



Geoid improvement by optimal combination of GRAV-D and terrestrial gravity data in Iowa

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The Geoid Slope Validation Survey of 2014 (GSVS14) consists of co-located GPS/leveling stations along a 320 km traverse running East to West in Iowa, USA. Some gravimetric geoid models were able to match the GPS/leveling data to 1-cm accuracy differentially along the eastern majority of the traverse, which ran across moderate topography but high gravity variation. However, for the western 50 km of the traverse, these same gravimetric geoid models exhibited a 9-cm slope mismatch against the GPS/leveling data. This occurred despite the inclusion, into the geoid models, of the GOCO05S satellite gravity model, and newly flown GRAV-D airborne data over the traverse. This paper examines possible causes for this, and tries to find remedies for the discrepancy. Candidate areas of investigation include: 1. errors in the terrestrial gravity data; 2. topographic and gravimetric reductions; 3. optimal weights (spectral/space) used to combine the different data types.