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Predictability of the Arctic Sea Ice Extent from S2S Multi Model Ensemble

Jinkyung Park (1), Hyun-Suk Kang (1), Yu-Kyung Hyun (1), and Tetsuo Nakazawa (2)

(1) National Institute of Meteorological Sciences, Korea, Republic Of (iamkyungi@gmail.com), (2) Meteorological Research Institute, Japan Meteorological Agency

Sea ice plays an important role in modulating surface conditions at high and mid-latitudes. It reacts rapidly to climate change, therefore, it is a good indicator for capturing these changes from the Arctic climate. While many models have been used to study the predictability of climate variables, their performance in predicting sea ice was not well assessed. This study examines the predictability of the Arctic sea ice extent from ensemble prediction systems. The analysis is focused on verification of predictability in each model compared to the observation and prediction in particular, on lead time in Sub-seasonal to Seasonal (S2S) scales. The S2S database now provides quasi-real time ensemble forecasts and hindcasts up to about 60 days from 11 centers: BoM, CMA, ECCC, ECMWF, HMCR, ISAC-CNR, JMA, KMA, Meteo France, NCEP and UKMO. For multi model comparison, only models coupled with sea ice model were selected. Predictability is quantified by the climatology, bias, trends and correlation skill score computed from hindcasts over the period 1999 to 2009. Most of models are able to reproduce characteristics of the sea ice, but they have bias with seasonal dependence and lead time. All models show decreasing sea ice extent trends with a maximum magnitude in warm season. The Arctic sea ice extent can be skillfully predicted up 6 weeks ahead in S2S scales. But trend-independent skill is small and statistically significant for lead time over 6 weeks only in summer.