ReadMe file for Hales\_Kavanaugh Remote-sensing-based SOM and Carbonate-system Metamodel.

Overview:

The model is based on a semi-mechanistic model of total CO2 (TCO2) and alkalinity, applied within regions defined hierarchical SOM classification of monthly-resolved seascapes along the North American Pacific coast, constrained by reproduction of coastal pCO2 observations as provided by Takahashi. This follows the Hales et al. 2012 approach, improved by the monthly-resolved dynamic seascape approach of Kavanaugh et al. The improvements allow coverage from Vancouver Island to Panama, with only a marginal increase in the number of seascapes over that limited in southern extent to Baja California Sur. The model domain is from 5° N to 50° N, and within 200 nm of the coastline.

The result is further enhanced by employing the intermediate, pCO2-constrained TCO2 and Alk product to generate predictions of pH and the saturation state of the CACO3-mineral aragonite.

Data format:

The output data consists of four groups of monthly grids of 1) surface pCO2 (csnl\_co2map\_m\*) 2) air-sea CO2 flux (csnl\_fluxmap\_m\*), 3) surface aragonite saturation (csnl\_omegamap\_m\*), and surface pH (csnl\_pHmap\_m\*). In all cases \* can have value from 01 – 12, which corresponds to the month number from January – December.

All grids are presented as 740 (longitude) x 520 (latitude) at 1/12 ° (0.0833333 °) degree resolution in both Longitude and Latitude, with minimum latitude of 5.041667 ° (N), and minimum Longitude of -134.9583333 ° (W).

Surface pCO2 is expressed in µatm, at SST.

Surface air-sea flux is expressed as mmol m-2 d-1.

Surface pH is expressed as pHt, at SST.

Surface Ω is for aragonite, using the solubility suggested by Mucci, 1080.