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# Integration of gravity and topography analyses in analogue modelling: understanding lateral strength variations in Iberia and their influence on intra-plate mountain building.

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Analogue modelling alludes to the presence of lithosphere scale folds in Iberia as a result of convergence during Oligocene-Miocene times between the Iberian and European Plates. Moreover, different tectono-thermal events affected the microplate since late Palaeozoic time and resulted in lateral strength variations of the Iberian lithosphere. An old and cold lithosphere, Variscan in age, can be found in the western most part of Iberia where the main topographic uplifts are striking periodically s in E-W to NE-SW directions. In contrast a relative weak and hot Mesozoic lithosphere, affected by episodes of rifting and basin inversion during Mesozoic-Tertiary times, covers the area of the Iberian Chain, where topography follows non-periodic NE-SW, E-W and NW-SE trends. This work introduces a new methodology based on the gravity interpretation and spectral analysis carried out on the analogue modelling results which aids the interpretation of large-scale intraplate deformation. The gravity analyses let us distinguish and correlate areas of thickened crust characterised by a periodic distribution of gravity lows related to folding, and localised gravity lows along areas affected by thickening. The study was completed with the Moho depth map and the spectral analysis carried out over the models which show wavelengths close to the observed in Iberia (40-80km and 250 km). Our results have implications for the final distribution and orientation of topographic uplifts within the interior of the Iberian plate as their origin can be attributed to lateral strength variations which control the localisation of deformation and orientation of the resulting structures during N-S convergence.