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Estimating 2-D isotropic admittance from sparse ship-track bathymetry and dense gravity data

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We present a new method to estimate 2-D isotropic admittance using sparse shipboard bathymetry and dense satellite altimetry data. Gravitational admittance contains information on the state of isostasy and thus can potentially discriminate between various compensation mechanisms, providing useful constraints on subsurface density structure. Although dense gravity data are available globally owing to satellite altimetry, original (not predicted from gravity) bathymetry data are available only on ship tracks, which can be very sparse especially in the southern hemisphere. Because of this common imbalance between gravity and bathymetry data coverage, it has been traditional to estimate regional 1-D admittance by stacking ship tracks. We synthesize a large number of Monte Carlo ensembles of dense bathymetry grid based on ship-track bathymetry and predicted topography, and estimate 2-D isotropic admittance and its variance at any given point on sea surface. This statistical approach allows us to fully utilize uneven ship track distribution in estimating spectral properties such as admittance and coherency in two dimensions. We combine multi-resolusion data windowing with nested high-pass filtering, in order to maximize spectral resolution in our localization of admittance.Theoretical formulation as well as some case studies will be presented.