PDAF - features and recent developments

Lars Nerger*†[1]

[1]Alfred Wegener Institute – Am Handelshafen 12, 27570 Bremerhaven, Germany

Abstract

PDAF, the Parallel Data Assimilation Framework (http://pdaf.awi.de), is an open-source framework for ensemble data assimilation (DA). PDAF is designed to be particularly easy to use and a DA system can be quickly build, while PDAF ensures the computational efficiency. PDAF's ensemble-component provides online-coupled DA functionality, thus data transfers in memory and by using the MPI parallelization standard, by inserting 3 function calls into the model code. These additions convert a numerical model into a data-assimilative model, which can be run like the original model, but with additional options. Alternatively, one can use separate programs to compute the forecasts and the DA analysis update. PDAF further provides DA methods (solvers), in particular ensemble Kalman filters and particle filters. Tools for diagnostics, ensemble generation, and for generating synthetic observations for OSSEs or twin experiments, provide additional functionality for DA. PDAF is used for research purposes, teaching, but also operationally. In the operational context, PDAF is e.g. used at the CMEMS marine forecasting center for the Baltic Sea and in the Chinese Global Ocean Forecasting System (CGOFS). A recent addition to PDAF is OMI, the Observation Module Infrastructure, a library extension for observation handling. OMI is inspired by object-oriented programming, but for ease of use, it is not coded using classes. Recent developments further include support for strongly-coupled DA across components of Earth system models, model bindings for NEMO, SCHISM, and the climate model AWI-CM and ensemble-variational solvers. This presentation discusses the PDAF's features and recent infrastructure developments in PDAF.

*Speaker

†Corresponding author: lars.nerger@awi.de