
Role of low cloud feedback over the subtropical eastern Pacific Ocean on the ENSO development

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Abstract

The low cloud feedback plays an important role in the SST variability over the subtropical eastern Pacific Ocean during boreal summer when marine stratocumulus clouds are abundant. In particular, the positive low cloud radiative feedback serves to increase the magnitude and persistence of the SST anomalies. Meanwhile, the SST anomalies over the subtropical eastern Pacific Ocean have significant impact on ENSO development via wind-evaporation-SST (WES) feedbacks. Although much attention has been given to the role of WES feedback, recent studies have suggested that cloud radiative feedback also plays a role to develop the SST variability in the tropical Pacific. In this study, we investigated the role of low cloud feedback in the eastern subtropical Pacific Ocean on the ENSO development using the reanalysis datasets and a preindustrial simulation of Community Earth System Model, version 1 for the simulation period of 2,200 years. Here, it is found that an active low cloud feedback helps to ENSO development through the amplifying the SST perturbations over the eastern subtropical Pacific Ocean. Furthermore, we examined the detailed physical processes leading to an active subtropical low cloud feedback.

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