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Comparison of onshore Bouguer anomalies with GOCE Satellite Data in two sections of the Andes: at 29ºS and at 39ºS.

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In the present work we compare the Bouguer anomaly obtained from onshore measurements with the Bouguer anomaly obtained from satellite GOCE data along two well known sections of the Andes, at 29º18'S and at 38º45'S.
The first gravimetric section, published by Martinez et al. (2006), describes a gravity and altimetric profile that extends over a distance surpassing 800km in Argentina, at 29º18'S.
Using gravimetric inversion methods a crustal model was obtained which is in accordance with the main regional geologic structures. This model fits with a dominant collision mechanism that affected ancient blocks and is a two-layer crustal model with lateral density variations. The Chilenia, Cuyania, Famatina System, Pampia and River Plate cratons were detected. From the gravimetric signal we identify beyond doubt the suture zone between the Precordillera and the Famatina System Ranges, as well as the shear zone between the latter ranges and the Velasco Range.
The maximum crustal thickness determined beneath the Andean Cordillera at this latitude is 69 km, whereas under the Famatina System and the Velasco Ranges the values obtained are, respectively, 56 km and 46.5 km.
The second profile was published by Folguera et al., (2008). The western retroarc of the Southern Andes between 38º and 40ºS is formed by a NNW-elongated ridge not associated with stacked thrust sheets. On the contrary, during the last 4-3 Ma this ridge was affected by extensional deformation, regional uplift and related folding on a very broad scale. Receiver function analysis shows that the drainage divide area and adjacent retroarc lie over an attenuated crust. Normal crustal thickness at these latitudes is around 42km, whereas in this part of the retroarc the thickness is less than 32km. The causes for such attenuation have been linked to a moderate steepening of the subducted Nazca plate beneath South American plate, which is suggested by a westward shift and narrowing of the arc during the last 5Ma. Gravimetric studies show that the upper plate did not react homogeneously to slab steepening, but ancient sutures and lithospheric discontinuities deeply buried under Mesozoic to Cenozoic sequences in the retroarc were locally reactivated. These processes resulted in an asthenospheric anomaly that correlates at the surface with the area of Pliocene to Quaternary doming, widespread extension and three radial troughs.
By comparison of the Bouguer anomaly obtained from the models with those obtained from the satellite GOCE (Pail et al., 2011), we observe that the long wavelengths of the gravimetric signal are in good agreement. In the northern section, we observe positive anomaly changes in the contacts between the terrains Chilenia–Cuyania and Pampia–Río de La Plata craton. The negative gravimetric response of the Andean root is also observed. In the southern section, the attenuated crustal region is clearly depicted, showing a good correspondence between both anomalies.