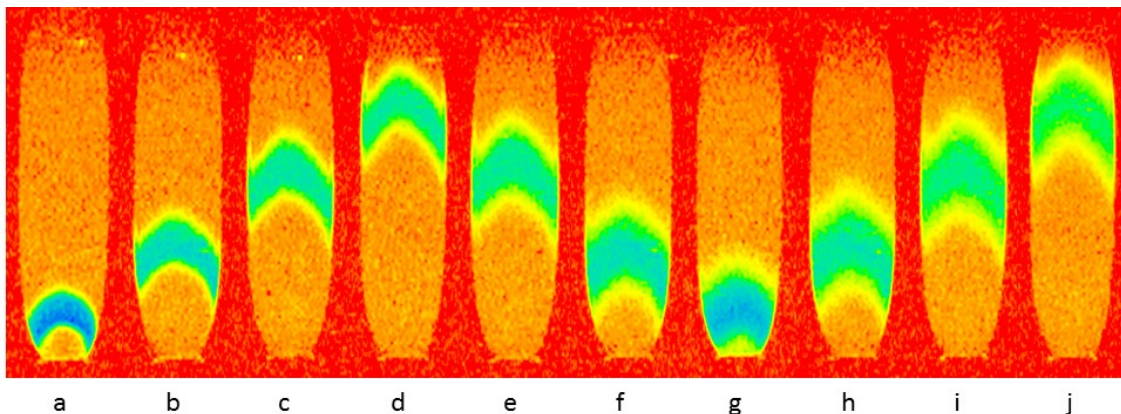


"Recent applications of NMR and MRI to study transport in porous media"

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Liquid, ion or particle transport, or transfers between phases, inside civil engineering materials, play a critical role on their properties or their durability. Our recent developments in NMR and MRI in Laboratoire Navier allow us to obtain internal measures which provide a direct quantification of several of these physical phenomena. The results sometimes question the usual assumptions relying on macroscopic observations in each case. I will present a few examples: homogeneous desaturation in drying nanoporous systems, subflorescence dramatically slowing down plaster drying, direct internal measurements showing lower dispersion than assumed so far, direct observation of colloid transport and adsorption in model soils, liquid transfers inside a composite concrete, peculiar characteristics of wood imbibition, breakage of the non-Newtonian characteristics of yield stress fluids flowing through a porous medium.



Successive pictures in a longitudinal cross-section of the distribution of paramagnetic nanoparticles injected (bottom) as a step in the liquid flow through a bead packing. The flow is first from bottom to top then inverted twice. The progressive dispersion is observed in the vertical step thickness which continuously increases.