INTEGRATION OF GEOSAT ERM ALTIMETRY AND MARINE GRAVITY TO IMPROVE THE GRAVITY FIELD IN THE EQUATORIAL BRAZILIAN CONTINENTAL MARGIN

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First year GEOSAT T2 ERM altimetry and shipborne gravity data in the South Atlantic region (70W/20E/40S/10N) were integrated to calculate the gravity field. The satellite data was corrected and averaged to remove seasonal variations and average tracks were adjusted in order to minimize the crossover differences in a least squares sense. The shipborne gravity data were inspected to remove erroneous points and corrected by adjusting the crossover errors. The covariances between the gravity field elements were adjusted from free-air gravity covariances, using appropriate spherical functions.An integrated free-air anomaly gravity field was calculated by least squares collocation in a 5' resolution grid which was compared with shipborne gravity. The integrated model gives a significant improvement in the representation of the oceanic gravity field in regions where the available data have uniform distribution, if compared with models using only high-density satellite altimetry. The high quality shipborne data from cruises EQUANT I and EQUANT II over the equatorial brazilian continental margin were used to investigate the problem of the loss of the satellite signal in regions of shallow waters. In regions where water depths are less than 50 m, there is a systematic increase in the differences between the altimetric models and the ship data, which did not occur with the integrated model. This demonstrates the importance of using shipborne gravity together with a more regular and denser distribution, as well as more accurate data from satellite altimetry in the representation of the global gravity field.