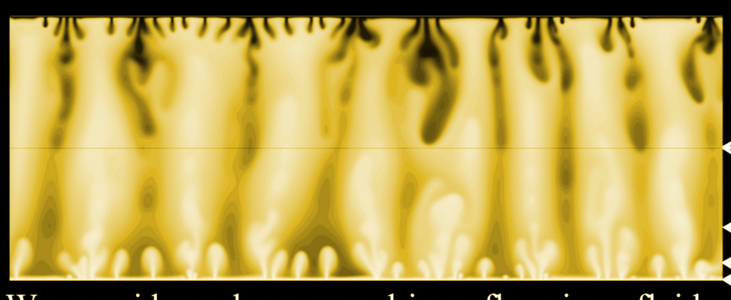
# LIGHTNING STORM

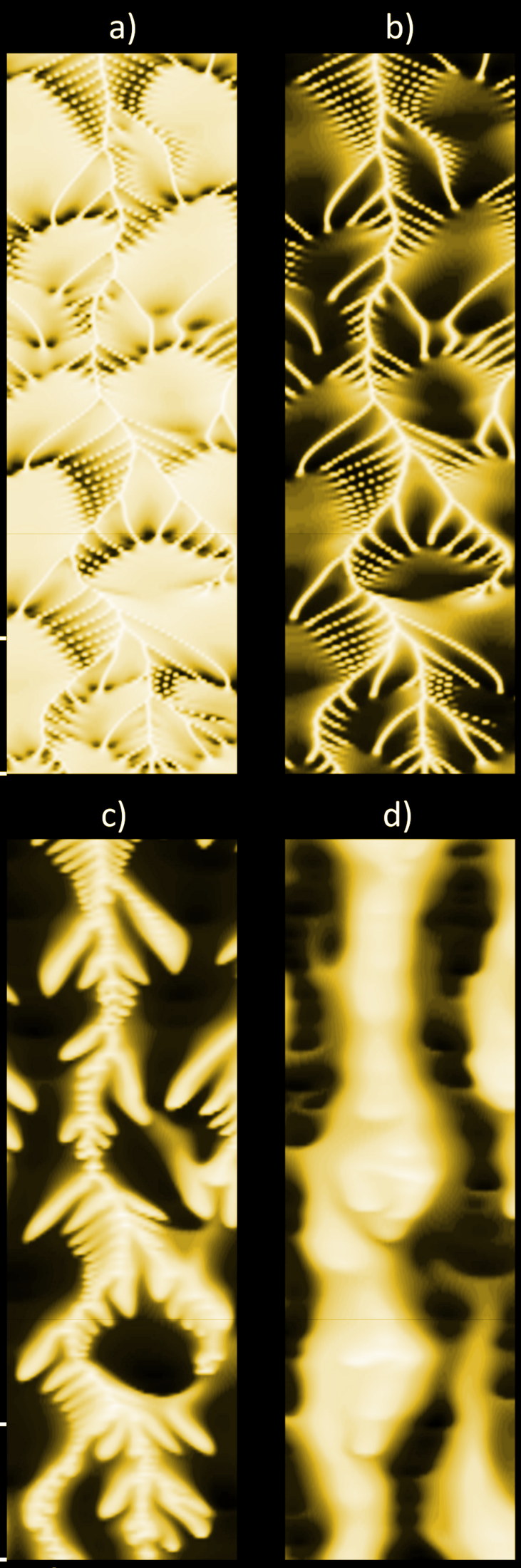
## Flow topology in porous media convection

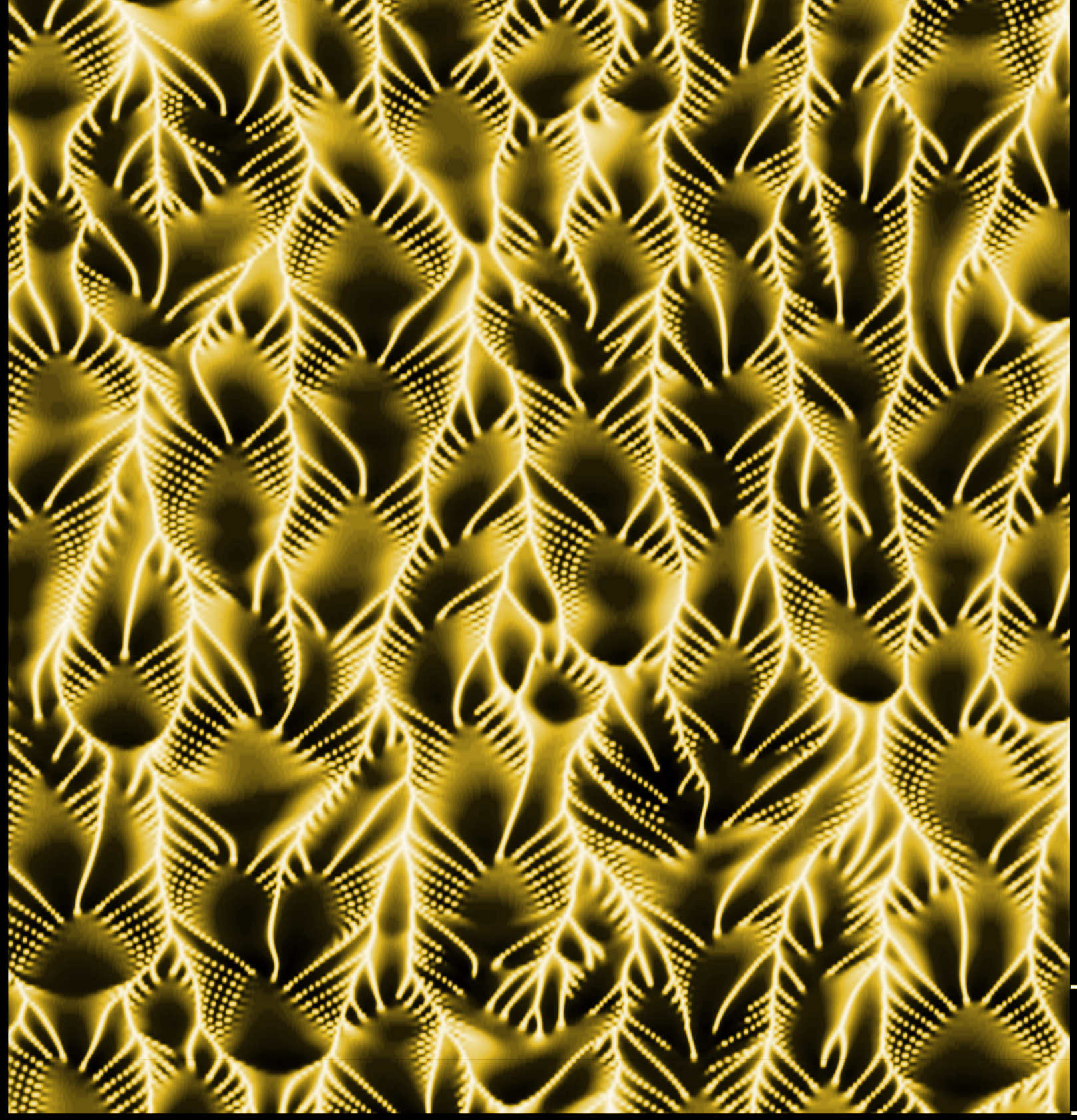
De Paoli M.[1,2], Zonta F. [1,2] & Soldati A. [1,2,3]

[1] University of Udine, Dept. of Elec. Manag. and Mechanical Engineering
[2] Vienna University of Technology, Institute of Fluid Mechanics and Heat Transfer
[3] International Center for Mechanical Sciences (CISM), Dept. of Fluid Mechanics




We consider a buoyancy-driven flow in a fluid-satured porous medium. Contour map of the solute concentration field is shown above. Space-time measurements of the concentration along four horizontal slices are reported in figures a-d. The slices are located inside the boundary layer (a), just outside of the the boundary layer (b), at one quarter (c) and at half-domain height (d).




Space-time evolution of the concentration field just outside of the boundary layer (b). In this near-wall region, the characteristic structures, small plumes of light, white fluid (small ribs) coalesce to form megaplumes (long and persistent roots). Adiacent megaplumes can merge or form branches.

References: De Paoli M., Zonta F. & Soldati A., *Influence of anisotropic permeability on convection in porous media: implications for geological CO2 sequestration*, Physics of Fluids (2016)