Contribution ID: **11** Type: **Talk**

Optimization of the Split-Explicit Time-Stepping Algorithm of MPAS-Ocean

Tuesday, 28 January 2020 16:00 (30 minutes)

My research involves improving the barotropic-baroclinic splitting of the time-stepping algorithm of the Model for Prediction Across Scales —Ocean (MPAS-Ocean) with a view to improving the numerical stability and solution accuracy while reducing the computational time. More specifically, I have been studying (a) different filters for time-averaging the intermediate instantaneous barotropic modes and including the 'mean' solution in the time derivative for the next baroclinic (large) time step, and (b) variations of the forward-backward time-stepping algorithm for advancing these barotropic modes. The primary purpose of the time-averaging filters in (a) is to minimize the aliasing and mode-splitting errors while ensuring the stability of the time-stepping scheme. The forward-backward algorithm in (b) consists of a predictor and an optional corrector stage with a set of weighting parameters, an optimum combination of which can enhance solution accuracy. I have programmed a one-dimensional shallow water equation solver in object-oriented Python for simulating the propagation of a surface gravity wave, where I have tested a number of filters and time-stepping schemes. In this talk, I will compare the efficiency and accuracy of various designs in the simplified code and global MPAS-Ocean simulations.

Do you need an official invitation letter?

Yes

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