



Application of genetic algorithms to a parameter optimization of a coupled ocean – sea ice model in the Arctic Ocean

Hiroshi Sumata (1), Frank Kauker (1,2), Ruediger Gerdes (1,3), Cornelia Koeberle (1), Michael karcher (1,2)

(1) Alfred Wegener Institute for Polar and Marine Research, Sea ice physics, Bremerhaven, Germany

(hiroshi.sumata@awi.de), (2) Ocean Atmosphere Systems, Hamburg, Germany, (3) Jacobs University, Bremen, Germany

We applied genetic algorithms to a parameter optimization problem in a coupled ocean – sea ice model, and examined applicability and efficiency of this approach from the point of view of a practical use for sea ice – ocean simulation in the Arctic Ocean. Several series of parameter optimization experiments were performed by minimizing a cost function composed of model – data misfit of 3 types of sea ice properties. The result shows that the genetic algorithms can effectively estimate near optimal parameter set with a practical number of iterations, and the methods provided better results compared to a traditional gradient descent approach. The result of the study indicates that a sophisticated stochastic approach is of practical use to a parameter optimization of a coupled ocean–sea ice model.