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Solutal convection induced by dissolution. Influence on erosion dynamics and interface shaping. MICHAEL BERHANU, MSC CNRS Paris Diderot, JULIEN PHILIPPI, CYRIL OZOUF, MSC Paris Diderot, CAROLINE COHEN, Ladhyx Polytechnique, JULIEN DERR, SYLVAIN COURRECH DU PONT, MSC Paris Diderot — Dissoluble minerals are often shaped by chemical erosion. In the case of fast kinetics of dissolution, local erosion rate is set by the advection of the solute. Even in absence of an imposed or external flow, advection can drive the dissolution, when buoyancy effects due to gravity induce a solutal convective flow, which controls the erosive dynamics and modifies the shape of the dissolving interface. Here, we investigate for fast dissolving materials like salt, solutal convection induced by dissolution. Results are interpreted regarding a linear stability analysis of the corresponding solutal Rayleigh-Benard instability, to predict onset time of convection, when a dissolving surface is suspended above water initially at rest. Then solutal convection induces pattern on the dissolving interface, whose dynamics is also investigated. More generally, we inquire what are the conditions to observe a such solutal convection instability in geological situations and if the properties of dissolution patterns can be related to the characteristic of the convective flow.

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