

# Group presentation WP 2

Explore coupled dynamic processes  
in highly instrumented sites

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# Explore coupled dynamic processes in highly instrumented sites

- **Activities**

- Quantify mixing and geochemical reaction hotspots at the saltwater-freshwater interface (ESR 1, 14)
- Identify and characterize the space and time patterns of fluxes and reactivity in riparian and hyporheic zones (ESR 2,3)
- Identify (and quantify) hydro/geochemical controls of mixing and evaluate the influence of hydrodynamics fluctuations (ESR 1, 2, 3)
- Characterize flow distributions and solute transport in fracture networks (ESR 4, 5, 6)

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- **Common main questions :**
  - What are the dynamics of reactive processes in mixing interfaces (surface water/ groundwater, freshwater/ saline water) ?
  - What is the impact of heterogeneity (sedimentary/fracture patterns) on transport processes ?
  - To which degree should heterogeneity be represented to capture main aquifer processes ?
  - How to adjust/compare geophysical methods in different hydrogeological environments ??

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- **Possible joint experiments or actions :**
  - Conservative/reactive tracer tests to evaluate main groundwater flow paths and residence times/reaction rates (ESR 1, 2, 3 and 4)
  - Tracer tests combined with ERT/GPR (ESR 1, 2, 3 and 4)
  - Joint experimental campaigns using techniques developed in the different ESR projects (ESR 2 and 3)
  - Experimental benchmarks for models (ESR 1, 2, 3 and 4)

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- **Existing reviews:**
  - McClain et al. (2003), Biochemical hot spots and hot moments at the interface of terrestrial and aquatic ecosystems, *Ecosystems*, 6 (4), 301-312
  - Knight et al. (2010), Geophysics at the interface: Response of geophysical properties to solid-fluid, fluid-fluid and solid-solid interfaces, *Rev. Geophys.*, 48
  - Boano et al. (2014), Hyporheic flow and transport processes: Mechanisms, models, and biogeochemical implications, *Rev. Geophys.*, 52
  - Binley et al. (2015), The emergence of hydrogeophysics for improved understanding of subsurface processes over multiple scales, *Water Resour. Res.*, 51

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- **Possible ideas of “reviewlets”:**

- Ex: Novel field methods for characterizing dynamic processes in mixing interfaces

suggested ESR contributors: ESR 1, 2, 3, 4

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