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Lamri Naidja, Hocine Ali-Khodja, Salah Khardi, Fairouz Bencharif-Madani, Ahmed Terrouche, et al.. Source apportionment of PM2.5 and their associated metallic elements by positive matrix factorization at a traffic site in Constantine, Algeria. Air Quality, Atmosphere & Health, 2022, 15 (12), pp.2137 -2155. 10.1007/s11869-022-01241-9. hal-04045347

HAL Id: hal-04045347 https://hal.science/hal-04045347v1

Submitted on 16 May 2023

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Source apportionment of PM_{2.5} and their associated metallic elements by positive matrix factorization at a traffic site in Constantine, Algeria

Lamri Naidja^{1,2,3} · Hocine Ali-Khodja¹ · Salah Khardi⁴ · Fairouz Bencharif-Madani¹ · Ahmed Terrouche¹ · Kanza Lokorai¹ · Mokhtar Bouziane¹ · Aurélie Charron⁵

Abstract

Chemical characterization of PM2.5 (major and trace elements) was carried out for a source apportionment study of PM2.5 at a traffic site in Constantine, Algeria, from March 2017 to March 2018. For this purpose, several tools were used of which PMF, CPF, PSCF, Spearman correlation matrix and HYSPLIT back trajectories. The mean annual concentration of PM_{2.5} at the sampling site was $54.07 \pm 28.81 \,\mu \text{g/m}^3$. This value is much higher than the annual threshold recommended by the WHO of 10 μ g/m³. Based on the PMF modelling, five sources were identified: sea salts (15.1%), industrial activities (18.9%), nonexhaust emissions (wear of brakes, tires and road surfaces) (24.2%), exhaust emissions (mixed diesel and gasoline engine exhaust) (15.8%) and mineral dust (25.9%) as the main sources of metallic aerosols at the sampling site in Constantine. Our results revealed that anthropogenic activities (traffic and industry) contributed 59% to all emissions, while natural sources (mineral dust and sea salt) accounted for 41%. Traffic-related sources are the major contributor to anthropogenic emissions (40%) with non-exhaust emissions being the dominant source. As anthropogenic emissions are the leading sources, their control is of utmost importance for improving air quality. The concentrations of $PM_{2.5}$ tend to increase appreciably with temperature and wind speed for a relative humidity less than 60%. The contribution of vehicular emissions is affected by relative humidity and temperature while industrial emissions are affected mainly by wind intensity and direction. Relative humidity, temperature and wind speed are determining parameters of mineral dust. There are seasonal variations in the contributions of the PMF-derived sources. Summer undergoes significant contributions of three factors: sea salts, industrial emissions and mineral dust. Spring is affected mainly by industrial emissions and non-exhaust emissions. Winter experiences a drastic contribution of the exhaust emission factor. Autumn is the least affected season by mineral dust and sea salts. It is rather affected by industrial and traffic emissions.

Keywords Metallic aerosols $\cdot PM_{2.5} \cdot PMF \cdot CPF \cdot PSCF \cdot Source apportionment \cdot Traffic site$

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Introduction

Particulate matter (PM) is a complex mixture of small particles and liquid droplets whose physical and chemical characteristics vary by region and time. Common chemical constituents of PM include sulphates, nitrates, ammonium, other inorganic ions, metals, elemental carbon and organic compounds.

The health effects were related to the distribution of PM sizes, the latter were divided into two parts: PM_{10} (coarse particles) and $PM_{2.5}$ (fine particles). The potential impact of smaller particles on human health has been revealed by several authors (Biersteker 1976; Bevan and Manger 1985; Quackenboss et al. 1989). Boubel et al. (2013) showed that $PM_{2.5}$ could not be retained in the upper part of the

respiratory system and can accumulate in the lungs and enter the airways, due to Brownian motion, unlike PM_{10} which could be retained. Besides the size, the effect of aerosols on health is also a function of their chemical composition. Most heavy metals are dangerous because they tend to bio-accumulate in the human body. Metallic elements cannot be degraded, and can be transported by air, and enter water and human food supply. However, at higher (although relatively low) concentrations they can become toxic (Järup 2003). Many studies have linked certain metals to several health problems such as cardiovascular disease, heart disease, aggravated asthma and lung cancer (Kampa and Castanas 2008; Sudheer and Rengarajan 2012).

The problem of air pollution is clearly ignored by many African countries, largely because it is not seen as a priority over economic development. Therefore, these countries are clearly in no rush to solve air quality problems. In many African countries, air quality data is scarce and virtually absent, especially in sub-Saharan countries. The lack of data is therefore one of the main constraints to understanding the harmful effects on human health of fine particles.

Ambient air quality improvement strategies involve reducing emissions from primary sources. It is therefore essential to be able to identify and distribute the contributions of these sources and then implement effective regulations and policies that reduce the levels of particulate pollution. Receptor models are often presented as a reliable tools which allow the identification of the contribution of emission sources and which require speciation data for the aerosol fraction sampled at a receptor site (Hoke 2010). In Algeria, few studies have been carried out to identify PM emission sources. Terrouche et al. (2016) used the varimax rotated factor analysis, a multivariate technique. Their study targeted only eight metallic elements. Bencharif-Madani et al. (2019) and Talbi et al. (2018) both used the PCA technique which did not differentiate separate sources. Moreover, these methods do not provide a quantitative distribution of mass contributions.

In addition, the absence of a non-negativity requirement implies that PCA can give factors with negative loadings and could promote physically unreasonable results (Paatero and Tapper 1994). To solve this problem, specific methods such as positive matrix factorization (PMF) have been specifically developed (Paatero and Hopke 2003). In order to distinguish between nearby and distant sources, the *CPF* and *PSCF* tools have been used.

Materials and methods

Description of the sampling site

Constantine is a city in northeastern Algeria, located about 390 km from Algiers, the country's capital (Fig. 1) and 63 km from the Algerian coast. This metropolis is the third most populous city in the country. The agglomeration of Constantine had 943,112 inhabitants in 2015, of which only 54% live in the municipality of Constantine (448,000 inhabitants). This city is characterized by a hot and dry semi-arid climate in summer with an average maximum temperature of 36 °C and a humidity of around 25% while



Fig. 1 Location of the sampling site and city of Constantine, Algeria

the winter is cold and wet. Precipitation totals 560 mm per year, with monthly precipitation varying from 0 to 80 mm (Bencharif-Madani et al. 2019).

To attain the objectives of our work, an urban traffic site was chosen in Zouaghi, Constantine $(36^{\circ} 31' \text{ North}, 6^{\circ} 62' \text{ East}, 649 \text{ m}$ above sea level). The site is located 5.65 km southwest of the city of Constantine (Fig. 1). It has around 26,000 inhabitants.

The national vehicle fleet is composed approximately of 50% vehicles running on gasoline and the remaining 50% on gas-oil. However, gas-oil represents 70% of total fuel consumption.

The nearest main road (national road N79) is about 5 m west of the study site and has two lanes of traffic in each direction (Fig. S1). This road connects the city of Constantine with the new town, Ali Mendjli, as well as other cities such as Batna, Oum El Bouaghi and Biskra. The East–West motorway is 1.7 km south of the site. The sampling site is also surrounded by three urban areas. These are located to the east, south and northwest of the site (Fig. S1). In addition, Mohamed Boudiaf Airport is located 2.86 km south of the sampling site.

Sampling campaign

 $PM_{2.5}$ was collected on quartz fibre filters (WHATMAN®, diameter 47 mm, QMA grade) at the frequency of one sample every 3 days at the entrance of the Faculty of Earth Sciences in Zouaghi. The sampling campaign ran from March 15, 2017 to March 15, 2018, using a low volume LVS (low volume sampler) brand "Tactical Air Sampler" (Fig. S2). Each sampling was carried out for a period of 24 h with a suction flow rate of 5 l of air/min.

The sampler is attached to a metal pipe at a height of 1.80 m and at a distance of approximately 5 m from the N79 national road. It operates from a battery that can power the sampler for at least 24 h continuously, making the sampling site independent of mains power.

The exposed filter is recovered within hours of the end of the sampling period to prevent damage to the filter or change in particle mass due to passive absorption or volatilization. The exposed filters are placed in petri dishes, placed with the exposed side of the filter facing up and kept in the desiccator for 48 h. They are weighed before and after each sampling using a microbalance with an accuracy of 1 μ g (Shimadzu AUW 120D) to determine the mass of particles captured on the filters. All precautions are taken during the installation and recovery of the filters (wearing gloves, using the pliers) to avoid any contamination. A total of 120 samples were collected throughout the sampling period of 12 months.

Mineralization protocol

We have chosen the mineralization method proposed by Querol et al. (2001). Kemmouche et al. (2017) were able to demonstrate that the chosen protocol is the most effective since it promotes the complete recovery of all the elements by the essential use of hydrofluoric acid (HF) which remains the only reagent capable of releasing major elements and traces linked to silica with recovery rates greater than 80%. This protocol is best suited for source distribution studies, which require a large number of elements and where it is strongly recommended to consider total dissolution of samples using HF to ensure reliability of results.

First, the filters are cut in half. Half undergo the digestion protocol and the other half are stored in the fridge at 3 °C for further analysis. The half-filters are digested in a solution containing 1 ml of nitric acid (HNO₃) and 2 ml of HF in closed Teflon-PFA (PerFluorAlkoxy) vials in the oven at 90 °C overnight (at least 8 h of time). After cooling, 1 ml of perchloric acid (HClO₄) is added. Then, the containers are heated for 4 h on a hotplate at 240 °C until the acids have completely evaporated. 2.5 ml of HNO₃ are then added to the remaining dry residue and then diluted in a 25-ml flask, making up the volume with ultra-pure water (MilliQ) to obtain 5% HNO₃ solutions. Then the contents of each vial are transferred to test tubes and centrifuged for 2 min at 3000 rpm to remove residues from the mineral filters. The solutions obtained are stored in polypropylene (PP) bottles fitted with tight caps.

Filter analysis

The 120 PM_{2.5} samples, including the 5 blank filters, were analysed by two instruments, inductively coupled plasma emission spectroscopy (ICP-OES, Perkin Elmer Optima 4300 DV model) for sulphur (S) and plasma mass spectrometry with inductive coupling (ICP-MS, Perkin Elmer NexIon 300 X model) for the rest of the elements, at the CEREGE Sustainable Development Team laboratory (UM34 University of Aix Marseille), Technopole Environnement Arbois-Méditerranée. Twenty elements which include Na, Mg, P, K, Ca, Sr, Zr, Ba, Pb, Al, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Mo and S were measured. The detection limits and measurement uncertainty of metallic elements analysed by ICP-MS and ICP-OES are reported in Table S1.

Computation of the concentration of mineral dust

Mineral dust from the Sahara/Sahel region is mainly composed of oxides (such as SiO₂, Al₂O₃, FeO, Fe₂O₃, CaO) and carbonates (such as CaCO₃, MgCO₃) allows the determination of the mineral load brought by the Sahara (Denier van der Gon et al. 2010; European Commission 2011). Among all other elements, oxygen is present as an oxide and is never directly measured in particle samples (Denier van der Gon et al. 2010).

There is a formula that calculates the concentration of mineral dust in their oxide forms directly, given in the equation below. According to Remoundaki et al. (2011), these oxides represent the mineral dust portion of $PM_{2.5}$:

$$\begin{aligned} \text{Mineral Dust oxide} &= \left[\text{SiO}_2\right] + \left[\text{A1}_2\text{O}_3\right] + \left[\text{Fe}_2\text{O}_3\right] + \left[\text{K}_2\text{O}\right] \\ &+ \left[\text{CaO} + \text{CaCO}_3\right] + \left[\text{MgO}\right] + \left[\text{Tio}_2\right] \end{aligned}$$

To estimate the calcium levels in its most abundant forms $(CaO + CaCO_3)$, Ca was multiplied by a factor of 1.95 (Remoundaki et al. 2011).

The silicon concentration was not obtained by analysis because quartz filters are rich in silicon. In our study, silicon was estimated by multiplying the concentration of aluminium by a factor of 3 (Alastuey et al. 2005).

Data analysis by PMF

The PMF approach is a multivariate factor analysis technique that has been widely applied in numerous studies in recent years. The fundamental principle of PMF is to decompose the matrix of ambient data X comprising the measurements of concentration of n chemical species in m samples and their corresponding uncertainties, into two matrices, the matrix G which represents the contribution of each factor for each sample and the matrix F which represents the chemical composition of the profile of each factor. PMF calculates the site-specific source profiles with the temporal variations of these sources based on the correlations between the data as shown in equation:

$$x_{ij} = \sum_{k=1}^{p} g_{ik} f_{kj} + e_{ij}$$
(1)

where x_{ij} is the concentration of species *j* measured on sample *i*, g_{ik} is the relative contribution of any *k* factor to sample *i*, f_{kj} is the concentration of species *j* in the *k* factor profile, e_{ij} is the residue associated with the concentration of species *j* measured in sample *i*, and *p* is the number of independent sources.

The PMF model tries to reproduce x_{ij} by minimizing the sum of the squares of the scaled residuals (*Q*):

$$Q = \sum_{i=1}^{n} \sum_{j=1}^{m} \left(\frac{e_{ij}}{S_{ij}}\right)^{2}$$
(2)

Thus, PMF identifies a set of p factors that best characterize PM_{2.5} on our site. The results are constrained so that no sample can have a negative contribution to the source.

The identification of the main sources of particulate pollution as well as the contribution of each source to the

levels of the $PM_{2.5}$ is based on the protocol compiled by Belis et al. (2013), the recommendations of the EPA PMF v.5 guide (Norris et al. 2014) as well as the recommendations of Brown et al. (2015).

The number of factors (*p*) was determined using two criteria: the interpretability of the resulting PMF factor profiles and the factor matching success rate for the bootstrap (BS), displacement (DISP) trials and combination two (BS—DISP).

The following approach has been used consistently. The solution with the greatest number of physically significant factors is the one chosen. This choice is confirmed by visual inspection of any sharp drop in the Q_{true}/Q_{exp} graphs, relative to the number of adjusted factors. A detailed examination of the model results and goodness of fit was performed for the solutions of 2 to 9 factors.

Two input files must be specified, a concentration file and a file of uncertainties associated with these concentrations in order to be able to use PMF (Huang et al. 2001; Poirot et al. 2001).

As the PMF solution is highly dependent on the concentration and uncertainties, their estimation is crucial to obtain reliable results. Initially, all available species and samples (20 chemical elements and 120 samples) in the dataset are considered for the $PM_{2.5}$ source apportionment, then data processing was performed to exclude species, samples or outliers.

To ensure a strong data signal, only samples with less than 10% data below zero or below the limit of detection (*LD*) are accepted; the uncertainty attributed to these values is given as follows:

$$\sigma a^2 = LDj^2 + \left(a_{ij}X_{ij}\right) \tag{3}$$

where LD_j is the detection limit of element j, α_{ij} is the measurement uncertainty (%) of the concentration of element j in sample i and X_{ij} is the concentration of element X_i in sample i.

In addition, the analytical determination also includes the subtraction of the concentrations of the metallic elements of the blank filters which are filters different from those used for sampling. Blanks entail an additional source of uncertainty σ_{blk} which must be propagated together with σ_a to obtain the analytical determination uncertainty σ_A : $\sigma_A^2 = \sigma_a^2 + \sigma_{blk}^2$.

In order to include additional sources of uncertainty, the overall uncertainty was estimated by the following formula (Amato et al. 2009):

$$\sigma_{ij}^2 = \sqrt{\frac{\sigma_A^2}{V_i^2} + \left(\beta X_{ij}\right)^2} \tag{4}$$

where V_i is the volume of air sampled for each sample *i* and β is a coefficient estimated at 0.15.

Species with a concentration below the detection limit have been replaced by LD/2 and the uncertainty S_{ij} of these values is calculated as follows:

$$\sigma_{ij} = 5/6LD \tag{5}$$

The data obtained is systematically filtered to detect unusual events and instrument performance, and is validated before modelling. The Grubbs test was also applied to the data set to detect maximum outliers. These values are removed from the data set and the test is repeated until no outlier is detected. An outlier may indicate an unusual event that disturbed the observed phenomenon to the point of making it incomparable to others. In such cases, the extreme value is either corrected where possible, or removed from the dataset. In our study, the outliers obtained during desert dust intrusions or other uncommon events were examined and retained and the uncertainties calculated for these values were increased by a factor of 3 (Kim et al. 2004, 2005).

The time series of species were also plotted and studied to identify any unusual outliers. Time series of uncertainties attributed to species concentrations were also plotted to detect any data anomalies, in which case the sample date is reconsidered to justify the extreme observation. If the anomaly is not justified, the actual value is taken as such in the modelling procedure. Each data set was also analysed to find the number of missing information, the number of validated data and the number of samples with a concentration below the *LD* value. Only species for which 50% of the data are above the mean detection limit were taken into account. Samples for which data are missing were removed from the PMF analysis. The final datasets contain 95 samples and 20 species.

Conditional probability calculation

The conditional probability function (*CPF*) was used to locate potential local sources based on local meteorological data (wind direction and speed) (Begum et al. 2004; Kim and Hopke 2004). *CPF* calculates the probability of a source that is in a particular wind direction sector, $\Delta\Theta$:

$$CPF = \frac{m_{\Delta\Theta}}{n_{\Delta\Theta}} \tag{6}$$

where $n_{\Delta\Theta}$ is the number of times the wind passed through the direction sector, and $m_{\Delta\Theta}$ is the number of times the source contribution peaked as the wind passed through the sector (Ashbaugh et al. 1985). It should be noted that the *CPF* is not suitable for distant sources because the air particles can be diverted from their path. A good knowledge of local sources is necessary.

To ensure statistical reliability, 24-h average source contribution data was applied to all 60-min wind direction averages measured at the site for each date. The wind direction range has been divided into 24 sectors of 15° . All periods associated with wind speeds less than 1 m/s were removed from the dataset. *CPF* is useful for determining the direction of a source from a receiving site. However, it cannot determine the actual location of the source.

Similarly to *CPF*, *PSCF* is a conditional probability function. In this case, regional potential sources are examined using backward trajectories. Potential source contribution function (*PSCF*) analysis has been widely used to identify regional sources that increase the level of pollutant concentration. *PSCF* is calculated with the probability of concentration at each cell and is calculated using the following equation:

$$\text{PCSF}_{ij} = \frac{m_{ij}}{n_{ij}} \tag{7}$$

where m_{ij} is the number of points whose concentration is greater than a threshold and n_{ij} is the number of endpoints of the return paths that pass through each cell of the grid (Karnae and John 2011). The back trajectories required for the analysis are generated using a model developed by the National Oceanic and Atmospheric Administration (NOAA), called a hybrid single-particle Lagrangian integrated trajectory model (HYSPLIT4). The level of pollutant concentration in each of the parameters is calculated. Using the geographic information system (GIS), a spatial grid of required resolution is generated and a 90th percentile threshold is established for the distributed mass of each source.

The emission source contributions from the PMF analysis were analysed using the conditional probability function (*CPF*) and the potential source contribution function (*PSCF*) to identify the geographic locations of likely sources. The simultaneous use of these two tools is an effective way to identify local and regional sources affecting the sampling site (Wimolwattanapun et al. 2011). The *CPF* was applied at the 75 percentile of contributions and the *PSCF* at the 90 percentile (Pekney et al. 2006).

It should be noted that very few PMF studies have been conducted in Africa. The only source apportionment study conducted in Constantine is that of Bencharif-Madani et al. (2019), in which the authors used principal component analysis (PCA) to perform chemical speciation and identification of sources of PM_{10} .

Results and discussion

Characterization and temporal trend of PM_{2.5} and metallic elements

The mean annual concentration of $PM_{2.5}$ at the Zouaghi sampling site was $54.07 \pm 28.81 \ \mu g/m^3$. It should be noted that the

relatively high standard deviation is due to a strong seasonal variation of $PM_{2.5}$ and the recording of high concentrations of $PM_{2.5}$ during unusual events. The maximum and minimum concentrations were 132.52 and 16.91 µg/m³, respectively.

Figure 2 illustrates the average monthly PM_{2.5} concentrations observed between 3/15/2017 and 3/15/2018 at the sampling site. The highest averages were recorded during the dry period (June-July-August). The mean annual concentration of PM25 obtained in this campaign is higher than those measured at the traffic sites of other Algerian cities, such as Algiers (32.85 μ g/m³) (Talbi et al. 2018), Algiers (10.22 μ g/m³) (Belarbi et al. 2020) and Tiaret $(33.57 \ \mu g/m^3)$ (Khadidja et al. 2019), and comparable to other North African cities such as Kenitra $(51 \,\mu\text{g/m}^3)$ (Zghaid et al. 2009), Kenitra (50.73 μ g/m³) (Tahri et al. 2013), Cairo, Egypt (51 μ g/m³) (Boman et al. 2013) and Giza, Egypt (61.31 µg/m³) (Hassan and Khoder 2017). This value is much higher than the annual threshold recommended by the WHO of $10 \,\mu g/m^3$, the American annual limit (NAAQS) for $PM_{2.5}$ (32 µg/m³) and exceeds by a factor of 2 the standard decreed by the European Commission $(25 \ \mu g/m^3)$. However, this value is lower than the limit value set by Algerian regulations ($80 \mu g/m^3$). According to the study carried out by the Health Effects Institute and the Global Burden of Disease (GBD) project of the Institute for Health Metrics and Evaluation (IHME) in 2019, 90% of the world's population lives in an environment where annual average PM2 5 concentrations exceed the WHO recommended threshold. Algeria is among the countries most exposed to fine particles in the world, with average annual concentrations between 35 and 45 μ g/m³ in the north and exceeding 70 μ g/m³ in the south. The areas most polluted in the world by fine particles are South and Southeast Asia,

North Africa, the Middle East and the countries of sub-Saharan Africa. The highest annual levels were recorded in Nepal (100 μ g/m³), Niger (94 μ g/m³), India (91 μ g/m³), Qatar (91 μ g/m³), Saudi Arabia (88 μ g/m³), Egypt (87 μ g/m³), Cameroon (73 μ g/m³) and Nigeria (72 μ g/m³) (Health Effects Institute 2019).

The WHO recommended daily limit (25 μ g/m³) was exceeded 83 times during the sampling period, representing 69.17% of all sampling days.

Elemental analysis of $PM_{2.5}$ revealed that Ca, Na and Al predominate, followed by the elements S, Fe, K, Ba and Mg (Table 1). The terrigenous species Al, Ca, Fe, K, Mg and Ti are important as they represent about 62% of the total mass of metallic elements and the mineral dust component represents 16.6% of the mass of $PM_{2.5}$. Similar results were also observed in Barcelona (Pérez et al. 2008; Querol et al. 2004a). The concentrations of trace metals are in decreasing order Pb>P>Mo>Zn>Zr>C r>Sr>Mn>Ni>Cu>V and are between 0.3 and 42 ng/m³. The concentrations of Pb and Ni are not alarming. Their maximum values are 124 ng/m³ and 14 ng/m³, respectively.

The annual Pb concentration is well below the limit of 500 ng/m³ recommended by the WHO and the limit set by the European Commission (200 ng/m³). This value is lower than those reported in $PM_{2.5}$ nearby traffic sites in Algiers (371 ng/m³, Talbi et al. 2018; 283 ng/m³, Oucher et al. 2015), but it is close to that recorded in Barcelona (37 ng/m³) (Querol et al. 2008). In Algeria, the main source of Pb emissions is leaded gasoline commonly used by vehicles (Naidja et al. 2018; Bencharif-Madani et al. 2019). Pb is not a tracer element for the combustion of gasoline in other countries where its use is prohibited.

The measured annual average concentrations of Cr, Ni and Zn are 6 ng/m^3 , 3 ng/m^3 and 16 ng/m^3 , respectively. They are



Fig. 2 Mean monthly concentrations of $PM_{2.5}$

Table 1 Statistical data on the concentrations of $PM_{2.5}$ (µg/m³) and their components (ng/m³)

Species	Min	25th	Mean	75th	Max	Standard deviation
PM _{2.5}	17	33	54	71	132	29
Na	10	352	769	987	2440	399
Mg	33	74	113	123	343	46
Р	5	21	32	38	129	13
K	39	115	183	221	605	79
Ca	175	774	1249	1534	3771	496
Sr	2	4	6	7	14	2
Zr	7	10	14	17	27	4
Ba	11	65	120	139	442	54
Pb	0	30	46	58	123	19
Al	445	549	765	884	1767	220
Ti	7	13	20	22	62	8
V	0.14	0.3	0.6	0.7	2	0.3
Cr	0.01	4	6	7	28	2
Mn	2	4	5	6	49	2
Fe	57	122	158	218	5399	102
Ni	0.08	2	3	4	13	1
Cu	0.20	1	3	4	17	2
Zn	0	10	19	22	98	10
Mo	9	28	30	32	81	3
S	137	191	254	294	601	67

lower than those recorded in Algiers (46 ng/m³, 14 ng/m³, 78 ng/m³) (Talbi et al. 2018) and in Kenitra, Morocco (84 ng/ m³, 166 ng/m³, 1413 ng/m³) (Zghaid et al. 2009). Spearman correlations between PM2 5, mineral dust (MD), measured metals and meteorological parameters are presented in Fig. 3. This figure illustrates a strong correlation between mineral dust (MD) and terrigenous elements such as Al, Ca, Mg, Ti and K (0.76 < r < 0.93), except Fe (r=0.36). Fe is influenced by various anthropogenic sources (traffic and industry in particular). Kandler et al. (2007) analysed dust plumes from the Sahara and observed the predominance of the major elements Al, Si, Fe, Ti, Ca, S, Na and Mg to which are added some trace elements Sr, Zr, Ba, La, Th and Nd. In addition, a strong correlation between Fe and mineral dust was recorded in summer and in autumn (r=0.91 and 0.81, respectively) (Figs. S3, S4) while in spring, this correlation is medium (0.51) (Fig. S5).

There is no significant correlation between Fe and mineral dust during winter, while they are fairly well correlated during the other seasons (Figs. S3-S6). This trend has been highlighted by Bencharif-Madani et al. (2019) who observed high concentrations of this element at the same site during spring, summer and autumn, a phenomenon which could be explained by the frequency of Saharan dust episodes in Algeria during these seasons. Fe has an excellent correlation with Mn (r=0.97). Mn is often an alloy with Fe to make steel. A probable source of emission of these two elements is the agricultural tractor company of Oued Hmimime, 10 km southeast from our sampling site.

Apart from Cr and Ni, which are fairly well correlated (59%), the trace elements Pb, Mo, Cu and Zn do not show a good correlation between them, with Ni and Cr and the major elements. This reflects the diversity of the sources of emission of these trace elements unlike the major elements which mainly come from the earth's crust. Figure 4 illustrates a similar time course for the major elements Na, Al, K and Mg indicating the existence of a common source. The major elements Ca, Fe, Ba and S do not follow the same pattern of temporal variation. This is due to the diversity of the sources of these major elements. Indeed, Fe, Ba and S are linked to traffic, industrial and natural emissions. V and Ti are, on the other hand, closely linked from the point of view of time evolution and also show a good correlation (76%). Several major elements (Na, Ca, Al, S, K, Mg, Ba) and traces (Sr, Ti, V, Cr) reach a peak during the period of July-August (Figs. 4, 5). As this season is known to be strongly impacted by desert dust (Lokorai et al. 2021) and temperature peaks favourable to the lifting of soil dust, it follows that these elements are essentially linked to sources of wind emissions.

Influence of meteorological conditions on PM_{2.5} concentrations

Conventional meteorological parameters such as temperature, wind speed, wind direction, relative humidity and precipitation level have a strong effect on PM concentrations (Tran and Mölders 2011; Kassomenos et al. 2014).



Fig. 3 Spearman correlation matrix showing the relationships between annual average concentrations of $PM_{2.5}$ components and different meteorological parameters

The variations of these factors over the course of a year have an impact on the seasonality of the annual profiles. This trend was also observed in our study. The sampling period was characterized by a low level of precipitation as a total volume of 476.62 mm was recorded. The average daily value of relative humidity varies between 22.40 and 91.21% with an annual average of 60.18 ± 18.12 , the high values being recorded during winter. The wind rose specific to our site (Fig. S7) indicates that the prevailing winds are north-westerly (19.38%), north (18.95%) and west (15.61%), respectively. The mean annual wind speed was 3.96 m/s.

The figure of correlations between $PM_{2.5}$ and its metal compounds and several meteorological variables indicates that relative humidity (RH) and precipitation (Prec) have a negative correlation with most pollutants during the entire study period (Fig. 3). This was predictable due to the leaching of the atmosphere by precipitation (Dawson et al. 2007; Feng and Wang 2012). In addition, humidity promotes the agglomeration of particles in the air and their wet or dry deposition (Anda et al. 2015; Kang et al. 2015) or considerably reduces resuspension of dust by the wind (Hieu and Lee 2010). According to Chu (1997), a decrease in relative humidity (40–60%) led to higher PM concentrations. Positive correlations were found between RH and $PM_{2.5}$ leading to an exacerbation of PM pollution until sufficient hygroscopic growth, aggregation and merging of small-sized particles led to PM deposition (Lou et al. 2017). The highest concentrations of $PM_{2.5}$ were observed at elevated temperatures, thus facilitating the resuspension of soil dust by the wind.

Fig. S8 shows the combined effects of temperature, wind speed and relative humidity on $PM_{2.5}$ concentrations. These results showed that, for an RH < 60%, the concentrations of $PM_{2.5}$ tend to (i) increase appreciably with T and (ii) increase with wind speed (WS). For an RH > 60%, the concentrations of $PM_{2.5}$ tend to (i) increase slightly with T but (ii) they are independent of the wind speed.

For temperatures below 15 $^{\circ}$ C, PM_{2.5} concentrations are independent of wind speed and relative humidity. Above



Fig. 4 Monthly average concentrations of major elements. The histogram represents the monthly minimum and maximum average values



Fig. 5 Monthly average concentrations of trace elements. The histogram represents the monthly minimum and maximum average values

15 °C, $PM_{2.5}$ concentrations decrease with relative humidity but increase with wind speed.

In addition, the concentrations of $PM_{2.5}$ are not affected by the wind speed for a temperature < 15 °C and a relative humidity > 60%. In the latter case, relative humidity is linked to the agglomeration of particles, which weakens the influence of wind speed. This behaviour of $PM_{2.5}$ with respect to wind speed and relative humidity has been highlighted by Wang and Ogawa (2015) and Chen et al. (2018).

Identification of emission sources (profiles/contributions)

The high levels of particulate air pollution in Constantine are influenced by Saharan dust episodes (Ali-Khodja et al. 2008; Terrouche et al. 2016; Bencharif-Madani et al. 2019). The geographic proximity of North Africa to particularly active desert dust emission areas (Engelstaedter et al. 2006) such as the Libyan desert, Niger and Mali explains the high levels of particles in the air in this region (Safar and Labib 2010; Evan et al. 2015). In addition, the semi-arid climate, hot and dry in summer and cold and humid in winter where the frequency and intensity of precipitation is concentrated over a short period (on average 20 days per year), which characterizes the city of Constantine promotes the resuspension of dust and increases the concentrations of particles in the ambient air. It should be noted that activities related to agriculture are also an important source of dust and lead to soil erosion (Webb and Strong 2011; Ginoux et al. 2012; Avecilla et al. 2015). Constantine is traditionally an agricultural town. Agricultural land represents 82% of the total area of the province, of which forests only occupy nearly 8%, or 17,858 hectares (ANDI 2013). These factors explain the significant presence of dust raised by the winds, especially in dry weather.

The choice of the optimal solution is based on the knowledge available a priori of the profile of the chemical composition of the sources and on the results of the error estimation methods. This subjectivity is part of the process of choosing the optimal solution (Ulbrich et al. 2009). The discussion above indicates that the five-factor solution is more stable and realistic than the six- and seven-factor solutions, due to the lower random errors and rotational ambiguity (Fig. S9). In addition, the scaled residuals (*d*) for all elements are in the range -3 < d < +3 and mostly obey a normal distribution, adding credibility to the chosen solution.

Five factors were shown to be physically significant (Fig. 6). The PMF model identified sea salts (15.1%), industrial activities (18.9%), non-exhaust emissions (24.2%), exhaust emissions (15.8%) and mineral dust (25.9%) as the main sources of metallic aerosols near road traffic in Constantine. Mineral dust and non-exhaust emissions were found to be the two main contributors to $PM_{2.5}$. The results also

show that 40% of the mass of $PM_{2.5}$ is attributable to vehicle emissions.

Sea salt

The species contributing to the first factor mainly include Na (86.7%), K (56%) and Mg (42.3%) (Fig. 7). This source is attributed to sea salts and contributes 15.1% to the concentration of $PM_{2.5}$. Indeed, the back trajectories of marine aerosols (85th percentiles) show that in many cases, the contribution of the Mediterranean Sea is undeniable (Fig. S10).

However, the contribution of the salt lakes in the region and the great chott of El Djerid which is crossed by southeastern air masses cannot be overlooked (Trousset 1995). The importance of this source is explained by the proximity of the city of Constantine to the Mediterranean Sea (60 km). Na, K and Mg are commonly used as sea salts tracer elements (Saradhi et al. 2008; Gupta et al. 2012). Several authors have used the Mg/Na ratio (Buat-Menard et al. 1974; Savoie and Prospero 1980). Marine aerosols are generally characterized by a Mg/Na ratio close to 0.12 (Brewer et al. 1975). A ratio equal to 0.129 was recorded on the island of Lampedusa (Kishcha et al. 2011), while in Athens, Basel and Helsinki, this ratio was between 0.11 and 0.14 (Ilacqua et al. 2007). In our study, the Mg/Na ratio is 0.066. The enrichment of Na in this factor could be explained by the high Na content in soil dust as well as in aerosols from salt lakes and anthropogenic sources (Hoffman and Duce 1972). According to the latter authors, continental dust transported across the Pacific is the source of excess Na in sea salts. In Algeria, the "sabkha" salt lakes have high concentrations of Na (Demdoum et al. 2015; Lamini and Hacini 2018). Doumbia (2012) found a ratio equal to 0.33 and concluded that salt lakes are the main source of Na, Mg and Cl. Other studies



Fig. 6 Contributions of the five emission sources to PM_{2.5}



Fig. 7 PMF factor profiles for identified sources

have confirmed the association between high Na levels and salt lakes (Wen 1989; Cao et al. 2008).

The presence of elements such as Sr, Zr, Ca, Ba, Al and Ti in this factor could be linked to desert dust, which may be raised by air masses from the Mediterranean Sea. The Ca/Al ratio (0.77) calculated in this factor is in agreement with the reports of other studies (0.84 (Kong et al. 2011), 0.81 (Xu et al. 2004) and 0.76 (Shen et al. 2007)) which reflect the determining contribution of desert dust. Fig. S11 indicates that the Mediterranean Sea is the main source of this factor, the eastern contribution being more decisive than the northern contribution of the Sahara is not to be overlooked, either. The first factor can therefore, be considered as a mixture of sea salt and mineral dust.

The "sea salts" factor is more significant during the months of May, July and August as shown in Fig. S12. The scarcity of precipitation during the dry season facilitates wind erosion of soil and salt lakes.

Regarding the "sea salt" factor, its contribution tends to increase when RH < 30%, T > 20 °C and WS > 3 m/s (Fig. S13).

When RH decreases, sea salts tend to change from biphasic (saline) to crystals that can stay longer in the atmosphere and reach areas farther from the sea (Zezza and Macrì 1995; Morcillo et al. 2000). The temperature increase coincides with the warm seasons (summer and spring) when the recorded precipitation is lower. As a result, leaching of the atmosphere is less frequent and leads to a higher concentration of sea salts in the air (Zezza and Macrì 1995; Gong et al. 1997; Feliu et al. 1999). Furthermore, the wind speed favours the production of marine aerosols and this effect is observed at wind speeds greater than 3 m/s (McKay et al. 1994; Gustafsson and Franzén 1996; Morcillo et al. 2000). Moreover, according to these authors, sea salt concentrations increase exponentially with wind speed above 3 m/s.

Industrial activities

The second factor is attributed to industrial emissions, which are characterized by high contributions of Cr (76.1%), Ni (48.3%), Cu (31.2%), S (29.3%), V (26.4%), Mo (25.9%), Fe (22.1%) and Mn (21.3%) (Fig. 7). Industrial emissions are generally heterogeneous and differ depending on the manufacturing process and the type of fuel used (Singh et al. 2017). In contrast, the choice of metal tracers specific to an industrial source is often difficult (Banerjee et al. 2015). S, Ni, Mo and V are linked to anthropogenic activities such as combustion and industrial processes (Marcazzan et al. 2003). Ni and V are natural constituents of petroleum and are found in all of its by-products (Turunen et al. 1995; Vale et al. 2004).

Ni and V are widely associated with fuel oil combustion and the refining industry (Celis et al. 2004; Pey et al. 2009). The V/Ni ratio in this factor is 0.11 and cannot be representative of diesel emissions with a characteristic factor > 4 (Moreno et al. 2010). A ratio of < 2 reflects the presence of Ni enriched by emissions from the surface treatment industry located west-southwest of our sampling site (Bencharif-Madani et al. 2019). The Cr and Ni pollution rose indicates a similar concentration profile indicating that these two elements have a common emission source (Fig. S14). Ten kilometres from our site and in this direction is a large mechanical industrial pole within the Ain Smara industrial area.

In general, Ni, Cr, Fe, Mn, Zn, Fe, S, Cu and Mo are used as tracers of industrial emissions (Song et al. 2006; Tauler et al. 2009; Sharma et al. 2014). Metals like Cr, Fe, Mn, Mo and Ni are associated with the metallurgical and steel industries (Lodhi et al. 2009; Mansha et al. 2012). The production of iron and steel is an important source of particles in the ambient air around industrial areas (Kumar et al. 2001; Mazzei et al. 2006). Studies have reported that the particles emitted by the steel smelter in the region of Cornigliano, Italy, represent 60% of the mass of PM_{10} (Prati et al. 2000) and 45% of the mass of PM_{10} in Port Talbot, UK (Taiwo et al. 2014). Cr, Ni and Cu are generally used in the metallurgical industry and in foundries as a highly corrosion-resistant element in the steel plating process (Wadden et al. 1991; Kulshrestha et al. 2009). Fe, Cr, Ni and Cu are probably from construction sites (Kulshrestha et al. 2009) in Didouche Mourad and El Khroub city (Fig. S15). They can also be emitted by the cement and glass industries as well as brickworks in the industrial zone of Didouche Mourad (Tian et al. 2012; Hasheminassab et al. 2014).

Mo is used as an additive in lubricants (Zainal et al. 2018) and it may be released into the environment by the combustion of fossil fuels used in industry, explaining its significant presence in this factor (Salminen et al. 2005). S in the form of SO₂ is a pollutant emitted by power plants, petroleum refineries as well as industrial activities such as steel processing (Salminen et al. 2005; Shahbazi et al. 2016). Finally, Fe and Mn are tracers in the steel industry (Owoade et al. 2015).

Summer and spring have the highest concentrations of this factor. The impact of an industrial zone is closely linked to the frequency of the winds that pass through it. Indeed, the wind rose (Fig. S16) indicates that N, N-NE and SE winds are more frequent during summer compared to fall and winter. The industrial zones of Didouche Mourad, Skikda and El Khroub located in these respective directions are believed to be responsible for this marked increase in this factor in summer. In the spring, NN-E and SE winds are more frequent than in the fall and winter. The contribution of the Skikda industrial zones and El Khroub would be decisive. Moreover, Fig. S17 perfectly illustrates the nuanced increase in this factor between summer and spring.

The factor "industrial activities" does not seem to be affected by the meteorological parameters. No particular trend is observed with the variation of these parameters (Fig. S18).

Wind direction and emission intensity are the determining factors for particulate matter concentrations from industrial areas. Fig. S19 shows the sources of the emissions contributing to this factor. These sources are located in the industrial zones of El Khroub (south-west), Didouche Mourad (north), Palma (north-west) and construction sites in Ali Mendjeli (south-west), in Didouche Mourad (north–north-east), the El Hadaba plateau (north-west) and the quarry of the National Aggregates Company (south-east).

The contribution of industrial activities to $PM_{2.5}$ in the study site (18.9%) is much less than that reported by Tahri et al. (2013) (52%) in Kenitra City, Morocco, who asserts that a significant number of small industrial facilities involved in metal works surround the sampling site located close to a bus station.

Non-exhaust emissions

The third factor includes elements resulting from the wear of brakes, tires and road surfaces as well as the resuspension of soil particles. Querol et al. (2004b) showed that in European cities, non-exhaust sources account for half of all traffic emissions. Harrison et al. (2001) also estimate that particles resuspended by vehicles represent a fraction equivalent to that of exhaust emissions. Rehn et al. (2014) also found that the contribution of non-exhaust emissions was equivalent to that of exhaust emissions. In some northern European countries, non-exhaust particulate concentrations in PM₁₀ can represent up to 90% of airborne particles near the road (Forsberg et al. 2005; Omstedt et al. 2005). The contribution of this source at our sampling site is estimated at 24.2% of the total mass of $PM_{2.5}$ (Fig. 6) and represents more than 60% of the total emissions related to road traffic. This factor is mainly characterized by high loads of Zn (84.6%), Ni (37%), S (34.5%), P (32.5%), Cu (22.5%), Mo (31.8%), Zr (21.2%) and Pb (20.8%) (Fig. 7). The main sources of non-exhaust emissions are brake and tire wear and pavement abrasion (Thorpe and Harrison 2008; Pant et al. 2017). Several studies have indicated that Fe, Cu, Pb and Zn are basic tracers and reliable markers of brake wear (Hildemann et al. 1991; Legret and Pagotto 1999; Westerlund and Johansson 2002). Hulskotte et al. (2014) reported that Cu, Zn, Fe and Sn represent 80 to 90% of the metals present in brake pads. Furthermore, Hjortenkrans et al. (2007) reported that brake dust contains significant amounts of Cu, Sb, Ba, Al, Si, S, Ti, Zn, Ni, Cr and Pb. Kennedy and Gadd (2003) reported that concentrations of Cu are 11 mg/kg (25% by mass). Other studies have revealed that Cu is the most abundant species and represents 11.8% (Westerlund and Johansson 2002), 14.2% (Legret and Pagotto 1999) and 2.4% of the total mass of brake linings (von Uexküll et al. 2005). A wide variety of components is commonly used in brake linings (Chan and Stachowiak 2004). This contributes to the difficulty of identifying the chemical composition of the resulting particles. The presence of Zr as zirconium oxide can be attributed to brake wear (Eriksson et al. 1999) or road wear (Huzita and Kasama 1983).

Zn is considered, according to several studies, to be the main indicator of tire wear in traffic areas or urban areas (Adamiec et al. 2016). Tires contain between 0.4 and 4.3% Zn (Smolders and Degryse 2002; Ozaki et al. 2004). These high contents result from the addition of ZnO and ZnS to the tire during vulcanization (Heideman et al. 2004, 2005). Zn, Cd, Co, Cr, Cu, Hg, Mo, Ni and Pb are associated with tire wear (Adachi and Tainosho 2004; Hjortenkrans et al. 2007). Amato et al. (2011) showed the predominance of Zn, Sb, Cu, S, Ni and Cr in the factor representative of tire wear. Similar results have been reported in source allocation studies using PMF (Bukowiecki et al. 2010; Doumbia 2012). On the other hand, the absence of other metals characteristic of tire wear and, consequently, of elementary ratios makes it difficult to use it as a tire tracer when it emanates from other anthropogenic or natural sources. This factor also contains

terrigenous species such as Ca, Al, Ti, Fe and Mn as well as other trace elements such as Ni, Mo, S, Zr and P related to pavement wear (Lindgren 1996; Arditsoglou and Samara 2005; Amato et al. 2011). Fe and Mn are generally associated with the mechanical wear of engine parts and various seals (Hildemann et al. 1991).

According to Fig. S20, the main sources of the "nonexhaust" factor are the entrance to the faculty, the parking, the traffic roundabout in front of the entrance to the faculty and the pedestrian crossing. Indeed, emissions increase significantly during braking and deceleration, especially at the traffic roundabout.

Fig. S21 illustrates the seasonal effect of the "non-exhaust emissions" factor on the temporal evolution of the contribution. The latter is minimum in winter during the months of January and February and maximum in spring during the months of March to June. In summer, a decrease in this contribution is observed, because it corresponds to a notable drop in traffic, which coincides with the holiday period. In winter, the effect of precipitation on particles generated by the wear of various components is evident.

The contribution of emissions to the "non-exhaust emissions" factor increases when RH < 50% and the temperature is below 15 °C (Fig. S22). This is because low temperatures reduce the elasticity of the pavement surface, exacerbating friction on the harder inner layer. In addition, low temperatures tend to harden the tires thereby increasing the frictional force (Gustafsson et al. 2008). The effect of relative humidity is such that its decrease leads to favourable soil conditions for the resuspension of particles produced by various wear processes (Jeong et al. 2019). However, wind speed does not seem to have any effect (Fig. S22).

Exhaust emissions

The fourth factor is dominated by the presence of Pb, Ba, Mo, S, Sr and Mn, which contribute 73.9%, 57.6%, 41.5%, 33.9%, 32.4% and 22.9%, respectively, reflecting exhaust emissions. In India, vehicle emissions have been identified by Pb, Ni, Cu, Zn and Mn (Deshmukh et al. 2013; Sharma et al. 2016). Ba, Cd, Pb, Sb and Zn have been used as tracers of vehicular emissions in Pakistan (Lodhi et al. 2009; Mansha et al. 2012). In Sri Lanka, Seneviratne et al. (2011) identified K, Pb, Fe and S as tracers of vehicular emissions.

Pb, Ba and Mn are used as fuel additives to improve engine performance (Karar et al. 2006; Belis et al. 2013). The combustion of leaded gasoline remains the main source of lead emissions in the world (Pacyna and Pacyna 2001). It is an element that is often used as a marker of automotive emissions (Sabin et al. 2006; Zhu et al. 2018). Algeria is one of the few countries still using leaded gasoline (Naidja et al. 2018). Ba is considered to be a potential tracer of emissions from gasoline and LPG engines (Lin et al. 2005; Cheng et al. 2010). It is also used as a corrosion inhibitor in engine lubricating oils (Bern et al. 2003).

The profile of this factor also contains a substantial proportion of terrigenous elements such as Ca (23%), Ti (22.5%), Al (22%), P (16%) and Mg (15.4%) revealing the significant contribution of dust resuspended by road traffic. In our study, the Ca/Al ratio = 1.56 is close to those announced by Ho et al. (2003) (1.19) and by Kong et al. (2011) (1.29) which they attribute to dust from paved roads.

Fig. S23 shows the probability of the different directions contributing to the "exhaust emissions" factor at the local scale. The main sources are the road along the faculty as well as the roundabout in front of its entrance.

Winter experiences a drastic increase in concentrations of the "exhaust emissions" factor resolved by PMF (Fig. S24). Road traffic is usually intense during this season (Bencharif-Madani et al. 2019). This factor, associated with the reduction in the height of the atmospheric boundary layer and the stability of the lower atmospheric layers, increases remarkably during winter. In addition, the wind rose during winter is characterized by prevailing westerly winds where the main source of emissions contributing to the "exhaust emissions" factor is found, namely, the national road N79.

As for the "exhaust emissions" factor, its contribution increases when RH > 60% and T < 10 °C (Fig. S25). At low temperatures, meteorological conditions are more stable than in summer (Taghvaee et al. 2018). This results in a poor dispersion, which is at the origin of high concentrations of primary and secondary particles emitted directly into the atmosphere. The mixing of the hot vapours in the exhaust with the cold air considerably favours the nucleation phenomena for the atmospheric aerosols (Nilsson and Kulmala 1998; Charron and Harrison 2003). It is believed that nucleation increases the total mass of particles (Kulmala et al. 2001). Low temperatures associated with high relative humidity favour the formation of new particles (Easter and Peters 1994). In addition, high relative humidity promotes binary nucleation of sulphuric acid and water (Easter and Peters 1994; Hinds 1999; Seinfeld and Pandis 2016). Jamriska et al. (2008) suggest that the significant influence of RH on exhaust emissions may be related to particle agglomeration and changes in the hygroscopic properties of primary particles emitted by traffic which become hydrophilic under high-rate humidity conditions.

Mineral dust

The fifth factor represents 25.9% of the total mass of $PM_{2.5}$ and is dominated by V (56.7%), Ca (52.6%), Fe (43%), Ti (34.2%), Mn (32.9%), Mg (30.8%), P (30.3%) and K (27.7%) which are all terrigenous elements (Fig. 7). Therefore, this factor could be associated with the resuspension of soil dust. According to Lough et al. (2005), these dusts contain most

of the terrigenous elements Fe, Ca, Na, Mg, Al and K at high concentrations. Apart from K, these are the same terrigenous elements which are considered as tracers of soil dust: Al, Si, Ca, Mg, Fe and Na by Begum et al. (2006). A ratio of x/Al (where x is any element) could be considered a good criterion to distinguish the different sources of dust (Wang et al. 2006; Shen et al. 2016). The elementary ratios calculated in this study are more or less close to the ratios shown in Table 2.

The Ca/Al ratio of our study site is relatively higher compared to those of other sites. This is explained by the influence of anthropogenic emissions (Athanasopoulou et al. 2010). According to Fig. S26, we can assume that the construction sites near the sampling site (Ali Mendjeli, El Khroub), the quarries near El Khroub in the south-east and Ain Smara in the south-west and the area industrial plant of Didouche Mourad in the north (cement plant, brickyard, quarries) are the nearby sources that contribute the most to this factor.

On a regional scale, Fig. S27 reveals that the eastern region of Constantine contributes strongly to the "mineral dust" factor. This region is located in North Africa, between eastern Tunisia and eastern Algeria, and is considered a particularly intense and persistent source of dust (Prospero et al. 2002).

In fact, the prevailing synoptic winds are from the northwest (41.5%), east (39.4%) and west (19.1%) (Fig. S28).

The temporal evolution of mineral dust contributions perfectly illustrates the influence of the hot season on this factor. The period from June to September is the most favourable for the lifting of soil dust (Fig. S29).

The contribution to the "mineral dust" factor is favoured by RH < 35% and T > 15 °C and a wind speed > 3 m/s (Fig. S30). The influence of relative humidity on dust levels has been highlighted by several authors due to its impact on the moisture content of the soil surface, and therefore on the cohesion of soil particles (Ravi et al. 2004; McKenna Neuman and Sanderson 2008). According to Csavina et al. (2014). Conversely, when RH is relatively low, soil particles are looser and more easily dispersed by the wind.

Moreover, wind speed is a main factor in the resuspension of soil dust (Yin et al. 2007). Temperature is also strongly correlated with dust concentrations (Hussein et al. 2006). The contribution of this factor increases in the hot season due to the absence of leaching of the atmosphere which leads to the accumulation of dust in the air. Associated with strong winds, dry soil generates more dust in hot weather (Kassomenos et al. 2014; Li et al. 2015).

The influence of Saharan dust episodes, which are generally more frequent in summer, has been highlighted by several authors (Matassoni et al. 2009; Kopanakis et al. 2018; Querol et al. 2019).

Conclusion

The PMF model identified natural sources related to sea salt and mineral dust (41%) and vehicular emissions (exhaust and non-exhaust) (40%) as the main contributors to $PM_{2.5}$. Industrial emissions account for less than half of the contribution of each of these sources. The Mediterranean Sea is the main source of sea salt. The contribution of the Sahara is not to be overlooked, either. Emissions from natural sources are exacerbated during the hot season. The decrease of relative humidity and the increase of temperature favour sea salt particles and mineral dust resuspension. During winter, exhaust emissions are highest while non-exhaust emissions are lowest. These two components of vehicular emissions are affected in opposite ways by relative humidity and temperature. None of these parameters has an effect on industrial emissions which are mainly determined by wind intensity and direction. Moreover, the metallic tracers of different sources have been identified. These are Na for sea salt. Cr for industrial activities, Zn for non-exhaust emissions, Pb for exhaust emissions and Ca for mineral dust. It should be noted that Pb originates mainly from gasoline before its ban in August 2021. Ba and Mo could alternatively serve as metallic tracers for such exhaust emissions.

In order to be able to discriminate between influential sources, it would be wise to analyse a larger number of metallic elements and if possible other pollutants such as cations and anions. The analysis of organic tracers could be considered and integrated into future studies to better determine the influence of combustion sources.

A sufficiently large number of data can also allow separate studies according to the seasons. From a broader perspective, it appears very desirable to continue measurements

Table 2	Comparison between
element	ary ratios

	K/Al	Ca/Al	Ti/Al	Mn/Al	Fe/Al	Pb/Al	References
Constantine	0.48	5.92	0.06	0.02	0.75	0.021	This study
Hong Kong	0.40	1.93	0.05	0.03	1.54	0.030	Ho et al. (2003)
North-west China	0.73	3.73	0.12	0.04	1.35	0.008	Shen et al. (2016)
North-east China	0.41	2.65	0.09	0.03	0.95	0.004	Shen et al. (2016)
North China	0.47	3.07	0.10	0.03	1.14	0.006	Shen et al. (2016)

of the chemical composition of PM over the long term with, if necessary, a higher temporal resolution.

Acknowledgements This work was supported by the PHC-Tassili, a cooperation program between Algeria and France.

Funding This work was supported by the PHC Tassili project (Hubert Curien Tassili Partnership) referenced under number 16MDU969, a cooperation program between Algeria and France.

Data availability All data generated or analysed during this study are included in this published article (and its supplementary information files).

Declarations

Ethics approval and consent to participate This study did not require ethics approval. Informed consent was obtained from all individual participants included in the study.

Consent for publication Consent to publish has been received from all participants.

Competing interests The authors declare no competing interests.

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Source apportionment of PM_{2.5} and their associated metallic elements by positive matrix factorization at traffic site in Constantine, Algeria

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Table of contents

Fig. S1. Sampling site with (A) industrial emission sources and (B) nearby roads. Fig. S2. Sampler (LVS) used for sampling aerosols at the Zouaghi site.	3 3
Fig. S3. Spearman correlation matrix showing the relationships between the average seasonal concentrations of the components of $PM_{2.5}$ and the different meteorological parameters during the summer	1
Fig. S4. Spearman correlation matrix showing the relationships between the average seasonal	4
concentrations of $PM_{2.5}$ components and the various meteorological parameters during the autumn.	5
Fig. S5. Spearman correlation matrix showing the relationships between the average seasonal concentrations of PM _{2.5} components and the various meteorological parameters during the	
spring.	6
Fig. So. Correlation matrix showing the relationships between average seasonal concentrations of PM _{2.5} components and different meteorological parameters during winter	7
Fig. S7. Wind rose for the Zouaghi site for the period from 03/15/2017 to 3/15/2018	8
Fig. S8. Scatterplot of daily PM_{25} concentrations versus relative humidity (%), temperature (°C)	U
and wind speed (m/s).	9
Fig. S9. The results of error estimation (a) DISP, (b) BS, and (c) BS DISP for the five-factor solu	tion
Fig. S10. 85 th percentiles of sea salt back trajectories developed by HYSPLIT at altitudes of 7	750,
1500 and 2500 m above sea level for 5 days	
Fig. S11. PSCF probabilities (percentile 90) for sea salts contributions	10
Fig. S12. Daily and monthly concentrations of the "sea salts" factor resolved by PMF	11
Fig. S13. Contributions (μ g/m ²) of sea saits as a function of wind speed (m/s), relative humidity (η) and temperature (η C)	11
Fig. S14 Spatial distribution of Cr and Ni concentrations as a function of wind direction and	11
speed	12
Fig. S15. 75 th percentile of the conditional probability function (CPF) for the "industrial	
emissions" factor contributing to $PM_{2.5}$	12
Fig. S16. Seasonal wind roses for the Zouaghi site	13
Fig. S17. Daily and monthly contribution of the "industrial activities" factor resolved by PMF	13
Fig. S18. Contributions $(\mu g/m^3)$ of "industrial activities" as a function of wind speed (m/s),	
relative humidity (%) and temperature (°C)	14
Fig. S19. Contribution of "industrial activities" as a function wind speed and direction	14
Fig. S20. 75 th percentile of the conditional probability function (CPF) for the	
"non-exhaust emissions" factor contributing to $PM_{2.5}$	15
Fig. S21. Daily and monthly contribution of the "non-exhaust emissions" factor resolved by	15
PMF Fig. S22 Contributions (ug/m^3) of "non-axhaust amissions" as a function of wind	15
Fig. 522. Contributions (μ g/m) of non-exhaust emissions as a function of which speed (m/s) relative humidity (%) and temperature (°C)	16
Fig S23 75 th percentile of the conditional probability function (CPE) for "exhaust emissions"	10
factor contributing to $PM_{2.5}$	16
Fig. S24. Daily and monthly contribution of the "exhaust emissions" factor resolved by PMF	17
Fig. S25. Contributions ($\mu g/m^3$) of "exhaust emissions" as a function of wind speed (m/s), rela	tive
humidity (%) and temperature (°C)	17
Fig. S26. 75 th percentile of the conditional probability function (CPF) for the "mineral dust"	
factor contributing to PM _{2.5}	18
Fig. S27. 90 th percentile of PSCF probabilities for the "mineral dust" contributions	18
Fig. S28. Synoptic wind rose (clusters of back-trajectories calculated for our site for the study	
period)	19

Fig. S29. Daily and monthly concentration of the "mineral dust" factor resolved by PMF	19
Fig. S30. Contributions (μ g/m ³) of "mineral dust" as a function of wind speed (m/s), relative	
humidity (%) and temperature (°C)	20

Table S1

Detection limits and relative standard deviations of major and trace elements analysed by ICP-OES and ICP-MS

Element	Detection limit	Measurement uncertainty (%)
	$(\mu g/L)$	
Na	10	1.25
Mg	0.05	1.25
Р	20	5.98
Κ	10	1.15
Ca	10	0.97
Sr	0.01	1.17
Zr	0.01	0.93
Ba	0.05	1.56
Pb	0.01	1.33
Al	0.02	11.15
Ti	0.05	8.02
V	0.01	6.60
Cr	0.01	3.96
Mn	0.02	6.24
Fe	0.1	3.58
Ni	0.01	1.79
Cu	0.05	1.65
Zn	0.1	3.02
Мо	0.05	1.66
S	150	4.52



Fig. S1. Sampling site with (A) industrial emission sources and (B) nearby roads

 Hamma Bouziane cement plant, (2) mechanical manufacturing plant (Oued Hmeimim), (3) stone production quarries, (4) mechanical complex (Ain Smara), (5) industrial activity zone (Palma).



Fig. S2. Sampler (LVS) used for sampling aerosols at the Zouaghi site



Fig. S3. Spearman correlation matrix showing the relationships between the average seasonal concentrations of PM_{2.5} components and the different meteorological parameters during the

summer



Fig. S4. Spearman correlation matrix showing the relationships between the average seasonal concentrations of PM_{2.5} components and the various meteorological parameters during the

autumn



Fig. S5. Spearman correlation matrix showing the relationships between the average seasonal concentrations of PM_{2.5} components and the various meteorological parameters during the

spring



Fig. S6. Spearman correlation matrix showing the relationships between the average seasonal concentrations of $PM_{2.5}$ components and the various meteorological parameters during winter



Fig. S7. Wind rose for the Zouaghi site for the period from 03/15/2017 to 3/15/2018



Fig. S8. Scatterplot of daily PM_{2.5} concentrations versus relative humidity (%), temperature (°C) and wind speed (m/s)

EPA PMF	Base Mo	del	Rotatio	nal Tools	Help	Ĩ								
ase Model Ru	ns B	ase Mo	del Res	its B	ase Model	Bootstra	ap Results	Base Model	BS-DISP Result	Base Mod	del DISP F	Results	Error Estir	nation Summary
ISP Box Plot	DIS	P Sum	mary											
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Fig. S9. The results of error estimation (a) DISP, (b) BS, and (c) BS DISP for the five-factor

solution



Fig. S10. 85th percentiles of sea salt back trajectories developed by HYSPLIT at altitudes of 750, 1500 and 2500 m above sea level for 5 days



Fig. S11. PSCF probabilities (percentile 90) for sea salts contributions



Fig. S12. Daily and monthly concentrations of the "sea salts" factor resolved by PMF



Fig. S13. Contributions (µg/m³) of "sea salts" as a function of wind speed (m/s), relative humidity (%) and temperature (°C)



Fig. S14. Spatial distribution of Cr and Ni concentrations as a function of wind direction and

speed



Fig. S15. 75th percentile of the conditional probability function (CPF) for the "industrial emissions" factor contributing to PM_{2.5}



Fig. S16. Seasonal wind roses for the Zouaghi site



Fig. S17. Daily and monthly contribution of the "industrial activities" factor resolved by PMF



Fig. S18. Contributions (μ g/m³) of "industrial activities" as a function of wind speed (m/s), relative humidity (%) and temperature (°C)



Fig. S19. Contribution of "industrial activities" as a function wind speed and direction



Fig. S20. 75th percentile of the conditional probability function (CPF) for the "non-exhaust emissions" factor contributing to PM_{2.5}



Fig. S21. Daily and monthly contribution of the "non-exhaust emissions" factor resolved by PMF



Fig. S22. Contributions (µg/m³) of "non-exhaust emissions" as a function of wind speed (m/s), relative humidity (%) and temperature (°C)



Fig. S23. 75th percentile of the conditional probability function (CPF) for "exhaust emissions" factor contributing to PM_{2.5}



Fig. S24. Daily and monthly contribution of the "exhaust emissions" factor resolved by PMF



Fig. S25. Contributions (μ g/m³) of "exhaust emissions" as a function of wind speed (m/s), relative humidity (%) and temperature (°C)



Fig. S26. 75th percentile of the conditional probability function (CPF) for the "mineral dust" factor contributing to PM_{2.5}



Fig. S27. 90th percentile of PSCF probabilities for the "mineral dust" contributions



Fig. S28. Synoptic wind rose (clusters of back-trajectories calculated for our site for the study period)



Fig. S29. Daily and monthly concentration of the "mineral dust" factor resolved by PMF



Fig. S30. Contributions (μ g/m³) of "mineral dust" as a function of wind speed (m/s), relative humidity (%) and temperature (°C)

Factor Profiles (conc. of species) from Base Run #1 (Convergent Run)

	Sea-salt	Industrial e	Non-exhaust	Exhaust	Mineral dust
1 PM2.5	5,7995	7,2829	9,3096	6,0815	9,974
1 Na	0,66525	0,10187	0	0	0
1 Mg	0,043967	0,007336	0,0046574	0,015968	0,032069
1 P	0	0,005763	0,0087976	0,004326	0,0082171
1 K	0,094687	0,013319	0,0094812	0,004778	0,046773
1 Ca	0,19822	0	0,06991	0,2533	0,57767
1 Sr	0,0021654	0,000253	0,0002923	0,001785	0,0010173
1 Zr	0,0041576	0,002918	0,0028646	0,002962	0,00058641
1 Ba	0,04214	0	0	0,057337	0
1 Pb	0	0	0,0080946	0,028764	0,0020408
1 Al	0,25673	0,12004	0,099676	0,16212	0,097498
1 Ti	0,003299	0,003242	0,0013406	0,004085	0,0062146
1 V	0,00089098	0,00014	0	0	0,00030028
1 Cr	0,00024465	0,003811	0,00013323	0,000227	0,00059013
1 Mn	0,0003818	0,001033	0,00073132	0,001111	0,001599
1 Fe	0,02247	0,037771	0,019884	0,01727	0,073576
1 Ni	0	0,00123	0,00094036	0,000197	0,00017775
1 Cu	0,00025244	0,000417	0,00034076	0	0,00032744
1 Zn	0,0023458	0	0,012926	0	0
1 Mo	0,00023708	0,007541	0,0092419	0,012087	0
1 S	0,0011189	0,066587	0,079397	0,077006	0,0033523

Factor Profiles (% of species sum) from Base Run #1 (Convergent Run)

		Eactor 1	Factor 2	Factor 3	Factor 4	Factor 5
1	PM2.5	15 08420574	18 94245	24 21379804	15 81767	25 94186878
1	Na	86,72046094	13,27954	0	0	20,01100010
1	Ma	42 27722172	7 053576	4 478402722	15 3543	30 83649609
1	P	0	21 26222	32 45987529	15 95986	30 31804597
1	ĸ	56 01521551	7 879293	5 608916338	2 826465	27 67010968
4	Ca	18 03/75571	1,010200	6 360658721	23 04613	52 558/5602
4	Sr.	30 2812051	4 585166	5 302/36617	32 37697	18 45422001
4	7.	20 2027001	21 62266	01 00764040	21 05752	4 247542407
4		40.00155001	21,03333	21,23704949	21,90700	4,34/34242/
	Da	42,30155091	0	0	57,03045	C 040050444
1	Pb	0	0	20,80906132	73,94459	5,246353414
1	Al	34,87876054	16,30836	13,54175724	22,02526	13,24585906
1	Ti	18,14541634	17,83135	7,37367237	22,46753	34,18202619
1	V	16,83101359	26,44474	0	0	56,72424476
1	Cr	4,886930432	76,12945	2,661294672	4,534368	11,78795935
1	Mn	7,862729673	21,2652	15,06069006	22,88182	32,9295567
1	Fe	13,14257974	22,09205	11,63004252	10,10113	43.03419878
1	Ni	0	48,3196	36,95032869	7,745596	6,984475015
1	Cu	18,8720433	31,17431	25,47471667	0	24,47893305
1	Zn	15.36033735	. 0	84.63966265	0	. 0
1	Mo	0.814523726	25.90686	31,75192688	41.52669	0
1	S	0.49190807	29.274	34,90573337	33,85457	1,473789816

Factor Profiles (% of factor total) from Base Run #1 (Convergent Run)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1 PM2.5	81,25672091	95,1246	96,58955866	90,43362	92,12997974
1 Na	9,320809309	1,330561	0	0	0
1 Mg	0,616021079	0,095812	0,048321755	0,237449	0,296221809
1 P	0	0,075269	0,091277423	0,064323	0,075901469
1 K	1,326658356	0,173964	0,098369954	0,071047	0,432042866
1 Ca	2,777257905	0	0,725334713	3,766642	5,335945999
1 Sr	0,030339392	0,003301	0,00303269	0,02654	0,009396815
1 Zr	0,058252081	0,038113	0,029720982	0,044041	0,005416678
1 Ba	0,590423005	0	0	0,852617	0
1 Pb	0	0	0,083983613	0,427729	0,018850899
1 AI	3,597040772	1,567886	1,034164824	2,41077	0,900590412
1 Ti	0,046222247	0,042344	0,013909079	0,060742	0,057404349
1 V	0,001248351	0,001828	0	0	0,002773691
1 Cr	0,003427788	0,049779	0,001382296	0,003376	0,005451039
1 Mn	0,005349395	0,013487	0,007587638	0,016522	0,014769986
1 Fe	0,314826885	0,493341	0,206301751	0,25681	0,679622558
1 Ni	0	0,016062	0,009756483	0,002931	0,001641879
1 Cu	0,003536934	0,005447	0,003535475	0	0,003024568
1 Zn	0,032866974	0	0,134110664	0	0
1 Mo	0,003321725	0,098491	0,095887153	0,179737	0
1 S	0,015676894	0,869717	0,823764844	1,145101	0,030965243

0,027338 0,036779 0,064337 0,021733

	Sea-salt	Industrial e	Non-exhau	Exhaust	Mineral dust
Ca/Al	0,772095	0	0,701372	1,562423	5,92494205
Ti/Al	0,01285	0,027007	0,01345	0,025196	0,063740795
Mn/Al	0,001487	0,008602	0,007337	0,006854	0,016400336
Fe/Al	0,087524	0,314653	0,199486	0,106526	0,754641121
Zn/Al	0,009137	0	0,12968	0	0
Pb/Al	0	0	0,081209	0,177424	0,020931711
Zn/Pb	#DIV/0!	#DIV/0!	1,596867	0	0
V/Ni	#DIV/0!	0,113841	0	0	1,689338959
Mn/Fe	0,016992	0,027338	0,036779	0,064337	0,02173263
Fe/Ca	0,113359	#DIV/0!	0,284423	0,06818	0,127366836
Na/Mg	15,13067	13,88726	0	0	0
Na/Sr	307,2181	403,0305	0	0	0
Sr/Mg	0,049251	0,034457	0,06276	0,111774	0,031722224
K/Fe	4,21393	0,352625	0,476826	0,276653	0,635710014
k/Al					0,479732918

Factor Contributions (avg = 1) from Base Run #1 (Convergent Run)

1 03/15/17 00:00 0,93715 1,4984 0,11435 -0 1 03/21/17 00:00 0,93544 1,1133 2,3837 -0,0850 1 03/24/17 00:00 0,81526 1,8623 1,1277 0,537 1 03/30/17 00:00 0,78304 0,37965 1,5466 0,0255 1 04/05/17 00:00 0,9103 0,95328 1,4495 0,2265 1 04/06/17 00:00 0,2112 2,0384 2,7012 0,06324 1 04/14/17 00:00 1,1165 0,34443 2,7017 0,06324 1 04/20/17 00:00 1,14618 1,5573 1,0976 0,6665 1 04/23/17 00:00 1,4618 1,553 0,86635 0,2233 1 04/26/17 00:00 1,1742 0,91238 0,96905 0,2525 1 05/06/17 00:00 1,3688 1,6652 0,7019 0,7662 1 05/12/17 00:00 1,4802 1,9837 0,4944 0,5184 1,9856 0,8287 <	Factor 1 Factor 2 Factor 3 Factor 4 Fac	ctor 5
1 03/18/17 00:00 0,52385 1,1434 2,858 -0,0850 1 03/24/17 00:00 0,81526 1,8623 1,1277 0,037 1 03/27/17 00:00 0,78304 0,37965 1,5466 0,2255 1 04/05/17 00:00 0,78104 0,37965 1,5466 0,2257 1 04/05/17 00:00 0,25196 0,75311 1,2367 0,02216 1 04/17/17 00:00 1,1615 0,34443 2,7012 0,04522 1 04/12/17 00:00 1,4618 1,3573 1,0976 0,6666 1 04/28/17 00:00 1,7474 0,9138 0,98905 0,2522 1 05/05/17 00:00 2,1851 0,7672 1,9837 0,4940 1 05/05/17 00:00 1,3608 1,6652 0,7719 0,2826 1 05/06/17 00:00 1,3608 1,6652 0,719 0,2826 1 05/14/17 00:00 1,3235 1,5556 0,86396 0,8785 1 0	0:00 0,93715 1,4984 0,11435 -0,2 0),47951
1 03/21/17 00:00 0,99544 1,1193 2,3837 -0,0852 1 03/22/17 00:00 0,78304 0,37965 1,5466 0,0253 1 03/30/17 00:00 0,98103 0,95328 1,4495 0,2266 1 04/05/17 00:00 0,27112 2,0384 0,38657 0,00216 1 04/10/17 00:00 0,25796 0,75311 1,2367 0,7052 1 04/12/17 00:00 1,1165 0,34443 2,7012 0,04522 1 04/22/17 00:00 1,4618 1,5571 1,4327 0,0223 1 04/23/17 00:00 1,4618 1,5531 1,0976 0,6665 1 05/05/17 00:00 2,1851 0,7672 1,9837 0,4940 1 05/14/17 00:00 1,3589 1,555 0,86635 0,2212 1 05/20/17 00:00 1,3359 1,5556 0,86396 0,37413 1 05/20/17 00:00 1,3259 1,556 0,86396 0,37213 1	0:00 0,52385 1,1434 2,858 -0,2 0),26622
1 03/24/17 00:00 0,81526 1,8623 1,1277 0,0252 1 03/30/17 00:00 1,1348 0,65938 0,83198 0 1 04/06/17 00:00 0,71112 2,0384 0,36657 0,00210 1 04/10/17 00:00 0,25796 0,75311 1,2367 0,0252 1 04/11/17 00:00 1,0213 1,1582 2,5707 0,06322 1 04/20/17 00:00 1,4618 1,3573 1,0976 0,6665 1 04/22/17 00:00 1,4618 1,3573 1,0976 0,6665 1 04/22/17 00:00 1,1742 0,91238 0,96905 0,2525 1 05/05/17 00:00 1,3608 1,6652 0,7019 0,2897 1 05/14/17 00:00 1,3589 1,556 0,86396 0,8785 1 05/20/17 00:00 1,3359 1,556 0,86396 0,8785 1 05/20/17 00:00 1,4202 1,965 0,74219 0,206418 1 05/2	0:00 0,99544 1,1193 2,3837 -0,08507 -0),02621
1 03/27/17 00:00 0,78304 0,37965 1,5466 0,0253 1 04/06/17 00:00 0,98103 0,55328 1,4495 0,2266 1 04/08/17 00:00 0,71112 2,0384 0,38657 0,02701 1 04/14/17 00:00 1,213 1,1582 2,5707 0,06322 1 04/12/17 00:00 1,4817 1,5917 1,4327 0,06262 1 04/22/17 00:00 1,4818 1,5517 1,4327 0,02626 1 04/22/17 00:00 1,4618 1,3573 1,9976 0,4665 1 04/26/17 00:00 1,1618 0,52581 2,3063 0,2235 1 05/08/17 00:00 1,3608 1,6652 0,7019 0,7662 1 05/17/17 00:00 1,3698 1,553 0,86635 0,3287 1 05/20/17 00:00 1,359 1,5556 0,8396 0,7782 1 05/20/17 00:00 1,6449 1,4638 1,1923 1,226 1 05/2	0:00 0,81526 1,8623 1,1277 0,53744	1,6621
1 03/30/17 00:00 1,1448 0,65938 0,83198 -0 1 04/05/17 00:00 0,91112 2,0384 0,38657 0,02216 1 04/14/17 00:00 0,25796 0,75311 1,2367 0,2705 1 04/14/17 00:00 1,165 0,34443 2,7012 0,04522 1 04/20/17 00:00 1,8487 1,5917 1,4327 0,02624 1 04/23/17 00:00 1,8487 1,5917 1,4327 0,02625 1 04/23/17 00:00 1,1742 0,91238 0,96905 0,2525 1 05/08/17 00:00 1,3608 1,6652 0,7019 0,7662 1 05/08/17 00:00 1,3699 1,563 0,8683 0,3217 1 05/20/17 00:00 1,3259 1,5556 0,8639 0,712 1 05/26/17 00:00 1,3259 1,556 0,8629 0,74219 0,2807 1 05/20/17 00:00 1,4809 2,1739 1,3083 1,716 1,325 <t< th=""><td>0:00 0,78304 0,37965 1,5466 0,02531</td><td>0,4353</td></t<>	0:00 0,78304 0,37965 1,5466 0,02531	0,4353
04/05/17 00:00 0,98103 0,95328 1,4495 0,2266 1 04/08/17 00:00 0,25796 0,75311 1,2367 0,00210 1 04/11/17 00:00 1,0213 1,1582 2,5707 0,06324 1 04/20/17 00:00 1,1467 0,5917 1,4327 0,2626 1 04/20/17 00:00 1,4618 1,3573 1,0976 0,6665 1 04/23/17 00:00 1,1472 0,91238 0,56050 0,5252 1 05/05/17 00:00 1,3608 1,6652 0,7019 0,7662 1 05/05/17 00:00 1,3659 1,563 0,86635 0,2215 1 05/11/17 00:00 1,3639 1,556 0,86396 0,8785 1 05/20/17 00:00 1,3235 1,144 0,8103 1,2220 1 05/20/17 00:00 1,2235 1,4463 1,1923 1,226 1 05/20/17 00:00 1,2835 1,1464 0,87679 1,175 1 05/20/17 00:00	0:00 1,1348 0,65938 0,83198 -0,2	5,3051
04/08/17 00:00 0,71112 2,0384 0,38657 0,0210 1 04/14/17 00:00 0,25796 0,75311 1,2367 0,2705 1 04/14/17 00:00 1,1165 0,34443 2,7012 0,04522 1 04/20/17 00:00 1,4818 1,5917 1,4327 0,02626 1 04/20/17 00:00 1,4818 1,5373 1,0976 0,6652 1 04/26/17 00:00 1,1742 0,91238 0,96905 0,2525 1 05/05/17 00:00 1,3608 1,6652 0,7419 0,2806 1 05/05/17 00:00 1,3589 1,563 0,86635 0,2216 1 05/11/17 00:00 1,3608 1,6652 0,7419 0,2806 1 05/20/17 00:00 1,3255 1,184 0,58105 1,775 1 05/20/17 00:00 1,2325 1,184 0,58105 1,775 1 05/20/17 00:00 1,6349 1,4638 1,1923 1,222 1 06/07/17 00:00	0:00 0,98103 0,95328 1,4495 0,22683 0),31756
1 $04/11/17 00:00$ 0.25796 0.75311 1.2367 0.2705 1 $04/14/17 00:00$ 1.1582 2.5707 0.06324 1 $04/70/17 00:00$ 1.165 0.34443 2.7012 0.04525 1 $04/20/17 00:00$ 1.8487 1.5917 1.4327 0.02626 1 $04/26/17 00:00$ 1.7742 0.91238 0.96905 0.2525 1 $05/05/17 00:00$ 2.1851 0.7672 1.9837 0.4944 1 $05/05/17 00:00$ 1.3689 1.563 0.86635 0.2212 1 $05/10/17 00:00$ 1.3359 1.563 0.86366 0.7872 1 $05/20/17 00:00$ 1.3359 1.565 0.86396 0.7872 1 $05/20/17 00:00$ 1.3235 1.184 0.5863 0.2217 1 $06/0/17 00:00$ 1.6824 0.6712 0.3727 0.3083 1.772 1 $06/0/17 00:00$ 1.6854 0.6	0:00 0,71112 2,0384 0,38657 0,002102 C),02629
04/14/17 00:00 1,0213 1,1582 2,5707 0,06324 1 04/20/17 00:00 1,847 1,5917 1,4327 0,02625 1 04/23/17 00:00 1,847 1,5917 1,4327 0,02625 1 04/23/17 00:00 1,1742 0,91238 0,96905 0,2525 1 04/29/17 00:00 1,1742 0,91238 0,96905 0,2525 1 05/05/17 00:00 1,3608 1,6652 0,7019 0,7662 1 05/11/17 00:00 1,3420 1,965 0,74219 0,2806 1 05/11/17 00:00 1,3359 1,556 0,8639 0,8788 1 05/20/17 00:00 1,4809 2,1739 1,3083 1,715 1 05/26/17 00:00 1,6849 1,4638 1,1923 1,222 1 06/07/17 00:00 0,6841 0,67129 1,335 0,8275 1 06/07/17 00:00 1,0545 2,046 1,2757 -0 1 06/28/17 00:00 1,	0:00 0,25796 0,75311 1,2367 0,27056	0,8706
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,0213 1,1582 2,5707 0,063247 0),67492
1 $04/20/17 \ 00:00$ $1,8487$ $1,5917$ $1,4327$ $0,02626$ 1 $04/26/17 \ 00:00$ $1,9763$ $0,52581$ $2,3063$ $0,2235$ 1 $04/26/17 \ 00:00$ $1,1742$ $0,91238$ $0,69055$ $0,2525$ 1 $05/05/17 \ 00:00$ $1,3608$ $1,6652$ $0,7019$ $0,7662$ 1 $05/14/17 \ 00:00$ $1,3608$ $1,653$ $0,86635$ $0,3215$ 1 $05/14/17 \ 00:00$ $1,3259$ $1,556$ $0,86635$ $0,3287$ 1 $05/20/17 \ 00:00$ $1,4202$ $1,965$ $0,74219$ $0,2897$ 1 $05/20/17 \ 00:00$ $1,4309$ $2,1739$ $1,3083$ $1,7175$ 1 $05/26/17 \ 00:00$ $1,6349$ $1,4638$ $1,1921$ $0,6712$ $1,372$ 1 $06/07/17 \ 00:00$ $1,6849$ $1,4638$ $1,1921$ $0,2825$ 1 $06/25/17 \ 00:00$ $1,7421$ $0,8566$ $0,71997$ $0,58866$ 1 $06/25/17 \ 00$	0:00 1,1165 0,34443 2,7012 0,045225 0	0,60349
1 $04/23/17$ 0000 $1,9763$ $0,5281$ $2,3063$ $0,2235$ 1 $04/29/17$ $00:00$ $1,1742$ $0,91238$ $0,96905$ $0,2235$ 1 $05/05/17$ $00:00$ $1,1742$ $0,91238$ $0,96905$ $0,2235$ 1 $05/05/17$ $00:00$ $1,3608$ $1,6652$ $0,7019$ $0,7662$ 1 $05/14/17$ $00:00$ $1,3589$ $1,565$ $0,74219$ $0,2806$ 1 $05/23/17$ $00:00$ $1,3359$ $1,5556$ $0,86396$ $0,8788$ 1 $05/23/17$ $00:00$ $1,3325$ $1,184$ $0,58105$ $1,172$ 1 $05/23/17$ $00:00$ $1,6849$ $1,4638$ $1,1923$ $1,2202$ 1 $06/0/17$ $00:00$ $1,6849$ $1,4638$ $1,1923$ $1,2202$ 1 $06/25/17$ $00:00$ $1,0655$ $2,046$ $1,2757$ 0 1 $07/07/17$ $00:00$ $1,6$	0:00 1,8487 1,5917 1,4327 0,026261 0	,27075
1 $04/26/17$ 0000 $1,7742$ $0,91238$ $0,96905$ $0,2525$ 1 $05/05/17$ 0000 $1,1742$ $0,91238$ $0,96905$ $0,2525$ 1 $05/05/17$ 0000 $1,3608$ $1,6652$ $0,7019$ $0,7662$ 1 $05/11/17$ 0000 $1,4808$ $1,6652$ $0,74219$ $0,2807$ 1 $05/17/17$ 0000 $1,4202$ $1,965$ $0,74219$ $0,2807$ 1 $05/17/17$ 0000 $1,4202$ $1,955$ $0,74219$ $0,2807$ 1 $05/20/17$ $00:00$ $1,4202$ $1,955$ $0,74219$ $0,2897$ 1 $05/20/17$ $00:00$ $1,4399$ $1,1333$ $1,222$ 1 $05/20/17$ $00:00$ $1,4638$ $1,1923$ $1,222$ 1 $06/07/17$ $00:00$ $1,0642$ $1,469$ $1,1391$ $0,2925$ 1 $06/19/17$ $00:00$ $1,0454$ $1,9666$ $0,7$	0:00 1,4618 1,3573 1,0976 0,66658 C),55577
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,9763 0,52581 2,3063 0,22356	2,1654
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,1742 0,91238 0,96905 0,25254 0),48131
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 2,1851 0,7672 1,9837 0,49408	1,3727
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.3608 1.6652 0.7019 0.76625 C	0.70186
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.3589 1.563 0.86635 0.32125	1.8989
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.4202 1.965 0.74219 0.28068	1.656
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 2.0926 0.73193 1.9089 0.28978 0).96572
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.3359 1.5556 0.86396 0.87856 0).60757
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.4809 2.1739 1.3083 1.7182 -0	0.06721
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.3235 1.184 0.58105 1.1752 0).64791
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.6949 1.4638 1.1923 1.2203	0.64
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1.1288 0.6624 0.67129 1.3721 0).53894
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 0.60801 0.26618 2.5335 0.082798	1.3506
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 0,7492 1,469 1,1391 0,29259	4,2639
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,0655 2,046 1,2757 -0,2	1,1016
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,054 1,9566 0,71997 0,58861 0),74941
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 0,56699 2,0862 0,17481 0,80526	1,3505
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,4164 0,87679 1,7157 -0,17947 C),49944
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 2,6392 1,0747 0,87465 1,0534	2,5299
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 2,2553 1,3368 1,2125 0,78214	4,273
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 2,3021 2,4626 0,40385 0,50698 0),45765
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,4236 1,6782 0,43323 1,2925 -0	0,00714
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 2,5532 1,3723 0,73031 1,2705	2,0465
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 3,3523 0,86483 0,48617 1,2684	2,4291
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 3,9549 0,51984 1,3022 0,95831	4,9371
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 3,0057 1,9693 0,48436 0,86339	1,3287
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 3,4636 1,031 0,86107 0,72388 0),65667
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 0,15934 1,1515 1,7025 -0,00011	1,9498
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 -0,15608 1,1172 1,6292 0,13028	1,679
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 0,1057 -0,03606 1,2073 1,5641	1,9938
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 -0,2 1,4111 1,253 0,85778	1,939
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 1,0341 0,49112 0,90837 1,1039	1,583
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0:00 0,31234 1,5803 1,2149 0,60974 0),25427
1 09/14/17 00:00 0,71059 1,2001 0,34979 1,059 1 09/17/17 00:00 1,0331 0,9081 1,6755 0,4825 1 09/20/17 00:00 0,68132 0,3603 0,98283 0,7002 1 09/23/17 00:00 0,55183 1,0662 0,55491 1,340 1 09/26/17 00:00 0,4856 1,6144 1,035 0,7474 1 09/29/17 00:00 0,5088 1,4314 1,0473 0,6602 1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029 1 10/08/17 00:00 0,72921 0,98718 0,98201 0,8658	0:00 0,42517 0,90328 0,24051 1,4741 0),66438
1 09/17/17 00:00 1,0331 0,9081 1,6755 0,4825 1 09/20/17 00:00 0,68132 0,3603 0,98283 0,7002 1 09/23/17 00:00 0,55183 1,0662 0,55491 1,340 1 09/26/17 00:00 0,4856 1,6144 1,035 0,7474 1 09/29/17 00:00 0,5088 1,4314 1,0473 0,6602 1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029 1 10/08/17 00:00 0,72921 0,98718 0,98201 0,8656	0:00 0,71059 1,2001 0,34979 1,0591	1,8876
1 09/20/17 00:00 0,68132 0,3603 0,98283 0,7002 1 09/23/17 00:00 0,55183 1,0662 0,55491 1,340 1 09/26/17 00:00 0,4856 1,6144 1,035 0,7474 1 09/29/17 00:00 0,5088 1,4314 1,0473 0,6602 1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029 1 10/08/17 00:00 0,72921 0,98718 0,98201 0,8658	0:00 1,0331 0,9081 1,6755 0,48258	2,2076
1 09/23/17 00:00 0,55183 1,0662 0,55491 1,340 1 09/26/17 00:00 0,4856 1,6144 1,035 0,7474 1 09/29/17 00:00 0,5088 1,4314 1,0473 0,6602 1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029 1 10/08/17 00:00 0,72921 0,98718 0,98201 0,8655	0:00 0,68132 0,3603 0,98283 0,70023 C	0,99901
1 09/26/17 00:00 0,4856 1,6144 1,035 0,7474 1 09/29/17 00:00 0,5088 1,4314 1,0473 0,6602 1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029 1 10/08/17 00:00 0,72921 0,98718 0,98201 0,8655	0:00 0,55183 1,0662 0,55491 1,3409	2,261
1 09/29/17 00:00 0,5088 1,4314 1,0473 0,6602 1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029 1 10/08/17 00:00 0,72921 0,98718 0,98201 0,8655	0:00 0,4856 1,6144 1,035 0,74748	1,7224
1 10/05/17 00:00 0,51793 1,6672 0,48331 0,8029	0:00 0,5088 1,4314 1,0473 0,66025 C),76331
	0:00 0,51793 1,6672 0,48331 0,80293 C),66176
	0:00 0,72921 0,98718 0,98201 0,86858 C),92607

1	10/11/17 00:00	0,68027	1,0374	0,74918	1,1656	1,0979
1	10/14/17 00:00	-0,03952	0,35242	1,4791	1,1052	0,47947
1	10/17/17 00:00	-0,02238	0,24553	2,1811	0,68237	1,2991
1	10/20/17 00:00	0,88274	0,63216	0,99228	2,9001	1,5746
1	10/23/17 00:00	0,07709	-0,2	2,0167	0,56208	1,274
1	11/04/17 00:00	0,040628	-0,16409	1,4919	1,6077	1,5423
1	11/10/17 00:00	0,085167	-0,19811	-0,19126	1,5404	0,73106
1	11/13/17 00:00	0,26406	0,95832	1,0364	1,0262	0,3236
1	11/19/17 00:00	-0,2	1,9166	0,078076	1,2953	0,49822
1	11/25/17 00:00	0,015858	0,63012	1,5035	0,96284	0,76455
1	11/28/17 00:00	0,061548	0,021175	1,6593	0,93622	1,0309
1	12/04/17 00:00	0,51746	0,46225	2,3128	0,82172	0,51477
1	12/07/17 00:00	0,058561	1,2975	1,184	1,0909	0,4635
1	12/10/17 00:00	1,3456	1,2405	1,0868	1,4208	0,31263
1	12/13/17 00:00	1,051	1,1949	0,7524	1,437	0,33626
1	12/16/17 00:00	1,1221	1,5223	1,0653	1,4926	-0,2
1	12/19/17 00:00	1,2599	0,71255	1,4694	1,6694	0,13583
1	12/22/17 00:00	1,0803	1,5763	1,8078	1,116	0,029742
1	12/25/17 00:00	0,33827	0,86636	0,73815	1,8251	0,86499
1	12/28/17 00:00	0,082406	1,6535	0,25041	1,659	0,31853
1	01/03/18 00:00	0,22467	1,022	0,37087	1,8067	0,35138
1	01/06/18 00:00	0,34943	0,88891	0,36664	1,8487	0,48096
1	01/09/18 00:00	0,28235	0,97626	0,23797	1,9026	0,28217
1	01/12/18 00:00	0,4782	-0,05929	0,49506	1,7751	0,41457
1	01/15/18 00:00	0,20102	1,1394	-0,2	1,6911	0,31277
1	01/18/18 00:00	0,32572	0,80309	-0,2	2,031	0,3836
1	01/21/18 00:00	0,39137	0,35355	0,60927	1,5367	0,7286
1	01/24/18 00:00	1,3682	0,64605	0,47797	2,1517	0,47974
1	01/27/18 00:00	1,4218	-0,15233	-0,17412	2,356	0,50585
1	01/30/18 00:00	1,329	-0,2	0,7369	2,2032	0,40507
1	02/05/18 00:00	0,77747	-0,14064	-0,04998	1,3658	0,26728
1	02/08/18 00:00	1,1813	0,080923	-0,05342	2,4706	0,41848
1	02/11/18 00:00	1,0073	1,0197	-0,05395	1,9838	0,13387
1	02/14/18 00:00	0,96775	-0,02375	1,1387	1,4658	1,0745
1	02/17/18 00:00	0,92064	0,95505	0,57306	1,634	0,054568
1	02/20/18 00:00	1,2785	1,1944	0,35167	1,5977	0,10355
1	02/23/18 00:00	1,3466	0,90795	1,078	1,6581	0,071953
1	02/26/18 00:00	1,2241	1,0547	0,44765	1,8229	0,5492
1	03/04/18 00:00	1,7405	0,89931	0,67116	1,6301	1,1145



**** Run Comparison Statistics **** Concentration of Species	Lowest Q (Robust)	Run = Run 1								
Factor 1	Lowest Q	Min 25th		50th	75th	Max	Mean	Std Dev	RSD % mean	RSD % Lowest Q
PM2.5 Na	5,7995 0,66525	5,7929 0.66444	5,795425 0.6648025	5,79785 0,66498	5,79965 0.66528	5,8017 0.66541	5,79761	0,002500295	0,000431263	0,000431122
Mg	0,043967	0,043919	0,043943	0,0439555	0,0439715	0,043984	0,04395495	1,75454E-05	0,000399167	0,000399057
K	0,094687	0,094572	0,09461975	0,094652	0,09469	0,094707	0,09465005	3,96624E-05	0,000419042	0,000418879
Ca Sr	0,19822 0,0021654	0,19801 0,0021626	0,1980925 0,002163925	0,198175 0,00216445	0,198215 0,0021654	0,19845	0,198176 0,002164545	0,000108308 9,32724E-07	0,000546522 0,00043091	0,000546401 0,00043074
Zr Ba	0,0041576	0,0041526	0,004154625	0,00415605	0,0041576 0.04213375	0,0041587	0,00415602	1,82197E-06 2,25675E-05	0,000438393	0,000438227
Pb	0	0	0	0	0 0507575	0,012101	0	0	0	0,000440004
Ti	0,25673	0,25642	0,25657	0,256635	0,2567575	0,25677	0,256538	1,30465E-06	0,000395372	0,000419824
V Cr	0,000089098 0.00024465	0,00008907 0.00024465	8,91278E-05 0.000246573	0,000089176 0.00024751	8,92163E-05 0.000248053	0,000089267	8,9173E-05 0.000247329	5,47141E-08 1,29209E-06	0,000613572 0.005224171	0,000614089
Mn Fo	0,0003818	0,00038171	0,000381883	0,00038213	0,000382235	0,00038256	0,000382104	2,34844E-07	0,000614607	0,000615096
Ni	0,02247	0	0,022472	0,022400	0,0224000	0	0	0	0	0,000317100
Zn	0,00025244 0,0023458	0,0002522 0,0023294	0,00025234	0,00252395	0,000252498	0,00025258	0,000252401	1,042E-07 4,50839E-06	0,000412836	0,000412771
Mo S	0,00023708 0.0011189	0,00023495 0.0010998	0,000236065 0.00110955	0,00023638 0.0011148	0,00023699 0.001117875	0,00023793	0,000236411	6,82626E-07 6,39122E-06	0,002887453 0.005736072	0,002879305
		Statistics Over All Buns								
Factor 2	Lowest Q	Min 25th	7 070005	50th	75th	Max	Mean	Std Dev	RSD % mean	RSD % Lowest Q
Na	0,10187	0,10166	0,1017125	0,10175	0,1018575	0,10195	0,101777	8,0138E-05	0,000787388	0,00078667
Mg P	0,0073355 0,0057627	0,0073241 0,0057577	0,00732625 0,005759625	0,00733005 0,00576255	0,0073338 0,0057663	0,0073433	0,007330545	4,97864E-06 3,64784E-06	0,000679163 0,000632982	0,000678704
K Ca	0,013319	0,013295	0,01329925	0,013305	0,01331475	0,013332	0,01330755	9,81661E-06 0	0,000737672	0,000737038
Sr Zr	0,00025276	0,00025235	0,00025242	0,00025258	0,000252693	0,00025301	0,000252583	1,80324E-07	0,000713921	0,000713421
Ba	0,002918	0,0029156	0,002915825	0,0029175	0,002918775	0,0029215	0,00291749	1,71154E-06	0,000586648	0,000586546
Pb Al	0 0,12004	0 0,11993	0 0,11994	0 0,120005	0 0,120055	0,12018	0,120009	0 7,10004E-05	0 0,000591625	0,000591473
Ti V	0,0032419 0.00013999	0,0032391 0,00013986	0,0032396	0,0032413	0,0032427	0,0032459	0,00324137	1,88459E-06 8.08442E-08	0,000581418	0,000581323
Cr Mp	0,0038112	0,0038079	0,003808475	0,00381085	0,00381255	0,0038155	0,00381067	2,21837E-06	0,000582147	0,000582066
Fe	0,0010326	0,0010318	0,001032	0,00103255	0,001033075	0,001034	0,001032585	6,01992E-07 2,19185E-05	0,000582995	0,000582987
Ni Cu	0,0012297 0,000417	0,0012287 0,00041647	0,001229 0,000416533	0,00122965 0,00041677	0,0012302 0,000417053	0,0012312	0,00122967 0,000416781	6,96684E-07 2,69891E-07	0,000566562 0,00064756	0,000566548 0,00064722
Zn Mo	0 0075406	0	0.00753705	0.00754085	0.007545125	0 007551	0.00754135	0 4,3997E-06	0.00058341	0.000583469
S	0,066587	0,066536	0,066553	0,066588	0,06662275	0,066677	0,0665914	3,87181E-05	0,000581429	0,000581467
Easter 0	Laurant O	Statistics Over All Runs		50th	754			Ohd Davi	DOD (/	DOD of Lawrent O
PM2.5	9,3096	9,2981	9,303475	9,3075	9,30945	9,3143	9,30668	0,004358851	0,000468357	0,00046821
Na Mg	0 0,0046574	0 0,0046483	0,004650925	0 0,00465175	0 0,004654775	0,0046593	0,004652795	0 2,95892E-06	0 0,000635946	0,000635317
P K	0,0087976 0.0094812	0,0087866 0.0094671	0,0087916	0,0087953 0.00947325	0,0087974 0.009479025	0,0088014	0,008794535	4,16063E-06 4,94192E-06	0,000473092 0.000521619	0,000472927 0.000521234
Ca	0,06991	0,069738	0,06976475	0,0697945	0,06983975	0,069949	0,06980935	5,78321E-05	0,00082843	0,000827237
Zr	0,002923	0,0028613	0,002863075	0,0028643	0,00292208	0,0029233	0,00286394	1,35972E-06	0,000474773	0,000474664
Ba Pb	0 0,0080946	0 0,0080826	0 0,008085975	0 0,00809005	0 0,008093975	0,008097	0,008089825	0 4,26625E-06	0 0,00052736	0,000527049
Al Ti	0,099676	0,099553	0,0996135	0,099658	0,099676	0,099724	0,09964625	4,76201E-05 7 81766E-07	0,000477891	0,000477749
V C	0	0	0	0,000133735	0,000134335	0 00013463	0 000133808	0	0,004416028	0.004436084
Mn	0,00073132	0,00073028	0,000133328	0,000731105	0,00073131	0,00073166	0,000731042	3,72591E-07	0,000509671	0,000509477
Fe Ni	0,019884 0,00094036	0,019853 0,0009393	0,01986775 0,00093996	0,019876 0,000940305	0,01988325 0,000940613	0,019893	0,01987495	1,0704E-05 4,80444E-07	0,000538569 0,000510966	0,000538324
Cu Zn	0,00034076	0,00034037	0,000340618	0,000340745	0,000340888	0,00034107	0,000340747	1,81696E-07 5,20526E-06	0,000533229	0,000533208
Mo	0,0092419	0,0092311	0,00923685	0,0092406	0,0092423	0,0092466	0,00923942	4,37993E-06	0,000474048	0,000473921
3	0,079397	0,079306	0,07935375	0,0793675	0,07940275	0,07944	0,0793774	3,77007E-05	0,000476036	0,00047592
Factor 4	Lowest Q	Min 25th		50th	75th	Max	Mean	Std Dev	RSD % mean	RSD % Lowest Q
PM2.5 Na	6,0815 0	6,0695 0	6,0719 0	6,07395 0	6,0762 0	6,0815	6,0741 0	0,003070402 0	0,000505491 0	0,000504876 (
Mg P	0,015968	0,015946	0,01595	0,015955	0,0159625	0,015968	0,01595595	6,58127E-06 2,31219E-06	0,000412465	0,000412154
ĸ	0,0047778	0,0047714	0,004775475	0,0047778	0,004780675	0,0047867	0,004778215	4,10305E-06	0,0008587	0,000858774
Sr	0,2533	0,0017821	0,25306	0,25313	0,25328	0,25331	0,253158	7,4302E-07	0,000427096	0,000426856
Zr Ba	0,0029617 0,057337	0,0029553 0,057248	0,0029568 0,05726525	0,00295795 0,057286	0,0029586 0,057307	0,0029617	0,002957825	1,55695E-06 2,45667E-05	0,000526382 0,000428844	0,000525693
Pb	0,028764	0,028718	0,0287265	0,0287375	0,0287475	0,028764	0,02873725	1,25315E-05	0,000436073	0,000435667
Ti V	0,0040848	0,0040778	0,0040792	0,0040805	0,0040821	0,0040848	0,00408059	1,83243E-06	0,000449059	0,000448597
Cr	0,000227	0,00022308	0,000224428	0,0002249	0,000225593	0,000227	0,000224973	9,49165E-07	0,004219027	0,004181344
Mn Fe	0,0011111 0,01727	0,0011091 0,017237	0,001109525 0,0172425	0,00110985 0,017249	0,0011103 0,017254	0,0011111	0,00110988 0,01724875	5,21738E-07 8,44097E-06	0,000470085 0,000489367	0,000469569 0,000488765
Ni Cu	0,00019712	0,00019608 0	0,000196348 0	0,000196495	0,000196703	0,00019712	0,000196515	2,53927E-07	0,001292151 n	0,001288185
Zn	0 012087	0	0	0 012072	0.01207575	0 012097	0 01207225	0 6 107675 06	0	0.000507701
S	0,077006	0,076838	0,07687575	0,0769085	0,076925	0,077006	0,07690555	4,13082E-05	0,000537129	0,000536428
_		Statistics Over All Runs								
Factor 5 PM2.5	Lowest Q 9,974	Min 25th 9,9693	9,971925	50th 9,9759	75th 9,97955	Max 9,9869	Mean 9,97638	Std Dev 0.004832195	RSD % mean 0.000484364	RSD % Lowest Q 0,000484479
Na Mg	0 033060	0 032053	0.03206275	0 0320775	0 03208025	0 032100	0 0320776	0 1 52433E-05	0 0004752	0 000475339
P	0,0082171	0,0082128	0,008215475	0,00821855	0,0082217	0,0082284	0,00821915	4,10257E-06	0,000499147	0,000499272
Ca	0,046773	0,046/52	0,046/655	0,0467865	0,04680275 0,578045	0,046833	0,04678695	2,2343E-05 0,000280325	0,000477547	0,000477689
Sr Zr	0,0010173 0,00058641	0,0010167 0,00058602	0,00101705 0,000586275	0,00101755 0,00058641	0,0010179 0,000586605	0,0010185 0,00058714	0,00101753 0,000586459	4,8569E-07 2,82822E-07	0,000477322 0,000482254	0,00047743 0,000482294
Ba Pb	0	0	0 005030035	0 00204055	0 002041025	0 0020425	0 00204015	1 302025 00	0 0006363	0 000637006
Al	0,097498	0,097449	0,097473	0,097511	0,09754925	0,097618	0,09751575	4,51184E-05	0,000462678	0,000462762
V	0,0062146 0,00030028	0,0002118 0,00030014	0,006213275	0,0062158 0,000300325	0,0062181 0,000300438	0,0062225	0,00621607	2,93421E-06 1,39752E-07	0,000472036 0,000465318	0,000472148 0,000465404
Cr Mn	0,00059013 0,001599	0,00058851 0,0015983	0,000589285 0,00159865	0,000589755 0,00159935	0,000590323 0,0015999	0,00059071	0,000589782 0,00159939	5,90741E-07 7,46853E-07	0,001001626 0,000466961	0,001001035 0,000467075
Fe Ni	0,073576	0,073547	0,073562	0,0735915	0,07361975	0,07367	0,07359515	3,43623E-05	0,000466909	0,000467031
Cu	0,00032744	0,00032723	0,000327323	0,00032742	0,000327538	0,00032781	0,000327445	1,50035E-07	0,000458199	0,000458206
Mo	0 0	0	0	0	0	0	0	0	0	
S	0,0033523	0,0033416	0,00334705	0,00335005	0,0033535	0,0033565	0,00334993	4,04801E-06	0,001208388	0,001207533
Percent of Species Sum		Statistics Over All Runs								
Factor 1 PM2.5	Lowest Q 15.08420574	Min 25th	15.07695308	50th 15.08462621	75th 15.08749425	Max 15,09605302	Mean 15 0833215	Std Dev 0.006608789	RSD % mean 0.000438152	RSD % Lowest Q 0.000438126
Na	86,72046094	86,71072527	86,7199338	86,72659325	86,7331331	86,73884686	86,72650223	0,008741036	0,000100789	0,000100796

Lowest Q	Min		25th		50th		75th		мах		Mean		Sta	Dev	RSD	% mean	RSD	% Lowest Q
15,08420574		15,06974397		15,07695308		15,08462621		15,08749425		15,09605302		15,0833215		0,006608789		0,000438152		0,000438126
86,72046094		86,71072527		86,7199338		86,72659325		86,7331331		86,73884686	8	6,72650223		0,008741036		0,000100789		0,000100796

Mg	42,27722172	42,25060799	42,26379489	42,27753367	42,28434812	42,29617128	42,27582169	0,013149532	0,000311041	0,000311031
K	0 56.01521551	0 55.97731833	0 55.99419137	0 56.010151	0 56.01681786	0 56.02721491	0 56.00694979	0.014110224	0.000251937	0.0002519
Ca	18,03475571	18,01602617	18,02546217	18,03467786	18,03770012	18,0573577	18,03277357	0,009877715	0,000547765	0,000547704
Sr	39,2812051	39,25999332	39,27238182	39,28513743	39,29296539	39,30239563	39,28384869	0,012824337	0,000326453	0,000326475
Zr	30,8237281	30,80251808	30,81941301	30,82682359	30,83673723	30,84385359	30,82704376	0,011441461	0,00037115	0,00037119
Ba Pb	42,36155091	42,33114022	42,35859568	42,36829376	42,37638077	42,39658694	42,36715748	0,015897595	0,000375234	0,000375284
AI	34,87876054	34,85677393	34,87201328	34,88117707	34,89048248	34,89962077	34,88118908	0,011954312	0,000342715	0,000342739
Tì	18,14541634	18,13920994	18,14591334	18,15373378	18,1582371	18,16791542	18,15306249	0,008045591	0,000443208	0,000443395
V Q-	16,83101359	16,8288755	16,83337714	16,84274862	16,84785109	16,85948883	16,84199267	0,009230131	0,000548043	0,0005484
Gr Mn	4,886930432	4,886930432	4,923069134 7 865649341	4,940709741 7.870591633	4,954001663	4,993198719	4,940098124 7 870318807	0,025787007	0,005219938	0,005276729
Fe	13,14257974	13,14044464	13,14465558	13,14994255	13,1543323	13,16374399	13,14996828	0,006594493	0,000501484	0,000501766
Ni	0	0	0	0	0	0	0	0	0	C
Cu	18,8720433	18,85872775	18,86890814	18,87402484	18,87854975	18,88518264	18,8728583	0,007349176	0,000389405	0,000389421
Zn	15,36033735	15,27335195	15,29475013	15,31276534	15,32342631	15,36033735	15,3115227	0,022562594	0,00147357	0,001468887
S	0.49190807	0.483931648	0.488190283	0.490489283	0.491637734	0.495632759	0.490112361	0.002729667	0.005569471	0.00554914
0	0,10100001	0,100001010	0,100100200	0,100100200	0,101007701	0,100002700	0,100112001	0,002720007	0,000000111	0,00001011
	S	tatistics Over All Ru	ns						505 a/	505 er 1
Factor 2	Lowest Q M	in 2	5th 5th 5th	18 04420656	/5th	Max 18.06536038	Mean	Std Dev	RSD % mean	RSD % Lowest Q
PM2.5 Na	13 27953906	13 26115314	13 2668669	13,94429656	13 2800662	13 28927473	18,94635932	0,008565614	0,000452098	0,000452191
Mg	7,053575635	7,045784468	7,046748763	7,050074847	7,053285293	7,060281554	7,050509744	0,004053731	0.000574956	0,000574706
P	21,26222189	21,24936808	21,26228748	21,2672723	21,2747196	21,28902792	21,26811705	0,009777014	0,000459703	0,00045983
K	7,879293413	7,868563329	7,870004824	7,87387591	7,878545995	7,88566379	7,874430713	0,004752288	0,000603509	0,000603136
Ca	4 595165512	4 59000017	4 591090706	4 594412067	4 59594066	4 500441725	4 594070000	0 003950009	0 000631036	0 000621787
Si Zr	21.63354786	21.62043515	21.63372066	21.63876431	21.65094154	21.65928751	21.64031694	0.01073444	0.000496039	0.000496194
Ba	0	0	0	0	0	0	0	0	0	0
Pb	0	0	0	0	0	0	0	0	0	C
Al	16,30836449	16,29781215	16,30628739	16,30920196	16,3185526	16,32725148	16,31113294	0,008122442	0,000497969	0,000498054
	17,83135048	17,8200121	17,82605646	17,83105423	17,83695097	17,84903191	17,83162214	0,007649025	0,000428958	0,000428965
v Gr	76 12944723	76 09244948	76 10658971	76 11350836	26,44226909	26,43696402	26,43369452	0.009878384	0,000411982	0,000411813
Mn	21,26520341	21,25551727	21,2632969	21,26632015	21,27443739	21,28833547	21,268483	0,008643225	0.000406387	0,000406449
Fe	22,0920507	22,07665358	22,08422799	22,08762298	22,09395143	22,11023548	22,09008502	0,008828251	0,000399648	0,000399612
Ni	48,31960015	48,30069136	48,32139761	48,33237687	48,34443104	48,35498023	48,33151442	0,015037592	0,000311134	0,000311211
Cu	31,17430699	31,13939004	31,15281338	31,16353649	31,17473593	31,18770795	31,16415369	0,013636375	0,000437566	0,000437424
Zn Mo	25 9068568	25 90190449	25 9147834	25 92616269	25 933805	25 94621564	25 9247082	0.013090945	0 00050496	0 000505308
S	29,27400365	29,26740025	29,28192708	29,29290049	29,30317612	29,31448587	29,2917396	0,013628287	0.00046526	0.000465542
	.,	.,	.,	.,					.,	.,
	S	tatistics Over All Ru	ns							
Factor 3 PM2 5	24 21 379804	IN 24 19370367	5tn : 24 20807009	24 21 335965	24 21861557	Max 24 22866923	24 21267393	510 Dev 0.008875068	RSD % mean 0.000366546	RSD % Lowest Q 0.000366529
Na	24,21373004	24,13370307	24,20007009	24,2100000	24,21001337	24,22000923	24,21207333	0,000073000	0,000300340	0,000300323
Mg	4,478402722	4,469927541	4,473067054	4,474589514	4,477371142	4,481177669	4,475053072	0.002706839	0.000604873	0,000604421
P	32,45987529	32,43688234	32,44939838	32,45518241	32,46241947	32,47927295	32,45621314	0,012046782	0,00037117	0,000371128
K	5,608916338	5,600478937	5,604075812	5,606140114	5,608508149	5,610767638	5,606139071	0,002734095	0,000487697	0,000487455
Ca	6,360658721	6,345119943	6,348892607	6,351451356	6,355990983	6,366587815	6,352213404	0,005530929	0,000870709	0,000869553
Sr 7r	21 23764949	21 22423003	5,298293584 21 23772058	21 24273762	21 24893124	21 25658613	5,300341814 21 24311294	0,002601277	0,000490775	0,000490582
Ba	21,20701010	0	0	0	0	0	0	0,007012000	0,000000171	0,000000200
Pb	20,80906132	20,79875532	20,80650376	20,81556581	20,82071314	20,8297961	20,81400273	0,009414743	0,000452327	0,000452435
Al	13,54175724	13,53006492	13,54047815	13,54226551	13,54793351	13,5523907	13,54351135	0,005360572	0,000395804	0,000395855
Ti	7,37367237	7,361564951	7,368761309	7,370175481	7,373633738	7,377631036	7,370699848	0,00409756	0,000555925	0,000555701
V Cr	2 661294672	2 653447063	2 663998776	2 671372974	2 683579709	2 689429887	2 672641335	0.011327296	0 00423824	0.00425631
Mn	15.06069006	15.04354776	15.05444056	15.05693354	15.06182282	15.0699524	15.05749615	0.006964083	0.000462499	0.000462401
Fe	11,63004252	11,61252208	11,62203812	11,62449784	11,63009396	11,63605522	11,62494698	0,006276775	0,00053994	0,000539704
Ni	36,95032869	36,92999206	36,94596378	36,95310347	36,96954488	36,98781969	36,95659014	0,01541569	0,00041713	0,0004172
Cu Z-	25,47471667	25,45355289	25,47325662	25,47766159	25,48529214	25,50113274	25,47879349	0,011456117	0,000449633	0,000449705
Zn Mo	31 75192688	31 74064272	31 75281538	31 76173422	31 7722606	31 77970252	31 76212026	0,022562594	0,000266419	0,000266572
S	34.90573337	34.89179419	34.90638309	34,91808925	34.92508265	34.93617244	34.91595229	0.011981573	0.000343155	0.000343255
Easter 4	Lowest O M	tatistics Over All Ru	ns 5th f	Oth 7	75th	Mov	Moon	Std Dov	PSD % moon	PSD % Lowest O
PM2.5	15.81767345	15.78888496	15.79616078	15.80320727	15.80760766	15.81767345	15.80265001	0.007568792	0.000478957	0.000478502
Na	0	0	0	0	0	0	0	0	0,000110001	0,000170002
Mg	15,35430383	15,3345153	15,34123068	15,34586888	15,35245715	15,35825506	15,34641551	0,006856205	0,000446763	0,000446533
P	15,95985684	15,92809997	15,93799645	15,94268142	15,94855162	15,95985684	15,94291447	0,007927091	0,000497217	0,000496689
K Ca	2,826465055	2,822896021	2,825359902	2,827672331	2,829141683	2,832613251	2,827397205	0,002732274	0,000966357	0,000966675
Sr	32.37697186	32,3430714	32,35660143	32,36304978	32,37409572	32,38663588	32,36480862	0.011280659	0.000348547	0.000348416
Zr	21,95753211	21,9178326	21,93207138	21,93997269	21,94413132	21,95753211	21,93949957	0,009406354	0.000428741	0,000428388
Ba	57,63844909	57,60341306	57,62361923	57,63170624	57,64140432	57,66885978	57,63284252	0,015897595	0,000275843	0,000275816
Pb	73,94458526	73,91473277	73,93146732	73,93736736	73,94430689	73,95301591	73,93697292	0,010074509	0,000136258	0,000136244
Al Ti	22,02525867	21,99138/1/	22,00328779	22,01003898	22,0155566	22,02589283	22,01022359	0,008853256	0,000402234	0,000401959
V	22,40733401	22,43230404	22,43323712	22,440/13/8	22,45502051	22,40733401	22,44033131	0,003321035	0,000441978	0,000441001
Cr	4,534368315	4,455887552	4,482181864	4.491870758						0,004169684
Mn	22,88182017	22,84269186	22 85127173		4,50488162	4,534368315	4,493553928	0,018906884	0,004207557	
Fe	10 10110000		22,00127170	22,86186366	4,50488162 22,86878627	4,534368315 22,88182017	4,493553928 22,86055464	0,018906884 0,010616862	0,004207557 0,000464418	0,000463987
INI	10,10112826	7 700 400000	10,08393529	22,86186366 10,08869705	4,50488162 22,86878627 10,09351013	4,534368315 22,88182017 10,10112826	4,493553928 22,86055464 10,08887121	0,018906884 0,010616862 0,005627138	0,004207557 0,000464418 0,000557757	0,000463987 0,00055708
Cu	7,745596146	7,709426039	10,08393529 7,719680368	22,86186366 10,08869705 7,722653267	4,50488162 22,86878627 10,09351013 7,729874107	4,534368315 22,88182017 10,10112826 7,745596146	4,493553928 22,86055464 10,08887121 7,723915443	0,018906884 0,010616862 0,005627138 0,00895806	0,004207557 0,000464418 0,000557757 0,001159782	0,000463987 0,00055708 0,001156536
Cu Zn	10,10112826 7,745596146 0 0	7,709426039 0	10,08393529 7,719680368 0	22,86186366 10,08869705 7,722653267 0 0	4,50488162 22,86878627 10,09351013 7,729874107 0	4,534368315 22,88182017 10,10112826 7,745596146 0	4,493553928 22,86055464 10,08887121 7,723915443 0 0	0,018906884 0,010616862 0,005627138 0,00895806 0	0,004207557 0,000464418 0,000557757 0,001159782 0	0,000463987 0,00055708 0,001156536 0
Cu Zn Mo	10,10112826 7,745596146 0 0 41,52669259	7,709426039 0 0 41,46882773	10,08393529 7,719680368 0 41,48926991	22,86186366 10,08869705 7,722653267 0 0 41,50024501	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259	4,493553928 22,86055464 10,08887121 7,723915443 0 0 41,5004676	0,018906884 0,010616862 0,005627138 0,00895806 0 0 0,014630965	0,004207557 0,000464418 0,000557757 0,001159782 0 0 0,000352549	0,000463987 0,00055708 0,001156536 0 0 0,000352327
Cu Zn Mo S	10,10112826 7,745596146 0 0 41,52669259 33,85456509	7,709426039 0 41,46882773 33,80046781	10,08393529 7,719680368 0 41,48926991 33,81676035	22,86186366 10,08869705 7,722653267 0 41,50024501 33,8283797	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152 33,83968103	4,534368315 22,88182017 10,10112826 7,745596146 0 41,52669259 33,85456509	4,493553928 22,86055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274	0,018906884 0,010616862 0,005627138 0,00895806 0 0 0,014630965 0,013886697	0,004207557 0,000464418 0,000557757 0,001159782 0 0 0,000352549 0,000410501	0,000463987 0,00055708 0,001156536 0 0 0,000352327 0,000410187
Cu Zn Mo S	10,10112826 7,745596146 0 41,52669259 33,85456509	10,0/329175 7,709426039 0 41,46882773 33,80046781	10,08393529 7,719680368 0 41,48926991 33,81676035	22,86186366 10,08869705 7,722653267 0 41,50024501 33,8283797	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152 33,83968103	4,534368315 22,88182017 10,10112826 7,745596146 0 41,52669259 33,85456509	4,493553928 22,86055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274	0,018906884 0,010616862 0,005627138 0,00895806 0 0 0,014630965 0,013886697	0,004207557 0,000464418 0,000557757 0,001159782 0 0,000352549 0,000352549 0,000410501	0,000463987 0,00055708 0,001156536 0 0,000352327 0,000410187
Cu Zn Mo S Factor 5	10,10112826 7,745596146 0 41,52669259 33,85456509 S Lowest Q M	10,07329175 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 2	10,08393529 7,719680368 0 41,48926991 33,81676035 ns 5th	22,86186366 10,08869705 7,722653267 0 41,50024501 33,8283797	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152 33,83968103 75th	4,534368315 22,88182017 10,10112826 7,745596146 0 41,52669259 33,85456509 Max	4,493553928 22,86055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean	0,018906884 0,010616862 0,005627138 0,00895806 0 0,014630965 0,013886697 Std Dev	0,004207557 0,000464418 0,000557757 0,001159782 0 0 0,000352549 0,000410501 RSD % mean	0,000463987 0,00055708 0,001156536 0 0,000352327 0,000410187 RSD % Lowest Q
Cu Zn Mo S Factor 5 PM2.5	10,10112626 7,745596146 0 41,52669259 33,85456509 S Lowest Q M 25,94186878	10,07329175 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878	10,08393529 7,719680368 0 41,48926991 33,81676035 5th { 25,9462972	22,86186366 10,08869705 7,722653267 0 41,50024501 33,8283797 50th 7 25,95331705	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152 33,83968103 75th 25,96256061	4,534568315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419	4,493553928 22,86055464 10,08887121 7,723915443 0 41,5004676 33,82865274 Mean 25,95499523	0,018906884 0,010616862 0,005627138 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115	0,004207557 0,000464418 0,000557757 0,001159782 0 0,000352549 0,000410501 RSD % mean 0,000375578	0,000463987 0,00055706 0,001156536 0 0 0,000352327 0,000410187 RSD % Lowest Q 0,000375768
Cu Zn Mo S Factor 5 FACtor 5 Na.5 Na	10,10112226 7,745596146 0 0 41,52669259 33,85456509 S Lowest Q 25,94186878	10,0/329/75 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 2 25,94186878	10,08393529 7,719680368 0 41,48926991 33,81676035 5th 25,9462972 0	22,86186366 10,08869705 7,722653267 0 41,50024501 33,8283797 50th 7 25,95331705	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152 33,83968103 75th 25,96256061	4,534368315 22,88182017 10,10112826 7,745596146 0 41,52669259 33,85456509 Max 25,97315419	4,493553928 22,86055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0	0,018906884 0,010616862 0,005627138 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115	0,004207557 0,000464418 0,000557757 0,001159782 0 0,000352549 0,000410501 RSD % mean 0,000375578	0,000463987 0,00055706 0,001156536 0 0 0,000352327 0,000410187 RSD % Lowest Q 0,000375768
Cu Zn Mo S Factor 5 PM2:5 Na Mg	10,10112225 7,745596146 0 0 41,52669259 33,85456509 S Lowest Q 25,94186878 0 30,83649609 20,94047672	10(0/329175 7,709426039 0 0 41,46882773 33,80046781 tatistics Over All Ru in 2 25,94186878 0 30,83340306	10,08393529 7,719680368 0 41,48926991 33,81676035 5th 25,9462972 0 30,84239278	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 50th 25,95331705 0 30,84923323 0 00,84923323	4,50488162 22,86876627 10,09351013 7,729874107 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125	4,53436832 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 30,87962535 20,087262547	4,493553928 22,86055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 30,85219998	0,018906884 0,010616862 0,005627138 0,00895806 0,014630965 0,01388697 Std Dev 0,009748115 0 0,013028066	0,004207557 0,000464418 0,000557757 0,001159782 0 0 0,000352549 0,000410501 RSD % mean 0,000375578 0 0,000422273	0,000463987 0,00055708 0,001156536 0 0 0,000352327 0,000410187 RSD % Lowest Q 0,000375768 0,000422488
Cu Zn Mo S Factor 5 PM2.5 PM2.5 Na Mg P K	10,10112226 7,745596146 0 0 41,52669259 33,85456509 Lowest Q S 25,94186878 0 30,83649609 30,31804597 27,67010968	10,01929175 7,709426039 0 0 41,46882773 33,80046781 tatistics Over All Ru in 2 25,94186878 0 30,83340306 30,31804597 27 66546666	10,08393529 7,719680388 0 0 41,48926991 33,81676035 5th 25,9462972 0 30,84239278 30,3249354 27 67467922	22,86186366 10,0889705 7,722653267 0 0 41,50024501 33,8283797 50th 7 25,95331705 0 30,84923323 30,32982057 27,86183988	4,50488162 22,8687627 10,09351013 7,729874107 0 41,51314152 33,89968103 75th 25,96256061 0 30,85988125 30,3434693 27,66613062	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 30,87962535 30,3532017 27,71224112	4,493553928 22,80655464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 30,85219998 30,33275534 27,6860823	0,018906884 0,010616862 0,005627138 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,013028066 0,0130285889 0,013313079	0,004207557 0,000464418 0,000557757 0,001159782 0 0,000352549 0,000410501 RSD % mean 0,000375578 0,000342273 0,000342718	0,000463987 0,00055708 0,001156536 0,001156536 0,000352327 0,000410187 RSD % Lowest Q 0,000375768 0,000422488 0,000422488 0,000342885
Cu Zn Mo S Factor 5 PM2-5 Na Mg P K Ca	10,10112225 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692	10,0/32/31/3 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 30,83340306 30,31804597 27,66454666	L1,08293529 7,719680368 0 0 14,48226091 33,81676035 ns 5th 2 25,9462972 30,84239278 30,34239278 30,34239278 30,34239278	22,86186366 10,08869705 7,722653267 0 41,50024501 33,8283797 25,95331705 0 30,8492323 30,32982057 27,86183968 52,57696411	4,50488162 22,86878627 10,09351013 7,729874107 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988152 30,3424693 27,69613062 52,5871498	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0,30,87962535 30,3532017 27,71224112 52,6132882	4,49355328 22,86055464 10,08887121 7,723915443 0 0 4,15004676 33,82865274 Mean 25,95499523 30,85219998 30,33275534 27,68508323 52,57922189	0,018906884 0,010616862 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,013028066 0,013028066 0,013035589 0,013635589	0.004207557 0.000464418 0.000557757 0.001159782 0 0 0 0.000352549 0.000410501 RSD % mean 0.000375578 0.000422278 0 0.000422718 0.000422718	0.000463987 0.00055708 0.001156536 0.001156536 0.000352327 0.000410187 RSD % Lowest Q 0.000375768 0.000422485 0.00048336 0.000482485 0.000482885
Cu Zn Mo S Factor 5 PM2-5 Na Mg P K Ca Sr	10,10112225 7,745596146 0 0 41,52669259 33,85456509 S Lowest Q 30,83649609 30,31804597 27,67010968 52,55845692 18,84522091	10,07929173 7,709426039 0 41,46882773 33,80046781 ktatistics Over All Ru in 2 25,94186878 0 30,83340306 30,31804597 27,66454666 52,55845692 18,45422091	10,08393529 7,719680368 0 41,48926991 33,81676035 ns 5th 25,9462972 0 30,84239278 30,3249354 27,67467922 52,5691048 18,46024377	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 500h 7 25,95331705 0 30,3283797 30,3282057 27,68183968 52,57596411 18,4654001	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,85988125 30,3434693 27,69613062 52,5871498 18,472225105	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 30,87962535 30,0352017 27,71224112 52,6132382 18,48661073	4,49355328 22,80055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0 30,85219998 30,32775534 7,85508323 52,57922189 18,46682794	0,018906884 0,010616862 0,0095806 0,0095806 0,014630965 0,013886697 Std Dev 0,009748115 0 0,013028066 0,013028066 0,013028066 0,013313079 0,013453397	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0.000325249 0.000410501 RSD % mean 0.00037578 0.000422273 0.000422273 0.000422273 0.000422273 0.00042215 0.00042215 0.0004281 0.0004281 0.0004281 0.0004281 0.000552952	0,000463987 0,0005708 0,0015658 0,0015658 0,000352827 0,000352827 0,000410187 RSD % Lowest Q 0,000375768 0,00042886 0,00042886 0,00048364 0,000488364 0,000488364 0,000278812 0,0006288
Cu Zn Mo S Factor 5 PM2.5 PM2.5 Na Mg P K Ca Sr Zr	10,10112225 7,745596146 0 0 41,52669259 33,85456509 SLowest Q 30,83649609 30,31804597 27,67010968 52,55845692 18,85422091 4,347542427	10,07329175 7,70942603 0 414,6882773 33,80046781 katistics Over All Ru 25,94186878 0 0,83340306 30,83340306 30,83340306 52,56345692 18,4542699 18,4542691 18,4542695	10,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 25,9462972 0,30,84239278 30,3249354 27,67467922 52,5691048 18,44024377 4,347555309	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 50th 7 25,95331705 0 30,84923323 30,32982057 27,68183968 52,57596411 18,46540023 18,46540023	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 0,085988125 30,85988125 30,85988125 30,8434633 27,69613062 52,5871498 18,47225105	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 0,0,87962535 30,0352017 27,71224112 52,6132382 18,48661073 4,35443902	4,49355328 22,86055464 10,08887121 7,723915443 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0,8521999 30,32275534 27,6850823 52,57922189 18,46692794 4,350026789	0,018906884 0,010616862 0,008627138 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,013028066 0,013028066 0,013363079 0,014653951 0,00287976	0.004207557 0.000464418 0.000557757 0.001159782 0 0 0.000352549 0.000410501 RSD % mean 0.000375578 0.00042273 0.000422273 0.000422273 0.000342718 0.00042252 0.00052952 0.000521522	0,000463987 0,00055708 0,001156536 0,001156536 0,000352327 0,000410187 850 % Lowest Q 0,000410187 0,000422489 0,000422489 0,00042848 0,000488364 0,000278412 0,000278412 0,00051657
Cu Zn Mo S Factor 5 PM2.5 Na Mg P K Ca Sr Zr Zr Ba Bh	10,10112226 7,745596146 0 0 41,52669259 33,85456500 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,347542427	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,83340306 30,31804597 27,66454666 25,55845692 18,45422091 4,346981563 4,346981563	10,08393529 7,719680368 0 0 14,48256991 33,81676035 5th 25,9462972 30,8429072 30,8429278 30,3249354 27,67467922 52,5691048 18,46024377 4,347555309	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 25,95331705 0 30,84923323 0,32982057 27,68183968 25,57696411 18,46540023 4,350309718	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 25,96256061 0 0,0,85988125 30,3434633 27,69613062 52,5571498 18,47225105 52,5571498	4,534368315 22,88182017 10,10112826 7,745596146 0 0 4,1,52669259 33,85456509 Max 25,97315419 0 30,87962535 30,3532017 27,71224112 52,6132382 18,48661073 4,35443902 0,574543902	4,49355328 22,86055464 10,08887121 7,723915443 0 0 41,500467 33,82865274 Mean 25,95499523 30,3227534 20,3521998 30,33275534 25,57922189 18,46692794 4,350026789 0 5,257922189	0,018906884 0,010616862 0,008627138 0,00895806 0 0,014630965 0,013886697 0,009748115 0,009748115 0,01395689 0,013513079 0,014653951 0,00928796 0,00228796	0.004207557 0.000464418 0.000557757 0.001159782 0 0 0 0.000352549 0.000410501 RSD % mean 0.000355787 0.00042273 0.00042273 0.00042273 0.00042273 0.00052952 0.00052952 0.000551292 0.0005551292	0,000463987 0,00055708 0,001156536 0,001156536 0,000355327 0,000410187 0,000410187 0,00042248 0,000375768 0,00042248 0,00042848 0,00042848 0,00042848 0,000551607 0,000551607
Cu Zn Mo S Factor 5 PM2-5 Na Mg P Na K Ca Sr Zr Zr Zr Ba Al	10,10112225 7,745596146 0 0 41,5269259 33,85456509 30,38549609 30,3864597 30,3864597 27,67010968 52,55445692 18,45422091 4,347542427 0 5,24635314 13,2455906	10,01929173 7,709426039 0 41,46882773 33,80046781 hatistics Over All Ru in 2 25,94188878 0 30,31804597 27,66454666 52,55845692 27,66454666 52,55845692 18,45422091 4,346981553 0 5,243335854 13,24574864	L1.082393529 7,719680368 0 0 0 14,48226991 33,81676035 5th 5 25,9462972 30,84239278 30,84239278 30,3423954 27,67467922 52,5691048 18,46024377 4,34755309 0 5,247087332 13,249553	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 50,95331705 0 30,8283797 50,95331705 0 30,32882057 27,68183968 52,57696411 18,46540023 4,350309718 18,46540023 0 5,248600365 13,25183859	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,04368125 30,043613062 52,5871498 18,472225105 4,351807049 0 5,251008794 13,2581079	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 30,87962535 30,0352017 27,71224112 52,6132382 18,48661073 4,35443902 5,25554695 13,26574590	4,49355328 22,80055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0,085219998 0,03527534 2,7,68508323 52,57922189 18,46692794 4,355026789 0 5,249024351 112,2534304	0.018906884 0.010616862 0.005627138 0.00895806 0.013886697 0.013886697 0.013828666 0.013328066 0.013328066 0.013328066 0.013353079 0.013513079 0.013513079 0.013513079 0.013513079 0.013513079 0.013513079 0.003287376 0.003287376 0.003319231	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0.000322549 0.000410501 RSD % mean 0.000325549 0.000422273 0.000422273 0.000422273 0.000422273 0.00042273 0.000422529 0.000422529 0.00052952 0.00052952 0.00052952 0.00052952	0,000463987 0,00055708 0,00115638 0,001555387 0,000355327 0,000410187 0,000410187 0,000422488 0,00042886 0,00048286 0,00048286 0,00048286 0,00048286 0,00048286 0,00048286 0,000551607 0,00055129 0,00
Cu Zn Mo S Factor 5 PM2-5 Na Mg P K Ca Ca Sr Zr Zr Zr Zr Zr Zr Zr Zr Zn Zn Zn Zn Sn Zn Sn Sn Sn Sn Sn Sn Sn Sn Sn Sn Sn Sn Sn	10,10112225 7,745596146 0 0 41,52669259 33,85456509 SLowest Q 30,83649609 30,31804597 27,67010968 52,55845692 18,8452291 4,3475422427 0 5,246353414 13,24585906 34,18202619	10,07329173 7,70942003 7,70942003 0 0 41,46882773 33,80046781 katistics Over All Ru in 2 25,94186878 0 30,83340306 30,31804597 27,66454666 52,55845692 27,66454666 52,55845692 18,45422091 4,346981563 0 5,243335854 13,24574863 34,18190221	11,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55h 25,9462972 0 0,04239278 30,84239278 30,84239278 30,324354 27,67467922 25,5691048 18,46024377 4,347555309 0,0 2,24708732 13,2495533 34,18755308	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 30,8283797 30,84923323 30,32982057 27,68183968 52,57696411 8,846540023 4,350309718 0 5,248600365 13,25183868 34,19253244	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,8434693 27,69613062 52,5871498 18,47222105 4,351807049 0 5,251008794 13,25801712 4,20376999	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0,0,87962535 30,87962535 30,03532017 27,71224112 52,6132382 18,46661073 4,35443902 0,5,25554695 13,26574589 34,21772113	4,49355328 22,86055464 10,08887121 7,7291543 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0,85219998 30,3275534 27,68508323 52,57922189 18,46682794 4,350026789 0 5,249024351 13,25394304 4,319622361	0,018906884 0,010616862 0,008627138 0,00895806 0 0 0,014630965 0,013886697 Std Dev 0,009748115 0 0,013028066 0,013028066 0,013028066 0,0130280797 0,014633951 0,002387376 0,002387376 0,003346837 0,003347 0,00347000000000000000000000000000000000	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0 0 0 0.000352549 0.000410501 RSD % mean 0.00037578 0.000422273 0.000422273 0.000422273 0.000422273 0.000422573 0.000422572 0.000609491 0.000609491 0.000478853 0.0003232976	0,000463987 0,00055708 0,001156538 0,001156538 0,000352327 0,000352327 0,000410187 8 0,000410187 0,00042148 0,0004288 0,00048384 0,000278812 0,00055129 0,00045160 0,00045110 0,00047914 0,0004704 0,000470000000000
Cu Zn Mo S Factor 5 PM2.5 Na PM2.5 V Mg P Ca Sr Zr Ca Sr Zr Ca Sr Zr Ba A H T T V	10,10112225 7,745596146 0 0 41,52669259 33,85456550 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,347542427 5,246353414 13,24585906 34,18202619 56,72424476	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,81340306 25,55445682 18,45422091 4,346981563 25,55445692 18,45422091 4,346981563 34,18190221 5,659673025	10,08393529 7,719680368 0 0 0 14,48926991 33,81676035 5th 25,9462972 0 30,84239278 30,34239278 30,34239278 30,34239278 30,34239278 30,34239278 30,34239278 30,34239278 30,34239278 30,34239278 30,34239278 52,55501048 18,46024377 50,55309 5,247087322 13,2495533 34,18753089 56,71724104	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 25,95331705 23,084923323 0,32982057 27,68183968 3,032982057 27,68183968 3,032982057 27,68183968 3,032982057 2,5686411 18,46540023 4,350309718 4,35044900 5,24640035 5,57640490 5,24640035 5,57640490 5,24640035 5,57640490 5,24640035 5,57640490 5,24640035 5,35040400 5,24640035 5,3504040 5,24640035 5,3504040 5,24640035 5,3504040 5,24640035 5,3504040 5,24640035 5,35040400 5,24640035 5,350400 5,246400400 5,34640000 5,34600400 5,34600000 5,246000000000000000000000000000000000000	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 25,96256061 0 0,055988125 30,3434633 27,69613062 52,5671498 18,47225105 0,3434633 27,696130629 4,351807049 0,5251008794 13,25801712 34,20376999 56,73513487	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0,8,796253 30,8796253 30,6352017 27,71224112 52,6132382 18,48661073 4,35443902 0 5,25554695 13,26574589 34,21772113 56,74329068	4,49353328 22,86055464 10,08887121 7,723915443 0 0 41,500467 33,82865274 Mean 25,95499523 0,08521998 30,3275534 27,68508323 52,57922189 18,46692794 4,350026789 0,5,249024351 13,25394304 34,19622361 56,72411281	0,018906884 0,010616862 0,008627138 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115 0 0,019748115 0 0,013028066 0,013958976 0,00288786 0,00288786 0,00288786 0,00288776 0,00346887 0,01107876	0.004207557 0.000464418 0.000557757 0.001159782 0 0 0 0.000352549 0.000410501 RSD % mean 0.000375578 0.000442273 0.00042273 0.00042273 0.00042273 0.000342718 0.000428702 0.00051292 0.000551292 0.000551292 0.000552192 0.0005295129 0.0005295129 0.0005295129 0.0005295129 0.0005295129 0.0005295129 0.0005295129 0.000529526 0.000252526	0,000463987 0,00055708 0,001156536 0,001156536 0,000355327 0,000410187 RSD % Lowest Q 0,000375768 0,000375768 0,00042248 0,00042248 0,00047812 0,000551607 0,000651607 0,000551607 0,00055167 0,0005570 0,0
Cu Zn Mo S Factor 5 PM2-5 Na Mg P K Ca Sr Zr Zr Ba Ba Pb Ba Al Ti Ti V Cr	10,10112225 7,745596146 0 0 41,52669259 33,85456509 30,33645965 30,3364597 30,3364597 30,3364597 27,67010968 52,5545692 18,45422091 4,34754227 0 5,24635314 13,2458596 34,18202619 56,724224776 11,78795335	10,01929173 7,709426039 0 41,46882773 33,80046781 12,8418887 0 30,83340306 52,55845692 18,4542669 52,55845692 18,4542669 0 5,243335854 0 5,24335854 0 5,2454669 13,4547456 0 5,24335854 0 5,2457456 13,2457487 14,2457487 14,2457477 14,2457487 14,245777 14,245777 14,2457777 14,2457777777777777777777777777777777	10,0893529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 30,84239278 30,3243954 27,67467922 52,5691048 18,46024377 4,347555309 13,249553 34,18753089 56,71724104 11,77069919	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 25,95331705 0 30,8283797 25,95331705 0 30,32882057 30,32882057 30,32882057 30,328420326 4,350309718 18,46540023 4,350309718 0 5,248600365 13,25183858 34,19253344 56,72409606 11,170002264	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,04368125 30,043613062 52,5871498 18,47222105 4,351807049 0 5,25108794 13,25801712 34,20376999 56,73513897	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 41,52669259 33,85456509 30,87962535 30,0352017 27,71224112 52,6132382 18,48661073 4,35443902 0 5,25554695 13,26574589 34,21772113 53,25554695 13,26574589 34,21772113 51,26574589 34,2177213	4,49355328 22,80055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0 30,8521998 30,3275534 0 30,8521998 30,3275534 2,7,85508323 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 34,19622361 56,72411281 56,72411281	0.018906884 0.010616862 0.005627138 0.00895806 0.013886697 0.013886697 0.013886697 0.013028066 0.013028066 0.013028066 0.01392807 0.013453951 0.003287376 0.00238136 0.003199231 0.00346867 0.01107876 0.011643526	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0.000410501 RSD % mean 0.000325249 0.000410501 RSD % mean 0.00032273 0.000422273 0.00042273 0.00042273 0.00042273 0.00042252 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.000205266 0.000052976 0.000205266 0.000055951 0.00025576 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.000575777 0.000575777 0.00057577 0.000575777 0.000575777 0.00057577 0.000575777 0.000575777 0.000575777 0.00057777 0.00057777 0.000577777 0.000577777 0.000577777 0.000577777 0.000577777 0.0005777777 0.0005777777 0.0005777777 0.000577777 0.000577777 0.000577777 0.000577777 0.0005777777777 0.0005777777777777777777777777777777777	0,000463987 0,00055708 0,00115638 0,00115638 0 0,000355327 0,000410187 0,000410187 0,000422488 0,00042848 0,00042848 0,00042848 0,00042848 0,00042840 0,00042841 0,00055167 0 0,00027811 0,00025175 0,00025175
Cu Zn Xn Factor 5 PM2.5 Na Mg P K Ca Ca Sr Zr Zr Zr Ba Pb Al 1 Ti V Cr Mn Sr	10,10112225 7,745596146 0 0 41,52669259 33,85456509 33,85456509 30,31804597 27,67010968 52,55845692 18,85422091 4,34754227 0 5,246353414 13,24585906 34,18202619 56,72424476 11,7875935 32,9295667	10,07329173 7,709426039 7,709426039 0 41,46882773 33,80046781 225,94186878 0 30,31804597 27,66454666 52,55845692 27,66454666 52,55845692 0 5,243335854 13,24574863 0 5,243335854 13,24574863 13,44574863 11,75538707 22,9295567 11,75538707	11,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55h 25,9462972 0 0,04239278 30,84239278 30,84239278 30,84239278 30,3243554 27,67467922 25,5691048 18,46024377 4,347555309 0 0 5,24708732 13,2495533 34,187553089 56,71724104 11,77060919 32,93569093	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 30,3283797 50th 7 25,95331705 0 0 0,04923323 30,32982057 27,68183968 52,57696411 8,84540023 4,350309718 8,46540023 4,350309718 8,45540025 13,25183858 0 5,248600365 13,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,25183858 14,2528588 14,2528588 14,2528588 14,2528588 14,2528588 14,2528588 14,2528588 14,2528588 14,25285888 14,2528588 14,2528588 14,2528588 14,2528588 14,25285888 14,2528588 14,2528588 14,2528588 14,2528588 14,25285888888 14,25285888 14,2528	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,8434693 27,69613062 52,5871498 18,47222105 4,351807049 0 5,251008794 13,25801712 4,20376999 56,73513487 11,729065171 32,95182685 4,95182665	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 41,52669259 33,85456509 33,85456509 33,85456509 30,87962535 30,87962535 30,0532017 27,71224112 52,6132882 18,46661073 4,35443902 0 5,255554695 13,26574589 4,21772113 56,74329068 11,80177394 29,96101237 4,0544590 34,21772113	4,49355328 22,86055464 10,08887121 7,72915443 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0,85219998 30,3275534 27,6850823 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,36022361 55,249024351 13,25394304 4,19622361 56,72411281 11,78018456 22,94314741	0,018906884 0,010616862 0,00895806 0 0 0,014630965 0,013886697 Std Dev 0,009748115 0,013028066 0,013028066 0,013028066 0,013028066 0,0130280797 0,014653951 0,002398136 0,00349687 0,00349687 0,0116453251	0.004207557 0.000464418 0.000557757 0.001159782 0.001352549 0.000410501 RSD % mean 0.000375788 0.000422273 0.000422273 0.000422273 0.000422273 0.000422273 0.000422273 0.000422528 0.000422528 0.0004881 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000252582 0.000255757 0.000255757 0.000255785 0.000255757 0.000255785 0.000255785 0.000257575 0.000255782 0.000257578 0.000257578 0.000257578 0.000257578 0.000257578 0.000257578 0.00025773 0.00025773 0.00025773 0.000257578 0.0002575778 0.0002577778 0.000257577778 0.000257577778 0.000025777778 0.000	0,000463987 0,00055708 0,001156536 0,001156536 0,000352327 0,000410187 0,000410187 0,000422489 0,000422489 0,000422489 0,000422489 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,0004289 0,000429 0,000400000000000000000000000000000000
Cu Cu Zh Mo Zh Mo S Factor 5 PM2.5 Na Mg P K Ca Ca Sr Zr Ca Sr Zr Zr Ba A H Ti V Cr Mn Fe Ni	10,10112225 7,745596146 0 0 41,52669259 33,85456500 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,347542427 5,246353414 13,2458596 34,18202619 56,72424476 11,78795935 32,2925567 43,03419878 6,92447501	10,01929173 7,709426039 0 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,318046781 25,954186878 0 30,31804597 27,66454666 30,31804597 27,66454666 0 52,55546592 18,45422091 4,346981563 34,18190221 5,659673025 11,75538707 32,9295567 43,0284358 6,0770156	10,08393529 7,719680368 0 0 0 14,48256991 33,81676035 5th 25,9462972 0 0,04239278 30,34239	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 0 30,84923323 0,32982057 27,68183968 30,32982057 27,68183968 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,3504640257 4,34496006 11,76002264 4,3249660557 43,04396006	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 0,055988125 30,3434633 27,66613062 52,5871498 18,47225105 4,351807049 0 0,255008794 13,25801712 34,20376999 56,75513487 11,79055171 12,95182885 43,05584421	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0 0,8796253 30,87962535 30,0532017 27,71224112 52,6132382 18,48861073 4,35443902 0 5,25554695 13,26574599 34,21772113 56,74292068 11,8071739 4,35443902 8,26574599 34,2177213 56,74292068 11,8071739 4,35443902 12,6574599 34,2177213 56,74292068 11,8071739 4,35445077 2,306492079 4,306492079	4,49355328 22,86055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,85219998 03,03275534 4,350026789 0 5,249024351 13,25394304 2,3944304 2,3944304 2,2944351 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,2944354 2,294445454 2,294445454 2,294445454 2,294445454 2,294445454 2,294445454 2,29444545454 2,2944454545454 2,2944454545454545454545454545454545454545	0,018906884 0,010616862 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,009748115 0,013028066 0,013028076 0,013028076 0,00287976 0,0032463951 0,000328136 0,00334637 0,011078758 0,011087571 0,01059758 0,01059758	0.004207557 0.000464418 0.000557757 0.001159782 0 0 0 0 0.0003252549 0.000410501 RSD % mean 0.000375578 0 0.000422273 0.000422273 0.00042273 0.000422526 0.00024851292 0.00051292 0.00051292 0.00051292 0.0005251292 0.00052526 0.000248512 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035578 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.00035787 0.0003787 0.00047885 0.0003787 0.00047885 0.0003787 0.00047885 0.0003787 0.00047885 0.00047857 0.0004785 0.0004785 0.00047857 0.000	0,000463987 0,00055708 0,001156536 0,001156536 0,000355327 0,000410187 0,000375768 0,000375768 0,00042248 0,00042108 0,000551607 0,0006551607 0,000551607 0,000551607 0,000551607 0,00024288 0,000551607 0,00024586 0,0002586 0,0002556 0,0002556 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,0002455 0,000255 0,00025 0,00025 0,000255 0,000255 0,00025 0,0005 0,00
Cu Zn Mo S Factor 5 PM2-5 Na Mg P K Ca Sr Zr Zr Ba Sr Zr Ba Ba Pb Al Tī V Cr Mn Fe Cu	10,10112225 7,745596146 0 0 41,52669259 33,85456509 30,38456509 30,3804597 0 30,3804597 27,67010968 52,55845692 18,45422091 4,347542427 0 5,24635314 13,2458596 34,18202619 56,72424476 11,78795935 32,9295567 32,9295567 43,03419878 6,984475015	10,01929173 7,709426039 0 41,46882773 33,80046781 1225,94188878 0 30,83340306 52,55845692 13,4542669 18,4542669 19,4542669 10,4597 27,66454666 52,55845692 11,75538707 32,9295567 13,7595757 13,759773156 13,759773156 13,759773156	10,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 30,84239278 30,3243954 27,67467922 52,5691048 18,46024377 4,347555309 52,47087332 13,2449553 34,18753089 56,71724104 11,77080919 32,93569093 43,03885773 6,94448288	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 0 0 0,04492332 0 30,8283797 0 30,0492332 0 30,3298205 30,3298205 30,3298205 30,32984203 0 5,257696411 18,46540023 4,350309718 0 5,2548600365 5,7249605 6,1283858 34,1925334 4,349406075 5,72496056 11,78002264 32,94066757 43,04396006 6,988448497 43,04396006	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 25,96256061 0 30,85988125 30,85988125 30,85988125 30,85988125 30,85988125 30,85981425 4,355108794 13,25801712 34,20376999 56,73513897 11,73065171 32,95182655 43,05584421 6,991942922 24,49172703	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 33,85456509 30,87962535 30,037962535 30,0352017 27,71224112 52,6132382 18,48661073 4,35443090 5,25554695 13,26574589 34,21772113 56,74329068 11,80171394 32,96101237 43,06442079 6,995074279	4,49355328 22,80055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 30,8521998 30,3275534 0 30,8521998 30,3275534 0 30,8521998 30,3275534 0 5,5240924351 13,25394304 34,19622361 56,72411281 1,72018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 22,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 1,73018456 32,94314741 2,9441475 2,94314741 2,9441475 2,9441	0,018906884 0,010616862 0,0095806 0,00895806 0,01388697 0,01388697 0,01388697 0,013828066 0,013028066 0,013028066 0,013328066 0,013353079 0,01465395 0,00339838 0,00339838 0,003199231 0,00346887 0,011078758 0,00450413 0,00539588 0,00450413	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0.000410501 RSD % mean 0.000325249 0.000410501 RSD % mean 0.00032273 0.000422273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.000422956 0.000052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.000052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.0002052952 0.000205757 0.000057577 0.000057577 0.000057577 0.000057577 0.000057577 0.000057577 0.000057577 0.000057577 0.000057577 0.0000575777 0.0000575777 0.0000575777 0.0000575777 0.00005757777 0.00005757777 0.00005757777 0.00005757777 0.00005757777 0.00005757777 0.000057577777 0.00007577777777 0.00005777777777777777777777777	0,000463987 0,00055708 0,001156536 0,001156536 0,00155708 0,000355327 0,000410187 0,000410187 0,000422486 0,000428486 0,000428486 0,00042846 0,00042846 0,00055167 0,00055167 0,0003645175 0,000365175 0,000365175 0,000375065 0,0005550 0,000550 0,000550 0,0005550 0,0005550 0,0005550 0,0005550 0,0005550
Cu Cu Zn Ch	10,10112225 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,84522091 4,34754227 0 5,246353414 13,2458596 34,18202619 56,72424476 11,7875935 32,9295567 43,03419878 6,984475015 24,47893305 0	10,01929173 7,70942039 7,70942003 0 0 41,46882773 33,80046781 225,94186878 0 30,31804597 27,66454666 52,55945692 27,66454666 52,55945692 0 5,24335854 13,24574863 0 5,24335854 13,24574863 0 5,24335854 13,24574863 0 5,24335854 13,24574863 0 5,24335854 13,24574863 0 5,24335854 13,24574863 0 5,24335854 11,75538707 22,9295567 43,0284358 6,97793156 24,46515173 0	10,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55h 25,9462972 0 0,04239278 30,84239278 30,324354 27,67467922 25,5691048 18,46024377 4,347555309 0 0,247058732 13,2495533 4,347555309 56,71724104 11,77060919 32,93569093 43,03865773 6,984448288 24,47662914 0	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 30,3283797 30,3283797 30,3283797 30,3283797 30,328429323 30,32982057 27,68183968 52,57596411 18,46540023 4,350309718 18,46540023 4,350309718 18,46540023 4,355183858 13,25183858 14,2518585858 13,25185858 14,2518585858 14,2518585858 14,2518585858 14,25185858 14,251858585858 14,251858585858 14,2518585858 14,2518585858 14,25185858 14,251858585858 14,2518585858585858585858585858585858585858	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,843868 27,69613062 52,5871498 18,47225105 4,351807049 0 5,251008794 13,25801712 4,20376999 56,73513487 11,729065171 32,95182685 43,05584421 6,991942922 24,49127203 0	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 41,5269259 33,85456509 33,85456509 33,85456509 30,8796235 30,8796235 30,03532017 27,71224112 52,6132882 0 5,25554695 13,26574589 34,21772113 56,74329068 11,80171394 29,96101237 43,06492079 43,96492079 24,50160772 24,50160772 24,50160772 24,50160772 0	4,49355328 22,86055464 10,08887121 7,7291543 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0,85219998 30,3275534 27,68508323 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,350026789 0 0,22394314741 43,04612852 29,94314741 43,04612852 29,94314741 43,04612852 29,94314741	0,018906884 0,010616862 0,00895806 0 0 0,014630965 0,013886697 Std Dev 0,009748115 0,003748115 0,013028066 0,013028066 0,013028066 0,0130280797 0,014653951 0,002398136 0,00349687 0,00349687 0,0011647524 0,01164751 0,010597958 0,004504413 0,00597558 0,004504413 0,00597558 0,004504413	0.004207557 0.000464418 0.000557757 0.001459782 0.000352549 0.000410501 RSD % mean 0.000375788 0.000422273 0.000422273 0.000422273 0.000422273 0.00042273 0.000422529 0.0004281 0.000278702 0.000252562 0.000252562 0.000262562 0.000262562 0.000262562 0.0002652952 0.000262562 0.0002652952 0.00026552952 0.00026552952 0.000265552 0.000265552 0.000265552 0.000265552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655552 0.0002655555 0.0002655555 0.000555555 0.000555555 0.000555555 0.000555555 0.0005555	0,00032411 0,00025708 0,001156538 0,00155708 0,000352327 0,000410187 0,000401187 0,00042848 0,00042848 0,00042848 0,00042848 0,00042848 0,00054285 0,000428418 0,00025167 0,0002517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,00025517 0,000255517 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,000255555 0,0002555555 0,0002555555 0,0002555555 0,0005555555 0,0005555555 0,00055555555 0,0005555555555
Cu Cu Xi Mo Xi Mo S Factor 5 PM2.5 Na Mg P K Ca Ca Ca Sr Zr Zr Zr Zr Zr Zr Zr Zr Zr Zr Mi Cu V Cr Mi Cu Zn Mo	10,10112225 7,745596146 0 0 41,52669259 33,85456509 30,83649609 30,83649609 30,83649609 30,83649609 30,8364590 4,347542427 5,246353414 13,24585906 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,2425475015 24,4789305 0 0	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,83340306 52,55445682 18,45422091 4,346981563 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,18190221 13,24574863 34,46515173 0 0	10,08393529 7,719680368 0 0 14,4825609 33,81676035 55 55 55 55 52,4708732 52,5691048 18,46024377 50 52,24708732 52,5691048 18,46024377 50 5,24708732 13,2495533 34,18753089 56,71724104 11,77080919 22,33569093 34,18753089 56,71724104 11,77708019 6,984448288 24,47662914 0 0	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 0 30,84923323 0,32982057 27,68183968 30,32982057 27,68183968 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,35046757 4,3496006 6,98844497 24,48528501 0 0	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 0,85988125 30,843463 27,69613062 52,5871498 18,47225105 52,5877498 18,47225105 52,5877499 0 5,25108794 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,25801712 0 5,2510874 13,2580174 0 5,2510874 13,2580174 0 5,2510874 14,2251074 12,2510875 12,2510875 12,2510875 12,2510875 12,2510875 12,2510875 12,2510875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875 12,2500875	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0,8796255 30,0532017 27,71224112 52,613232 18,48661073 4,35443902 0 5,25554695 13,26574699 34,21772113 56,74329068 11,80171394 32,26574299 34,21772113 56,74329068 11,80171394 32,26574279 24,50160772 0 0	4,49355328 22,86055464 10,08887121 7,72391543 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,08521999 0 30,3527534 27,68508323 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 24,48692794 34,19622361 22,93414741 43,04612852 6,9873980001 24,48419452 0 0 0	0,018906884 0,010616862 0,00895806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,009748115 0,009748115 0,01302806 0,013028076 0,013028076 0,0130289136 0,00287976 0,00346687 0,002398136 0,00346647 0,011643524 0,011643524 0,011643524 0,01164751 0,011059758 0,010159751 0,01059758 0,004504413 0,009205689 0 0 0	0.004207557 0.000464418 0.000557757 0.001459782 0 0 0 0 0 0.000352549 0.000410501 RSD % mean 0.00037578 0 0.00042273 0.00042273 0.00042273 0.00042273 0.00052922 0.00052922 0.00052922 0.00052922 0.00052922 0.000529256 0.00024864 0.00024864 0.000248512 0.000248512 0.000245256 0.000245256 0.00024525 0.000245256 0.00024525 0.000245256 0.00024525 0.00024525 0.00024525 0.00024525 0.00024525 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.0002455 0.000245 0.0002455 0.0002455 0.0002455 0.000245 0.000255 0.000245 0.000245 0.000245 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.000255 0.00025 0.000255 0.000255 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.0005 0.00025 0.0005 0.00025 0.00025 0.00025 0.00025 0.00025 0.00025 0.0005 0.00025 0.0005 0.00025 0.00025 0.0005 0.0005 0.00025 0.0005 0.0005 0.00025 0.0005 0.0005 0.0005 0.0005 0.0005 0.00025 0.0005 0	0,000463987 0,00055708 0,001156536 0,001156536 0,000355287 0,000410187 0,000375768 0,000375768 0,00042248 0,000375768 0,00042248 0,0004278812 0,000551607 0,0006551607 0,000551607 0,000551607 0,00027814 0,00025286 0,000551607 0,00037608 0,00024528 0,0002558 0,0005578 0,00
Cu Zn Mo S Factor 5 PM2.5 Na Mg P K Ca Sr Zr Ba Ca Sr Zr Ba Ba Pb Al Tī V Cr Cr Cr Sr Cu Zn Mn S S	10,10112225 7,745596146 0 0 41,52669259 33,85456509 30,85456509 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,347542407 0 5,24635314 13,24585906 34,18202619 56,72424476 11,78795935 32,9295567 32,9295567 43,03419878 6,984475015 24,47893305 24,47893305 0 0	10,01929173 7,709426039 0 41,46882773 33,80046781 12 22,94186878 0 30,83340306 52,55845692 13,4542665 52,55845692 13,4542665 0 5,243335854 13,2457465 5,253845692 11,75538707 22,9295567 11,75538707 22,9295567 13,2457465 11,75538707 22,9295567 13,2457465 11,75538707 22,9295567 14,30284358 6,97793156 24,46515173 0 0 1,469762246	10,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 30,84239278 30,3243954 27,67467922 52,5691048 18,46024377 4,347555309 52,47087332 13,2495533 34,18753089 56,71724104 11,77060919 32,93569093 43,03885773 6,984848288 24,47662914 0 0 1,472406844	22,86186366 10,08869705 7,72265367 0 0 41,50024501 33,8283797 0 0 0,04492332 0 30,28982057 30,28982057 30,28982057 30,28982057 30,28982057 30,28982057 30,28982057 30,284820365 52,57606411 18,46540023 4,350309718 34,19253344 65,72409606 5,724966057 43,04396006 6,988448497 24,4066757 24,406757 24,407577 24,4075777 24,40757777777777777777777777777777777777	4,50488162 22,86878627 10,09351013 7,729874107 0 0 0 41,51314152 33,83968103 75th 25,96250611 0 30,85988125 30,085988125 30,085988125 30,085988125 30,085988125 4,3551008794 13,25801712 34,20376999 0 0 5,251008794 13,25801712 34,20376999 24,40376999 24,40376999 24,40376999 24,40376999 24,40376999 24,4037699142222 24,49127203 24,49127203 24,49127203 24,49127203 24,49127203 24,49127203 24,49127203 20,000000000000000000000000000000000	4,534368315 22,84182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 33,85456509 30,87962535 30,037962535 30,0352017 27,71224112 52,6132382 18,48661073 4,35443902 5,25554695 34,21772113 56,74329068 11,80717394 32,96101237 4,306442079 6,995074279 24,50160772 24,50160772 24,50160777 24,501677777 24,50167777 24,501677777 24,5016777777777777777777777777777777777777	4,49355328 22,80055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0 30,8521998 30,3257534 0 30,8521998 30,3257932189 18,46692794 4,350026789 18,46692794 4,350026789 0 5,249024351 11,25394304 34,19622361 11,25394304 34,19622361 11,7018456 22,94314741 11,7018456 22,94314741 14,304612852 6,887980001 24,48419452 0 0 1,473543006	0,018906884 0,010616862 0,005627138 0,00895806 0,01388697 0,01388697 0,01388697 0,013828066 0,0103748115 0,003748115 0,013513079 0,013513079 0,013513079 0,013513079 0,013513079 0,00339836 0,003199231 0,00346887 0,011078758 0,004504413 0,0053758 0,004504413 0,0053758	0,004207557 0,000464418 0,000557757 0,001159782 0,001159782 0,000325249 0,000410501 RSD % mean 0,00032578 0,000422273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042273 0,00042758 0,0002256 0,00020526 0,00022576 0,00025295	0,000463987 0,00055708 0,001156536 0,001156536 0,00155708 0,000355327 0,000410187 0,000375108 0,00037812 0,000422486 0,000531607 0,000531607 0,000531607 0,00037814 0,00032817 0,000324286 0,000324526 0,000345175 0,0003455175 0,00034550 0,000345500
Cu Zn Mo S Factor 5 PM2.5 Na Mg P K Ca Sr Zr Ba Ca Sr Zr Ba Pb Al Ti V Cr Mn Fe Ni Cu Zn Mo S	10,10112225 7,745596146 0 0 41,52669259 33,85456509 33,85456509 30,385456509 30,31804597 27,67010968 52,55845692 18,8422091 4,347542291 34,18202619 34,1820567 32,929556755675567 32,92955675567556755675567556755675555675567	10.01929173 7,709420139 7,70942039 0 0 41,6482773 33,80046781 12 25,9418878 0 30,313046781 12 27,66454666 52,55845692 30,31904597 27,66454666 52,55845692 30,31904597 13,24574863 34,18190221 56,69673025 56,96973025 24,46515173 0 0 1,469762246	11,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 0 30,84239278 30,3249354 27,67467922 52,5691048 18,46024377 4,347555309 5,247087332 13,2495533 4,347555309 56,71724104 11,77080919 32,93569093 43,03855773 6,984848288 24,47662914 0 0 1,472406844	22,86186366 10,08869705 7,72265367 7,72265367 0 0 41,50024501 33,8283797 30,38283797 30,38283797 30,38283797 30,38283797 30,38283797 30,3828379 30,32982057 27,68183968 52,57596411 8,46540023 4,35039718 34,19253344 56,77405905 11,78002264 32,94060757 43,04396005 6,988448497 24,48528501 11,78002264 4,30496005 6,988448497 24,48528501 0 0 0 1,473821148	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,0434693 27,69613062 52,5871498 18,47225105 4,351807049 0 5,251008794 13,25801712 34,20376399 56,73513487 11,79065171 32,95182685 43,05594421 6,991942922 24,49127203 0 0 1,47499237	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 33,85456509 33,85456509 30,87962535 30,3532017 27,71224112 52,6132382 18,48661073 14,35443902 0,525554695 13,26574589 13,26574589 13,26574589 13,26574589 13,26574589 13,26574590 34,21772113 56,74329068 11,80171394 29,50160772 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,06492079 43,96101237 43,0649207943,06492079 43,0649207944,07916 44,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,07916 44,0791644,0791	4,49355328 22,86055464 10,08887121 7,72915443 0 0 0 0 3,08521998 33,82865274 Mean 25,95499523 0 30,8521998 30,33275534 27,68508323 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,3602261 14,73543006	0,018906884 0,010616862 0,005627138 0,00895806 0 0 0 0,014630965 0,013886697 0,013886697 0,013028066 0,013028066 0,013028066 0,01302807976 0,00349687 0,00349687 0,000349687 0,011645354 0,000546867 0,01108756 0,01108756 0,001587558 0,004504413 0,0025758 0,001892617	0.004207557 0.000464418 0.000557757 0.001459782 0.00159782 0.000325549 0.000410501 RSD % mean 0.000325788 0.000422273 0.000422273 0.000422273 0.000422273 0.000422273 0.000322776 0.000228526 0.0000551292 0.000551292 0.000551292 0.000552952 0.000552952 0.000552952 0.000552952 0.00020526 0.000028581 0.000323976 0.000323976 0.000323976 0.00032549 0.000324576 0.00032556 0.000325576 0.000325576 0.000325576 0.000325576 0.000325576 0.000325576 0.000325576 0.000325576 0.00032597 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.00037585 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.000325757 0.00032575 0.00032575 0.00032575 0.00032575 0.00032575 0.00032575 0.00032575 0.00032575 0.00035555 0.00035555 0.00035555 0.00035555 0.00035555 0.000355555 0.000355555 0.000355555 0.00035555 0.00035555 0.000355555 0.000355555 0.00035555 0.000355555 0.00035555 0.000355555 0.000355555 0.00035555 0.000355555 0.00055555 0.00055555 0.00055555 0.00055555 0.000555555 0.000555555 0.00055555 0.000555555 0.000555555 0.00055555 0.000555555 0.000555555 0.000555555 0.000555555 0.000555555 0.000555555 0.000555555 0.00055555555 0.0005555555 0.0005555555 0.0005555555 0.00055555555 0.0005555555 0.0005555555 0.0005555555555	0,000463987 0,00055708 0,001156536 0,001156536 0,00155708 0,000355327 0,000410187 0,000375766 0,000422486 0,000428486 0,00048364 0,00048364 0,00055167 0,00055129 0,00055129 0,000278411 0,000265268 0,00034141 0,000265268 0,00034141 0,000265268 0,00044418 0,000376066 0,000444518 0,000376066 0,0005765 0,0005776 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,0005765 0,00057576 0,00057577 0,00057577 0,000575777 0,0005757777777777
Cu Zn Mo S Factor 5 PM2.5 Na Mg P P Ca Ca Sr Zr Zr Zr Zr Zr Zr Zr Zr Zr Zr Zr Zr Zr	10,10112226 7,745596146 0 0 41,52669259 33,85456500 25,94186878 0 30,83649609 30,83649609 30,83649609 30,83649609 4,347542427 0 5,245354592 4,347542427 0 5,246353411 13,24585906 34,18202619 56,72424476 11,78795935 32,9295567 43,03419878 6,984475015 24,4789305 0 0 1,473789816	10,01929173 7,709426039 0 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,83340306 30,31804597 27,66454666 52,55346592 18,45422091 4,346981563 34,18190221 5,659673025 11,75538707 32,9295567 30,9295567	10,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 50 51 525,9462972 0 0,04239278 30,3249354 27,67467922 52,5691048 18,44024377 13,24955330 5,247087322 13,2495533 34,18753089 56,71724104 56,71724104 56,71724104 56,948448288 24,47662914 0 0,0 1,472406844	22,86186366 10,08869705 7,72265267 0 41,50024501 33,8283797 225,95331705 23,95331705 23,95331705 23,95331705 23,95331705 23,084923323 30,32982057 27,68183968 4,350309718 4,35030000000000000000000000000000000000	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,8434693 27,69613062 52,5871498 18,47225105 4,351807049 0 5,251008794 13,25801712 44,20376999 56,73513487 11,79065171 32,95182685 43,05584421 (6,991942922 24,49127200 0 1,47499237	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0 30,8796253 30,3532017 27,71224112 52,6132382 18,48661073 4,35443902 0 5,255554695 13,26574599 34,21772113 56,74329068 11,80171394 32,96101237 43,06492079 24,50160772 24,50160772 0 0 1,476447916	4,49355328 22,86055464 10,08887121 7,72915443 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,85219998 30,3275534 2,7,68508323 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,360226789 0 5,249024351 13,25394304 4,360226789 0 5,249024351 11,76018456 2,94314741 43,04612852 6,987980001 24,48419452 0 0 1,473543006	0,01890688 0,000627138 0,00095806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,00374815 0,013028066 0,013028066 0,013028076 0,002398136 0,002398136 0,00346837 0,0116453951 0,006346847 0,011087518 0,01059758 0,01059758 0,01059758 0,00454413 0,009205689 0 0,001892617	0,004207557 0,000464418 0,000557757 0,001159782 0 0 0 0,000352549 0,000410501 RSD % mean 0,00037578 0,000422273 0,000422273 0,000422273 0,00042273 0,000422573 0,000422573 0,00024251 0,00051292 0,000551292 0,000551292 0,000551292 0,000551292 0,000552952 0,000265295 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,0002655 0,000265 0,000265 0,000265 0,000265 0,000265 0,000265 0,000265 0,000265 0,00026 0,000265 0,00026 0,00000 0,0000000000	0,000300,0000,000000000000000000000000
Cu Zn Mo S Factor 5 PPM2.5 Na Mg P K Ca Sr Zr Ba Ca Sr Zr Ba Ba Pb b Al Ti Ti V Cr Cr Cr Ca Sr Zr Ba Ba Pb S S P P P P P P P P P P P P P P P P	10,10112226 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,34754247 0 5,24633314 13,2458306 34,18202619 56,72424476 56,7242476 56,72424476 56,7242476 56,7242476 56,7242476 34,303419878 6,984475015 24,4789305 0 1,473789816 S Lowest Q M	10,01929173 7,709426039 0 0 41,46882773 33,80046781 tatistics Over All Ru 0 30,83340306 52,5544682 30,31804597 27,66454666 30,31804597 27,66454666 52,55946592 18,45422091 4,346981553 34,18190221 13,2457486 4,346981553 34,18190221 13,2457486 4,346981553 34,18190221 13,2457486 4,346515173 22,295567 43,0284358 6,977793155 24,46515173 0 0 1,469762246	10,0893529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 30,84239278 30,3243954 27,67467922 52,5691048 18,46024377 4,347555309 52,47087332 13,249553 34,18753089 56,71724104 11,7706919 32,93569093 43,03885773 6,984848288 24,47662914 0 1,472406844	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 0 41,50024501 33,8283797 0 30,8283797 25,95331705 0 30,3288205 30,3288205 30,3288205 30,3288205 30,3288205 30,3288205 30,3288205 30,32842032 4,350309718 18,46540023 4,350309718 34,1925334 4,350309718 34,1925334 4,350309718 34,1925334 4,350309718 34,1925334 4,350309718 32,44600365 11,7800256 4,34496006 6,988448497 24,409606 6,988448497 0 0 1,473821148	4,50488162 22,86878627 10,09351013 7,729874107 0 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,344693 27,69613062 52,5871498 18,47225105 4,351807049 0 5,251008794 13,25801712 34,2037699 56,73513487 11,79065171 32,95182685 43,0554421 6,991942922 24,49127203 0 0 1,47499237 75th	4,534368315 22,81882017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 30,87962535 30,87962535 30,87962535 30,3532017 21,71224112 52,6132382 18,48661073 4,35443902 0 5,25554695 34,21772113 43,5543902 34,21772113 43,25554695 13,26574589 34,21772113 43,25554695 13,26574589 34,21772113 43,25554695 13,26574589 34,21772113 43,04429079 6,995074279 2,450160777 2,4501607779 2,4501607779 2,4501607779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,450160779 2,50160779	4,49355328 22,80055464 10,08887121 7,723915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,08521998 30,38221998 30,38221998 30,38221998 30,38221998 30,38221998 30,38221998 30,3825993 18,46692794 4,3550026789 18,46692794 4,3550026789 0 5,249024351 11,28394304 34,19622361 11,28394304 34,19622361 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 11,78018456 32,94314741 24,4819452 0 0 1,473543006	0.018906884 0.010616862 0.005627138 0.00895806 0 0 0 0.014630965 0.013886697 0.013886697 0.013886697 0.013028066 0.013028066 0.0130280589 0.013513079 0.014653951 0.00238136 0.013513079 0.011078758 0.00339231 0.003346847 0.011078758 0.011078758 0.011078758 0.011078758 0.011078758 0.004504413 0.003205689 0.004504413 0.002205689 0.001892617	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0.000325249 0.000410501 RSD % mean 0.000422718 0.000422718 0.000422718 0.000422718 0.00052952 0.00052952 0.00052952 0.000569491 0.00025296 0.000255296 0.000255296 0.00025529 0.00025529 0.00025529 0.00025529 0.00025529 0.00025529 0.00025295 0.00025529 0.00025529 0.00025529 0.00025529 0.00025529 0.00025529 0.00025529 0.00025529 0.0002557 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757 0.00025757	0,000463987 0,00055708 0,001156536 0,001156536 0,003552327 0,000410187 0,000375768 0,000375768 0,0003242885 0,000422488 0,000551607 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,00055007 0,000550070000000000
Cu Zn	10,10112225 7,745596146 0 0 41,5269259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,8422091 4,347542291 4,347542291 55,24455906 34,18202619 56,72424476 11,73759315 24,4789305 6,984475015 24,4789305 0 1,473789816 SLowest Q 81,22672091 M	10,01929173 7,709426039 7,709426039 0 41,6682273 33,80046781 12 25,94188878 0 30,8130406781 27,66454666 52,55846692 27,66454666 52,55846692 30,31804597 27,66454666 52,55846692 13,24574683 34,18190221 56,69673025 26,9673025 24,46515173 0 0 1,469762246 14,69762246 14,69762246 14,69762246 14,69762246 14,69762246 14,69762246	11,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 0,0243927 30,84239278 30,3249354 27,67467922 52,5691048 18,46024377 4,347555309 5,24708732 13,2495533 43,4187553089 56,71724104 11,77080919 32,93569093 43,03885773 6,984848288 24,47662914 0 0,1472406844 0,1472406844	22,86186366 10,08869705 7,72265367 7,72265367 0 0 41,50024501 33,8283797 30,3282057 0 30,3282057 25,5531705 0 30,3282057 27,68183968 52,57696411 8,46540023 4,350309718 34,19253344 56,77940506 6,988448497 24,48528501 1,78002264 32,94066757 0 0 1,473821148 500th 7 8,125710887 7 8,12571087 7 8,12571087 7 8,12571087 7 8,12571087 7 8,12571087 7 8,12571087 7 1,2571087	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,843863 27,69613062 52,5871498 18,47225105 4,351807049 0 5,251008704 13,25801712 34,20376399 56,73513487 11,79065171 32,95182685 43,05584421 6,991942922 24,49127203 0 0 1,47449237 75th 81,255484838	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 25,97315419 0 30,87962535 30,03532017 27,71224112 52,6132382 18,48661073 4,35443902 0 5,25554695 13,26574599 34,21772113 56,74329068 11,80171394 29,50160772 0 0 1,476447916 1,47647916	4,49353328 22,86055464 10,08887121 7,72915443 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0,35219998 30,3527534 27,68508323 52,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,36022361 56,72411281 11,78018456 32,94314741 43,04612852 6,987980001 24,46419452 0 0 0 1,473543006	0,018906884 0,010616862 0,005627138 0,00895806 0 0 0 0,014630965 0,013886697 0,013886697 0,013028066 0,013028066 0,0130280797 0,01305589 0,002398136 0,002398136 0,002398136 0,00346827 0,011045758 0,004504413 0,00592580 0 0 0 0,0018925617 0,002185753 0,002185753 0,002185753	0.004207557 0.000464418 0.000557757 0.00159782 0.00159782 0.000325249 0.000410501 RSD % mean 0.00032273 0.000422273 0.000422273 0.000422273 0.00042273 0.00042273 0.00042273 0.00042273 0.00051292 0.00051292 0.000552952 0.000552952 0.000552952 0.00028750 0.00028750 0.000205266 0.00028439 0.000323976 0.0002462 0.00002462 0.00002462 0.00002462 0.000024634 0.00037595 0 0 0 0 0 0 0 0 0 0 0 0 0	0,000463987 0,00055708 0,00115638 0,00115638 0,00155708 0,000355327 0,000410187 0,000410187 0,000422488 0,00048284 0,00048284 0,00048284 0,00048284 0,00048284 0,000551607 0,00055167 0,00027814 0,00025828 0,000245288 0,0002484888 0,0002484888 0,000248888 0,000248888 0,000248888 0,000248888 0,000248888 0,000248888 0,0000488888 0,0000488888 0,
Cu Cu Zh Mo S Factor 5 PM2-5 Na Mg P P Ca S Ca S Sr Zr	10,10112225 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,5584592 4,347542427 5,246353414 13,2458596 34,18202619 34,18202619 356,72424476 11,78795935 32,9295567 43,03419878 6,984475015 24,4789305 0 1,473789816 \$24,789305 0 1,473789816 \$24,26272091 9,320809309 0,228059309	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,83340306 52,55446892 18,45422091 4,346981563 30,31804597 27,66454666 0 52,5544692 13,24574663 34,18190221 13,24574663 34,18190221 13,24574663 24,46515173 0 1,469762246 tatistics Over All Ru in 81,25376356 9,316484801 6,67873156	10,08393529 7,719680368 0 0 14,48256918 25,9462972 0 30,84239278 30,34239278 30,3249354 27,67467922 52,5691048 18,46024377 13,2495533 4,18755309 56,71724104 11,77080919 32,33569093 43,03885773 6,984448288 24,47662914 0 0 1,472406844	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 0 30,84923323 0,32982057 30,32982057 30,32982057 30,32982057 30,32982057 3,4,350309718 4,35030077 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,350300777 4,3503007777 4,3503007777 4,350300777777777777777777777777777777777	4,50488162 22,86878627 10,09351013 7,729874107 0 41,5134152 33,83968103 75th 25,96256061 0 0,85988125 30,3434693 27,69613062 52,5871498 18,47225105 4,351807049 0 5,251008794 13,25801712 32,95182685 43,05584421 11,79065171 32,95182685 43,05584421 6,991942922 24,49127203 0 0 1,47499237 75th 81,25846838 9,321497499 0 0 0	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0 30,87962535 30,3532017 27,71224112 52,6132382 18,48661073 14,35443902 0 5,255554695 13,2657459 34,21772113 56,74229068 11,8071739 43,06492077 24,5016017777777777777777777777777777777777	4,49355328 22,86055464 10,08887121 7,72391543 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,85219998 30,3275534 2,76850823 52,57922189 0 0,5249024351 13,25394304 4,35002676789 0 5,249024351 13,25394304 4,3500267789 0 5,249024351 13,25394304 4,3500267784 0 5,249024351 13,25394304 4,3500267784 5,249024351 14,73543006 2,94314741 24,48419452 0 0,4612852 6,987980001 24,48419452 0 0,1,473543006	0,01890688 0,000627138 0,00095806 0 0,014630965 0,013886697 Std Dev 0,009748115 0,003748115 0,003748115 0,013028066 0,013028066 0,013028076 0,002387976 0,002387976 0,002387976 0,002387976 0,003346807 0,011643525 0,01059758 0,001892617 Std Dev 0,00189267573 0,00185753 0,001857533 0,001857533 0,00185755 0,00185755 0,00185755 0,00185755 0,00185755 0,00185	0.004207557 0.000464418 0.000557757 0.00146418 0.000557757 0.001159782 0 0 0 0 0 0.000352549 0.000410501 RSD % mean 0.000278702 0.000551292 0.000551292 0.000562952 0.000562952 0.000562952 0.000278702 0.00028872 0.000278702 0.0007878702 0.0007878702 0.0007878702 0.0007878702 0.0007877777 0.000787777 0	RSD % Lowest Q 0,0003708 0,00035708 0,001156536 0,00135237 0,000355327 0,000355327 0,000375768 0,000375768 0,000375768 0,000375768 0,000375768 0,000375160 0,000551607 0,000551607 0,00037606 0,00037600 0,00037600 0,00037600 0,00037600 0,00037600 0,00037600 0,00037600 0,00037600 0,00037600 0,00037600 0,000377600 0,000377760 0,000377777777777777777777777777777777
Cu Zn Xn	10,10112225 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,347542427 0 5,24633314 13,24583906 34,18202619 56,72424476 56,72424476 56,72424476 5,924557 32,925567 32,925567 0 0,1,473789816 81,25672091 9,3220803309 0,616021079 0,616021079 0,0000000000000000000000000000000000	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 2 25,94186878 0 30,81340306 52,55946682 18,45422091 18,45422091 18,45422091 18,45422091 18,45422091 18,45422091 18,45422091 13,245748681 56,69673025 11,75538707 32,2929567 43,0284358 6,97793155 24,46515173 24,46515173 24,46515173 0 1,469762246 tatistics Over All Ru in 2 81,25373356	10,0893529 7,719680368 0 0 14,48926991 33,81676035 ns 55th 25,9462972 25,9462972 30,84239278 30,84239278 30,84239278 30,84239278 30,84239278 30,84239278 30,84239278 30,84239278 30,84239278 30,84239278 34,18755089 11,27406919 32,93569093 34,1875308 56,71724104 11,77060919 32,93569093 43,03885773 6,984848288 24,47662914 0 1,472406844 81,25561881 9,31895782 0,616023166 0	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 0 41,50024501 33,8283797 0 30,8492332 0 30,3298205 30,3298205 30,3298205 30,3298205 30,3298205 30,3298205 30,3298205 30,3298205 34,19253345 4,30309718 32,44860365 5,2496006 5,24860365 11,78002264 4,304396006 6,988448497 2,44952601 1,473821148 500 1,473821148 500 7 81,25710687 9,320359921 0,616060567 0 0	4,50488162 22,86878627 10,09351013 7,729874107 0 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,344693 27,69613062 52,5871498 18,47225105 30,344693 27,69613062 52,5871499 0 0,5,251008794 13,25801712 34,0375990 56,75513487 11,79065171 32,95182685 43,0554421 6,991942922 24,49127203 24,49127203 0 0 1,47499237 75th 81,25846838 9,321497499 0,616102166	4,534368315 22,84182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 0 30,87962535 30,0352017 27,71224112 52,6132382 18,48661073 4,35443902 5,25554695 34,21772113 43,5543902 34,21772113 43,5543905 34,21772113 43,05442079 6,995074279 2,450160772 2,50160772 2,50160772 2,50160772 2,50160772 2,50160772 2,50160772 2,50160772 2,50257459 3,22570193 3,2502712 9,32357033 0,616161754	4,49355328 22,80055464 10,08887121 7,723915433 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,8521998 30,38279534 0,08521998 18,46692794 4,350026789 18,46692794 4,350026789 18,46692794 4,350026789 0 5,249024351 11,25373450 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 11,70018456 22,94314741 24,8419452 20,000 1,473543006	0.018906884 0.010616862 0.005627138 0.00895806 0.01386697 0.01386697 0.01386697 0.01386697 0.013028066 0.0103748115 0.003748115 0.0039748115 0.0039589 0.013513079 0.014653951 0.003287376 0.00339539 0.01107875 0.0011078758 0.0011078758 0.0011078758 0.0011078758 0.002185753 0.002185753 0.002185753 0.0021857573 0.0021857573 0.002185753 0.0021857573 0.0021857573 0.002185753 0.002185753 0.002185753 0.002185753 0.002185753 0.0021857573	0.004207557 0.000464418 0.000557757 0.001159782 0.001159782 0.000325249 0.000410501 RSD % mean 0.00032578 0.000422731 0.000422731 0.000422731 0.00042273 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.00052952 0.000329526 0.000225266 0.000225266 0.00025256 0.00025256 0.00025256 0.00025256 0.00025526 0.00025555 0.00015555 0.000	0,000463987 0,00055708 0,001156536 0,001156536 0,00155708 0,000355708 0,000355708 0,000357608 0,000357608 0,0003551607 0,00055507 0,00055
Cu Zn Xn	10,10112225 7,745596146 0 0 41,5269259 33,8555509 33,8555509 30,3864595 30,31804597 27,67010968 52,55845692 18,8422091 4,347542291 4,347542291 55,72424476 11,7875935 32,9295567 32,92955757 32,9295575757575757575757575757575757575757	10,01929173 7,709426039 7,709426039 0 41,6682273 33,80046781 12 25,94188878 0 30,8130406781 27,66454666 52,55845692 30,31804597 27,66454666 52,55845692 30,31804597 27,66454666 52,55845692 13,4542091 13,24574863 34,18190221 56,69673025 24,46515173 0 0 1,469762246 11,75538707 22,9295567 43,0284358 6,97793156 24,46515173 0 0 1,469762246 11,25576356 24,46515173 0 0 1,469762246	11,08393529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 0 30,84239278 30,3249354 27,67467922 52,5691048 18,46024377 4,347555309 5,247087322 13,2495533 4,347555309 56,71724104 11,77080919 32,93569093 43,03855773 6,984848288 24,47662914 0 0 1,472406844 81,25561881 9,31895782 6,0616023166 0 1,3286462272	22,86186366 10,08869705 7,72265367 7,72265367 0 0 41,50024501 33,8283797 25,95331705 25,95331705 27,68183968 52,57696411 18,46540023 4,350309718 30,32982057 30,32982057 30,32982057 30,32982057 30,3298400365 1,325183858 34,19253344 66,7240400365 6,988448497 24,48528501 1,77002254 33,04396076 6,988448497 24,48528501 1,473821148 9,320358921 9,320358921 9,320358927 9,320358927 1,325600573 2	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,3434693 27,69613062 52,5871498 18,47225105 4,351807049 0,5251008794 13,25801712 34,20376199 56,73513467 11,79065171 32,95182685 43,05584421 6,991942922 24,49127203 0 0 1,47449237 75th 81,25846838 9,321497499 0,6161012166 0 1,326600556	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 25,97315419 0 30,87962535 30,03532017 27,71224112 52,6132382 18,48661073 4,35443902 0,525554659 13,26574589 34,21772113 56,74329068 11,80171394 22,96101337 0,0 1,476447916 Max 81,26302712 9,322670393 0,616161754 0 1,326816694	4,49353328 22,86055464 10,08887121 7,72915443 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0,382265923 0,382259499523 0,3822559499523 26,57922189 18,46692794 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,350026789 0 5,249024351 13,25394304 4,36022361 24,46419452 6,987980001 24,46419452 6,987980001 24,46419452 0 0 0 1,473543006	0,018906884 0,010616862 0,0095806 0 0 0 0,014630965 0,013886697 0,013886697 0,013886697 0,013028066 0,013028066 0,013028066 0,0130280797 0,01345395 0,002388136 0,003398237 0,006346897 0,0107876 0,011645354 0,006346687 0,01108758 0,004504413 0,0059588 0,004504413 0,002185753 0,001892617 0,001852617 0,001852617 0,001852617 0,001852617 0,001852617 0,00018575 0,000185575 0,000185575 0,000185575 0,000185575 0,000185575 0,0000185575 0,000185575 0,000185	0.004207557 0.000464418 0.000557757 0.00146418 0.000557757 0.00159782 0.000325249 0.000410501 RSD % mean 0.00032273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042253 0.00032578 0.00022526 0.00025252 0.000551292 0.000551292 0.000551292 0.000552952 0.000552952 0.00025256 0.00025256 0.00025256 0.00025256 0.00025256 0.00025256 0.00025256 0.00025256 0.00025256 0.00025256 0.00025255 0.00025255 0.00025255 0.00025255 0.00025255 0.00025255 0.00025255 0.00025255 0.00025255 0.00025555 0.000255555 0.000255555 0.000255555 0.000255555 0.000255555 0.000255555 0.000255555 0.00055555 0.000555555 0.000555555 0.000555555 0.000555555 0.000555555 0.000555555 0.000	RSD % Lowest O 0,00027881 0,0005700 0,001156536 0,00155700 0,00055706 0,00055706 0,00057766 0,0007375766 0,0007375766 0,00022485 0,000342485 0,000278812 0,00051767 0,00073145 0,000278812 0,00025167 0,000278112 0,000278112 0,00027812 0,00000000000000000000000000000000000
Cu Zn Mo S Factor 5 PN2.5 Na Mg P K Ca Sr Zr Zr Zr Ba Ba Pb Al Ti Ti V Cr Mn Fo Al Ti Ti V Cr S Pb Al S Fo S P P S P P S P P S P P S P S P P S P P S R Ca S R P P S R Ca S R S R S R S R S R S R S R S R S R S	10,10112225 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,5584592 18,45422091 4,347542427 5,246353414 13,24585906 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 34,18202619 32,295567 43,03419878 6,984475015 24,47893305 0 1,473789816 \$2,27672091 9,320809309 0,616021079 0 1,326658356 2,777257905	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 25,94186878 0 30,83340306 52,55445682 18,45422091 4,346981563 33,18190221 6,69673025 11,75538707 32,2925567 32,2	10,08393529 7,719680368 0 0 41,48256186 55h 55h 52,59462972 0 30,84239278 30,34239278 30,324354 27,67467922 52,5691048 18,46024377 13,24955330 52,47087322 13,2495533 41,347555309 56,71724104 11,77080919 32,33569093 34,18753089 56,71724104 11,472406844 24,47662914 0 0 1,472406844 81,25561881 9,31895782 0,616023166 0 1,326462272 0 1,326462272	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 0 30,84923323 0,32982057 27,68183968 30,32982057 27,68183968 30,32982057 27,68183968 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,350309718 4,35046757 4,3496006 6,988448497 0 1,473821148 300h 7 81,25710687 9,320358921 0,616060567 0 1,326602732 0,1326602732 0 1,326602737 0 1,326602737 0 1,326602737 0 1,326602737 0 1,326602737 0 1,326602757 0 1,32660757 0 1,32660757 1,32660757 0 1,32660	4,50488162 22,86878627 10,03351013 7,729874107 0 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,3434693 27,69613062 4,35180749 4,35180749 4,35180749 4,35180749 4,35180749 4,35180749 4,35180749 4,35180749 0 5,25108794 11,2956182855 43,05584421 6,991942922 24,9127203 0 1,47499237 75th 81,25846838 9,321497499 0,616102166 0 1,326660556 0 1,226660556 0 1,226660556 0	4,534368315 22,88182017 10,10112826 7,745596146 0 0 0 0 41,52669259 33,85456509 Max 25,97315419 0 0 30,8796253 30,3532017 27,71224112 52,6132382 18,48661073 14,35443902 0 5,255554695 13,2657459 34,21772113 56,74229068 11,8017139 43,26574279 24,501601772 24,501610175 0 0 0 1,476447916	4,49355328 22,86055464 10,08887121 7,723915433 0 0 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0,085219998 30,32275534 4,5500267789 0 5,249024351 13,25394304 4,3500267789 0 5,249024351 13,25394304 4,3500267789 0 5,249024351 11,78018456 2,94314741 43,04612852 6,987980001 24,48419452 0 0,4612852 6,987980001 24,48419452 0 0,616556136 0,1326579736 0,1326579736 0,1326579736	0,01890688 0,0005627138 0,0005627138 0,00895806 0,001895806 0,014630965 0,013886697 0,009748115 0 0,013028066 0,010395589 0,013518079 0,014653951 0,002389736 0,002389736 0,002389736 0,002389736 0,002399736 0,002399736 0,00199231 0,00346887 0,01107876 0,01107876 0,001109751 0,001057258 0,002185753 0,00185763 6,43226E05 0 0 0,001682767 0,000160271 0,000160271	0.004207557 0.000464418 0.00055757 0.001159782 0.001352549 0.000410501 RSD % mean 0.000410501 0.000422273 0.000422718 0.000422718 0.000422718 0.00042273 0.000362952 0.000278702 0.00051292 0.000452952 0.000278702 0.000452952 0.000278702 0.000242718 0.000242718 0.000242718 0.000242526 0.00025266 0.00025266 0.00025256 0.00025256 0.00025526 0.00025526 0.00025526 0.000242523 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.00024293 0.0002425 0.00024293 0.0002425 0.0002493 0.00024293 0.0002494 0.00024943 0.0002495 0.0002495 0.0002495 0.0002495 0.0002495 0.0002495 0.0002495 0.0000445 0.0000445	RSD % Lowest Q 0,00035708 0,001156536 0,001156536 0,00135237 0,00035237 0,000410187 0,000357686 0,000375768 0,000375768 0,000375768 0,000375768 0,000551607 0,000551607 0,000551607 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,0001288183 0,00012885 0,00012885 0,00012885 0,00037666 0,00012885 0,00012885 0,00037666 0,00037666 0,00012885 0,00037666 0,00037666 0,00037666 0,00037666 0,00037666 0,00012885 0,00012885 0,00037666 0,00037657 0,00037657 0,00037657 0,00037657 0,000375766 0,000375767 0,00037577777777777777777777777777777777
Cu Zn Xn	10,10112226 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55845692 18,45422091 4,34754247 0 5,24633314 13,24583906 34,18202619 56,72424476 56,7242476 4,34754247 0 5,24633314 11,78795935 32,995567 43,03419878 6,984475015 24,47893305 0 0 1,473789816 State 10 1,473789816 State 10 1,22652091 9,3220803309 0,616021079 0,1326658356 2,777257905 0,0320339392	10,01929173 7,709426039 0 41,46882773 33,80046781 tatistics Over All Ru in 2 25,94186878 0 30,31804597 27,66454666 30,31804597 27,66454666 33,41804597 27,66454666 13,245746891553 34,18190221 13,245748691553 11,75538707 32,9295567 43,0284359 6,977793155 24,46515173 24,46515173 24,46515173 24,46515173 24,46515173 24,46515173 0 0 1,469762246 tatistics Over All Ru in 2 81,25373356 0,3164484801 0,615568444 0 1,326194893 2,775590884 0,030228475	10,0893529 7,719680368 0 0 14,48256188 5th 25,9462972 30,84239278 30,84239278 30,3243954 27,67467922 52,569104 18,46024377 4,347555308 56,71724104 11,77080919 32,93569093 43,03885773 6,98484828 24,47662914 1,472406844 ns 81,25561881 9,31895782 0,616023166 1,326462272 2,276698528 0,01032164	22,86186366 10,08869705 7,722653267 0 0 41,50024501 33,8283797 25,95331705 0 30,8283797 25,95331705 0 30,32882057 30,32882057 30,32882057 30,32882057 30,32842032 4,350309718 18,46540023 4,350309718 32,44860365 11,7800254 4,304396006 6,988448497 24,4852807 24,4852807 1,473821148 5010 7 81,25710687 0 0 1,473821148 5010 7 81,25710687 0 0 1,473821148 5010 7 1,473821148 5010 7 1,473821148 5010 7 1,473821148 5010 1,473821 1,473821148 5010 1,473821 1,474821 1,473821 1,474821 1,474	4,50488162 22,86878627 10,09351013 7,729874107 0 0 0 41,51314152 33,83968103 25,96256061 0 30,85988125 32,7,69613062 52,5871498 18,47222105 4,351807049 0,5,25108794 13,25801712 34,20376999 0,0 5,25108794 13,25801712 34,20376999 0,5,7513487 11,79065171 32,95182685 4,30554421 6,991942922 24,49127203 24,49127203 24,49127203 24,49127203 24,49127203 24,49127203 24,49127203 0 0 1,47499237 75th 81,25846838 9,321497499 0,616102166 2,778176104 0 0 1,326660556 2,778176104	4,534368315 22,88182017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 33,85456509 33,85456509 30,87962535 30,037962535 30,0352017 27,71224112 52,6132382 13,26574589 34,21772113 52,5554695 34,21772113 52,5554695 34,21772113 52,5554695 34,21772113 52,6132302 13,26574599 34,2177213 52,6132302 13,26574599 34,2177213 52,6132302 13,26574599 34,2177213 52,6132302 13,26574599 34,2177213 52,6132302 13,26574599 34,2177213 52,6132302 13,26574599 34,2177213 52,6132302 13,25564650 11,476447916 Max 81,26302712 9,323670333 0,61616174	4,49355328 22,80055464 10,08887121 7,723915433 0 0 41,5004676 33,82865274 Mean 25,95499523 0 0 30,8521998 30,3275534 0 30,8521998 30,3275534 2,7,65508323 52,57922189 18,46692794 4,350026789 18,46692794 4,350026789 18,46692794 4,350026789 0 5,244024351 11,25313454 32,94314741 11,72018456 22,94314741 43,04612852 6,987980001 24,4419452 0 0 1,473543006 81,25713464 9,202272445 0,61605616 9,202272445 0,61605616 0 1,226579736	0.018906884 0.010616862 0.005627138 0.00895806 0.013886997 0.013886997 0.013886997 0.013028066 0.010395806 0.01395389 0.013513079 0.014653951 0.003287376 0.00238136 0.003199231 0.003346897 0.011078758 0.00319231 0.003246897 0.011078758 0.004504413 0.002205689 0.00185753 0.002185753 0.002185753 0.0001851673 6.43326E-05 0 0.0001851673 6.43326E-05 0 0.0001851673 0.000185758 0.00018558 0.000018558 0.000018558 0.000018558 0.000018558	0.004207557 0.000464418 0.000557757 0.00146418 0.000557757 0.001159782 0.00055757 0.000412511 RSD % mean 0.000322573 0.000422273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042273 0.00042252 0.00052952 0.00052952 0.00052952 0.000252952 0.000128459 0.0001284399 RSD % mean 2.689922-05 0.000118672 0.000128459 0.000118672 0.000118672 0.000128459 0.00012855 0.00012855 0.00012855 0.00012855 0.00012855 0.00012855 0.00012855 0.00012855 0.00012855 0.000128	0,000463987 0,00055708 0,001156536 0,001156536 0,00155708 0,000355708 0,000355708 0,000355708 0,000355708 0,0003551087 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000551607 0,000376066 0,0001284183 RSD % Lowest Q 2,68994E-00 0,000128658 0,000128658 0,000128653 0,000128653 0,000128653 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,000128655 0,00012855 0,000
Cu Zin Mo S Factor 5 FActor 5 FActor 5 FActor 5 Mg P K Ca S F F Ca Zin Min F F Cu Zin Mo S S Percent of Total Variable F Factor 1 PM2.5 Nia Cu Zin Mo S S	10,10112225 7,745596146 0 0 41,52669259 33,85456509 25,94186878 0 30,83649609 30,31804597 27,67010968 52,55445692 18,45422091 4,347542247 0 55,24645906 34,18202619 56,72424476 34,18202619 56,72424476 11,78795935 32,9295567 32,9295567 32,9295567 32,9295567 32,9295567 32,9295567 0 0 1,473789816 SLowest Q 81,25672091 9,320809309 0,616021079 0 1,326658356 2,777257905 0,0339392 0,058252081	10,01929173 7,709426039 0 41,6682773 33,80046781 1225,94188878 0 30,81340306 52,55845692 13,4542665 52,55845692 13,4542665 30,31804597 27,66454665 52,55845692 13,4542665 34,18190221 56,69673025 56,69673025 56,69673025 56,69673025 24,6515173 0 1,469762246 11,75530870 1,469762246 11,25576356 9,31644801 0,615868444 0,015265475 0,030225475 0,030225475 0,0358227133	11,0893529 7,719680368 0 0 41,48926991 33,81676035 ns 55th 25,9462972 0 0,04239278 30,84239278 30,84239278 30,84239278 30,3249354 27,67467922 52,5691048 18,46024377 4,347555309 5,247087322 13,2495533 41,177508019 32,33569093 43,03885773 6,984442288 24,47662914 0 0 1,472406844 1,472406844 1,472406844 1,472406844 0 1,32561881 9,31895782 5 1,32561881 9,31895782 0,616022166 0 0 1,326462272 2,76989528	22,86186366 10,08869705 7,72265367 7,72265367 7,72265367 0 0 41,50224501 33,8283797 25,95331705 0 30,8283797 25,95331705 0 30,8283203 30,3298203 30,3298203 30,3298203 30,3298203 30,3298203 30,3298203 30,3298203 30,3298203 31,25138358 34,19253344 56,72409605 5,724960036 6,988448497 24,4066757 9,320358921 0 1,473821148 500h 7 81,25710687 9,320358921 0,616060567 0 1,326602732 2,777475021 2,777475021 2,777475021 0,058249009 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,05824900 0,0582490 0,0582490 0,0582490 0,0582490 0,0582490 0,0582490 0,058249009 0,0582490 0,0582490 0,0582490 0,0582490 0,058249009 0,058249000 0,058	4,50488162 22,86878627 10,09351013 7,729874107 0 0 41,51314152 33,83968103 75th 25,96256061 0 30,85988125 30,3434693 27,69613062 52,5871498 18,47222105 4,35108794 13,25801712 34,20376999 56,7351347 11,73065171 32,95102854 4,35108794 13,25801712 34,20376999 56,7351347 11,73065171 32,95182685 43,05584421 6,991942922 24,49127203 0 0 1,47499237 75th 81,25846838 9,321497499 0,616102166 0 1,326660556 2,778176104 0,030339905 0,058258386	4,534368315 22,84882017 10,10112826 7,745596146 0 0 41,52669259 33,85456509 Max 25,97315419 25,97315419 0 30,87962535 30,87962535 30,03532017 27,71224112 52,6132382 18,48661073 4,35443902 0 5,25554605 13,26574589 34,21772113 56,74329068 11,8017739 4,35443902 0 0,52554605712 4,36442079 6,995074279 24,50160772 0 0 0,476447916 1,476447916 1,326816694 2,779490172 0,03034661694 2,779490172	4,49355328 22,86055464 10,08887121 7,72915443 0 0 41,5004676 33,82865274 Mean 25,95499523 0,38225949 30,3527534 27,68560823 52,57922189 18,46692794 4,350026789 18,46692794 4,350026789 18,46692794 4,350026789 11,2652361 56,72411281 11,78018456 32,94314741 43,04612852 6,987380001 24,48419452 6,987380001 24,48419452 6,987380001 24,48419452 0 0 0 1,473543006	0,018906884 0,010616862 0,0095806 0 0 0,014630965 0,013886697 0,013886697 0,013886697 0,013028066 0,013028066 0,013028066 0,013028076 0,0130287976 0,0023813079 0,01465395 0,003199231 0,000287976 0,003199231 0,0002987976 0,011645524 0,011987518 0,002185753 0,001851673 0,0001857208 4,2837276	0.004207557 0.000464418 0.000557757 0.001459782 0.00159782 0.000410501 RSD % mean 0.000325249 0.000410501 0.00042273 0.000422273 0.000422273 0.000422273 0.000422273 0.000422273 0.000422273 0.000422273 0.00042252 0.00051292 0.000551292 0.000551292 0.000551292 0.000552952 0.000551292 0.000552952 0.000552952 0.000552952 0.000552952 0.00055454 0.000205266 0.000025266 0.000025266 0.000025266 0.000025266 0.000025266 0.000025265 0.0001045851 0.000308581 0.00032452 0.0001284594 0.000128459 0.000128459 0.00014426 0.000198672 0.00014426 0.000198672 0.00014425 0.00014425 0.00014425 0.00014425 0.00014425 0.00014425 0.00014425 0.00020441	0,000463987 0,00055708 0,001156536 0,001156536 0,00155708 0,000355327 0,000410187 0,00037508 0,00037508 0,00042248 0,000428485 0,00048384 0,00055167 0,00055167 0,000376168 0,000376168 0,000376168 0,000376168 0,000376168 0,000376168 0,000376168 0,000376088 0,000376088 0,000376088 0,00037608 0,00037

Ba	0,590423005	0,589907203	0,590095164	0,590247524	0,59031625	0,59056062	0,590228145	0,000158468	0,000268486	0,000268398
Pb	0	0	0	0	0	0	0	0	0	0
AI	3,597040772	3,595624854	3,596632104	3,596922373	3,597436369	3,598024514	3,596942336	0,000568207	0,000157969	0,000157965
Ti	0.046222247	0.046222247	0.046244767	0.046250431	0.046257232	0.046269741	0.046248766	1.28949E-05	0.000278816	0.000278976
v	0.001248351	0.001247924	0.001249484	0.001249841	0.001250323	0.001251027	0.001249815	7.84895E-07	0.000628009	0.000628745
Cr	0.003427788	0.003427788	0.003456458	0.003468269	0.003476718	0.003505003	0.003466474	1.87429E-05	0.005406892	0.005467914
Mn	0.005349395	0.005347984	0.00535436	0.00535513	0.00535798	0.005360282	0.005355427	3 18212E-06	0.000594186	0.000594856
Fe	0.314826885	0.314734022	0.315035416	0.315109492	0.315213793	0.31533216	0.315102835	0.000151765	0.000481636	0.000482058
Ni	0,011020000	0,011701022	0,010000110	0,010100102	0,010210700	0,01000210	0,010102000	0,000101700	0,000 101000	0,000102000
Cu	0 002526024	0.002525054	0 002527007	0 00252752	0 002527000	0 002529990	0.002527551	7 70294E 07	0.000217745	0 000217792
Zn	0,0000000000	0.02264990	0,003337037	0,00333733	0,0033373335	0,003330003	0.000000749412	5.62691E 05	0,000217745	0,000217703
20	0,032000974	0,03204009	0,03270962	0,032743593	0,032771236	0,032000974	0,032740413	3,03001E-03	0,001721245	0,001715036
MO	0,003321725	0,003290709	0,00330779	0,003312731	0,003320594	0,003334156	0,003313448	9,35617E-06	0,002823697	0,002816661
S	0,015676894	0,015403796	0,015551534	0,01562399	0,015673072	0,015/92856	0,015616416	8,8466E-05	0,005664937	0,005643083
F + A		Statistics Over All Runs						0.15	DOD #/	505 er 1 . 0
Factor 2	Lowest Q	Min 25tr	1	50th /	5tn I	мах	Mean	Std Dev	RSD % mean	RSD % Lowest Q
PM2.5	95,12459884	95,1243592	95,12553217	95,12603376	95,12673027	95,12753534	95,12606813	0,00090993	9,56552E-06	9,56567E-06
Na	1,330561024	1,328375119	1,328867946	1,329516374	1,329873918	1,3305907	1,32944808	0,00068817	0,000517636	0,000517203
Mg	0,095811627	0,09570465	0,095719418	0,095756253	0,095778381	0,095825014	0,095754238	3,35237E-05	0,000350101	0,000349892
P	0,075268715	0,075264192	0,075270034	0,075276637	0,075283855	0,07529149	0,075277611	8,08365E-06	0,000107385	0,000107397
К	0,173964291	0,173717623	0,173743993	0,173836911	0,173880467	0,17398725	0,173828044	7,77588E-05	0,000447332	0,000446981
Ca	0	0	0	0	0	0	0	0	0	0
Sr	0,00330139	0,003296958	0,003298109	0,003299409	0,00330029	0,003302359	0,003299331	1,36922E-06	0,000415001	0,000414742
Zr	0,038113057	0,03810344	0,038106572	0,03810923	0,038111672	0,038115117	0,038109313	3,41607E-06	8,96386E-05	8,96298E-05
Ba	0	0	0	0	0	0	0	0	0	0
Pb	0	0	0	0	0	0	0	0	0	0
AL	1 567885986	1 567310294	1 567481672	1 567583304	1 567695827	1 567976761	1 567601087	0 000176276	0 00011245	0 000112429
Ti	0.042343632	0.042337587	0.042338411	0.042339625	0.04234097	0.042345176	0.042339951	2 16587E-06	5 11542E-05	5 11/98E-05
v	0.00182846	0.001827895	0.001828068	0.001828197	0.001828223	0.001828585	0.001828195	1.67028E-07	9 1362E-05	9 13488E-05
Cr	0,00102040	0.049767284	0.049774457	0.049776778	0.049779115	0.049782051	0.049776354	3 86819E-06	7 77113E-05	7 77065E-05
Mo	0,043773400	0.012496947	0.012497626	0,043770770	0.012/09/01	0.012490020	0,040770004	6 22125E 07	4 60200E 05	4 604295 05
Fo.	0,013407103	0,013400047	0,013407030	0,013407973	0,013400431	0,013403035	0,013400	0,001202-07	4,030332-00	4,034202-03
Ni	0,493340/33	0,490300722	0,49330/039	0,493324306	0,49333964	0,493380535	0,493326253	2,10082E-05	4,309902-05	4,30984E-05
	0,010001558	0,010009090	0,0100018/5	0,01000251	0,010062813	0,010004849	0,010062396	1,10119E-06	1,22925E-05	1,22903E-05
Cu	0,005446588	0,005441743	0,00544332	0,005443853	0,005444965	0,005446588	0,005444145	1,2269E-06	0,000225361	0,00022526
Zn	0	0	0	0	0	0	0	0	0	0
Mo	0,098490512	0,098490512	0,098502377	0,09850804	0,098514092	0,098524938	0,098507849	9,14908E-06	9,28767E-05	9,2893E-05
S	0,869716962	0,869698132	0,869786848	0,869845517	0,869891352	0,869951874	0,869841023	7,01812E-05	8,06827E-05	8,06942E-05
		Statistics Over All Runs								
Factor 3	Lowest Q	Min 25th	ı	50th 7	5th I	Max	Mean	Std Dev	RSD % mean	RSD % Lowest Q
PM2.5	96,58955866	96,58935036	96,59018965	96,59044063	96,59068797	96,59111321	96,5903784	0,000434778	4,50125E-06	4,50129E-06
Na	0	0	0	0	0	0	0	0	0	0
Mg	0,048321755	0,048261832	0,048278875	0,048283545	0,048301093	0,048334614	0,048289532	1,92057E-05	0,00039772	0,000397455
P	0,091277423	0,091271187	0,091273648	0,091274597	0,09127729	0,091279449	0,091275026	2,24022E-06	2,45437E-05	2,4543E-05
К	0.098369954	0.098293959	0.098302511	0.098325459	0.098345269	0.098387376	0.098329056	2.75105E-05	0.00027978	0.000279663
Ca	0.725334713	0.723756258	0.7241711	0.724459624	0.724729234	0.725636455	0.724523819	0.000460588	0.000635711	0.000635
Sr	0.00303269	0.003029945	0.003030558	0.003030827	0.003031506	0.003032778	0.003031067	7.58341E-07	0.00025019	0.000250056
Zr Zr	0.029720982	0.029718843	0.029721858	0.0297238	0.029725706	0.029726648	0.029723709	2 17264E-06	7 30945E-05	7 31012E-05
Ba	0,020720002	0,0207 100 10	0,020721000	0,0207200	0,020720700	0,020720010	0,020720700	2,172012.00	1,000102-00	7,010122.00
Ph	0 083983613	0.083941696	0 083947686	0 083960628	0 083969257	2033996580.0	0.083961117	1 506695-05	0 000179451	0 000179403
AI	1 034164824	1 034121941	1 034164926	1 034182301	1 034226252	1 034265278	1 034189309	3 87567E-05	3 74755E-05	3 74764E-05
Ti	0.012000070	0.012001470	0.012004175	0.01200552	0.012007022	0.012000070	0.012005465	2 01006E 06	0.000145264	0.000145226
N States and States an	0,013303073	0,013301473	0,013304173	0,01330333	0,013307032	0,013303073	0,013303403	2,01330E-00	0,000143204	0,000143220
v C-	0 001202200	0.001078060	0 001204221	0 001299009	0.001202509	0.00120769	0.001200725	E 00094E 06	0 004040077	0 004069969
UI Ma	0,001302290	0,001376262	0,001364331	0,001300090	0,001393506	0,00139700	0,001300733	3,90004E-00	0,004249077	0,004200000
Mn	0,007587638	0,007586289	0,00758692	0,007587235	0,007587558	0,007587797	0,007587193	3,9836E-07	5,25042E-05	5,25011E-05
Fe	0,206301751	0,206236781	0,206260386	0,206272687	0,206287669	0,206302923	0,2062/4298	1,9128/E-05	9,2/345E-05	9,27222E-05
Ni	0,009756483	0,009755515	0,009757658	0,0097586	0,009759948	0,009760701	0,009758636	1,44811E-06	0,000148393	0,000148426
Gu	0,003535475	0,003534974	0,003536063	0,003536526	0,003537036	0,003537478	0,003536474	6,71859E-07	0,00018998	0,000190033
Zn	0,134110664	0,134110664	0,134120364	0,134128432	0,134138505	0,134153115	0,134128975	1,15373E-05	8,60165E-05	8,60283E-05
Mo	0,095887153	0,095881858	0,095886931	0,095893526	0,095898895	0,095900013	0,095892313	6,19902E-06	6,46456E-05	6,46491E-05
S	0,823764844	0,823720669	0,823785868	0,823841591	0,823876558	0,823903528	0,823826874	5,56636E-05	6,75671E-05	6,75722E-05
		Statistics Over All Runs								
Factor 4	Lowest Q	Min 25th	ı	50th 7	5th I	Max	Mean	Std Dev	RSD % mean	RSD % Lowest Q
PM2.5	90,43362147	90,42797491	90,42989202	90,43054547	90,43172171	90,43362147	90,43071468	0,001390874	1,53806E-05	1,53801E-05
Na	0	0	0	0	0	0	0	0	0	0
Mg	0,237448667	0,237448667	0,237506184	0,237566409	0,237581863	0,237661931	0,237550922	5,39984E-05	0,000227313	0,000227411
Р	0,064322893	0,064305778	0,064311351	0,064314726	0,064319682	0,064330762	0,064315665	6,1855E-06	9,61741E-05	9,61633E-05
К	0,071047235	0,071031637	0,071082105	0,071139952	0,07118696	0,071274755	0,071137695	6,5372E-05	0,000918951	0,000920121
Ca	3,766642493	3,766642493	3,768118115	3,769156468	3,769739028	3,771530012	3,768996364	0,001230007	0,000326349	0,000326553
Sr	0,02654048	0,02654048	0,026547416	0,02655014	0,026551736	0,026556728	0,026549703	3,98353E-06	0,00015004	0,000150093
Zr	0,044041315	0,044027241	0,044032405	0,044036243	0,044039097	0,044043987	0,044035862	4,4303E-06	0,000100607	0,000100594
Ва	0.852617373	0.852617373	0.852803389	0.852892581	0.852938727	0.853018508	0.852868674	0.000101326	0.000118806	0.000118841
Pb	0,427728799	0,427728799	0,427808408	0,42784943	0,427869757	0,42791717	0,427837894	4,97151E-05	0,000116201	0,00011623
Al	2,410770158	2.41069122	2.410879317	2.410952655	2.411032817	2.411170457	2,410949804	0.000132995	5.51631E-05	5.51672E-05
ті	0.060742129	0,060742129	0,060748441	0,060751607	0,060755218	0,060757921	0,060751499	4,13843E-06	6,81206E-05	6.81311E-05
V	0	0	0	0	0	0	0	0		0
Cr	0.003375554	0.003321698	0.003340471	0.003349931	0.003357711	0.003375554	0.00334937	1.33156E-05	0.003975566	0.003944728
Mn	0.016522371	0.016522371	0.016523281	0.016523924	0.016524298	0.016525013	0.016523805	7.06885E-07	4.27798E-05	4.27835E-05
Fe	0,256809774	0.256767637	0.256785902	0.256798112	0.25680906	0,25683013	0.256798012	1.53237E-05	5,96721E-05	5.96694E-05
Ni	0.00293123	0.00292011	0.002923955	0.002925292	0.002927343	0.002931246	0.002925699	2.83328E-06	0.00096841	0.000966583
Cu	0,00233123	0,00232011	0,0020200000 N	0,002323232	0,002327343	0,002301240	0,002323039	2,000201-00	0,00030041	0,000300363
Zn	0	0	0	0	0	0	0	0	0	0
Mo	0 179737101	0.179697379	0.179721561	0 17973227	0.179741346	0.179758311	0.179730602	1 44221 E-05	8 02435-05	8 024025-05
S	1 145100955	1 144681471	1 144856609	1 144981942	1 145061564	1 145194297	1 144963663	0.000139224	0,02402 03	0.000121582
0	1,140100000	1,144001471	1,144050005	1,144301342	1,140001004	1,140104207	1,144000000	0,000100224	0,000121007	0,000121302
		Statistics Over All Runs								
Eactor 5	Lowert O	Min 25th		50th 7	5th	Mov	Moon	Std Dov	DSD % moon	PSD % Lowort O
PM2.5	02 12007074	02 12010497	02 12051025	02 12099520	02 12000101	02 12025992	02 12090474	0.000209009	2 24419E 06	2 24417E 06
Na	32,1233/3/4	32,1231340/	JE, 12331325	32,12300333	32,13000191	32,13023083	32,123004/4	0,000300098	0,04410E-06	0,04417E-06 ∩
Ma	0 206221900	0 206207427	0 206216522	0.206230015	0.20634330	0.206266420	0.506330000	1 657925 05	5 506205 05	5 50654E 05
n n n n n n n n n n n n n n n n n n n	0,290221809	0,23020/43/	0,200210003	0,29022805	0,29024329	0,290205432	0,290229999	1,00/02E-05	3,39039E-05	J,09004E-05
r V	0,075901469	0,0/5895918	0,075899688	0,075901852	0,075904189	0,075908148	0,075902149	3,1943E-06	4,20845E-05	4,20849E-05
N	0,432042866	0,432039392	0,432051543	0,432064781	0,432082934	0,43210262	0,432067803	1,99296E-05	4,61261E-05	4,61287E-05
ua .	5,335945999	5,335794659	5,335923718	5,336128704	5,336343815	5,336711601	5,336172799	0,000293513	5,50045E-05	5,50068E-05
sr	0,009396815	0,009395496	0,009396168	0,009396816	0,009397148	0,009397791	0,009396679	6,36751E-07	6,77634E-05	6,77624E-05
2r	0,005416678	0,005413803	0,005414559	0,005416075	0,005416672	0,005417939	0,005415828	1,20058E-06	0,000221679	0,000221645
ва	0	0	0	0	0	0	0	0	0	0
Pb	0,018850899	0,018824675	0,018837497	0,018839738	0,018844828	0,018850899	0,018840363	6,52622E-06	0,000346395	0,000346202
AI	0,900590412	0,900442704	0,900508594	0,900538845	0,900564038	0,900616143	0,900537781	4,10701E-05	4,56061E-05	4,56035E-05
Ti	0,057404349	0,057401132	0,057403294	0,057404305	0,057405065	0,057407442	0,05740412	1,6681E-06	2,90589E-05	2,90588E-05
V	0,002773691	0,002773262	0,002773424	0,002773527	0,00277368	0,002773863	0,002773541	1,56571E-07	5,64517E-05	5,64487E-05
Cr	0,005451039	0,005436807	0,005441229	0,005446435	0,005450377	0,005457215	0,005446515	5,54224E-06	0,001017575	0,00101673
			0.014769753	0.014770061	0.014770332	0.014770652	0.014770036	3,63087E-07	2,45826E-05	2,45827E-05
Mn	0,014769986	0,014769302	0,014/03/30	0,014770001	-,					
Mn Fe	0,014769986 0,679622558	0,014769302 0,679602383	0,679616311	0,679636236	0,679646983	0,67967543	0,679635986	2,10057E-05	3,09073E-05	3,09079E-05
Mn Fe Ni	0,014769986 0,679622558 0,001641879	0,014769302 0,679602383 0,001640622	0,679616311 0,001641498	0,679636236 0,00164184	0,679646983 0,001642405	0,67967543 0,001643301	0,679635986 0,001641863	2,10057E-05 6,67208E-07	3,09073E-05 0,000406372	3,09079E-05 0,000406368
Mn Fe Ni Cu	0,014769986 0,679622558 0,001641879 0,003024568	0,014769302 0,679602383 0,001640622 0,003023035	0,679616311 0,001641498 0,003023405	0,679636236 0,00164184 0,003023861	0,679646983 0,001642405 0,003024351	0,67967543 0,001643301 0,003024701	0,679635986 0,001641863 0,003023887	2,10057E-05 6,67208E-07 5,07212E-07	3,09073E-05 0,000406372 0,000167735	3,09079E-05 0,000406368 0,000167697
Mn Fe Ni Cu Zn	0,014769986 0,679622558 0,001641879 0,003024568 0	0,014769302 0,679602383 0,001640622 0,003023035 0	0,679616311 0,001641498 0,003023405 0	0,679636236 0,00164184 0,003023861 0	0,679646983 0,001642405 0,003024351 0	0,67967543 0,001643301 0,003024701 0	0,679635986 0,001641863 0,003023887 0	2,10057E-05 6,67208E-07 5,07212E-07 0	3,09073E-05 0,000406372 0,000167735 0	3,09079E-05 0,000406368 0,000167697 0
Mn Fe Ni Cu Zn Mo	0,014769986 0,679622558 0,001641879 0,003024568 0 0	0,014769302 0,679602383 0,001640622 0,003023035 0 0	0,679616311 0,001641498 0,003023405 0 0	0,679636236 0,00164184 0,003023861 0	0,679646983 0,001642405 0,003024351 0 0	0,67967543 0,001643301 0,003024701 0 0	0,679635986 0,001641863 0,003023887 0 0	2,10057E-05 6,67208E-07 5,07212E-07 0 0	3,09073E-05 0,000406372 0,000167735 0 0	3,09079E-05 0,000406368 0,000167697 0 0