New 3D density model of Mt Etna (Italy)

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To construct the 3D density model beneath the volcano edifice of Mt Etna (Italy) we utilized a merged dataset including (i) about 950 gravity measurements collected in the late eighties and covering an area of about 50 x 50 km^2 around the volcano (benchmarks at elevations between about 0 and 2000m) and (ii) microgravity measurements performed by INGV-OE between 1994 and 2001. The latter data were collected during 40 campaigns of measurement, accomplished, for monitoring purposes, along an array of about 70 benchmarks (elevations between 500 and 3000m).

The new integrated dataset was utilized to derive a Bouguer anomaly map, that, unless previous ones, also includes information in correspondence of the uppermost part of the volcano (active craters zone).

Inversion of the Bouguer anomalies was performed using a non-subjective 3D inversion technique, involving adjustment of isolated anomalous 3D structures with free geometry. Anomalies in the resulting density model were compared with features identified in previous geophysical and geological studies, with the aim of gaining new insight into the underground structure of Etna.