



The one-shot optimization strategy for parameter identification in marine ecosystem models

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We present an iterative method to solve data assimilation problems to identify parameters marine ecosystem models. The exemplary, spatially 3-dimensional model under consideration computes a steady annual cycle and is driven by climatological ocean circulation data. Since the necessary spin-up takes quite a long computational time, the goal of the method is to correct model parameters already during this simulation process in a piggyback manner. For this purpose, we augment the simulation program with adjoint solvers to obtain derivatives and immediately use this sensitivity information to determine parameter corrections. We verify that the application of this one-shot optimization strategy requires only a small multiple of the computational time and costs which are needed for one model spinup with fixed parameters. Numerical results are shown on the basis of a least-squares fit of model output of a nutrient-based 3D marine ecosystem model to given data.