

Paper for consideration by NSHC**[TOSCA-SURFREF Project]**

Submitted by:	France
Executive Summary:	A focus on the TOSCA-SURFREF project - an scientific research initiative to generate a global marine vertical reference surface.
Related Documents:	-
Related Projects:	BathyElli project (FR)

Summary

According to IHO recommendations, hydrographic chart datum should be as close as possible to the LAT level, and that all existing vertical reference surfaces used by HOs to be unified. In that scope, NSHC TWG is currently undertaking adjacent reference surface comparison for the purpose of combining those existing national models to generate a common reference surface for tidal reduction to chart datum in the North Sea.

The TOSCA-SURFREF project also aims at developing a common reference surface, with a more global and bottom-up approach: refining the reference surface determination method by taking advantage of recent developments made in altimetry regarding coastal geoids. The purpose of that project is to determine a reference surface on a large area using a single calculation method.

Analysis

The LAT is considered as the main reference level from which are derived most of hydrographic chart datum. Therefore, it is crucial to build the most accurate, consistent and homogeneous reference level to maintain the quality and confidence on hydrographic products. IHO recommends reducing the uncertainty on the reference level (LAT or Chart datum) to less than 0.75 meters with a 95% confidence rate in the 0-100 meters depth area. Nowadays, this level of accuracy is not reached in all European maritime areas, and more widely over most of coastal areas worldwide.

Lowest Astronomic Tide level is deducted from the mean sea level and maximum amplitude of astronomic tide. The mean sea level determination actually depends on the quality of measures, modeling and geoid accuracy, tides, atmospheric effects and signal aliasing when acquired. This approach suggested by this project is to clean out the radar signal in coastal areas in order to isolate the oceanic component. If positive, this new determination method could lead to generate a more accurate global vertical reference surface.

The project encompasses the following phases:

1. LAT level estimation relies on mean surface, which highly depends on the accuracy of the geoid surface determination. A key component of the project stands in the precise estimation of mean sea level, tidal signal and coastal geoid. A harmonic analysis is to be performed on more than 20 years of remote sensor altimetric radar dataset on the one hand, using SHOM's tidal model. The results of that analysis will then be

compared to existing tidal solutions in order to improve altimetric measures processing in coastal areas where high frequencies and non-linear physics prevail.

2. The second phase will be focused on the interpolation of LAT levels calculated during phase 1 on a global grid and the study of its limits considering tidal spatial variability.
3. Three case studies (Brest, Marseille, La Rochelle) will then be performed to demonstrate the spatial consistency of that global LAT interpolation based on historical achievements.

The final results of that project are expected for early spring 2017 and will be made available to all NSHC Member States.

Action required by NSHC

The NSHC is invited to:

- take note of that information paper,
- take appropriate actions.