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Variations of Indian and African summer monsoons at 6 and 9.5 kyr BP

C. Marzin, P. Braconnot

Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France
(charline.marzin@cea.fr / Fax: +33 0169083073 / Phone: +33 0169084108)

The seasonal cycle of insolation during the Early to Mid-Holocene was more contrasted, resulting in a warmer and shorter summer in the Northern Hemisphere. Summer monsoon systems were enhanced according to paleoclimate records synthesis and climate simulations. Here, the different responses of Indian and African monsoons to those changes in the insolation forcing are analysed for the 6000 years BP, 9500 years BP and preindustrial periods using ocean-atmosphere coupled simulations.

The increase in precipitation over Indian subcontinent and Sahelian regions is larger at 9500 years BP than at 6000 years BP, the InterTropical Convergence Zone (ITCZ) penetrates further inland and the corresponding monsoon dynamical systems are shifted northward. The decrease in precipitation throughout the Holocene from past to present seems to be faster for the Indian system than the African counterpart. We quantify the differences between the two periods and analyse their causes. Several aspects are considered:

- the differences between the timing of the monsoons related to the seasonality of the insolation forcing

- the role of the Tibetan Plateau snow cover delaying the indian monsoon onset at 6000 years BP

- the remote influence of the Indian summer monsoon convection on the subsidence over North Africa