Identification of upper-crustal discontinuities using dip curvature analysis of isostatic residual gravity: examples from the central Andes *Poster*

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Structural analysts are often faced with the problem of identifying prominent structural discontinuities covered by post-tectonic sedimentary or volcanic rocks. Gravity fields are often used to delineate the trace of buried discontinuities but are frequently found to be too crude to localize discontinuities adequately. Here, we introduce the importance of dip curvature of the isostatic residual gravity for identifying upper-crustal discontinuities. The relationship between Bouguer gravity, isostatic residual gravity and its dip curvature, first-order structural elements and distribution of Neogene volcanic rocks was examined in the central Andean plateau, more specifically, the southern Altiplano and the Puna. In the southern Altiplano, strong positive Bouguer gravity corresponds to areas affected by late-Cenozoic faulting and large-scale folding of upper crust. Dip curvature analysis of isostatic residual gravity shows that elongate zones of maximum curvature correspond remarkably well with the structural grain defined by first-order folds and faults. Similarly, isostatic residual gravity in the Puna is largely controlled by prominent, upper-crustal structures but also by the distribution of Miocene and younger volcanic rocks. The Central Andean Gravity High, in particular, is confined by Neogene volcanic rocks and is mostly associated with areas of low topography, i.e., fault-bounded, internally-drained basins. Dip curvature analysis of the isostatic residual gravity field shows that elongate zones of maximal curvature correlate with the strike of prominent Neogene faults. Our study suggests that such analysis constitutes an important tool for imaging upper-crustal structures, even those which are not readily apparent at surface. For example, upper-crustal faults in the Salar de Atacama area, the presence of which is suggested by the dip curvature of residual gravity, offers a plausible explanation as to the pronounced angular departure of the volcanic belt from its overall meridional trend and its narrowing south of the salar. In contrast to previous interpretations, our study suggests that gravity anomalies of the Central Andes arise chiefly from late Cenozoic volcanism and tectonism. Furthermore, dip curvature analyses of gravity fields bear a great potential for elucidating first-order structural elements of deformed upper-crustal terranes such as the modern Andes.

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