

Regional atmospheric data assimilation coupled with an ocean mixed layer model: a case of typhoon Soudelor (2015)

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This study investigates the effect of atmosphere-ocean coupling in a regional atmospheric data assimilation system for a case of Typhoon Soudelor (2015). A simple ocean mixed layer model, known as the Price-Weller-Pinkel (PWP) model, has been implemented into a regional atmospheric data assimilation system SCALE-LETKF.

The results show that the PWP model produced reasonable sea surface temperature (SST) fields in response to the atmospheric flow, particularly, dropping SST associated with the typhoon's mixing the ocean upper layers. However, the analyzed track and intensity of the typhoon were not improved by coupling the PWP model. This can be explained by lower SSTs and by smaller ensemble spread of near surface atmospheric temperature. In the atmosphere-ocean coupling system, the stronger a typhoon, the cooler the SSTs via heat releases from the ocean surface and via vertical mixing of the upper ocean. These processes induce negative feedback for the typhoon development, so that the typhoon growth rates are suppressed (enhanced) in ensemble members with strong (weak) typhoon. This results in more similar typhoon intensities among ensemble members. Therefore, the coupled system reduces the ensemble spreads in the atmospheric fields associated with typhoon. The presentation will include the most up-to-date results at the time of the conference.

Keywords: Data Assimilation, Typhoon, Air-Sea Interaction