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3D gravity inversion across the area struck by the 2016-2017 seismic events in Central and Northern Apennines, Italy

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In this work, the crustal volume struck by the 2016-2017 seismic sequence in Central and Northern Apennines is investigated using constrained 3D inversion of the Bouguer anomaly. After a preliminary regional field removal the residual dataset is then inverted into a 3D density contrast model. With an increasing complexity in the reference geometries, we test different geological scenarios and software settings. Geometries used in the reference models were retrieved from the available geological and geophysical information in the area. Starting with a reference model encompassing turbidites, carbonates and evaporites, and basement we finally test the effects of a low-density layer at the top of the basement. The retrieved density distribution with depth is compatible with previous models. Moreover, results support the hypothesis based on borehole evidence, of a low-density upper basement across the entire area, possibly phyllitic in composition. Comparison of the resulting models with the spatial distribution at depth of $M > 3$ seismic events between August and November 2016, allows to locate volumes with the higher concentration of seismic events. Both at shallow and deep locations, the majority of the events enucleated in volumes relatively denser while deeper events occur in a region of major density change corresponding to the top of the basement.