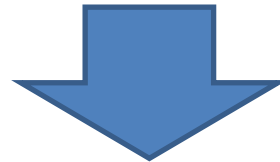


Meiringen, June 17-18, 2014

WP2 - EROSION

Work Package 2: MAIN OBJECTIVES

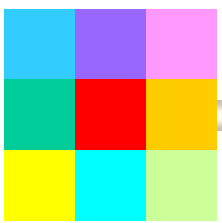
To understand the main mechanisms of clay particle erosion from the bentonite surface and to quantify the (maximum) extent of the possible erosion under different *physico-chemical conditions*.



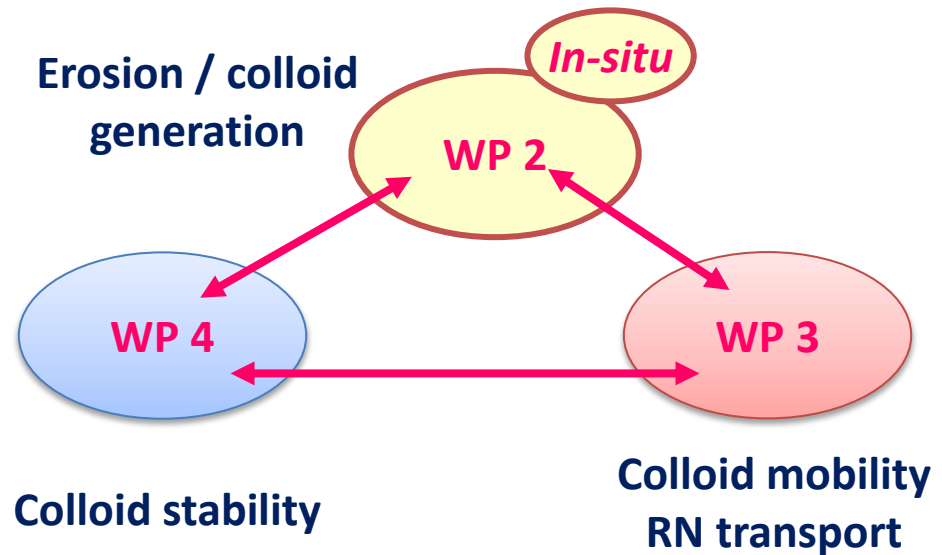
1. Analysis of bentonite erosion is important for establishing the functionality of the bentonite barrier at the long-term, which could be compromised if a significant clay loss occurs.

2. The “eroded” colloids might interact with RN and affect their transport of towards the far-field of the repository.

WP 3



To understand colloid behaviour and erosion processes under realistic scenarios; provide input data for qualitative and quantitative models description in SA.



- Work packages are totally inter-dependent.
- Collaboration and result transfer between them needed.
- Coherence in the selection of experimental conditions even the experimental approach is different.



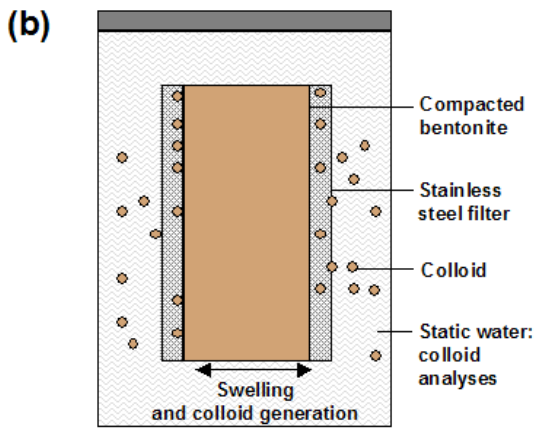
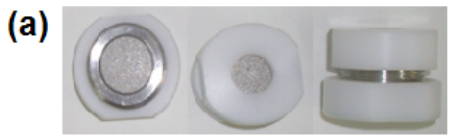
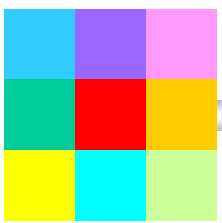
Work Package 2: PARTICIPANTS and PMs

Work package number	2		Start date or starting event:				Project Month 1				
Erosion											
Activity Type	RTD										
Participant	CIEMAT	MSU	KIT-INE	NRI-REZ	SKB	B+Tech	ClayTech	VTT	JYU	NDA	KTH
Person-months for the participant	18	6	6	10	1	28.5	9	16	11	1	1

11 participants, 7 countries

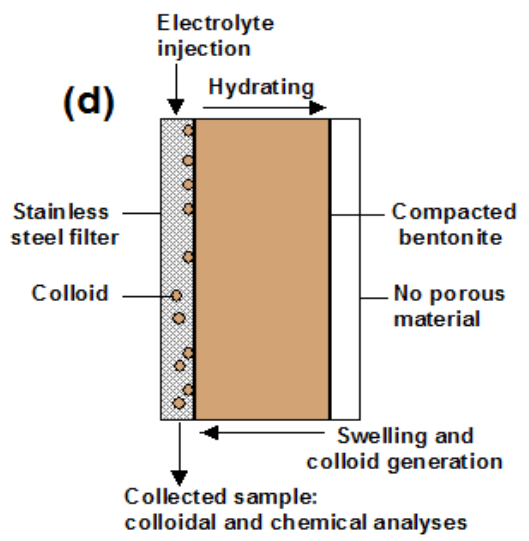
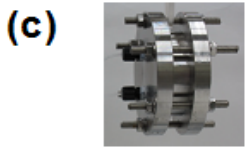


- Characteristics of the bentonite clay: smectite content; presence of certain accessory minerals (calcite, gypsum); nature of the cations present in the interlayer; total charge and charge distribution between the tetrahedral and octahedral sheets; compaction density;
- 2. Chemistry of the groundwater: ionic strength, pH, chemical composition (concentration of monovalent vs. divalent cations, potassium content);
- 3. Clay – groundwater interactions: dissolution processes and ionic exchange; kinetics of the interactions; effects of the solid to-liquid ratio; effects of hydrodynamic conditions;
- 4. Groundwater velocity at the bentonite surface: the presence of a hydraulically active fracture may play a role in bentonite erosion and has to be accounted for.
- 5. Characteristic of clay extrusion paths: porosity of the rock, fracture dimensions.



Static approach

CHEMISTRY

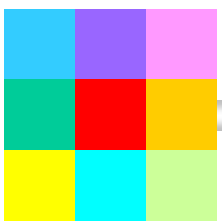


Dynamic approach

**CHEMISTRY
+ FLOW**

Radial" cells:

**CHEMISTRY
+ FLOW
+ fracture
+ gel analysis**



BELBaR

Parameters investigated



- Different clay density;
- Different clay type: natural, Ca, Na;
- Different flow rates;
- Different water chemistry;
- Bentonite/electrolyte contact area;
- Etc.,.



Taking advantage from different approaches to the problem