



## **Uncertainties and misunderstandings in the Indian summer monsoon response to global warming**

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While a majority of coupled climate scenarios suggest an increase in Indian summer monsoon rainfall with increasing amounts of greenhouse gases, such results are still very uncertain and are sometimes misunderstood. Uncertainties have many sources, including the difficulty to achieve a realistic simulation of present-day climate with the current-generation coupled ocean-atmosphere GCMs. Time-slice climate change experiments represent a valuable tool to explore uncertainties, but show serious limitations to downscale climate change at the regional scale. Moreover, simple mechanisms based on our understanding of the 20th century monsoon variability are not necessarily relevant to explain the simulated monsoon response to global warming. Each of these remarks will be illustrated through the results of both transient scenarios and time-slice experiments using the CNRM climate model. A special attention will be paid to the ENSO-monsoon relationship, suggesting that the recent weakening of this teleconnection is not due to climate change and that the tropical Pacific SSTs could have different impacts on the seasonal and multi-decadal timescales.