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The chemical composition of atmospheric aerosol is responsible for the impact of particulate matter on human health and, at a larger scale, on the ongoing climate changes.
The Arctic regions are showing to be the first areas affected by the present climatic variations. Consequently, the study of the chemical composition of atmospheric aerosol in the polar areas is important to understand the feedback processes between the climate forcing and the environmental responses [1, 2].
In this study, the concentrations of main and trace metals in the PM_{10} collected at Ny-Ålesund (Svalbard Islands) during the spring and summer 2010, 2011 and 2012 campaigns were determined. The results obtained reveal an evident seasonal pattern in the temporal profiles of the majority of the chemical components of the PM_{10}, that show higher atmospheric concentrations in March-April. The most likelyexplanation for thistrendis the influence of continental sources on the composition of the Arctic PM_{10}. Indeed, Svalbard Islands are affected by aerosols coming from anthropized continental areas by long range transport processes, especially occurring in early spring.
The enrichment factors, calculated considering Al as a crustal reference element, are higher than 100 for Zn, Mo, As, Cd, Pb and Na, indicating their non- geogenic origin (anthropogenic sources and sea spray).
The final dataset was treated by chemometric techniques. Principal Component Analysis showed an evident separation between spring and summer Arctic PM_{10} samples. Factor Analysis identified four factors: F1 – geogenic source (Al, Fe, Mn, Ba, Ti and REEs with exception of Ce); F2 – sea spray source (K, Na and Mg); F3 – combustion processes source (As, Cd, Co, Ni, V, Pb and Zn); F4 – wear-related source (Cu, Zn and Ce).
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[1]M.E. Gagne, N.P. Gillett, J.C. Fyfe, Geophys. Res. Lett. 42 (2015) 8481-8488.