HARP – A Software Tool for Decision Support during Nuclear Emergencies

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Abstract of oral presentation and poster

The contribution presents software system HARP designed for fast assessment of radiological consequences of accidental releases of radionuclides into the living environment. A special segmented Gaussian plume model is introduced, which can take into account both short-term meteorological forecast and release dynamics of discharged admixtures. The system offers various alternative options of input parameters definition of the release scenarios in their atmospheric, deposition, ingestion and dose parts. For that reason the software product can serve as a training tool enabling responsible staff to improve their knowledge and perception of the problem details.

A special emphasis is laid on proper treatment of types of input parameter fluctuations in sense of differentiation between variability and uncertainty. Some model errors arising from the conceptual limitations can be roughly estimated on the basis of computations with alternative submodel options (atmospheric dispersion formulae for smooth/rough terrain, effect of near-standing buildings, influence of size of aerosol particles on dry deposition velocity, variability in Julian day of radioactive fallout, alternative semi-empirical expressions for time evolution of deposited radioactivity on terrain and some others). The options can be entered interactively from the screen and provide fast response for comparison.

Our presentation demonstrates the initialisation of computation runs consisting in interactive definitions of accidental release scenario, atmospheric and deposition parameters and dynamic food chain model data. Visualisation of radiological outputs and various countermeasure actions can be done on the proper map backgrounds of the NPPs operating in the Czech Republic.