

# Construction of Tidal Datums Based on Ellipsoid Using Spatial Interpolation

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**Key words:** Spatial Interpolation, Tidal bench Mark, Ellipsoid, Tidal Datums, Spline with Barrier

## SUMMARY

In this paper, conversion of vertical based information provision system through tidal bench mark which is currently implemented to area based information provision system was studied. When analyzing a range that allows area modelling using tidal bench mark by calculating the height from ellipsoid to mean sea level based on tidal bench mark performance in 2016. For

spatial interpolation, IDW interpolation, Spline interpolation, Kriging interpolation and Spline with Barrier interpolation were used. Parameter for each interpolation was selected through

cross validation. An experiment for obtaining optimum spatial interpolation was conducted by comparing and analyzing external verification and performance. The experiment showed that for RMSE of IDW was 14.5cm, for RMSE of Spline was 9.47cm, for RMSE of Kriging was

8.49cm and for RMSE of Spline with Barrier 8.60cm.

It was found that Spline with Barrier interpolation is the most suitable in constructing ellipsoid based tidal datums because Spline with Barrier interpolation using Minimum Curvature

technique meets allowable error based on first class of hydrographic survey provided by International Hydrographic Organization (IHO) and allows us to interpolate considering coastline.

Ellipsoid based area shaped mean sea level was constructed by using Spline with Barrier interpolation obtained from the experiment and it was converted into approximately highest high

water and datum level by obtaining the sum of four Largeness tide value in tide from tide grid mesh

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model and adding and subtracting it. When comparing a result of conversion with observed value, it was found that for approximately highest high water, RMSE was 3.235cm and for tidal bench mark, RMSE was 3.529cm.

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