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The Absolute Gravity Reference Network of Italy

Riccardo Barzaghi[1], Federica Riguzzi[2], Filippo Greco[3], Giovanna Berrino[4], Alessandro Germak[5], and Augusto Mazzoni[6]

[1]Politecnico di Milano, DICA, Milano, Italy (riccardo.barzaghi@polimi.it)
[2]INGV, Via di Vigna Murata 605, 00143 Roma, Italy
[3]INGV-OE, Piazza Roma 2, 95125 Catania, Italy
[4]INGV, Sezione Napoli OV, Via Diocleziano 328, 80124 Napoli, Italy
[5]INRiM, Strada delle Cacce 91, 10135 Torino, Italy
[6](6) DICEA, Università degli Studi di Roma "La Sapienza", Piazzale Aldo Moro 5, 00185 Roma, Italy

The project for realizing the reference network for absolute gravity in the Italian area is presented. This fundamental infrastructure is the general frame for all the scientific and technological activities related to the gravity field in Italy. The project is in line with the actions promoted by the International Association of Geodesy that during its 2015 General Assembly approved a resolution on the establishment of the new global gravity network the so-called International Terrestrial Gravity Reference System/Frame that will replace IGSN71.

The selection of the absolute gravity station sites in Italy has been performed either taking into account the existing absolute gravity stations and to have a homogeneous distribution of points. An initial set of 30 stations has been defined over the peninsular part of Italy and the two islands of Sicily and Sardinia. Particularly, the GGOS core station of Matera (the Agenzia Spaziale Italiana Center for Space Geodesy "Bepi" Colombo) is one of the network points as required in the documents of the GGOS-Bureau of Networks and Observations. Thus, this station will provide one link between the Italian national absolute gravity network and the GGOS observation system of IAG.

The project is now ongoing and will close at the beginning of 2025.

As required by the international standards on gravity measurements (https://www.bipm.org/documents/20126/41442296/CCM++IAG+Strategy+for+Metrology+in+Absolute+Gravimetry/7f9bc651-a2b6-08cc-7bba-f63b0a7e9765), the absolute gravimeters used in the measurements have been compared with absolute gravimeters that participated into international comparison campaigns in order to ensure the measurements traceability.

Furthermore, absolute gravity measurements have been supplemented with direct measurements of the local value of the vertical gravity gradient, in order to reduce to the ground reference level the absolute values measured by different instruments at different heights. The gravity field campaigns will be assisted by topographic survey campaigns. This will allow a precise georeferencing (of the order of 12 cm) of the gravity stations that will be so framed to the current

ITRF.

The collected data will be then validated and reduced following the internationally accepted standards and finally published through a dedicate web page of the project. These data will also be sent for storage to the absolute gravity database maintained by the Bureau Gravimétrique International/Bundesamt fuer Kartographie und Geodaesie where the absolute gravity data that will contribute to the new global absolute gravity reference system are collected.