GSJ: Volume 8, Issue 2, February 2020, Online: ISSN 2320-9186
www.globalscientificjournal.com

THE GEOCHEMICAL ASSESSMENT OF SOILS WITHIN TEWURE IJU AND ELESUN AIYETORO, NORTHWESTERN PART OFOGBOMOSO

By

Smart M.O, Adesida O.A, Odewale M.O

ABSTRACT

Geological assessment of the quadrant covering 08^{0}19`24``N, 08$^0$21`06``N to 004 02`40``E 004$^0$04`46``E, Northwest of Ogbomosho was carried out in order to provide baseline information for either mineral exploration or environmental management or policy making. To achieve this, eight (8) composited soil samples were collected and analyzed for physicochemical parameters in EMS laboratory using standard methods and also for elemental composition at the Activation laboratory in Canada using the method of Inductive Couple Plasma-Mass Spectrometry (ICP-MS).

The results obtained indicated a pH range of 7.5 and 8.5 for Tewure Iju soils and 6.20 and 9.30 for Elesun Aiyetoro soil samples thereby precluding that the soils of these areas are majorly basic except for the top soil Elesun Aiyetoro which is slightly acidic. The result also

indicated EC range of 110us/cm and 220us/cm for Tewure Iju soils and 130us/cm and 200us/cm for Elesun Aiyetoro soils. These low EC indicates that the soils are found within the geologic material. The OC range of Tewure Iju soils are 0.77% - 5.72% while that of Elesun Aiyetoro soils are 2.32% - 7.57%. The OM also ranges from 1.34% - 9.95% for Tewure Iju soils and 4.03% - 13.17% for Elesun Aiyetoro soils. These low percentages of OC and OM indicate that the geological materials have low tendency of capturing carbon which foster the formation of organic matter. The particle size of the study areas is not well distributed because sand is well above clay and silt in percentage. For Tewure Iju soils, sand has a percentage range of 56.8% and 67.6%, silt has a percentage range of 7.2% and 21.6%, clay has a range of 14.4% and 25.2% while for Elesun Aiyetoro soils sand has a percentage range of 67.20% and 74.80%, silt has a percentage range of 10.80% and 18.00%, clay has a percentage range of 10.80% and 14.80%.Similarly the Elemental Composition of Tewure Iju and Elesun Aiyetoro soils comprise majorly of manganese (Mn) and barium (Ba). The Mn and Ba composition of Tewure Iju soils ranges from 57.00-357.00 ppm and 59.20-64.30ppm respectively while that of Elesun Aiyetoro soils ranges from 93.00-550.00ppm and 31.90-123.00ppm. The high composition of Mn and Ba indicates that they tend to settle within shorter period of deposition. Statistical analyses of the generated data indicates that Manganese with the highest mean and standard deviation values is the most distributed element among the soils and sediment of the study areas while Mo with the lowest mean and standard deviation values is the least distributed soils of the study area. The presence of some these elements may constitute risk to the health of plants, animals, and humans in the study areas due to their relatively high concentration.

INTRODUCTION

Geochemical sampling involves collecting and analyzing various types of geological materials(such as rocks, soils, and sediments)or certain biogeochemicalmaterialssuch as plants.Historically, these geochemical sampling methods have been observed to be the most productive of the methods used in mineral exploration.Most near surface base metal mineralization has likely already been discovered. Continued exploration for undiscovered mineralization into the third dimension. Geochemical evaluation has become increasingly focused on the use of relatively weak leaches of soils, sediments that may be buried by as much as 200m of the overburden(Hall et al. 1997).

Thus geochemical sampling plays a key role in the delineation of mineralization. For example, geochemical sampling of soils is often employed to outline the general distribution of mineralization at shallow depth where outcrops of bedrock are minimal or non existent (Canon, and Anderson, 1971). The material involve in carrying out the analysis may be analysed for any number of element. Most near surface base metal mineralization has likely already been discovered. Continued exploration for undiscovered mineralization into the third dimension. Geochemical evaluation has become increasingly focused on the use of relatively weak leaches of soils, sediments that may be buried by as much as 200m of the overburden(Hall et al. 1998).The availability of chemical elements in acceptable proportions and combinations plays a vital role in the quality and survival of life. Risk to humans, animals or plants may exist where certain chemical elements occur high or low concentration in the earth`s crust.Contaminations of soils by major and trace elements may be caused by natural processes or through human activities in the environment (DTMC, 1996).

Soils transformed by man to a varying extent and developed as a result of human activity (anthrosols and technosols) are characterized by sharp boundaries between different soil units and between individual soil components (Bednarek and Markiewicz 2006). They often do not have the transition zones, called pedoecotones, characteristic of natural soils (Bednarek and Prusinkiewicz 1980). Properties of soils developed as a result of spatially limited human activities (such as plowing, fertilization, liming, drainage, changes in the species composition of forest stands or their habitat, and activities related to production, etc.) persist at different time scales (Bednarek and Markiewicz 2006). Some newly developed properties may became obliterated in a relatively short time (tens or hundreds of years) if the causes are eliminated (e.g. disappearance of characteristics related to anthropogenic soil salinity). On the other hand, other soil properties permanently encoded in the “soil memory” (Targulian and Goryachkin 2004) allow for the determination of the extent and intensity of the former anthropopressure, even in areas where human impact on the soil is not visible during direct field observations.

Elevated levels of major and trace elements in soils are of a major concern in today`s world because of the economic and health reasons. It is important to have a record of the level of elemental concetrations and if possible their source of occurence. Avalability of such records enables the responsible agencies to plan for the cleanup of the polluted soil and protect the agricultural products from loses and the members of the communities from health problems(Davis, 1950). These problems faced in Nigeria arose from artesian mining and non availability of a standard geochemical survey laboratory which consequently leads to fake or non concise results, causing a problem to profer solution to the problems. Disposal of industrial wastes, application of fertilizers, metal sheets wire, pipes, unaccessible rocks and burning of coal are also some of the problems faced due to industrial activities.

Soil pollution can be caused by a specific event or a series of events within a particular area in which contaminants are released to the soil, and the source and identity of the pollution is easily identified. This type of pollution is known as point-source pollution. Anthropogenic activities represent the main sources of point-source pollution. Examples include former factory sites, inadequate waste and wastewater disposal, uncontrolled landfills, excessive application of agrochemicals, spills of many types, and many others. Activities such as mining and smelting that are carried out using poor environmental standards are also sources of contamination with heavy metals in many regions of the world (Lu *et al.*, 2015; Mackay *et al*., 2013; Podolský *et al.*, 2015; Strzebońska, Jarosz-Krzemińska and Adamiec, 2017).

METHODOLOGY

The study area is located in the northwestern part of Ogbomoso, with coordinates 08^{o}19\`24\`\`N, 08$^{o}$21\`06\`\`N to 004^{o} 02\`40\`\`E 004$^{o}$ 04\`46\`\`E.Within these coordinates lies the areas where the samples are collected which include Tewure Iju and Elesun Aiyetoro respectively.The topography of the study area vary from place to place, from flat topography to gentle slope topography. The gentle slope is due to the stream/river which always tends to be at the lower ground. The stream has a maximum depth of about 30cm. The vegetation of the areas where the field work was carried out is semi- natural having been influenced (though to a low degree) by human activities. The annual rainfall range of the study area is from 1755-1905mm with a double maximum rainfall at July and September. The mean annual temperature of the study areas is about 29^{o}C and the annual range of temperature is much higher. The relative humidity is about 60% on the average (Eludoyin et.al, 2008).

Materials used for the work are soil auger, polyethylene bottles, disposable gloves, disposable filters, permanent drawing ink marker, maps (topographical maps, preferred scale 1:50000), heavy duty elbow length rubber gloves,sieve set with two preferably wooden or plastic frame containing nylon 2.0mm mesh, 0.150mm and 0.125mm mesh screen, metal free plastic bucket, nylon mats, tapes.

The sampling locations are totally randomized and are not designed to show the lowest natural background concentration, but to demonstrate the current geochemistry of the surface environment.

Soil samples collection was achieved at the site on a flat lying surfaces. Soils distributed by agricultural activities are avoided because the top soil is usually affected by human activities. Soils collected are residual and not alluvium or transported soils, this is to avoid contanmination. Pits were dug and soil samples were collected in four soil depths namely; horizons A, B, C, and D respectively.

Horizon A soils are the top soil and are taken from a depth of 0-30cm. This layer containshighly decomposed organic materials e.g fallen leaves.

Horizon B soils are taken from a depth of 30-50cm. This layer is slightly rich in organic material and humus.

Horizon C soils are taken from depth of 50-75cm. It is often quite clayey and is also known as zone of metal accumulation.

Horizon D soils are taken from a depth of 75-100cm. This is the bottom layer and it consist of weathered parent material underlying bedrock.

The soils in each horizon are then collected using the tape to measure the depth and put in the sample bags. The sample bags are labelled witheach measurement among the labelling.

After the samples havebeen packed, they were air-dried in an enclosed environment(in order to avoid contanmination). This is done by pouring the soil samples on the nylon mats. The samples are then left for a couple of days until certain that they are well dried by feeling with gloved hand.When the samples are dried, they are then seived.

Pre Laboratory Treatment of Samples

Three sieve size wereusedhere. The first was the 5mm seive which is used to remove the stones and the other coarse grained. The second seive is the 2mm mesh which is placed under the 5mm mesh which is use for collecting the samples for particle size analysis and for some other analysis like pH, organic carbon determination, e.t.c. The 2mm mesh is used to further seive the samples to get a finer grain. The third seive is the 0.125mm to further get a very fine grain sand.The seive were washed and dried after each sample had been seived. After the samples have been seived they are then packed into nylon envelope weighing 1g, 3g, 5g, and 50g. The 1g, 3g, 50g were sent to the laboratory here in Nigeria for analysis of some physicochemical parameters while the 5g was sent to Activation Laboratory in Canada for analysis of metals using Industrial Couple Plasma-Mass Spectrometry (ICP-MS).

RESULTS AND DISCUSSION

Physicochemical analysis of soils

TABLE 1: Physicochemical properties of Tewure Iju Soils

Coordinate	Sample Depth(cm)	pH	EC (us/cm)	Organic Carbon(%)	Organic Matter (%)	Particle size (%)		
						Sand	Silt	Clay
08^{0}21' 06" N and 004^{0}04' 46" E	0-30	8.5	220	0.77	1.34	64	21.6	14.4
08^{0}21' 06" N and 004^{0}04' 46" E	30-50	7.5	180	5.72	9.95	56.8	21.6	21.6
08^{0}21' 06" N and 004^{0}04' 46" E	50-75	8.5	110	0.93	1.61	67.6	7.2	25.2
08^{0}21' 06" N and 004^{0}04' 46" E	75-100	8.3	130	2.16	3.76	60.4	21.6	18

TABLE 2: Physicochemical Properties of Elesun Aiyetoro Soils

COORDINATE	SAMPLE DEPTH (cm)	pH	EC us/cm	O.C %	O.M %	Particle size (%)		
						Sand	Silt	Clay
08^{o}17^{1}38^{11}N, 004^{0}02^{1}44^{11}E	0-30	6.20	180	3.86	6.72	71.20	18.00	10.80
08^{o}17^{1}38^{11}N, 004^{0}02^{1}44^{11}E	30-50	9.30	160	7.57	13.17	67.60	18.00	14.40
08^{o}17^{1}38^{11}N, 004^{0}02^{1}44^{11}E	50-75	8.20	130	2.32	4.03	67.20	18.00	14.80
08^{o}17^{1}38^{11}N, 004^{0}02^{1}44^{11}E	75-100	9.00	200	3.71	6.45	74.80	10.80	14.40

The results of the analyzed soils samples from different horizons are shown in the table 1 and 2 above. From the table, it can be seen that the pH of soils from the horizon A-D of the two locations that is Tewure Iju and Elesun Aiyetoro are alkaline with the exception of the top soil of Elesun Aiyetoro with a pH value of 6.20 indicating slight acidity. It can also be observed that there is decrease in the electrical conductivity moving down the horizons of the soils, but there tends to be an increase getting to the depth range of 75-100cm. Generally the electrical conductivity of the soils are low. This indicates that the soils are found within the geologic material that have low tendency of capturing carbon which foster the formation of organic matter.The result also indicated a EC range of 110us/cm and 220us/cm for Tewure Iju soils and 130us/cm and 200us/cm for Elesun Aiyetoro soils. These low EC indicates that the soils are found within the geologic material. The OC range of Tewure Iju soils are 0.77% and 5.72% while that of Elesun Aiyetoro soils are 2.32% and 7.57%. The OM also ranges from 1.34% and 9.95% for Tewure Iju soils and 4.03% and 13.17% for Elesun Aiyetoro soils. These low percentages of OC and OM indicate that the geological materials have low tendency of capturing carbon which foster the formation of organic matter.

The particle size is not well distributed because sand is well above other particles (clay and silt) in percentage. This shows that area is well drained and so do not provide sediment with necessary H^+ ions needed for the formation of acid which is why the soils are alkaline in nature. The high percentage of sand also shows that sand is the main geologic material found in this setting.

TABLE 3 Elemental Composition of Tewure Iju Soils

(08^0 21\` 06\`\` N and $004^0$ 04\` 46\`\` E)

SAMPLE NO	Depth (cm)	Pb ppm	Ba ppm	Co ppm	Cu ppm	Fe %	Mn ppm	Cr ppm	Al %	Mo ppm
AU_2	0-30	6.26	59.20	1.70	4.09	0.62	57.00	10.80	2.29	0.11
BU_2	30-50	9.25	60.80	7.50	3.45	1.17	357.00	15.30	0.85	0.15
CU_2	50-75	12.20	64.30	9.70	5.15	1.71	329.00	20.80	1.25	0.22
DU_2	75-100	12.70	59.60	9.60	5.50	1.71	291.00	23.90	1.21	0.24
Calculated Background Value		4.50	44.30	2.47	2.75	0.45	181.75	5.70	0.51	0.98

TABLE 4 Elemental Composition of Soils at Elesun Aiyetoro

(08^0 17` 38``N and $004^0$ 02` 44``E)

SAMPLE NO	DEPTH (cm)	Pb Ppm	Ba ppm	Co ppm	Cu ppm	Fe %	Mn ppm	Cr ppm	Al %	Mo ppm
AU_3	0-30	9.70	123.00	7.90	5.03	1.18	550.00	16.30	0.89	0.17
BU_3	30-50	5.56	54.40	6.20	4.43	0.84	239.00	14.60	1.09	0.14
CU_3	50-75	5.09	38.80	4.00	3.67	0.66	155.00	12.00	0.87	0.12
DU_3	75-100	3.87	31.90	2.60	2.87	0.53	93.00	9.70	0.67	0.09
Calculated Background Values		4.50	44.30	2.75	2.47	0.45	181.75	5.70	0.51	0.98

The results of the elemental composition of the soil samples collected in areas of Tewure Iju and Elesun Aiyetoro (Northwest of Ogbomoso) from soils of different horizons are shown in table 3 and 4 respectively. These include the total concentrations of Pb, Ba, Co, Cu, Fe, Mn, Cr, Al, and Mo determined in the soil samples. There is variation in the concentration of these elements. These variations were probably due to the quantities of elements trapped in the soil samples. From the tables, Mn has the highest concentration. In the soils at Tewure Iju the manganese concentration tends to be highest(357.00ppm) in depth range of 30-50cm while at Elesun Aiyetoro, the manganese concentration tend to be highest (550.00ppm) at depth range of 0-30cm which is the top soil. This indicates that the manganese in the soils tend to settle within shorter period of deposition. On the other hand, molybdenum has the lowest concentration. While the topsoil of Tewure Iju tend to have the lowest concentration (0.11ppm), the bottom soil of Elesun Aiyetoro has the lowest concentration (0.09ppm). The concentration of barium also tend to be high but not as high as that of Mn. Horizon C has the highest concentration of Ba in soils of Tewure Iju while horizon A has the highest concentration of Ba in the soils of Elesun Aiyetoro. Other elements tend to have low concentration but not as low as the concentration of Mo.

Using the calculated background value (CBV), it can be observed that the lead (with a CBV of 4.50) concentration are more than the CBV in all the horizons except horizon D of Elesun Aiyetoro. This indicates that the Pb had been affected by external source i.e. anthropogenic source. This also applies to barium concentration except horizon C and D which are less than the CBV of barium (44.30) indicating that the Ba concentration of horizon C and D of Elesun Aiyetoro are normal i.e. they are from the source. The concentration of cobalt in all the horizons of the study areas seems to be affected by external source since they are all greater than the CBV for Co which is 2.75 (except horizon A of Tewure Iju). Copper concentrations are on the increase due to anthropogenic source; this is because the Cu concentrations in the entire horizon of the study areas are all greater than the CBV of Cu which is 2.47. The calculated background value for iron is 0.45, this indicate that Fe concentration in all the horizon have been affected by external source which may be human waste, or agricultural products. This is due to their greater value than the CBV. Manganese concentration in horizon A in Tewure Iju and horizon C and D in Elesun Aiyetoro are directly from the source, while the remaining horizons have been affected by anthropogenic sources because they are greater than the CBV of Mn which is 181.75. All the chromium concentration in all the soil horizons of the study area have been affected by other sources other than the primary source that supply it. This is so because the CBV for Cr is 5.70 which is smaller than the Cr composition in all the horizons. It can also be observed that Aluminum composition have been affected by external sources. This is due to CBV (0.51) of Al being smaller than the concentration of Al in all the horizons of the study areas. Molybdenum on the other hand is not affected by external sources because the CBV (0.98) is greater than the concentration of Mo in all the soil horizons of the study areas.

Trace Element Composition of Soil in the Study Areas

TABLE 5 Trace Element Composition of Soils at Tewure Iju

(08^0 21\` 06\`\` N and $004^0$ 04\` 46\`\` E)

SAMPLE NO	DEPTH (cm)	Li Ppm	Be ppm	Sc ppm	V ppm	Sr ppm	Y ppm	Zr ppm	Tl ppm	U ppm
AU_2	0-30	17.60	0.80	2.30	14.00	8.40	5.30	0.50	0.17	2.20
BU_2	30-50	16.50	0.70	2.10	25.00	8.80	6.94	1.20	0.10	1.10
CU_2	50-75	8.90	1.20	2.90	37.00	9.80	9.22	0.90	0.12	1.50
DU_2	75-100	9.60	1.20	2.90	37.00	9.00	11.30	1.10	0.13	1.60
Calculated Background Value		2.25	0.18	0.87	10.10	9.00	3.16	0.28	0.41	0.50

TABLE 6 Trace Element Composition of Soil at Elesun Aiyetoro

(08^0 17` 38``N and $004^0$ 02` 44``E)

SAMPLE NO	DEPTH (cm)	Li (ppm)	Be (ppm)	Sc (ppm)	V (ppm)	Sr (ppm)	Y (ppm)	Zr (ppm)	Tl (ppm)	U (ppm)
AU_3	0-30	6.60	0.70	2.10	24.00	24.20	7.51	0.90	0.08	1.00
BU_3	30-50	13.70	0.70	1.80	22.00	8.30	6.10	0.90	0.09	1.60
CU_3	50-75	11.00	0.50	1.40	19.00	6.20	5.02	1.30	0.08	1.80
DU_3	75-100	8.90	0.40	1.10	16.00	4.70	4.08	1.30	0.07	2.50
Calculated Background Value		2.25	0.18	0.87	10.10	9.00	3.16	0.28	0.41	0.50

The normalization of raw concentrations in soil composition was noted before making comparisons, assessing baseline concentrations and calculating patterns of trace element fallout over the study areas. The trace elements observed are Li, Be, Sc, V, Sr, Y, Zr, Tl, and U. From the table below it can be observed that Vanadium has the highest concentration, therefore vanadium tend to be the most common trace element found in the soils of the study areas. The concentration of V in horizon C and D of the soils of Tewure Iju tend to be the same and also the highest (37.00ppm). On the other hand the thallium(Tl) tends to have the lowest concentration in the soils of the study areas. Horizon B has the lowest concentration of Tl in the soil of Tewure Iju while horizon D has the lowest concentration of Tl in the soils of Elesun Aiyetoro.

Using the calculated background value (CBV), it can be observed that the lithium (with a CBV of 2.25) concentration are more than the CBV in all the horizons. This indicates that the Li had been affected by external source i.e. anthropogenic source. This also applies to beryllium, scandium and vanadium with a CBV of 0.18, 0.87 and 10.10 respectively. But in the case of strontium, the Sr concentration in horizons C and D of Tewure Iju and horizon A of Elesun Aiyetoro are the horizons affected by anthropogenic sources while the other horizons are have the suitable concentration of Sr The concentration of yttrium in all the horizons of the study areas seems to be affected by external source since they are all greater than the CBV for Y which is 3.10. This also applies to Zircon and Uranium with calculated background values of 0.28 and 0.50 respectively. But on the other hand, thallium seems not to be affected by external source; this is because the Tl concentrations in the entire horizon of the study areas are all smaller than the CBV of Tl which is 0.41.

Statistical Analysis of Elements

Table 7 Statistical Analysis of Element Composition in Soils of Tewure Iju Area

Elements	No of samples	Min	Max	Mean	Std. Deviation
Pb	4	6.26	12.70	10.1025	2.97983
Ba	4	59.20	64.30	60.9750	2.31858
Cu	4	3.45	5.50	4.5475	0.94588
Co	4	1.70	9.70	7.1250	3.75622
Fe	4	0.62	1.71	1.3025	0.52137
Mn	4	57.00	357.00	258.5000	137.02919
Cr	4	10.80	23.90	17.7000	5.81435
Al	4	0.85	2.29	1.4000	0.62000
Mo	4	0.11	0.24	0.1800	0.06055

TABLE 8 Statistical Analysis of Element Composition in Soils of Elesun Aiyetoro

Elements	No of Samples	Minimum	Maximum	Mean	Std. Deviation
Pb	4	3.87	9.70	6.0550	2.53223
Ba	4	31.90	123.00	62.0250	41.72532
Cu	4	2.87	5.03	4.0000	0.93659
Co	4	2.60	7.90	5.1750	2.34432
Fe	4	0.53	1.18	0.8025	0.28194
Mn	4	93.00	550.00	259.2500	202.85689
Cr	4	9.70	16.30	13.1500	2.90115
Al	4	0.67	1.09	0.8800	0.17166
Mo	4	0.09	0.17	0.1300	0.03367

Considering the four horizons where samples were collected at Tewure Iju, the minimum and the maximum values of each element was noted with barium having the highest minimum value (59.20ppm) and manganese having the highest maximum value (357.00ppm). The average i.e. the mean of the values collected from the four horizons was calculated and it was found that Mn has the highest mean value (258.00ppm), meaning that manganese is the most distributed element among the soils of the study area. Molybdenum has the lowest minimum and maximum values (0.11 and 0.24 respectively), consequently has the lowest mean value (0.1800ppm). This indicate that Mo is the least distributed element among the soils of the study area i.e. Tewure Iju.

Considering the soils at Elesun Aiyetoro manganese has the highest minimum and maximum values, which has a result with the highest mean value (259.25ppm). This indicate that Mn is again the most distributed element in the soils at Elesun Aiyetoro, while Mo with the lowest mean value (0.1300ppm) is the least distributed element among the soils in the studied area i.e Elesun Aiyetoro.

TABLE 9 Statistical Analysis of Trace Element Composition of Soils at Tewure Iju

Trace elements	No of Samples	Minimum	Maximum	Mean	Std. Deviation
Li	4	8.90	17.60	13.1500	4.53468
Be	4	0.70	1.20	0.9750	0.26300
Sc	4	2.10	2.90	2.5500	0.41231
V	4	14.00	37.00	28.2500	11.05667
Sr	4	8.40	9.80	9.0000	0.58878
Y	4	5.30	11.30	8.1900	2.62346
Zr	4	0.50	1.20	0.9250	0.30957
Tl	4	0.10	0.17	0.1300	0.02944
U	4	1.10	2.20	1.6000	0.45461

TABLE 10Statistical Analysis of Trace Element Composition of Soils at Elesun Aiyetoro

Trace elements	No of Sample	Minimum	Maximum	Mean	Std. Deviation
Li	4	6.60	13.70	10.0500	3.02490
Be	4	0.40	0.70	0.5750	0.15000
Sc	4	1.10	2.10	1.6000	0.43970
V	4	16.00	24.00	20.2500	3.50000
Sr	4	4.70	24.20	10.8500	9.02164
Y	4	4.08	7.51	5.6775	1.47432
Zr	4	0.90	1.30	1.1000	0.23094
Tl	4	0.07	0.09	0.0800	0.00816
U	4	1.00	2.50	1.7250	0.61847

Vanadium has the highest minimum and maximum values, indicating that V has the highest/lowest mean value. Because of the high mean value, it can be deduced that V is the most distributed trace element in the soils in both Tewure Iju and Elesun Aiyetoro soils, while Tl with the lowest minimum and maximum values has the least mean value. This indicate that Tl is the least distributed soil in the soils of the studied areas.

CONCLUSION

Baseline geochemical assessment has been proved to be an important tool in delineation of minerals. This assessment was done by collecting soil samples from Tewure Iju and Elesun Aiyetoro areas of Ogbomoso Northwest. Elemental composition and trace element composition were analyzed in the activation laboratory in Canada using the Industrial Couple Plasma-Mass Spectrometry (ICP-MS) method while the physicochemical properties of the soils and sediment was carried out in EMS laboratory in Nigeria.Results shows that Manganese (Mn) has the highest concentration in the soils of the two study areas while molybdenum has the lowest concentration of all the elements considered (not considering the trace elements). This signifies that the habitants of the studied areas are highly open to lung, liver and vascular disturbances, declines in blood pressure, failure in development of animal foetuses, brain damage and skin tremors because this elements are being tapped by the root, stem and leaves of the plants in the area which the habitants consume. Because of the high concentration of manganese, Mn is the best reference element for the normalization procedure among the elements considered. Considering the trace elements studied, it is observed that Vanadium has the highest concentration, while Tl has the lowest concentration. This also indicates that Vanadium can be used as a reference element for the normalization procedure among the trace elements studied.

References

Bednarek R, Markiewicz M2006: Reconstructions of frontiers of ancient cultures on the base of soils properties. *In* Granice W Krajobrazach Kulturowych, Ed. Plit J, pp. 7–14. Prace Komisji Krajobrazu Kulturowego PTG, Warszawa.

Bednarek R, Prusinkiewicz Z 1980: Geography of Soils, p. 242. Polish Scientific Publishers PWN, Warsaw.

Cannon, H.L., Woodruff, L. G., and Anderson B.M, 2003, Some statistical relationships between stream sediment and soil geochemistry in northwestern Wisconsin--can stream sediment compositions be usedto predict compositions of soils in glaciated terranes?: *Journal of Geochemical Exploration,* v. 81, p. 29-46.

Cannon H.L and Anderson B.M, 1971. The geochemist involvement in the pollution problem in Cannon H.L and Hopps H.C. eds. Enivronmental geochemistry in health and disease: Geol.Soc.America Mem 123 p 155-177

Davis G.K: 1950. The influence of copper on the metabolism phosphorus and molybdenum. In symposium on copper metabolism, W.D. McElroy and B. Glass (eds.) John Hopkins University Press, Baltimore, Md. pp. 216-229

DTMC 1996. Surface soil contamination; external and immediate source, NGSA journal

Hall, G.E.M. 1998. Analytical perspectives on trace element species ofinterest in exploration. *Journal of Geochemical Exploration,* 61, 1–20

Hall, G.E.M., Vaive, J.E. & Button, P. 1997. Detection of past undergroundnuclear events by geochemical signatures in soils. *Journal of Geochemical Exploration,* 59, 145–162

Lu, Y., Song, S., Wang, R., Liu, Z., Meng, J., Sweetman, A.J., Jenkins, A., Ferrier, R.C., Li, H., Luo, W. & Wang, T. 2015. Impacts of soil and water pollution on food safety and health risks in China. Environment International, 77: 5–15.

Mackay, A.K., Taylor, M.P., Munksgaard, N.C., Hudson-Edwards, K.A. & Burn-Nunes, L.2013. Identification of environmental lead sources and pathways in a mining and smelting town: Mount Isa, Australia. Environmental Pollution, 180: 304–311

Podolský, F., Ettler, V., Šebek, O., Ježek, J., Mihaljevič, M., Kříbek, B., Sracek, O., Vaněk, A., Penížek, V., Majer, V., Mapani, B., Kamona, F. & Nyambe, I. 2015. Mercury in soil profiles from metal mining and smelting areas in Namibia and Zambia: distribution and potential sources. Journal of Soils and Sediments, 15(3): 648–658.

Strzebońska, M., Jarosz-Krzemińska, E. & Adamiec, E. 2017. Assessing Historical Mining and Smelting Effects on Heavy Metal Pollution of River Systems over Span of Two Decades. Water, Air, & Soil Pollution, 228(4)

Targulian VO, Goryachkin SV 2004: Soil memory: types of record, carriers, hierarchy and diversity. *Rev. Mex. Sci. Geol*., 21(1), 1–8.