



Asian monsoon variations and teleconnections during the Holocene

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The seasonal cycle of insolation during the Early to Mid-Holocene was more contrasted, due to the orbital configuration of the Earth, 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, East-Asian and African monsoons to those changes in the insolation forcing are analysed for the climates of 6000 and 9500 years ago (6 and 9.5 kyr BP) and of the preindustrial period, using ocean-atmosphere coupled simulations. Insolation was stronger during the Northern Hemisphere summer at 9.5 kyr BP, also at 6 kyr BP but with a one month lag of the maximum of insolation towards autumn. The aim of this study is to analyse the responses of several monsoon systems to such different forcings, in terms of amplitude, timing and regional differences at the seasonal time scale, and to understand their mechanisms. As a result, the increase in precipitation over the Asian subcontinent and Sahelian regions is larger at 9.5 and 6 kyr BP than at present, but even more amplified at 9.5 than at 6 kyr BP. The InterTropical Convergence Zone (ITCZ) penetrates further inland and the corresponding monsoon dynamical systems are shifted northward. Differences of behaviour of the different monsoon regions throughout Holocene are explored through the large scale heating gradients, the role of the Tibetan Plateau snow cover and through the teleconnection between the Asian and African monsoon.