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Wetting and packing effects on evaporation out of a porous medium CESARE MIKHAIL CEJAS, BERTRAND SELVA, RAPHAEL BEAUFRET, LARRY HOUGH, CNRS UMI 3254 Complex Assemblies of Soft Matter COMPASS, CHRISTIAN FRETIGNY, CNRS UMR7615 Physico-chimie des Polymères et des Milieux Dispersés (PPMD) - ESPCI Paris, REMI DREYFUS, CNRS UMI 3254 Complex Assemblies of Soft Matter COMPASS, COMPASS TEAM — Evaporation through granular media involves complex fluid transport and exhibits two regimes: (1) a capillary-supported regime maintaining hydraulic continuity to the surface and vapor exchange with the atmosphere followed by (2) a diffusion-limited regime through the medium. A well-defined intermediate partially saturated zone (PSZ) has already been observed in the past. It is evidently seen from our experimental investigations using a 2D model soil of glass beads. The PSZ is the region identified above the interface formed by the drying front, which separates the PSZ from the fully-saturated wet region. This intermediate zone is filled with a dynamic mixture of vapor and liquid. The existence of this zone is of significant importance as it sets the kinetics of the evaporation process. Here we will present how wetting and packing effects influence the size of this partially saturated zone and we will show how a simple model based on geometrical considerations can explain our observations.

Cesare Mikhail Cejas
cesare.cejas@etu.upmc.fr
CNRS UMI 3254 Complex Assemblies of Soft Matter COMPASS

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