



Tracking and Reconstructing the Interdecadal Pacific Oscillation

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A new index is developed for the Interdecadal Pacific Oscillation, termed the IPO Tripole Index (TPI). The IPO is associated with a distinct 'tripole' pattern of sea surface temperature anomalies (SSTA), with three large centres of action and variations on decadal timescales, evident in the second principal component (PC) of low-pass filtered global SST. The new index is based on the difference between the SSTA averaged over the central equatorial Pacific and the average of the SSTA in the Northwest and Southwest Pacific. The TPI is an easily calculated, non-PC based index for tracking decadal SST variability associated with the IPO. The TPI time series bears a close resemblance to previously published PC-based indices and has the advantages of being simpler to compute and more consistent with methods used to track the El Niño–Southern Oscillation (ENSO), such as the Niño 3.4 and Trans Niño Indices. The TPI also provides a simple metric, with physical units of °C, for evaluating decadal and interdecadal variability of SST fields in a straightforward manner, and can be used to evaluate the skill of dynamical decadal prediction systems. Composites of SST and mean sea level pressure anomalies reveal that the IPO has maintained a broadly stable structure across the seven most recent positive and negative epochs that occurred during 1870-2013. The TPI is shown to be a robust and stable representation of the IPO phenomenon in instrumental records, with relatively more variance in decadal than shorter timescales compared to Niño 3.4, due to the explicit inclusion of off-equatorial SST variability associated with the IPO. This presentation will also report on progress towards developing a new multi-proxy reconstruction of the IPO over the last several centuries, along with an assessment of the TPI in climate models.