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Pierre Fischer, Hervé Jourde

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Large-scale spatial characterization of a karst aquifer by combination of periodic and non-periodic hydrodynamic responses (Lez aquifer, France)

Pierre Fischer ¹, Hervé Jourde ¹ ¹ HydroSciences Montpellier, Univ. Montpellier, CNRS, IRD, Montpellier, France

Methodology

1. Measured data: Hydraulic heads in 11 locations during 7 days in June 2012
   - Periodic responses to daily pumping variations (Lez spring)
   - Non-periodic drawdown slopes

2. Model physics: Darcy’s law (confined aquifer)
   - Frequency domain (periodic responses)
   - Time domain (non-periodic drawdown slopes)

3. Inversion algorithm: Cellular Automata-based Deterministic Inversion (Fischer et al. 2017)
   - Initial karst structure based on main faults

Results highlights & Next steps

- Complex karst responses can be reproduced with a distributed model
- Coupling periodic and non-periodic hydrodynamic responses allows generating a coherent hydraulic diffusivity field imagery
- Next > Validation with other measurement time windows, Uncertainties quantification, Tracer tests simulation