



Emergence of the significant local warming of Korea in CMIP5 projections

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According to IPCC AR5, anthropogenic influence on warming is obvious in local scales, especially in some tropical regions. Detection of significant local warming is important for adaptation to climate change of society and ecosystem. Recently much attention has focused on the time of emergence (ToE) for the signal of anthropogenic climate change against the natural climate variability. Motivated from the previous studies, this study analyzes ToE of regional surface air temperature over Korea. Simulations of CMIP5 15 models are used for RCP 2.6, 4.5 and 8.5. For each year, JJA and DJF temperature anomalies are calculated for the time period 1900-1929. For noise of interannual variability, natural-only historical simulations of CMIP5 12 models are used and the standard deviation of the time series is obtained. For signal of warming, we examine the year when the signal above 2 standard deviations is detected in 80% of the models using 30-year smoothed time series. According to our results, interannual variability is larger in land than ocean. Seasonally, it is larger in winter than in summer. Accordingly, ToE of summertime temperature is earlier than that in winter and is expected to appear in 2030s from three RCPs. The seasonal difference is consistent with previous studies. Wintertime ToE appears in 2040s for RCP85 and 2060s for RCP4.5. The different emergence time between RCP8.5 and RCP4.5 reflects the influence of mitigation. In a similar way, daily maximum and minimum temperatures are analyzed. ToE of Tmin appears earlier than that of Tmax and difference is small.

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