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Deep and Shallow Srustal Structure of Gran Canaria Island (Canaries, Spain) through Gravity Inversion and Microseismic Sounding Modelling

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Different geophysical methods allow drawing crustal structures for a wide depth range and obtaining a more complete subsurface model of the study area. With this aim, a gravity inversion approach and microseismic sounding method (MSM) give more light to crustal structures in Gran Canaria Island. Ground and marine gravity data sets used in an inversion scheme (Montesinos et al., 2005) establish a 3D model distribution of density contrasts up to 15 km deep. MSM (Gorbatikov et al., 2011, 2013) unveils a distribution of low/high velocities up to 60 km deep through five observing profiles.
Joint interpretation of MSM and gravity models reveals different volcanic scenarios of the island, their evolution from deeper sections, feeding systems and relations with tectonic or volcanic lineaments

1) Low-density bodies found up to 3000 m in depth identify fractures acting as feeder dikes of monogenetic volcanoes during Post-Roque Nublo activity phase whilst a fragmented view appeared in the respective MSM model

2) A shallower low-density body, placed between two high-density structures, identifies volcanic material related to the remains of a great stratocone (Roque Nublo group) around Tejeda collapse caldera. The MSM modelling distinguish a low velocity stock running from the surface up to more than 40 km deep

3) Two deep high-density structures, from 18000 m depth to the surface and followed in the northwest sector through MSM, suggest the feeding system of the Miocene volcanic edifices whose remains presently outcrop as basalts. A contemporary magmatic fissure is suggested by seismic velocity change between10-20 km, to the southeast.