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# Flow and transport properties of a 200 meters multi scale fractured block at the Äspö (Sweden) underground laboratory

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Within the framework of nuclear spent fuel storage, special care is put on experimentation and modelling work to improve the modelling capabilities for the transfers of radionuclides within a natural fractured media. Several aspects make it a challenging task, among which the heterogeneity of the system, the scarcity of the available information, the strong contrasts in the parameter values between mobile and immobile zones. In addition to these difficulties relative to the system, the assessment of storage capacity of a repository involves predictions at very large time scales (typically 100.000 years) which are not accessible to experimentation. We provide here with some of the results obtained within the SKB Task Force (Task6) related with the Äspö granitic underground laboratory in Sweden. The purpose of this task, involving several other modelling teams, is to provide a bridge between detailed SC (Site Characterization) models operating at experimental and local time scale and more simple PA (Performance Assessment) models operating at large spatial and time scales used for sensitiviy analysis to different scenarios. The present step involves a study of a 200 meters complex and realistic fractured system considering several scales of fracturation or heterogeneity according to the in situ observations: deterministic features identified from the Block Scale project, synthetic background fractures simulated based on in situ measurements of smaller scale fracturation and finally complexity of the fractures at different scales (fault zones with several channels along Cataclasite to simple joints with fracture coating). Tracer tests conducted within local portions of the system during Block Scale project are provided as well as laboratory measurements of the properties of the system. We present an overview of our modelling strategy and trans-

port results as well as associated studies highlighting the role played by the different sub units of the system. We focus here mainly on (i) the sensitivity of fractured block flow and transport properties (equivalent permeability, main flow and transport paths, retention properties associated with matrix diffusion and sorption) to the number of features considered or levels of heterogeneity included in the model (main fractures, back ground fracturing, complexity of the fractures); (ii) the issues of homogenisation of flow and transport processes for the lower scales of fracturation and heterogeneity and (iii) the ways the system can be simplified in view of building a Performance assessment model.