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This study aims to understand the source of surface air temperature bias over the contiguous United States (CONUS) during boreal summer (June-September) in the Unified Forecast System (UFS) coupled model Prototype 8 (P8), developed by the National Centers for Environmental Prediction (NCEP) and the National Oceanic and Atmospheric Administration (NOAA). The focus is on the subseasonal variability defined as a weaekly average in weeks 2-5 of forecast leads (total 224 cases; 4 weeks x 2 initialization dates x 4 months x 7 years). The large-scale surface air temperature bias pattern is extracted using the Empirical Orthogonal Function (EOF) analysis. The associated principal component describes the variability of bias in each reforecasting week during the reforecasting period 2011-2017. The dominant EOF of surface temperature bias shows an East-West dipole pattern over the CONUS, explaining 31.6% of the total variability of weekly temperature bias. This bias pattern is strongly related to the upper-level Rossby wave induced by bias in convection over the Central Tropical Pacific. Furthermore, the mean bias of background flow degrades the representation of teleconnections from Tropics to Mid-latitudes. UFS P8 has weaker zonal wind over the North Pacific with stronger vertical wind shear than ERA5 reanalysis. The weak zonal wind hampers the propagation of the Rossby wave, and a strong vertical shear reduces its amplitude.
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