



Wetter or dryer: observed vs. simulated covariability of temperature and rainfall in Asia

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Asia's economies, agriculture and population strongly depend on the regular monsoon precipitation. Temperatures in the region, along with greenhouse gas emissions, are highly likely to increase. In contrast, the response of the hydrological cycle to global climate changes is rather uncertain. Key aspects of the monsoon, such as its timing and intensity, continue to present a challenge to climate models. The analysis of instrumental data is hampered by its sparsity and yields no clear trends for this region. In this contribution we go beyond the instrumental period and use late Holocene paleoclimate proxy data and climate model simulations to elucidate the linkage between temperature and precipitation in Asia. We find that the past relationship between temperature and precipitation has been timescale-dependent. While on annual to decadal timescales, cool summers tended to be rainy summers, cool centuries tended to be dryer centuries in monsoonal Asia. In contrast, current climate models simulations from the CMIP5/PMIP3 ensemble suggest the opposite, overestimating the short-term negative associations between regional rainfall and temperature and lacking long-term positive relationships between them. This implies that the long-term future projection of precipitation trends for the region may be even more uncertain than previously thought.