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Designing and implementation of the multi-purpose physical geodesy and geodynamics network of Iran (MPGGNI2005)

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In order to model the earth gravity field and its temporal variations in Iran, we developed the Multi-purpose Physical Geodesy and Geodynamics Network of Iran (MPGGNI2005). The mesh of the network is 55 km x 55 km corresponding to 700 multi-purpose bedrock stations.

The main objectives of the network are 1- establishing the first order gravity network, and densification of the existed Gravity Base Network (zero-order) of Iran, 2- estimating the precise orthometric heights, and 3- computing a precise geoid with an accuracy ranging from 1cm to 25 cm.

Different kinds of collocalized measurements were considered at each 55 km built bedrock station:

1- Gravity: with an accuracy of about 3 micro-gals, 2- Geodetic positions (GPS): with

an accuracy of 1cm for the geodetic heights, 3- Precise leveling: with an accuracy of 1cm between each two neighbor stations, 4- Astronomical positions (for astro-geodetic geoid determination): with an accuracy of 0.05-0.1 arc second.

For gravity, using 6 precise micro-gravimeters, it is considered to measure 2300 relative gravity measurements, between each 2 neighbor 55 km stations and also connecting them to the stations of (absolute) Gravity Base Network of Iran, to strengthen the gravity part of the network. Each relative gravity measurement is measured at one day and it contains 3 sets of 0.5 hour observations (go and return).

For GPS, using 6 bi-frequency GPS receivers at the same time, it is considered to measure 24 hours continusely at each station. These measurements were processed together with the measurements of permanent GPS stations of Iran.

For precise leveling, it is considered to connect each 55 km station to the first-order national precise leveling network of Iran.

For astronomical positions, we are preparing a system of Digital Zenith Camera.

The realization of the above mentioned multi-purpose network has considerably progressed at field and will be achieved completely in 1 year, except the astronomical measurements.

The measurements of the network will be repeated every 10 years to model the temporal changes of the earth gravity field. The data of MPGGNI2005 will be useful for the calibration/validation procedure of the all present GRACE gravity models and also for the future GOCE gravity models. It will be also compared with airborne gravity data of Iran that will be acquired in a near future.