Geophysical Research Abstracts
Vol. 15, EGU2013-5090, 2013
EGU General Assembly 2013

Variation of atmospheric concentarations of I-131, Cs-134 and Cs-137 observed over eastren Japan: contribution of leakage from Fukushima Dai-ichi Nuclear Power Plant and secondary emission from soil and vegetation.

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A huge amount of radionuclides were emitted and extensively diffused from nuclear plant facilities by the accident in Fukushima Dai-ichi Nuclear Power Plant (FDNPP) on 11 March, 2011. Soon after the FDNPP accident, many Japanese researchers started monitoring radionuclides in various environmental fields to understand extent and magnitude of radioactive pollution. This paper shows the variation of atmospheric concentrations of I-131, Cs-134 and Cs-137 obtained by an observation network of investigators in The Japanese Geoscience Union, The Geochemical Society of Japan and The Japan Society of Nuclear and Radiochemical Sciences. We also continuously observed atmospheric concentrations and deposition fluxes of I-131, Cs-134 and Cs-137 intensively in Kawamata-town near Fukushima.

The observed temporal and spatial variations of atmospheric concentrations of these radionuclide showed that a leakage from FDNPP mainly supplied them to the atmosphere till September 2011. Although atmospheric concentrations of the radionuclides decreased gradually after the FDNPP accident in the average, increases of those of a factor of 10 – 100 had often been observed. These increase occurred when an atmospheric advection can be occurred from FDNPP.

After September 2011, atmospheric concentration of radioactive cesium has not decreased significantly and their values depend on the the radioactive cesium concentration deposited there. Extensive observation at Kawamata has showed that atmospheric radioactive cesium have been mainly supplied by secondary emission (re-suspension) from soil and vegetation since September 2011 till now.