	0.03	125	0.71	6.8	0.01	0.58	5	8.4	2.4	0.018	0.46
7	30600	18500	8	34.7	27	14.5	6.2	32	0.04	0.92	80	13.9	47	0.58	3.26	0.06	9.5	0.05	576	0.8	5.3	0.01	3.17	5.9	13.4	1.8	0.005	0.71
8	30600	18700	5	87	42	28.5	17.1	109	0.21	2.69	30	11.3	483	0.55	30.3	0.07	2.9	0.01	304	3.9	5.3	0.05	22.3	14.1	3.5	6.6	0.018	1.69
9	30600	18900	5	305	35	14.4	16.6	58	0.8	2.88	20	3.3	669	0.61	29.5	0.04	2.4	0.01	126	8.15	4.6	0.05	39.2	17.2	3	9.1	0.027	1.54
10	30600	19100	8	284	44.7	14.8	13.9	50	1.08	3.04	20	4.8	550	0.48	32.6	0.05	2.5	0.01	214	14.35	4.3	0.05	32.5	17.4	3.9	8.3	0.025	1.4
11	30600	19300	6	155	68.9	21.8	12.4	67	0.67	2.73	20	7.8	379	0.68	29.5	0.04	3.2	0.02	287	3.56	5.2	0.04	15.75	16.5	4.6	6.6	0.017	1.2
12	30600	19500	12	64.5	17	7.1	7	13	0.05	1.98	40	2.6	89	1.02	4.27	0.07	4.6	0.02	135	1.4	11.3	0.01	5.5	8.1	5.6	4	0.007	0.77
13	30600	19700	36	540	57.4	48.1	16.5	100	0.55	2.74	30	8.3	691	0.63	28.1	0.07	2.6	0.01	239	4.49	6.7	0.04	41.6	19.2	6.1	6.4	0.014	1.38
14	30600	19900	25	382	70.2	29.3	9.7	75	0.07	1.39	30	11.1	154	0.83	12.2	0.04	3.8	0.02	269	2.43	5.1	0.01	29.2	13.6	5.9	2.7	0.007	0.88
15	31000	16800	2	35	70.8	19.3	7.1	56	0.17	2.3	80	27.3	134	0.35	11.15	0.08	10.1	0.46	685	2.33	14.2	0.09	0.59	18.4	12.9	4.7	0.159	1.09
16	31000	17000	5	8.3	28	18.4	7.8	38	0.2	1.77	60	9.9	180	0.23	12.6	0.09	10.6	0.11	314	2.83	7.2	0.02	0.86	14.9	5.8	5.5	0.058	1.08
17	31000	17200	6	6.5	14.8	6.7	7.1	9	0.07	1.75	20	3.1	142	0.7	7.68	0.04	4	0.02	118	1.62	7.2	0.02	0.62	9	3.1	5.7	0.029	0.98
18	31000	17400	13	1.7	16.1	6.7	4.5	13	0.02	1.43	20	3.5	71	0.37	3.84	0.03	6.5	0.03	125	0.72	4.6	0.01	0.17	8.6	3.1	3.5	0.053	0.73
19	31000	17600	9	22	40	18.7	15	30	0.69	2.53	20	5.5	751	0.28	29.8	0.03	2.4	0.01	217	4.36	4.3	0.03	1.82	33.4	5.2	13.9	0.085	1.54
20	31000	17800	6	21.2	41.2	20.4	15.7	86	0.29	1.57	70	7.4	169	0.38	16.8	0.12	7	0.03	155	2.29	7	0.02	2.43	12.4	6.1	6.1	0.018	1.73
21	31000	18000	3	46.9	44.1	10.9	10.2	18	0.09	2.55	40	2.7	316	0.73	11.3	0.1	2.5	0.01	92	2.3	7.8	0.02	1.64	8.5	16.2	5.9	0.008	1.02
22	31000	18200	2	5.6	51.4	31.1	8.9	104	0.07	1.36	50	15	38	0.41	12.75	0.13	3.4	0.03	425	1.07	7.2	0.02	1.05	9	6.4	2.8	0.007	1.98
23	31000	18400	2	7	16.6	6.8	8.9	7	0.03	2.02	60	4.1	43	0.96	2.42	0.12	6.3	0.03	210	0.93	17.8	0.02	0.54	5.4	9.9	4.4	0.009	0.85
24	31000	18600	6	148.5	54.9	20.3	32	35	0.06	2.73	110	45.7	438	0.98	15.1	0.08	5.8	0.02	1480	4.19	10.2	0.02	15.4	15.7	7.8	6.7	0.022	1.65
25	31400	16500	2	5.2	17.7	9.2	9.4	31	0.1	2.83	30	4.3	120	0.47	8.05	0.04	12.9	0.04	142	1.63	5.3	0.02	0.42	16.7	4.1	8.8	0.033	1.41

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
26	31400	16700	4	10.7	30.3	17.3	11	49	0.33	4.16	20	5.5	354	0.77	21.2	0.04	4.5	0.03	182	3.88	4.9	0.03	1.04	33	3.4	13.2	0.081	1.75
27	31400	16900	2	3	32.6	11.3	5.2	30	0.04	2.73	80	6.3	90	0.7	6.7	0.1	16.9	0.07	197	2.08	18	0.01	0.27	10.5	5.3	7.4	0.031	1.35
28	31400	17500	97	1.2	24.8	11	2.9	33	0.06	0.61	350	8.8	16	0.3	2.86	0.16	19.3	0.4	355	3.49	4.1	0.12	0.32	4.1	70.5	2.8	0.009	0.3
29	31400	17700	21	19.7	61.7	27.8	13.3	46	0.55	5.13	20	6.5	873	0.29	34.5	0.03	2.9	0.02	397	4.32	3.5	0.03	1.55	49.6	7.9	14.9	0.126	1.62
30	31400	17900	5	30.4	30.4	10.5	11.6	43	0.12	2.1	50	2.8	150	0.7	11.75	0.1	3.5	0.02	132	1.57	8.6	0.02	1.21	14.3	5.1	4.6	0.015	1.22
31	31400	18100	4	9.4	23.7	10.5	5.9	23	0.04	1.35	90	12.4	61	0.68	3.81	0.08	9.1	0.05	717	0.55	6.3	0.01	1.21	6.2	9.7	1.8	0.011	0.59
32	31400	18300	1	17.6	23.1	8.5	9.1	17	0.03	1.91	80	6.2	37	1.13	4.53	0.11	4.1	0.04	811	1.07	9.3	0.01	0.76	5	16.8	3	0.011	0.77
33	31400	18500	34	9.7	14.5	8.5	6.5	15	0.03	2.07	40	3.5	61	1.09	4.86	0.11	3.8	0.03	153	1.16	11.3	0.01	0.87	7	7.9	3.3	0.01	0.79
34	31400	18700	10	33.2	44.2	18.6	18	29	0.03	3.38	70	46.1	297	1.52	9.72	0.11	6.3	0.04	1430	2.12	12.6	0.02	3.29	12.6	7.7	5.5	0.027	1.36
35	31400	18900	4	13.8	40	17.6	9.5	40	0.03	2.1	60	46.5	82	0.92	6.95	0.11	13	0.05	1040	0.86	11	0.01	0.72	15.1	8.2	2.9	0.015	0.7
36	31400	19100	8	57.7	37	15.4	7.9	32	0.03	2.08	60	16.6	76	1.24	5.06	0.11	5.5	0.03	423	1.3	9	0.02	4.39	8.9	10.1	2.5	0.009	0.63
37	31400	19300	11	120	45.9	40.9	8.8	81	0.05	1.56	50	10.9	29	1.88	9.66	0.13	3.9	0.02	148	1.51	7.6	0.01	10.3	8.3	12.1	2.2	0.001	0.67
38	31400	19500	37	181	75.3	54	7.6	61	0.05	1.9	50	20.5	179	1.42	8.23	0.09	4.3	0.03	285	1.55	6.7	0.02	16.55	18	5.6	2.3	0.005	0.66
39	31400	19700	42	128	41.9	29.8	8.5	32	0.03	3.39	50	9	96	2.65	7.58	0.1	4.3	0.04	157	1.47	9	0.02	7.56	18.9	9.6	4.3	0.011	1.07
40	31400	19900	13	99.4	33.7	54.9	8.8	38	0.04	3.2	50	5.7	533	1.74	7.93	0.13	4.1	0.04	82	1.48	10.3	0.02	2.56	16.2	9.4	3.5	0.007	0.98
41	31400	20100	4	19	44.4	18.6	7.7	15	0.04	1.45	30	2.6	183	0.53	7.36	0.09	1.9	0.01	63	1.15	5.3	0.01	1.66	4.9	8.7	2.3	0.001	0.4
42	31400	20300	3	11.5	28.1	19.1	6.7	22	0.02	2.04	50	2.5	108	0.85	4.96	0.14	2.9	0.03	196	1.03	10.7	0.01	0.96	5.4	18.5	2.7	0.006	0.47
43	31400	20500	4	62.5	37.2	17.2	10.2	27	0.03	1.74	30	3.5	382	0.79	12.7	0.07	2.9	0.01	194	2.28	5	0.01	4.2	6.3	8.6	3	0.008	0.92
44	31400	20700	9	8.5	4.8	12.2	2.9	11	0.02	0.63	30	1.5	103	0.47	1.74	0.05	3.4	0.02	95	0.58	4.5	0.001	0.91	1.3	5.6	0.9	0.005	0.2
45	31400	20900	10	14.4	8.7	8.2	2.7	12	0.02	0.71	20	1.3	64	0.33	4.37	0.04	0.9	0.01	132	0.81	4	0.01	0.29	1.7	6.8	1.1	0.006	0.25
46	31800	16200	1	1.8	41.4	28.4	6.2	64	0.03	3.68	250	32.2	64	0.43	7.81	0.07	18.9	0.26	692	0.74	8.8	0.01	0.2	22.9	20.4	3.5	0.08	0.99
47	31800	16400	16	2.5	59.2	53.2	5.4	63	0.04	4.01	190	46.9	185	0.48	9.01	0.13	5.9	0.24	1140	0.86	12.8	0.01	0.24	22.1	11.9	2.9	0.083	0.8
48	31800	16600	2	1.7	122.5	53.5	1	56	0.02	2.21	190	58.7	60	0.44	9.5	0.09	12.8	0.39	907	0.67	6.2	0.001	0.001	29.8	20.8	1.3	0.211	0.32
49	31800	16800	3	1.3	46.6	61.3	4.2	51	0.02	3.91	150	76.7	192	0.39	7.03	0.05	7.8	0.28	1850	0.62	6.2	0.01	0.11	21.7	10.9	2.4	0.119	0.6
50	31800	17000	5	1.4	47.4	63.9	3.2	30	0.02	3.9	110	59.6	230	0.33	5.75	0.15	4.7	0.3	1300	0.38	9.1	0.01	0.13	18.6	12.9	1.5	0.027	0.35

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
51	31800	17200	12	1.5	11.7	6.6	4.8	12	0.02	1.04	30	8.7	49	0.55	3.29	0.05	4.2	0.02	510	0.78	6.1	0.001	0.26	3.7	5.5	2.3	0.023	0.51
52	31800	17400	19	6.7	20.4	14.5	6.5	24	0.02	2.37	40	8.5	74	1.31	6.28	0.07	7.2	0.04	197	1.93	9.1	0.02	0.56	11.6	5.2	4	0.017	0.87
53	31800	17600	21	18	31.1	24.8	11.4	36	0.3	2.35	20	5.4	666	0.33	25.6	0.04	1.6	0.01	122	3.13	2.5	0.03	1.46	32.9	1.9	9	0.077	1.27
54	31800	17800	3	2.9	17.7	8	8.2	29	0.21	1.74	60	5.2	43	0.98	4.54	0.18	5.5	0.03	189	0.97	14.3	0.01	0.71	4.8	5.8	3.6	0.013	1.17
55	31800	17800	3	2.9	17.7	8	8.2	29	0.21	1.74	60	5.2	43	0.98	4.54	0.18	5.5	0.03	189	0.97	14.3	0.01	0.71	4.8	5.8	3.6	0.013	1.17
56	31800	18000	4	14.3	50.1	37.1	10.9	203	0.08	1.48	40	10.3	43	0.58	18.35	0.13	3.3	0.02	101	2	5.4	0.03	2.9	7.6	4	3.2	0.008	2.7
57	31800	18200	15	32.6	24.9	10.6	5.7	24	0.03	1.71	50	12.6	108	0.72	4.85	0.08	4.2	0.02	378	0.67	6.5	0.01	3.23	7.2	6.7	2.2	0.008	0.57
58	31800	18400	16	7.4	18.6	11.3	8.9	22	0.05	1.51	40	33.8	104	0.73	3.69	0.09	13.5	0.04	1060	1.03	10.1	0.001	0.99	8.5	4.9	2.2	0.013	0.53
59	31800	18600	6	50.1	39.6	23.7	11.5	42	0.06	3.01	60	54.2	147	1.01	7.62	0.09	10.2	0.04	1660	1.31	10.2	0.001	5.94	16.6	11.9	4.8	0.018	0.86
60	31800	18800	6	67.8	58.2	30	10	55	0.09	2.78	40	31.2	298	0.6	12.7	0.05	6.1	0.02	792	1.66	5.7	0.001	6.83	21.6	4.9	4.8	0.021	0.93
61	31800	19000	7	157	80.4	37.5	7.7	57	0.04	1.02	40	10.9	16	0.9	7.71	0.11	3.7	0.02	146	1.26	5.7	0.001	7.6	6.5	8.7	1.3	0.001	0.55
62	31800	19200	7	131	75.3	36.7	9	69	0.06	1.34	50	11.5	47	0.51	6.79	0.1	3.5	0.17	345	1.33	4.7	0.001	5.28	5.9	13.6	1.6	0.001	0.44
63	31800	19400	7	156.5	112	52.9	9	64	0.08	3.03	60	11.3	576	0.77	13.25	0.08	3.7	0.03	296	1.53	6.1	0.001	8.28	30.3	10.5	2.3	0.006	0.7
64	31800	19600	18	253	56.3	89.1	9.8	63	0.06	1.77	40	7.8	378	0.5	11.35	0.07	2.8	0.01	210	1.53	5.6	0.001	5.1	20.8	6.4	2.3	0.001	0.85
65	31800	19800	12	132.5	41.7	107.5	11.2	56	0.06	1.49	50	7.6	601	0.39	7.82	0.08	4.6	0.03	289	1.47	6.6	0.001	2.51	15.5	16.9	1.9	0.005	0.69
66	31800	20000	7	24.7	35	22	8.4	33	0.1	1.38	40	3.9	318	0.39	7.88	0.08	3.9	0.01	181	1.02	5.7	0.001	1.3	6.2	9.5	2.4	0.005	0.4
67	31800	20200	7	29.3	15.5	9.1	6.3	15	0.03	0.83	10	1.8	215	0.28	6.38	0.03	1.1	0.01	122	1.1	3.2	0.001	1.76	3.4	5.2	2.1	0.008	0.43
68	31800	20400	25	169.5	35.1	42.9	13.8	43	0.22	3.72	10	6.2	1120	0.4	18.2	0.03	2.7	0.01	201	3.56	4	0.001	10.7	13.5	4.6	8.1	0.025	1.49
69	31800	20600	16	33.6	23.1	13	11.9	16	0.08	1.84	20	2.8	463	0.63	10.5	0.06	2.4	0.02	183	1.82	7.4	0.001	0.92	5.4	9.6	5	0.014	0.89
70	32200	15900	3	15.9	60.4	12.4	11.9	70	0.41	4.76	10	7.1	274	0.23	31.4	0.02	3.1	0.02	208	2.75	1.2	0.05	0.51	51.7	1.3	11.7	0.129	1.98
71	32200	16100	36	12.3	58.3	24.7	9.7	68	0.26	3.47	20	6	446	0.38	23.7	0.02	6.1	0.03	313	1.96	1.9	0.03	0.44	48.4	2.5	8.8	0.108	1.27
72	32200	16300	9	15.9	20.9	12.2	11.6	24	0.35	5.32	20	3.5	366	0.66	28.1	0.04	3.1	0.03	186	3.9	4.3	0.03	1.17	23.3	2.9	14.1	0.087	1.38
73	32200	16500	12	13.8	41.7	23.6	13.4	50	0.27	3.37	20	8.6	677	0.5	26.1	0.03	5	0.03	281	3.34	3.2	0.03	0.81	31.9	2.5	11.1	0.088	1.73
74	32200	16700	9	2.6	38.2	20.2	5.8	81	0.05	4.11	140	52	83	0.57	10.45	0.03	14.2	0.11	1240	0.8	5.3	0.001	0.17	30	11.6	3.9	0.181	0.95
75	32200	16900	9	2	57.9	31.9	4.5	60	0.02	4.5	80	14.7	68	0.68	10.55	0.11	18.1	0.26	151	0.72	7.1	0.001	0.12	27.7	9.3	3.7	0.095	0.76

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
76	32200	17100	3	5.4	17.6	14.5	6	18	0.02	3.18	110	4.7	68	0.97	5.85	0.2	5.1	0.05	150	0.88	12.2	0.001	0.32	6.5	19.5	3	0.012	0.67
77	32200	17300	20	2.5	21.5	9.3	4.4	12	0.03	1.58	60	3	46	0.5	5.09	0.1	4.3	0.02	132	0.54	5.1	0.001	0.21	5	15	1.7	0.006	0.36
78	32200	17700	1	5.4	31.6	12	7.7	30	0.02	2.16	60	7.2	64	0.6	5.58	0.11	12.7	0.05	246	0.64	9.6	0.001	0.38	7.1	6.7	3.1	0.017	0.62
79	32200	17900	1	34.7	27.6	8.7	12.6	19	0.02	2.41	60	6.8	48	1.04	5.97	0.15	6.9	0.03	168	1.11	9.1	0.001	1.07	7.4	7.4	4.3	0.006	1.27
80	32200	18100	3	6	29.9	19.2	8.4	29	0.02	2.24	110	14.4	144	0.85	4.94	0.14	14.6	0.1	318	0.57	10	0.001	0.59	8.8	15.5	2.8	0.016	0.71
81	32200	18300	4	1.7	18.6	36.2	5.6	36	0.01	1.27	90	17.3	26	0.6	3.27	0.18	5.9	0.06	522	0.31	7.5	0.001	0.64	3.6	17.6	1.2	0.005	0.2
82	32200	18500	6	46.2	25.8	21.6	11.3	30	0.1	4.48	50	6.9	175	1.38	8.57	0.1	8.1	0.04	177	1.66	8.6	0.001	6.94	19.3	7.6	6	0.014	1.05
83	32200	18700	5	50.4	36.2	29.2	6.4	71	0.11	2.06	50	8.8	116	1.09	12.5	0.1	3.9	0.02	198	0.74	7.3	0.001	1.96	12.8	15.7	3.4	0.011	0.83
84	32200	18900	196	425	163.5	49.7	6.8	90	0.1	1.86	80	37.5	42	1.09	11.05	0.12	6.2	0.03	756	1.25	6.7	0.001	20.1	26.6	16	1.4	0.006	0.39
85	32200	19100	5	78.7	65.9	22.4	8.3	38	0.05	2.47	80	20.9	123	1.03	7.7	0.17	8.7	0.04	483	1.41	10.3	0.001	9.29	15.2	6	2.7	0.006	0.63
86	32200	19300	23	414	74	75.4	22.7	111	0.17	2.61	380	27.6	138	0.97	15.45	0.19	9.3	0.03	2270	2.49	9.6	0.001	16.85	51.6	19	2.3	0.005	1.32
87	32200	19500	24	852	70.1	126	21.8	168	0.74	3.9	50	23.2	789	0.61	34.2	0.09	3.5	0.02	309	5	5.7	0.01	32.1	31.5	9	6.7	0.014	1.25
88	32200	19700	11	759	145	188.5	19.4	216	0.48	2.25	30	25.8	565	0.57	30.2	0.09	3	0.01	104	3.79	5.8	0.001	23.2	18.1	7.1	4.3	0.009	1.05
89	32200	19900	1	23.4	48.7	14	12.4	60	0.41	5.15	10	7.5	279	0.35	26.6	0.02	4.1	0.02	229	2.66	2.1	0.05	0.83	49.6	2	11.8	0.135	1.96
90	32600	16000	1	13	40	21.1	11.3	44	0.26	6.85	30	10.1	408	1.03	21.6	0.07	4.6	0.06	379	3.24	7.9	0.05	0.87	35.9	5.9	12.6	0.109	1.66
91	32600	16200	11	5.7	39.1	22.4	9.2	46	0.07	5.61	50	8.8	84	1.27	8.95	0.15	12.4	0.07	348	1.67	12	0.02	0.44	31.1	4.6	6.7	0.053	1.52
92	32600	16400	7	3.8	39.4	23.1	8.5	45	0.04	4.17	40	7.4	137	0.69	8.08	0.11	20.8	0.06	288	1.33	10.5	0.03	0.34	26.2	3	6.4	0.049	1.59
93	32600	16600	6	3.3	47.4	27.3	6	37	0.05	3.89	490	43.4	114	0.56	8.65	0.07	16.4	0.06	2480	1.52	6.7	0.02	0.3	25	3	3.4	0.093	0.98
94	32600	16800	9	2.3	53.9	25.8	5.1	52	0.04	3	140	37.7	120	0.44	8.09	0.05	13.6	0.11	1040	0.78	4.5	0.02	0.2	27.4	8.3	3.8	0.127	0.83
95	32600	18200	4	14.1	18.5	14.3	4.8	18	0.04	1.45	30	8.8	176	0.29	5.2	0.06	2.7	0.04	281	0.51	3.8	0.01	1.97	7.7	5.4	1.6	0.008	0.37
96	32600	18400	11	97.1	68.9	18.1	12	85	0.18	2.71	70	5.5	211	0.7	12.35	0.2	2.6	0.02	98	1.48	8.6	0.02	4.91	24.2	5.2	2.7	0.006	0.75
97	32600	18600	24	122	81.7	22.3	10.9	67	0.07	5.88	30	7	257	0.57	17.15	0.07	2.6	0.03	157	1.96	4.4	0.02	18.1	46.4	8.8	4.9	0.014	0.88
98	32600	18800	15	42.3	238	22.3	10	37	0.06	4.93	60	6.5	298	0.44	11.25	0.13	3.4	0.04	296	1.58	7.3	0.02	8.49	38.1	15.3	2.5	0.016	0.57
99	32600	19000	14	107	16	7.9	6.2	8	0.07	5.63	50	1.2	255	0.55	5.45	0.11	5.3	0.02	49	2.05	7	0.02	19.95	8	11.1	3.9	0.007	0.53
100	32600	19200	8	34.7	39.2	13.6	4.3	15	0.2	1.15	40	2.4	122	0.32	4.18	0.11	5.2	0.02	91	2.54	5.6	0.001	1.82	5.7	12.2	1.5	0.001	0.39

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
101	32600	19400	69	75.9	33.1	6.5	3.4	3	0.09	0.89	40	0.7	61	0.37	2.39	0.11	2.5	0.01	65	0.82	5.3	0.001	4.93	3.6	18.5	0.9	0.001	0.17
102	32600	19600	8	25.7	54.9	24.2	5.9	23	0.03	2.14	50	4.7	127	0.61	6.06	0.16	10.8	0.01	150	0.73	8.7	0.01	0.63	8.5	19.6	3.1	0.001	0.97
103	32600	19800	5	33.2	40.2	46.5	6.3	25	0.05	1.55	90	9.8	251	0.39	3.83	0.12	10.5	0.09	390	0.75	8.1	0.01	0.78	5.9	19.8	1.8	0.005	0.39
104	32800	16800	4	22.3	10.9	10.9	4.6	37	0.03	0.46	30	5.9	17	0.26	3.8	0.06	5.1	0.01	151	1.76	3.1	0.001	2.22	3.3	2.3	2.1	0.001	0.58
105	33000	14100	4	3.1	35.3	18.7	8.3	24	0.05	1.82	70	31.4	248	0.28	11.5	0.03	8.2	0.04	634	2.21	5.6	0.01	0.29	11.9	6.3	3.9	0.04	1.09
106	33000	14300	3	0.7	53.4	8	5.2	46	0.02	1.41	390	17.1	24	0.12	4.16	0.06	23.9	0.1	823	0.94	6.4	0.01	0.13	7.1	37.3	3.3	0.024	0.59
107	33000	14500	18	2.4	64.7	45.1	9.2	67	0.06	2.48	220	62	460	0.21	10.8	0.04	9.2	0.24	1680	3.32	5.4	0.01	0.28	19.4	14.1	2.9	0.075	0.89
108	33000	15500	2	7.3	37.6	19	10.2	35	0.23	4.79	60	17.5	380	0.61	15.05	0.05	15.4	0.06	466	2.09	5.5	0.03	0.43	32.6	6.3	8.1	0.115	1.61
109	33000	15700	3	11.9	31.7	15.5	10.4	44	0.27	4.53	20	7.7	365	0.44	22.3	0.03	3.6	0.03	390	2.49	3.5	0.05	0.79	33.1	3.7	11.7	0.104	1.33
110	33000	15900	2	3.1	43.9	27.7	7.3	58	0.06	3.79	50	12.6	124	0.56	9.96	0.06	21.4	0.06	418	0.85	6.2	0.03	0.25	37.6	2.9	5.6	0.083	1.42
111	33000	16100	29	6.6	24.9	18.9	8.4	43	0.09	4.16	40	8.5	152	0.92	11.45	0.06	6.6	0.07	282	2.71	6.4	0.03	0.45	29.5	3.5	7	0.052	1.38
112	33000	16300	11	2.8	31.2	40	6	89	0.03	2.68	220	53.6	69	0.34	5.47	0.12	13.9	0.36	1720	1.02	13.2	0.02	0.22	11.1	19.1	3.7	0.104	1.03
113	33000	16500	18	2.4	30	22.2	4.2	57	0.03	1.64	100	19.3	92	0.2	4.24	0.08	11.1	0.16	673	0.72	8.7	0.03	0.18	10	14.9	2.1	0.046	0.79
114	33000	16700	25	3	16	20.2	3.8	34	0.04	1.4	80	11	79	0.43	4.24	0.12	7.7	0.12	389	1.04	8.1	0.01	0.27	6.6	11.8	2	0.061	0.54
115	33000	16900	6	3	15.4	7.9	3.7	23	0.03	0.74	40	6.7	32	0.44	4.43	0.08	3.3	0.01	295	0.62	4.3	0.01	0.4	4.1	5.6	1.5	0.009	0.48
116	33000	17100	4	8.3	11.6	6.9	5.2	12	0.02	1.35	40	3	44	0.63	6.02	0.08	3.3	0.01	124	0.97	5.5	0.01	0.59	5.3	5.6	2.2	0.007	0.65
117	33000	17300	3	4.4	38.2	7.5	5.8	11	0.02	1.98	60	6.7	67	1.01	5.98	0.1	3.6	0.02	225	0.79	8.3	0.01	0.91	6.5	10	3	0.01	0.79
118	33000	17500	35	2.3	21.5	16.4	4.2	36	0.03	1.39	80	15.7	72	0.39	4.1	0.07	8.8	0.08	496	0.76	5.8	0.01	0.28	8.1	9.8	2.2	0.064	0.59
119	33000	17700	4	8.5	13.4	8.7	5.4	11	0.02	1.1	80	5.2	85	0.59	3.56	0.08	5.6	0.03	302	0.58	6.8	0.001	1.51	4.7	8.5	1.7	0.007	0.46
120	33000	17900	5	29.5	13.9	8.8	7.1	12	0.03	1.9	50	4.4	57	1.05	3.68	0.13	3.8	0.03	204	0.8	11.1	0.01	1.28	5.1	10.5	2.7	0.008	0.65
121	33000	18100	4	63.2	34.8	25.9	9.6	50	0.19	3.43	40	7.2	393	0.6	15.15	0.12	3.2	0.02	267	1.73	7.9	0.02	8.68	14.3	4.8	5.2	0.018	1.12
122	33000	18300	15	80	66	24.9	10.4	66	0.13	8.4	30	9.2	268	0.97	13.4	0.06	3.6	0.04	322	2.16	7.3	0.02	15.25	32.1	7.4	10.3	0.027	1.53
123	33000	18500	12	55.2	58.6	36.7	10.8	54	0.11	15.8	30	5.1	488	0.65	13.15	0.07	6	0.05	283	2.93	6.4	0.02	11.35	22.9	20.8	10.6	0.05	1.31
124	33000	18700	8	43.6	27.3	10.8	8.2	16	0.05	4.98	70	1.8	191	1.09	4.54	0.16	6.5	0.06	127	1.45	12.7	0.03	3.7	11.7	22.5	4.5	0.008	0.79
125	33000	18900	2	20.5	14.3	1.9	2.7	0.001	0.02	0.66	30	0.4	48	0.17	1.24	0.09	2.9	0.01	19	0.74	4	0.02	1.99	2.3	6.6	1	0.001	0.11

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
126	33000	19100	19	79.1	18.5	12.7	7.4	16	0.15	7.99	30	1.3	629	0.39	13.4	0.08	4.4	0.02	95	3.49	6.9	0.04	9.42	10	10	6.9	0.026	0.76
127	33000	19300	5	23.4	22.8	17.9	7.3	25	0.08	1.44	50	3.5	79	0.49	6.21	0.14	4.8	0.02	128	1.21	9.2	0.02	0.4	5.8	12.4	2.5	0.001	0.5
128	33000	19500	33	128	44.4	153.5	9.3	41	0.06	2.03	90	26	758	0.54	6.66	0.11	10.4	0.12	424	1.49	9.7	0.03	0.85	14.9	9.3	2.3	0.005	0.58
129	33400	15800	3	11	33	12.8	12.5	55	0.41	7.24	50	7.3	393	0.61	24.7	0.07	7.7	0.05	523	3.01	10.2	0.06	0.68	25.9	7.2	15.3	0.132	1.61
130	33400	16000	3	12.1	43.2	21	12.9	47	0.21	5.2	30	9.4	328	0.63	16.85	0.05	12	0.05	399	2.13	4.6	0.07	0.56	35.5	4.2	8.6	0.091	1.84
131	33400	16200	17	3.2	25.3	17.1	8.7	53	0.06	4.52	80	9.1	83	1.23	7.19	0.17	33.3	0.09	327	1.45	27.5	0.05	0.35	16.1	4.7	6.8	0.033	1.51
132	33400	16400	11	5	51.5	32.6	11.3	47	0.04	5.64	110	9.9	135	1.2	10.8	0.13	38.4	0.13	350	1.7	17.4	0.05	0.31	24.8	18.4	4.8	0.117	1.51
133	33400	16600	4	2.4	15.1	7.5	3.5	13	0.03	1.48	60	3.4	30	0.76	4.18	0.16	4.4	0.02	168	0.61	8.7	0.03	0.29	3.7	9.9	2	0.007	0.42
134	33400	16800	5	2	15.8	7.6	6.8	29	0.03	1.57	50	7.8	43	1.06	3.45	0.08	7.8	0.02	249	0.56	8.7	0.03	0.3	5.2	8.4	2.4	0.006	0.63
135	33400	17000	8	19.8	31.3	20.4	14.7	52	0.62	4.58	30	8	510	0.84	31.7	0.06	4.7	0.02	174	4.92	5.6	0.07	1.94	24.3	3.7	17.2	0.07	1.96
136	33400	17200	16	17.9	31.8	14.3	21.4	35	0.7	4.32	20	4.4	612	0.71	34.3	0.04	3.8	0.02	235	5.96	4	0.07	1.45	27.5	2.9	21.4	0.104	2.26
137	33400	17400	10	4.1	14.4	11.5	5.3	33	0.04	1.57	80	9.3	55	0.56	3.39	0.06	9.9	0.07	483	0.53	7.4	0.03	0.2	7.5	16.4	2.9	0.035	0.67
138	33400	17600	5	17.6	35.2	30	15.2	45	0.31	2.19	40	9.4	582	1.06	16.15	0.09	4.3	0.01	305	1.66	6.8	0.05	3.6	17.6	10	4.5	0.016	1.45
139	33400	17800	3	8.7	12.7	7.4	7.3	10	0.03	2	40	3	145	1.38	4.22	0.12	4.4	0.04	134	0.76	11.5	0.03	1.21	7.4	6.8	2.9	0.009	0.65
140	33400	18000	5	30.2	34.9	20.3	10.3	50	0.08	2.06	50	6.5	102	1.39	10.3	0.13	4.7	0.02	253	1.38	9.8	0.05	1.14	13.1	4.3	3.3	0.01	1.38
141	33400	18200	6	21.6	29.2	10	6.7	18	0.05	1.68	50	4.2	72	0.81	7.11	0.12	5	0.02	251	0.8	9.4	0.04	2.5	9.6	18.4	3.2	0.015	0.75
142	33400	18400	8	48.7	41.1	21.1	9.1	40	0.11	2.17	30	9.1	142	0.84	9.08	0.05	7.5	0.03	569	1.05	9	0.05	5.05	18.8	5	4.1	0.023	0.97
143	33400	18600	18	108.5	29	24.1	11.7	38	0.05	2.27	70	2.2	109	1.34	6.64	0.17	4.9	0.02	105	1.29	12.4	0.03	6.33	15	17.8	2.6	0.001	0.77
144	33400	18800	10	173.5	34.3	71.4	25.6	82	0.42	17.45	20	5.5	1500	0.91	29.4	0.03	9.7	0.02	199	6	4.1	0.07	17.4	23.3	6	19.8	0.041	2.71
145	33400	19000	5	31.7	25.6	21	9.9	22	0.04	2.36	40	5.9	251	1.16	6.07	0.09	6.5	0.03	261	1.23	13.3	0.04	1.42	9.8	9.5	4.2	0.009	0.97
146	33400	19200	4	28.6	17.7	18	8.7	29	0.04	1.14	30	2.2	92	0.51	6.69	0.07	3.3	0.01	128	1.08	7.8	0.03	1.19	5	8.4	2.4	0.001	0.59
147	33400	19400	5	32.9	17.5	16.6	9.2	17	0.05	1.85	20	2.8	228	0.6	7.42	0.05	5.5	0.02	78	1.32	5.3	0.04	0.84	6.1	3.3	4.7	0.005	0.79
148	33800	16300	3	2.3	17.4	6.3	4	24	0.03	0.66	30	3.1	22	0.41	4.46	0.08	3.1	0.01	99	0.8	4.6	0.01	0.49	2.4	6.4	2.3	0.014	0.41
149	33800	16500	8	1.8	22.5	11.3	8.2	22	0.04	1.31	50	10.2	70	0.57	4.16	0.06	7.9	0.03	251	0.62	6.1	0.02	0.23	5.7	6.5	2.4	0.013	0.55
150	33800	17300	9	6.6	20.4	14.8	5.4	43	0.05	1.3	100	16.4	58	0.44	4.62	0.05	11.1	0.06	565	0.71	5.2	0.01	0.38	8.4	8.7	2.3	0.031	0.6

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
151	33800	17500	3	49.4	40.4	17	12.8	44	0.16	2.8	30	5.3	275	0.86	15.15	0.08	3.1	0.03	118	2.28	6.5	0.03	2.52	18.7	3.3	5.2	0.018	0.84
152	33800	17700	14	111.5	52.5	39.7	15.6	89	0.27	5.28	20	7.9	492	0.4	27.6	0.03	2.7	0.01	172	3.01	2.1	0.04	12.3	35.1	2.5	8.9	0.028	1.17
153	33800	17900	18	81.9	41.5	42.4	12.6	68	0.33	2.22	20	11.2	440	0.62	15	0.06	4.6	0.02	184	2.13	8	0.03	7.8	23.9	5.2	5.7	0.015	1.49
154	33800	18100	5	18	36.4	20	9.2	26	0.08	1.51	50	8	79	1.06	5.22	0.07	6.9	0.02	302	0.94	8.9	0.01	1.55	8.4	9.2	3.8	0.007	0.85
155	33800	18300	41	138.5	62	32.8	5.8	44	0.14	1.65	80	15.4	91	0.76	8.8	0.05	8.7	0.04	367	1.04	4.3	0.01	5.72	18.2	5.8	2.2	0.005	0.57
156	33800	18500	48	152.5	91	61	10.5	76	0.09	1.57	50	77.4	117	0.86	9.29	0.05	4.9	0.04	1280	1.11	6.9	0.02	8.32	23.5	7.5	2.5	0.007	0.79
157	33800	18700	14	112	28.6	26	8.2	45	0.08	0.99	30	14.4	59	0.62	6.8	0.07	2.8	0.02	405	1.25	6.4	0.01	9.47	7.2	7.8	2.3	0.005	0.67
158	33800	18900	22	67.5	25.3	16.4	6.8	30	0.07	2.29	40	3.8	162	0.65	5.52	0.08	3.7	0.02	84	1.45	6.1	0.001	6.51	11.3	9.7	3.9	0.007	0.8
159	33800	19100	11	51.4	29.9	33.4	8.8	25	0.07	1.37	50	13.4	190	0.44	4.69	0.07	4.8	0.02	580	1.06	7.7	0.01	2.45	7.2	9.2	2.4	0.005	0.55
160	33800	19300	13	182.5	42.3	85.6	16.2	48	0.82	4.28	30	7.9	1600	0.3	22.7	0.06	2.4	0.02	161	4.49	6.2	0.03	5.31	23.7	5.4	11	0.022	1.44
161	34200	15400	5	5.3	58.1	26	11.5	61	0.13	4.04	40	52.5	334	0.66	14.05	0.03	21.8	0.04	986	1.7	3.7	0.03	0.19	36.3	5.4	6.3	0.087	1.52
162	34200	15600	2	4.9	49.7	19.8	10.5	46	0.08	3.33	100	41	225	0.45	11.5	0.03	11.9	0.07	860	1.35	4.7	0.01	0.18	24.6	8.9	5.7	0.078	1.28
163	34200	15800	5	3.3	42.8	25.4	6.7	44	0.03	3.48	80	13.4	141	0.68	9.25	0.05	18	0.06	547	0.97	5.4	0.01	0.25	24.7	9.5	4	0.029	1.1
164	34200	16000	1	13.8	7	9.2	3.7	62	0.02	1.33	190	6.3	25	0.3	3.96	0.08	20.8	0.11	376	1.53	3.8	0.001	0.3	3	4.7	3.1	0.008	0.46
165	34200	16200	1	2.4	20.8	5.8	3.5	20	0.01	0.73	20	3.4	13	0.27	4.96	0.07	4.5	0.01	127	0.37	2.3	0.01	0.29	4.5	3.2	1.2	0.001	1.55
166	34200	16400	8	6.2	10.7	6.6	6.8	14	0.04	1.4	40	2.9	84	0.61	5.33	0.07	3	0.02	103	1	6.3	0.001	0.71	4.8	7.2	3.4	0.013	0.69
167	34200	16600	68	7.8	30.6	27.7	5.7	50	0.06	1.93	150	19.3	79	0.52	7	0.1	25.5	0.17	514	3.48	6.4	0.001	0.42	11.2	12.4	3.4	0.045	0.79
168	34200	16800	28	1.1	55.5	100	2.5	110	0.03	2.91	710	29.6	145	0.47	7.25	0.1	17.3	1.25	653	0.97	4.9	0.001	0.18	16.1	7.1	1.5	0.014	0.56
169	34200	17000	28	0.5	6.9	4.5	5	9	0.03	1.07	30	1.5	29	0.59	1.2	0.03	7.3	0.02	83	0.31	3.8	0.001	0.09	4.8	5.4	3.2	0.026	0.44
170	34200	17400	4	28	21.4	11	17.5	22	0.06	1.96	40	4.7	254	0.96	11.05	0.1	2.8	0.01	204	2.98	6.5	0.01	3.54	7.4	4.2	3.6	0.014	1.14
171	34200	17600	1	9.9	7.1	9.9	5.3	19	0.03	1.28	40	2.5	50	1	3.38	0.09	9.6	0.02	66	0.86	6.3	0.001	1.73	7	2.8	2.9	0.001	0.5
172	34200	18000	2	25.3	28.9	17.6	5.4	44	0.03	1.37	30	1	96	0.22	7.22	0.06	3.9	0.01	121	0.44	3	0.001	1.07	10.9	2.4	2.8	0.008	0.5
173	34200	18200	9	16	51.8	25.4	4.9	31	0.02	2.28	50	26.4	111	0.87	7.9	0.04	19.8	0.06	923	0.76	5	0.02	2.08	21.7	3.7	2.4	0.012	0.55
174	34200	18400	57	170	85.3	38.9	7.2	70	0.03	1.52	40	22.4	48	1.35	8.3	0.08	4.9	0.04	406	1.43	7.9	0.02	12.5	20.5	11.2	2.1	0.006	0.74
175	34200	18600	18	58.5	66.2	26.9	6.4	46	0.03	2.02	40	8.8	88	0.98	8.63	0.06	7.6	0.02	248	1.1	6.4	0.03	8.52	31.2	8	2.4	0.014	0.9

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
176	34200	18800	20	158.5	28.9	40.4	9.6	39	0.13	5.4	30	3.5	384	0.86	10.8	0.05	5.1	0.01	59	2.72	5.2	0.02	20.2	16.2	7.7	5.3	0.008	0.94
177	34200	19000	11	53.7	42.7	12.3	6.7	57	0.05	1.16	20	3.2	114	0.27	8.48	0.05	1.8	0.01	44	1	3.4	0.01	2.5	7.8	6.1	1.9	0.001	0.6
178	34600	15300	2	4.1	104.5	51.2	13.2	54	0.03	3.61	180	192	309	0.62	11.6	0.04	9.7	0.09	3530	1.6	4.8	0.02	0.22	37.1	5.5	3.6	0.108	1.26
179	34600	15500	3	6.1	98.9	40.3	15.1	48	0.06	3.62	140	38.7	676	0.38	18.8	0.04	5.8	0.09	1190	1.8	5	0.02	0.37	28.3	5.3	3.8	0.121	1.23
180	34600	15700	8	2.2	29.1	38.7	4.4	63	0.04	2.09	90	22	115	0.32	4.9	0.18	11.3	0.47	379	0.47	15.3	0.02	0.11	10.6	22.7	2	0.052	0.52
181	34600	15900	184	5.1	15.5	10.8	15.7	35	0.1	1.73	50	5.6	45	0.69	5.26	0.13	9.3	0.03	145	27.4	9.3	0.01	2.69	8.4	6.3	5.2	0.012	0.83
182	34600	16100	7	14.3	22.8	10.2	13.5	26	0.18	2.08	50	4.1	203	0.89	11.5	0.11	8.2	0.02	147	4.44	9	0.02	1.21	12.2	4.7	8.3	0.025	1.4
183	34600	16300	6	23.8	25.9	18	15.1	39	0.71	3.57	60	4.7	507	0.38	28.7	0.05	3.8	0.03	553	7.88	3.6	0.03	2.14	26.6	10.7	11.5	0.088	1.29
184	34600	16500	5	20.6	13.2	5.6	11.5	15	0.06	2.23	40	1.2	88	0.8	9.35	0.09	4.4	0.01	53	1.44	8.1	0.02	2.36	8.9	9.1	5.4	0.016	1.12
185	34600	16700	5	28.2	23.4	16.2	18.2	42	0.42	4.88	20	4.6	532	0.67	28.1	0.04	3.1	0.01	210	4.81	4.6	0.03	2.79	21.7	4.7	12.8	0.072	1.46
186	34600	16900	13	16.8	18.3	8.8	20.8	15	0.08	2.5	20	2.6	332	0.66	17.7	0.04	2.6	0.01	106	3.35	4.5	0.02	1.15	9.7	5.7	8.2	0.039	1.66
187	34600	17100	985	1.4	5.7	3.3	5.9	4	0.02	0.38	10	0.7	20	0.32	1.5	0.01	4	0.01	44	0.47	1.6	0.001	0.15	2.1	2.6	2.2	0.016	0.33
188	34600	17300	300	2.6	7.6	7.3	3.6	8	0.02	0.31	20	2.5	81	0.26	2.1	0.01	4	0.01	67	0.67	2.2	0.001	0.5	2.5	6.1	1.3	0.009	0.23
189	34600	17700	16	191.5	33.1	34.4	17.8	156	0.13	1.12	30	8.9	46	0.65	24	0.08	5.9	0.01	356	49.7	5.8	0.02	10.5	11.6	4.2	2.9	0.006	1.72
190	34600	17900	9	18.1	56.7	9.5	15.1	22	0.06	2.43	40	28.7	93	0.69	14.25	0.03	4.6	0.02	1020	1.53	5	0.03	0.94	24.6	6	4.7	0.025	1.12
191	34600	18100	186	345	37	31.8	10	68	0.05	1.03	20	5.3	36	0.93	7.69	0.05	3.1	0.01	88	1.46	5.2	0.01	17.95	7.8	6.8	2.7	0.005	0.57
192	34600	18300	19	59.9	11.8	5.9	4.2	11	0.03	0.41	10	1.2	29	0.39	2.39	0.04	1.3	0.01	69	0.85	3.7	0.01	3.43	1.9	6.6	1.1	0.001	0.19
193	34600	18500	22	62.4	34.7	14.2	12	20	0.03	1.8	40	5	126	0.9	9.01	0.06	4	0.03	322	1.4	8.9	0.01	3.62	9.5	11.5	4.6	0.015	0.84
194	34600	18700	8	31.7	10.1	6.6	7.4	8	0.01	0.78	10	1.8	117	0.51	4.03	0.03	2.3	0.01	100	0.93	5.4	0.01	1.46	2.7	4.2	2.7	0.008	0.45
195	34600	18900	17	17.1	9.7	5.6	7	7	0.01	1.12	30	1.5	37	0.8	2.5	0.05	4.8	0.02	77	0.64	8.4	0.01	0.66	3.2	8.6	3.6	0.007	0.54
196	34600	19100	34	24.5	16.5	9.1	6.6	19	0.03	0.67	30	4.6	29	0.76	3.15	0.03	6.5	0.02	159	0.64	6.1	0.001	1.94	4.2	8.3	2.3	0.006	0.5
197	34655	13020	3	7.6	27.9	13.3	9.8	34	0.31	2.49	40	7.7	348	0.22	16.95	0.03	7.5	0.04	307	3.08	3.8	0.02	0.5	27.9	7.4	9	0.05	1.46
198	34655	13220	1	2.2	28.7	21.6	7.9	32	0.06	2.03	120	32	249	0.17	9.44	0.06	9.3	0.06	979	1.15	4.7	0.01	0.21	12.5	7.8	7.4	0.043	1.11
199	34655	13420	2	4.8	73.1	70.9	11.3	59	0.05	2.65	480	109	459	0.15	9.74	0.06	12.6	0.19	3400	1.23	7.9	0.01	0.27	19.8	13.9	3	0.042	0.84
200	34655	13620	3	8.9	52.2	19.7	10.3	44	0.27	2.41	140	30.8	479	0.16	17.85	0.04	7.7	0.08	891	2.75	4.6	0.02	0.68	31.8	6.5	6.4	0.075	1.28

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
201	34655	13820	1	1.9	16.4	7.2	6.9	21	0.04	1.94	120	16.9	39	0.33	3.91	0.11	53.9	0.06	430	1.1	22.6	0.01	0.13	8.4	6.5	8.7	0.016	1.68
202	34655	14020	1	4.4	30.9	15.4	8.8	37	0.11	2.7	180	40.3	138	0.27	8.5	0.14	15.8	0.09	918	1.15	14.4	0.01	0.31	16	10.8	6.2	0.054	1.19
203	34655	14220	1	3.4	46.8	19.9	12.4	53	0.04	4.59	190	65.5	68	0.34	10.05	0.05	15.2	0.24	1340	1.08	5.3	0.05	0.19	23.8	26.5	4.2	0.195	0.98
204	34655	14420	3	6.7	40.2	18.8	24.8	58	0.23	4.62	140	176.5	203	0.69	16.65	0.05	18.1	0.06	4190	2.57	8	0.02	0.45	39.8	11.4	8.5	0.09	2.19
205	34655	14620	2	4	21.2	16.5	9.8	60	0.09	5.04	40	16.4	95	0.5	12.15	0.05	10.3	0.07	541	1.3	6.4	0.03	0.34	38.5	6	7	0.073	1.56
206	34655	14820	2	3.7	18.6	16.5	10.6	50	0.07	6.19	70	24	82	0.63	12.05	0.07	10.9	0.1	599	1.58	5.5	0.02	0.25	34.3	8.4	7.5	0.104	1.73
207	34655	15020	2	4.1	118	36.2	10.7	91	0.04	4.53	80	92.5	219	0.74	8.62	0.04	8.5	0.08	2200	1.15	6.5	0.03	0.19	33.1	4.1	4.2	0.071	0.99
208	34655	15220	4	5.7	103.5	42.5	10.4	68	0.04	3.69	100	137.5	300	0.64	8.83	0.03	10.8	0.06	2780	1.12	4.9	0.03	0.21	30.9	3.5	3.6	0.061	0.93
209	35000	15200	2	2.3	94.4	53.9	5.9	57	0.06	3.5	130	38.5	219	0.26	8.43	0.06	11.5	0.22	1150	0.38	6.9	0.01	0.08	26.8	8.6	3.1	0.086	0.7
210	35000	15400	4	3.1	50.7	36.2	4.5	74	0.03	4	320	59.7	52	0.38	9.35	0.07	18.8	0.57	2360	0.78	7.3	0.01	0.31	24.8	17.9	3.4	0.103	0.56
211	35000	16400	21	0.9	13.7	7.5	6.4	14	0.01	1.33	30	3.2	44	0.57	2.19	0.03	7	0.03	133	0.61	4.1	0.01	0.15	6.5	4.8	4.1	0.044	0.66
212	35000	16800	25	1.8	19.6	6.2	13.6	20	0.02	0.94	70	10.3	45	0.25	3.56	0.07	6.6	0.04	351	0.6	2.9	0.01	0.17	5.7	10.7	3.6	0.018	0.75
213	35000	17000	21	7.6	22.5	14	7.9	21	0.03	1.39	60	9.1	87	0.69	3.56	0.04	8.1	0.04	195	0.81	7.2	0.01	0.34	7.9	8.6	3.7	0.013	0.78
214	35000	17400	4	20.2	21.6	8.2	9.9	16	0.03	2.03	50	3.4	60	0.9	6.81	0.13	4.7	0.03	212	2	11.9	0.01	3.32	6.5	7.2	4.8	0.017	0.87
215	35000	17600	617	18.2	23	6.8	8.8	42	0.06	1.09	20	4.3	24	0.76	7.83	0.05	4.4	0.01	112	2.53	6.5	0.001	3.13	10.4	4.1	2.4	0.007	0.86
216	35000	17800	25	64.6	61.1	14.8	20.2	102	0.15	2.11	40	13.2	103	1.01	20.5	0.09	5.8	0.02	445	5.1	8.2	0.03	8.44	33.7	3.6	6.2	0.014	2.15
217	35000	18000	31	37.6	25.8	16.7	5.4	30	0.03	0.91	70	12	63	0.85	3.47	0.04	9.7	0.03	381	0.74	4.7	0.001	1.85	7.3	6.6	2.3	0.014	0.56
218	35000	18200	35	4.3	5.9	6	4.3	10	0.04	0.72	30	1.5	43	0.73	1.49	0.04	5.3	0.02	59	0.4	5	0.001	0.48	3.1	5.3	2.2	0.013	0.36
219	35000	18400	19	12.1	8.1	6.8	4.1	15	0.03	0.97	30	2.3	53	0.97	2.55	0.04	3.4	0.02	67	0.6	5.7	0.001	0.67	3.4	6	2.4	0.008	0.42
220	35000	18600	42	5.6	4	5	3.5	11	0.11	0.51	20	1.4	38	0.59	2.07	0.02	3.1	0.01	70	0.53	3.3	0.001	0.37	2	3.9	1.6	0.015	0.3
221	35000	18800	46	8.9	14.7	11.5	4.4	17	0.03	0.87	40	8.6	57	0.51	2.65	0.05	7.8	0.03	277	0.76	4.6	0.01	0.64	4.8	7	1.6	0.02	0.42
222	35400	14900	2	4.1	75.9	29.1	6.6	53	0.05	3.71	70	15.2	215	0.42	9.6	0.04	15.9	0.09	476	0.62	3.4	0.02	0.3	30.1	5.7	5.1	0.053	0.76
223	35400	15100	23	2.7	55	12.5	11.4	40	0.02	2.58	160	16.5	141	0.64	8.89	0.08	8.6	0.05	875	1.71	8.5	0.02	0.47	11.2	10.3	5.7	0.015	1.44
224	35400	15300	26	3.4	40.1	23.5	5.9	55	0.04	2.7	70	8.9	71	0.37	7.43	0.09	41.5	0.06	414	1.05	8.8	0.02	0.68	19.4	4.6	4.9	0.02	1.28
225	35400	16300	88	1.5	8.1	2.6	4.3	6	0.08	0.79	10	0.9	47	0.43	2.65	0.02	3.4	0.01	49	0.84	4.4	0.01	0.32	3.7	3.4	2.7	0.01	0.5

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
226	35400	16500	37	4	25.1	6.6	7	12	0.02	2.2	30	2.8	80	0.73	6.7	0.06	4.9	0.03	95	0.99	8	0.01	0.43	8.3	6.2	4.8	0.013	1.09
227	35400	16700	105	1.2	3.8	2.4	2.9	4	0.02	0.53	10	0.6	18	0.43	1.3	0.03	2.4	0.01	97	0.43	3.1	0.01	0.22	1	4.5	1.6	0.008	0.29
228	35400	16900	37	1.6	6	5	3.6	8	0.02	0.62	40	2.8	38	0.35	1.96	0.03	4.6	0.02	127	0.38	3.3	0.001	0.29	2.4	7.6	1.7	0.034	0.31
229	35400	17100	6	23.9	16.7	9.2	10.1	21	0.03	2.66	60	2.8	70	1.47	5.45	0.16	7.6	0.05	111	9.21	13.8	0.02	3.47	7.6	4.7	4.8	0.008	0.95
230	35400	17300	6	43	19.7	9.6	12.1	23	0.17	3.55	60	3.4	88	1.29	8.89	0.15	8.7	0.04	116	1.67	11.1	0.02	6.23	12.1	3.3	6.4	0.006	1.22
231	35400	17500	3	33.2	62.9	15.6	23.6	119	0.1	2.21	120	23.6	61	0.96	16.8	0.17	8.6	0.02	1020	2.26	9.6	0.04	3.32	20.5	6.4	3	0.007	1.9
232	35400	17700	4	21.7	38.1	12.3	10.7	51	0.05	2.38	80	49.3	28	1.03	6.5	0.1	14.7	0.03	1990	0.89	11.2	0.03	1.01	14.2	4.2	4.2	0.014	0.97
233	35400	17900	53	165.5	35.9	33.6	9.4	42	0.05	1.69	60	9.5	50	1.37	6.14	0.12	4.4	0.03	221	1.36	8.7	0.02	5.01	8.1	15	2.9	0.001	0.81
234	35400	18100	43	147.5	40.3	35	12.2	44	0.07	1.8	130	23	143	0.95	7.35	0.09	3.6	0.02	1290	1.48	9.2	0.02	6.24	8.5	13.8	3.8	0.008	0.79
235	35400	18300	44	270	35.3	42.7	9.4	42	0.19	2.24	60	10.4	227	1.05	9.08	0.12	3.9	0.03	97	1.23	13.6	0.02	2.13	10.3	10.1	4.1	0.005	0.93
236	35400	18500	13	22	23	17.2	8.5	14	0.03	2.6	60	2.5	253	0.97	3.98	0.13	6.6	0.04	202	0.97	17.6	0.02	0.69	8.2	8.5	5.2	0.01	0.95
237	35400	18700	13	111.5	43.8	28.2	14.2	35	0.27	3.21	30	4	1030	0.72	19	0.08	3.1	0.02	121	3.61	10.8	0.05	2.9	15.4	6.2	7.4	0.021	1.31
238	35456	12740	1	1.8	45.4	26.3	12.7	65	0.21	3.49	370	102	65	0.36	12.35	0.02	8.5	0.19	2440	1.17	3.7	0.001	0.27	15.7	16.3	2.1	0.1	0.61
239	35456	12940	2	2.4	54.9	24.3	4.9	55	0.07	2.89	220	28.4	40	0.32	6.45	0.09	17.7	0.09	1020	0.72	14.5	0.01	0.19	18.4	8.5	2.9	0.053	0.68
240	35456	13140	3	2.8	87.5	40.7	7.7	42	0.12	3.42	360	156	283	0.31	13.65	0.05	15.1	0.1	2970	2.41	8.1	0.01	0.32	27.2	8.5	3.2	0.102	1.05
241	35456	13340	1	2.4	46.8	21.2	5.3	70	0.05	3.19	270	37.4	56	0.22	7.89	0.06	16.7	0.28	1060	0.57	5.7	0.01	0.13	22.6	21.8	2.6	0.09	0.58
242	35456	13540	9	6.1	50.7	23.9	6.3	31	0.05	2.06	140	25	155	0.31	6.12	0.06	14.1	0.06	598	2.59	7.8	0.01	0.21	16.8	8	3.3	0.033	0.69
243	35456	13740	29	1.2	18.6	9.6	15	29	0.04	1.54	120	30.9	38	0.2	4.5	0.07	11.2	0.16	1070	0.82	9	0.01	0.15	8.8	11.5	3.2	0.067	0.78
244	35456	13940	3	1.4	8.2	3.3	4	11	0.02	1.07	90	3	11	0.21	1.97	0.13	8.8	0.04	120	0.53	12.4	0.001	0.12	2	5.2	5.1	0.025	0.95
245	35456	14140	1	1.5	13.2	6.2	9.8	22	0.03	1.37	80	14.5	26	0.34	2.48	0.07	10.5	0.04	730	0.89	14	0.01	0.13	4	4.9	4.6	0.037	1.05
246	35456	14340	2	4.1	29.7	9.3	11.6	30	0.07	2.75	40	11.2	157	0.64	10.2	0.04	11.9	0.04	423	2.39	7.8	0.02	0.4	18	5.2	8.2	0.038	1.75
247	35456	14540	6	3.4	32.9	18.8	14	40	0.04	2.69	100	72.5	216	0.52	8.02	0.05	7.7	0.05	1680	2.02	8.3	0.02	0.26	15.2	5.2	5.6	0.052	1.35
248	35456	14740	4	4.3	125	46.4	5.4	45	0.04	3.27	100	21.4	204	0.24	10.1	0.02	7.2	0.09	808	0.55	1.7	0.01	0.17	40	3.7	2	0.09	0.47
249	35456	14940	3	2.8	60.6	25.5	5	43	0.02	2.9	120	23.1	121	0.71	6.52	0.07	14.3	0.07	520	0.97	6.7	0.02	0.3	15.7	7.1	5.5	0.028	0.9
250	35800	16000	69	19.7	10.8	4.6	10.5	13	0.62	6.48	10	1.4	378	0.18	35	0.02	1.6	0.02	83	5.28	1.8	0.05	1.89	27.3	4.5	16.3	0.135	0.91

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
251	35800	16200	59	28	31.4	18.3	15	40	0.58	4.13	20	4.2	449	0.99	28.2	0.06	2.8	0.02	210	7.14	5.9	0.04	2.84	28.8	4.8	15	0.067	1.49
252	35800	16400	26	16.5	28.6	17.7	12.4	39	0.37	3.08	30	3.2	315	1.04	17.45	0.08	3.2	0.03	242	4.02	9.4	0.04	2.13	15.1	8	9.1	0.035	1.42
253	35800	16600	47	1.1	5.7	3.8	5	7	0.05	1.35	20	0.8	41	0.88	1.73	0.04	3.5	0.02	87	0.49	5.8	0.01	0.24	2.8	4.5	4.1	0.021	0.52
254	35800	17000	11	62.7	28.6	7	5.9	15	0.02	1.23	30	4.1	92	0.51	7.56	0.04	3.9	0.02	72	1.44	4.4	0.02	4.42	7.3	6.1	2.9	0.007	0.94
255	35800	17200	7	14.6	26.3	11.6	11.6	31	0.11	1.71	30	19.7	89	0.83	6.68	0.08	4.3	0.02	535	1.68	8.4	0.02	2.25	11	4.6	3.4	0.012	0.91
256	35800	17400	4	13	32.4	8.1	6.5	29	0.08	2.13	30	5	29	0.72	7.42	0.09	5.2	0.02	203	1.68	5.9	0.01	1.26	19.6	2.8	2.6	0.011	0.63
257	35800	17600	4	52.6	55.3	19.2	4.8	41	0.07	1.86	40	17	49	0.9	8.47	0.06	3	0.02	370	0.88	5	0.01	6.12	21.7	5.7	1.7	0.001	0.42
258	35800	17800	84	234	69.6	51.7	6.7	71	0.04	2.2	50	25	61	1.51	9.89	0.11	3.6	0.05	425	1.58	10.5	0.02	11.3	25.9	16.2	2.8	0.007	0.7
259	35800	18000	28	124	56.2	28.7	8.8	44	0.03	2.41	150	39.5	65	1.43	8.36	0.11	12.7	0.03	1470	1.32	12.7	0.02	6.49	21.4	12.6	3.1	0.009	0.82
260	35800	18200	7	30.9	27.5	25.7	7.2	24	0.03	2.02	60	10.2	150	0.91	4.6	0.17	4.7	0.03	341	0.97	13.1	0.01	0.88	5.9	15.1	2.5	0.006	0.63
261	35800	18400	5	54.9	36.8	37.6	6.9	38	0.05	1.01	30	11.7	134	0.53	6.41	0.08	4.6	0.01	140	0.81	6.7	0.01	1.08	5.4	5	1.5	0.001	0.58
262	35800	18600	40	121.5	30.8	59.7	10.3	42	0.25	2.13	30	3.6	938	0.21	18.7	0.1	1.8	0.01	81	2.61	5.5	0.01	5.88	13	6	5.2	0.012	0.79
263	36200	14700	9	4.7	45.2	28	6.1	64	0.04	3.19	40	25.1	100	0.72	8.86	0.07	12.3	0.05	802	1.13	7.2	0.02	0.41	30.4	4.4	3.3	0.064	0.85
264	36200	14900	9	1.7	99	109	2.2	136	0.04	3.98	550	412	106	0.34	7.3	0.09	20.3	0.12	3730	0.22	3.4	0.001	0.33	26.8	1	0.7	0.108	0.24
265	36200	17300	2	36.6	37.3	19.2	6.9	45	0.06	2.09	50	7.9	67	0.65	8.81	0.13	5	0.05	190	2	7	0.01	2.88	22.6	19.9	1.9	0.009	0.63
266	36200	17500	10	13.1	49.7	37.9	5.7	41	0.03	3.02	130	59.9	115	1.36	7.36	0.13	11	0.05	1440	1.06	11.9	0.01	1.68	19.4	15.3	2.6	0.011	0.53
267	36200	17700	102	200	62.5	48.3	6	61	0.04	2.04	40	18	65	1.49	9.55	0.1	2.9	0.03	322	1.42	8.1	0.01	12	18.2	9.4	2.5	0.008	0.66
268	36200	17900	30	37.5	30.9	27.7	7.5	32	0.03	1.6	60	13.6	206	0.82	4.16	0.13	7.6	0.03	470	0.8	11.1	0.01	1.31	6.5	11	1.9	0.006	0.67
269	36200	18100	19	47.9	35.8	55.5	6.7	35	0.02	1.48	140	12.3	411	0.44	5.84	0.25	14	0.05	197	0.71	11.9	0.01	0.56	8.2	3.3	2.8	0.005	0.59
270	36200	18500	15	75	26.9	40.8	8.8	26	0.11	5.39	70	3.2	506	1.66	9.63	0.19	3.6	0.06	88	1.77	17.1	0.02	1.75	17.5	7	7.1	0.012	1.01
271	36250	12060	3	6.6	66	29.8	20.4	48	0.74	3.38	10	12.3	431	0.53	27	0.02	3.6	0.02	436	9.06	4.1	0.04	0.6	32.9	2.3	7.1	0.059	2.2
272	36250	12260	12	2.9	41.7	21.9	13.1	35	0.29	4.08	30	13.6	159	0.7	12.25	0.02	6.8	0.04	514	2.62	2.8	0.03	0.28	28.6	3.7	6	0.06	1.28
273	36250	12460	3	1.3	61.6	85.7	8.6	56	0.09	3.43	150	131.5	358	0.4	10.05	0.02	7.4	0.16	2460	0.94	3.6	0.01	0.18	21.5	15.4	2	0.107	0.77
274	36250	12660	2	0.9	19.6	16.3	4.8	25	0.03	1.51	80	26.6	45	0.32	3.59	0.02	9.4	0.09	801	0.68	4.5	0.001	0.11	9.8	14	1.8	0.078	0.53
275	36250	12860	6	1.1	12.1	8.1	7.1	8	0.02	1.11	50	9	46	0.21	3.7	0.04	12.3	0.04	220	0.66	4.2	0.01	0.15	6.2	4.7	3.6	0.04	0.76

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
276	36250	13060	19	4.4	35.9	19.8	22.1	54	0.12	2.78	30	13.5	167	0.59	12.85	0.04	14.3	0.04	353	12.25	4.8	0.02	0.46	26.3	4.6	5.7	0.052	1.58
277	36250	13260	11	12.6	45	24.6	13.6	63	0.29	3.22	60	10.1	252	0.45	18.5	0.07	7.9	0.07	394	3.55	10.9	0.02	0.9	30.1	19.5	8.3	0.059	1.14
278	36250	13460	5	9	41.1	22.6	12.2	50	0.17	3.37	70	10.1	210	0.38	14.5	0.07	10.5	0.05	387	2.97	11.8	0.02	0.66	31	10	7.4	0.038	1.31
279	36250	13660	6	3.1	22.5	17.6	5.7	48	0.06	1.52	180	19.4	53	0.27	4.12	0.08	14.8	0.09	1040	1.1	10.9	0.02	0.17	8.6	21.1	3.3	0.023	0.78
280	36250	13860	3	1.7	9.4	4.8	5.4	9	0.04	1.54	20	3	43	0.52	3.16	0.03	4.6	0.02	164	1.25	5.8	0.01	0.19	5.1	2.6	6.2	0.025	0.75
281	36250	14060	6	5.3	40.3	20.9	14.6	50	0.15	2.9	70	69.3	232	0.61	11.35	0.04	7.7	0.05	1970	2.37	6.6	0.02	0.53	20.4	3.7	6.5	0.062	1.29
282	36250	14260	9	3.8	40.7	16.1	7.4	36	0.06	3.27	40	5.6	87	0.84	8.98	0.05	6	0.03	210	1.66	6.4	0.02	0.35	28.3	7.9	5	0.019	1.46
283	36250	14460	0	17.9	58.7	41.2	11.7	84	0.65	3.27	20	11.2	630	0.31	29.7	0.02	3.1	0.02	234	3.6	2	0.04	1.4	54.7	1.7	7.4	0.059	2.1
284	36250	14660	54	4.6	59.2	37.5	8	146	0.06	3.49	100	68	135	0.6	9.76	0.05	11.2	0.07	1800	1.23	7.3	0.02	0.3	31.4	9.9	2.7	0.093	0.96
285	36600	14600	18	5.7	46.9	48.6	5.7	71	0.07	4.76	160	32.8	214	0.46	9.53	0.17	11.2	0.13	909	1.2	15.2	0.01	0.4	24.1	9.2	3.6	0.097	0.76
286	36600	14800	35	1.8	8.7	5.6	5.4	27	0.02	1.88	60	3.3	24	0.31	3.59	0.07	16.6	0.03	153	2.2	9.3	0.01	0.17	5.3	2.4	5.8	0.019	1.17
287	36600	15200	19	19	17.2	21.5	8.2	27	0.29	2.15	30	2.8	390	0.51	14.95	0.05	2.5	0.02	79	6.65	4.8	0.02	2.38	17.3	4.6	6.1	0.021	1.02
288	36600	15400	16	39	24.1	47.3	12.1	59	0.52	2.83	30	5.7	505	0.43	31.5	0.08	2.5	0.01	77	3.22	4.6	0.04	5.53	24.7	6.5	6.7	0.02	1.2
289	36600	15600	44	48.8	25.4	22.8	10.1	45	0.7	2.66	20	4.3	530	0.5	27.6	0.06	1.7	0.02	92	3.39	5.1	0.05	5.77	18.7	5.2	7.2	0.027	1.22
290	37000	14500	15	8.1	45.6	38.6	8.4	59	0.2	2.54	40	7.6	276	0.39	14.55	0.05	5.7	0.04	303	2.55	7.6	0.04	0.66	30.7	11.2	7.6	0.03	1.49
291	37000	14700	19	4.8	29	26	8.7	42	0.1	2.97	30	6.8	151	0.61	10.15	0.04	4.9	0.05	266	2	6.7	0.03	0.47	24.3	9.7	7.4	0.034	1.29
292	37054	11790	2	1.1	13.1	7.4	7	16	0.03	1.34	50	11.2	41	0.32	3.71	0.03	7.1	0.05	234	2.48	4.5	0.01	0.14	7.5	13.7	2.8	0.056	0.79
293	37054	11990	5	0.9	13.3	7.3	8	14	0.03	1.71	20	6.7	56	0.68	2.68	0.02	5.8	0.02	272	1.26	4.7	0.001	0.13	5.6	4.7	3.6	0.058	0.76
294	37054	12190	2	1.7	25.9	19.4	6.7	35	0.04	2.2	110	35.3	63	0.38	5.12	0.05	18.9	0.1	1100	0.75	6.9	0.01	0.14	13.7	11.9	3.5	0.062	0.92
295	37054	12390	4	1.1	25	13.7	7.5	27	0.02	2.57	70	11.2	63	0.46	5.72	0.04	19.9	0.1	187	0.5	5.1	0.01	0.1	18.2	12.2	5.4	0.019	1.28
296	37054	12590	2	3.5	50.3	32.2	11	27	0.02	3.11	90	47.5	352	0.38	13	0.02	7.3	0.05	1040	1.74	4	0.01	0.29	23	7.6	3.9	0.097	1.59
297	37054	12790	3	1.2	22.7	14.5	4.6	33	0.02	1.92	90	27.1	45	0.25	4.13	0.06	9.6	0.17	896	0.49	7	0.01	0.14	11.3	17.9	2.3	0.085	0.46
298	37054	12990	1	1.1	16.7	10.4	7.4	17	0.01	2.45	150	14.8	48	0.29	3.97	0.09	7.4	0.06	345	0.75	10.8	0.01	0.1	4.8	9.6	10.5	0.042	1.24
299	37054	13190	1	2.6	50.4	29.1	6.7	47	0.02	2.71	190	63.1	142	0.19	8.38	0.05	6.9	0.17	1700	0.52	5.2	0.01	0.14	16.8	16	2.5	0.041	0.62
300	37054	13390	1	2.9	41.7	29.3	3.2	43	0.02	2.9	180	53	105	0.17	5.58	0.07	9.7	0.34	1280	0.33	5.2	0.01	0.08	20.5	18.2	2	0.05	0.34

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
301	37400	14200	17	2.8	56.4	34.1	5	76	0.07	2.2	130	32.4	84	0.35	9.07	0.15	15.6	0.18	927	1.31	12.6	0.02	0.24	19.1	9.3	2.8	0.026	0.56
302	37400	14400	15	11	43	19.1	24.5	152	0.53	3.89	480	22.5	276	0.22	35.2	0.04	3	0.04	1980	5.07	5.9	0.04	1.11	45.2	15.2	10.4	0.065	1.9
303	37400	15400	22	18	54.5	23.6	11.3	56	0.41	3.8	20	5	548	0.25	27.7	0.02	3.8	0.03	143	4.63	2.1	0.05	1.14	54.1	7.8	11.5	0.08	2.09
304	37800	14100	12	8.3	49.1	18.2	13.4	61	0.4	2.86	100	65.7	417	0.49	19.8	0.04	10.9	0.08	1790	2.3	6.8	0.04	0.52	34.4	9	9.5	0.106	1.56
305	37800	14300	27	4.3	45	21.3	8.3	55	0.09	2.66	30	22.5	133	0.65	10.5	0.04	11.3	0.05	871	1.39	8	0.04	0.32	26.8	4.5	5	0.052	1.13
306	37800	14500	14	5.6	115	54.4	10.5	65	0.1	4.32	90	99.3	549	0.45	13.6	0.05	9.3	0.37	2010	2.17	5.6	0.04	0.27	36.7	9	3.8	0.13	1.1
307	37800	14700	19	3.6	30.9	17.2	9	34	0.08	2.36	30	10.6	250	0.71	8.68	0.02	9.9	0.06	228	1.78	3.9	0.02	0.28	21	9.3	6.8	0.065	1.51
308	37800	15100	26	1	18	10.4	1.1	21	0.05	0.44	20	1.6	35	0.13	3.24	0.05	2.4	0.001	38	1.25	1.8	0.01	0.25	4.5	4.3	1.7	0.005	0.41
309	37800	15300	6	2.6	16	7.8	4.6	21	0.04	0.65	40	8.5	36	0.73	3.69	0.05	4.6	0.02	410	1.3	5.3	0.01	0.48	3.6	9.8	2.3	0.012	0.52
310	37800	15500	52	14.1	30.5	15.9	9.1	37	0.35	3.53	20	3.9	323	0.29	21.5	0.04	2.4	0.01	99	4.63	3.8	0.04	1.03	36.2	3.8	9	0.063	1.54
311	37800	15700	36	12.8	26.9	18.9	8.5	35	0.34	2.33	40	4.3	302	0.44	16.8	0.07	3.5	0.02	132	5.03	5.6	0.04	1.27	24.1	4.7	7.6	0.028	1.47
312	37800	16100	12	1.8	5.4	4.6	2.5	10	0.04	0.39	40	3.2	18	0.35	0.95	0.02	3.5	0.01	183	0.35	2.6	0.01	0.24	1.3	8.8	0.8	0.001	0.19
313	37800	16300	4	24.8	35	36.6	12.5	93	0.26	1.74	20	6.2	224	0.73	21.8	0.05	2	0.01	76	1.43	4.7	0.04	2.81	17	3.7	3.8	0.007	1.61
314	37800	16500	4	19.3	43.5	16.7	10.9	119	0.27	1.68	20	5.1	132	0.4	23.4	0.05	1.4	0.01	27	1.37	3.9	0.04	2.19	12	4.2	3.5	0.008	1.04
315	37800	16700	6	24.8	16.1	9.5	9.8	19	0.03	1.5	40	16.6	36	0.98	3.31	0.08	7.7	0.02	415	1.06	11.8	0.02	2.14	4.6	5	3.5	0.008	0.67
316	37800	16900	19	19.6	39.2	14.3	7.8	29	0.12	2.34	40	10.8	73	1.06	9.67	0.06	12.2	0.03	380	1.87	7.6	0.03	1.83	12.4	6.1	4.5	0.014	0.73
317	37800	17100	14	61.7	29.8	29.3	8.9	18	0.05	1.2	40	7.5	424	0.46	5.26	0.06	4.2	0.02	191	1.36	6.5	0.001	1.29	5	5.2	3.2	0.006	0.7
318	37800	17300	21	37.2	14.1	9.4	7.6	11	0.03	1.43	40	3.3	172	0.89	3.53	0.07	5.2	0.03	137	1.14	9.8	0.001	1.35	4.1	7.3	3.9	0.01	0.88
319	38200	14000	5	4.9	43.4	18	8	45	0.15	2.92	60	36.3	260	0.38	12.35	0.03	12.2	0.06	802	1.53	5.2	0.01	0.27	26.7	8.8	5.3	0.092	1.13
320	38200	14200	5	5.2	59.8	16.3	10.2	45	0.08	3.72	80	32.7	156	0.54	13.15	0.03	16.7	0.07	691	1.67	4	0.02	0.15	37.1	10.9	6.5	0.156	1.65
321	38200	14400	9	14.1	39.6	15.1	12.8	41	0.38	4.56	10	10.1	313	0.6	28.4	0.02	3.8	0.03	711	3.95	2.7	0.05	0.63	53.7	3.3	12.3	0.102	1.86
322	38200	14600	43	6.2	31.7	18.7	11.7	53	0.16	3.59	20	17.2	241	1.07	13.2	0.03	8.5	0.04	471	3.24	5.7	0.03	0.4	33.6	3.7	9.7	0.068	1.83
323	38200	14800	28	12.6	48.1	28.2	16.9	55	0.5	4.3	30	44.1	871	0.64	26.1	0.02	7.1	0.04	747	4.45	3.3	0.03	0.95	48.9	3.8	11.3	0.107	1.81
324	38200	15200	10	1.9	13.8	6.7	4.4	17	0.05	0.96	30	1.9	40	0.37	3.85	0.05	5.9	0.02	83	3.87	5	0.001	0.49	5.5	5.8	3.1	0.011	0.59
325	38200	16400	15	29.1	26.9	25.4	9.2	60	0.2	1.71	30	6	174	0.9	14.7	0.07	2.9	0.02	141	1.93	7.5	0.02	2.72	10.6	6.8	4.1	0.009	1.52

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
326	38200	16600	8	10	12.1	11.4	8	22	0.04	1.24	30	13.8	54	0.78	4.68	0.05	6.2	0.02	442	0.76	6.8	0.001	0.9	5.9	6.1	3.1	0.009	0.73
327	38600	13900	9	8.2	34	25.2	11.1	57	0.18	4.63	10	11	246	0.72	17.05	0.02	3.4	0.03	337	2.89	3.7	0.02	0.57	28.4	7.8	11.8	0.074	1.98
328	38600	14100	15	9.4	35.9	23.6	11.3	55	0.19	3.8	30	17.3	409	0.82	19.55	0.02	4.2	0.02	561	2.87	2.8	0.03	0.77	40.1	3.4	9.6	0.067	1.87
329	38600	14300	7	9.8	49.9	27.3	14.4	56	0.31	4.87	200	18.5	539	0.33	23.7	0.02	6.9	0.04	1100	2.84	3.2	0.02	0.8	48.6	10.5	10.1	0.121	1.57
330	38600	14500	11	5.9	39.6	27.3	13.8	105	0.13	4.47	140	27.1	156	1.18	15.9	0.03	7.5	0.04	1450	2.08	5.3	0.03	0.29	37.4	5.9	8.6	0.061	2.27
331	38600	14700	16	13	29.7	15.1	12.5	54	0.25	5.46	30	8.8	256	0.45	23.6	0.02	2.4	0.02	412	3.8	3.1	0.03	0.88	32.9	3.5	13.8	0.099	1.57
332	38600	14900	20	4.7	63.6	32.8	9.5	55	0.08	3.16	40	26.1	406	0.81	13.1	0.02	11.2	0.05	719	1.8	3.7	0.02	0.27	39.8	5.7	6.3	0.089	1.35
333	38600	15100	39	5.8	61.6	83.6	6.6	74	0.07	2.97	160	80.3	251	0.53	9.78	0.05	15.4	0.56	1680	2.48	6.9	0.001	0.89	29	16.2	4	0.059	0.79
334	38600	15300	6	4.9	17.3	11.5	6.5	31	0.11	1.25	20	3.3	164	0.29	9.74	0.04	3.8	0.02	122	2.43	4.6	0.001	0.62	12.7	5	5	0.026	0.91
335	38600	15500	8	14.1	29	17.6	11.7	35	0.35	3.08	20	4.9	532	0.63	22.7	0.03	3.9	0.03	161	8.03	4.4	0.03	1.31	34.7	5.8	10.5	0.062	1.73
336	38600	16100	16	31.9	19.7	20.4	5.7	24	0.04	0.91	50	10.9	122	0.43	3.92	0.04	15.3	0.04	257	0.73	3.9	0.001	1.05	5.1	7.5	2	0.001	0.5
337	38600	16300	10	53.9	28.8	22.8	6.9	30	0.04	1.29	50	7.8	144	0.53	5.19	0.07	13.2	0.03	295	1.13	5.9	0.001	1.82	7.4	8.4	2.3	0.007	0.68
338	38600	16500	13	45	28.5	30.7	8.2	45	0.05	1.17	70	12.2	142	0.51	4.4	0.09	16.8	0.07	491	0.86	6.3	0.01	1.12	5.4	12.2	1.8	0.005	0.66
339	39000	14000	30	14.9	35.3	22.8	12	49	0.39	3.75	70	12.3	341	0.36	25.6	0.02	4.4	0.04	557	3.57	2.5	0.03	0.83	44.2	3.9	14	0.106	1.48
340	39000	14200	12	5.5	22.6	15.6	11.4	31	0.14	5.69	20	6	134	0.79	11.45	0.02	4.6	0.03	241	2.09	3.8	0.03	0.39	23.8	5.3	13.2	0.058	2.05
341	39000	14400	15	11.6	41.7	23	12.7	73	0.23	6.27	10	11.5	315	0.45	22	0.02	3.4	0.02	378	3.46	1.9	0.04	0.64	45.3	3.3	11.9	0.098	2.1
342	39000	14600	43	15	41.4	30.5	13.3	64	0.31	3.72	130	21	314	0.45	22.5	0.03	5.8	0.07	990	3.59	3.3	0.03	0.83	41.2	5.7	11.8	0.085	1.72
343	39000	14800	44	5.3	42	17.5	14.9	63	0.12	3.09	50	25.6	193	0.73	11.8	0.02	6.9	0.04	1000	2.22	3.3	0.02	0.33	34.4	8.3	7.7	0.071	1.57
344	39000	15000	274	7.8	38.3	25.7	12.8	47	0.13	2.76	30	9.7	210	0.59	12.95	0.01	6.9	0.03	352	3.3	2.5	0.03	0.38	36	2.7	7.2	0.054	1.4
345	39000	15200	35	7.3	25.1	12.1	11.5	23	0.23	2.37	30	2.7	300	0.47	15.45	0.03	3.3	0.02	137	3.19	5.2	0.04	0.81	25.3	2.6	8.9	0.044	1.13
346	39000	15400	22	13.8	30.8	16.9	11.7	34	0.25	5.15	20	3.7	459	0.31	22	0.01	3.8	0.02	164	3.92	1.6	0.05	0.85	35.8	1.6	10.9	0.072	1.47
347	39000	15600	21	14.9	40	27.1	13.7	58	0.38	2.73	20	7.3	575	0.46	25.2	0.02	3.2	0.02	217	3.05	3.9	0.04	1.33	40.7	2.9	10.9	0.061	1.88
348	39000	15800	5	12	29.8	13.4	7.7	75	0.09	1.87	30	9.4	135	0.84	13.8	0.04	16	0.02	332	1.7	5.9	0.01	1.39	23.9	3.6	5.8	0.026	2.04
349	39000	16000	3	4.9	16.4	6	5.6	19	0.02	1.24	20	4	60	0.56	5.74	0.05	3.8	0.02	173	1.02	7.4	0.01	0.91	6.7	3.9	4	0.014	0.97
350	39000	16200	4	12.4	16.7	8.3	4.7	18	0.03	0.75	40	5	29	0.37	4.05	0.04	6.7	0.03	186	0.67	3.7	0.001	1.73	4.6	5.7	1.7	0.008	0.41

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
351	39000	16400	11	9.1	23.5	10	5.3	20	0.01	1.16	30	5.5	83	0.82	4.84	0.05	5	0.03	300	0.84	5.9	0.01	0.83	8.3	5.9	2.3	0.009	0.58
352	39400	13700	3	9.6	20.7	8.9	11.1	30	0.38	4.25	10	10	435	0.24	23.7	0.01	2.5	0.01	833	2.23	1.7	0.04	0.69	30.6	1.9	14.5	0.115	1.05
353	39400	13900	4	4.3	32.2	14.7	8.1	37	0.15	4.01	60	32.3	267	0.31	11.35	0.02	5.5	0.08	1220	1.43	3.3	0.02	0.29	22.2	6.8	7.1	0.064	0.85
354	39400	14100	13	3.7	25.3	18.9	11.9	41	0.08	3.33	50	27.7	147	0.99	7.73	0.03	9.8	0.06	1380	1.39	5.6	0.03	0.26	17.1	6.1	7.8	0.042	1.28
355	39400	14300	21	8.2	31.1	15.3	15.5	40	0.15	3.69	40	27	266	0.61	17.9	0.02	4.3	0.03	1450	2.4	3.9	0.03	0.63	27.9	6.5	11.1	0.076	1.59
356	39400	14500	27	4.9	60.7	14.1	5.9	71	0.04	3.74	90	23.4	69	0.62	12.05	0.04	10.6	0.14	694	0.8	6.8	0.02	0.22	35.3	8.4	4	0.107	0.8
357	39400	14700	10	3.8	46.8	12.2	7.9	54	0.03	2.8	50	13.9	114	0.52	11.1	0.02	13.4	0.04	661	1.49	2.6	0.03	0.19	38.9	3	4.4	0.107	1.07
358	39400	14900	155	7.9	94.6	52.4	23.8	89	0.2	3.11	710	282	509	0.7	13.2	0.04	14.8	0.08	7820	3.79	6.9	0.02	0.37	37.3	6.8	5.7	0.105	1.65
359	39400	15100	1000	1.6	32.5	5.8	4.3	20	0.18	1.11	30	2.2	48	0.08	6.51	0.04	35.6	0.01	178	2.39	1.4	0.01	0.5	20.8	6.7	3.3	0.066	0.47
360	39400	15300	354	16.2	43	24.5	17.6	83	0.52	3.04	20	10.3	511	0.4	31.4	0.02	3	0.02	307	5.72	3	0.04	2.24	40.5	3.5	13.4	0.065	1.75
361	39400	15500	14	15.6	54.1	26.8	9.8	52	0.13	3.22	30	20.4	266	0.74	13.45	0.02	9.3	0.04	633	1.52	3.5	0.03	0.93	38.5	5	6	0.086	1.45
362	39400	15700	5	12.7	69.4	42.5	5.8	58	0.03	2.21	130	40	317	0.34	8.53	0.03	11.4	0.1	1420	0.61	4.1	0.01	0.52	29.2	8.7	3.4	0.071	0.83
363	39400	15900	5	30.1	28.9	19.8	6.1	45	0.12	2.2	30	6.2	128	0.82	10.3	0.05	6.6	0.04	191	1.26	5.9	0.02	6.08	19.6	5.2	4.3	0.017	0.9
364	39400	16100	5	63.6	15.4	9.5	5.3	23	0.17	1.27	30	2.7	117	0.36	9.39	0.05	2.9	0.02	139	2.15	3.8	0.01	11.35	7	8	3.4	0.011	0.58
365	39400	16300	5	60.2	13.8	11.9	6.8	25	0.05	1.23	50	4.1	16	0.7	3.18	0.11	3.9	0.02	103	1.98	6.3	0.01	5.33	3.8	6.4	1.6	0.005	0.51
366	39400	16500	13	60.1	39.4	35.4	9.5	45	0.03	1.66	60	23.6	134	0.91	5.37	0.12	10.8	0.05	727	0.92	10	0.02	1.57	5.3	12.8	2.8	0.005	0.63
367	39800	14200	15	8.4	23.6	14.1	13.2	31	0.34	4.59	30	8.1	361	0.63	21.2	0.02	5.3	0.02	795	2.6	3.7	0.03	0.69	30.3	3.7	16	0.104	1.69
368	39800	14400	23	10.9	36	14.8	13.7	54	0.29	5.18	40	14.9	273	0.52	23.7	0.02	6.3	0.03	879	2.46	4.3	0.03	0.89	34.8	3.7	16.1	0.097	1.62
369	39800	14600	36	7.3	30.5	15.4	11.1	64	0.12	3.05	40	19.7	161	0.68	13.05	0.03	9.5	0.04	650	1.69	6.1	0.02	0.36	30.6	5.2	7.9	0.06	1.41
370	39800	14800	63	6.2	47.5	22.4	8.6	85	0.1	3.38	100	28.4	166	0.31	13.25	0.03	6.9	0.08	1040	1.89	4	0.01	0.35	34.9	8	5.3	0.058	1.32
371	39800	15000	37	6.5	41.9	23.6	7.3	58	0.1	3	40	10.4	175	0.62	12.75	0.02	6.9	0.05	305	2.2	3.1	0.02	0.32	33.1	4	5.9	0.057	0.98
372	39800	15400	4	40.4	64.4	27.7	17.6	85	0.55	3	50	37.9	623	0.42	29.3	0.03	4.1	0.02	718	3.56	4.6	0.05	2.91	50.7	2.4	10.3	0.066	2.84
373	39800	15600	5	27.8	55.5	31	7.5	58	0.16	2.7	40	20.7	333	1	13.55	0.04	11.1	0.05	669	1.39	5.9	0.02	2.55	35.5	6.7	5.3	0.046	1.1
374	39800	15800	6	10.9	42.7	41.5	5.1	43	0.02	2.12	130	22.8	127	0.84	6.06	0.04	6.1	0.13	630	0.51	5.6	0.01	0.52	15.6	8.8	2.4	0.018	0.48
375	39800	16000	6	6.9	12.7	7.1	6	18	0.03	1.48	30	3.6	51	0.99	4.96	0.06	4.6	0.02	102	1.44	6.3	0.01	0.8	6.7	5.2	3.8	0.009	0.75

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
376	39800	16200	3	51	34.1	16	7.5	55	0.27	1.43	50	16.1	36	0.87	7.28	0.06	8.2	0.02	376	3.49	5.5	0.01	13.5	12.5	2.5	2.1	0.005	0.63
377	39800	16400	19	60.9	28.1	31.5	6.5	52	0.07	0.81	20	9.6	35	0.53	5.69	0.05	3	0.03	117	1.27	4.1	0.01	1.44	5.2	6.3	1.8	0.001	0.59
378	39800	16600	73	1.6	4.3	4.5	2.6	6	0.06	0.33	40	0.8	23	0.51	0.53	0.03	2.8	0.02	34	0.19	2.9	0.001	0.49	1.3	5.6	1	0.001	0.17
379	40200	13900	3	10.6	38.3	23.9	17	38	0.3	5.88	30	73.3	923	0.67	24.1	0.03	5.3	0.03	1020	3.63	4.2	0.04	0.82	36.2	2.1	12.8	0.134	1.73
380	40200	14100	6	2.9	38.5	32.8	5.7	61	0.06	2.65	340	46.7	140	0.54	8.33	0.08	12.7	0.29	1640	1.04	13.2	0.01	0.18	16.1	12.9	3.6	0.132	0.81
381	40200	14300	20	3.3	44.8	21.2	3.9	48	0.05	2.21	220	18.2	65	0.28	8.48	0.05	17.8	0.2	586	1.24	6.4	0.01	0.27	17.1	14.3	2.9	0.024	0.6
382	40200	14500	6	2.1	43.5	97.8	4.8	58	0.04	2.48	240	54.7	243	0.2	6.15	0.08	14.1	0.47	1380	0.57	8.9	0.01	0.11	16.1	26.4	2.5	0.073	0.61
383	40200	14700	52	1.5	27.1	17.1	5.1	43	0.05	1.71	130	47	64	0.23	5.19	0.05	20.6	0.08	1340	0.73	9.1	0.01	0.17	12.8	11.7	3	0.053	0.84
384	40200	14900	287	7.3	33.6	21.8	10.9	47	0.22	4.24	60	34.5	244	0.35	15.5	0.03	4.5	0.03	901	4.66	4.9	0.02	0.85	25.8	4.5	7.6	0.073	1.17
385	40200	15100	28	13	31.3	17.7	10.8	62	0.27	4.29	30	10.9	319	0.4	22.3	0.02	4.6	0.04	252	5.45	2.9	0.02	0.92	38.9	8.3	11	0.096	1.94
386	40200	15300	3	6.5	53.3	18.7	5.1	33	0.04	1.71	60	9.1	109	0.25	7.75	0.02	11.1	0.07	377	0.83	3.4	0.01	0.38	20.7	11.9	3.4	0.07	0.9
387	40200	15500	2	15.8	32.9	12.5	5.1	47	0.03	1.68	90	18.1	62	0.46	7.5	0.04	16.1	0.07	405	1.13	5.5	0.01	0.73	14.3	7.9	2.9	0.042	0.86
388	40200	15700	4	9.8	17	10.2	6.8	22	0.03	1.11	30	5	129	0.5	7.3	0.04	2.7	0.02	168	1.17	4.1	0.02	0.96	6.3	3.5	2.3	0.008	0.71
389	40200	15900	36	90.3	28.9	15.7	13.5	36	0.02	0.95	60	11.9	26	0.48	5.14	0.09	6.7	0.02	359	2.9	6.4	0.02	7.64	3.9	3.2	2.1	0.001	0.52
390	40200	16100	23	58.2	36.1	33.3	6.8	42	0.02	1.91	80	13.6	161	0.7	8.13	0.06	16	0.06	583	0.94	5.4	0.02	2.4	15.9	4.2	2	0.005	0.42
391	40200	16300	28	77.8	30.6	25.7	11.2	30	0.03	1.57	50	30.3	164	0.79	5.41	0.08	9.3	0.02	669	1.24	9.2	0.02	1.98	6.8	6.9	2.8	0.008	0.71
392	40200	16500	9	33.3	36.6	27.7	15	28	0.05	2.15	110	15	136	0.81	6.1	0.08	15.7	0.05	1110	1.15	10.2	0.02	0.55	8.1	20.6	4.3	0.01	0.96
393	40200	16700	5	10.8	13.7	15.1	15.7	13	0.02	1.49	40	25.9	183	0.78	2.7	0.04	8.7	0.03	907	0.64	9.4	0.01	0.35	4.9	3.8	2.9	0.012	0.64
394	40600	14600	6	2.9	42.8	34.4	5	69	0.04	2.44	260	50.2	87	0.25	7.3	0.05	19.9	0.17	1520	0.59	7.3	0.01	0.2	22.7	16.5	3.2	0.064	0.85
395	40600	14800	12	1.9	32.3	26.7	5.8	53	0.02	2.63	190	38.5	67	0.16	5.73	0.16	12.2	0.27	1160	0.46	7.3	0.01	0.21	15.8	20.7	6.1	0.045	1.15
396	40600	15000	73	1.1	103	64.7	3.3	124	0.07	3.73	250	53.2	77	0.26	10.05	0.08	8.1	1.3	977	4.02	3.8	0.001	0.27	17.4	16.9	0.9	0.008	0.2
397	40600	15200	62	9.9	53.9	32.9	10.3	51	0.09	2.23	60	78.9	203	0.75	9.91	0.03	9.8	0.05	1650	3.27	6.1	0.02	0.57	25.9	3.3	4.5	0.052	1.2
398	40600	15400	4	3.1	9.4	3.8	3.7	6	0.02	0.72	20	1.5	30	0.46	4.65	0.04	2.3	0.01	63	0.65	3.5	0.01	0.65	2.5	3.3	2	0.013	0.38
399	40600	15600	9	3.9	21.9	5.8	3.7	13	0.04	0.75	20	2	45	0.26	6.25	0.04	1.4	0.01	90	0.77	2.2	0.01	0.34	3.6	2.9	1.8	0.006	0.36
400	40600	15800	7	66.9	28.8	23.1	7.6	30	0.02	1.58	50	10.8	62	0.77	5.57	0.1	12.6	0.03	228	2.38	8.9	0.02	4.6	8	3.5	2.8	0.006	0.61

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
401	40600	16000	4	34	36.7	30.2	6	22	0.03	1.14	50	7.7	262	0.63	4.62	0.06	12.7	0.03	201	0.99	5	0.01	1.25	4.9	6.9	2.1	0.001	0.52
402	40600	16200	6	32.4	24.9	13.7	9.9	20	0.02	1.73	60	10.9	97	0.92	5.54	0.07	10.3	0.03	565	1.5	9.2	0.02	1.32	6.3	11.5	3.7	0.011	0.92
403	40600	16400	3	66.6	31.4	49.6	10.9	29	0.16	2	20	11	1540	0.74	10.8	0.03	5.7	0.03	206	3.41	4.8	0.02	5.24	13.9	3.3	3.9	0.026	0.86
404	40600	16600	3	9.2	4.7	5.6	9.2	10	0.04	1.38	20	2.6	54	0.48	3.06	0.04	5.9	0.02	127	0.62	7.8	0.01	0.42	4.6	4.5	2.5	0.009	0.9
405	41000	14100	4	3.3	50	24.9	6.5	59	0.05	4.09	130	40.2	102	0.58	8.73	0.07	14.4	0.13	1210	0.91	8.8	0.02	0.16	26.4	11.7	3.6	0.089	0.98
406	41000	14300	4	4.8	50.7	29.3	13.2	62	0.08	3.8	190	111	361	0.83	11.05	0.05	13.5	0.07	2730	1.55	7	0.02	0.27	26.6	8.6	4.9	0.095	1.37
407	41000	14500	2	6.7	66.4	40.9	15	53	0.14	2.28	760	112.5	364	0.22	13.9	0.06	8.1	0.12	4180	1.59	4	0.02	0.5	18.6	13.8	3.8	0.07	0.86
408	41000	14700	2	0.9	9.3	5	3.4	5	0.03	0.45	30	5.6	33	0.24	3.28	0.06	4.4	0.01	174	0.39	3.3	0.001	0.32	1.3	8.3	1.6	0.01	0.25
409	41000	14900	10	3	12.9	5.9	5.8	9	0.02	0.76	30	4.6	83	0.22	6.1	0.04	7.7	0.02	143	0.68	2.7	0.01	0.5	2.2	6.3	2.5	0.015	0.59
410	41000	15100	1	2.3	10.4	27.4	7.4	41	0.02	2.39	90	12.8	53	0.35	4.5	0.07	15.4	0.38	242	0.45	4.3	0.01	0.28	2.5	6.2	2.6	0.006	0.38
411	41000	15300	5	2.6	14.3	5	3.7	7	0.03	1.03	30	1.8	27	0.72	4.53	0.07	2.7	0.01	90	0.63	4.4	0.01	0.61	3.8	5.5	2.4	0.009	0.49
412	41000	15500	2	3.1	16.1	7	4.4	13	0.02	1.14	40	6.2	37	0.56	4.94	0.05	3.7	0.02	179	0.59	3.6	0.01	1.07	6.3	4.4	2.4	0.01	0.47
413	41000	15700	6	20.7	21.4	12.5	11.3	23	0.02	1.42	50	42.5	76	0.56	4.38	0.07	8.9	0.03	1540	2.87	9.2	0.01	1.53	6.7	4.3	3.5	0.012	0.75
414	41000	15900	21	73.5	30.8	39.3	10.3	33	0.03	1.33	50	13.5	284	0.63	5.01	0.07	12.9	0.03	276	1.14	7.3	0.01	1.54	7.3	6.1	2.7	0.005	0.75
415	41000	16100	9	34.9	23.6	22.4	8	18	0.01	0.97	30	9.2	408	0.41	5.09	0.04	4.6	0.02	244	1.15	5.5	0.01	0.74	4.1	6.5	2.3	0.007	0.65
416	41000	16300	29	7.3	16.7	15.2	9.8	14	0.02	1.1	60	40	98	0.48	4.07	0.04	11.1	0.03	949	1.14	6.2	0.01	0.53	6.2	4.2	2.7	0.022	0.7
417	41000	16500	16	8.4	26.9	16.4	11.6	22	0.01	2.1	50	44.4	87	0.85	5.31	0.05	14.2	0.04	1040	1.36	11.6	0.02	0.66	10.2	6.1	4.5	0.022	0.9
418	41000	16700	14	4.7	13.8	8.8	8.9	13	0.02	1.14	40	35.9	58	0.52	3.05	0.04	6.9	0.02	1080	0.83	7.3	0.01	0.47	5.1	7.7	2.8	0.017	0.58
419	41400	15800	19	11.6	34.3	45.4	7.2	53	0.04	1.59	120	37.6	167	0.51	5.79	0.05	13.9	0.12	1780	1.18	6.6	0.01	0.52	12.7	10.6	2.7	0.035	0.74
420	41400	16000	22	63.7	24.8	30.5	7.4	23	0.05	1.32	50	14.9	204	0.63	4.69	0.07	9.2	0.03	332	1	8.2	0.01	1.17	6.5	5.3	2.6	0.007	0.63
421	41400	16200	22	4	23.6	23.1	4.6	42	0.22	1.25	80	22	89	0.32	5.04	0.04	8.9	0.11	719	0.94	3.9	0.01	0.35	9.3	8.1	2	0.046	0.59
422	41400	16400	50	6.7	26.7	21	7.1	38	0.03	1.89	100	41.7	98	0.46	6.12	0.04	10.7	0.06	943	1.16	6.3	0.01	0.46	11.8	10	3.5	0.025	0.78
423	41400	16600	24	5.1	25.4	21.3	5.5	39	0.04	1.34	130	26.7	76	0.32	5.09	0.05	10	0.11	868	1.08	6.1	0.01	0.36	9.5	21.6	2.3	0.032	0.43
424	41800	14100	4	5.6	48.2	68.1	3.3	59	0.04	2.53	170	34.2	169	0.35	6.01	0.08	16.5	0.53	1000	0.31	5.3	0.14	0.23	16	19.4	3	0.047	0.58
425	41800	14300	6	2.5	17.2	11.2	6.6	21	0.02	1.36	50	26.7	48	0.74	3.64	0.07	6.1	0.03	543	0.52	6.5	0.17	0.34	4.9	6.9	2.7	0.01	0.56

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
426	41800	14500	5	2.8	9.2	14	4.7	18	0.02	0.85	100	9.7	17	0.74	2.24	0.09	4.7	0.04	315	0.33	5.3	0.12	0.32	2.3	19.4	1.2	0.001	0.27
427	41800	14700	13	5.1	20.9	10.9	6.7	28	0.37	0.78	30	4.5	73	0.51	5.63	0.06	2.5	0.01	161	0.86	4.4	0.01	1.28	3.9	7.4	2.5	0.011	0.59
428	41800	14900	2	3.3	8.9	8.7	3.5	23	0.07	0.68	20	2.2	18	0.45	4.3	0.08	2.2	0.01	41	0.44	3.9	0.001	0.97	1.9	3.5	1.8	0.007	0.3
429	41800	15100	1	2.7	21.8	6.8	2.5	35	0.09	0.56	20	2.2	15	0.3	4.89	0.07	1.4	0.01	32	0.28	3.1	0.001	1.34	2.2	2	1.7	0.005	0.28
430	41800	15300	2	79.9	21.4	32.8	7.7	74	0.05	1.09	40	6.2	18	0.53	11.1	0.08	6.9	0.02	68	1.64	4.4	0.001	2.93	9.2	1.8	2.9	0.001	1.31
431	41800	15500	3	15.9	39.1	35.8	5.2	69	0.04	2.41	180	39.3	55	0.78	7.49	0.05	10.5	0.35	1280	0.95	4.7	0.001	1.18	18.6	8.4	1.4	0.019	0.44
432	41800	15700	22	73.6	32.8	37.5	6.8	40	0.06	1.03	30	13.7	59	0.82	4.9	0.07	4.5	0.03	180	1.26	5.9	0.001	1.37	5.2	8.5	2.4	0.001	0.67
433	41800	16100	5	13.5	34.8	30.1	16.9	25	0.04	1.45	160	60.8	204	0.87	5.21	0.07	19.4	0.02	1900	1.49	8.9	0.001	0.36	7.8	11	3.9	0.012	0.88
434	41800	16300	6	20.1	40.5	62.1	16.6	42	0.06	2.22	100	38.6	650	1.51	6.07	0.06	17.9	0.06	1320	1.78	14.6	0.001	0.53	11.8	15.9	4.1	0.025	0.71
435	41800	16500	5	10.1	30	16.3	12.2	52	0.08	1.78	80	10.7	76	0.67	4.29	0.06	12	0.08	748	0.88	10.2	0.02	0.27	6.8	141.5	2.4	0.014	0.85
436	41800	16700	7	6.4	18.4	12.8	14.3	25	0.03	2.01	50	9.7	94	0.95	3.05	0.06	11.8	0.06	574	0.76	10.4	0.001	0.24	7.1	23.2	5.8	0.021	0.95
437	42600	14100	1	13.2	63.1	30.3	4.2	40	0.04	3.91	130	32.8	63	0.62	8.48	0.09	10.2	0.32	639	0.51	6.4	0.01	0.89	18.6	15.8	3.2	0.037	0.66
438	42600	14300	7	1.9	17	12.4	7.1	21	0.02	1.53	40	8	91	1.05	3.54	0.07	7.1	0.02	217	0.72	8.1	0.01	0.35	5.5	7.6	3.6	0.014	0.69
439	42600	14500	10	4.3	30.8	21.5	6.9	39	0.03	3.03	110	12.3	110	0.83	7.75	0.07	12.5	0.1	307	1.04	7.6	0.01	0.49	12.4	9.7	4.6	0.046	0.94
440	42600	14700	5	14.9	22.4	7.5	17.8	19	0.12	2.02	20	6.2	300	0.57	21.9	0.04	3.3	0.01	135	3.01	4	0.03	2.81	10.4	3.9	10.3	0.037	1.65
441	42600	14900	3	5.9	14.4	16	4.9	55	0.04	0.76	20	6	25	0.74	7.25	0.06	3.4	0.01	85	0.62	3.1	0.001	1.94	4.3	5.4	2.3	0.006	0.58
442	42600	15100	1	14	32.6	22.2	7.6	51	0.02	1.27	90	24.9	57	0.58	5.92	0.06	6.8	0.15	717	2.24	5.7	0.001	1.56	5.4	5.3	2	0.008	0.52
443	42600	15300	4	36.7	22.5	15.1	10	27	0.02	1.14	60	30.7	31	0.59	3.87	0.09	7.5	0.04	1060	2.15	8.8	0.01	2.57	4.2	6.8	2.9	0.014	0.57
444	42600	15500	253	206	50.5	59.9	8	80	0.16	0.88	30	5.3	135	0.52	7.14	0.07	3.4	0.01	110	1.64	5.1	0.02	7.69	9.6	6	2.2	0.008	1.06
445	42600	15700	32	141	33.9	34.9	10.8	31	0.04	1.94	50	18.6	229	1.12	5.72	0.09	9.1	0.03	365	1.32	13.3	0.02	0.86	8.1	9.5	4.9	0.014	1.08
446	42600	15900	6	11.3	19.5	14.3	10.1	15	0.05	1.09	40	12.5	147	0.49	4.19	0.05	4.4	0.01	572	0.94	6.1	0.02	0.22	3.9	8.4	3.1	0.012	0.69
447	42800	14300	172	51.5	16.2	44	14.4	77	0.19	0.97	30	4.8	46	0.65	7.86	0.06	2.1	0.03	109	1.55	6.2	0.001	0.73	4	7.6	2.1	0.008	0.39
448	43400	14100	2	6	36.7	27.6	11	26	0.03	1.75	170	68.3	166	0.51	6.11	0.04	7.5	0.06	1660	1.03	6.8	0.01	0.59	9.3	11.8	3.5	0.047	0.68
449	43400	14300	7	1.4	13.6	9	4.3	18	0.1	0.88	80	12.7	37	0.38	2.39	0.07	14.4	0.06	504	0.4	5.2	0.01	0.19	2.1	10.5	2.1	0.015	0.25
450	43400	14500	3	2.6	5.6	7.3	5.2	11	0.03	0.67	70	7.9	40	0.34	1.98	0.04	5.9	0.06	333	0.3	3.4	0.01	0.25	1.6	15.8	1.2	0.016	0.35

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
451	43400	14700	4	5.9	18.4	5.5	3.7	14	0.02	0.65	30	2.5	28	0.59	4.8	0.04	2.6	0.02	134	0.52	2.9	0.01	1.16	3.2	7.1	1.4	0.01	0.53
452	43400	14900	4	26.8	19.1	15.9	12.7	16	0.02	1	70	39.1	164	0.71	3.65	0.05	9.8	0.02	991	0.99	7.6	0.01	1.16	4.1	7.2	2.9	0.012	0.72
453	43400	15100	11	63.2	32.5	58.9	9.8	47	0.04	0.96	90	22.3	234	0.6	4.33	0.06	14.5	0.03	715	1.06	6.1	0.01	2.2	4.7	8.8	2.2	0.01	0.64
454	43400	15300	6	39.6	47.3	36.4	13.9	29	0.03	1.3	30	28.8	302	0.55	7.14	0.06	10.4	0.01	686	1.21	6.6	0.02	0.59	6.1	4.6	5	0.012	1.15
455	43400	15500	1	5.7	39.5	66	20.1	41	0.08	0.98	600	89.2	233	0.5	3.5	0.05	12.7	0.01	4590	0.89	5.8	0.02	0.12	3.6	13.8	2.5	0.013	0.56
456	43400	15700	3	14.1	63.8	23.1	6.5	44	0.13	0.93	30	5.8	116	0.31	6.21	0.05	12.8	0.02	206	0.91	3.6	0.01	0.16	6	12.6	3.3	0.01	0.86
457	44200	13900	4	20.6	39	16.5	7.2	66	0.04	1.86	120	32	54	1.36	7.52	0.06	20.3	0.05	1320	1.64	11.2	0.02	1.07	16.9	12.3	4.5	0.054	1.59
458	44200	14100	1	10.1	35.2	16.7	13.3	26	0.04	1.99	80	26.9	202	0.64	11.95	0.03	5.3	0.03	729	2.14	3.9	0.01	0.78	13.1	4.4	6.8	0.065	2.46
459	44200	14300	3	18.4	47.8	30.7	13.3	49	0.1	2.34	40	31.8	710	0.41	21.6	0.03	6.6	0.03	501	2.97	3	0.02	1.91	17.8	3.9	11.4	0.049	3.41
460	44200	14500	3	5.4	13.5	8.8	3.6	15	0.04	0.59	30	1.7	88	0.3	4.94	0.03	1.4	0.01	123	0.51	2.1	0.01	0.74	3.5	6.6	2.2	0.017	0.44
461	44200	14700	10	12.1	22.5	8.4	8.1	28	0.04	1.02	20	2.5	66	0.35	7.03	0.07	1.9	0.02	103	0.87	4	0.02	1.32	6	6.5	2.7	0.012	0.87
462	44200	14900	14	92.8	34.4	27.4	6.7	31	0.06	1.16	30	4.2	432	0.49	6.11	0.06	3.2	0.02	132	1.15	6.7	0.02	3.17	6	9.2	2.5	0.012	0.66
463	44200	15100	10	75.5	50.6	49.5	12.4	44	0.04	1.66	40	15.8	438	0.6	9.96	0.07	5.5	0.02	296	1.63	6.9	0.02	0.94	6.6	6.2	5.8	0.011	1.53
464	44200	15300	2	4.8	30.1	53.6	8	40	0.03	1.37	80	20.7	163	0.49	4.23	0.06	16.6	0.21	351	0.64	6	0.01	0.13	4.2	9.3	3.4	0.012	0.75
465	44200	15500	2	3.4	22.2	19.9	4.5	35	0.04	1.35	90	18.7	66	0.43	3.87	0.05	11.4	0.12	770	0.57	5.1	0.01	0.33	9.3	16.4	2.5	0.034	0.54
466	45000	13700	0.001	11.5	71.1	41.3	10.1	85	0.12	3.09	30	25.4	459	0.38	23.9	0.03	5.4	0.03	749	2.28	1.9	0.03	1.56	43.8	4.2	7.1	0.057	2.22
467	45000	13900	0.001	10.3	41.7	33	15.4	58	0.14	4.64	40	19.1	309	0.68	18.75	0.03	6.4	0.02	657	1.73	2.9	0.03	1.21	30.1	6.2	10.8	0.067	2.05
468	45000	14100	7	4.9	18	7.3	4.4	17	0.05	1.03	20	2.1	61	0.7	5.66	0.05	2.2	0.01	67	0.92	4.1	0.01	1.51	4.7	3.1	2.8	0.016	0.52
469	45000	14300	18	5.4	19.2	6.7	4.9	12	0.03	0.9	20	2.2	36	0.52	4.88	0.04	2.4	0.02	107	0.57	4.3	0.01	1.01	4.4	6.3	2.3	0.015	0.49
470	45000	14500	5	41.1	35.9	76.4	6.5	46	0.05	1.63	30	2.7	805	0.41	6.93	0.04	3.7	0.02	58	0.88	4.5	0.02	1.1	15.5	2.4	2.9	0.011	0.65
471	45000	14900	13	44.5	26.3	18.9	6.3	19	0.03	1.3	30	3.1	192	0.66	4.12	0.07	3.2	0.02	75	1.07	7.2	0.01	0.77	6.1	6.6	3.1	0.01	0.57
472	45000	15100	1	7.6	27.2	20.6	6.9	27	0.05	1.38	40	8.3	418	0.77	6.35	0.04	9.7	0.02	172	1.18	5.8	0.02	0.31	6.7	4.7	4	0.016	1.02
473	45000	15300	1	7.9	17.5	26.5	6	32	0.03	0.97	50	10.5	176	0.52	3.6	0.04	11.1	0.11	281	0.59	5.6	0.01	0.15	4.3	8.8	2.7	0.011	0.68
474	45800	13700	10	6.6	17.9	19.8	3.5	37	0.04	0.85	20	2	46	0.3	5.65	0.05	1.3	0.01	86	0.67	2.7	0.01	0.69	4	5.5	1.9	0.013	0.48
475	45800	13900	2	5.8	40.6	21.1	6.6	21	0.02	0.7	20	2.5	124	0.33	5.46	0.06	4.1	0.01	129	0.4	2.6	0.01	2.85	12.5	1.8	1.4	0.007	0.61

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
476	45800	14100	7	2.7	17.1	8.9	2.7	27	0.04	0.66	20	2.2	23	0.67	4.97	0.04	2.3	0.01	40	0.47	2.7	0.001	1.17	4.7	3	1.5	0.001	0.49
477	45800	14300	9	3.4	14.1	9.3	4.7	23	0.03	1.02	30	4.4	30	0.74	4.67	0.04	3.5	0.01	96	0.8	4.3	0.001	1.62	5	5.1	3	0.006	0.55
478	45800	14500	10	57.9	21	41.7	8.7	48	0.04	1.12	20	19.5	187	0.67	7.47	0.05	3.2	0.02	445	1.09	7	0.01	2.64	6	6.4	3.3	0.007	0.77
479	45800	14700	6	16.3	21.5	15.9	8.6	22	0.03	0.88	50	16.6	104	0.53	5.21	0.04	10.2	0.03	588	0.95	6	0.001	1.25	4.8	9.5	2.9	0.01	0.73
480	45800	14900	1	6.2	26.1	14.5	8.7	15	0.03	1.81	40	4.4	153	1.34	5.17	0.05	10.8	0.02	137	1.23	9.5	0.01	0.21	6.8	7	5.8	0.01	1.19
481	45800	15100	1	0.6	2.5	5.3	3.3	6	0.01	0.4	50	1.3	19	0.43	0.58	0.03	5.6	0.04	84	0.12	3.5	0.001	0.08	1.2	7.1	1.5	0.001	0.25
482	46600	13700	3	10.9	28.5	27.8	7.5	36	0.07	2.13	40	3.6	151	0.76	8.35	0.04	4.8	0.02	276	1.3	5.8	0.02	0.92	18.1	3.2	6.4	0.024	1.09
483	46600	13900	0.001	11	10.3	4.1	5.8	30	0.07	0.97	30	1	40	0.36	4.13	0.09	19.8	0.01	51	0.86	5.7	0.01	2.49	2.9	1.3	3.5	0.005	0.6
484	46600	14100	9	6.5	34	12.4	5.4	37	0.05	1	80	14.1	34	0.58	5.35	0.05	7	0.05	437	0.9	4.5	0.001	1.41	7.1	7.5	2	0.01	0.6
485	46600	14300	10	16.9	63.4	29.3	5.1	69	0.06	1.52	170	38.6	76	0.63	8.19	0.04	23.8	0.09	1110	1.12	2.7	0.001	1.43	25.3	9	1.9	0.044	0.4
486	46600	14500	19	44.9	31.4	28.8	16.5	27	0.05	1.48	60	56.6	286	0.91	4.42	0.09	14.3	0.04	1020	1.93	13	0.001	0.66	6.2	16.6	4.7	0.011	0.96
487	46600	14700	7	9.2	25.7	18.6	9.1	31	0.04	1.86	50	21.8	91	0.89	5.22	0.06	11.7	0.04	671	0.99	10	0.01	0.74	10.8	8.8	4.4	0.035	0.84
488	46600	14900	6	6.3	24.8	22.9	16.2	29	0.04	2.7	40	34.6	111	1.84	3.96	0.12	13.5	0.04	1000	1.02	16.1	0.001	0.38	9.3	12.5	7.4	0.028	1.25
489	47400	13700	9	4.1	14.9	4.2	4.3	9	0.03	0.75	30	1	22	0.45	3.59	0.1	2.6	0.01	56	0.89	5.7	0.001	1.55	2.4	5	2	0.006	0.38
490	47400	13900	14	3.7	25.4	9.9	4.9	23	0.04	1.81	60	5.3	30	1.02	5.74	0.1	15.4	0.03	160	1.02	9.1	0.01	1.43	10	4.9	3.4	0.008	0.57
491	47400	14100	4	16.1	31.8	33.3	9.5	35	0.09	0.96	60	6.4	62	0.41	6.06	0.08	8.4	0.04	250	1.21	6.1	0.001	0.78	5.5	12.9	2.6	0.001	0.51
492	47400	14300	6	15.8	40.3	41	11	50	0.07	2.28	50	5.2	196	0.65	8.45	0.08	9.3	0.04	199	1.33	7.6	0.001	0.74	16.7	19.2	5.6	0.01	1.2
493	47400	14500	10	54.9	30.5	30.3	6.8	30	0.04	1.53	60	6.2	146	0.8	5.52	0.11	9.6	0.03	244	1.51	9.2	0.01	0.36	5.8	10.7	3.8	0.006	0.78
494	47400	14700	6	29.7	27.3	41.5	7.8	40	0.03	1.38	40	8.3	235	0.75	5.03	0.07	8.7	0.02	174	1.27	8.6	0.01	0.34	5.7	7.2	3.3	0.005	0.73
495	48200	13500	3	5.4	9.7	8.8	10.9	20	0.06	2.93	50	2	84	1.28	6.27	0.1	4.5	0.04	95	1.66	11.9	0.01	1.1	9.2	6.6	7	0.012	1.16
496	48200	13700	2	5.4	35.8	23	9.7	61	0.15	4.06	110	40.8	120	0.58	13.05	0.07	9.4	0.12	1160	1.14	9.4	0.01	3.29	21.8	10.6	5.1	0.045	0.79
497	48200	13900	1	2	68.2	51.6	2.2	118	0.04	3.51	630	52.7	42	5.33	8.84	0.17	13.1	0.75	1160	0.31	15.9	0.001	0.61	24.1	48.8	1.3	0.376	0.31
498	48200	14100	5	27.9	114.5	36.4	11.5	62	0.2	1.03	80	5.8	56	0.49	6.31	0.08	16.5	0.01	597	2.23	4.7	0.001	0.92	8.4	14.5	3.8	0.001	0.84
499	48200	14500	32	18	33.5	30.4	13	38	0.05	2.87	60	19.3	238	1.98	6.38	0.11	19.4	0.04	480	1.16	17.3	0.04	0.31	10.9	7.9	5.8	0.02	1.24
500	49000	13300	3	15.8	41.7	27	14.5	61	0.35	6.82	20	6.3	649	0.75	25.8	0.04	4.3	0.03	336	2.35	3.7	0.05	1.81	33.3	6.7	9.2	0.088	1.49

APPENDIX A Cont'd

ID	North	East	Au ppb	As ppm	Cu ppm	Ni ppm	Pb ppm	Zn ppm	Ag ppm	Al pct.	Ba ppm	Co ppm	Cr ppm	Cs ppm	Fe pct.	K pct.	La ppm	Mg pct.	Mn ppm	Mo ppm	Rb ppm	S pct.	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti pct.	U ppm
501	49000	13500	1	12	41.9	33.3	7.3	42	0.08	3.68	60	13.5	379	0.5	12	0.02	14.9	0.06	372	1.05	3	0.03	0.38	27.7	9.9	6.3	0.076	1.35
502	49000	13700	2	13.4	24.4	19.3	6.2	42	0.07	1.15	30	3.2	75	0.46	6.17	0.09	17.6	0.01	140	0.65	5.3	0.02	0.24	5.3	9.5	3.9	0.011	0.7
503	49000	13900	5	6.9	44.6	27.6	11.6	48	0.12	3.13	120	130.5	167	0.99	11.35	0.03	13.1	0.06	4450	1	4.3	0.04	0.87	22.6	5.4	5	0.074	0.99
504	49000	14100	10	17.4	37.3	22.4	10.8	64	0.35	7.06	10	8.7	440	0.66	24.4	0.02	5	0.02	217	1.76	2	0.06	1.81	45.4	1.7	7.8	0.077	1.89
505	49000	14300	3	8.4	51.8	46	9.3	48	0.08	4.22	100	108	402	0.82	11.15	0.02	9.9	0.06	1940	0.98	3.6	0.04	0.39	24.8	11.4	5.5	0.106	1.07
506	49800	12100	8	10.3	62.8	29.3	16.9	96	0.2	3.5	30	31.5	393	1	24.2	0.03	8.8	0.03	875	3.67	4.4	0.05	2.06	34.6	3.6	7.1	0.048	1.84
507	49800	12300	2	8.1	23	9.2	6.5	63	0.07	4.56	50	14.8	60	1.12	12.3	0.03	11.5	0.09	625	0.84	4.1	0.03	0.48	27.7	10	3.8	0.107	0.99
508	49800	12500	1	6.9	41.1	23.9	8.3	46	0.12	3.85	20	8.7	259	0.56	12.25	0.03	12.1	0.05	447	0.76	2.7	0.06	0.46	33.1	3.4	4.4	0.068	0.75
509	49800	12700	3	7	46.7	26.9	9.8	51	0.07	4.54	70	51.6	279	1.06	10.65	0.05	10.9	0.08	1180	0.92	6.2	0.05	0.39	25.3	6.7	4.1	0.08	0.92
510	49800	12900	2	8.6	69.8	87.1	3.2	76	0.06	4.11	200	60.3	188	0.57	8.63	0.03	14.1	0.77	1560	0.38	3	0.06	0.2	24.4	17.9	1.6	0.112	0.38
511	49800	13100	2	17.2	22.9	11.2	7.8	32	0.04	1.52	60	14.1	47	0.5	3.64	0.11	11.7	0.04	426	1.17	8.9	0.03	0.56	4.7	3.1	2.8	0.02	0.63
512	49800	13300	11	7.8	72.9	32.1	4.1	89	0.07	3.08	160	45	71	2.16	10.6	0.05	13.7	0.32	1860	0.34	5.1	0.03	0.65	26.4	13.9	1.6	0.088	0.38
513	49800	13500	86	85.2	63.3	25.8	8.8	119	0.16	3.57	80	10.5	148	0.79	18.35	0.1	9.1	0.04	492	1.58	6.3	0.03	5.65	33.7	10.2	2	0.02	0.76
514	49800	13700	18	107.5	45.5	79.4	7.3	64	0.05	1.64	50	14.8	100	0.95	6.61	0.14	9.7	0.04	236	1.25	9.6	0.04	1	6.9	10	3.6	0.009	0.8
515	49800	13900	2	11.3	23.9	41.6	12.4	24	0.03	1.16	100	48.3	294	0.7	3.83	0.1	6.3	0.04	1060	0.86	10.9	0.02	0.3	3.9	10.9	2.4	0.018	0.46
516	49800	14100	9	19.7	36.2	30.4	6.8	56	0.05	2.27	90	31.5	99	0.9	7.83	0.09	18	0.14	1160	0.83	9	0.02	1.08	12.6	17.6	2.4	0.03	0.6
517	50600	12900	2	2.3	23	8.6	5.7	49	0.04	1.52	100	11.8	22	0.57	3.74	0.16	17.2	0.05	452	0.72	10.3	0.03	1.06	4.7	3.7	2.2	0.016	0.53
518	50600	13100	4	31.3	18.3	5	5.7	60	0.06	2.73	110	5.1	14	1.18	9.53	0.19	29.2	0.05	233	1.91	11.2	0.03	1.82	11.3	3.3	2	0.013	0.49
519	50600	13300	3	11.8	48.2	32.6	4.8	73	0.05	2.96	170	39.1	71	1.36	9.98	0.06	12	0.33	1500	0.45	5	0.03	0.92	19.8	14.9	1.2	0.05	0.26
520	50600	13500	27	67.7	27	35.8	5.8	53	0.05	0.81	40	6.5	31	0.88	5.61	0.09	4.2	0.03	193	0.86	6.2	0.03	0.88	5.3	15.7	1.9	0.009	0.41
521	50600	13700	10	16.3	33.2	33.2	12.5	34	0.04	2.93	90	22.9	209	1.53	4.96	0.13	15.4	0.06	885	0.98	18.7	0.03	0.29	10	12.7	5	0.016	0.92

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
1	30600	16900	106	0.05	19.1	0.06	0.01	0.02	0.065	1	0.08	30.6	8.24	0.14	0.41	200	0.9	0.02	6.05	0.74	0.05	1.6	0.001	0.001	0.05	0.03	0.001
2	30600	17100	12	0.001	2.3	0.05	0.001	0.01	0.011	0.2	0.18	77.6	6.76	0.1	0.28	140	0.8	0.001	19.15	1.12	0.05	1.4	0.001	0.001	0.04	0.04	0.001
3	30600	17300	143	0.1	23.5	0.02	0.03	0.01	0.087	0.9	0.07	64.9	10.05	0.19	0.23	300	0.7	0.03	7.66	0.89	0.05	3.5	0.001	0.001	0.06	0.04	0.001
4	30600	17500	196	0.12	29.5	0.01	0.01	0.02	0.118	0.7	0.21	36.7	19.25	0.6	0.53	420	2.8	0.16	7.63	0.49	0.05	1.6	0.001	0.001	0.06	0.12	0.001
5	30600	17700	63	0.001	6.1	0.05	0.001	0.001	0.028	0.5	0.07	53	10.3	0.23	0.5	170	0.7	0.03	8.47	1.17	0.06	1.7	0.001	0.001	0.06	0.08	0.001
6	30600	17900	47	0.001	5.1	0.07	0.01	0.001	0.023	0.4	0.06	93.8	9.86	0.17	0.2	170	1.1	0.05	11.5	1.06	0.06	3.7	0.001	0.001	0.11	0.06	0.001
7	30600	18500	46	0.08	2.3	0.1	0.01	0.03	0.025	0.4	0.17	40.2	16.4	0.43	0.25	300	1.6	0.21	7.54	1.19	0.08	2.1	0.001	0.001	0.05	0.06	0.001
8	30600	18700	295	0.17	30.7	0.02	0.01	0.02	0.117	0.7	0.05	124	9.64	0.21	0.43	70	1.7	0.04	40	0.45	0.1	2	0.001	0.001	0.11	0.06	0.001
9	30600	18900	535	0.21	37.9	0.01	0.01	0.01	0.204	0.9	0.09	81.1	11.3	0.3	0.42	160	1.3	0.06	11.75	0.95	0.07	2.9	0.001	0.001	0.09	0.07	0.001
10	30600	19100	535	0.18	42.1	0.02	0.01	0.01	0.219	0.8	0.56	83.7	16.85	0.44	0.34	260	1.5	0.05	12.1	1.24	0.1	4.8	0.001	0.001	0.08	0.05	0.001
11	30600	19300	340	0.11	24.1	0.02	0.01	0.02	0.135	0.8	0.19	251	23.2	0.43	0.26	580	2.5	0.12	15.55	1.17	0.1	4.8	0.001	0.001	0.36	0.11	0.001
12	30600	19500	90	0.08	11.3	0.02	0.01	0.001	0.055	0.7	0.18	96.2	21.9	0.41	0.33	420	1.7	0.07	8.25	0.74	0.07	3.9	0.001	0.001	0.09	0.07	0.001
13	30600	19700	355	0.51	30.7	0.01	0.02	0.03	0.174	0.7	0.1	96.3	22.8	0.57	0.5	440	1.8	0.06	7.69	0.68	0.08	4.8	0.001	0.001	0.12	0.09	0.001
14	30600	19900	118	0.21	8	0.03	0.02	0.02	0.065	0.4	0.31	43.7	15.3	0.21	0.26	240	1.2	0.06	6.9	0.55	0.001	4.2	0.001	0.001	0.15	0.11	0.001
15	31000	16800	189	0.08	18	0.46	0.03	0.07	0.074	0.8	0.14	60.7	15.15	0.17	0.29	240	1.7	0.03	10.3	0.65	0.05	4.1	0.001	0.001	0.17	0.1	0.001
16	31000	17000	205	0.09	21.1	0.1	0.01	0.03	0.086	0.9	0.08	134	15.5	0.35	0.16	110	0.9	0.01	7.57	1.45	0.1	4.3	0.001	0.001	0.15	0.05	0.001
17	31000	17200	131	0.06	19.2	0.02	0.01	0.01	0.055	0.9	0.09	46.7	12.55	0.24	0.27	200	0.8	0.02	19.9	1.32	0.06	3.2	0.001	0.001	0.13	0.05	0.001
18	31000	17400	103	0.001	7.6	0.03	0.01	0.01	0.042	0.7	0.09	85.9	15.8	0.38	0.18	300	1.3	0.03	16.25	1.56	0.08	4.3	0.001	0.001	0.25	0.06	0.001
19	31000	17600	653	0.25	53.7	0.05	0.01	0.03	0.202	1.2	0.06	42.8	11.1	0.23	0.24	110	0.6	0.01	18.35	0.85	0.07	2.8	0.001	0.001	0.05	0.05	0.001
20	31000	17800	118	0.1	19.9	0.04	0.01	0.02	0.096	0.8	0.15	31.7	9.29	0.17	0.34	100	1	0.1	10.3	0.59	0.001	2.4	0.001	0.001	0.08	0.04	0.001
21	31000	18000	113	0.05	18.9	0.01	0.03	0.01	0.056	0.6	0.07	47.4	5.68	0.09	0.41	130	0.3	0.04	8.31	0.55	0.05	2.3	0.001	0.001	0.08	0.07	0.001
22	31000	18200	42	0.08	19.1	0.02	0.01	0.03	0.062	0.4	0.05	33.7	5	0.3	0.85	40	0.5	0.01	6.79	0.3	0.001	0.7	0.001	0.001	0.06	0.04	0.001
23	31000	18400	44	0.001	10.7	0.03	0.03	0.01	0.031	0.9	0.09	49.3	5.48	0.12	0.6	100	0.4	0.01	7.8	0.26	0.001	1.5	0.001	0.001	0.08	0.07	0.001
24	31000	18600	310	0.2	18.4	0.03	0.02	0.02	0.111	0.8	0.22	71.8	14.75	0.26	0.62	260	1.9	0.07	9.22	0.35	0.05	2.1	0.001	0.001	0.11	0.09	0.001
25	31400	16500	134	0.09	37.2	0.04	0.001	0.001	0.094	2.1	0.13	64.5	12.05	0.19	0.41	260	0.7	0.02	5.63	0.47	0.001	2.6	0.001	0.001	0.15	0.11	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
26	31400	16700	412	0.1	64.4	0.03	0.001	0.01	0.201	2.5	0.1	19.85	13.7	0.21	0.21	170	0.8	0.01	9.15	0.68	0.001	2.8	0.001	0.001	0.06	0.07	0.001
27	31400	16900	113	0.001	19.1	0.07	0.001	0.02	0.07	1.5	0.18	37.7	11.85	0.19	0.41	130	0.8	0.03	6.69	0.62	0.001	3.5	0.001	0.001	0.06	0.09	0.001
28	31400	17500	17	0.12	10.2	1.42	0.06	0.04	0.028	0.3	0.22	22.5	17.45	0.47	0.43	750	1.5	0.26	5.11	0.54	0.09	1.9	0.001	0.001	0.07	0.08	0.001
29	31400	17700	979	0.26	75	0.09	0.01	0.02	0.245	1.7	0.27	50.9	18.05	0.35	0.5	350	1.3	0.14	7.75	0.35	0.06	3.2	0.001	0.001	0.11	0.08	0.001
30	31400	17900	158	0.07	16.9	0.02	0.01	0.01	0.068	0.9	0.15	55.7	13.2	0.24	0.19	160	1	0.05	10.2	0.81	0.06	3.9	0.001	0.001	0.11	0.05	0.001
31	31400	18100	59	0.05	2.1	0.07	0.01	0.02	0.027	0.4	0.08	26.4	5.16	0.1	0.3	90	0.6	0.001	9.56	0.44	0.001	2.7	0.001	0.001	0.05	0.04	0.001
32	31400	18300	52	0.001	6.3	0.09	0.04	0.04	0.033	0.7	0.05	29	3.98	0.12	0.32	70	0.4	0.001	9.1	0.37	0.05	1.4	0.001	0.001	0.04	0.04	0.001
33	31400	18500	58	0.06	8.4	0.05	0.02	0.01	0.035	0.8	0.17	62.4	15.1	0.37	0.44	440	1.7	0.09	13.35	0.71	0.08	2.5	0.001	0.001	0.1	0.07	0.001
34	31400	18700	175	0.07	10.2	0.05	0.01	0.02	0.068	1.1	0.19	25.9	18.1	0.38	0.51	730	1.5	0.12	7.66	0.41	0.08	2.2	0.001	0.001	0.07	0.12	0.001
35	31400	18900	98	0.06	3.9	0.08	0.01	0.01	0.039	0.7	0.15	35.3	16.15	0.33	0.31	510	1.8	0.06	7.88	0.41	0.06	2.3	0.001	0.001	0.08	0.08	0.001
36	31400	19100	59	0.7	5.4	0.06	0.03	0.01	0.035	0.6	0.09	45.1	6.35	0.11	0.78	290	1.1	0.01	11.45	0.53	0.05	3.6	0.001	0.001	0.06	0.09	0.001
37	31400	19300	31	0.38	8.1	0.03	0.05	0.02	0.06	0.4	0.14	24.6	6.74	0.26	0.5	80	0.5	0.02	3.13	0.12	0.001	1.3	0.001	0.001	0.07	0.08	0.001
38	31400	19500	73	0.14	7.6	0.02	0.03	0.03	0.064	0.5	0.16	61.3	14	0.25	0.43	260	1.3	0.08	7.13	0.4	0.05	2.7	0.001	0.001	0.19	0.12	0.001
39	31400	19700	135	0.21	13.6	0.01	0.05	0.01	0.072	1.2	0.16	35.8	16.8	0.27	0.81	330	1.4	0.04	4.13	0.25	0.001	3.5	0.001	0.001	0.14	0.09	0.001
40	31400	19900	96	0.44	13.8	0.02	0.04	0.02	0.054	0.9	0.22	22.4	20.4	0.71	0.58	870	2.7	0.24	6.53	0.66	0.09	2.2	0.001	0.001	0.06	0.26	0.001
41	31400	20100	60	0.06	9.6	0.02	0.03	0.01	0.032	0.3	0.08	54.4	16.6	0.13	0.59	490	1.3	0.04	18.45	0.77	0.05	3.9	0.001	0.001	0.14	0.13	0.001
42	31400	20300	52	0.65	6.2	0.05	0.05	0.001	0.028	0.5	1	17	4.61	0.1	0.29	110	0.4	0.01	5.83	0.42	0.001	4	0.001	0.001	0.04	0.05	0.001
43	31400	20500	115	0.12	11.7	0.01	0.03	0.001	0.047	0.4	0.09	28.2	6.4	0.13	0.42	110	0.5	0.02	3.42	0.17	0.001	2.3	0.001	0.001	0.08	0.04	0.001
44	31400	20700	31	1.81	1.3	0.02	0.01	0.01	0.01	0.3	0.1	46	8.7	0.11	0.35	180	0.5	0.02	17.5	0.64	0.06	4	0.001	0.001	0.07	0.05	0.001
45	31400	20900	26	1.26	2.4	0.03	0.02	0.01	0.013	0.3	0.1	40.9	9.13	0.16	0.21	120	0.7	0.001	17.85	0.7	0.05	4.5	0.001	0.001	0.07	0.08	0.001
46	31800	16200	153	0.001	8.1	0.31	0.01	0.01	0.077	1.4	0.09	39	15.4	0.22	0.34	240	0.8	0.04	5.8	0.71	0.07	2.6	0.001	0.001	0.08	0.07	0.001
47	31800	16400	190	0.001	8.1	0.21	0.01	0.02	0.069	1.1	0.04	29.9	6.51	0.12	0.33	130	0.6	0.02	11	0.43	0.05	3.2	0.001	0.001	0.05	0.05	0.001
48	31800	16600	520	0.001	7.5	0.73	0.04	0.04	0.056	1.1	0.08	45.1	9.46	0.84	0.66	70	0.5	0.01	6.37	0.41	0.1	2	0.001	0.001	0.07	0.03	0.001
49	31800	16800	192	0.001	5.9	0.37	0.01	0.05	0.045	0.7	0.06	42.8	9.62	0.16	0.22	120	1	0.03	7.55	0.65	0.1	3.2	0.001	0.001	0.05	0.04	0.001
50	31800	17000	116	0.001	3.6	0.32	0.01	0.02	0.028	0.4	0.05	36.5	9.45	0.18	0.25	90	0.7	0.01	12.65	0.41	0.11	3.2	0.001	0.001	0.04	0.03	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
51	31800	17200	49	0.37	2.8	0.03	0.01	0.01	0.02	0.5	0.19	63.5	10.95	0.39	0.61	140	1.2	0.06	8.26	0.95	0.07	2.7	0.001	0.001	0.1	0.07	0.001
52	31800	17400	96	0.14	12.7	0.03	0.01	0.001	0.056	1.1	0.05	45.4	2.23	0.05	0.23	90	0.3	0.01	3.07	0.15	0.05	2.4	0.001	0.001	0.02	0.05	0.001
53	31800	17600	400	0.18	57.3	0.01	0.01	0.01	0.152	1.1	0.31	13.35	14.9	0.44	0.78	200	1.9	0.12	2.78	0.27	0.09	3.8	0.001	0.001	0.08	0.12	0.001
54	31800	17800	38	0.25	12.1	0.03	0.01	0.001	0.041	0.9	0.51	5.28	11.85	0.55	0.6	770	1.8	0.37	2.76	0.3	0.17	0.8	0.001	0.001	0.05	0.08	0.001
55	31800	17800	38	0.25	12.1	0.03	0.01	0.001	0.041	0.9	0.07	11.8	4.68	0.12	0.25	60	0.4	0.02	3.01	0.2	0.001	2.1	0.001	0.001	0.04	0.05	0.001
56	31800	18000	46	0.44	15.4	0.02	0.01	0.02	0.066	0.5	0.08	8.84	5.08	0.09	0.27	80	0.5	0.02	1.57	0.18	0.001	6.9	0.001	0.001	0.04	0.05	0.001
57	31800	18200	79	0.13	4.4	0.02	0.02	0.01	0.034	0.4	0.08	25.1	4.15	0.05	0.25	240	0.8	0.04	4.58	0.35	0.05	6.2	0.001	0.001	0.03	0.06	0.001
58	31800	18400	71	0.14	3.4	0.02	0.01	0.01	0.024	0.5	0.2	9.85	14.4	0.59	0.51	1090	2.4	0.42	3.28	0.9	0.19	1.4	0.001	0.001	0.04	0.06	0.001
59	31800	18600	187	0.15	9.3	0.08	0.02	0.02	0.075	0.9	0.39	12.3	21.2	0.69	0.73	840	2.8	0.97	2	0.31	0.21	1.4	0.001	0.001	0.05	0.08	0.001
60	31800	18800	247	0.1	10.5	0.03	0.01	0.02	0.096	0.8	0.37	8.69	21.1	0.74	0.67	700	1.8	0.79	2.4	0.32	0.24	1.4	0.001	0.001	0.03	0.17	0.001
61	31800	19000	16	0.21	7	0.02	0.04	0.02	0.065	0.2	0.25	16.15	15.85	0.37	0.67	1190	1.5	0.43	3.04	0.38	0.2	1.9	0.001	0.001	0.06	0.11	0.001
62	31800	19200	33	0.12	4.9	0.07	0.02	0.04	0.036	0.2	0.16	13.75	9.33	0.19	0.59	140	1.4	0.13	1.7	0.24	0.05	4.4	0.001	0.001	0.08	0.07	0.001
63	31800	19400	179	0.22	5.5	0.07	0.02	0.04	0.069	0.5	0.39	11.35	16.5	0.5	0.56	1120	2.7	0.91	3.06	0.51	0.19	1.9	0.001	0.001	0.04	0.09	0.001
64	31800	19600	87	0.09	6.9	0.01	0.03	0.02	0.041	0.5	0.11	8.12	6.91	0.12	0.48	500	2.7	0.28	3.87	0.42	0.1	3.3	0.001	0.001	0.04	0.05	0.001
65	31800	19800	71	0.11	4	0.11	0.01	0.03	0.035	0.4	0.12	28	13	0.32	0.43	870	1.8	0.24	9.2	0.52	0.13	6.3	0.002	0.001	0.1	0.07	0.001
66	31800	20000	71	0.18	5.5	0.03	0.02	0.01	0.029	0.3	0.17	28.6	10.85	0.39	0.5	360	1.5	0.15	6.82	0.52	0.12	3.3	0.001	0.001	0.04	0.09	0.001
67	31800	20200	58	0.17	6.4	0.02	0.02	0.01	0.023	0.3	0.13	12.5	10.45	0.41	0.66	200	1.3	0.06	2.14	0.13	0.09	1.7	0.001	0.001	0.07	0.07	0.001
68	31800	20400	359	0.15	30.7	0.03	0.01	0.02	0.127	0.9	0.05	17.3	6.95	0.17	0.35	90	0.7	0.02	4.23	0.18	0.08	2	0.001	0.001	0.06	0.03	0.001
69	31800	20600	120	0.09	13.2	0.06	0.02	0.01	0.043	0.6	0.4	7.87	23.6	1.12	0.61	620	1.2	0.29	2.65	0.33	0.2	1.1	0.001	0.01	0.04	0.2	0.001
70	32200	15900	507	0.07	63.7	0.01	0.01	0.03	0.205	2	0.74	14.75	9.04	0.39	0.43	650	3.4	0.24	3.55	0.45	0.12	1.7	0.001	0.001	0.05	0.09	0.001
71	32200	16100	435	0.05	31.9	0.02	0.01	0.03	0.177	1.9	0.31	8.92	13.6	0.4	0.55	190	3.7	0.39	1.16	0.26	0.09	2.9	0.001	0.001	0.09	0.06	0.001
72	32200	16300	518	0.12	56.6	0.02	0.01	0.02	0.199	2.3	0.21	10.65	4.38	0.36	0.29	750	2	0.08	3	0.43	0.1	1.1	0.001	0.001	0.05	0.06	0.001
73	32200	16500	457	0.15	30.5	0.02	0.01	0.01	0.174	1.7	0.15	16	8.43	0.23	0.43	90	0.9	0.03	2.39	0.23	0.09	4.9	0.001	0.001	0.11	0.07	0.001
74	32200	16700	190	0.06	6.1	0.16	0.01	0.06	0.073	1.2	0.15	36.2	14.7	0.31	0.55	460	3.7	0.24	2.58	0.47	0.12	3.8	0.001	0.001	0.13	0.1	0.001
75	32200	16900	170	0.001	8.7	0.14	0.02	0.01	0.083	1.5	0.16	90.1	19.65	0.86	1.12	210	1.7	0.07	5.59	0.37	0.05	1.9	0.001	0.001	0.1	0.12	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
76	32200	17100	67	0.001	9.2	0.04	0.07	0.01	0.03	0.6	0.36	29.3	30.2	1.41	0.97	390	2.5	0.24	4.26	0.53	0.06	2.8	0.001	0.001	0.12	0.24	0.001
77	32200	17300	65	0.001	5.3	0.07	0.06	0.01	0.023	0.3	0.1	31.9	14.3	0.5	0.53	90	0.6	0.02	6.74	0.6	0.001	2.6	0.001	0.001	0.18	0.13	0.001
78	32200	17700	72	0.001	5.9	0.05	0.01	0.01	0.032	0.6	0.07	39.5	2.11	0.32	0.07	200	0.001	0.03	3.46	0.23	0.001	2.9	0.001	0.001	0.03	0.08	0.001
79	32200	17900	50	0.001	23.4	0.01	0.04	0.001	0.048	0.8	0.48	7.74	31.4	1.68	0.53	550	2.2	0.52	3.42	0.51	0.14	1.7	0.001	0.001	0.04	0.34	0.001
80	32200	18100	85	0.001	6.1	0.08	0.02	0.001	0.028	0.6	0.3	8.57	11.5	0.36	0.62	430	1.8	0.11	1.63	0.39	0.001	2.1	0.001	0.001	0.1	0.15	0.001
81	32200	18300	20	0.001	4.8	0.08	0.04	0.02	0.021	0.001	0.11	23.4	5.91	0.05	0.31	210	0.8	0.03	3.62	0.34	0.001	6.6	0.001	0.001	0.06	0.12	0.001
82	32200	18500	210	0.14	24.3	0.02	0.02	0.01	0.083	1.2	0.19	10.55	8.48	0.12	0.7	150	0.8	0.04	2.08	0.28	0.001	5.1	0.001	0.001	0.12	0.11	0.001
83	32200	18700	124	0.1	8.8	0.06	0.04	0.02	0.043	0.5	0.15	9	8.83	0.16	0.73	170	1.1	0.04	1.3	0.21	0.001	3.9	0.001	0.001	0.13	0.1	0.001
84	32200	18900	95	0.15	4.2	0.04	0.09	0.06	0.064	0.3	0.18	36.3	13.75	0.19	0.53	400	2.9	0.08	2.88	0.41	0.05	4.6	0.001	0.001	0.16	0.1	0.001
85	32200	19100	101	0.2	8	0.05	0.01	0.02	0.047	0.5	0.14	59	10.7	0.08	0.52	240	0.5	0.06	5.63	0.36	0.06	2.8	0.001	0.001	0.11	0.1	0.001
86	32200	19300	135	0.4	4.6	0.06	0.05	0.07	0.065	0.6	0.15	16.1	8.74	0.09	0.63	190	0.8	0.06	1.84	0.34	0.001	4.1	0.001	0.001	0.09	0.1	0.001
87	32200	19500	420	0.37	22.3	0.01	0.04	0.05	0.142	0.9	0.22	9.82	5.01	0.14	0.37	570	2.9	0.21	2.05	0.38	0.001	4.3	0.001	0.001	0.09	0.1	0.001
88	32200	19700	231	2.42	11	0.01	0.03	0.13	0.085	0.6	0.14	10.95	7.27	0.15	0.64	370	1.5	0.1	2.72	0.31	0.001	4.1	0.001	0.001	0.09	0.08	0.001
89	32200	19900	475	0.08	60.1	0.01	0.01	0.02	0.2	2.3	0.18	12	14.5	0.31	1.18	280	2.4	0.05	1.88	0.3	0.001	6.5	0.001	0.001	0.17	0.08	0.001
90	32600	16000	459	0.1	57.6	0.05	0.01	0.02	0.191	2.5	0.2	15.15	14.55	0.29	0.86	280	2.5	0.08	1.81	0.31	0.001	4.6	0.001	0.001	0.14	0.08	0.001
91	32600	16200	178	0.001	19.3	0.02	0.01	0.01	0.098	2	0.21	5.86	10.4	0.18	0.29	110	2	0.14	0.83	0.21	0.001	2.1	0.001	0.001	0.06	0.05	0.001
92	32600	16400	148	0.001	17.2	0.02	0.001	0.01	0.092	2.1	0.18	7.29	9.5	0.12	0.43	140	1.1	0.07	1.02	0.28	0.001	3.2	0.001	0.001	0.09	0.07	0.001
93	32600	16600	138	0.001	12.3	0.01	0.001	0.03	0.087	1.5	0.21	6.94	7.87	0.2	0.4	300	4.2	0.41	1.17	0.43	0.05	3.5	0.001	0.001	0.05	0.06	0.001
94	32600	16800	182	0.001	9.1	0.14	0.001	0.02	0.077	1.3	0.05	6.58	2.88	0.02	0.23	70	0.001	0.02	0.78	0.18	0.001	3.8	0.001	0.001	0.04	0.02	0.001
95	32600	18200	76	0.08	3.9	0.04	0.001	0.01	0.035	0.4	0.1	1.97	2.72	0.04	0.32	150	0.8	0.2	0.41	0.1	0.001	1.2	0.001	0.001	0.04	0.04	0.001
96	32600	18400	157	0.1	11.4	0.02	0.01	0.02	0.08	0.6	0.1	49.8	14.85	0.26	0.23	110	0.8	0.001	14.15	1.05	0.07	4.6	0.001	0.001	0.09	0.04	0.001
97	32600	18600	386	0.33	19	0.07	0.02	0.02	0.143	1.1	0.13	25.1	14.85	0.23	0.24	190	0.6	0.05	3.96	1.04	0.001	7.6	0.001	0.001	0.12	0.08	0.001
98	32600	18800	707	0.17	9.8	0.11	0.01	0.03	0.129	0.5	0.02	23.7	12	0.3	0.001	470	0.8	0.02	25.9	0.49	0.09	3.4	0.001	0.001	0.05	0.02	0.001
99	32600	19000	196	0.12	17.8	0.02	0.01	0.001	0.12	1.3	0.06	33.1	11.1	0.2	0.19	120	0.4	0.01	9.23	0.6	0.06	7	0.001	0.001	0.08	0.04	0.001
100	32600	19200	57	0.06	4.7	0.02	0.03	0.01	0.025	0.3	0.04	17.35	9.27	0.12	0.13	80	0.6	0.04	5.1	0.61	0.001	8.2	0.001	0.001	0.06	0.04	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
101	32600	19400	28	0.1	3.6	0.01	0.06	0.01	0.021	0.3	0.08	13.8	4.69	0.05	0.44	110	0.6	0.02	2.15	0.17	0.001	2.1	0.001	0.001	0.06	0.04	0.001
102	32600	19600	48	0.001	11.9	0.01	0.04	0.01	0.028	0.3	0.15	23.8	12.55	0.25	0.79	160	1.7	0.04	4.81	0.28	0.001	4.5	0.001	0.001	0.11	0.04	0.001
103	32600	19800	58	0.05	2.8	0.09	0.02	0.03	0.025	0.3	0.42	4.53	20.1	1.36	0.65	510	3.9	0.48	2.79	0.37	0.09	1	0.001	0.001	0.04	0.16	0.001
104	32800	16800	12	0.07	10.9	0.01	0.001	0.01	0.025	0.2	0.22	18.9	6.34	0.25	0.55	170	0.8	0.03	2.66	0.27	0.001	2.8	0.001	0.001	0.14	0.06	0.001
105	33000	14100	171	0.001	6.7	0.09	0.01	0.02	0.042	0.9	0.22	18.9	6.34	0.25	0.55	170	0.8	0.03	2.66	0.27	0.001	2.8	0.001	0.001	0.14	0.06	0.001
106	33000	14300	36	0.001	3.1	0.46	0.01	0.05	0.04	1.2	0.69	8.9	5.15	0.35	0.28	980	2.6	0.14	4.19	0.81	0.05	1.1	0.001	0.001	0.06	0.08	0.001
107	33000	14500	230	0.001	7.7	0.24	0.01	0.07	0.052	0.7	0.1	11.6	6.33	0.09	0.3	160	0.6	0.04	1.48	0.24	0.001	5.3	0.001	0.001	0.07	0.04	0.001
108	33000	15500	311	0.001	32.2	0.06	0.01	0.01	0.131	2	0.07	47.4	6.37	0.06	0.34	110	0.5	0.01	5.16	0.31	0.09	4.1	0.001	0.001	0.09	0.07	0.001
109	33000	15700	437	0.09	36.1	0.04	0.001	0.03	0.182	2	0.13	41.4	14.55	0.17	0.64	260	1.1	0.06	5.23	0.34	0.1	5.9	0.001	0.001	0.12	0.11	0.001
110	33000	15900	250	0.001	13.9	0.02	0.001	0.02	0.095	1.9	0.14	19.65	16.75	0.18	0.52	410	1.5	0.12	4.04	0.33	0.1	2.3	0.001	0.001	0.07	0.11	0.001
111	33000	16100	250	0.05	18.8	0.02	0.001	0.01	0.111	2	0.17	9.74	2.58	0.1	0.16	490	2.4	0.2	2.72	0.41	0.09	2.4	0.001	0.001	0.04	0.07	0.001
112	33000	16300	97	0.001	5.7	0.36	0.02	0.08	0.044	1.2	0.18	9.94	5.3	0.08	0.14	540	1.2	0.15	2.48	0.36	0.09	16.9	0.001	0.001	0.05	0.09	0.001
113	33000	16500	86	0.001	3.2	0.37	0.01	0.05	0.037	0.7	0.1	9.91	12.1	0.13	0.59	950	2.2	0.07	2.69	0.49	0.1	3.6	0.001	0.001	0.11	0.06	0.001
114	33000	16700	63	0.06	3.6	0.26	0.01	0.05	0.033	0.5	0.12	10.4	7.58	0.13	0.39	960	2	0.07	2.28	0.43	0.09	2.7	0.001	0.001	0.12	0.08	0.001
115	33000	16900	33	0.07	2.7	0.03	0.03	0.01	0.016	0.2	0.12	13.3	6.88	0.08	0.39	710	0.9	0.06	1.93	0.38	0.08	1.7	0.001	0.001	0.11	0.08	0.001
116	33000	17100	40	0.05	7.6	0.02	0.02	0.01	0.026	0.4	0.16	16.3	7.74	0.09	0.32	180	1.6	0.1	1.24	0.21	0.09	1.8	0.001	0.001	0.05	0.05	0.001
117	33000	17300	74	0.001	9.1	0.03	0.03	0.01	0.035	0.6	0.12	3.18	4.3	0.11	0.37	180	2	0.19	0.56	0.15	0.08	1	0.001	0.001	0.03	0.07	0.001
118	33000	17500	64	0.05	4.1	0.12	0.02	0.02	0.033	0.6	0.3	13	19.9	0.52	0.61	720	2.9	0.4	1.46	0.48	0.11	1.2	0.001	0.001	0.04	0.1	0.001
119	33000	17700	54	0.09	2.2	0.05	0.001	0.01	0.019	0.3	0.19	8.31	8.68	0.23	0.69	320	3	0.3	0.96	0.23	0.1	2	0.001	0.001	0.07	0.07	0.001
120	33000	17900	49	0.07	6.9	0.03	0.01	0.01	0.027	0.6	0.29	18.95	27.8	1.45	0.67	830	3.6	0.25	5.79	0.61	0.14	1.8	0.001	0.001	0.04	0.24	0.001
121	33000	18100	241	0.24	20.4	0.02	0.01	0.01	0.087	0.7	0.21	26.7	26	0.72	0.55	650	3	0.12	9.46	0.55	0.13	2.4	0.001	0.001	0.07	0.14	0.001
122	33000	18300	308	0.24	45.2	0.05	0.01	0.03	0.163	1.5	0.33	13.45	31.7	1.14	1.39	500	2.3	0.24	2.11	0.31	0.14	2.6	0.001	0.001	0.07	0.23	0.001
123	33000	18500	391	0.26	57.3	0.19	0.01	0.03	0.169	2	0.21	18	23.5	0.62	0.88	640	4.5	0.21	5.28	0.49	0.14	1.9	0.001	0.001	0.06	0.13	0.001
124	33000	18700	194	0.07	9.8	0.11	0.05	0.01	0.079	1.1	0.07	47.9	17.25	0.17	0.38	970	1.3	0.02	20.5	0.96	0.13	4.8	0.001	0.001	0.11	0.07	0.001
125	33000	18900	37	0.001	2.2	0.01	0.02	0.001	0.015	0.2	0.04	32.3	16.55	0.33	0.15	260	1	0.01	19.4	0.81	0.16	4.2	0.001	0.001	0.05	0.04	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
126	33000	19100	373	0.13	45.7	0.03	0.02	0.01	0.155	1.3	0.1	11	10.05	0.19	0.49	130	0.8	0.03	2.5	0.34	0.09	7	0.001	0.001	0.08	0.06	0.001
127	33000	19300	42	0.001	3.4	0.02	0.03	0.01	0.022	0.3	0.07	9.26	7.22	0.1	0.32	240	1	0.03	2.62	0.27	0.08	4.7	0.001	0.001	0.04	0.06	0.001
128	33000	19500	84	0.07	4.6	0.06	0.03	0.03	0.032	0.4	0.17	29.4	8.83	0.12	0.5	370	0.4	0.03	6.01	0.32	0.11	3.2	0.001	0.001	0.05	0.06	0.001
129	33400	15800	493	0.1	43.8	0.09	0.03	0.04	0.208	2.2	0.25	20.7	10.4	0.45	0.77	180	1.8	0.05	2.99	0.3	0.09	4.6	0.001	0.001	0.1	0.08	0.001
130	33400	16000	358	0.06	31.1	0.03	0.03	0.01	0.153	2.1	0.08	30.6	7.84	0.11	0.27	350	0.3	0.02	5.81	0.75	0.1	9.1	0.001	0.001	0.07	0.07	0.001
131	33400	16200	122	0.07	14.5	0.02	0.03	0.01	0.094	1.7	0.06	13.5	2.98	0.09	0.11	110	0.2	0.03	3.4	0.41	0.09	4.9	0.001	0.001	0.04	0.06	0.001
132	33400	16400	174	0.05	17.1	0.06	0.03	0.001	0.122	1.6	0.17	34.1	18.15	0.51	1.03	250	1.8	0.07	3.52	0.34	0.1	6.9	0.001	0.001	0.17	0.1	0.001
133	33400	16600	42	0.001	6.3	0.01	0.08	0.01	0.014	0.3	0.1	9.92	9.96	0.17	0.49	320	0.8	0.05	1.68	0.34	0.09	2.6	0.001	0.001	0.06	0.08	0.001
134	33400	16800	37	0.001	4.9	0.02	0.05	0.01	0.022	0.4	0.07	27.8	7.34	0.09	0.33	490	1.6	0.04	5.72	0.47	0.1	9	0.001	0.001	0.06	0.09	0.001
135	33400	17000	499	0.19	73.5	0.01	0.04	0.01	0.225	1.7	0.11	23.9	10.55	0.13	0.49	360	1.3	0.06	3.77	0.47	0.1	8.8	0.001	0.001	0.13	0.06	0.001
136	33400	17200	687	0.18	92.8	0.01	0.03	0.01	0.27	1.6	0.11	99.3	7.9	0.09	0.43	1790	1.7	0.06	4.13	0.79	0.11	4.6	0.001	0.001	0.74	0.14	0.001
137	33400	17400	69	0.001	4.8	0.1	0.04	0.01	0.029	0.5	0.38	18.45	19.65	0.36	0.47	1970	1.8	0.36	3.57	0.6	0.14	3.4	0.001	0.001	0.16	0.19	0.001
138	33400	17600	191	0.09	16.4	0.02	0.06	0.01	0.088	0.5	0.23	17.7	12	0.22	0.33	2500	1.6	0.27	2.94	0.71	0.13	2.2	0.001	0.001	0.09	0.1	0.001
139	33400	17800	65	0.07	7.1	0.04	0.03	0.01	0.026	0.6	0.28	25.2	29.1	1.43	0.72	740	3.7	0.19	5.35	0.56	0.13	2.7	0.001	0.001	0.07	0.12	0.001
140	33400	18000	89	0.13	12.2	0.01	0.04	0.02	0.044	0.6	0.29	22.8	32.6	1.24	0.74	450	1.7	0.27	3.98	0.47	0.1	5	0.001	0.001	0.12	0.17	10
141	33400	18200	114	0.08	8.9	0.02	0.09	0.01	0.035	0.5	0.13	80.9	22	0.5	0.74	380	1.4	0.03	6.42	0.55	0.05	6.6	0.001	0.001	0.18	0.13	0.001
142	33400	18400	161	0.11	6.2	0.03	0.04	0.02	0.068	1	0.09	84.4	18.25	0.5	0.71	260	1.2	0.03	15.55	0.6	0.08	3.7	0.001	0.001	0.14	0.12	0.001
143	33400	18600	61	0.17	10.2	0.01	0.11	0.01	0.045	0.5	0.05	48.9	20.6	0.39	0.27	370	1	0.02	18.25	0.79	0.08	3.8	0.001	0.001	0.12	0.1	0.001
144	33400	18800	618	0.14	95.1	0.01	0.03	0.03	0.354	3.1	0.05	37.3	14.65	0.27	0.7	220	1.3	0.03	15.4	1.01	0.001	3.7	0.001	0.001	0.07	0.1	0.001
145	33400	19000	83	0.07	9.4	0.03	0.04	0.01	0.041	0.7	0.07	6.39	6.8	0.08	0.3	170	0.5	0.05	1.28	0.22	0.001	2.5	0.001	0.001	0.03	0.07	0.001
146	33400	19200	42	0.06	5.2	0.02	0.05	0.01	0.021	0.3	0.16	7.38	14.1	0.26	0.46	280	2.1	0.11	2.36	0.41	0.001	2.7	0.001	0.001	0.11	0.1	0.001
147	33400	19400	85	0.06	14.1	0.01	0.03	0.01	0.041	0.6	0.14	8.62	24.5	0.42	0.71	540	1.5	0.19	2	0.39	0.05	3.2	0.001	0.001	0.09	0.12	10
148	33800	16300	28	0.001	4.8	0.03	0.03	0.01	0.027	0.4	0.1	10.3	18.95	0.29	0.24	440	2	0.16	1.69	0.32	0.001	2.4	0.001	0.001	0.07	0.07	0.001
149	33800	16500	43	0.001	4.7	0.03	0.01	0.01	0.025	0.3	0.18	12.55	22.6	0.39	0.56	170	1.2	0.24	1.25	0.24	0.001	2.7	0.001	0.001	0.06	0.12	0.001
150	33800	17300	67	0.001	2.7	0.09	0.01	0.02	0.028	0.5	0.09	13.4	6.57	0.09	0.12	150	0.6	0.05	1.51	0.23	0.001	1.8	0.001	0.001	0.05	0.04	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
151	33800	17500	267	0.09	19.2	0.02	0.01	0.02	0.097	0.8	0.09	5.55	3.4	0.07	0.06	70	1	0.03	0.81	0.17	0.001	2.4	0.001	0.001	0.04	0.03	0.001
152	33800	17700	445	0.16	46.2	0.01	0.01	0.02	0.187	1	0.17	50.4	11.6	0.26	0.13	640	0.8	0.04	2.51	0.72	0.001	2.9	0.001	0.001	0.06	0.03	0.001
153	33800	17900	228	0.22	17	0.03	0.02	0.02	0.073	0.5	0.13	24.7	7.06	0.09	0.2	300	0.7	0.06	3.12	0.35	0.001	4.9	0.001	0.001	0.06	0.04	0.001
154	33800	18100	56	0.15	10.5	0.02	0.03	0.01	0.027	0.5	0.18	63.4	23.8	0.72	0.84	420	1.9	0.13	12.95	0.57	0.07	4.3	0.001	0.001	0.1	0.09	0.001
155	33800	18300	86	0.41	7.9	0.03	0.03	0.03	0.046	0.3	0.31	21.4	27.1	0.72	0.86	490	2.8	0.26	3.51	0.39	0.08	2.7	0.001	0.001	0.07	0.17	0.001
156	33800	18500	78	0.3	8.1	0.02	0.04	0.02	0.059	0.4	0.09	99.4	20.1	0.37	0.61	470	1.4	0.04	19.5	0.77	0.09	3.4	0.001	0.001	0.11	0.07	0.001
157	33800	18700	37	0.21	7.1	0.03	0.04	0.01	0.034	0.3	0.16	25.6	22.6	0.48	0.83	340	2.4	0.12	5.15	0.41	0.05	4.4	0.001	0.001	0.11	0.1	0.001
158	33800	18900	103	0.19	12.2	0.06	0.03	0.01	0.052	0.5	0.06	41.3	10.9	0.18	0.85	290	0.9	0.03	11.85	0.7	0.001	7.7	0.001	0.001	0.11	0.12	0.001
159	33800	19100	55	0.1	5.7	0.02	0.03	0.01	0.029	0.3	0.05	27.2	6.95	0.12	0.45	250	0.5	0.01	12.25	0.5	0.001	4.1	0.001	0.001	0.06	0.07	0.001
160	33800	19300	393	0.17	43.1	0.02	0.02	0.01	0.154	0.8	0.05	21.1	5.29	0.1	0.61	210	0.3	0.02	6.21	0.39	0.05	6.6	0.001	0.001	0.05	0.06	0.001
161	34200	15400	287	0.001	13.3	0.02	0.001	0.02	0.093	1.6	0.07	10.6	3.18	0.05	0.2	280	0.4	0.02	2.7	0.26	0.001	3.4	0.001	0.001	0.03	0.05	0.001
162	34200	15600	255	0.001	11.3	0.1	0.01	0.01	0.079	1.8	0.09	7.88	6.11	0.14	0.48	180	1	0.04	2.09	0.21	0.001	2.9	0.001	0.001	0.06	0.05	0.001
163	34200	15800	170	0.001	7.9	0.11	0.01	0.02	0.055	1	0.16	8.28	10.65	0.18	0.63	200	0.9	0.04	2.06	0.35	0.001	4.1	0.001	0.001	0.08	0.07	0.001
164	34200	16000	8	0.06	3.5	0.04	0.02	0.02	0.023	0.4	0.07	24.1	6.24	0.11	0.56	200	0.5	0.01	7.86	0.4	0.001	6.3	0.001	0.001	0.05	0.05	0.001
165	34200	16200	17	0.12	7.1	0.01	0.02	0.01	0.013	0.2	0.07	15.2	4.8	0.05	0.29	120	0.5	0.02	1.81	0.24	0.001	7.5	0.001	0.001	0.05	0.05	0.001
166	34200	16400	66	0.001	9.7	0.04	0.01	0.01	0.031	0.5	0.1	11.45	7.32	0.15	0.48	120	0.5	0.03	1.5	0.19	0.001	3.5	0.001	0.001	0.11	0.05	0.001
167	34200	16600	89	0.001	8.8	0.1	0.02	0.02	0.045	0.8	0.2	8.15	15.3	0.39	0.54	680	2.3	0.28	1.72	0.45	0.001	1.6	0.001	0.001	0.08	0.11	0.001
168	34200	16800	96	0.001	2.2	0.05	0.04	0.06	0.047	0.2	0.2	13.65	29.7	0.96	0.98	540	1.5	0.26	1.88	0.42	0.001	4.3	0.001	0.001	0.1	0.14	0.001
169	34200	17000	52	0.001	6.9	0.03	0.01	0.001	0.018	0.5	0.26	15.9	42.2	1.6	0.88	790	0.5	0.33	2.34	0.43	0.08	3.5	0.001	0.001	0.06	0.18	0.001
170	34200	17400	135	0.09	15.3	0.01	0.01	0.01	0.044	0.5	0.23	14	18.25	0.2	0.74	280	1.1	0.42	1.57	0.26	0.07	6	0.001	0.001	0.12	0.17	0.001
171	34200	17600	52	0.12	5.7	0.01	0.01	0.001	0.017	0.3	0.2	5.85	2.55	0.04	0.06	40	0.6	0.14	0.48	0.08	0.001	0.9	0.001	0.001	0.02	0.03	0.001
172	34200	18000	68	0.001	7.8	0.01	0.01	0.03	0.03	0.4	0.28	9.26	27.5	1.04	0.78	340	2.4	0.46	0.96	0.19	0.18	1.2	0.001	0.001	0.04	0.23	0.001
173	34200	18200	137	0.09	4.4	0.02	0.01	0.06	0.049	0.5	0.15	18.55	6.19	0.06	0.26	180	1.3	0.15	1.38	0.23	0.08	2.4	0.001	0.001	0.06	0.05	0.001
174	34200	18400	52	0.31	7.1	0.02	0.05	0.08	0.066	0.5	0.11	40.6	9.07	0.08	0.37	360	0.9	0.11	4.9	0.55	0.001	6.1	0.001	0.001	0.1	0.05	0.001
175	34200	18600	170	0.12	8.4	0.02	0.03	0.05	0.062	0.7	0.31	24.7	31	0.73	1.15	1050	1.2	0.43	4.02	0.28	0.32	2.5	0.001	0.001	0.07	0.18	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
176	34200	18800	167	0.18	29.2	0.01	0.02	0.04	0.104	1.2	0.21	97.2	25.1	0.56	0.88	650	2.2	0.44	7.37	0.58	0.2	4.3	0.001	0.001	0.1	0.11	0.001
177	34200	19000	60	0.05	9	0.01	0.02	0.03	0.038	0.3	0.09	90.3	17.15	0.3	0.93	210	1.1	0.14	17.7	0.68	0.11	5.6	0.001	0.01	0.18	0.09	0.001
178	34600	15300	287	0.001	7.3	0.06	0.001	0.05	0.099	1.3	0.07	68.9	23.7	0.4	0.74	550	1.2	0.16	9.1	1.17	0.16	6.8	0.001	0.001	0.11	0.08	0.001
179	34600	15500	447	0.001	12	0.08	0.01	0.03	0.119	1	0.1	9.02	5.6	0.09	0.29	170	0.6	0.05	2.67	0.31	0.001	5.6	0.001	0.001	0.05	0.04	0.001
180	34600	15700	103	0.05	3.6	0.56	0.03	0.07	0.031	0.4	0.08	27.6	6.47	0.08	0.65	140	0.7	0.06	3.53	0.24	0.001	4.6	0.001	0.001	0.07	0.06	0.001
181	34600	15900	47	0.34	11	0.02	0.01	0.001	0.052	0.6	0.54	14.35	25.3	1.48	1.26	650	1.9	0.7	3.85	0.38	0.43	2.4	0.001	0.001	0.07	0.23	0.001
182	34600	16100	155	0.13	13.1	0.02	0.01	0.01	0.069	0.9	0.54	13.25	27.5	1.89	1.1	550	1.9	0.75	3.11	0.31	0.48	2.4	0.001	0.001	0.05	0.25	0.001
183	34600	16300	532	0.24	36.1	0.07	0.02	0.03	0.204	1.3	0.06	24.8	5.94	0.1	0.38	120	0.5	0.06	6.36	0.45	0.05	12.5	0.001	0.001	0.05	0.06	0.001
184	34600	16500	94	0.001	16.6	0.01	0.03	0.001	0.058	0.7	0.23	23.8	9.99	0.26	0.66	420	2.1	0.43	2.73	0.44	0.2	3.8	0.001	0.001	0.06	0.12	0.001
185	34600	16700	468	0.43	46.5	0.01	0.01	0.02	0.215	1.3	0.08	10.55	8.09	0.12	0.62	130	1	0.11	1.35	0.21	0.05	3.4	0.001	0.001	0.09	0.08	0.001
186	34600	16900	314	0.06	25.2	0.03	0.01	0.01	0.107	0.6	0.12	16	8.51	0.21	0.92	510	1.9	0.21	2.58	0.42	0.13	4.3	0.001	0.001	0.12	0.11	0.001
187	34600	17100	36	0.001	4.3	0.01	0.01	0.001	0.011	0.3	0.11	16.55	8.73	0.14	0.66	290	1	0.13	2.51	0.29	0.09	3.9	0.001	0.001	0.08	0.06	0.001
188	34600	17300	34	0.001	1.5	0.03	0.01	0.01	0.013	0.2	0.13	27.9	13.45	0.11	1.06	430	1.4	0.22	3.76	0.33	0.1	2.8	0.001	0.001	0.09	0.09	0.001
189	34600	17700	40	0.38	4.2	0.02	0.01	0.05	0.039	0.3	0.18	13.65	8.72	0.16	0.56	300	1.4	0.18	1.68	0.34	0.08	10.3	0.001	0.001	0.13	0.07	0.001
190	34600	17900	241	0.05	8.2	0.02	0.01	0.03	0.1	0.7	0.76	32.5	59.9	1.63	1.73	1170	2.1	1.67	2.62	0.59	0.44	6.1	0.001	0.001	0.11	0.28	0.001
191	34600	18100	36	0.32	6.8	0.02	0.03	0.02	0.053	0.4	0.18	18.1	13.2	0.15	0.94	250	1.4	0.19	1.73	0.34	0.1	4.8	0.001	0.001	0.13	0.07	0.001
192	34600	18300	17	0.09	2.5	0.03	0.02	0.001	0.016	0.2	0.17	9.74	6.52	0.08	0.5	330	1.5	0.21	1	0.23	0.11	2.3	0.001	0.001	0.06	0.05	0.001
193	34600	18500	116	0.11	7.3	0.09	0.02	0.02	0.058	0.6	0.18	23.2	11.45	0.23	0.84	300	1.1	0.31	1.42	0.33	0.11	2.3	0.001	0.001	0.07	0.07	0.001
194	34600	18700	39	0.05	5.6	0.02	0.01	0.01	0.023	0.3	0.1	6.71	2.56	0.08	0.44	160	0.9	0.03	1.44	0.11	0.06	1.8	0.001	0.001	0.03	0.06	0.001
195	34600	18900	38	0.001	6.4	0.03	0.02	0.001	0.021	0.4	0.11	20.2	5.4	0.09	0.53	120	0.7	0.05	4.23	0.25	0.07	4.7	0.001	0.001	0.05	0.05	0.001
196	34600	19100	28	0.09	1.9	0.05	0.01	0.01	0.021	0.3	0.05	30.7	5.85	0.06	0.36	330	0.5	0.01	9.35	0.4	0.11	5.5	0.001	0.001	0.05	0.06	0.001
197	34655	13020	343	0.09	23.9	0.1	0.01	0.02	0.161	2.6	0.21	11.65	15.65	0.39	0.67	350	2.7	0.19	2.27	0.33	0.12	2.7	0.001	0.001	0.09	0.1	0.001
198	34655	13220	168	0.001	8	0.13	0.01	0.03	0.059	1.4	0.33	8.82	26.3	1.01	0.45	640	2.1	0.42	2.47	0.39	0.13	2	0.001	0.001	0.06	0.18	0.001
199	34655	13420	221	0.001	4.7	0.25	0.01	0.06	0.048	0.8	0.22	13.95	14.45	0.3	0.99	570	1.6	0.22	2.81	0.59	0.38	2	0.001	0.001	0.08	0.34	0.001
200	34655	13620	411	0.05	16.1	0.08	0.01	0.03	0.115	1.1	0.14	31.7	8.35	0.19	0.81	250	1.3	0.1	4.36	0.41	0.1	3.9	0.001	0.001	0.1	0.16	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
201	34655	13820	58	0.001	6.8	0.09	0.01	0.01	0.029	1.4	0.11	25.4	9.3	0.15	0.73	370	1.6	0.11	6.12	0.59	0.21	8.5	0.001	0.001	0.07	0.09	0.001
202	34655	14020	162	0.001	11.2	0.17	0.01	0.04	0.061	1.5	0.1	21.7	7.01	0.13	0.66	290	1.3	0.06	4.83	0.42	0.22	7.6	0.001	0.001	0.08	0.08	0.001
203	34655	14220	241	0.001	13.2	0.51	0.03	0.03	0.075	1.8	0.12	8.26	3.83	0.1	0.55	290	1.3	0.13	1.87	0.26	0.1	3	0.001	0.001	0.05	0.06	0.001
204	34655	14420	427	0.06	18	0.11	0.01	0.05	0.131	1.8	0.16	8.01	8.75	0.21	0.54	240	0.9	0.12	1.38	0.32	0.08	4.9	0.001	0.001	0.06	0.07	0.001
205	34655	14620	300	0.001	15.9	0.06	0.01	0.02	0.103	1.9	0.14	15.75	6.98	0.09	0.52	190	1.2	0.1	1.93	0.28	0.07	5.9	0.001	0.001	0.09	0.06	0.001
206	34655	14820	301	0.001	23	0.08	0.01	0.03	0.111	2.1	0.44	8.79	25.1	0.85	1.45	600	2.2	0.56	2.39	0.8	0.73	2.1	0.001	0.001	0.06	0.17	0.001
207	34655	15020	213	0.001	8	0.05	0.01	0.02	0.067	1.3	0.13	83.8	21.5	0.32	0.36	490	2.2	0.06	21	0.68	0.09	4.5	0.001	0.001	0.11	0.11	0.001
208	34655	15220	206	0.001	7.3	0.03	0.01	0.03	0.071	1.2	0.09	57.1	18.45	0.32	0.25	250	1.7	0.04	8.47	0.75	0.05	3	0.001	0.001	0.1	0.08	0.001
209	35000	15200	174	0.001	4.2	0.18	0.01	0.03	0.066	0.8	0.07	75	16.45	0.19	0.36	320	1	0.02	15.75	0.52	0.06	4.2	0.001	0.001	0.09	0.08	0.001
210	35000	15400	212	0.05	7.1	0.33	0.03	0.03	0.079	0.9	0.03	39.3	5.39	0.09	0.07	190	0.6	0.001	7.65	0.56	0.08	11.2	0.001	0.001	0.02	0.07	0.001
211	35000	16400	58	0.05	7.7	0.03	0.01	0.001	0.026	0.5	0.03	16.1	3.01	0.16	0.05	330	0.001	0.02	2.16	0.26	0.001	1.3	0.001	0.001	0.02	0.04	0.001
212	35000	16800	67	0.001	5.2	0.09	0.02	0.01	0.025	0.4	0.11	6.15	6.58	0.19	0.44	120	0.6	0.04	1.04	0.18	0.001	1.9	0.001	0.001	0.07	0.05	0.001
213	35000	17000	66	0.001	3.2	0.04	0.01	0.01	0.033	0.5	0.09	31.7	8.43	0.26	0.16	210	1.1	0.05	30.1	0.66	0.08	4.6	0.001	0.001	0.04	0.05	0.001
214	35000	17400	76	0.08	11.7	0.04	0.01	0.01	0.045	0.6	0.03	28.8	10.05	0.06	0.001	350	0.5	0.02	11.7	1.4	0.1	25	0.001	0.001	0.02	0.01	0.001
215	35000	17600	32	0.1	5.9	0.03	0.001	0.02	0.034	0.4	0.05	15.5	4.67	0.16	0.26	50	0.4	0.01	3.51	0.11	0.001	3.8	0.001	0.001	0.05	0.06	0.001
216	35000	17800	131	0.26	14.7	0.02	0.001	0.04	0.103	0.7	0.17	8.07	8.55	0.32	0.36	220	2.8	0.18	1.28	0.31	0.05	1.8	0.001	0.001	0.09	0.07	0.001
217	35000	18000	53	0.07	3.5	0.04	0.001	0.04	0.025	0.4	0.08	26	4.91	0.11	0.3	110	0.9	0.04	1.77	0.14	0.001	2.5	0.001	0.001	0.09	0.04	0.001
218	35000	18200	35	0.06	3.9	0.02	0.02	0.01	0.016	0.3	0.16	13.15	10.4	0.17	0.28	280	0.6	0.07	2.36	0.24	0.001	1.1	0.001	0.001	0.04	0.03	0.001
219	35000	18400	39	0.001	4.7	0.03	0.01	0.01	0.02	0.4	0.07	40.2	13.15	0.08	0.63	330	1.6	0.001	8.29	0.43	0.08	10.6	0.001	0.001	0.06	0.06	0.001
220	35000	18600	27	0.001	3.3	0.02	0.001	0.01	0.011	0.2	0.13	18.75	6.24	0.12	0.66	330	1.3	0.09	3.04	0.32	0.05	5.3	0.001	0.001	0.07	0.04	0.001
221	35000	18800	37	0.07	1.7	0.03	0.01	0.01	0.018	0.3	0.13	25.5	11.65	0.18	0.72	330	1.6	0.04	4.86	0.33	0.05	3.7	0.001	0.001	0.07	0.06	0.001
222	35400	14900	221	0.001	9.7	0.06	0.001	0.02	0.072	1.1	0.37	15.4	23	0.63	0.87	290	2.5	0.36	1.65	0.31	0.001	4.3	0.001	0.001	0.08	0.1	0.001
223	35400	15100	85	0.001	8.9	0.03	0.04	0.02	0.069	0.8	0.14	4.57	7.14	0.19	0.3	160	1.7	0.05	0.82	0.2	0.001	1.4	0.001	0.001	0.03	0.04	0.001
224	35400	15300	112	0.001	8.8	0.05	0.001	0.02	0.078	1.8	0.08	91.7	18.05	0.18	0.57	330	1.5	0.03	10.4	0.89	0.05	4.5	0.001	0.001	0.25	0.1	0.001
225	35400	16300	43	0.001	4.4	0.02	0.001	0.01	0.018	0.4	0.08	31.4	18.9	0.36	0.35	280	1.6	0.11	5.57	0.8	0.19	2.7	0.001	0.001	0.09	0.1	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
226	35400	16500	116	0.001	7	0.03	0.01	0.01	0.049	0.7	0.04	28.6	8.27	0.14	0.45	430	0.6	0.04	9.33	0.35	0.07	6.3	0.001	0.001	0.05	0.07	0.001
227	35400	16700	19	0.001	2	0.05	0.001	0.001	0.012	0.4	0.08	28.4	10	0.19	0.65	160	1.3	0.16	3.38	0.25	0.05	2.3	0.001	0.001	0.09	0.07	0.001
228	35400	16900	28	0.001	4.5	0.03	0.03	0.01	0.014	0.3	0.18	16.45	13.85	0.25	0.64	400	2	0.17	3.21	0.33	0.13	2.1	0.001	0.001	0.08	0.09	0.001
229	35400	17100	59	0.12	10.1	0.02	0.001	0.001	0.036	0.7	0.31	10.45	23.8	0.89	0.75	730	2.3	0.42	3.1	0.27	0.39	2	0.001	0.01	0.04	0.19	0.001
230	35400	17300	106	0.1	19.1	0.01	0.001	0.01	0.069	1	0.15	9.16	12.45	0.36	0.61	170	2	0.16	1.46	0.16	0.1	2.7	0.001	0.001	0.08	0.06	0.001
231	35400	17500	67	0.14	11.2	0.02	0.02	0.05	0.079	0.5	0.33	11	24	1.24	0.71	620	2.8	0.49	3.16	0.36	0.35	1.9	0.001	0.01	0.05	0.17	0.001
232	35400	17700	79	0.06	8	0.03	0.001	0.01	0.055	0.8	0.13	5.46	11.6	0.56	0.79	300	4	0.23	1.1	0.29	0.22	1.8	0.001	0.001	0.05	0.08	0.001
233	35400	17900	38	0.25	11.9	0.03	0.07	0.02	0.049	0.6	0.04	8.79	1.94	0.08	0.25	40	0.2	0.02	1.75	0.08	0.001	2.6	0.001	0.001	0.03	0.03	0.001
234	35400	18100	67	0.26	10.6	0.02	0.04	0.03	0.046	0.5	0.03	8.42	1.89	0.03	0.21	100	0.3	0.02	1.4	0.13	0.001	2.1	0.001	0.001	0.02	0.03	0.001
235	35400	18300	64	0.07	9.1	0.02	0.03	0.09	0.037	0.5	0.09	13.05	4.6	0.08	0.52	3430	1.1	0.16	6.62	0.9	0.29	1.1	0.001	0.01	0.08	0.09	0.001
236	35400	18500	70	0.05	10.9	0.03	0.01	0.01	0.036	0.8	0.18	50.2	20.6	0.15	0.71	680	1.9	0.18	3.26	0.29	0.18	3.1	0.001	0.001	0.14	0.08	0.001
237	35400	18700	382	0.11	25.3	0.01	0.02	0.01	0.112	0.8	0.12	7.74	5.22	0.12	0.5	460	2.3	0.17	2.38	0.17	0.09	3.4	0.001	0.001	0.06	0.06	0.001
238	35456	12740	310	0.001	11.3	0.24	0.01	0.02	0.057	1.5	0.15	3.19	2.07	0.04	0.22	110	0.9	0.16	0.44	0.07	0.001	1.4	0.001	0.001	0.02	0.03	0.001
239	35456	12940	131	0.001	9.9	0.12	0.01	0.02	0.054	1.4	0.19	10.1	11.6	0.12	0.85	290	1.7	0.15	1.46	0.19	0.11	3.4	0.001	0.001	0.08	0.05	0.001
240	35456	13140	301	0.001	13.2	0.11	0.01	0.03	0.072	1.2	0.12	6.45	4.59	0.08	0.54	140	1.5	0.16	0.79	0.09	0.05	1.6	0.001	0.001	0.05	0.04	0.001
241	35456	13340	190	0.001	5	0.35	0.02	0.02	0.061	1.1	0.09	9.28	5.66	0.11	0.43	60	0.6	0.04	1.51	0.16	0.001	4.9	0.001	0.001	0.07	0.04	0.001
242	35456	13540	123	0.001	5.6	0.1	0.01	0.01	0.048	1.2	0.08	15.05	4.41	0.03	0.4	100	0.5	0.03	2.44	0.23	0.001	4.3	0.001	0.001	0.05	0.04	0.001
243	35456	13740	97	0.001	3.3	0.13	0.01	0.02	0.026	0.9	0.09	30.6	14.25	0.13	0.28	190	0.9	0.1	13	0.64	0.13	4.5	0.001	0.01	0.07	0.05	0.001
244	35456	13940	17	0.001	8.5	0.06	0.03	0.01	0.019	1.5	0.05	51.1	17.4	0.25	0.2	160	0.7	0.11	23.8	0.56	0.19	10.3	0.001	0.01	0.06	0.05	0.001
245	35456	14140	37	0.001	4.8	0.06	0.01	0.02	0.023	1.3	0.06	14.55	6.02	0.16	0.38	60	0.3	0.04	3.98	0.16	0.001	4.2	0.001	0.001	0.06	0.05	0.001
246	35456	14340	183	0.05	12.1	0.03	0.001	0.01	0.084	2.3	0.05	14.7	4.26	0.1	0.23	90	0.4	0.04	4.05	0.24	0.05	3.9	0.001	0.001	0.04	0.05	0.001
247	35456	14540	174	0.001	8	0.04	0.001	0.01	0.059	1.5	0.08	18.5	7.14	0.06	0.35	140	0.6	0.07	3.92	0.34	0.06	8.4	0.001	0.001	0.07	0.07	0.001
248	35456	14740	228	0.001	7.7	0.03	0.001	0.02	0.065	1	0.1	12.7	8.79	0.19	0.54	160	1.1	0.12	1.98	0.25	0.1	2.7	0.001	0.001	0.1	0.04	0.001
249	35456	14940	125	0.001	7.4	0.05	0.02	0.02	0.055	1.1	0.09	11.6	5.84	0.11	0.41	580	0.9	0.14	2.5	0.28	0.07	1.8	0.001	0.001	0.06	0.05	0.001
250	35800	16000	706	0.29	62.4	0.04	0.001	0.02	0.35	2.7	0.14	33.3	12.45	0.24	0.43	2100	2	0.28	7.99	0.95	0.31	2.6	0.001	0.001	0.14	0.08	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
251	35800	16200	461	0.24	56.7	0.02	0.01	0.01	0.21	1.8	0.06	23	4.28	0.07	0.18	170	0.6	0.07	6.04	0.39	0.001	6	0.001	0.001	0.05	0.05	0.001
252	35800	16400	246	0.14	22.7	0.06	0.01	0.02	0.112	1.1	0.05	10.25	2.96	0.08	0.17	40	0.2	0.03	1.72	0.14	0.001	6.1	0.001	0.001	0.05	0.04	0.001
253	35800	16600	37	0.001	9.3	0.02	0.001	0.001	0.023	0.6	0.06	6.32	3.91	0.08	0.22	80	0.4	0.07	1	0.16	0.001	5.2	0.001	0.001	0.06	0.04	0.001
254	35800	17000	91	0.001	7.7	0.03	0.01	0.001	0.039	0.4	0.15	6.21	1.96	0.06	0.2	60	0.3	0.03	1.08	0.13	0.001	3.4	0.001	0.001	0.03	0.05	0.001
255	35800	17200	79	0.07	11.5	0.03	0.001	0.02	0.051	0.7	0.05	19.7	3.84	0.03	0.28	140	0.4	0.06	4.1	0.26	0.001	4.1	0.001	0.001	0.04	0.04	0.001
256	35800	17400	86	0.05	10.2	0.02	0.001	0.02	0.056	0.6	0.13	36.1	15.5	0.26	0.42	190	2.1	0.02	13.25	0.46	0.11	3.7	0.001	0.001	0.08	0.23	0.001
257	35800	17600	88	0.2	6	0.01	0.03	0.01	0.055	0.5	0.28	41.3	11.7	0.18	0.51	210	1	0.03	4.49	0.55	0.09	3.8	0.001	0.001	0.08	0.2	0.001
258	35800	17800	69	0.21	10.2	0.02	0.11	0.02	0.074	0.7	0.11	81.4	13.35	0.23	0.65	230	1.8	0.02	31.7	0.67	0.16	3.2	0.001	0.001	0.09	0.2	0.001
259	35800	18000	82	0.13	6.8	0.03	0.06	0.02	0.057	0.8	0.06	7.55	4.18	0.08	0.35	100	0.4	0.03	1.29	0.08	0.08	1.4	0.001	0.001	0.04	0.12	0.001
260	35800	18200	48	0.06	5.8	0.03	0.03	0.01	0.028	0.5	0.08	9.17	8.51	0.13	0.35	290	0.8	0.01	1.98	0.22	0.09	2.5	0.001	0.001	0.08	0.13	0.001
261	35800	18400	30	0.06	4.2	0.01	0.01	0.02	0.022	0.2	0.05	4.92	2.34	0.04	0.25	110	0.4	0.01	0.87	0.001	0.07	3.1	0.001	0.001	0.03	0.09	0.001
262	35800	18600	288	0.12	18.4	0.03	0.01	0.02	0.102	0.5	0.04	9.41	2.11	0.11	0.23	40	0.4	0.001	2.15	0.14	0.08	4.2	0.001	0.001	0.03	0.05	0.001
263	36200	14700	176	0.001	5.3	0.04	0.001	0.02	0.065	1	0.15	23.8	9.49	0.2	0.56	210	0.9	0.06	2.4	0.24	0.09	5.6	0.001	0.001	0.16	0.18	0.001
264	36200	14900	141	0.001	2.4	0.02	0.01	0.11	0.053	0.5	0.2	40.3	13.95	0.45	0.63	260	1.7	0.09	2.6	0.29	0.1	6.4	0.001	0.001	0.17	0.17	0.001
265	36200	17300	88	0.06	7.7	0.18	0.03	0.02	0.051	0.5	0.1	73.2	8.32	0.2	0.28	1370	1.8	0.04	8.7	1.09	0.13	4.1	0.001	0.001	0.15	0.1	0.001
266	36200	17500	87	0.08	6.1	0.06	0.06	0.02	0.049	0.6	0.13	63.8	12	0.15	0.66	330	1.4	0.02	7.57	0.43	0.12	3.7	0.001	0.001	0.15	0.12	0.001
267	36200	17700	80	0.4	8.8	0.01	0.07	0.03	0.06	0.6	0.22	14.65	6.62	0.21	0.55	240	1.9	0.08	1.72	0.24	0.09	5.6	0.001	0.001	0.09	0.08	0.001
268	36200	17900	46	0.08	2.5	0.04	0.03	0.02	0.025	0.4	0.13	15.65	7.61	0.16	0.56	300	2	0.13	1.91	0.18	0.08	13.7	0.001	0.001	0.1	0.08	0.001
269	36200	18100	56	0.05	7.3	0.01	0.001	0.02	0.028	0.3	0.13	10.35	9.32	0.16	0.41	200	1.1	0.02	1.99	0.3	0.09	7.7	0.001	0.001	0.11	0.05	0.001
270	36200	18500	175	0.07	20.7	0.03	0.01	0.01	0.066	1.3	0.17	19.6	11.35	0.19	0.68	150	0.8	0.03	2.32	0.24	0.09	4.3	0.001	0.001	0.12	0.06	0.001
271	36250	12060	513	0.07	22.5	0.02	0.001	0.02	0.103	1	0.28	13.3	18.6	0.53	0.79	470	2.6	0.31	1.66	0.32	0.11	3.4	0.001	0.001	0.09	0.04	0.001
272	36250	12260	297	0.05	15.1	0.03	0.001	0.02	0.088	1.4	0.63	5.24	53.3	1.54	0.7	290	1.1	0.16	0.88	0.16	0.21	1.5	0.001	0.001	0.03	0.35	0.001
273	36250	12460	211	0.001	8.5	0.31	0.01	0.04	0.047	0.7	0.56	10	28	1.3	0.97	490	2.5	0.44	2.58	0.28	0.14	3.8	0.001	0.001	0.09	0.19	0.001
274	36250	12660	78	0.001	3.6	0.24	0.02	0.02	0.021	0.6	0.27	9.66	16.3	0.48	1.02	490	2.3	0.2	2.27	0.3	0.12	3.6	0.001	0.001	0.11	0.14	0.001
275	36250	12860	72	0.001	6.2	0.05	0.01	0.01	0.017	0.7	0.09	7.52	5.93	0.23	0.51	70	0.5	0.01	1.3	0.1	0.08	3.9	0.001	0.001	0.08	0.04	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
276	36250	13060	228	0.05	17	0.06	0.001	0.01	0.078	1.9	0.06	8.37	4.71	0.15	0.4	100	1.3	0.05	1.67	0.24	0.08	2.7	0.001	0.001	0.05	0.05	0.001
277	36250	13260	361	0.11	16.1	0.35	0.01	0.04	0.115	1.7	0.11	19.95	9.72	0.2	0.57	310	1.7	0.08	3.02	0.38	0.1	2.1	0.001	0.001	0.08	0.07	0.001
278	36250	13460	299	0.08	12.1	0.11	0.01	0.04	0.094	1.5	0.09	25.5	13.2	0.19	0.86	460	1.1	0.03	2.88	0.4	0.11	3	0.001	0.001	0.11	0.05	0.001
279	36250	13660	64	0.05	3.3	0.42	0.01	0.09	0.03	1.1	0.08	11.55	9.87	0.12	0.43	380	1.6	0.04	2.5	0.33	0.09	4.1	0.001	0.001	0.06	0.07	0.001
280	36250	13860	48	0.001	12.3	0.02	0.001	0.001	0.025	1.3	0.11	18.9	9.16	0.17	0.85	310	1.5	0.07	2.43	0.36	0.1	9	0.001	0.001	0.1	0.07	0.001
281	36250	14060	232	0.06	11	0.03	0.001	0.03	0.085	1.8	0.11	44.7	11	0.11	0.83	310	2.1	0.08	6.84	0.45	0.12	6.9	0.001	0.001	0.14	0.06	0.001
282	36250	14260	164	0.05	11.7	0.01	0.04	0.01	0.065	1.2	0.15	17.3	9.1	0.11	0.51	230	1	0.06	1.65	0.34	0.1	3.7	0.001	0.001	0.09	0.05	0.001
283	36250	14460	513	0.13	33.7	0.01	0.01	0.03	0.162	1.1	0.14	18.3	5.11	0.07	0.26	320	1	0.05	1.73	0.34	0.09	1.8	0.001	0.001	0.06	0.04	0.001
284	36250	14660	209	0.001	4.2	0.13	0.01	0.08	0.083	1.2	0.4	5.25	14.4	0.4	0.36	630	2	0.46	1.24	0.5	0.16	0.9	0.001	0.001	0.04	0.08	0.001
285	36600	14600	166	0.06	12.2	0.16	0.01	0.06	0.074	1.2	0.07	42.1	15.7	0.13	0.71	340	1.3	0.02	13.65	0.41	0.13	3.3	0.001	0.001	0.12	0.08	0.001
286	36600	14800	29	0.12	4.6	0.01	0.001	0.01	0.038	1.1	0.02	53.4	13.75	0.11	0.001	420	1.6	0.01	46.8	2.48	0.19	11.4	0.001	0.001	0.05	0.02	0.001
287	36600	15200	207	0.15	16.6	0.01	0.03	0.02	0.079	0.9	0.08	17.15	9.98	0.19	0.46	490	1.4	0.03	3.83	0.41	0.11	3.9	0.001	0.001	0.08	0.05	0.001
288	36600	15400	370	0.34	23.1	0.01	0.05	0.01	0.129	0.7	0.07	38.7	12.05	0.17	0.61	300	1.1	0.04	4.93	0.45	0.11	13.8	0.001	0.001	0.1	0.05	0.001
289	36600	15600	391	0.15	28.3	0.02	0.03	0.01	0.161	0.9	0.13	8.39	8.82	0.16	0.72	340	1.9	0.07	2.38	0.26	0.11	4.6	0.001	0.001	0.08	0.07	0.001
290	37000	14500	241	0.16	7.4	0.12	0.001	0.04	0.111	1.4	0.11	25.5	8.08	0.06	0.44	340	0.6	0.03	2.43	0.36	0.1	3.5	0.001	0.001	0.07	0.05	0.001
291	37000	14700	194	0.1	8.9	0.11	0.001	0.02	0.096	1.7	0.09	43.5	6.69	0.13	0.31	380	1.1	0.05	2.57	0.6	0.11	1.5	0.001	0.001	0.08	0.02	0.001
292	37054	11790	92	0.001	4.4	0.11	0.02	0.01	0.021	0.7	0.24	21	20.6	0.49	0.95	250	1.7	0.08	1.64	0.38	0.1	7	0.001	0.001	0.22	0.08	0.001
293	37054	11990	65	0.001	6.4	0.05	0.001	0.01	0.025	1.1	0.07	32.4	16.65	0.38	0.37	280	1.4	0.05	9	0.89	0.17	5.3	0.001	0.001	0.09	0.06	0.001
294	37054	12190	108	0.001	4.7	0.16	0.01	0.03	0.038	1.1	0.05	53.1	9.01	0.11	1.17	130	0.7	0.02	6.85	0.24	0.12	1.7	0.001	0.001	0.07	0.05	0.001
295	37054	12390	153	0.001	6	0.15	0.02	0.001	0.048	1	0.16	7.09	14.1	0.38	0.87	380	2.4	0.17	2	0.28	0.11	4.2	0.001	0.001	0.07	0.12	0.001
296	37054	12590	288	0.001	10	0.11	0.001	0.04	0.071	0.9	0.34	6.51	20.9	0.45	0.66	960	2.9	0.39	1.76	0.4	0.16	3.4	0.001	0.001	0.05	0.21	0.001
297	37054	12790	92	0.001	3.5	0.33	0.02	0.03	0.031	0.9	0.39	4.32	23.2	0.57	0.8	590	2.8	0.53	1.1	0.32	0.16	2.7	0.001	0.001	0.05	0.19	0.001
298	37054	12990	67	0.001	27.5	0.13	0.01	0.01	0.029	2.2	0.14	18.05	16.9	0.19	0.98	540	2.5	0.33	5.43	0.43	0.22	1.9	0.001	0.001	0.08	0.15	0.001
299	37054	13190	228	0.001	4.9	0.39	0.02	0.05	0.043	0.8	0.11	23.4	16.65	0.2	1.04	330	1.4	0.19	3.99	0.35	0.1	2.9	0.001	0.001	0.1	0.14	0.001
300	37054	13390	106	0.001	4.6	0.53	0.02	0.03	0.042	0.8	0.06	38.1	11.55	0.15	0.39	490	1.1	0.12	13.85	0.67	0.14	5.1	0.001	0.01	0.06	0.08	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
301	37400	14200	125	0.13	4	0.12	0.01	0.05	0.06	0.5	0.29	9.61	25.6	0.49	1.21	1450	1.2	0.32	4.54	0.63	0.79	1.4	0.001	0.01	0.09	0.22	0.001
302	37400	14400	343	0.44	22.8	0.17	0.01	0.08	0.182	1	0.23	13.1	27.7	1.03	1.44	650	1.6	0.38	6.59	0.48	0.56	1.9	0.001	0.01	0.04	0.25	0.001
303	37400	15400	532	0.23	44.8	0.06	0.01	0.02	0.192	1.4	0.2	53.3	21.6	0.35	0.79	560	1.9	0.28	11.95	0.56	0.37	2.2	0.001	0.01	0.17	0.12	0.001
304	37800	14100	406	0.11	18.2	0.1	0.01	0.03	0.136	1.4	0.09	47.9	16.3	0.12	0.76	450	1.5	0.34	10	0.42	0.15	2.4	0.001	0.01	0.12	0.11	0.001
305	37800	14300	231	0.11	5	0.03	0.001	0.02	0.086	1.2	0.06	38.5	20	0.22	0.56	550	1.7	0.23	10.95	0.78	0.22	6.8	0.001	0.01	0.15	0.09	0.001
306	37800	14500	302	0.09	8.3	0.13	0.01	0.02	0.096	1	0.1	26.4	13.7	0.2	0.7	270	1.1	0.16	10.65	0.4	0.09	3.4	0.001	0.01	0.08	0.09	0.001
307	37800	14700	209	0.08	8.6	0.14	0.001	0.01	0.078	1.2	0.03	7.12	2.42	0.09	0.05	250	0.001	0.03	4.78	0.2	0.001	0.6	0.001	0.001	0.001	0.02	0.001
308	37800	15100	31	0.05	3.4	0.01	0.03	0.01	0.007	0.2	0.1	11.75	3.13	0.04	0.33	160	0.4	0.06	3.84	0.13	0.001	1.5	0.001	0.001	0.04	0.07	0.001
309	37800	15300	50	0.07	2	0.05	0.03	0.02	0.019	0.4	0.21	14.3	21.8	0.85	0.98	410	0.8	0.23	3.55	0.29	0.35	1.5	0.001	0.01	0.05	0.22	0.001
310	37800	15500	522	0.18	39.4	0.01	0.01	0.02	0.149	1.2	0.18	12.65	14.75	0.42	0.99	380	1.1	0.22	3.58	0.23	0.22	1.8	0.001	0.001	0.06	0.15	0.001
311	37800	15700	301	0.2	21.8	0.02	0.01	0.02	0.093	1	0.03	7.58	1.49	0.03	0.13	80	0.001	0.02	1.45	0.08	0.001	1.9	0.001	0.001	0.03	0.06	0.001
312	37800	16100	16	0.001	1.3	0.1	0.01	0.04	0.008	0.2	0.15	5.97	7.12	0.2	0.61	1030	1.9	0.17	2.2	0.45	0.33	3.5	0.001	0.001	0.06	0.12	0.001
313	37800	16300	85	0.09	11.5	0.01	0.02	0.02	0.045	0.3	0.14	3.7	7.75	0.2	0.6	430	1.7	0.19	1.39	0.35	0.39	1.5	0.001	0.001	0.03	0.09	0.001
314	37800	16500	126	0.07	11.4	0.02	0.02	0.01	0.047	0.3	0.11	37	5.67	0.11	0.57	110	0.7	0.09	3.36	0.16	0.001	1.7	0.001	0.001	0.09	0.08	0.001
315	37800	16700	35	0.09	6.9	0.03	0.01	0.001	0.03	0.6	0.11	27.5	13.75	0.21	1.01	290	1.2	0.09	3.44	0.31	0.18	4.9	0.001	0.001	0.07	0.04	0.001
316	37800	16900	122	0.1	12.1	0.05	0.001	0.01	0.054	0.6	0.15	17.45	5.75	0.12	0.39	170	0.9	0.11	1.58	0.25	0.06	1.8	0.001	0.001	0.05	0.04	0.001
317	37800	17100	61	0.22	7.3	0.02	0.001	0.01	0.027	0.3	0.12	13.95	6.76	0.11	0.7	130	0.8	0.07	1.54	0.15	0.001	2.5	0.001	0.001	0.08	0.06	0.001
318	37800	17300	52	0.07	6.1	0.02	0.001	0.001	0.027	0.6	0.1	36.2	16.95	0.22	0.94	360	1.5	0.16	12	0.54	0.27	3.3	0.001	0.01	0.07	0.07	0.001
319	38200	14000	282	0.06	9.4	0.15	0.001	0.02	0.087	1.1	0.2	52.4	23.9	0.44	0.85	390	1.6	0.2	12.25	0.83	0.31	4.5	0.001	0.01	0.09	0.08	0.001
320	38200	14200	331	0.001	17.7	0.08	0.001	0.01	0.098	1.5	0.3	20.7	29.8	1.17	1.47	580	2.4	0.46	3.17	0.37	0.72	3.5	0.001	0.001	0.06	0.19	0.001
321	38200	14400	557	0.1	58.5	0.01	0.001	0.01	0.169	1.8	0.22	48.6	23.6	0.48	1	410	1.9	0.28	7.61	0.4	0.29	4.6	0.001	0.01	0.11	0.09	0.001
322	38200	14600	276	0.07	22.3	0.01	0.001	0.01	0.122	1.8	0.25	35.6	29	0.68	1.11	560	2.2	0.42	7.73	0.51	0.62	3.2	0.001	0.01	0.07	0.14	0.001
323	38200	14800	540	0.09	34.9	0.03	0.001	0.01	0.186	1.5	0.07	14.75	4.95	0.09	0.45	130	0.3	0.06	2.22	0.11	0.001	2.2	0.001	0.001	0.04	0.04	0.001
324	38200	15200	66	0.05	4.9	0.01	0.001	0.01	0.021	0.4	0.16	6.39	7.97	0.18	0.72	600	1.6	0.18	1.75	0.3	0.28	6.4	0.001	0.001	0.07	0.08	0.001
325	38200	16400	85	0.08	10.7	0.03	0.001	0.02	0.049	0.4	0.09	27.8	5.67	0.06	0.56	240	0.7	0.09	2.76	0.2	0.05	4.4	0.001	0.001	0.06	0.06	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
326	38200	16600	43	0.05	3.4	0.03	0.001	0.001	0.023	0.5	0.14	12.7	1.89	0.21	0.2	120	0.6	0.03	1.93	0.21	0.05	0.8	0.001	0.001	0.02	0.07	0.001
327	38600	13900	382	0.09	31.6	0.07	0.001	0.03	0.144	2	0.23	19.6	27.3	0.61	1.61	620	1.3	0.26	4.31	0.41	0.36	3.3	0.001	0.001	0.06	0.14	0.001
328	38600	14100	358	0.1	28.4	0.01	0.001	0.02	0.15	1.8	0.21	19.75	27.6	0.57	1.46	660	1.7	0.31	4.59	0.46	0.39	3.2	0.001	0.001	0.1	0.13	0.001
329	38600	14300	473	0.19	26.6	0.1	0.001	0.04	0.182	1.8	0.3	26	31.7	0.53	1.39	680	1.3	0.36	6.98	0.43	0.52	2.9	0.001	0.01	0.06	0.14	0.001
330	38600	14500	228	0.08	9.4	0.04	0.001	0.05	0.1	1.9	0.16	34.3	23.7	0.18	1.42	970	1.2	0.24	6.03	0.44	0.32	5	0.001	0.001	0.16	0.11	0.001
331	38600	14700	518	0.13	44.5	0.02	0.001	0.03	0.189	2.3	0.29	8.35	33.4	0.85	1.78	640	1.9	0.31	2.52	0.37	0.5	1.9	0.001	0.01	0.05	0.23	0.001
332	38600	14900	293	0.05	16.1	0.07	0.001	0.01	0.108	1.5	0.11	37.2	21.8	0.4	0.9	380	1.5	0.26	12.4	0.55	0.26	4	0.001	0.01	0.1	0.08	0.001
333	38600	15100	161	0.06	6.6	0.3	0.001	0.04	0.072	1.2	0.12	34.9	13.55	0.24	0.22	350	1	0.12	22.7	0.67	0.22	9.1	0.001	0.01	0.07	0.05	0.001
334	38600	15300	160	0.09	13	0.03	0.001	0.01	0.054	0.7	0.11	12.7	8.67	0.24	0.68	280	0.8	0.12	3.09	0.18	0.14	1.5	0.001	0.001	0.03	0.07	0.001
335	38600	15500	438	0.1	39.8	0.04	0.001	0.01	0.142	1.4	0.3	12	21.1	0.87	1.66	530	1.4	0.31	2.94	0.32	0.45	3.2	0.001	0.001	0.06	0.17	0.001
336	38600	16100	41	0.05	1.6	0.03	0.001	0.001	0.02	0.2	0.09	30.5	4.84	0.04	0.29	230	0.5	0.07	4.1	0.31	0.06	4.6	0.001	0.001	0.03	0.03	0.001
337	38600	16300	55	0.07	2	0.05	0.001	0.01	0.032	0.4	0.17	27.8	7.14	0.05	0.48	310	1.2	0.12	4.04	0.31	0.09	3.5	0.001	0.001	0.04	0.03	0.001
338	38600	16500	43	0.07	2.6	0.09	0.001	0.03	0.026	0.3	0.16	40	6.56	0.09	0.34	490	0.8	0.1	4.44	0.36	0.09	5.3	0.001	0.001	0.05	0.05	0.001
339	39000	14000	507	0.11	56.3	0.03	0.001	0.03	0.202	2	0.36	16.85	30.6	1.12	1.37	610	2	0.42	5.1	0.41	0.55	2.8	0.001	0.01	0.06	0.16	0.001
340	39000	14200	239	0.07	25.4	0.03	0.001	0.01	0.136	3.3	0.24	22	33.2	0.47	1.96	460	1.1	0.29	1.91	0.24	0.21	7	0.001	0.001	0.07	0.15	0.001
341	39000	14400	372	0.09	53.3	0.01	0.001	0.03	0.203	2.3	0.19	16.15	36.3	1.09	1.61	930	1.6	0.33	4.53	0.44	0.51	2.6	0.001	0.01	0.05	0.15	0.001
342	39000	14600	403	0.11	38.4	0.04	0.001	0.04	0.169	1.7	0.27	20.4	26.9	0.76	1.27	680	2	0.37	6.83	0.48	0.49	3.5	0.001	0.01	0.11	0.16	0.001
343	39000	14800	246	0.08	10.2	0.1	0.001	0.04	0.113	1.7	0.16	35.6	23.3	0.18	0.99	470	1.2	0.06	6.22	0.45	0.13	4.1	0.001	0.001	0.12	0.1	0.001
344	39000	15000	262	0.09	21.8	0.01	0.001	0.02	0.113	1.7	0.17	30.6	23.6	0.47	1.01	380	1.6	0.1	7.22	0.25	0.12	2.9	0.001	0.001	0.09	0.13	0.001
345	39000	15200	338	0.1	23.3	0.01	0.01	0.02	0.14	1.5	0.22	19.6	22.1	0.51	0.68	220	1.8	0.08	2.74	0.23	0.13	2.2	0.001	0.001	0.06	0.17	0.001
346	39000	15400	441	0.11	50.3	0.01	0.001	0.01	0.169	1.5	0.22	13.5	24.4	1.17	0.91	540	1	0.21	3.85	0.41	0.14	2	0.001	0.001	0.03	0.21	0.001
347	39000	15600	445	0.16	38.3	0.01	0.01	0.02	0.171	1.2	0.24	15.45	22.1	0.78	0.65	630	0.3	0.27	4.47	0.38	0.16	1.9	0.001	0.001	0.05	0.2	0.001
348	39000	15800	87	0.06	11.1	0.02	0.001	0.02	0.086	1.3	0.1	47.8	13.2	0.2	0.36	840	1.8	0.01	24	0.83	0.17	2.1	0.001	0.001	0.07	0.09	0.001
349	39000	16000	64	0.08	7.8	0.02	0.01	0.01	0.033	0.7	0.11	21	7.17	0.13	0.6	200	0.001	0.001	2.79	0.18	0.11	2	0.001	0.001	0.07	0.07	0.001
350	39000	16200	45	0.06	1.6	0.03	0.01	0.01	0.019	0.3	0.07	17.6	4.74	0.03	0.31	170	0.5	0.001	2.96	0.24	0.1	3.9	0.001	0.001	0.02	0.07	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
351	39000	16400	55	0.32	3.4	0.04	0.01	0.03	0.03	0.4	0.09	14.35	7.64	0.05	0.66	190	0.9	0.03	2.79	0.23	0.09	2	0.001	0.001	0.06	0.09	0.001
352	39400	13700	480	0.14	53.7	0.02	0.001	0.02	0.225	1.9	0.41	12.85	27.3	0.96	0.56	460	1.5	0.4	2.75	0.24	0.16	0.9	0.001	0.001	0.04	0.24	0.001
353	39400	13900	245	0.001	15.3	0.09	0.001	0.01	0.112	1.5	0.19	21.4	19.6	0.3	0.56	290	0.001	0.09	5.52	0.35	0.1	2.2	0.001	0.001	0.07	0.14	0.001
354	39400	14100	166	0.06	8.9	0.05	0.001	0.03	0.083	1.6	0.18	50.5	17.8	0.16	0.71	320	1.5	0.08	6.82	0.37	0.13	5.3	0.001	0.001	0.13	0.16	0.001
355	39400	14300	385	0.12	21.8	0.06	0.001	0.03	0.157	1.6	0.26	26.6	24.4	0.35	0.72	470	0.3	0.12	3.27	0.32	0.13	2.2	0.001	0.001	0.16	0.21	0.001
356	39400	14500	253	0.001	8.1	0.11	0.01	0.05	0.119	1.3	0.09	28.7	19.7	0.2	0.38	490	1	0.01	15.4	1	0.15	2.8	0.001	0.001	0.09	0.15	0.001
357	39400	14700	265	0.001	11.1	0.03	0.001	0.02	0.091	1.4	0.09	62.7	20.5	0.31	0.85	400	2.3	0.03	16.65	0.41	0.13	2.9	0.001	0.001	0.08	0.07	0.001
358	39400	14900	315	0.06	8.1	0.05	0.01	0.08	0.122	1.3	0.13	146.5	20.8	0.19	0.44	560	1.2	0.11	14.95	1.07	0.16	6.4	0.001	0.001	0.64	0.15	0.001
359	39400	15100	185	0.09	8.5	0.001	0.001	0.02	0.073	0.3	0.05	102	10.3	0.24	0.001	490	0.7	0.2	7.65	0.33	0.16	0.4	0.001	0.001	0.001	0.03	0.001
360	39400	15300	570	0.26	28.1	0.03	0.01	0.03	0.224	1.4	0.29	13.05	25.6	0.52	0.82	910	1.9	0.31	5.32	0.54	0.22	1.7	0.001	0.001	0.04	0.19	0.001
361	39400	15500	320	0.05	11.3	0.04	0.01	0.02	0.113	1.3	0.13	42.9	20.5	0.23	0.82	480	2.3	0.08	9.65	0.48	0.14	3.2	0.001	0.001	0.09	0.12	0.001
362	39400	15700	195	0.001	3.9	0.15	0.01	0.04	0.058	1	0.06	35.3	12.8	0.1	0.37	270	0.5	0.02	11.65	0.74	0.14	3.8	0.001	0.001	0.07	0.07	0.001
363	39400	15900	146	0.08	4.9	0.05	0.01	0.02	0.069	1	0.12	21.1	13.7	0.11	0.55	490	1.2	0.001	4.53	0.33	0.13	2.8	0.001	0.001	0.09	0.09	0.001
364	39400	16100	124	0.08	5.3	0.03	0.03	0.02	0.056	0.5	0.16	6.67	9.13	0.09	0.46	300	0.8	0.09	1.58	0.15	0.11	2.6	0.001	0.001	0.03	0.07	0.001
365	39400	16300	17	0.11	6.2	0.01	0.01	0.01	0.022	0.3	0.1	9.68	3.77	0.1	0.31	90	0.4	0.03	1.75	0.21	0.1	1.5	0.001	0.001	0.05	0.06	0.001
366	39400	16500	43	0.06	3.1	0.02	0.03	0.02	0.034	0.4	0.19	36.2	8.98	0.05	0.28	330	0.8	0.05	2.95	0.36	0.12	7	0.001	0.001	0.06	0.04	0.001
367	39800	14200	448	0.1	43.5	0.03	0.01	0.03	0.199	2	0.4	21.1	27.3	0.8	0.7	500	0.8	0.26	3.69	0.22	0.14	2.1	0.001	0.001	0.12	0.2	0.001
368	39800	14400	487	0.16	42.7	0.03	0.001	0.05	0.192	2.2	0.44	34.6	29.4	0.67	0.59	660	0.7	0.25	5.8	0.42	0.16	2	0.001	0.001	0.1	0.28	0.001
369	39800	14600	254	0.1	12.9	0.03	0.001	0.03	0.121	1.9	0.17	43.5	22	0.26	0.73	480	1.5	0.19	9.43	0.33	0.13	2.6	0.001	0.001	0.12	0.19	0.001
370	39800	14800	254	0.09	8.1	0.12	0.01	0.04	0.103	1.4	0.1	26.4	18.55	0.15	0.35	530	1.2	0.06	10.2	0.6	0.12	2.8	0.001	0.001	0.07	0.11	0.001
371	39800	15000	291	0.06	14.6	0.04	0.001	0.02	0.11	1.5	0.13	20.6	20.8	0.37	0.62	420	1.4	0.13	8.76	0.5	0.11	3.7	0.001	0.001	0.09	0.11	0.001
372	39800	15400	584	0.13	21.6	0.02	0.01	0.03	0.198	1.1	0.19	53.5	22.4	0.42	0.31	800	2.5	0.12	8.83	0.59	0.17	1.6	0.001	0.001	0.11	0.16	0.001
373	39800	15600	250	0.05	11.1	0.08	0.01	0.02	0.098	1.2	0.22	40.5	18.45	0.23	0.66	380	1.7	0.12	13.85	0.61	0.14	3.4	0.001	0.001	0.1	0.09	0.001
374	39800	15800	105	0.001	4.2	0.09	0.01	0.01	0.045	0.6	0.06	20.4	9.05	0.09	0.26	140	1	0.001	7.05	0.45	0.11	6.6	0.001	0.001	0.05	0.06	0.001
375	39800	16000	59	0.001	10.2	0.02	0.01	0.01	0.026	0.6	0.09	13.65	8.62	0.17	0.71	170	1	0.01	2.3	0.13	0.1	3.1	0.001	0.001	0.07	0.06	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
376	39800	16200	51	0.08	11.8	0.01	0.01	0.03	0.051	0.5	0.12	35.3	7.91	0.21	0.55	380	1.4	0.05	7.14	0.49	0.05	5.2	0.001	0.001	0.08	0.08	0.001
377	39800	16400	22	0.05	8.4	0.01	0.03	0.02	0.039	0.3	0.17	8.86	3.54	0.14	0.24	250	1.4	0.06	1.27	0.21	0.001	2.2	0.001	0.001	0.03	0.05	0.001
378	39800	16600	8	0.001	2.4	0.02	0.01	0.01	0.008	0.2	0.04	6.4	1.48	0.05	0.1	20	0.001	0.01	0.81	0.09	0.001	4.9	0.001	0.001	0.02	0.04	0.001
379	40200	13900	465	0.1	72.3	0.01	0.01	0.01	0.179	2.1	0.38	39.3	26.5	1.57	0.46	420	1.3	0.31	5.03	0.66	0.1	2.8	0.001	0.001	0.12	0.19	0.001
380	40200	14100	133	0.001	8.2	0.2	0.01	0.05	0.062	0.9	0.08	42.9	11.75	0.2	0.6	290	0.9	0.03	11.65	0.78	0.06	6	0.001	0.001	0.12	0.07	0.001
381	40200	14300	166	0.001	4	0.19	0.01	0.03	0.053	0.8	0.05	34.1	10.4	0.13	0.24	240	0.9	0.03	14.15	1.02	0.06	2.9	0.001	0.001	0.05	0.06	0.001
382	40200	14500	124	0.001	4.9	0.45	0.01	0.08	0.036	0.8	0.04	41.8	9.18	0.15	0.38	190	1	0.03	17.85	0.68	0.06	5.4	0.001	0.001	0.05	0.07	0.001
383	40200	14700	109	0.001	3.6	0.21	0.01	0.03	0.038	0.8	0.04	48.8	7.7	0.09	0.29	150	0.5	0.01	21.4	0.68	0.07	2.6	0.001	0.001	0.06	0.05	0.001
384	40200	14900	307	0.14	25	0.05	0.001	0.02	0.119	1.6	0.43	26.1	21	0.45	0.58	470	0.9	0.22	5.46	0.53	0.05	2.1	0.001	0.001	0.09	0.2	0.001
385	40200	15100	388	0.13	48.5	0.13	0.001	0.02	0.192	2.2	0.31	21.4	28.6	0.97	0.72	670	1.4	0.25	7.13	0.56	0.07	2	0.001	0.001	0.05	0.19	0.001
386	40200	15300	171	0.001	5.7	0.29	0.001	0.03	0.09	1.9	0.05	36.8	12.9	0.17	0.76	200	1.1	0.03	14.35	0.86	0.05	2	0.001	0.001	0.05	0.08	0.001
387	40200	15500	76	0.001	5.2	0.17	0.01	0.02	0.066	1	0.06	48.7	10.3	0.13	0.37	200	1.2	0.01	15	0.92	0.06	6.7	0.001	0.001	0.05	0.08	0.001
388	40200	15700	54	0.06	6.4	0.01	0.01	0.02	0.021	0.4	0.11	7.41	5.59	0.1	0.43	270	1.1	0.06	1.55	0.25	0.001	1.7	0.001	0.001	0.03	0.05	0.001
389	40200	15900	20	0.08	5.4	0.01	0.001	0.01	0.026	0.3	0.12	25.8	3.35	0.08	0.31	200	1	0.03	2.91	0.3	0.001	0.9	0.001	0.001	0.05	0.07	0.001
390	40200	16100	61	7.19	6.4	0.02	0.01	0.03	0.043	0.3	0.08	34.4	9.26	0.11	0.41	240	1.2	0.05	5.81	0.57	0.06	5.8	0.001	0.001	0.05	0.07	0.001
391	40200	16300	48	0.16	7.5	0.02	0.02	0.01	0.033	0.5	0.15	44.9	7.87	0.12	0.58	210	1.1	0.05	3.46	0.38	0.001	3.6	0.001	0.001	0.07	0.06	0.001
392	40200	16500	67	0.07	7.9	0.12	0.02	0.03	0.037	0.8	0.17	75.3	12.7	0.17	0.74	250	0.9	0.05	6.11	0.41	0.05	3.5	0.001	0.001	0.1	0.06	0.001
393	40200	16700	46	0.05	2.7	0.02	0.001	0.01	0.024	0.6	0.09	39.3	7.12	0.06	0.3	140	0.4	0.02	4.6	0.2	0.001	2.3	0.001	0.001	0.11	0.05	0.001
394	40600	14600	140	0.001	4.2	0.27	0.01	0.05	0.048	1.1	0.04	54.3	11.05	0.13	0.3	210	1	0.02	26.1	0.87	0.05	4.6	0.001	0.001	0.07	0.05	0.001
395	40600	14800	128	0.001	5	0.29	0.01	0.02	0.039	1.4	0.04	49	9.84	0.16	0.24	120	0.7	0.02	10.85	0.7	0.001	4.8	0.001	0.001	0.05	0.04	0.001
396	40600	15000	134	0.06	5.1	0.09	0.01	0.04	0.04	0.2	0.04	22.1	12.5	0.1	0.001	340	0.6	0.07	6.31	0.54	0.06	34.6	0.001	0.001	0.03	0.03	0.001
397	40600	15200	180	0.05	6.5	0.04	0.01	0.02	0.071	1.3	0.09	49.5	13.15	0.15	0.4	340	0.9	0.07	12.35	0.56	0.05	3.1	0.001	0.001	0.12	0.11	0.001
398	40600	15400	62	0.08	3	0.01	0.02	0.01	0.016	0.4	0.07	5.56	4.35	0.06	0.35	160	0.6	0.03	1.07	0.11	0.001	2.1	0.001	0.001	0.04	0.06	0.001
399	40600	15600	68	0.08	4.8	0.01	0.01	0.03	0.018	0.2	0.12	3.28	5.74	0.08	0.21	380	0.7	0.05	1.53	0.24	0.001	1.1	0.001	0.001	0.02	0.05	0.001
400	40600	15800	44	0.09	7.8	0.02	0.01	0.01	0.031	0.5	0.11	36	5.99	0.13	0.46	130	0.9	0.01	4.21	0.42	0.001	3.5	0.001	0.001	0.07	0.08	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
401	40600	16000	43	0.001	6.5	0.02	0.02	0.01	0.023	0.3	0.16	33.8	7.14	0.11	0.32	190	0.8	0.06	3.24	0.46	0.001	4	0.001	0.001	0.05	0.03	0.001
402	40600	16200	57	0.07	4.9	0.08	0.02	0.01	0.034	0.7	0.16	28.3	9.54	0.08	0.77	200	1.2	0.04	2.79	0.3	0.001	4.6	0.001	0.001	0.08	0.05	0.001
403	40600	16400	183	0.1	9.9	0.02	0.01	0.01	0.058	0.7	0.18	25.2	12.3	0.18	0.43	350	1.4	0.2	2.72	0.46	0.05	1.8	0.001	0.001	0.06	0.06	0.001
404	40600	16600	52	0.001	4.5	0.02	0.01	0.01	0.024	0.7	0.06	22.4	8.22	0.11	0.31	110	1.1	0.03	2.92	0.2	0.001	2	0.001	0.001	0.11	0.04	0.001
405	41000	14100	169	0.001	8.1	0.19	0.01	0.03	0.066	1.5	0.06	48.2	15.1	0.23	0.44	240	1.3	0.02	13	1	0.07	4.9	0.001	0.001	0.1	0.09	0.001
406	41000	14300	224	0.001	9.7	0.07	0.01	0.03	0.087	1.5	0.11	82.4	17.45	0.21	0.44	380	1.4	0.05	10.85	0.84	0.06	4.7	0.001	0.001	0.25	0.07	0.001
407	41000	14500	279	0.001	8.9	0.2	0.01	0.06	0.083	0.7	0.08	111.5	12.5	0.2	0.4	280	1.5	0.08	5.02	1.2	0.18	5	0.001	0.001	0.13	0.08	0.001
408	41000	14700	41	0.06	2	0.07	0.02	0.02	0.01	0.2	0.06	11.55	2.61	0.05	0.22	100	0.2	0.01	1.39	0.17	0.14	1.2	0.001	0.001	0.02	0.04	0.001
409	41000	14900	66	0.001	5.2	0.04	0.01	0.01	0.021	0.3	0.09	18.45	4.21	0.1	0.28	240	1.1	0.04	1.58	0.31	0.15	1.3	0.001	0.001	0.02	0.06	0.001
410	41000	15100	52	0.001	6.5	0.02	0.01	0.01	0.016	0.3	0.07	48.5	8.15	0.13	0.15	130	1.2	0.02	2.09	0.38	0.16	22.2	0.001	0.001	0.03	0.05	0.001
411	41000	15300	51	0.07	3.6	0.01	0.03	0.02	0.017	0.4	0.07	6.56	5.26	0.07	0.37	190	0.6	0.03	1.48	0.15	0.14	2.7	0.001	0.001	0.03	0.07	0.001
412	41000	15500	53	0.06	6.7	0.02	0.02	0.01	0.022	0.4	0.07	10.9	6.03	0.14	0.34	160	0.8	0.01	2.46	0.23	0.001	3.1	0.001	0.001	0.04	0.06	0.001
413	41000	15700	52	0.11	4.1	0.02	0.01	0.01	0.03	0.5	0.1	46.2	6.47	0.08	0.46	170	0.7	0.02	3.64	0.26	0.001	2.5	0.001	0.001	0.07	0.06	0.001
414	41000	15900	49	0.07	5.9	0.02	0.01	0.02	0.035	0.5	0.13	65.1	7.38	0.11	0.52	220	1	0.03	3.6	0.35	0.001	2.6	0.001	0.001	0.06	0.05	0.001
415	41000	16100	48	0.05	4.1	0.03	0.01	0.02	0.026	0.4	0.18	18.3	5.53	0.07	0.44	220	1.2	0.1	1.7	0.29	0.001	1.4	0.001	0.001	0.04	0.04	0.001
416	41000	16300	63	0.06	2.2	0.02	0.01	0.01	0.025	0.6	0.07	42.6	5.52	0.04	0.4	190	0.8	0.01	6.52	0.44	0.001	4.7	0.001	0.001	0.06	0.04	0.001
417	41000	16500	95	0.05	7.2	0.03	0.01	0.01	0.042	1	0.1	68.5	10.8	0.14	0.46	150	0.9	0.03	10	0.27	0.05	3.7	0.001	0.001	0.11	0.06	0.001
418	41000	16700	58	0.001	2.9	0.05	0.01	0.02	0.024	0.6	0.07	40.5	5.58	0.06	0.41	130	0.4	0.01	4.34	0.17	0.001	2.4	0.001	0.001	0.07	0.07	0.001
419	41400	15800	110	0.001	3	0.1	0.01	0.07	0.038	0.7	0.08	43.1	8.22	0.08	0.33	250	0.5	0.03	9.86	0.61	0.001	8.8	0.001	0.001	0.05	0.06	0.001
420	41400	16000	47	0.08	4.6	0.01	0.02	0.01	0.033	0.4	0.12	32.2	6.12	0.08	0.33	180	1.1	0.05	3.42	0.3	0.001	4	0.001	0.001	0.05	0.04	0.001
421	41400	16200	92	0.05	2.3	0.1	0.01	0.04	0.034	0.6	0.06	26.5	6.46	0.06	0.33	290	0.5	0.04	9.01	0.44	0.001	5	0.001	0.001	0.04	0.05	0.001
422	41400	16400	123	0.001	4.2	0.1	0.01	0.01	0.049	0.8	0.07	38.4	8.16	0.1	0.25	210	0.8	0.05	7.82	0.6	0.001	5.3	0.001	0.001	0.06	0.05	0.001
423	41400	16600	88	0.05	2.7	0.26	0.01	0.06	0.034	0.6	0.05	32.5	6.79	0.09	0.38	300	0.8	0.01	8.67	0.42	0.001	4.5	0.001	0.001	0.04	0.04	0.001
424	41800	14100	112	0.001	3.3	0.39	0.02	0.03	0.041	0.6	0.03	35.8	8.18	0.14	0.13	150	0.6	0.01	14.95	0.6	0.05	11	0.001	0.001	0.04	0.05	0.001
425	41800	14300	55	0.06	3	0.04	0.01	0.01	0.022	0.4	0.08	26.8	5.36	0.06	0.39	140	0.6	0.01	3.78	0.25	0.001	3.8	0.001	0.001	0.06	0.08	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
426	41800	14500	18	0.001	2	0.14	0.02	0.02	0.012	0.2	0.06	10.85	2.52	0.05	0.19	90	0.2	0.001	1.9	0.2	0.001	5.7	0.001	0.001	0.03	0.07	0.001
427	41800	14700	59	0.13	4.9	0.03	0.02	0.01	0.025	0.3	0.09	5.82	4.42	0.1	0.34	190	1.1	0.03	1.24	0.18	0.001	1.6	0.001	0.001	0.03	0.08	0.001
428	41800	14900	35	0.3	2.1	0.01	0.01	0.01	0.017	0.2	0.05	4.57	2.31	0.04	0.22	240	0.5	0.001	0.78	0.12	0.001	1.7	0.001	0.001	0.03	0.06	0.001
429	41800	15100	26	0.09	1.9	0.01	0.01	0.01	0.02	0.001	0.05	2.86	1.73	0.03	0.11	50	0.3	0.01	0.65	0.09	0.001	0.9	0.001	0.001	0.02	0.04	0.001
430	41800	15300	23	0.13	4.8	0.01	0.001	0.02	0.03	0.3	0.11	18.55	3.08	0.09	0.31	1020	1.1	0.16	2.69	0.49	0.17	2.3	0.001	0.001	0.05	0.08	0.001
431	41800	15500	99	0.001	3.9	0.06	0.01	0.03	0.042	0.3	0.07	25.9	10.2	0.09	0.25	280	0.8	0.15	7.63	0.71	0.15	21.1	0.001	0.001	0.05	0.1	0.001
432	41800	15700	30	0.06	5.4	0.02	0.03	0.02	0.033	0.3	0.19	21.7	5.58	0.08	0.44	290	1.1	0.16	1.69	0.25	0.1	3.1	0.001	0.001	0.05	0.04	0.001
433	41800	16100	69	0.09	4	0.07	0.01	0.02	0.032	0.6	0.16	102.5	9.3	0.08	0.5	290	1.1	0.26	6.33	0.4	0.16	3.1	0.001	0.001	0.16	0.05	0.001
434	41800	16300	110	0.07	5	0.11	0.01	0.03	0.041	0.8	0.13	57.1	10.95	0.12	0.34	790	0.8	0.19	9.06	0.47	0.17	3.9	0.001	0.001	0.21	0.05	0.001
435	41800	16500	64	0.06	5	2.48	0.01	0.06	0.034	0.9	0.1	36	9.76	0.17	0.47	900	0.6	0.21	7.19	0.27	0.11	2.9	0.001	0.001	0.11	0.05	0.001
436	41800	16700	63	0.001	5.1	0.2	0.01	0.02	0.033	0.9	0.11	44	9.59	0.13	0.38	300	0.3	0.13	6.1	0.26	0.08	3.5	0.001	0.001	0.13	0.03	0.001
437	42600	14100	206	0.001	4.5	0.2	0.01	0.01	0.046	0.8	0.06	31.6	12.7	0.12	0.28	130	0.7	0.12	7.27	0.53	0.13	13.2	0.001	0.001	0.07	0.05	0.001
438	42600	14300	60	0.001	5.9	0.03	0.01	0.01	0.022	0.5	0.08	37.8	6.55	0.09	0.61	120	0.6	0.09	5.05	0.14	0.06	2.7	0.001	0.001	0.07	0.06	0.001
439	42600	14500	135	0.001	8.4	0.06	0.01	0.01	0.054	0.8	0.08	30.4	11.5	0.16	0.59	220	0.9	0.13	9.66	0.44	0.12	6.7	0.001	0.001	0.08	0.07	0.001
440	42600	14700	304	0.09	30.6	0.01	0.01	0.01	0.092	0.7	0.21	9.64	12.8	0.64	1.03	400	3.6	0.39	2.09	0.21	0.3	2	0.001	0.01	0.05	0.12	0.001
441	42600	14900	38	0.39	6.1	0.01	0.02	0.01	0.022	0.2	0.08	9.02	2.92	0.1	0.31	460	0.9	0.09	1.76	0.13	0.09	2.7	0.001	0.001	0.04	0.04	0.001
442	42600	15100	47	0.001	3.5	0.04	0.001	0.02	0.03	0.2	0.12	17.65	5.13	0.05	0.33	200	0.6	0.09	3.26	0.37	0.1	9.4	0.001	0.001	0.04	0.06	0.001
443	42600	15300	25	0.1	6.9	0.06	0.01	0.01	0.026	0.4	0.11	31.5	4.53	0.09	0.5	130	0.8	0.07	2.81	0.27	0.07	2.3	0.001	0.001	0.07	0.06	0.001
444	42600	15500	27	0.09	6.5	0.01	0.02	0.02	0.039	0.2	0.13	12.45	4.05	0.08	0.39	400	1.3	0.1	2.2	0.25	0.09	1.6	0.001	0.001	0.04	0.04	0.001
445	42600	15700	56	0.12	8.3	0.03	0.02	0.01	0.039	0.7	0.18	53.5	10.25	0.11	0.95	280	1.3	0.14	3.04	0.3	0.1	3.8	0.001	0.001	0.1	0.08	0.001
446	42600	15900	34	0.07	7.8	0.01	0.01	0.01	0.023	0.4	0.21	54.6	6.51	0.11	0.45	210	1	0.14	1.61	0.16	0.07	1.9	0.001	0.001	0.06	0.02	0.001
447	42800	14300	41	0.1	2.6	0.03	0.02	0.01	0.028	0.4	0.05	49.8	7.68	0.09	0.57	140	0.5	0.07	6.98	0.57	0.1	3.3	0.001	0.001	0.08	0.04	0.001
448	43400	14100	111	0.001	5.3	0.29	0.01	0.03	0.049	0.7	0.04	35.1	3.29	0.05	0.19	120	0.3	0.04	2.73	0.28	0.07	2.6	0.001	0.001	0.03	0.04	0.001
449	43400	14300	31	0.001	2.4	0.14	0.01	0.02	0.009	0.2	0.04	18.9	2.72	0.03	0.19	80	0.3	0.03	2.16	0.21	0.05	4.3	0.001	0.001	0.02	0.03	0.001
450	43400	14500	29	0.001	1.6	0.07	0.02	0.01	0.009	0.2	0.07	8.41	3.29	0.04	0.25	160	0.8	0.06	1.6	0.18	0.07	1.4	0.001	0.001	0.02	0.05	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
451	43400	14700	31	0.59	2.9	0.05	0.01	0.02	0.016	0.2	0.12	43.9	5.24	0.04	0.49	130	1.2	0.1	3.15	0.25	0.08	3.5	0.001	0.001	0.06	0.06	0.001
452	43400	14900	46	0.07	2.7	0.04	0.01	0.01	0.024	0.4	0.14	66.3	5.45	0.08	0.45	170	1.2	0.1	4.26	0.37	0.11	3.8	0.001	0.001	0.04	0.05	0.001
453	43400	15100	33	0.05	5.8	0.03	0.02	0.03	0.027	0.3	0.17	47.8	9.51	0.09	0.48	290	1.3	0.13	3.03	0.53	0.13	1.6	0.001	0.001	0.05	0.05	0.001
454	43400	15300	62	0.05	7.3	0.01	0.01	0.01	0.032	0.3	0.2	87	6.34	0.05	0.48	140	1.2	0.14	3.52	0.31	0.1	13.3	0.001	0.001	0.09	0.03	0.001
455	43400	15500	34	0.06	4.1	0.02	0.01	0.1	0.021	0.3	0.29	41.9	8.75	0.07	0.24	400	1.1	0.2	4.46	0.29	0.13	1.1	0.001	0.001	0.02	0.03	0.001
456	43400	15700	42	0.001	4.1	0.05	0.02	0.02	0.033	0.2	0.07	62.2	10.85	0.13	0.93	380	1.5	0.12	29.3	0.81	0.18	2.4	0.001	0.01	0.12	0.09	0.001
457	44200	13900	65	0.34	5.1	0.17	0.01	0.06	0.092	1.1	0.08	22.4	9.36	0.16	0.81	270	0.9	0.1	4.12	0.51	0.15	2.3	0.001	0.001	0.07	0.05	0.001
458	44200	14100	186	0.06	10.9	0.07	0.01	0.01	0.071	0.9	0.1	18.45	11.55	0.37	0.91	440	1.5	0.17	6	0.76	0.27	1.6	0.001	0.01	0.03	0.06	0.001
459	44200	14300	303	0.09	20.9	0.04	0.001	0.03	0.119	0.8	0.07	4.74	4.25	0.04	0.29	210	0.6	0.05	1.09	0.13	0.07	0.9	0.001	0.001	0.02	0.04	0.001
460	44200	14500	64	0.07	2.1	0.07	0.01	0.02	0.016	0.2	0.09	5.56	6.09	0.05	0.51	330	1.2	0.1	1.4	0.2	0.09	1.2	0.001	0.001	0.03	0.05	0.001
461	44200	14700	65	0.05	4.2	0.04	0.01	0.02	0.023	0.3	0.14	9.03	5.94	0.06	0.69	200	1.2	0.16	1.42	0.19	0.09	1.5	0.001	0.001	0.05	0.05	0.001
462	44200	14900	58	0.07	4.3	0.06	0.01	0.02	0.033	0.4	0.2	30.4	9.25	0.12	0.66	290	1.7	0.19	3.04	0.44	0.14	2.9	0.001	0.001	0.05	0.05	0.001
463	44200	15100	76	0.07	10.3	0.01	0.02	0.01	0.042	0.4	0.11	46	6.43	0.05	0.29	120	0.8	0.09	7.61	0.69	0.1	10.6	0.001	0.001	0.04	0.03	0.001
464	44200	15300	43	0.001	2.7	0.05	0.03	0.01	0.022	0.3	0.05	32.1	5.97	0.08	0.41	190	0.6	0.13	9.64	0.43	0.09	6.5	0.001	0.001	0.04	0.06	0.001
465	44200	15500	67	0.001	2.9	0.16	0.02	0.04	0.033	0.6	0.13	20.9	13.55	0.3	0.74	670	1.1	0.28	10	0.51	0.31	1.9	0.001	0.001	0.07	0.12	0.001
466	45000	13700	346	0.14	16.8	0.03	0.01	0.04	0.121	0.9	0.23	26.1	20.1	0.66	0.88	370	0.7	0.24	6.46	0.4	0.27	3.1	0.001	0.001	0.09	0.18	0.001
467	45000	13900	322	0.08	35.6	0.03	0.001	0.01	0.162	1.7	0.09	5.95	5.21	0.13	0.51	170	1	0.09	1.3	0.16	0.08	2.6	0.001	0.001	0.04	0.06	0.001
468	45000	14100	64	0.2	8.4	0.02	0.01	0.01	0.022	0.3	0.09	6.48	5.56	0.06	0.55	190	0.6	0.07	1.26	0.12	0.07	2.1	0.001	0.001	0.03	0.05	0.001
469	45000	14300	56	0.06	4.3	0.04	0.01	0.01	0.02	0.3	0.11	10.5	8.76	0.08	0.51	330	1.1	0.16	2.2	0.28	0.11	2.4	0.001	0.001	0.05	0.04	0.001
470	45000	14500	89	0.001	5	0.01	0.001	0.01	0.035	0.4	0.15	12.2	6.85	0.07	0.64	170	1.3	0.12	1.06	0.17	0.07	2	0.001	0.001	0.06	0.05	0.001
471	45000	14900	42	0.06	5	0.01	0.02	0.001	0.03	0.4	0.12	20.6	8.79	0.11	0.72	180	1.2	0.15	3.77	0.26	0.12	3.3	0.001	0.001	0.06	0.05	0.001
472	45000	15100	68	0.06	7.4	0.02	0.01	0.01	0.033	0.5	0.08	32.2	5.42	0.03	0.3	90	0.6	0.06	5.21	0.4	0.08	6.3	0.001	0.001	0.04	0.03	0.001
473	45000	15300	43	0.001	2	0.06	0.01	0.01	0.019	0.3	0.06	3.31	4.87	0.03	0.28	360	0.4	0.06	1.58	0.19	0.08	2	0.001	0.001	0.02	0.04	0.001
474	45800	13700	48	0.3	2	0.01	0.03	0.02	0.016	0.3	0.05	11.1	3.5	0.08	0.15	310	0.2	0.07	2.1	0.35	0.1	1	0.001	0.001	0.02	0.06	0.001
475	45800	13900	57	0.25	4.5	0.01	0.001	0.02	0.024	0.2	0.06	5.79	2.6	0.05	0.2	300	0.7	0.08	1.17	0.16	0.09	2.8	0.001	0.001	0.03	0.07	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
476	45800	14100	28	0.2	3.2	0.01	0.01	0.02	0.015	0.2	0.09	9.45	5.01	0.12	0.53	200	0.7	0.11	1.41	0.12	0.09	4.3	0.001	0.001	0.05	0.06	0.001
477	45800	14300	47	0.09	6.4	0.01	0.02	0.01	0.025	0.4	0.13	18.95	5.18	0.1	0.56	510	0.9	0.17	1.81	0.21	0.14	2	0.001	0.001	0.06	0.08	0.001
478	45800	14500	42	0.09	6.3	0.03	0.01	0.01	0.034	0.4	0.11	33.6	4.92	0.06	0.44	190	0.6	0.09	3.88	0.29	0.13	2.2	0.001	0.001	0.05	0.06	0.001
479	45800	14700	54	0.09	3.5	0.06	0.01	0.01	0.028	0.3	0.2	37.2	9.98	0.16	0.63	140	0.9	0.15	3.38	0.28	0.12	3	0.001	0.001	0.1	0.07	0.001
480	45800	14900	74	0.05	8.8	0.02	0.01	0.01	0.036	0.6	0.02	12.55	1.6	0.06	0.05	20	0.001	0.02	1.34	0.17	0.001	3.3	0.001	0.001	0.03	0.02	0.001
481	45800	15100	17	0.001	2.6	0.04	0.01	0.01	0.007	0.001	0.14	19.25	11.95	0.28	1	290	1	0.17	3.39	0.21	0.16	2.5	0.001	0.001	0.11	0.11	0.001
482	46600	13700	148	0.07	14.7	0.01	0.001	0.02	0.065	0.9	0.12	51.8	5.64	0.11	0.74	130	0.7	0.1	2.3	0.18	0.15	2.4	0.001	0.001	0.05	0.09	0.001
483	46600	13900	48	0.13	5.4	0.01	0.001	0.02	0.044	0.6	0.1	23.2	5.52	0.07	0.38	220	0.7	0.1	3.34	0.42	0.12	5	0.001	0.001	0.04	0.08	0.001
484	46600	14100	70	0.001	3.2	0.05	0.001	0.02	0.033	0.3	0.12	47.6	11.4	0.15	0.42	470	1.4	0.12	23.8	0.83	0.28	4.9	0.001	0.01	0.05	0.04	0.001
485	46600	14300	163	0.08	4.3	0.06	0.001	0.06	0.074	0.7	0.19	71.3	7.94	0.08	0.59	190	0.9	0.17	5.01	0.32	0.14	3.2	0.001	0.001	0.09	0.08	0.001
486	46600	14500	62	0.1	4.5	0.1	0.01	0.02	0.037	0.5	0.1	41.3	8.34	0.09	0.63	190	0.6	0.14	6.81	0.44	0.15	6.3	0.001	0.001	0.09	0.08	0.001
487	46600	14700	102	0.07	4.1	0.05	0.001	0.02	0.047	0.6	0.14	68	12.45	0.16	0.61	180	0.7	0.14	6.72	0.31	0.12	5.7	0.001	0.001	0.2	0.08	0.001
488	46600	14900	88	0.06	7.9	0.08	0.001	0.01	0.049	1	0.07	7.77	3.44	0.06	0.26	170	0.5	0.04	1.08	0.14	0.07	1.5	0.001	0.001	0.05	0.08	0.001
489	47400	13700	31	0.23	3.8	0.02	0.01	0.01	0.015	0.2	0.1	53.7	8.37	0.12	0.54	270	1.1	0.17	5.11	0.34	0.18	3.5	0.001	0.001	0.09	0.07	0.001
490	47400	13900	86	0.1	6.2	0.02	0.001	0.01	0.034	0.4	0.15	36.4	5.54	0.05	0.21	370	0.7	0.13	2.53	0.28	0.16	2	0.001	0.001	0.04	0.05	0.001
491	47400	14100	44	0.05	1.8	0.03	0.03	0.02	0.03	0.2	0.21	27.5	13.2	0.14	0.78	450	1.2	0.19	3.78	0.43	0.18	3.4	0.001	0.001	0.08	0.07	0.001
492	47400	14300	123	0.08	7.4	0.07	0.01	0.02	0.059	0.7	0.18	33.1	7.51	0.06	0.51	300	0.9	0.17	3.05	0.37	0.13	2.7	0.001	0.001	0.06	0.05	0.001
493	47400	14500	46	0.09	3.6	0.03	0.02	0.01	0.034	0.4	0.15	49.3	6.67	0.07	0.6	190	1	0.18	3.38	0.2	0.13	2.7	0.001	0.001	0.07	0.06	0.001
494	47400	14700	47	0.08	4.3	0.02	0.01	0.01	0.031	0.3	0.18	16.95	12.7	0.27	1.25	200	1	0.42	1.45	0.22	0.13	5.6	0.001	0.001	0.16	0.13	0.001
495	48200	13500	105	0.12	14.1	0.03	0.01	0.01	0.069	1.2	0.16	27	19.6	0.24	0.52	260	0.5	0.18	8.7	0.6	0.27	6.2	0.001	0.01	0.12	0.12	0.001
496	48200	13700	254	0.08	12.6	0.08	0.001	0.04	0.114	1.3	0.03	21	12.55	0.35	0.28	320	1.3	0.05	23.8	0.7	0.37	10	0.001	0.01	0.1	0.07	0.001
497	48200	13900	223	0.001	10	0.88	0.02	0.09	0.056	0.5	0.26	138	6.7	0.03	0.2	620	0.7	0.2	3.01	0.5	0.19	3.8	0.001	0.001	0.11	0.05	0.001
498	48200	14100	34	0.05	1.5	0.01	0.04	0.1	0.037	0.2	0.41	4.89	4.61	0.04	0.65	570	0.9	0.88	1.64	0.19	0.14	2.6	0.001	0.001	0.06	0.06	0.001
499	48200	14500	97	0.06	8.5	0.04	0.03	0.01	0.05	1	0.2	87	13.15	0.15	0.69	310	1.1	0.09	8.59	0.38	0.12	5.4	0.001	0.001	0.19	0.06	0.001
500	49000	13300	437	0.1	49.2	0.07	0.01	0.04	0.253	1.6	0.25	14.75	21.4	1.26	1.22	680	1.2	0.4	3.94	0.42	0.39	2.1	0.001	0.001	0.07	0.17	0.001

APPENDIX A Cont'd

ID	North	East	V ppm	W ppm	Zr ppm	Ca pct.	Na pct.	Cd ppm	In ppm	Sn ppm	Bi ppm	Ce ppm	Ga ppm	Hf ppm	Nb ppm	P ppm	Se ppm	Te ppm	Y ppm	Be ppm	Ge ppm	Li ppm	Re ppm	Ta ppm	Tl ppm	Hg ppm	B ppm
501	49000	13500	277	0.09	18.9	0.14	0.02	0.03	0.112	1.9	0.11	34.6	19.3	0.49	0.72	340	0.8	0.15	14.25	0.35	0.16	4.1	0.001	0.01	0.06	0.07	0.001
502	49000	13700	42	0.001	5.8	0.02	0.05	0.02	0.027	0.2	0.09	46.4	8.67	0.11	0.25	500	0.9	0.07	5.99	0.22	0.12	1.5	0.001	0.001	0.04	0.04	0.001
503	49000	13900	261	0.08	7.5	0.07	0.02	0.05	0.109	1.4	0.12	66.4	15.45	0.18	0.64	380	0.8	0.13	9.86	0.59	0.17	4.7	0.001	0.01	0.24	0.17	0.001
504	49000	14100	405	0.09	40.2	0.01	0.01	0.02	0.224	1.8	0.16	21.1	23.2	1.15	1.12	740	1	0.32	4.15	0.48	0.39	3.4	0.001	0.001	0.05	0.15	0.001
505	49000	14300	250	0.05	13.1	0.15	0.02	0.03	0.114	1.6	0.09	59.7	17.7	0.32	0.53	310	0.9	0.13	9.16	0.58	0.15	5.9	0.001	0.001	0.12	0.11	0.001
506	49800	12100	311	0.12	14.9	0.03	0.02	0.03	0.164	1.7	0.13	42.9	15.1	0.32	0.97	730	1.6	0.25	6.54	0.57	0.35	3	0.001	0.01	0.11	0.14	0.001
507	49800	12300	236	0.05	9.1	0.13	0.02	0.02	0.128	1.5	0.07	36.1	19.25	0.25	0.62	540	1.2	0.14	9.84	0.69	0.18	4.4	0.001	0.01	0.09	0.1	0.001
508	49800	12500	300	0.09	13.6	0.03	0.02	0.02	0.103	1.5	0.1	37.2	14.7	0.38	0.66	280	1.5	0.16	7.95	0.27	0.17	3.3	0.001	0.001	0.07	0.08	0.001
509	49800	12700	219	0.06	8.4	0.08	0.02	0.01	0.111	1.4	0.08	44.6	17.45	0.23	0.57	410	1.3	0.12	8.55	0.56	0.15	4.3	0.001	0.001	0.13	0.11	0.001
510	49800	12900	176	0.06	5.8	0.44	0.03	0.06	0.081	0.7	0.03	33.7	13.25	0.24	0.25	320	1.2	0.06	26.8	0.62	0.16	10.6	0.001	0.01	0.07	0.06	0.001
511	49800	13100	44	0.06	7.6	0.03	0.02	0.01	0.03	0.6	0.11	45.1	6.88	0.15	0.71	160	0.9	0.04	4.88	0.25	0.09	4	0.001	0.001	0.07	0.05	0.001
512	49800	13300	244	0.001	3.4	0.22	0.02	0.08	0.095	1.1	0.06	38.5	12.85	0.14	0.26	360	1	0.06	16.9	0.59	0.18	8.8	0.001	0.01	0.08	0.06	0.001
513	49800	13500	184	0.59	5.9	0.03	0.05	0.08	0.109	0.5	0.06	21.5	12.2	0.17	0.46	1640	1.2	0.11	5.8	0.69	0.26	4.8	0.001	0.001	0.08	0.05	0.001
514	49800	13700	43	0.08	6.8	0.02	0.05	0.02	0.045	0.3	0.18	34.3	6.67	0.11	0.4	290	1.3	0.12	2.57	0.33	0.1	4.7	0.001	0.001	0.07	0.04	0.001
515	49800	13900	45	0.001	2.4	0.05	0.02	0.02	0.019	0.3	0.1	33.4	4.46	0.05	0.31	160	0.7	0.07	2.37	0.29	0.06	3.7	0.001	0.001	0.11	0.04	0.001
516	49800	14100	87	0.001	4.6	0.16	0.03	0.03	0.056	0.5	0.1	47.1	8.99	0.11	0.3	380	0.9	0.06	9.18	0.42	0.14	8.8	0.001	0.001	0.07	0.04	0.001
517	50600	12900	34	0.09	5	0.03	0.02	0.02	0.023	0.5	0.08	44.7	5.29	0.09	0.45	120	0.5	0.03	4.98	0.51	0.09	2.5	0.001	0.001	0.05	0.03	0.001
518	50600	13100	25	0.1	12.4	0.02	0.02	0.03	0.067	0.7	0.08	55	10.95	0.22	0.55	550	1.1	0.08	6.21	0.59	0.18	2.6	0.001	0.001	0.08	0.05	0.001
519	50600	13300	147	0.001	4	0.16	0.02	0.05	0.079	0.6	0.04	41.4	10.85	0.13	0.24	380	0.9	0.05	8.96	0.55	0.16	14.9	0.001	0.001	0.05	0.04	0.001
520	50600	13500	21	0.09	3.3	0.1	0.06	0.02	0.044	0.2	0.15	9.75	3.08	0.05	0.28	550	1.1	0.08	2.17	0.2	0.08	2.3	0.001	0.001	0.04	0.03	0.001
521	50600	13700	73	0.05	6.9	0.06	0.03	0.01	0.046	0.9	0.15	52.2	12.2	0.13	0.51	180	0.9	0.08	5.72	0.35	0.1	6.9	0.001	0.001	0.15	0.06	0.001

APPENDIX B: Summary Statistics

Element	Count	Minimum	Maximum	Mean	Median	Range	Variance	Standard Deviation	Skewness	Kurtosis	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Au_ppb	521	0	1000	22.22	7	1000	5584.55	74.7298	9.9501	115.879	4	7	18	36
As_ppm	521	0.5	852	34.80	10.9	851.5	5766.54	75.9377	5.93222	47.6302	4.3	10.9	32.4	79.9
Cu_ppm	521	2.5	238	36.12	31.7	235.5	552.315	23.5014	2.51963	13.1796	21	31.7	44.6	62
Ni_ppm	521	1.9	188.5	24.16	19.4	186.6	392.845	19.8203	2.96751	14.8785	11.3	19.4	30	44
Pb_ppm	521	1	32	8.948	8.2	31	18.6772	4.32171	1.20701	2.41331	5.8	8.2	11.3	14.5
Zn_ppm	521	0.001	216	42.36	39	215.999	743.401	27.2654	1.88718	6.85028	23	39	55	71
Ag_ppm	521	0.01	1.08	0.113	0.05	1.07	0.021671	0.147212	2.74045	8.77148	0.03	0.05	0.12	0.29
Al_pct	521	0.31	17.45	2.433	2.09	17.14	2.67047	1.63416	3.12065	21.3633	1.35	2.09	3.13	4.3
Ba_ppm	521	10	760	75.34	50	750	8399.55	91.6491	4.15644	21.6752	30	50	80	150
Bi_ppm	521	0.02	1	0.149	0.12	0.98	0.012442	0.111545	2.68177	11.3685	0.08	0.12	0.18	0.28
Ce_ppm	521	1.97	251	30.00	23.8	249.03	622.19	24.9437	2.59474	13.5637	12.45	23.8	40.3	57.1
Co_ppm	521	0.4	412	20.28	10.1	411.6	1022.74	31.9803	5.88531	54.014	4.8	10.1	24.9	46.5
Cr_ppm	521	7	1600	197.77	126	1593	44184.06	210.2	2.62291	10.4546	61	126	262	459
Cs_ppm	521	0.08	5.33	0.651	0.59	5.25	0.151975	0.38984	4.15855	40.3623	0.4	0.59	0.81	1.04
Fe_pct	521	0.53	35.2	9.970	7.62	34.67	54.269	7.36675	1.46316	1.51414	4.9	7.62	12.3	22.3
Ga_ppm	521	1.48	59.9	12.078	9.96	58.42	61.5019	7.84231	1.46941	3.74354	6.34	9.96	16.15	23.2
Hf_ppm	521	0.02	1.89	0.2717	0.16	1.87	0.091135	0.301886	2.52823	6.94205	0.1	0.16	0.32	0.6
K_pct	521	0.01	0.25	0.0682	0.06	0.24	0.001567	0.039585	1.15095	1.30861	0.04	0.06	0.09	0.13
La_ppm	521	0.9	53.9	8.2278	6.6	53	35.9677	5.9973	2.23856	9.60427	3.9	6.6	11.1	15.6
Mg_pct	521	0.001	1.3	0.0652	0.03	1.299	0.0139828	0.118249	5.9152	47.1466	0.02	0.03	0.06	0.12
Mn_ppm	521	19	7820	581.194	322	7801	532777.59	729.916	3.83846	24.1271	155	322	747	1320
Mo_ppm	521	0.12	49.7	1.8851	1.25	49.58	8.04971	2.8372	11.0404	165.887	0.83	1.25	2.16	3.56
Nb_ppm	521	0.001	1.96	0.5330	0.49	1.959	0.090457	0.300761	1.26725	2.53742	0.31	0.49	0.68	0.91
P_ppm	521	20	3430	355.374	290	3410	96673.75	310.924	3.88235	25.9134	170	290	450	650
Rb_ppm	521	1.2	27.5	6.70614	6	26.3	11.74	3.42636	1.55222	4.13519	4.3	6	8.4	11.1

APPENDIX B Cont'd

Element	Count	Minimum	Maximum	Mean	Median	Range	Variance	Standard Deviation	Skewness	Kurtosis	25^{th} Percentile	50^{th} Percentile	75^{th} Percentile	90^{th} Percentile
S_pct	521	0.001	0.17	0.01887	0.01	0.169	0.000325	0.018023	2.9224	16.1032	0.01	0.01	0.03	0.04
Sb_ppm	521	0.001	41.6	2.3447	0.79	41.599	22.613	4.75532	4.48796	24.9554	0.33	0.79	1.94	5.88
Sc_ppm	521	0.8	54.7	16.1084	12.4	53.9	146.752	12.1141	0.922569	0.0733849	6.1	12.4	24.3	33.7
Se_ppm	521	0.001	4.5	1.22439	1.1	4.499	0.527958	0.726607	1.21792	2.10141	0.7	1.1	1.6	2.2
Sr_ppm	521	1	141.5	8.60825	6.8	140.5	68.625	8.28402	9.18596	131.824	4.7	6.8	10	15.8
Te_ppm	521	0.001	1.67	0.12836	0.08	1.669	0.0233459	0.152794	3.63861	23.9364	0.03	0.08	0.17	0.31
Th_ppm	521	0.7	21.4	4.64107	3.5	20.7	10.6407	3.262	1.75813	3.44899	2.4	3.5	5.8	9
Ti_pct	521	0.001	0.376	0.03626	0.018	0.375	0.0015882	0.0398524	2.27015	10.5621	0.008	0.018	0.058	0.093
U_ppm	521	0.11	3.41	0.95040	0.83	3.3	0.24482	0.494793	1.05546	1.37963	0.59	0.83	1.27	1.62
V_ppm	521	8	979	161.261	98	971	22106.52	148.683	1.54694	2.4955	52	98	230	391
W_ppm	521	0.001	7.19	0.11199	0.07	7.189	0.125466	0.354212	16.16	307.767	0.001	0.07	0.11	0.21
Y_ppm	521	0.41	46.8	5.80879	3.78	46.39	32.4217	5.694	2.59271	9.82391	2.16	3.78	7.61	12.35
Zr_ppm	521	1.3	95.1	12.7699	7.8	93.8	197.229	14.0438	2.55891	7.50026	4.7	7.8	13.8	30.6
Ca_pct	521	0.001	2.48	0.076835	0.03	2.479	0.0242214	0.155632	9.13519	119.761	0.02	0.03	0.08	0.16
Na_pct	521	0.001	0.11	0.015925	0.01	0.109	0.000241685	0.0155462	2.21945	7.41211	0.01	0.01	0.02	0.03
Be_ppm	521	0.001	2.48	0.426547	0.37	2.479	0.0670202	0.258883	2.06581	8.75799	0.25	0.37	0.54	0.75
Cd_ppm	521	0.001	0.13	0.022060	0.02	0.129	0.0003317	0.0182136	2.08176	5.72118	0.01	0.02	0.03	0.04
Ge_ppm	521	0.001	0.79	0.107914	0.09	0.789	0.0122954	0.110884	2.43426	8.56672	0.05	0.09	0.13	0.21
In_ppm	521	0.007	0.354	0.068522	0.049	0.347	0.0030436	0.0551688	1.65111	3.10974	0.029	0.049	0.092	0.153
Li_ppm	521	0.4	34.6	3.89367	3.2	34.2	9.1999	3.03313	4.1753	28.8544	2.2	3.2	4.6	6.6
Re_ppm	521	0.001	0.002	0.001002	0.001	0.001	1.920	4.380	22.6942	514.012	0.001	0.001	0.001	0.001
Sn_ppm	521	0.001	3.3	0.85394	0.7	3.299	0.326633	0.571518	1.07196	0.780485	0.4	0.7	1.2	1.7
Ta_ppm	521	0.001	0.01	0.0016564	0.001	0.009	0.00000549	0.0023425	3.27524	8.74399	0.001	0.001	0.001	0.001
Tl_ppm	521	0.001	0.74	0.0785067	0.07	0.739	0.00317177	0.0563185	5.62641	54.9575	0.05	0.07	0.1	0.13
Hg_ppm	521	0.01	0.35	0.085144	0.07	0.34	0.00280964	0.0530061	1.8067	3.89183	0.05	0.07	0.1	0.16
B_ppm	521	0.001	10	0.0393839	0.001	9.999	0.383062	0.61892	16.0007	254.512	0.001	0.001	0.001	0.001