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Long-term modelling for estimation of man-induced environmental risks

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As a part of the EU coordination action project ENVIRO-RISKS the long-term regional and transboundary atmospheric transport, dispersion, and deposition of atmospheric pollutants is investigated. Focus is on pollutants originating at nuclear and chemical risk sites of the NIS countries. Potential sources of atmospheric pollution include chemical and metallurgical enterprises and smelters, former testing polygons of nuclear weapons, and nuclear plants and facilities. These are situated within territories of Kazakhstan, Ukraine, and Russia (the Siberian, Ural, Krasnoyarsk, and Kola regions). The atmospheric pollutants considered are radionuclides such as Cs-137, I-131, and Sr-90 as well as sulphates and heavy metals. The Danish Emergency Model for Atmosphere (DERMA) is employed for simulations using 3D meteorological fields from the European Center for Medium-range Weather Forecasts.

The modeled concentration and deposition fields of atmospheric pollutants are used as input into further collaborative studies to estimate the man-induced environmental risks from regionally and remotely located potential sources with a focus on Siberian territories. The temporal and spatial variability of these fields and the probabilities and contribution of removal during atmospheric transport are evaluated.

Possible approaches for further GIS integration and use of obtained results are discussed with respect to estimation of man-received doses and risks, impact on environment with a focus on forests, applicability for integrated systems for regional environmental monitoring and management, and others.