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Modeling of modulus of gravity vector in the oceans based on satellite altimetry data

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Recent progresses in satellite altimetry techniques has resulted the high accuracy measurement of sea surface. If satellite altimetry data combine with sea surface topography, high resolution marine geoid can be computed. The geoid can be used for modeling of modulus of gravity vector at the oceans. The computation step is as follows: (i) Using linear Bruns formula of the type Somigliana-Pizzetti, the marine geoid is converted to the potential difference on the reference ellipsoid WGD2000. (ii) The computed potential difference is added to potential value of geoid to obtain real potential on the reference ellipsoid WGD2000. (iii) Reference potential is computed by using ellipsoidal harmonic expansion up to degree/order 360/360 and centrifugal potential. (iv) The reference potential is subtracted from the real potential to obtain residual potential on the reference ellipsoid WGD2000. (v) To obtain residual gravity modulus, the residual potential is up warded via Abel-Poisson to point of interest at sea surface. (vi) reference gravity vector is computed by adding ellipsoidal harmonic expansion up to degree/order 360/360. (vii) Modulus of gravity vector is computed by adding modulus of reference gravity vector and residual gravity modulus. This new methodology has successfully tested at the test area.