



A new method for identifying parameter sensitivity in atmosphere and ocean model

Qiang Wang (1,2), Youmin Tang (3), and Henk A. Dijkstra (4)

(1) Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China (wangqiang@qdio.ac.cn), (2) Qingdao National Laboratory for Marine Science and Technology, Qingdao, China, (3) Environmental Science and Engineering, University of Northern British Columbia, Prince George, Canada, (4) Institute for Marine and Atmospheric research Utrecht, Department of Physics and Astronomy, Utrecht University, Utrecht, the Netherlands

A new approach is proposed to investigate the model parameter sensitivity in atmosphere and ocean model. The method is able to well estimate sensitivity of specific model parameter with two significant advantages: 1) it takes into account interaction among uncertain parameters, 2) its computation is very simple and timesaving. The new approach is tested using the Lorenz'63 model and an intermediate complexity 2.5-layer shallow-water model of North Pacific Ocean. For the Lorenz'63 model, it is shown that the parameter sensitivities of the model results depend on the initial condition. For the 2.5-layer shallow-water model used to simulate the Kuroshio Large Meander (KLM) south of Japan, the method reveals that the prediction of the KLM path is insensitive to the uncertainties in the bottom friction coefficient, the interfacial friction coefficient, and the lateral friction coefficient. On the contrary, the KLM prediction is relatively sensitive to the uncertainties of the reduced gravities representing ocean stratification and the wind stress coefficient.