

Adjoint-Free Variational Data Assimilation into Regional Wave Model

Gleb Panteleev

Research Professor, International Arctic Research Center, University of Alaska Fairbanks

Abstract:

A variational data assimilation algorithm is developed for the ocean wave hindcast and forecast. The algorithm employs the adjoint-free technique and tested in a series of data assimilation experiments in the South Chukchi Sea region and a nested configuration for Hawaii region with synthetic observations from various platforms. The types of considered observations are directional spectra measured by stationary buoys, SWH observations by coastal high-frequency radars (HFRs), and satellite measurements of sea surface height. Numerical experiments demonstrate computational feasibility and robustness of the adjoint-free variational algorithm with the regional configurations of WAM. The similar results were recently obtained in the application of the adjoint free 4Dvar approach for assimilation into the NCOM ocean model. The adjointless 4Dvar theory and potential applications to other models will be discussed during the seminar as well.