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600-year reconstruction of the tri-pole Interdecadal Pacific Oscillation (TPI) using tree-ring chronologies and a single coral proxy from Indonesia, Australia and New Zealand.

Jonathan Palmer (1), Edward Cook (2), Chris Turney (1), Benjamin Cook (2), Pavla Fenwick (3), Kathy Allen (4), Patrick Baker (4), and Benjamin Henley (5)

(1) University of New South Wales, School of Biological, Environmental and Earth Sciences, Sydney, Australia (j.palmer@unsw.edu.au), (2) Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY 10964, USA., (3) Gondwana Tree-ring Laboratory, P. O. Box 14, Little River, Canterbury, 7546, New Zealand., (4) School of Ecosystem and Forest Sciences, University of Melbourne, Richmond, Victoria, 3121, Australia., (5) School of Earth Sciences, University of Melbourne, Richmond, Victoria, 3010, Australia.

The development of the eastern Australia and New Zealand summer drought atlas (i.e. ANZDA; Palmer et al., 2015) highlighted the potential for exploring the reconstruction of the Henley et al. (2015) tripole Interdecadal Pacific Oscillation index (TPI). The approach taken was to use both the 1375 drought atlas scPDSI (self-calibrating Palmer Drought Severity Index) grid-points and the 176 tree-ring and single coral proxies to determine the strength and spatial expression of their relationship to TPI. An important concern was the potential geographic bias of the proxies relative to the TPI. To examine this concern more closely, each of three main TPI regions of sea surface temperatures were extracted and then correlated to the ANZDA scPDSI grid-points. Results showed a robust correlation field to each of the three poles although the closest "Tasman" pole was, as expected, the strongest. Next, the 177 proxies were used in regressions to calibrate/verify to the TPI over the period CE 1871-1975. The positive results provided confidence for the reconstruction "summer" TPI values extending back to CE 1410. The wavelet pattern of the reconstruction shows the ENSO (2-7 year) band frequency has increased during the 20th century while the longer (10-30 year) periodicities are scattered throughout the entire time interval. Finally, the different recognised phases of the IPO are compared to the two reconstructions (grid-points and TPI) and earlier periods discussed.

References:
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