Feature Terrain and Enviro Layers in dbSEABED

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15 Mar 2019



Many grid interpolation/extrapolation routines depend on supporting information to guide data selection and weighting. This is particularly true of the co-kriging and random forest methods.

dbSEABED uses the SRTM 1/120 degree resolution global elevations and the GSSH coastline datasets to derive these layers. Their properties are described here:

- (i) <u>Elevations</u>, raw data extracted from the SRTM Global Elevations dataset, at 1/120dg resolution in layers labelled 'selvage' then at project resolutions for 'project', 'map' and 'box' renditions.
- (ii) <u>Slope</u> and <u>aspect</u> ("slp', 'asp') are calculated using Sobel filters as described by ESRI
 ("http://pro.arcgis.com/en/pro-app/tool-reference/spatial-analyst/how-aspect-works.htm").
- (iii) <u>Bathymetric Position Index</u> and <u>Topographic Ruggedness Index</u> ('bpi', 'tri') are un-dimensional metrics of seabed curvature and roughness ("https://www2.unil.ch/biomapper/Download/Wilson-MarGeo-2007.pdf").
- (iv) <u>Land Proximity</u> ('prox') is the distance from land in km, with values beyond 51km limited to 51km. This layer follows the NRL dataset, but is available per project for the whole world in dbSEABED. Proximity is a control on the IDW search radius in dbSEABED, decreasing to shore.
- (v) <u>Bottom Water Temperature</u> ('btmp') is a convolution of the WOA 2013 temperatures atlas ("https://www.nodc.noaa.gov/cgi-bin/OC5/woa13/woa13.pl") with the SRTM 30+ topography such that highpoints take the temperature of layers above the bottom of each 0.25dg WOA cell.
- (vi) <u>Surface water turbidity ('kd490')</u> represents areas affected by plumes of suspended sediment, mostly coastal river discharges. Derived from MODIS AQUA.
- (vii) <u>Surface Chlorophyll-A ('chlora')</u> are derived from MODIS AQUA and represent the remotesensed concentration of this pigment globally, annual maxima.
- (viii) <u>Bottom Current</u> speeds ('bCurr') and <u>Bottom Current Directions</u> ('bCuDir'). These layers are preliminary, and are derived from one day's Global HYCOM data ("https://www.hycom.org/ocean-prediction/global-nrl-stennis")

The mapbases: 'Project' unprojected, WGS84 spheroid latitude-longitude map area as ordered by the client for the project. 'Selvage' the same area but extended by 20 cells all around so marginal cells can be mapped correctly. The resolution is always as the SRT, i.e. 1/120dg. 'Map' is the client-ordered area in terms of a projection such as Albers or UTM. The units are often metres or kilometres but may be lat/lon, and map borders are snapped to the nearest kilometer. 'Box' is the same as the Map area but extended all around by 20 km, again for accurate treatment of the marginal cells.

CJJ 15 Mar 2019, Boulder. Figure: example bottom-current speeds for the NY Bight region.