



The small but clear gravity signal above the natural cave “Grotta Gigante” (Trieste, Italy)

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Gravity observations are a powerful means for detecting underground mass changes. The Italian and Slovenian Karst has a number of explored caves, several are also touristic due to their size (e.g. Grotta Gigante in Italy; Skocjanske Jame and Postojnska Jama in Slovenia). Just a few years ago another big cave was discovered by chance close to Trieste when drilling a tunnel for a motor-highway, which shows that more caves are expected to be discovered in coming years. We have acquired the gravity field above the Grotta Gigante cave, a cave roughly 100 m high and 200 m long with a traditional spring-gravity meter (Lacoste&Romberg) and height measurements made with GPS and total station. The GPS was made with two different teams and processing algorithms, to cross-check accuracy and error estimate. Some stations had to be surveyed with a classical instrument due to the vegetation which concealed the satellite positioning signal. Here we present the results of the positioning acquisitions and the gravity field. The cave produces a signal of 1.5 mGal, with a clear elongated concentric symmetry. The survey shows that a systematic coverage of the Karst would have the benefit to recover the position of all of the greater existing caves. This will have a large impact on civil and environmental purposes, since it will for example allow to plan the urban development at a safety distance from subsurface caves.