

Aspects of 3D air pressure reduction on gravity data Juergen Neumeyer, Carsten Stöber

Ground gravity measurements based on a test mass (relative and absolute gravimeters) are influenced by mass redistribution within the atmosphere which induces gravity variations (air pressure effect) in μgal range (about 15 μgal for the Sutherland Superconducting Gravimeter (SG) station). These variations are disturbing signals in gravity data and they must be reduced very carefully for detecting weak gravity signals.

From European Centre for Middle Weather Forecasts (ECMWF) 3D air pressure data are available. These data are used for modelling of the Newtonian attraction term. The modelling shows a surface pressure independent part (SPI) of gravity variations induced by mass redistributions of the atmosphere in the μgal order.

For different SG sites and an Absolute Gravimeter location the 3D models have been applied and the SPI part was calculated. Its influence is shown on long periodic gravity variations, SG measured polar motion, comparison of SG with GRACE and hydrology model derived gravity variations. It will be shown how the application of the SPI part can increase the precision of the air pressure reduction on gravity data.

BIBLIOGRAPHY

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