EGU21-14193
https://doi.org/10.5194/egusphere-egu21-14193
EGU General Assembly 2021

Marine extreme events in high-resolution coupled model simulations

Gesa Eirund[1], Matthias Münnich[1], Matthieu Leclair[2], and Nicolas Gruber[1,2]
[1]ETH, Institute for Biogeochemistry and Pollutant Dynamics, ETH Zurich, D-USYS, Zurich, Switzerland
(gesa.eirund@env.ethz.ch)
[2]Center for Climate Systems Modeling (C2SM), ETH Zurich, Switzerland

Air-sea interactions have been found to substantially affect and drive marine extreme events. Such extreme events comprise, among others, highly anomalous conditions in ocean temperature, pH, and oxygen content - all of which are crucial parameters directly impacting marine ecosystem. Nevertheless, our understanding of the role of such events in the marine environment remains limited. In addition, the extent to which the interplay between atmospheric and oceanic forcings impacts the spatial and temporal scales of extreme events and affects the marine ecosystem and ocean biogeochemistry remains largely unknown.

Given these complex interactions between the atmosphere, the ocean, and marine biogeochemistry, we developed a coupled regional high-resolution Earth System Model (ROMSOC). ROMSOC comprises the latest officially released GPU-accelerated Consortium for Small-Scale Modeling (COSMO) version as the atmospheric model, coupled to the Regional Oceanic Modeling System (ROMS). ROMS in turn includes the Biogeochemical Elemental Cycling (BEC) model that describes the functioning of the lower trophic ecosystem in the ocean and the associated biogeochemical cycle. Our current model setup includes thermodynamical coupling and will be extended further to include mechanical coupling between the atmosphere and the ocean. Here, we present first simulations of our coupled model system for the California Current System (CalCS) at the US west coast at kilometer-scale resolution. We will test the hypothesis if the strong mesoscale coupling of the atmosphere and the ocean as represented in our model impacts the spatial and temporal scales of marine heatwaves and can potentially act to shorten their duration.