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Episodic slab rollback fosters exhumation of HP-UHP rocks

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The burial-exhumation cycle of crustal material in subduction zones can either be driven by the buoyancy of the material, by the surrounding flow, or by both. High pressure – ultrahigh pressure rocks are chiefly exhumed where subduction zones display transient behaviors, which lead to contrasted flow regimes in the subduction mantle wedge. Subduction zones with stationary trenches (mode I) favor the burial of rock units, whereas slab rollback (mode II) moderately induces an upward flow that contributes to the exhumation, a regime that is reinforced when slab dip decreases (mode III). Episodic regimes of subduction that involve different lithospheric units successively activate all three modes and thus greatly favor the exhumation of rock units from mantle depth to the surface without need for fast and sustained erosion.