

Short Communication

Modern Standards for Gravity Surveys

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The modern gravity meter is capable of determining differences in gravity between measurement sites with very high accuracy. However, the gravity values established by one survey can be related to those established by another survey only when both are tied to gravity base stations whose gravity values are in a uniform system.

The benefits of adjusting all measured gravity values to a single datum are manifold. The geodesist, for example, must have world-wide coverage of gravity measurements related to a uniform system for computation of the Earth's level surface configurations. The geologist and geophysicist benefit by being able to use data from several different surveys for uniform structural interpretations on a local, regional and global scale. Having local gravity surveys which are compatible with compilations over broader areas without systematic errors due to datum shifts is essential for regional-residual separations and interpretations over sedimentary basins and crustal blocks. With today's emphasis on economy in all operations, the ability to trade, buy, and/or use existing data in conjunction with new surveys can lead to important cost savings.

The absolute gravity datum adopted and recommended for all gravity surveys by the International Union of Geodesy and Geophysics is defined by the gravity values at more than 1800 measurement sites which comprise the International Gravity Standardization 1971 (IGSN71) (1).

In addition to providing an absolute datum for gravity measurements, stations of the IGSN71 are strongly recommended for use in gravimeter calibration.

The readjustment of national gravity networks to IGSN71 datum and scale has been completed in many but not all countries. Therefore, users are cautioned to verify that the base reference values used for any new gravity survey are referred to IGSN71. Verification can be accomplished by contacting the national agency responsible for gravity standards. In case of doubt, new surveys should be tied directly to IGSN71 stations. Gravity values and site descriptions for all IGSN71 stations, as well as an index map showing their location, are available on request from the International Gravity Bureau (IGB) (2).

It is very important to recognize that, for calculation of gravity anomalies, the use of IGSN71 for observed gravity must be accompanied by the use of the Geodetic Reference System 1967 (3) for computation of theoretical gravity.

References

- (1) Morelli, C., Gantar C., Honkasalo T., McConnell R. K., Tanner I. G., Szabo B., Uotila U., Whalen C. T., 1971: *The International Gravity Standardization Net 1971*. Int. Ass. of Geodesy, 39^{er} Rue Gay Lussac, 75005 Paris. \$10, 194 pp.
- (2) Bureau Gravimétrique International, 9 Quai St Bernard, Tour 14, Paris (5^e).
- (3) Int. Ass. of Geodesy, 1971: *Geodetic Reference System 1967*. Publ. Spec. Bull. Géod., 116 pp.