



## **The Role of the East Asian active Margin in widespread extensional and strike-slip Deformation in East Asia**

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East Asia is a region of widespread deformation, dominated by normal and strike-slip faults. Deformation has primarily been interpreted to result from extrusion tectonics related to the India-Eurasia collision, which started in the Early Eocene in the western Himalayas and in the Middle Eocene in the Eastern Himalayas. However, in East and Southeast China, deformation started earlier than the collision (latest Cretaceous to Palaeocene), suggesting that extrusion tectonics is not the (only) driving mechanism for East Asia deformation. It is suggested that the East Asian active margin has influenced deformation in East Asia significantly. Along the margin, latest Cretaceous and Cenozoic back-arc extension took place behind several adjoining arcs, implying eastward rollback of the subducting slab and collapse of the overriding plate towards the retreating hinge-line. A compilation of geological data indicates that extension took place along a >7000 km long stretch of the East Asian margin during most of the Cenozoic.

Physical models have been built to simulate back-arc extension processes and overriding plate collapse towards a retreating trench. The models reproduce important aspects of the strain field in East Asia, including normal faulting close to and sub-parallel to the active margin (compare with back-arc extension in the South China Sea, Okinawa Trough, East China Rift system, Japan Sea, Kuril Basin, and Sea of Okhotsk), sinistral strike slip faulting in the north (compare with Stanovoy sinistral shear zone), dextral strike-slip faulting in the south (compare with Sagaing fault), and formation of pull-apart basins in the west (compare with Baikal Rift, Shantar-Liziansky Basin, Hetao-Yinchuan Rift, and Shanxi Rift). For geometrical and rheological conditions scaled to represent East Asia, the analogue modelling shows that the East Asian active margin can be held responsible for deformation in East Asia as far west as the Baikal

rift zone, located  $>3000$  km from the margin.