APPLICATION OF A SEQUENTIAL DATA ASSIMILATION TECHNIQUE TO IMPROVE THE RESULTS OF A 1D COUPLED PHYSICAL-BIOGEOCHEMICAL MODEL OF THE LIGURIAN SEA

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Data assimilation with a Kalman filter is a challenging task in ecosystem modelling. Ecosystem models are generally strongly non-linear and the numerical model responses depend largely on the chosen biogeochemical processes parameterisations and their parameters values. By combining the numerical model and the available observations, the data assimilation techniques are useful to improve the state estimation of the ocean.

A Singular Fixed Extended Kalman filter (Pham *et al.*, 1998) has been implemented to improve the model results of a 1D coupled physical-ecosystem model of the Ligurian Sea (NW Mediterranean Sea). The physical model is the turbulent closure model (version 1D) developed at the GHER (University of Liège, Belgium). The ecosystem model contains nineteen state variables describing the carbon, nitrogen, and silicium cycles of the pelagic food web. The model is forced at the air-sea interface by the METEO France meteorological data. The DYFAMED time series data of year 2000 are used to calibrate and validate the biological model (Raick *et al.*, 2005).By combining the numerical model and the available observations, the Singular Fixed Extended Kalman filter (Pham *et al.*, 1998) has been used. Twin experiments were first performed to choose the suitable experimental protocol, which was then applied in real data assimilation experiments using DYFAMED data (Raick *et al.*, submitted). The method has allowed to improve model results, but also to know about the performances and deficiencies of the model.

References

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