

Bathymetry Modelling from Altimeter-Based Gravity and Satellite Multispectral Images in the North Adriatic

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SUMMARY

Topography of the seafloor is important parameter in almost all maritime related research. Traditional shipboard bathymetry methods are time and money consuming. Bathymetry LiDAR is optimal method for deriving depth of shallow sea areas but also quite expensive. Alternative bathymetry data sources are open access data bases and publicly available digital bathymetry models. Direct survey data in Adriatic Sea is available only through negotiation with data holders. Current publicly available bathymetry models in the Adriatic are mainly based on depths predicted from gravity combined with sparse soundings from nautical charts, especially along East Adriatic coast. These models have coarse resolution and unknown quality. In this paper digital bathymetry model of the North Adriatic along east coast of Istrian peninsula is calculated from altimeter-based gravity anomalies from Scripps Institute of Oceanography and satellite multispectral images from Landsat 8 and Sentinel 2 satellite missions. The altimeter-derived gravity anomalies are correlated with depth undulation under the sea floor. Depth is predicted using the Gravity-Geologic method and density contrast between seafloor and seawater is determined by check points from direct survey data and soundings from nautical charts. Bathymetry of shallow, coastal areas is enhanced by depth data derived from multispectral images using Satellite Derived Bathymetry methods. Model is validated against data from nautical charts. Digital bathymetry model in test area that is derived from gravity anomalies and improved with data from Satellite Derived Bathymetry shows great correlation with soundings from nautical chart. As compared to traditional survey methods, model is time and cost effective. Although the accuracy of model is not sufficient for navigational purposes, in contrast to currently available bathymetry models it provides an advancement in quality of bathymetry data in the North Adriatic.

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