

## **The need to consider temporal variability when modelling exchange at the sediment–water interface**

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**Abstract** Most conceptual or numerical models of flows and processes at the sediment–water interface assume steady-state conditions and do not consider temporal variability. The steady-state assumption is required because temporal variability, if quantified at all, is usually determined on a seasonal or inter-annual scale. In order to design models that can incorporate finer-scale temporal resolution we first need to measure variability at a finer scale. Automated seepage meters that can measure flow across the sediment–water interface with temporal resolution of seconds to minutes were used in a variety of settings to characterize seepage response to rainfall, wind, and evapotranspiration. Results indicate that instantaneous seepage fluxes can be much larger than values commonly reported in the literature, although seepage does not always respond to hydrological processes. Additional study is needed to understand the reasons for the wide range and types of responses to these hydrologic and atmospheric events.

**Key words** groundwater–surface–water exchange; seepage; temporal variability