



Mantle unrooting beneath the Alpine-Himalayan belt: evidences from Atlas, Zagros and Tibet.

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The Alpine-Himalayan belt stretches from the Iberian Peninsula to Southeast Asia and is the result of the closure of the Tethys Ocean and the consequent continental collision between the Eurasian plate and the African, Arabian and Indian plates. Some chains along this belt appear to be affected by mantle instabilities in the lowermost part of the continental lithosphere, e.g. Atlas and Zagros Mountains, Tibetan Plateau. These three chains share similar unusual characteristics: undercompesated crustal thickness, recent alkaline volcanism, low mantle seismic velocities, and prominent dynamic topography component, thus suggesting a subcrustal mass deficit. We present an integrated study combining gravity, geoid, elevation and thermal data. Geopotential, lithostatic and heat transport equations are simultaneously solved by using a FE method under steady-state and along selected 2D transects. Results show that the three orogens are affected by mantle unrooting and lithospheric thinning and correlate well with seismic tomography data. The causes for such mantle instabilities are still unclear since the three chains respond to different geological settings going from a well developed continental collision in the Himalaya, to a less developed collision in the Zagros, and to inverted aulacogen structures in the Atlas.