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NEW MEASUREMENTS FOR THE DETERMINATION OF LOCAL VERTICAL GRADIENTS

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Measured vertical gravity gradients usually quite differ from the normal value of 0.3086 mGal/m. Generally the changing of vertical gradient is rather big, up to a few 10 cm height above the ground and can be taken into consideration as a second order function. Over 40 m height the changing is linear and over 500 m height the changing is very small, the measured value of vertical gradient is about 0.3073 mGal/m.
At present the scale (mGal level) of modern gravity networks are mostly determined by absolute gravity values measured by absolute gravimeters, which values are referred to the reference heights of absolute gravimeters. So the scale (mGal level) of the network of absolute points differs from the scale of the network of relative measurements. The vertical gradients can be used for the conversion of measured gravity from the reference height of an instrument to a bench mark. So the vertical gradients are playing a key role for joining the two types of network. The height correction is necessary to determine by an accuracy of 1-2 uGal, not to decrease the reliability of the transformed value of gravity. So the vertical gradients should be determined as high accuracy as it possible and using the normal value of vertical gradient (0.3086 mGal/m) is not sufficient for this purpose.