Anthropogenic Influences on July 2019 Precipitation Extremes over the Mid-Lower Reaches of the Yangtze River

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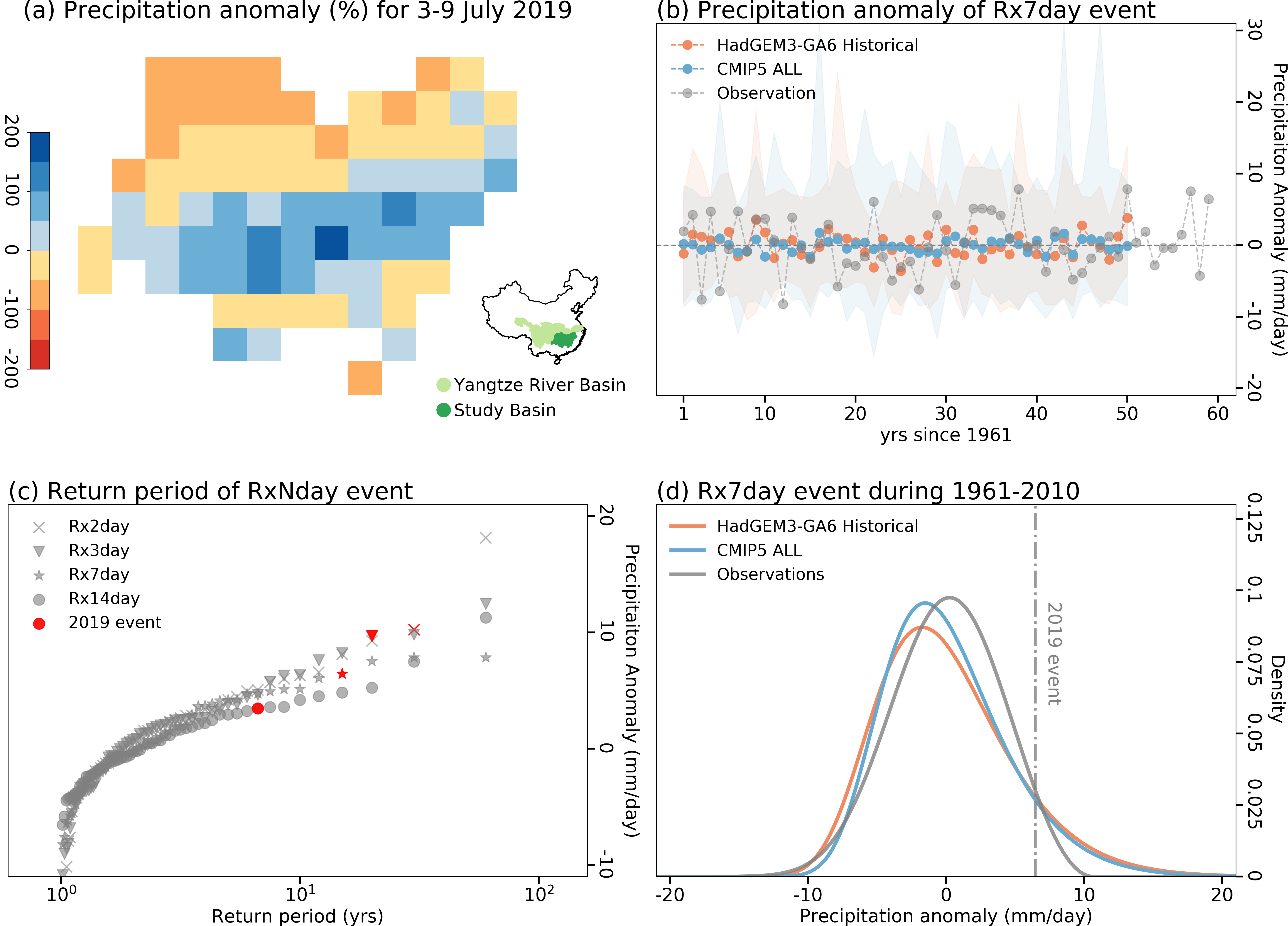
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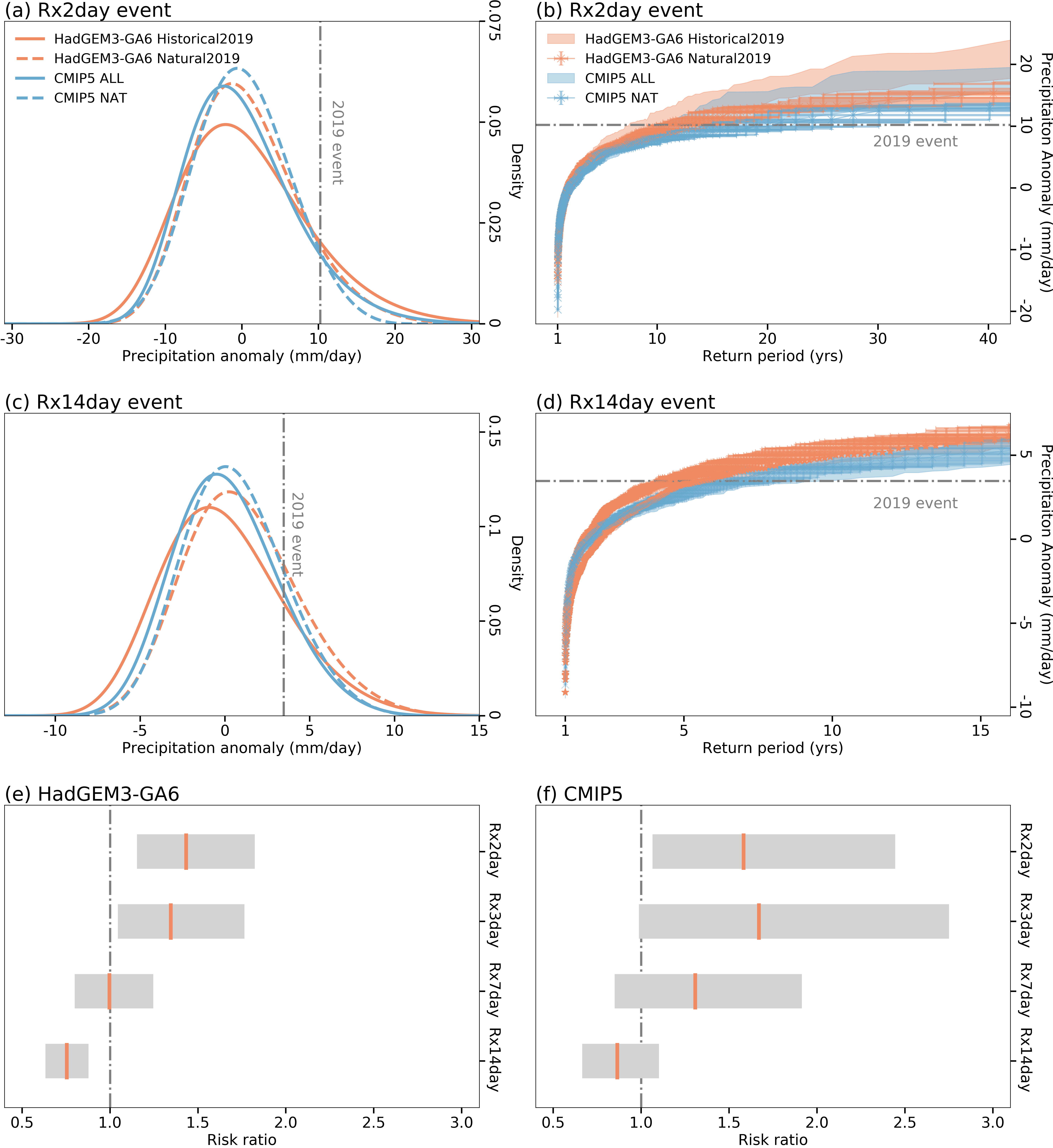
*List of supplemental materials*

**Fig S1.** shows the observed precipitation anomalies of RxNday events during entire summertime from June to August.

**Fig S2.** shows attribution results for summertime Rx2day and Rx14day events based on HadGEM3-GA6 and CMIP5 models.



**Fig S1.** (a) Observed anomalies (%) in precipitation accumulations for 3-9 July 2019 with respect to the summertime Rx7day precipitation anomalies during 1961-2010 climatology. The study basin (dark green) was located at the mid-lower reaches of the Yangtze River Basin; (b) Time series of observed and simulated summertime Rx7day precipitation anomalies with respect to the 1961-2010 climatology. The shaded areas indicate the spread of 15 and 36 members of HadGEM3-GA6 Historical and CMIP5 ALL simulations respectively, whereas the solid lines show their ensemble means; (c) The empirical return periods of summertime RxNday events estimated from the observations during 1961-2019; (d) PDFs of summertime Rx7day precipitation anomalies for the observations, HadGEM3-GA6 Historical and CMIP5 ALL ensemble simulations during 1961-2010 climatology.



**Fig S2.** PDFs of precipitation anomalies for the HadGEM3-GA6 and CMIP5 model ensembles with all-forcings (orange) and natural-only forcings (blue) simulations for summertime (a) Rx2day and (c) Rx14day extreme event; Return periods of summertime (b) Rx2day and (d) Rx14day extreme events estimated from the HadGEM3-GA6 and CMIP5 model ensembles; Empirical risk ratios (vertical line) with 90% confidence interval (shaded) for summertime RxNday extreme events estimated from the (e) HadGEM3-GA6 model and (f) CMIP5 multi-model ensembles.