

Application of Monte-Carlo-Based Sensitivity Analysis to Long-Term Performance Assessment Models for Final Repositories

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Safe final disposal of radioactive waste is an issue for very long times. Long-term performance assessment for a repository can only be done by performing numerical modelling of the contaminant transport through the geotechnical and the geological system as well as the biosphere. There are, however, a lot of uncertainties in such systems, which have to be handled with specific care in order to achieve reliable results. This can be done by performing probabilistic uncertainty and sensitivity analysis. Models for numerical analysis of real disposal systems are typically rather complex and often highly non-linear. Some parameters may cause a quasi-discrete behaviour, meaning that the model output changes essentially at a specific value. Another particularity is that typically, the model output varies over several orders of magnitude, in which low values dominate, but are of minor interest. It is even possible that the output is dominated by exact zero values. Such model properties can cause a strange behaviour of both regression-/correlation-based and variance-based sensitivity analysis methods. Some examples of such problems and ideas for handling them are presented.