

Progress Towards a Centimeter Geoid for Dubai Emirate

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SUMMARY

A high-resolution and high-precision detailed gravimetric geoid has been computed for Dubai Emirate, ranging from $24^{\circ} 35'N$ to $25^{\circ} 21'N$ in latitude and $54^{\circ} 52'E$ to $56^{\circ} 13' E$ in longitude. The EGM96 geopotential model complete to degree and order 360 was combined with surface gravity data and Fast Fourier Transformation (FFT) algorithm to generate the geoid file. The surface data consists of 1km x 1 km gravity data and 20m X 20m Digital Terrain Elevation Model as well as GPS and leveling data. The method of least square collocation has also been used for an alternative preliminary geoid computation. The computed geoid has an estimated error of 2cm rms.

Comparison of the gravimetric geoid with the GPS/ leveling derived geoidal heights of **3750** stations all over Dubai Emirate shows that the absolute agreement with respect to the GPS/ leveling datum is generally better than 3-4 cm rms. Results show that combining both GPS heights and the Dubai geoid model can give orthometric heights accurate to 2-5 cm. The method can thus work as a good alternative to traditional levelling, particularly for third order levelling in large areas.