



Data assimilation in a coastal 3D model of the Gulf of Lions, Western Mediterranean Sea

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The regional observation network FETCH-MOGLI1 (spring 1998) is assimilated in a free simulation run with the 3D coastal ocean model SYMPHONIE. This one-month experiment gives a real opportunity for testing the assimilation data tool SEQUOIA, especially on a period with different regimes of atmospheric forcing. The assimilation process is composed of two steps. First, ensemble simulations are run following a perturbation method given hypotheses about the main error sources (OGCM inputs and wind forcing). The exploration of the model error subspace is then managed by the calculation of ensemble multivariate Empirical Orthogonal Functions (EOFs). Second, these ensemble statistics are used in a sequential assimilation scheme, a Reduced-Order Optimal Interpolation based on 3D-EOFs. Various error regimes appear and several sets of multivariate 3D-EOFs give access to coherent error structures. These latter define the Reduced Order control subspace in which the FETCH-MOGLI1 observation network is assimilated to correct the Gulf of Lions model trajectory. Before assimilating the real dataset, twin experiments are run separately for each kind of error sources. They assess the efficiency of this assimilation method.