EGU21-9119
https://doi.org/10.5194/egusphere-egu21-9119
EGU General Assembly 2021

Comparison between a six-year (2015-2020) continuous time series from an iGrav superconducting gravimeter and absolute gravity data at Mt. Etna volcano (Italy).

Filippo Greco[1], Daniele Carbone[1], Alfio Alex Messina[2], and Danilo Contrafatto[1]
[1]Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Catania, Italy (filippo.greco@ingv.it)
[2]Istituto Nazionale di Geofisica e Vulcanologia, Sezione Roma2, Roma, Italy

Since September 2014, iGrav#016 superconducting gravimeter (SG; by GWR) has recorded continuously at the Serra La Nave Astrophysical Observatory (SLN; 1730 m elevation; ~6.5 km from the Etna's summit craters; Italy).

Here we present results of a comparison between a six-year (2015-2020) time series from iGrav#16 and absolute gravity data collected through the Microg LaCoste FG5#238 absolute gravimeter (AG), in the framework of repeated measurements that were performed at the same installation site of the SG. Both AG and SG records have been corrected for the local tides, local atmospheric pressure and for the polar motion effect.

The comparison allows to estimate the long-term drift of the SG, defined as the total SG trend minus the observed trend in AG measurements, which is of the order of 9 microGal/year. Once the drift effect is removed, there is a remarkably good fit between the two data sets. The differences between absolute gravity changes and corresponding relative data in the continuous time series from the SG are within 1-2 microGal (the total error on AG measurements at this station is typically +/- 3 microGal).

After being corrected for the effect of instrumental drift, the time series from the SG reveals gravity changes that are due to hydrological and volcanological effects.

Our study shows how the combination of repeated AG measurements and continuous gravity observations through SGs can be used to obtain a fuller and more accurate picture of the temporal characteristics of the studied processes.