Decadal & multidecadal variability of Indo-Pacific Walker Cell in observations and CAM4

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1. Background

**Linear trends: 1993-2000**


**2000-2006**


Existing studies: *On interannual timescales, ENSO and IOD variability are connected by the Walker Cell.*
Question:
On decadal & multidecadal timescales, are the variations of Walker Cells over the Indian & Pacific Oceans strongly connected, or do they co-vary?

Pacific decadal mode: Interdecadal Pacific Oscillation (IPO)
Multi-decadal (>20yrs)
Decadal (10-20yr)

EOF1 of 8-yr lowpassed HadISST & PC, IPO
Linear trends of surface windstress (arrows) corresponding to IPO *multidecadal* phase transition

*Tropical Indian & Pacific: Do NOT co-vary*

(Arrows >90% significance are shown)
Linear trends of MERRA wind stress (arrows) corresponding to IPO *decadal* phase transition

**Negative transition**

**Positive transition**

Arrows with 90% significance plotted

*Tropical Indian & Pacific: Co-vary!*
Decadal trends of CAM4 wind stress (arrows) corresponding to IPO phase transitions

(arrows with >90% significance are plotted)
4. Summary for our preliminary results

- Our preliminary results suggest that on multidecadal time scales, the surface branch of the Indian Ocean Walker Cell does not co-vary with the Pacific Walker Cell during recent decades;

- On decadal timescales, however, there is a strong teleconnection between the variability of the surface branch of the Indian and Pacific Walker Cells, including the simultaneous Indian-Pacific reversal detected by Lee and McPhaden (2008);

- The incoherent multidecadal variability of Walker Cell may have contributed to the weak Indian-Pacific teleconnection found in Nidheesh et al. (2013), which includes both decadal & multidecadal timescales.

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