



Local analytical optimal nudging: theoretical formulations and application in sea ice and ocean assimilations

Local analytical optimal nudging (LAON) is a simple, accurate and efficient data assimilation method, which is designed to update the model variables in every time step such that the analysis will eventually reach the optimal estimate. The computational time with LAON assimilation is generally comparable with the free run without assimilation, and in some cases faster than the free run. In this study we introduce the theoretical formulation of LAON and showcase some of its applications for assimilating sea ice concentration (SIC), sea ice thickness (SIT) and sea surface temperature (SST) in the Arctic. Comparisons with observations show that the LAON assimilation significantly improves the simulations of SIC, SIT and SST, providing a better simulation of SIC, SIT, sea ice edge and marginal ice zone than the CMEMS operational products.

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