Comparison of SRTM and ASTER DEM to the Prediction of the Mean Gravity Anomaly

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SUMMARY

Gravity surveys that collected on physical surface of Earth do not use directly in geoid modelling. They should be reduced to mean sea level by free-air approximation, which is caled free-air gravity anomaly. Then free-air gravity anomalies are evaluated in Stokes' function, which produces a geoid height in computation point. However Stokes function needs grid wise free-air gravity anomalies. Thus free-air gravity anomalies should be interpolated in grid nodes as well. In this case we need mean heights of grid nodes from any Digital Elevation Model (DEM).

DEMs are generally produced from local topographic maps by digitizing. Nevertheless, recent developments in technology provide us to determine precise DEMs with help of remote sensing. For example, SRTM (Shuttle Radar Topography Mission) yielded the most popular global DEM in worldwide. The resolution of SRTM DEM is 1 arc second at global scale. Another popular global DEM is ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) DEM that is derived in 1 arc second resolution at global scale, too.

In this study gravity surveys that randomly distributed in Konya Closed Basin are interpolated in grid nodes to get mean gravity anomalies by using both SRTM DEM and ASTER DEM. Differences of free-air gravity anomalies between using SRTM and ASTER DEMs are ranging at approximately 15 mGal level, which should be considered in geoid modelling studies.