

The lack of westerly wind bursts in unmaterialized El Niño years

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The lack of westerly wind bursts (WWBs) when the intraseasonal variability (ISV) such as the Madden-Julian Oscillation is observed from boreal spring to autumn is investigated by comparing two types of El Niño and unmaterialized El Niño (UEN) years both with high ocean heat content buildup. Whereas there were several intraseasonal convective events propagating eastward throughout the focused seasons in all years, few WWBs accompanied them in UEN years. The eddy kinetic energy budget analysis based on the ISV shows that background zonal wind convergence in the lower troposphere, which facilitates the development of eddy disturbances including WWBs, is retracted northwestward and does not reach the equatorial central Pacific in UEN years. In addition, positive sea surface temperature (SST) anomalies, which are conducive to active convection, lie from the equatorial western-central Pacific to the off-equatorial region. The northwestward-retracted convergence and off-equatorial warming both enhance off-equatorial eddies, which resulting in the reduced ability of equatorial eddy developments such as WWBs. These characteristics found in UEN years are significantly different from those in the eastern Pacific El Niño years (EP-EN), which are characterized by anomalous cooling (warming) and suppressed (enhanced) convective eddies in the off-equatorial (equatorial) western Pacific. Mixed features of the EP-EN and UEN years in the background states are found in the central Pacific El Niño years. Different background states not only in the equatorial but also off-equatorial region can be a reason for the lack of WWBs even with several ISV events in UEN years.

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