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Warm climates: differences and similarities in monsoon behaviours between the mid-Holocene and future climate scenario

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The mid-Holocene is a warm period that occurred around 6,000 years ago, in which orbital changes determined the warming of the Northern Hemisphere. This enhanced the inter-hemispheric thermal contrast in boreal summer, to a similar degree of what the future climate scenario RCP 8.5 projected for 2100. Although these two experiments have been constrained by different external forcing, they result in a similar response of the monsoons. Here, we analyse monsoon behaviours and dynamics in common models in the mid-Holocene and RCP8.5 simulations from the Paleoclimate and Coupled Model Intercomparison Project, PMIP3 and CMIP5. The ITCZ, tropical circulation, and land monsoon behaviours among these two warm climates have been investigated. Preliminary results suggest that the extent of the North African, Indian and North American monsoon in the future will not exceed the simulated shift in the Mid-Holocene. Only the Indian monsoon is expected to strengthen. Despite the significantly higher mean temperature in the RCP8.5 with respect to the mid-Holocene, we investigate if a dramatic change in the "biotic pump" can lead to weaker monsoons under global warming scenario than in the past climate. The invoked mechanism directly accounts for the effect of the evapo-transpiration on monsoon dynamics.