PIXE analysis of atmospheric deposition samples

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Abstract

After the Fukushima nuclear power plant accident, the level of radioactive Cs in the atmosphere became higher than before in certain parts of Japan. In this study, the components of atmospheric particles were investigated to determine the origin of this radioactive Cs. The Particle Induced X-ray Emission (PIXE) method was applied in a multi-element analysis of atmospheric deposition samples collected from fixed locations in the Fukushima and Ibaraki prefectures. The deposition amounts of Cl, Na, Si, and Al showed the contributions of sea-salt aerosols and soil particles. At a location where the deposition amount of radioactive Cs and the variation in its atmospheric levels were small, a positive correlation was found between soil-derived elements (Si, Al) and radioactive Cs in deposits. However, the relationship was unclear at other locations where the deposition amount and the variation in atmospheric levels were relatively large. This suggests that a component other than soil particles, containing radioactive Cs, contributes to the atmospheric radioactive Cs levels at the studied locations.