



Does the strength of extreme strong El Niño events change under global warming?

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The influence of the anthropogenic forcing on the amplitude of the extreme strong El Niño event is explored by comparing the long-term simulations between the constant climate forcing (ctrl, i.e. preindustry, run) and increasing greenhouse gas concentration (A1B run) scenarios from the GFDL-CM2.1. The change of the mean state and the Indo-Pacific coupling in future climate, which in turn affects the amplitude of El Niño is particularly focused on. Both the simulations show a well consistency with the observed, i.e. all the super El Niños are concurrent with the extreme strong positive Indian Ocean Dipole (IOD). The extreme positive IOD in A1B remains compatible amplitude compared with the CTRL run even though the SST negative skewness in the equatorial southeastern IO is significantly weakened. On the Pacific, the mean state of the depth of thermocline in the equatorial Pacific for the A1B shoals during the super El Niño period. Nevertheless, the enhancement of thermocline-SST feedback is nearly offset by the weakness of wind-SST response due to the stabilization of atmosphere. The Bjerknes feedback and Indo-Pacific coupling does not show significant change in future climate, and so does the amplitude of extreme strong El Niño events.