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Simulation of the Mid-Holocene climate using IAP/LASG Climate System Model

ZHOU TIANJUN[1], YU YONGQIANG[1] and ZHANG XUEHONG[1]
[1]*LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029*

The reliability of climate models in projecting climate change on regional scales where ecological and economic impacts of global climate change occur needs to be assessed. Current models exhibit a range of skill in simulating today's climate and have some skill in simulating changes in climate since 1850. Accurate simulation of current climate, however, does not guarantee the ability of a model to simulate climate change correctly. Attempting to simulate substantially different past climatic conditions allows us to evaluate how models respond to large changes in forcing. The Paleoclimate Modeling Intercomparison Project (PMIP) has coordinated carefully designed simulations of past climates. The mid-Holocene (6 Ka BP) was chosen to test the response of climate models to orbital forcing with CO_2 at pre-industrial concentration and present ice sheets. The second phase of PMIP will evaluate the capability of state of the art fully coupled climate models to reproduce climate states that are radically different from those of today. The new version of IAP/LASG climate system model namely FGOALS_g1.0 has been involved in the activities of the IPCC 20th climate reproduction and the 21st century climate scenario projection, its performance in simulating the past climate is however waiting for assessment. According to the design of PMIP II, the Mid-Holocene climate is simulated using the FGOALS_g1.0. The model can properly reproduce the increase of the African summer monsoon and conditions warmer than present in high northern latitudes; however, it fails in simulating the enhancement of the Indian summer monsoon. A warmer China and a wetter N. China are successfully reproduced associated with the northward shift of the western Pacific subtropical high. The ocean feedbacks should not be ignored and coupled climate models can make exclusive contributions.

Key words: Mid-Holocene, PMIP, FGOALS_g1.0