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Atmospheric correction for superconducting gravimeters based on operational weather models

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Atmospheric pressure fluctuations are a major source of noise in precise gravimetric measurements and must be corrected carefully. This is usually done by using the local air pressure, which reduces up to 90-95 % of the atmospheric signal. However, modern superconducting gravimeters require an even better atmospheric correction if small signals are to be identified. For this task the use of 3-dimensional modeling of atmospheric mass attraction based on operational numerical weather models has shown promising results. Similar strategies are realized and applied successfully for de -aliasing measurements of satellite gravity missions, such as GRACE and GOCE. For example, within the project GGOS Atmosphere at the Institute of Geodesy and Geophysics of TU Vienna a service was established providing atmospheric gravity corrections in form of global spherical harmonic coefficients (AGC). In this study we show that these products, originally dedicated to correct the gravity mission data, can also be used to correct the atmospheric effects on superconducting gravimeters (SG), i.e. the global contribution of the effect is obtained directly from the AGC. Furthermore, it will be examined if the additional effort of implementing high resolution regional models as well as analytical models in the near field is justified. The Conrad Observatory near Vienna is taken as example station for the SG corrections.