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## Using Level Sets in slab detachment modeling

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Slab detachment plays an important role in geodynamic models of subduction. To provide better insights in the process itself as well as the topographic response, we use level set methods [1] to track the interfaces between the lithosphere and mantle and between the crust and the “air”. By tracking the interface between the lithosphere and mantle, we can follow the compositionally distinct detaching slab and allow for slab specific rheology while leaving the mantle rheology unchanged. Tracking the subducting slabs interface, will also provide a better criterium for the timing of slab detachment, since we have a strict definition of the subducting slab interior.

Here we present model results of a high viscous 2D cylinder surrounded by a low viscous fluid [2]. The 2D cylinder sinks to the bottom of the model due to its buoyancy contrast with the surrounding material. This can be seen as an analogue for an already detached slab sinking into the mantle. We compare our results against benchmark results both from numerical modeling as well as experimental studies.

### References

- [1] Osher, S. and J.A. Sethian (1988), Fronts propagating with curvature-dependent speed-Algorithms based on Hamilton-Jacobi formulations, *J Comput. Phys.*, 79(1), 12-49.
- [2] Ristow, G.H. (1996), Wall correction factor for sinking cylinders in fluids, *Physical review E.*, 55(3), 2808-2813.