Response to Community Comments #2 by: Ulrik Kautsky

- We had an additional important comment to the manuscript lost in my previous post.
  Many of the claims regarding ecology and human health are outside of the scope of the study especially given the simplifications that have been made regarding the hydrology of the biosphere. An attempt to extrapolate results into these areas is not properly motivated. Results of the study will stand for r themselves without having to extrapolate them into areas outside of the study's scope which, at present, is largely theoretical.

We thank Ulrik Kautsky for the comment. Our aim is not to specifically claim what implications the results might have for the understanding of the impact of radionuclide migration on human health and ecology. The paper indicates that there is potentially a relationship between the results and the rate coefficients of radionuclide transport models used for the biosphere assessment, which, in principle, would have wider implications. Further, the contaminated area distribution is a factor for transport modeling. Therefore, we revised the parts of the paper describing the implications of the results for ecology and human health, in order to avoid any misunderstanding.

Lines 422-424 will be revised as:

> *Hence, the results from models of radionuclides transported by deep groundwater flow within the streambed sediment need to be considered as a basis for transport modeling in the biosphere, and for assessing doses to humans.*

Lines 56-58 will be revised as:

> *In particular, the residence times of radionuclides in streambeds and the sizes of regional groundwater discharge areas may be affected by hyporheic flows, which could be used as the input in dose assessment models to investigate radionuclide's spread in surface water over long periods.*

Lines 452-454 will be revised as follows:

> *Hence, a higher retardation factor in Quaternary deposits and sediments compared to that in bedrock leads to the accumulation of radionuclides within aquatic sediment for long periods of time , which needs to be considered in dose assessment models concerning the potential prolonged exposure of humans to radiological doses.*