



Effect of Unclassified Land Depressions on Gravity and Geoid in Africa: Case Study for Qattara Depression

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The determination of the gravimetric geoid is based on the magnitude of the gravity observed at the topographic surface of the earth. In order to satisfy Laplace's equation, the masses between the surface of the earth and the geoid must be removed or shifted inside the geoid. Then the gravity values have to be reduced to the geoid, forming the boundary values on the boundary surface. Gravity reduction techniques using unclassified DTM usually presume that negative elevations are reserved for ocean stations. In case of Qattara Depression, the elevations are negative, i.e. suited below sea level. This leads to an obvious error in the topographic-isostatic reduction using, for example, TC program with unclassified DTM by assuming water masses filling the depression instead of air, besides computing at the sea level instead of computing at the negative surface of the topography. The aim of this paper is to determine the effect of Qattara Depression on gravity reduction and geoid computation in Africa, as a prototype of the effect of the unclassified land depressions on gravity reduction and geoid determination. The results are shown and widely discussed.