

The rapid global surface warming since the 2010s and the role of tropical Pacific decadal variability

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Observational records feature a jump of the global mean surface temperature in the mid-2010s after the so-called “hiatus” of global warming, in association with the 2015/16 strong El Niño event. Since then, the temperature has remained high despite some La Niña events, and the top seven of annual global mean surface temperature in instrumental records are occupied by the recent seven years. Our coupled model pacemaker simulation, where the tropical Pacific SST anomalies are forced to follow the observational counterparts, reproduces this post-hiatus global warming well. The Pacific Decadal Variability shifted from the negative peak in the late hiatus period to the neutral state in the post-hiatus period, contributing to the rapid global warming. Atmospheric model experiments suggest that, in addition to direct influence from the tropical SST anomalies, tropical Pacific-induced extratropical SST and sea ice anomalies contributed comparably to the Northern Hemisphere atmospheric circulation anomalies during the post-hiatus period.

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