

Atmospheric Dispersion of Radionuclides Originating from Hypothetical Accidents in Turkish Nuclear Power Plants

Although nuclear power is considered to be economically beneficial, it has serious risks for environmental and human health. Turkey plans to build two nuclear power plants in Mediterranean and Black Sea coastlines: Akkuyu and Sinop NPPs. The atmospheric dispersion of Cs-137 to be released from potential accidents in these plants were modeled and total ground deposition of Cs-137 were estimated using a Lagrangian particle dispersion model – FLEXPART. The NCEP dataset used for meteorological input was a 6 hourly dataset with 0.5×0.5 -degree resolution. A total of 6 scenarios were simulated to assess potential consequences of a nuclear accident under distinct atmospheric conditions. All simulation results were visualized for the dispersion and deposition of radionuclides, and relative comparisons were made between the scenarios. The results were a strong function of regional meteorology. It was found that that the radioactive plume mainly moved towards south and ground level depositions were higher in the southern regions in the simulations conducted for August 2010, while an opposite situation was observed in the simulations conducted for December 2009. Simulated deposition values were ten times lower than the depositions observed after Chernobyl accident due to the differences in the main source term.

Primary author: BILGIC, Efem (Dokuz Eylul University)

Presenter: BILGIC, Efem (Dokuz Eylul University)

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