



FUTU(R)e

eurad
European Joint Programme
on Radioactive Waste Management

WP FUTURE

Eurad-Predis Webinar on Digital Twins

16 Februar 2021 • Zoom •

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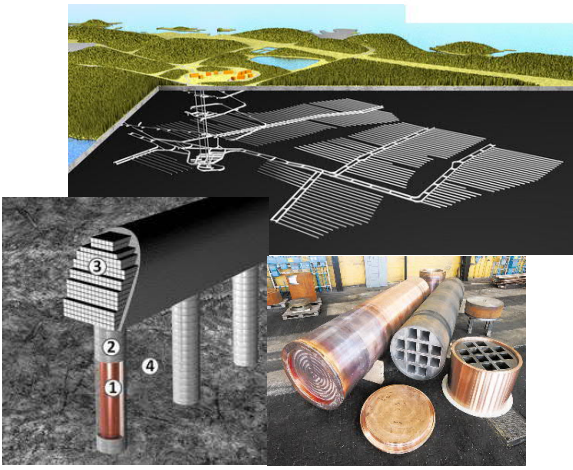
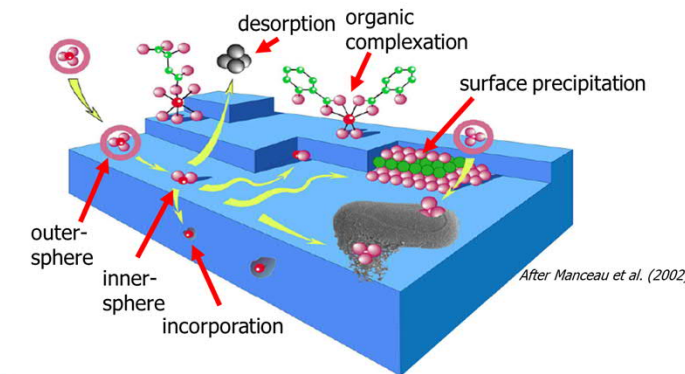
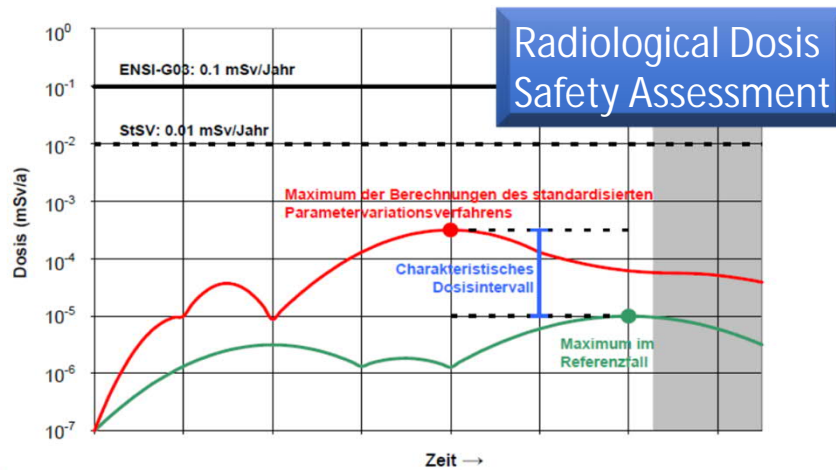


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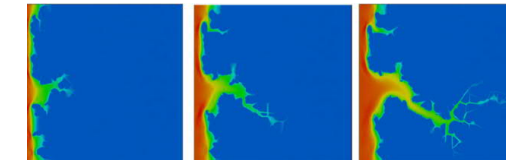
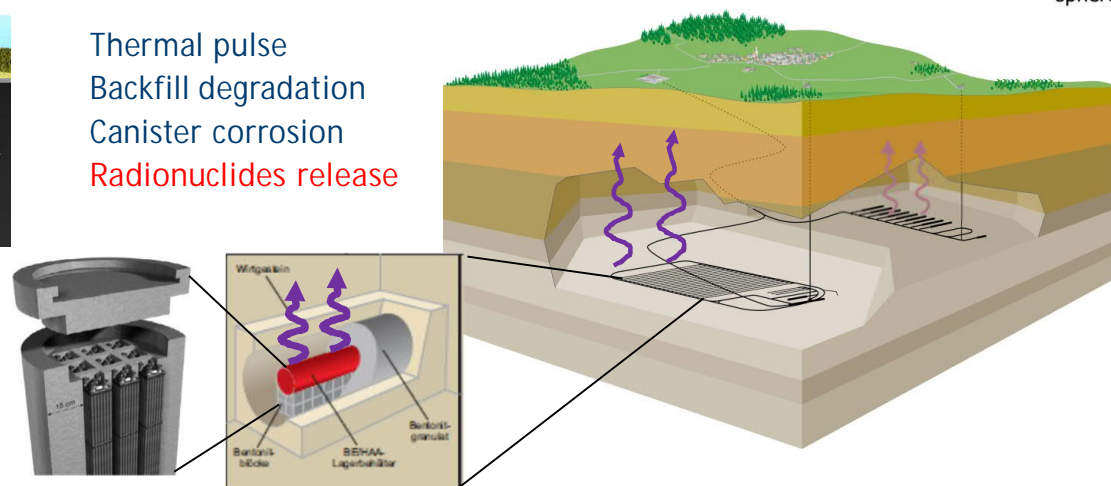
16/02/2023

Eurad-Predis Webinar on Digital Twins

WP-FUTURE: FUNDAMENTAL UNDERSTANDING OF RADIONUCLIDE RETENTION

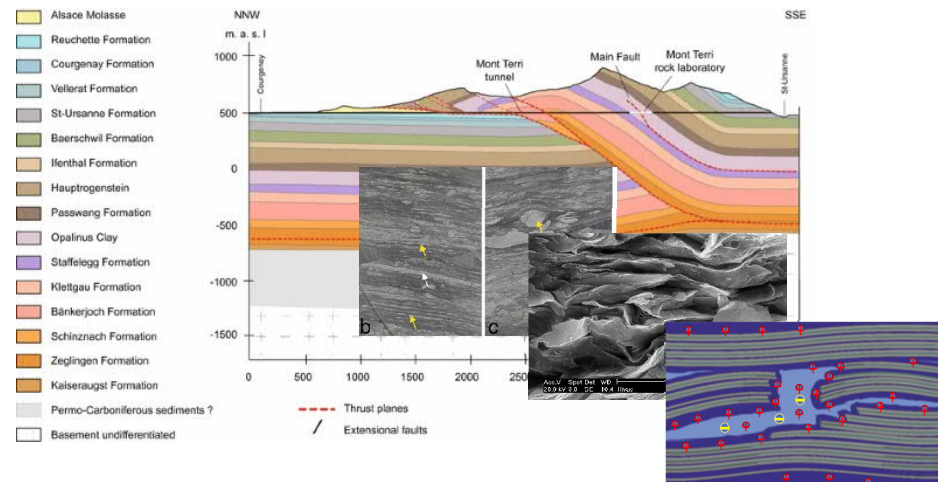
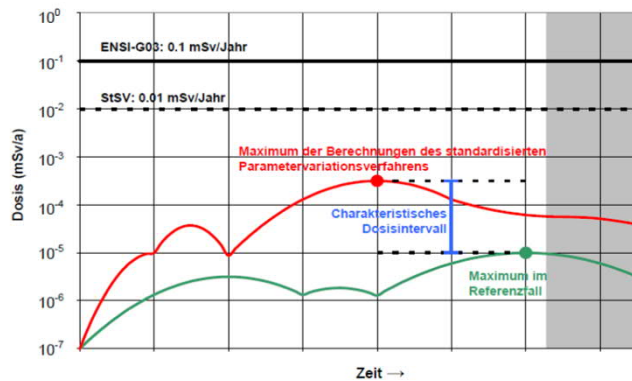


Thermal pulse
Backfill degradation
Canister corrosion
Radionuclides release



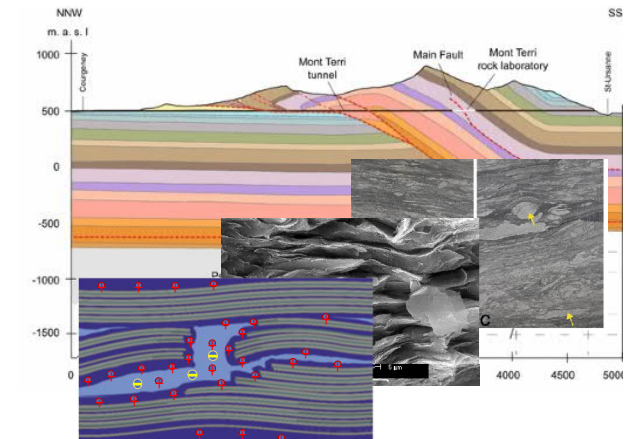
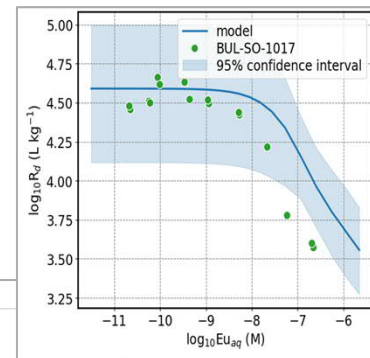
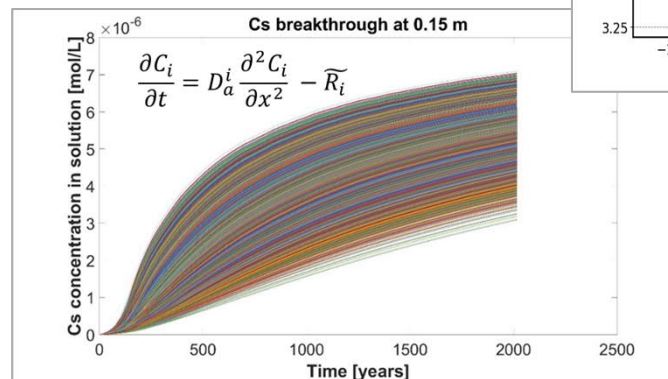
RELEVANCE OF WP FUTURE

- Retention and transport of radionuclides in host rocks are the basis for dosis calculations. Dosis calculations are an essential part of the safety assessment and the site selection criteria/repository design.
- Host rocks are intrinsically heterogeneous materials with complex chemistry and hydraulic properties.
- Traditional Dosis calculations are conducted based on simplified models assuming "static" properties of host rocks. Uncertainty analysis is implemented based on conservative estimates.



DIGITAL TWINS AND DIGITAL TOOLS IN WP FUTURE

- Conceptual framework for parameter upscaling: Lab-Field-Repository
- Numerical models for coupled physicochemical processes in laboratory and in field
- In silico Digital twin on laboratory experiments
- Simulators of transport processes:
 - RN-transport simulations
 - Uncertainty analysis
 - Scenario estimations

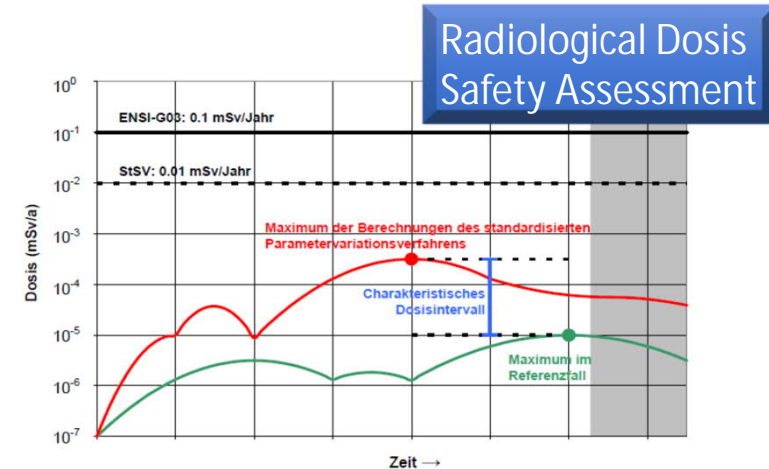


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IMPACT AND RELEVANCE FOR END USERS

- Essential research tool for understanding of process couplings
- Evacuation and minimization of uncertainties
- Reference process simulator for WMO organizations



CHALLENGES AND NEEDS FOR FURTHER DEVELOPMENT

- Digitalization of geological data and automated characterization of rocks
- Development of surrogate models for RN transport and retention
- Accelerated geochemical simulators