High resolution climatology
- towards climate change services

Modelling dispersion processes of hypothetical nuclear accidental release on different scales

R. Mészáros (1), I. Lagzi (2), F.Jr. Molnár (1), Cs. Vincze (1), Á. Leelőssy (1), and T. Kovács (3)

(1) Eötvös Loránd University, Department of Meteorology, Budapest, Hungary (mrobi@nimbus.elte.hu), (2) Northwestern University, Department of Chemical and Biological Engineering, Evanston, Illinois, (3) Institute of Radiochemistry and Radioecology University of Pannonia, Veszprém, Hungary

An increased attention of anthropogenic effects on the environment was observable in the last decades. As more nuclear, biological and industrial accidents occurred in the different part of the world, there is an increased demand both on the part of population and scientific society for the understanding and effective prediction of the environmental, social or economical effects of continuous or a possible accidental release. On the basis of sophisticated dispersion model calculations, the decision makers could make important arrangements, which can save human lives. For this purpose, accidental release models for different spatial and time scales were developed. Model estimations of radionuclide dispersions from the Paks Nuclear Power Plant (Hungary) were also carried out from regional to local scales. With the TREX-Euler, multi-layered, Eulerian passive tracer dispersion model, the transport and deposition of air pollutants over the Central European region were simulated under different weather conditions. For mesoscale simulation of accidental release, the stochastic TREX-Lagrangian particle model was chosen and developed. Both hypothetical accidental releases and continuous environmental loads were simulated. Additionally, near the point source, CFD simulations with A2C model were evaluated. Model estimations on different scales and their sensitivity analyses are presented in this study.