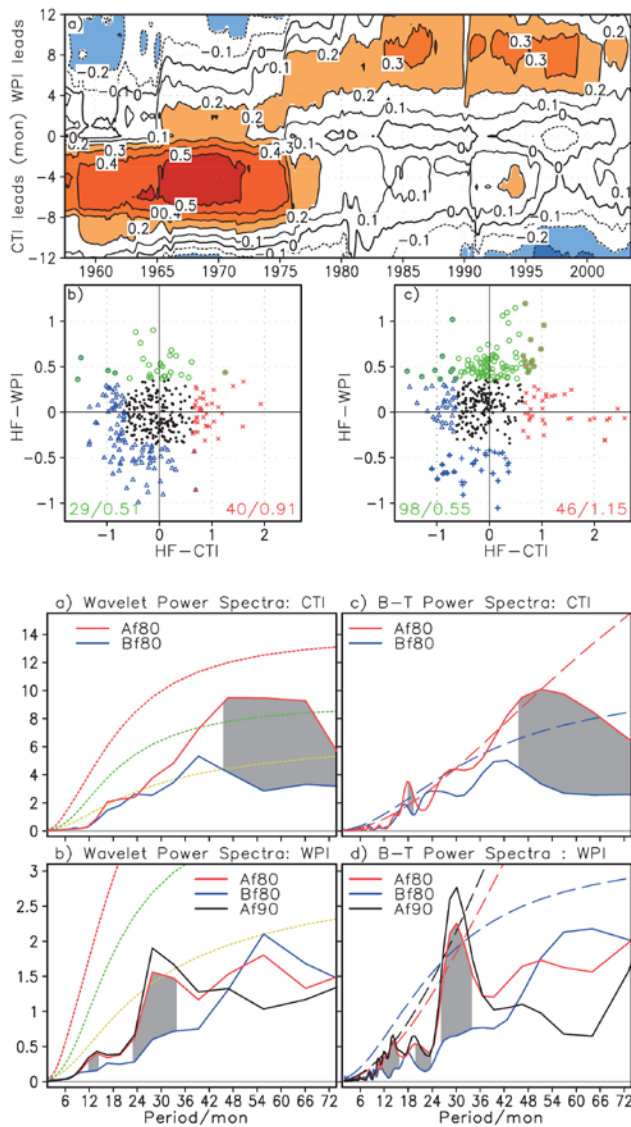


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 Figure 1. Lead-lag partial correlations for the positive phases of HF-CTI and HF-WPI, using a 15 yr running window in (a), where the duration of the positive phases of these indices are determined by the leading index. Shading denotes the 95% confidence level of a student's t-test, with a degree of freedom of about 60. Scatter plots for HF-CTI and HF-WPI before 1980 (b) and after 1980 (c), where the green, red, blue, and black denote WP El Niño, CT El Niño, La Niña (the two kinds of blue marks in (c) denote the separation of two types of La Niña), and near neutral states, respectively, as defined by the criterion of one standard deviation of either index in the whole period. Colored number pairs represent the numbers of the colored dots and their averaged values.

←
 Figure 2. Wavelet power spectra of CTI (a) and WPI (b) for the different periods, where the yellow, green, and red dashed lines correspond to 90%, 95%, and 99% confidence levels, respectively, and the shadings denote that the values of the red lines are 100% greater than those in the blue lines. Panels (c) and (d) are the same as panels (a) and (b), but for the B-T power spectra, with the 95% confidence level represented by dashed lines.

- This study aimed to develop a deep understanding of the ENSO regime change in the late 1970s by linking new observational evidence with previous studies, not only regarding the change in ENSO properties, but also the change in ENSO types (or ENSO mode stability).
- The ENSO regime change is predominantly manifested by the two types of ENSO: The dramatic changes of the CT ENSO properties such as amplitude, dominant ENSO period, and SST anomaly propagation characteristics (Fig. 1), and the frequent occurrence of the WP ENSO events.
- Observations strongly suggest that the WP and CT ENSO are independent quasi-biennial and quasi-quadrennial modes, respectively, of the tropical Pacific climate variability, and also suggest that these two ENSO modes have coexisted actively since the late 1970s when either El Niño or La Niña can be separated into the two modes (Fig. 2).