Federal Office
for the Safety of
Nuclear Waste Management

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Towards best possible safety - Current regulatory research for the German site selection process for high-level radioactive waste disposal

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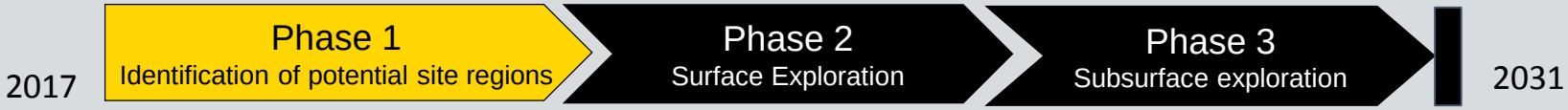
Regulatory research within BASE

The Federal Office for the Safety of Nuclear Waste Management (BASE)

- is the federal regulatory authority for radioactive waste disposal
- supervises the site selection process for a repository for high-level radioactive waste and is responsible for the accompanying public participation
- performs task related research to fulfill its tasks

German siting process (regulated in German Site Selection Act – StandAG, 2019) from white map to site decision

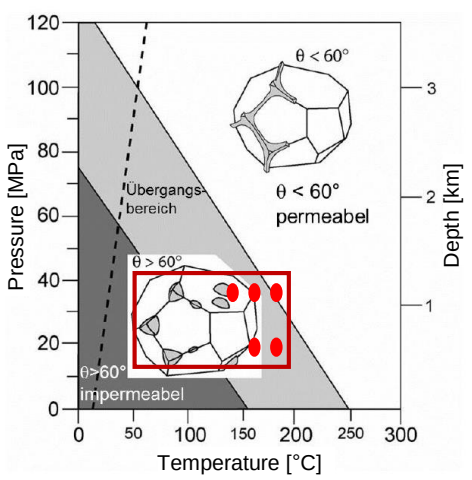


guided by i) exclusion criteria, ii) minimum requirements, iii) weighting criteria, iv) preliminary safety assessments

Current research activities in the context of the site selection process address

- geoscientific questions
- methodological aspects of the implementation of the site selection process
- public participation aspects

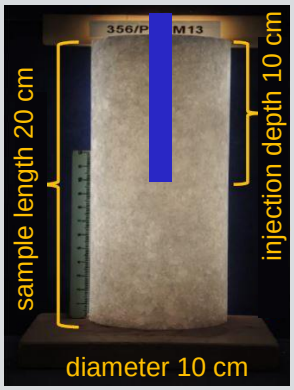
„PeTroS“ - *Research on percolation in rock salt*



(after Lewis & Holness 1996)

● = run conditions; each P-T condition
1 x N_2 (gas); 1 x NaCl brine

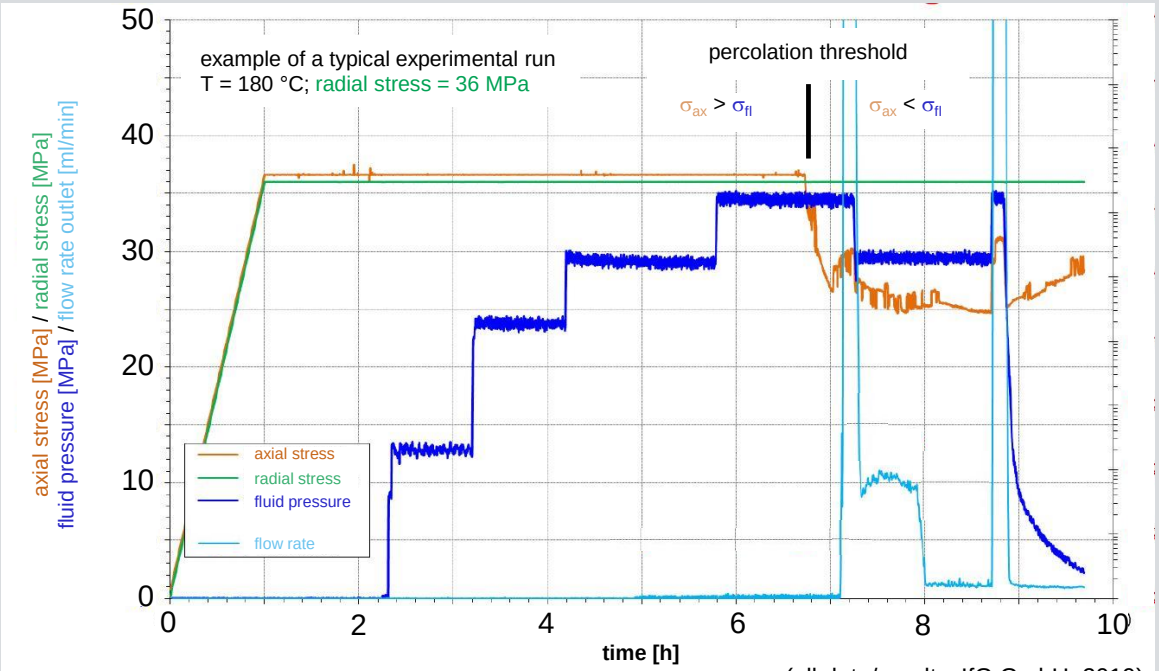
central fluid injection P_{fl}



natural rock salt samples

Postulated fluid percolation in rock salt below minimum stress criterion (Lewis & Holness 1996; Ghanbarzadeh et al. 2015)

➡ Experimental study on fluid percolation in rock salt
[carried out by IfG GmbH; FKZ 3617E03250]



(all data/results: IfG GmbH, 2019)

- no / insignificant fluid flow below minimum stress criterion
- discrete percolation threshold present

„KaStör“ - *Research on active fault zones*

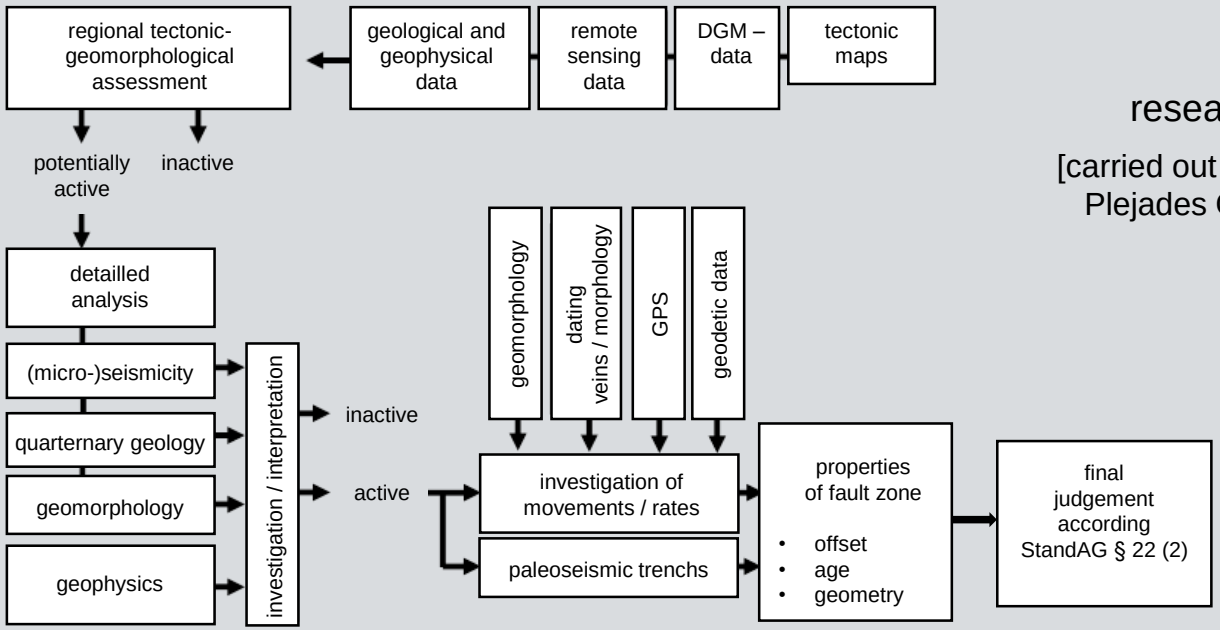
„active fault zones“ as defined by the Site Selection Act [§ 22 (2) Nr. 2] as exclusion criterion require:

- significant displacement along the faults as well as extensive fracture / damage zones,
- movement within the past 34 Mio years

How to detect, define, date „active fault zones“?

research project „KaStör“

[carried out by Beak Consultants GmbH
Plejades GmbH; FKZ: 4717F01301]



- compilation of current state of knowledge on fault zones in Germany
- compilation of available methods for detection and interpretation of fault zones
- suggestion of a work-flow for application of the StandAG § 22 (2)

Regulatory research within BASE

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Further research activities (brief overview):

Projects ***MessEr*** and ***übErStand*** compile state of science and technology with regard to surface based exploration methods. The foci are on methods suitable for addressing the criteria and requirements set out in the German Site Selection Act.

The project ***Grenztemperatur*** compiles the temperature dependency of the different THMC/B processes according to available FEP catalogues for rock salt, clay stone, and crystalline rock. (see D995 / EGU2020-3336 and D1016 / EGU2020-20302)

The project ***MaBeSt*** reviews methodological approaches to safety oriented weighting of different criteria and comparison of different potential regions and sites with special emphasis on multi criteria analysis (MCA) and multi criteria decision analysis (MCDA).