Origin and transportation course of heavy metal elements in the particulate matter (PM) at the Hachimantai mountain range in northern Japan

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Abstract

Particulate matter (PM) was collected at the Hachimantai mountain range in northern Japan. In the present study, the origin and transportation course of the heavy metal elements were discussed for PM_{fine} and PM_{coarse}, determined by using PIXE (Particle Induced X-ray Emission) and back trajectory analyses. The result shows that the PM_{fine} emitted mainly from artificial sources, compared with the PM_{coarse} from natural sources, since the Enrichment Factor (EF) value and S/K ratio of PM_{fine} was one order higher than that of PM_{coarse}. The origin of Pb in PM at Akita Hachimantai mountain range has both of the anthropogenic and the metal refining origins, using the analysis of Pb/Br. Furthermore, from result of back trajectory analysis when the air mass was transported over the Japanese Islands, the air mass was mainly passed over the large-scale industrial area in Japan. The origin of As and Se were mainly gasoline and coal combustion, and were transported from Chinese continent and/or Korea peninsula.