Baetens Katrijn

Royal Belgian Institute of Natural Sciences

Author(s): Katrijn Baetens[1], Stefano Salon[2], Gianpiero Cossarini[2], Henning Wehde[3], Sébastien Legrand[1], Ray Mahdon[4] and Jan Maksymczuk[4]
Affiliation(s) : [1]Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, Belgium
[2]Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - Ogs di Trieste, Italy
[3]Institute of Marine Research, Norway
[4]MetOffice, UK

Quantifying and visualizing the skill of biogeochemistry models in reproducing satellite chlorophyll patterns with binary metrics: a validation study.

Validation tasks are a routine part of research activities in ocean modelling, and aim to verify that the models are scientifically robust and provide numerical results that match. This work presents a technique for biogeochemistry models validated with satellite data that makes use of binary metrics. It is tested on three different area's (Southern Bight of the North Sea, Kattegat/Skagerrak and Mediterranean Sea) and three different models. The aim is not to compare the performance of the three biogeochemistry models, but to check the usefulness of the binary validation techniques. The binary technique checks if model and satellite data pass a threshold value at the same position on the map. This approach gives a rather robust validation of biogeochemical model data but recognizes a match in modelled and observed plankton patterns in space or time. The pattern match is quantified by different discriminants such as the Hanssen-Kuipers discriminant and visualized in colour coded maps. Flexibility in pixel match is introduced by allowing a match between an observed result at a position of interest and a modelled result in the neighbourhood of that position, a known methodology (neighboring method) is used.

The techniques are successfully tested for three different areas (the Southern bight of the North Sea, the Baltic and the Mediterranean Sea).

Categorical metrics in existing studies are usually not combined with neighboring methods and usually there is a focus on the spatial dimension. This work illustrates the temporal dimension. The validation technique is a fast way of detecting structural biases between model and observations. The new visualization presentation is useful for fast model skill assessment.

Keywords: Validation technique, biogeochemistry models, satellite data, neighbouring methods, binary methods, pattern validation