

## **The Evolution of Drainage Systems during a Continent-Continent-Collision : Snapshots from the India-Asia-Collision-Zone**

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Drainage systems of major rivers located in a continent-continent collision zone are controlled by topography build-up as function of crustal thickening. Topography build-up and erosion counteract so that the ratio of these two parameters highly influence the size of the drainage areas and the position of drainage divides. Models for orogens caused by indentation show that the zone of crustal thickening in front of the indenter has its maximum thickness near the indenter front. In the India Asia collision zone the topography (as a proxy for the crustal thickness) shows that the principal drainage divides do not coincide with the indenter front. The main separation between basins draining south (Ganges, Indus, Tsangpo-Brahmaputra) and basins draining north, west and east (e.g. Yangtze, Amu Dar) lies atop the Tibetan plateau some 500–1000 km north of the Himalayan range near the indenter front.

The numerical model presented here, couples a classical mechanical indentation model based on the thin viscous sheet formulation with a landscape evolution model. We show that the distance of the drainage divide from the indenter front bear characteristic information on the ratio of indentation to erosion: If the ratio exceeds a given value, the principle drainage divide separates from the indenter front, producing a zone near the indenter where crustal thickness increases with the distance from the indenter front.