



Modeling Airborne Gravity Data with Local Functions for Regional Geoid Enhancement — A Case Study in Puerto Rico Area

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Airborne gravimetry has been used as the primary method to quickly and economically obtain updated gravity field information over a region, targeted specifically. Thus, unlike the satellite missions that provide global or near global data coverage, the observables from airborne campaigns are apparently space limited. Moreover, they are also band limited in the frequency domain, considering that various filter banks and/or de-noising techniques have to be applied to overcome the low signal to noise ratio problem that are presented in the airborne systems due to mechanical and mathematical limitations in computing the accelerations, both the kinematic one and the dynamic one. As a result, in this study, a band-limited local function system based on the point mass model is used to process these airborne gravity data that have both a limited frequency domain and a limited space domain in the target area: Puerto Rico Island and its nearby ocean areas. The resulting geoid model show obvious middle to short wavelength geoid changes due to airborne gravity data contribution. In the land area, these changes improved the geoid precision from 3.27cm to 2.09cm at the local GNSS/Leveling bench marks. More importantly, the error trend in the geoid models is largely reduced if not completely removed. Various oceanographic models will be used to validate the geoid changes in the nearby open sea areas.