



Transformation of the Tanzania national levelling datum to the geoid

S. John and D. Deus

School of Geospatial Sciences and Technology, Ardhi University, Tanzania (saburi@aru.ac.tz)

Tanzania is embarking on a height modernization programme in support of the AFREF initiatives. This modernization program is such that in future it will not be necessary for the Surveys and Mapping Division (DSM) to create and maintain the old spirit leveled orthometric height benchmarks. The DSM shall only be required to measure and publish ellipsoidal heights and GPS derived orthometric heights for various survey markers. This paper focuses on the determination of the transformation parameters between the Tanzania National Levelling Datum (TNLD) and the geoid for facilitating GPS heighting in Tanzania. Least squares estimates of the transformation parameters have been determined from orthometric heights in the Tanzania Primary Levelling Network (TPLN) and GPS derived orthometric heights referred to a preliminary model of the African geoid called AGP2003 and a geoid implied by the EGM96 geopotential coefficients. Two transformation models were considered: The Molodensky's transformation formula and a 2D algebraic polynomial. The values of the transformation parameters which were obtained using the AG2003 model produced GPS derived orthometric heights that are closer to the TPLN heights than those produced using the EGM96 geopotential model. It is being proposed here that the new gravimetric geoids that have been developed for Tanzania be used with the GPS observations to obtain new GPS based orthometric heights for Tanzania.