

Oral.2: 11:45-12:00. The impact of convective permitting resolution in a coupled regional ocean-atmosphere model of the Eastern Tropical Pacific

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Abstract

Resolving processes at the convective scales is of key importance to decreasing model biases and can be of remarkable value to resolve the local dynamics. Simulations at these scales typically improve model representation of precipitation intensity and pattern, small scale wind variability and direction, as well as better resolving topographic interactions. An improved representation of the atmospheric circulation would also enhance the performance of air-sea interactions with the consequent impact on the oceanic models. In this study, we use the Coupled-Ocean-Atmosphere-Wave-Sediment Transport (COAWST) Modeling System to simulate the eastern tropical Pacific circulation and biogeochemistry, with a particular focus on Central America. This area is particularly sensitive to convective processes, which influence the behavior of the Intertropical Convergence Zone. The model includes an atmospheric component, the Weather Research and Forecast Model (WRF), and an oceanic component, the Regional Ocean Modeling System (ROMS), at 20 and 4 km resolution. Comparing the results of these two sets of simulations, we uncover the key role of convective permitting resolution in decreasing important biases. We focused on evaluating the improvement of crucial variables for marine ecosystems, such as SST and pCO₂, of which, more reliable future projections, are critical to predicting changes in reef fish distribution and the subsequent cascading effects on biodiversity and people well-being.