



Prominent control of age-dependent crust-mantle properties on topography of collisional orogens ?

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Plate convergence driven by mantle circulation is variably accommodated in collisional orogenic belts in response to temporal and spatial variations in rates of convergence, surface processes and continental rheology. However, a study of external collisional wedges reveals that crustal strain in orogens primarily reflect pre-orogenic thermal-mechanical conditions in the lithosphere. In particular, we establish that shortening is pre-conditioned by age-dependent crust and mantle properties, likely including crustal composition, subcontinental mantle petrogeochemistry, and temperature. This first-order control on shortening must be reflected in topography and erosional efflux, through isostasy. These results raise questions on how long-lived tectonic-magmatic evolution of the lithosphere deformed in collision zones controls topography of mountain ranges. Resolving these issues require additional constraints from orogens that develop on old cratonic to young continents and numerical approach in collisional settings.