



A new validation technique for shipborne gravity observations based on satellite altimetry data

Case study: The Persian Gulf

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Due to the measuring environment at sea, the marine gravity data collected via shipborne techniques are usually highly noisy and contaminated with various systematic errors. Validity control of the collected data is of great interest for marine applications. In this paper, we propose a new validation approach using satellite altimetry data and the modern high-resolution geopotential.

The main steps of this new method are as follows:

- Determination of geoid undulations from satellite altimetry data
- Computation of disturbing potential from geoid undulations via application of ellipsoidal Bruns formula
- Computation of actual potential on the ellipsoidal surface.
- Removal of the effect of an ellipsoidal reference field up to degree and order 360 plus the centrifugal field.
- Solution of Dirichlet problem with residual potential as boundary data.
- Application of gradient operator to solution of Dirichlet problem in order to get residual gravity acceleration.

- Restoration of the ellipsoidal reference field and the centrifugal acceleration at computation points.
- Downward continuation to the sea surface using free-air scheme
- Comparison of the observed data with the downward continued information.

Theoretical details and the numerical results of the case study area will be presented.