How fluid-mechanical erosion creates anisotropic porous media by Nicholas J. Moore, Jake Cherry, Shang-Huan Chiu and Bryan D. Quaife.

I enjoyed reading this paper. It will make a nice contribution to the special issue of *Physica D.* It begins by formulating a numerical boundary integral method based on Cauchy integrals for 2D Stokes flow past multiple solid bodies. The bodies erode with the normal velocity of their boundaries proportional to the local shear stress at the fluid-body interface. The method employs quadrature formulas enabling large numbers of bodies (up to 100) to be considered.

The numerical method is then applied to an interesting problem related to porous media flow: 2D Stokes flow past an ensemble of initially circular bodies. Erosion causes the bodies to become slender in the direction of the mean fluid flow and also results in the formation of channels within the porous media in the same direction. These two effects combine to create a media with anisotropic permeability.

The paper is well-written with the derivation of the method and examples and results clearly described. A particularly nice feature of the discussion is the linking of microscopic properties of the medium to large scale quantities such as permeability and tortuosity, including a clever way to compute both the longitudinal and transverse permeability; and the quantification of the channelization versus body-shape effects in contributing to the permeability. The paper will be of interest to readers with interests in fluid mechanics, applied complex analysis, free boundary problems and porous media flow. I am pleased to recommend publication. Below are some minor comments the authors should consider before publication.

1. In several places the numerical method is claimed to be 'highly accurate' and 'highly-efficient'. Some justification should be provided for these claims e.g. comparison to a simple test case and subsequent error analysis, comparisons to conserved quantities (if any) or citation of previous works that do such tests. Also, does the use of a narrow Gaussian filter (page 6) still preserve the high accuracy'? Please justify.

2. Some justification for using Stokes flow in studying porous media flow should given. For example, what is a typical Reynolds number?

3. Is there any effect of the choice of length of the 'buffer regions' (page 2) on the results?

4. In (6) $\mathbf{r}_l^{\perp}$ should be defined.

5. Is there a missing $2\pi i$ in the first integral of (15)?

6. It's not completely clear to me why the product of shape and configurational anisotropy is the total anisotropy. I think some further remarks on this would be useful.

7. It would be helpful to know (page 10) how the randomized sizes and locations of the bodies are chosen so as they do not overlap.