Source Apportionment and assessment of Air Quality Index of PM₁₀ and PM₂.₅ in at two different sites in Urban Background Area in Senegal

Alassane Traore [2,*], **Moustapha Kebe** [1], **Manousos Ioannis Manousakas** [3], **Vasiliki Vasilatou** [4] **Ababacar Sadikhe Ndao** [1, 2], **Ahmadou Wague** [2], **Konstantinos Eleftheriadis** [4]

[1] Institut de Technologie Nucléaire Appliquée, Université Cheikh Anta Diop Dakar; moustaphakebe8@gmail.com (MK) ; asndao@yahoo.com (ASN) ;

[2] Faculté des Sciences et Techniques Université Cheikh Anta Diop Dakar;

[3] Laboratory of Atmospheric Chemistry, Paul Scherrer Institute (PSI), 5232, Villigen, Switzerland manousos.manousakas@psi.ch (MIM);

[4] E.R.L., Institute of Nuclear & Radiological Sciences & Technology, Energy & Safety, N.C.S.R. Demokritos,15310, Ag. Paraskevi, Attiki, Greece vassiliki@ipta.demokristos.gr (VV);   elefther@ipta.demokritos.gr (KE)

* Correspondence: alassanemeister@gmail.com ; Tel.: +221 77 605 08 45

Abstract: The identification of the particulate matter (PM) sources and the quantification of their contribution are an important step to assess the PM effects on human health and understand the behavior of PM in the specific environment. Information about the composition of the organic or inorganic fraction of PM are usually used for source apportionment studies. In this study that have been performed in Dakar, Senegal, the identification of the sources of two PM fractions was performed, by combining measurements of the elemental composition using x-ray fluorescence techniques and elemental carbon content. Four PM sources were identified using PMF: Industry emissions, mineral dust, traffic emissions and sea salt/secondary sulfur. Based on the results, the Air Quality Indice (AQI) was the highest values of AQI are approximately 211 and 197, respectively in Yoff and HLM. Potential Source Contribution Functions (PSCF) plots revealed that the high effect of transported dust from the desert regions to PM concentration in the sampling site. To the best of our knowledge, this is the first study of this kind published for Dakar, Senegal.

Keywords: aerosol; Positive Matrix Factorization (PMF), metals composition
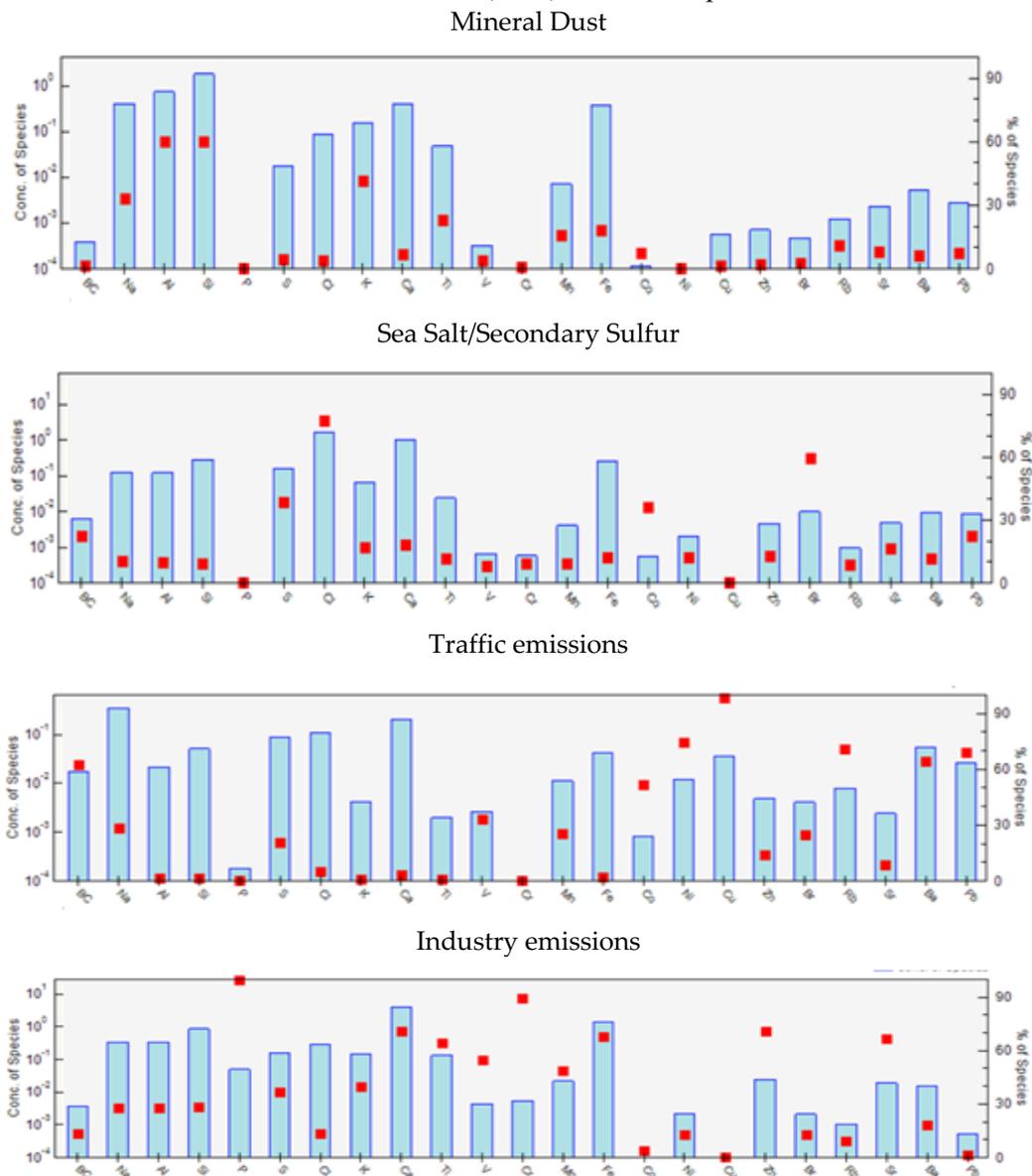

Figure 1: Particulate Matter sources profiles