

Abstract Submitted  
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**Simulations of flow focused at the interface of free flowing fluid and porous media** MAC PANAH, FRANCOIS BLANCHETTE, UC Merced — We present a novel numerical approach to simulate flow in and adjacent to porous media, with applications to geological flows. Rivers, flood water, and turbidity currents all involve water flowing over and within sandy deposits, leading to erosion or deposition of sand grains. This process is simulated using a continuum approach (Navier-Stokes and Brinkman equations) with a sharp interface between porous media and unimpeded flow. Our numerical solver allows this interface to be mobile and therefore can handle the dynamically evolving geometries present in these applications. We validated our numerical method by computing drag coefficients on 2D porous cylinders as a function of Reynolds and Darcy numbers. We then studied the flow generated within a deposit by an external fluid flow, and deduced erosion rates in sand beds. In a broader application, this mixed solver can be used to capture details in erosive regions, and its results may be incorporated into a coarser Navier-Stokes solver applied over larger scales.

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