The Indo-Asian collision regime is an ideal place to study the relationship between boundary forces and plate deformation. As a proxy for the integrated lithospheric strength (both brittle and ductile), the effective elastic thickness of the lithosphere ($Te$) is defined as the thickness of an ideal elastic plate that floats over viscous fluid and would bend by the same amount as the lithosphere under the same applied loads (e.g., Forsyth, 1985; Watts, 2001).

Using our new analysis method for coherence between topography and gravity anomaly, we obtained spatial variations in the rigidity of the lithosphere, expressed in $Te$ and its anisotropy, of the Eurasian plate. $Te$ values of the study area vary from 2-80 km, with highest $Te$ values of 50-80 km in the Indian craton, intermediate $Te$ values of 25-35 km in the Ordos basin, the Qaidam basin and the Junggar basin, 15-25 km in the Tarim basin, ~25 km in the central upper Yangtze region, and the low $Te$ values of <15 km along active mountain ranges (e.g., the Himalayan orogen, Tianshan, the Altai mountain) and active faults (e.g., the Kunlun fault). Comparison between seismicity and $Te$ values show that earthquakes are prone to occur in low-$Te$ regions where strain easily concentrates, while the cratonic basins could transmit force over long distance with much less deformation. The $Te$ anisotropy results indicate that the weakest direction of the lithospheric strength is perpendicular to the spreading and compressional boundary (e.g., the Tien Shan mountain, the Himalayan orogen, the Taibei mountain), and tends to be parallel to the strike-slip fault (e.g., the Kunlun fault, the Xianshuihe-Xiaojiang fault). Therefore the weakest direction of the lithosphere is parallel to the direction of the maximum strain accumulation. The poor correlation between the $Te$ anisotropy and the dynamic indicators of the present tectonic regime (the shear-wave splitting direction, the maximum horizontal compressive stress direction, GPS) (Wang et al., 2001; Huang et al., 2011) confirms that $Te$ anisotropy mainly reflects tectonic inheritance of the continental lithosphere, which has been observed in North America (Kirby and Swain, 2009).

**Key words:** Indo-Asian collision, effective elastic thickness, mechanical anisotropy

**References**


