

Analysis of Hydrographic Data Uncertainty for Seamless Reference Surface

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Key words:

SUMMARY

The development of a seamless vertical reference surface is accompanied by a number of challenges pertinent to the availability, volume and uncertainty of bathymetric and topographic data. Data uncertainty, which is by far the most difficult to deal with, is attributed to various sources of errors including those of geodetic and hydrographic origin. The uncertainties in the geodetic measurements originate mainly from the limitations in the employed geodetic technique, i.e. terrestrial or space. Old nautical charts and topographic maps were based on terrestrial techniques, which are far less accurate than modern space techniques. In addition, the distribution of the positioning uncertainty is not expected to follow a consistent pattern across the chart (map). This is mainly due to the inconsistent datum distortion as well as the discrepancies in the measuring techniques in the subsequent chart (map) versions. As well, the existing paper (and digitized) charts in many areas of the world were based on old hydrographic surveying methods, for example the leadline, which are far less accurate than modern techniques such as multibeam echo-sounding surveys. This creates inconsistent depth uncertainty across the chart.

As uncertainties are propagated into the estimated transformation parameters and their covariance matrix, it is of utmost importance that they are properly modelled. This paper addresses the issue of uncertainty in hydrographic data and suggests ways to account for it.

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