Geophysical Research Abstracts
Vol. 18, EGU2016-12311, 2016
EGU General Assembly 2016

Theoretical and numerical investigations towards a new geoid model for the Mediterranean Sea – The GEOMED2 project

Riccardo Barzaghi (1), Georgios S. Vergos (2), Alberta Albertella (1), Daniela Carrion (1), Noemi Cazzaniga (1), Ilias N. Tziavos (2), Vassilios N. Grigoriadis (2), Dimitrios A. Natsiopoulos (2), Sean Bruinsma (3), Sylvain Bonvalot (3), Marie-Françoise Lequentrec-Lalancette (4), Pascal Bonnefond (5), Per Knudsen (6), Ole Andersen (6), Mehmet Simav (7), Hasan Yildiz (7), Tomislav Basic (8), and Antonio J. Gil (9)

(1) Politecnico di Milano, Italy , (2) Aristotle University of Thessaloniki, School of Rural and Surveying Engineering, Department of Geodesy and Surveying, Thessaloniki, Greece , (3) GET UMR 5563, Toulouse, France, (4) SHOM, Brest, France , (5) OCA/Géoazur, Sophia-Antipolis, France , (6) DTU Space, Kopenhagen, Denmark , (7) General Command of Mapping, Ankara, Turkey , (8) University of Zagreb, Zagreb, Croatia, (9) University of Jaén, Jaén, Spain

The unique features of the Mediterranean Sea, with its large gravity variations, complex circulation, and geodynamic peculiarities have always constituted this semi-enclosed sea area as a unique geodetic, geodynamics and ocean laboratory. The main scope of the GEOMED 2 project is the collection of all available gravity, topography/bathymetry and satellite altimetry data in order to improve the representation of the marine geoid and estimate the Mean Dynamic sea surface Topography (MDT) and the circulation with higher accuracy and resolution. Within GEOMED2, the data employed are land and marine gravity data, GOCE/GRACE based Global Geopotential Models and a combination after proper validation of MISTRAL, HOMONIM and SRTM/bathymetry terrain models. In this work we present the results achieved for an inner test region spanning the Adriatic Sea area, bounded between 36o < φ < 48o and 10o < λ < 22o. Within this test region, the available terrain/bathymetry models have been evaluated in terms of their contribution to geoid modeling, the processing methodologies have been tested in terms of the provided geoid accuracy and finally some preliminary results on the MDT determination have been compiled. The aforementioned will server as the guide for the Mediterranean-wide marine geoid estimation. The processing methodology was based on the well-known remove-compute-restore method following both stochastic and spectral methods. Classic least-squares collocation (LSC) with errors has been employed, along with fast Fourier transform (FFT)-based techniques, the Least-Squares Modification of Stokes' Formula (KTH) method and windowed LSC. All methods have been evaluated against in-situ collocated GPS/Levelling geoid heights, using EGM2008 as a reference, in order to conclude on the one(s) to be used for the basin-wide geoid evaluation.