



Remarks on superconducting gravimeter calibration by co-located gravity observations

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Using absolute gravimetry for site by site recording of temporal gravity variations is the most common method to calibrate stationary relative gravimeters, specifically superconducting gravimeters. This method is based on the assumption that both sensors record the same gravity signal. Actually, this condition is never perfectly fulfilled, not even when absolute gravimeters are involved. Instrumental effects like drift are the main reason. Therefore the situation dramatically deteriorates if spring gravimeters are applied as reference due to their large and sometimes irregular drift.

This paper investigates the role of instrumental drift at calibration experiments based both on absolute and spring gravimeters and how the calibration results improve if drift is considered even in case of absolute gravimeters. The question whether spring gravimeters can reliably support SG calibration is discussed especially under the aspect of appropriate drift modelling.

The accuracy which is presently achievable with FG5 absolute gravimeters strongly depends on the drop-to-drop scatter and therefore on the site noise. E.g. at Conrad observatory (Austria) the difference between the mean calibration factor obtained when drift is or is not taken into account turns out to be in the same order of magnitude as the error, i.e. the improvement by a common drift adjustment is just at the error limit. Nevertheless, based on this result, adjusting the instrumental drift is recommended. This will especially hold when further instrumental improvements reduce the drop-to-drop scatter or even presently at low noise stations.