

## Does dead wood remember water?

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Wood interacts with moisture in the vapor and in the liquid states. We present a series of observations on wood/water interactions and link the observed behavior to what occurs in the living tree.

Adsorption originates at the molecular scale from the interactions between the atoms of the solid skeleton and the molecules of the fluid. When the size of the pores is in the order of the range of the molecular interactions (micro or nanoporous materials), a mechanical pressure arises orthogonal to the porous interface leading to sorption induced deformations (swelling). We observe experimentally different microstructures of wood using synchrotron X-ray microtomography, and use this hierarchical material to develop our understanding of shape memory effects upon moistening.

Liquid movement in wood, and in the tree, is not yet understood. In particular, little is known about the flow and water exchange between the xylem and the phloem at the microscale, where features like pits in the xylem and plasmodesmata in the phloem control the flow. We use neutron imaging to acquire the spatial distribution of water in wood during wetting (in liquid or vapor phase), redistribution, drying, with or without the presence of temperature gradients.