Geophysical Research Abstracts
Vol. 18, EGU2016-7296, 2016
EGU General Assembly 2016


# Influence of cloud radiative effects on tropical circulation and hydrological cycle in the Mid-Holocene

Kenji Izumi (1), Masa Kageyama (1), Sandrine Bony (2), and Pascale Braconnot (1)

(1) Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), Gif-sur-Yvette, France (kenji.izumi@lsce.ipsl.fr), (2) Laboratoire de Meteorologie Dynamique (LMD/IPSL), Paris, France

Paleoenvironmental data in particular, vegetation and lake-status at mid-Holocene (6,000 years ago) in Sahara shows that African monsoon extended much further north than today. Much of this change results from the changes in insolation driven by precession of the Earth's orbit, but in the state-of-the-art climate models, this factor alone is insufficient to explain the magnitude of the change. Previous studies showed that ocean and vegetation feedbacks affect the mid-Holocene monsoon and that the incorporation of these feedbacks in models improves the simulation of the hydrological cycle. However, it is not sufficient to reduce the discrepancies between simulated and reconstructed surface climates.

In this study, we investigate the extent to which the simulation of cloud-radiative effects matters for the simulation of paleo-climatic changes, and past changes in the position and strength of the tropical rain belts in particular. This is done by running a general circulation model with and without clouds-radiation interactions using the IPSL model. The impact of cloud –radiative effects, which prevents the precipitation band to move north, on the tropical circulation and precipitation changes in mid-Holocene experiments will be discussed. Additionally, we will show the simulated effects of land cover change over Sahara.