Current status and challenges in seasonal prediction of the Asian summer monsoon

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Understanding and predicting the Asian summer monsoon (ASM) variability are of considerable societal relevance and fundamental challenges. In the last few decades, the atmosphere–ccean coupled modeling has advanced greatly, enabling the seasonal ASM prediction with longer lead time (up to one–two seasons ahead). Based on a deeper understanding of interactions with the land and ocean, now we are unraveling the mystery of the seasonal ASM predictability. Recently, it has been recognized that the Indian Ocean, in addition to the tropical Pacific, plays a dominant role in controlling the ASM variability through a so-called Indo-western Pacific ocean capacitor (IPOC) effect; this was one of missing pieces of a puzzle of Asian monsoon processes. In fact, recent studies suggested that the Indian Ocean and tropical Pacific have predominant influences on the seasonal ASM variability and give the seasonal predictability in the surrounding regions. The latest climate prediction models are capable of representing and predicting these relevant variabilities to some extent. The Working Group on Subseasonal to Interdecadal Prediction (WGSIP) is planning a research initiative to revisit and explore further the Asian monsoon prediction in parallel with the AsiaPEX project, with a possible collaboration with the GEWEX/CLIVAR Monsoon Panel. Aims of this activity are to develop and convey consolidated information regarding the current state and past progress of the Asian monsoon seasonal prediction from a multi-model view. Some preliminary results of process-oriented evaluations with a limited number of models indicate that models generally well represent large scale variability modes, except for some poor representation of regional characteristics that are essential for making meaningful regional-scale prediction skill. Future plans of this initiative are also discussed.