

are essentially one-dimensional, the three-dimensional modeling had shown that the wall-shear stress is not uniform along the hole wall (in the water/soil interface). It was possible then through using a linear erosion law to predict non uniform erosion along the hole length. Studying the effect of Reynolds number has shown that it has important effect on the wall-shear stress and thus would affect in its turn surface erosion that develops at the fluid soil sample interface. This enabled qualitatively understanding why the eroded profile of the hole wall as observed during experiment is not uniform.

The modeling performed in this work has limitations since the hole wall was modeled to be rigid and perfectly waterproof while in reality the soil sample is deformable and the interface is traversed by a Darcy like flow. It would be interesting in the future to examine how the deformation of the tube can affect the fluid flow by developing an enhanced model which takes into account coupling in a more complete manner between the flow and the soil sample.

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