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Evaluating the sustainability of sites for nuclear facilities under the effects of climatic changes on variability of the effective dose to the representative person

The radiological environmental impact assessment, as part of the safety evaluations for authorizing nuclear facilities, in addition to the characteristics of the planned radioactive releases and information on members of the public distribution and habits, requires the knowledge of the meteorological variables which are relevant for the estimation of doses to the representative person. Climatic changes, which may happen in relative short periods, introduce an additional source of uncertainties. Presently, when weather anomalies are being observed more frequently, it is necessary to evaluate the impact on the doses of such anomalies. This has motivated LARE to reevaluate the effective dose (ED) under the hypothesis of weather annual variability, and to compare with the results using climatological averages. Among the variabilities considered, the estimated ED only showed some deviations in relation to the rainfall. The effects of rainfall variability are limited to distances up to 5 km from the source. Within this distance, for the rainier scenarios, the wet deposition causes more radionuclides to become available over the surfaces, increasing the ED in relation to the estimations using mean values. The opposite is observed on the drier scenario. Beyond 5 km, the two extreme scenarios behave similarly to the mean. Despite the deviations observed, doses in all the scenarios remained much lower than the dose criteria established, warranting the site's sustainability. This work is part of the expert recommendations of a recent IAEA mission.

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