Coupled Data Assimilation Experiments at CNR ISMAR

Coupled data assimilation in regional climate models is still largely unexplored, besides few pioneering applications, but represents a high potential for regional predictability gain, linked, among several factors, to the correction of imbalances at initial time and at the lateral boundaries, and the maximization of the benefits of the regional observing networks. Here, we present initial works and results relative to extending a variational data assimilation system in the ocean to include atmospheric parameters and observations. First, the concept is illustrated in an idealized atmosphere-ocean single-column model augmented with data assimilation, which indicates the benefits and advantages of the strongly coupled assimilation paradigm in a controlled environment. However, sensitivity to the choice of the coupled background-error covariances is large. Second, we show preliminary results in a realistic regional climate model over the Mediterranean region including state-of-the-art numerical models (NEMO, WRF, HD). Weakly coupled assimilation experiments indicate the importance of ocean data assimilation in predicting the intensity of individual medicane events. A roadmap towards a strongly coupled scheme is also presented.

A. Storto, V. de Toma, G. Liberti, C. Yang, D. Ciani, A. Pisano, C. Yang, R. Santoleri