Geophysical Research Abstracts
Vol. 20, EGU2018-6305, 2018
EGU General Assembly 2018

Linking 1D coastal ocean modeling to environmental management: an ensemble approach

Marco Zavatarelli, Giulia Mussap, and Nadia Pinardi
Bologna University, Physics and Astronomy, bologna, Italy (marco.zavatarelli@unibo.it)

The use of a one-dimensional interdisciplinary numerical model of the coastal ocean as a tool contributing to the formulation of ecosystem based management (EBM) is explored. The focus is on the definition of an experimental design based on ensemble simulations, integrating variability linked to scenarios (characterised by changes in the system forcing) and to the concurrent variation of selected, and poorly constrained, model parameters.
The modeling system used was previously specifically designed for the use in "data-rich" areas, so that horizontal dynamics can be resolved by a diagnostic approach and external inputs can be parameterized by nudging schemes properly calibrated.
Ensembles determined by changes in the simulated environmental (physical and biogeochemical) dynamics, under joint forcing and parameterisation variations, highlight the uncertainties associated to the application of specific scenarios that are relevant to EBM, providing an assessment of the reliability of the predicted changes.
The work has been carried out by implementing the coupled modeling system BFM-POM1D in an area of Gulf of Trieste (northern Adriatic Sea), considered homogeneous from the point of view of hydrological properties, and forcing it by changing climatic (warming) and anthropogenic (reduction of the land based nutrient input) pressure. Model parameters affected by considerable uncertainties (due to the lack of relevant observations) were varied jointly with the scenarios of change.
The resulting large set of ensemble simulations provided a general estimation of the model uncertainties related to the joint variation of pressures and model parameters. The information of the model result variability aimed at conveying efficiently and comprehensibly the information on the uncertainties/reliability of the model results to non-technical EBM planners and stakeholders, in order to have the model based information effectively contributing to EBM.