



Differentiating flavors of positive IOD events in recent decades

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Phase locked to austral winter and spring, canonical positive Indian Ocean Dipoles (pIODs) generally peak in spring. In recent decades, there has been an increase in unseasonable pIODs which, different from canonical pIODs, peak and decay by September. Distinguishing unseasonable pIODs from canonical pIODs is important, as conditions leading to more frequent unseasonable events are projected to persist in a warming climate. Here using superimposition of the first two seasonally evolving dominant modes of tropical Indian Ocean rainfall variability, we differentiate these types of pIODs. The first mode reflects characteristics of canonical pIODs, in which anomalies intensify with seasonal evolution. However, the second mode, with cool and dry anomalies extending from the eastern pole, reverses from winter to spring, signifying the demise of unseasonable pIODs. Processes embedded in the second mode reflect timing of propagation in equatorial Kelvin waves and their relative importance to the first mode, in generating different pIODs.