



Shifts in ENSO couplings under global warming

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The influence of the El Niño — Southern Oscillation (ENSO) is felt in large parts of the world. Global warming may shift the properties and dynamics of El Niño. We study the shifts in ENSO couplings in IPCC AR4 coupled general circulation climate model runs. First, we compare period, pattern, amplitude and mean states of the Pacific ocean between the current climate and an enhanced greenhouse gas scenario. Next, shifts in ENSO couplings between sea surface temperature (SST), thermocline depth and wind stress are discussed. Although the mean state shifts, the overall ENSO properties do not change much. Changes in the mean state affect the feedback loop between SST, thermocline depth and wind stress. Higher mean SST provides higher damping through higher evaporation and cloud feedbacks. The shallower thermocline depth and mixed layer depth increase the strength of the response of SST to thermocline variability and wind stress, respectively. Wind response to SST variability increases near locations where the mean SST has raised the most. However, the effects of these changes are of opposite sign and the residual change is relatively small.