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of the Release and Migration of Radioactive Xenon Through the Soil by Means of AMBER Compartment Model Software

As a first step of a more general study on the dispersion of radioactive products from an underground nuclear test, we have tried to define the dynamics of the inert gaseous products migration in the underground environment in which a hypothetical nuclear test has been carried out. The identification of the transport mechanism through the geosphere could be combined with the modeling of the migration paths, in order to identify the possible accumulation points to be surveyed and sampled in the framework of an On Site Inspection. We applied a deterministic approach by using the software AMBER, a compartment model that estimates the concentrations of radioactive compounds in soils, rocks and groundwater, for the design of a sampling strategy and to understand the dispersion of gaseous radioisotopes in the atmosphere. After appropriate validation, we have evaluated the potentiality of this software, originally designed for the performance assessment of a radioactive waste disposal, in order to verify and extend its possible application also in verification activities related to CTBT treaty. A preliminary AMBER modelization of a realistic case study of xenon migration from a hypothetical underground release source through the soil, up to its interface with the atmosphere, is discussed.

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