

## **From oceanic lithosphere subduction to continental collision: Influence of the plate contact**

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We showed recently that the overall dynamics of oceanic subduction differ depending on whether the plate contact is a fault or a channel (De Franco et al., 2007. *GJI*, doi: 10.1111/j.1365-246X.2006.03498.x). Here we investigate how the plate contact affects the transition from oceanic lithosphere subduction to continental collision. We use a finite element method to solve the heat and the time dependent momentum equations for elastic, (power law) viscous and plastic rheologies. For the same rheological properties and driving forces, varying the nature of the plate contact leads to three types of responses: subduction of the entire continental lithosphere, shear delamination of the continental crust or slab break-off. We make the following observations from our numerical experiments.

The presence of a subduction channel promotes coherent and, when the boundary conditions allow it, plate-like subduction of the continental margin.

In models with a subduction fault, coherent subduction of the incoming continental lithosphere occurs when the colliding passive margin has a gentle ocean-continent transition. The approaching continental sliver starts to subduct and the subduction is characterized by a non-plate-like behavior, slower subduction velocity than in channel models and strong slab deformation. If the continental margin is steep and the strength of the incoming continental crust is high, fault models result in locking of the trench, eventually leading to slab break-off. If the crustal strength is relatively low, shear delamination of the upper crust is expected. In the channel model this type of delamination never occurs.

The tectonic setting does not significantly affect the nature of the model response.

We conclude that the plate contact type, together with the geometrical and rheological properties of the incoming continental fragment, is a crucial subduction characteristic controlling the response of continental collision during the transition from oceanic subduction to continental collision. During the early stage of continental collision, the plate contact plays a more relevant role than the magnitude of slab pull and the tectonic setting.