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We challenge the generally accepted view that continent-continent collision results in doubly verging orogenic wedges with well-developed retro-wedges on the overriding plate. In fact we argue that retro-wedge formation is restricted to specify rheological conditions within the lower and upper plates as well as the plate contact; thus being the exception rather than the rule during collision.

In this contribution we use simple lithospheric-scale analogue experiments to infer favourable rheological conditions for the development of retro-wedges. In intermediate temperature lithospheres represented by three layer models (brittle crust, ductile crust and upper mantle), the contact between the colliding and neutrally buoyant continents is weak and represents the inheritance of a former subduction boundary. The degree of plate coupling however is not constant and is together with the rheological structures of the lower and upper plates, in particular the presence of decoupling horizons, key variable in this study.



Formation of retro-wedges during collision

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