Fukushima Dai-ichi and the Ocean: 10 years of study and insight Abstract Submission Form : Entry # 61

Name

Mizuo Kajino

Title

Dr.

Affiliation

Meteorological Research institute, Japan Meteorological Agency

Email

kajino@mri-jma.go.jp

Country

Japan

Additional Authors (names only)

Tsuyoshi Thomas Sekiyama
Kouji Adachi
Takeshi Kinase
Yuji Zaizen
Yasuito Igarashi

Session

What happened

Abstract Title (English, limited to 300 characters)

Dispersion, deposition, and re-suspension of radiocesium in East Japan

Abstract (English)

Numerical simulation studies on dispersion, deposition, and re-suspension of radio-Cs in East Japan conducted by our research group are summarized in the presentation. In the dispersion and deposition study, to assess the uncertainty of meteorological simulations in the transport and deposition of radio-Cs, a multiple meteorological model and module ensemble analysis with a single chemical transport model (CTM) was conducted. We concluded that the underestimation of the deposition efficiency of CTM was the reason for the underestimation of simulated radio-Cs deposition, whereas the simulated dispersion and precipitation and estimated source term were all reasonable. The current ensemble study indicated that in-cloud scavenging was the most dominant mechanism of radio-Cs deposition, followed by dry deposition and fog deposition over the entire land area. In some deposition regions, fog deposition was dominant, exceeding 80%, depending on the simulations. The simulated concentrations and depositions varied by more than two fold, depending on the selection of the meteorological field. We also assessed the non-negligible impacts of Cs-bearing solid microparticles (CsMPs) on the dispersion and deposition of radio-Cs in East Japan. In the re-suspension study, the long-term effect of Cs-137 re-suspension from contaminated soil and forests has been quantitatively assessed by numerical simulation, a field experiment on dust emission flux in a contaminated area, and surface air concentration measurements inside and outside the contaminated area. The dust emission model could reproduce the air concentration of Cs-137 in winter, whereas the summer air concentration

was underestimated by 1 to 2 orders of magnitude. Re-suspension from forests at a constant rate of 1e-7 /h, multiplied by the green area fraction, could explain the air concentration of Cs-137 in the contaminated area and its seasonal variation. Still, the re-suspension mechanisms, especially through the forest ecosystems, remain unknown. Additional research activities should investigate the processes/mechanisms governing the re-suspension over the long term through additional field experiments and numerical simulations.