



Modelling long-term Accumulation of Radionuclides in the Soil-Plant-System originating from continuous Groundwater Contamination – a Sensitivity Analysis

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A risk assessment of a final deposit of radioactive fuel waste should take into account the effect of an eventual long-term radioactive contamination of groundwater on possible accumulation of radionuclides in the soil-plant-system. The overall objective of the proposed project is to elucidate the possible long-term effect (i.e. 10.000 y) of a continuous groundwater contamination with a radionuclide on accumulation in the soil-plant-system. The specific objectives are to assess: i) What proportion of the added radionuclide will accumulate in the soil-plant-system? ii) Where in the soil-plant-system will it accumulate? iii) Which ecosystem characteristics are important for the accumulation? and iv) Under which circumstances do losses occur? This will be done using a model describing the transport and accumulation in the soil-plant-system of a radionuclide originating from a groundwater contamination (Gärdenäs et al. 2006) and the sensitivity toolbox EIKOS (Ekström & Broed, 2005). The sensitivity analysis is done for three ecosystems which differ in hydrological conditions, i) a mixed forest of Pine-Spruce (*Pinus-Picea*), ii) a Birch (*Betula*) forest, and iii) European Alder (*Alnus Glutinosa*). The daily fluxes of carbon and water are simulated by an external model, CoupModel (Jansson & Karlberg, 2004) or Rue (Noronha-Sannervik, 2003). The toolbox EIKOS is used for testing the sensitivity of the radionuclide accumulation in the soil-plant-system to various parameters, e.g. allocation pattern of radionuclide, adsorption capacity of soil particles and depletion concentration. The results of the Monte Carlo simulations will be presented.