Interannual variability and predictability assessment of JJA surface air temperature over the Arabian Peninsula in North American Multimodel Ensemble.

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Interannual variability and predictability of summer season (June-July-August: JJA) air-temperature over the Arabian Peninsula (AP) is investigated using observations and reforecast data obtained from North American Multimodel Ensemble (NMME) for the period of 1982-2017. The regional-mean air-temperature over AP shows a statistically significant warming trend. The warming over the AP is related to the equatorial Indian and Atlantic Ocean SSTs as well as local SSTs located in Mediterranean Sea, which itself showed significant warming trend in recent time. When trend is removed from the data the equatorial Indian Ocean still stand out as the major source of predictability of the air-temperature over AP. The potential and actual predictability of the air-temperature over the AP is explored in the reforecast data obtained from NMME at different lead times. First, unanimously all models shows positive temperature anomalies in recent decades (after 1998), which is matching with observed trend. Second, the interannual variability of the air-temperature anomalies in all the predictions is synchronized, but the magnitude of the air-temperature anomalies are notably different and underestimate the observed air-temperature anomaly, habitually due to the large error in the predicted temperature climatology. The focus of this study is to find the sensitivity of the potential and actual predictability of the air-temperature over the AP to different coupled model reforecast data and to their initial conditions. In general, all pooled models reforecast show an increase in potential predictability with a decrease in lead-time, however, CFSv2, GFDL-FlorA and GFDL-FlorB show higher JJA air-temperature potential and actual predictability as compared to COLA, GFDL-Aero and NASA.