

The Slab ocean El Niño in a doubled CO2 worldErwan Monier[†];[†] MIT, USALeading author: emonier@mit.edu

Recent modeling studies suggest that the atmospheric component plays a dominant role in the El Niño/Southern Oscillation (ENSO) phenomenon. In particular, simulations in which an Atmospheric General Circulation Model (AGCM) is coupled to a mixed-layer ocean model can produce 'ENSO-like' variability with associated patterns in SST, precipitation, or atmospheric circulation similar to that of ENSO, and referred to as 'Slab Ocean El Niño' or 'Atmospheric Walker Mode'. In the absence of Bjerknes feedback (no ocean dynamics), the Slab Ocean El Niño relies on ocean-to-atmosphere latent heat flux and cloud forcing feedback. Studying the Slab Ocean El Niño, in particular its response to greenhouse gas-induced changes in latent heat flux and cloud feedback, can provide important knowledge to understand potential impacts of climate change on ENSO. We present a number of experiments using the Community Atmosphere Model (CAM) version 3 coupled to a mixed-layer ocean, including doubled CO₂ equilibrium simulations with different values of the model's climate sensitivity, which is modified using a cloud radiative feedback scheme. Results show consistent changes in both the magnitude and the periodicity of the simulated Slab Ocean El Niño.