Geophysical Research Abstracts, Vol. 9, 05919, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05919

Role of ocean on changes of the Asian and African monsoon during 6000 years before present and the effect of the bias of the simulation

R. Ohgaito (1) and A. Abe-Ouchi (1,2)

(1) Frontier Research Center for Global Change/JAMSTEC, Yokohama, Japan, (2) University of Tokyo, Kashiwa, Japan (ohgaito@jamstec.go.jp / Fax: +81-45-778-5707 / Phone: +81-45-778-5573)

Studies of climate change 6,000 years before present using atmospheric general circulation models (AGCMs) suggest the enhancement and northward shift of the summer Asian and African monsoons in the Northern Hemisphere (Joussaume et al. 1999). Although enhancement of the African monsoonal precipitation by ocean coupling is a common feature, contradictions exist between analyses of the role of the ocean in the strength of the Asian monsoon (Hewitt and Mitchell (1998), Braconnot et al. (2000), Voss and Mikolajewicz (2001) and Liu et al. (2003)). We investigate the role of the ocean in the Asian and African monsoons and sought to clarify which oceanic mechanisms play an important role using three ocean coupling schemes: MIROC, an atmosphere–ocean coupled general circulation model, an AGCM extracted from MIROC coupled with a mixed-layer ocean model, and the same AGCM with prescribed sea surface temperatures. The precipitation change for the Asian and African monsoon area suggest that the ocean thermodynamics plays an important role. The enhancement of the Asian monsoonal precipitation is most vigorous in the AGCM simulations, but mitigated in ocean coupled cases, which are not significantly different from each other. On the other hand in Africa, ocean thermodynamics contribute to the further enhancement of the precipitation from spring to autumn, and the ocean dynamics has a modest impact in enhancing precipitation.

Because modeling is never able to avoid biases, it is important to evaluate the impact of the biases of the modeling studies. In this work, how the representation of the present day SST in MIROC affect the climate change simulation will be investigated.