Geophysical Research Abstracts
Vol. 15, EGU2013-5353-2, 2013
EGU General Assembly 2013

Can potential predictability characterize seasonal forecast skills of the East Asian summer monsoon in the ENSEMBLES coupled models?

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In ensemble forecasts, an important criterion for the reliability and calibration of a forecast system is the correspondence between two types of predictability metrics, the observation-free potential predictability measures and the observation-involved forecast skill measures. In this study, we investigate the ability of signal-to-noise ratio (SNR)-based potential predictability in characterizing seasonal forecast skills of the East Asian summer monsoon (EASM) in the ENSEMBLES models.

It is found that in the ENSEMBLES multi-model ensemble (MME) system, SNR-based potential predictability can well characterize the spatial-temporal variations of seasonal forecast skills of the EASM, deterministic and probabilistic, which indicates the good capability of this MME system in capturing the underlying true seasonal predictability of the EASM . On the other hand, there exists a potential predictability-forecast skill contradiction when comparing the MME with the participating single model ensembles (SMEs), that is, MME outperforms individual models in terms of forecast skills, whereas potential predictability estimated using the former is lower than those estimated using the latter. A simple statistical model is used to explain this contradiction with moderate success.