Simulated Impacts of Afforestation in East China on Climate Modulated by Ocean Variability

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Using the fully coupled climate model, NCAR CCSM3.5-DGVM, this work examines the effects of afforestation in East China on climate and the role of ocean variability in modulating with these land-atmosphere interactions.

In response to afforestation, the local surface air temperature significantly decreases in summer and increases in winter. The summer cooling is due to enhanced evapotranspiration. The winter warming is caused by a decrease in surface albedo, and in the presence of ocean variability, this warming is enhanced by the trapping of longwave radiation by additional moisture and clouds.

With the ocean variability, the response of the hydrologic cycle to afforestation is amplified. More water vapor transport in East China and form more cloud and precipitation especially in winter and pre-monsoon season.

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