

Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11854, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11854
EGU General Assembly 2008
© Author(s) 2008



Marine gravity field modeling using spectral methods

I.N. Tziavos, G.S. Vergos, V.N. Grigoriadis

Aristotle University of Thessaloniki, Department of Geodesy and Surveying, University Box 440, 54124, Thessaloniki, Greece, (tziavos@olimpia.topo.auth.gr / +30-2310-996125)

The principles and characteristics of different FFT-based methods are investigated whereby satellite altimetry observations are combined with surface and airborne gravity data for the recovery of quantities related to the gravity field (e.g., geoid heights, gravity anomalies, deflections of the vertical) in marine areas. The main focus is placed on (a) the FFT-based multiple input-output system theory and (b) the least-squares adjustment in the frequency domain methods. Evaluations are carried out in the spectral domain utilizing the spherical FFT algorithms, as well as in the space domain using conventional least-squares collocation methods. Numerical results are shown for the test area of eastern Mediterranean Sea. The numerical results derived by the different methods are tested from both the theoretical and practical point of view. Furthermore, several comparisons are made in order to assess the contribution of the heterogeneous data sources and their errors in the optimal marine gravity field modeling. Finally, conclusions are drawn on the improvement in the determination of various gravity field related quantities in terms of accuracy and resolution by combining satellite altimetry and surface and airborne gravity data.