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Supplementary information
The importance of interacting climate modes on Australia's contribution to global carbon cycle extremes

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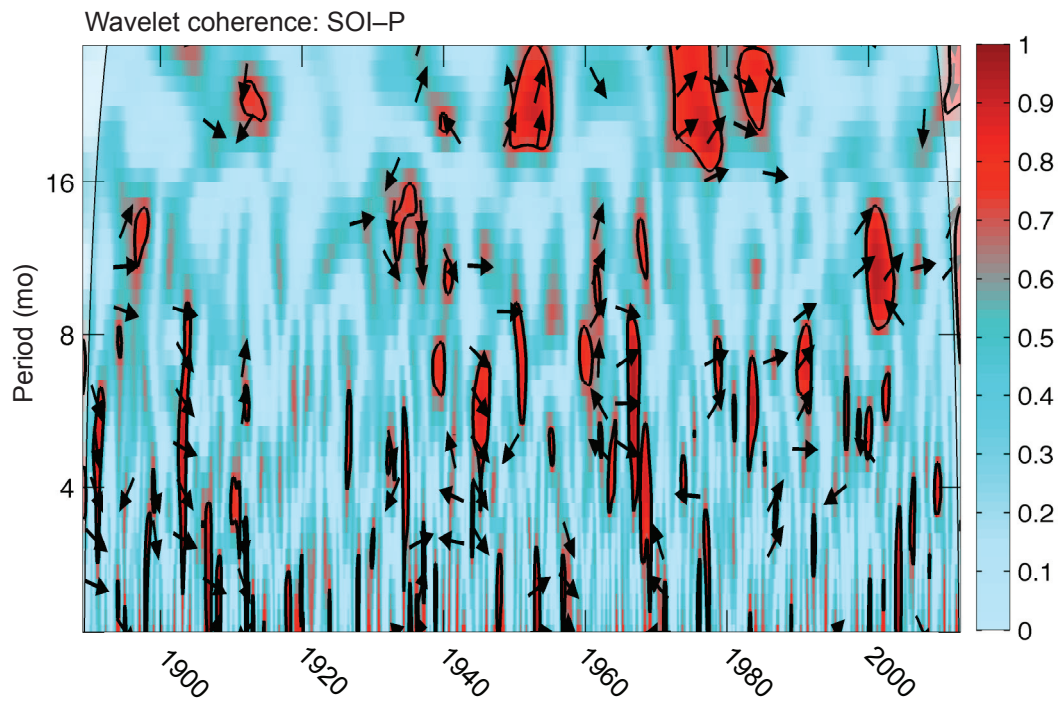
Extended Data Table 1 | Wavelet-based principal components analysis statistics.

Date range	wPC1 (% of total)	wPC2 (% of total)
1982–1998	0.99 SAMI – 0.16 Niño3.4 – 0.03 DMI (70.5)	–0.16 SAMI – 0.95 Niño3.4 – 0.25 DMI (24.6)
1998–2013	–0.99 SAMI + 0.17 Niño3.4 + 0.04 DMI (80.2)	–0.17 SAMI – 0.98 Niño3.4 – 0.05 DMI (15.7)
1982–2013	–0.93 SAMI + 0.24 Niño3.4 – 0.28 DMI (>99)	

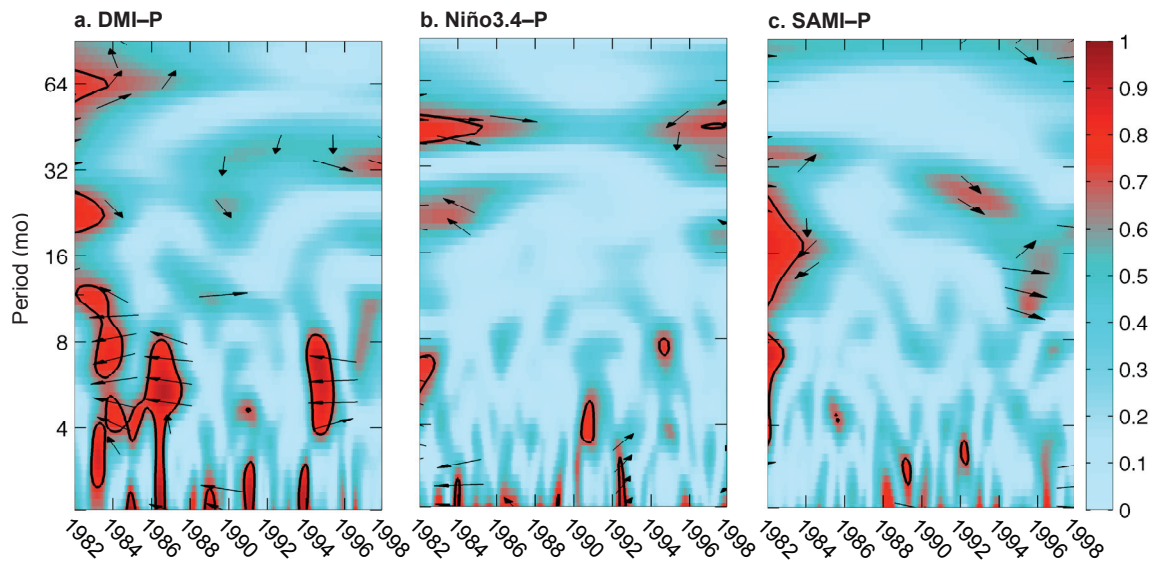
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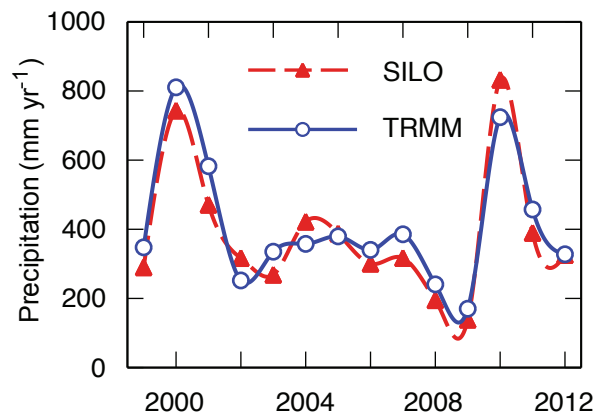
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Supplementary Figure 1. Relationship between local precipitation P and the southern oscillation index (SOI). Frequency-time coordinates of significant coherence (i.e., squared correlation) are outlined. Arrows indicate phase (leftward: 180° out-of-phase; rightward: 0° in-phase) and degree of lead or lag (upward or downward) between SOI and P . The cone of influence is shown near the top corners of the plot.



Supplementary Figure 2. Relationship between local precipitation P and climate modes: (a) dipole mode index (DMI), (b) Niño3.4 and (c) southern oscillation mode index (SAMI). The time period shown when significant correlations between P and the combined climate index (wPC1) were absent (cf. Fig. 3). Frequency-time coordinates of significant coherence (i.e., squared correlation) are outlined. Arrows indicate phase (leftward: 180° out-of-phase; rightward: 0° in-phase) and degree of lead or lag (upward or downward) between Niño3.4 and P. The cone of influence was outside domain plot's domain.



Supplementary Figure 3. Thirteen-year record of precipitation from SILO patched point observations (triangles and dashed red line) or TRMM satellite data (circles and solid blue line).