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ENSO at 6ka and 21 ka from ocean-atmosphere coupled simulations

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We analyze how the characteristics of El Nino-Southern Oscillation (ENSO) are changed in coupled ocean-atmosphere simulations of the mid-Holocene (MH) and the Last Glacial maximum (LGM) performed as part of the Paleoclimate modeling Intercomparison project. Comparison of the model results with present day observations show that most of the models reproduce the large scale features of tropical Pacific like the SST gradient, the mean SST and the mean seasonal cycles. However they suffer from common model biases, such as the westward penetration of the cold tongue in the west Pacific and the double ITCZ. All models simulated ENSO variability, although with different skill.

The mid-Holocene simulations allow to examine the climate response to a change in the seasonal and latitudinal distribution of incoming solar radiation (insolation) caused by known changes in orbital forcing ..(Berger, 1978).The LGM simulations represent the climate response to the presence of large ice sheets, cold oceans and lowered greenhouse gas concentrations. Results for the mid-Holocene show a consistent El Nino amplitude decrease. It can be related to the enhanced Asian summer monsoon due to the Earth's orbit change. Results are less conclusive for 21ka. Several mechanisms may compete and model results show a wide range of responses as it is the case in future climate projections.