Analysis of wetting process of rock by means of x-ray CT

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ABSTRACT: Subtraction of x-ray CT images is utilized for the quantitative analysis of the unsaturated wetting process of a porous rock. A multi-stage pressurization procedure is applied to a one-dimensional water permeation experiment, and in which the migration of water through a rock specimen is precisely monitored by means of the x-ray CT. Case examples make clear that the subtraction of x-ray CT images is an effective procedure available for the evaluation of the volumetric water content at each point within a rock specimen. Analyzing the forward speed of the wetting front and the distribution of the pore-water pressure, the coefficient of permeability of rock is evaluated along with the magnitude of the matric suction, which plays an important role to determine unsaturated wetting flows.