Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

MAG34-11 Room:IC Time:May 24 11:00-11:15

Radioactive fallout: lesson from Chernobyl and what could be experienced for the Fukushima post-accidental situation

MASSON, Olivier[1*]

[1]Nuclear Safety and Radioprotection Institute

Most of northern hemispheric countries have experienced radioactive fallout (from atmospheric nuclear weapon tests, Chernobyl or from Fukushima) but except in the case of the global fallout, various impacts were noticed both at short time scale and in the context of more or less long post-accidental situations. It is probably too early to determine precisely the evolution in the environment of the radionuclides that were released by the Fukushima accident. Thus it could be interesting to share our point of view both in the light of our respective experience of radioactive fallout and deposition and considering the respective environmental features of Europe (France) and Japan. What we have learnt from Chernobyl and what information is still needed and could be experienced from the Fukushima accident or applied to the Fukushima situation, is of great concern in the framework of atmospheric deposition.

Of course, distance from the source is a key (first order) parameter as well as initial conditions that yield to deposition mapping. After initial deposition, contaminated areas act as a delayed and secondary source that can explain the resilience of formerly deposited radionuclides in the atmosphere.

At European scale, Chernobyl provides a lasting step effect in the time series of airborne levels whereas Fukushima did not. This lasting step effect belonged to resuspension mechanisms that became rapidly predominant as the airborne levels drop down radically. Resuspension and biomass burnings provided most of the peaks of activity levels in France. Those mechanisms are encountered in France as well as in Japan but probably with different magnitude and possibly with different consequences regarding the evolution of the background level. A review of those mechanisms and their respective importance will be presented.

Spatially, we observed some deposition heterogeneity that corresponds first to different deposition patterns, especially in mountainous ecosystems. Snow and cloud deposition are among the main typical patterns that distinguish deposition conditions in highlands and lowlands. Occult deposition by cloud/fog water can explain higher levels at altitude locations compared to what could be expected from a rain deposition relationship. In addition, this study could benefit to lowlands and coastal areas where fogs occur, either seasonally or on a regular basis.

Results obtained in samples taken at the summit of a low-altitude mountain will be commented.

Keywords: airborne radioactivity, 137Cs, deposition, resuspension, chernobyl, fukushima