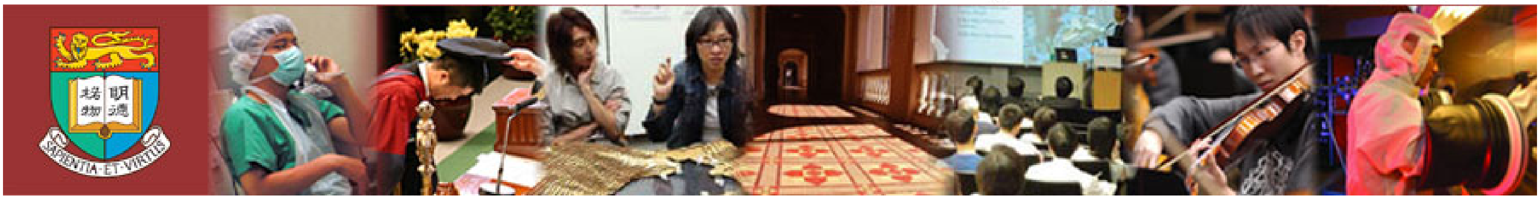

Title	Do structural differences along strike of the Himalaya range represent changes in the pre-collision geometry of Greater India prior to collision?
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Do structural differences along strike of the Himalaya range represent changes in the pre-collision geometry of Greater India prior to collision?

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Over the past few decades understanding of orogen development has evolved at a rapid pace, with classic geologic principles being combined with complex computer aided thermo-mechanical simulations, to produce testable models of orogenic growth[1, 2].

Typically, Greater India's pre-collisional northern edge, is usually modeled as a rifted passive margin. However, some workers[3] have argued for a quite different geometry resulting from its prior tectonic history. Whilst the western portion of the paleoboundary is seen as a Triassic rifted margin, the central and eastern portions developed more recently as India separated from Australia along a dextral 'scything' transform fault. This envisages the central-northern boundary to be a very narrow, weakly joined ocean–continent transition zone, with the North eastern corner attenuated into a series of half graben in response to shearing related to its motion along the original transform. Tentative models place the transition from passive rifted margin to 'scything transform' around longitude 77-80°East. Observable lines evidence presented for this transition are the restriction of ultra-high pressure metamorphic rocks to the north western Himalaya, and to ophiolite emplacement along the closing edge of the central portion of the India -Asia suture, and naturally, differences in the structural development of Himalayan front may also reflect this change.

Arguably, the most successful model to explain the development of the major structures of the central Himalaya, is the so called, 'Channel Flow' model, where a key controversy is the mechanism by which flow initiates, and how long such a flow is sustained. In previous studies from Tibet[4], we identified low volume mid-late Oligocene Eohimalayan prograde (M1) granites consistent with those necessary to facilitate crustal flow and predicted that Oligocene melting should also be evident in the GHS of the southern Himalaya.

However, despite recent studies having now began documenting similar prograde anatectic events both in the other North Himalayan gneiss dome, and also from very small late Eocene – early Oligocene prograde granitoid bodies (nanogranites) the GHS of central Nepal[5,6], and 33-28 Ma anatectic migmatites in the GHS of eastern Nepal[7,8] ,data for Himalayan prograde anatexis are still sparse. Furthermore, there still seems a paucity of any Himalayan age granitic bodies further west of Longitude ~82°East, compared to those found to the east. Do these observations throw light upon the state of the pre-collisional crust? And are these differences related to the paleoboundary of Greater India?

We speculate that the presence or absence of low volume prograde anatexis may relate to the geometry of the Indian crust, prior to plate collision, leading to either 'flow' or localised mid crustal ramping due to the availability, or lack, of more fusible lithologies. We present archive data, along with recent findings within this new context and suggest that the changes observed along strike of the orogen, allow us to gain a deeper understanding of not only the evolution of the Himalaya, but also of the pre-collisional geometry and nature of the plate boundaries of Greater India.

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