

Impact of Indian Ocean variability and change on regional rainfall Part 2

Matthew England

with... Caroline Ummenhofer, Alex Sen Gupta, Andrea Taschetto

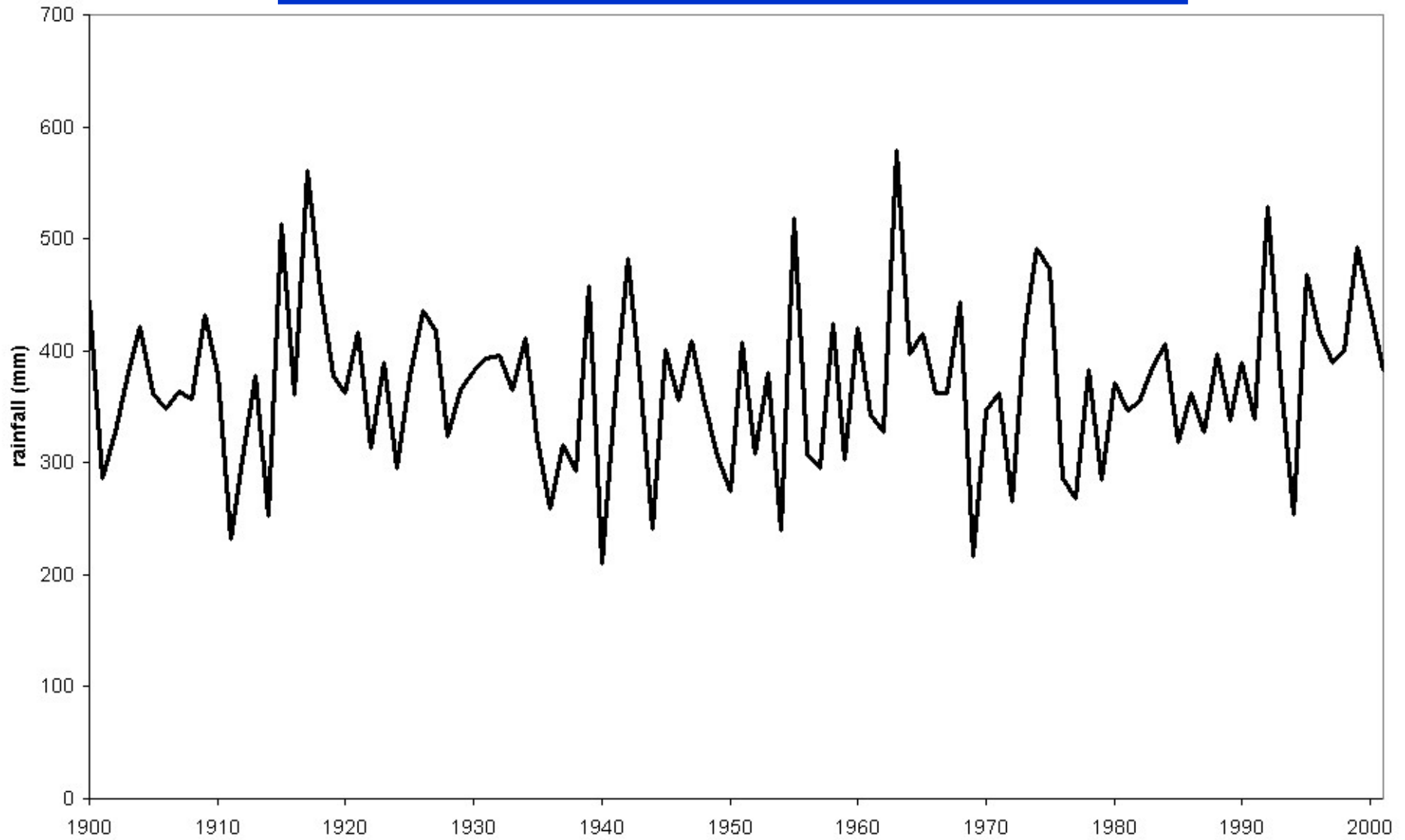
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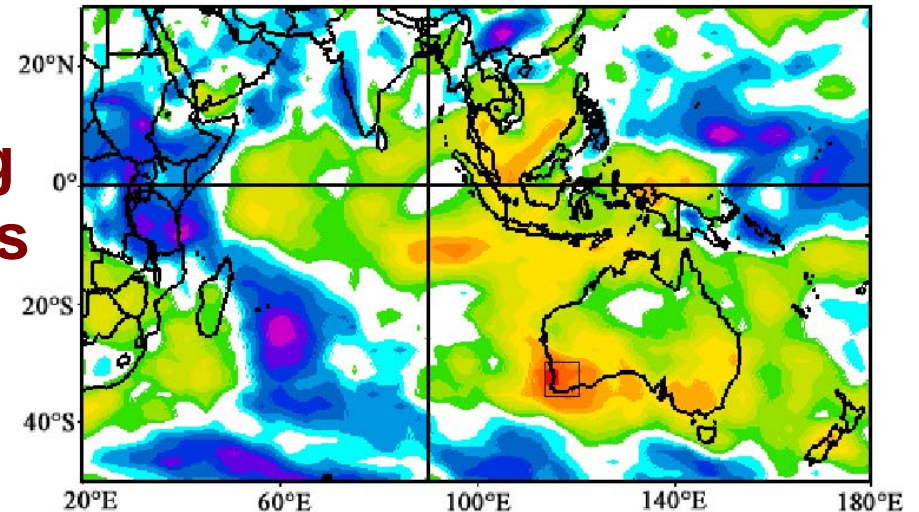
Observed 20th Century SWWA Rainfall



Interannual variability in southwest WA Rainfall

Goals:

- Describe climate states during 'extreme' wet/dry seasons/years
- Explore predictability of these anomalous rainfall events

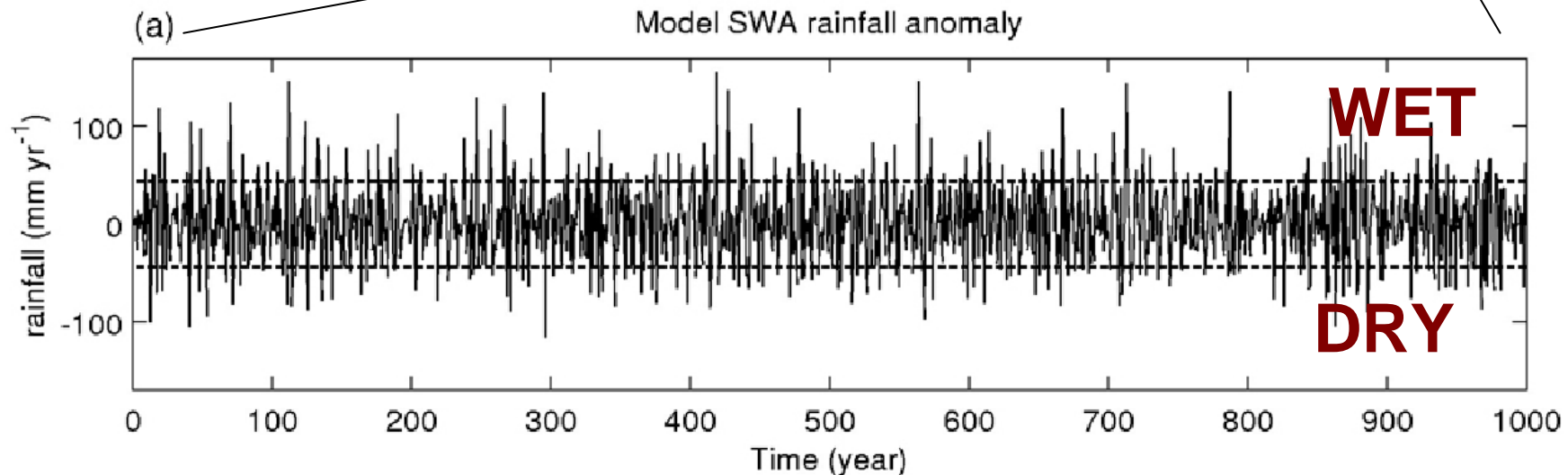
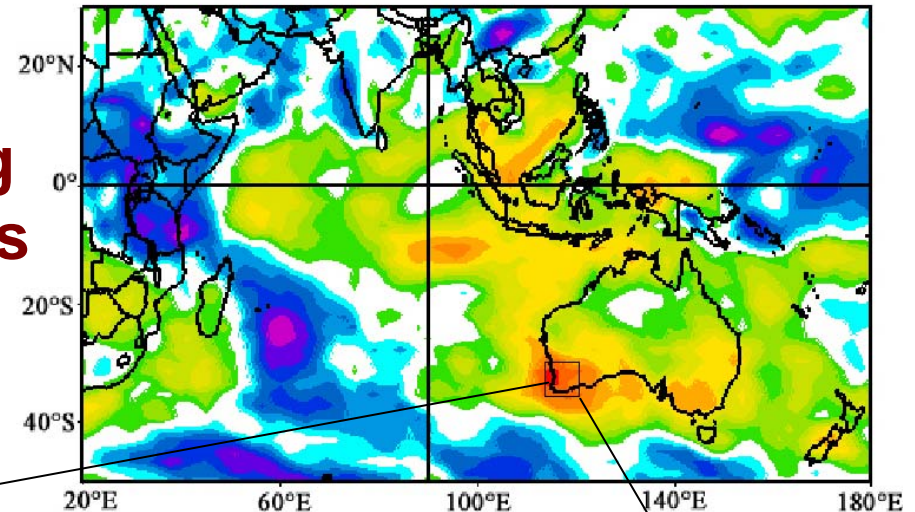


... follows on from work of W. Drosowsky, Rob Allan, Ian Watterson, Tara Ansell, Chris Reason, Ian Smith, Peter Macintosh, Gary Meyers, K. Ashok, Yamagata, Saji, Behera, Frederiksen, the Indian Ocean Climate Initiative (IOCI), Li, Neville Nicholls, Wenju Cai, Pandora Hope, Scott Power,...

Interannual variability in southwest WA Rainfall

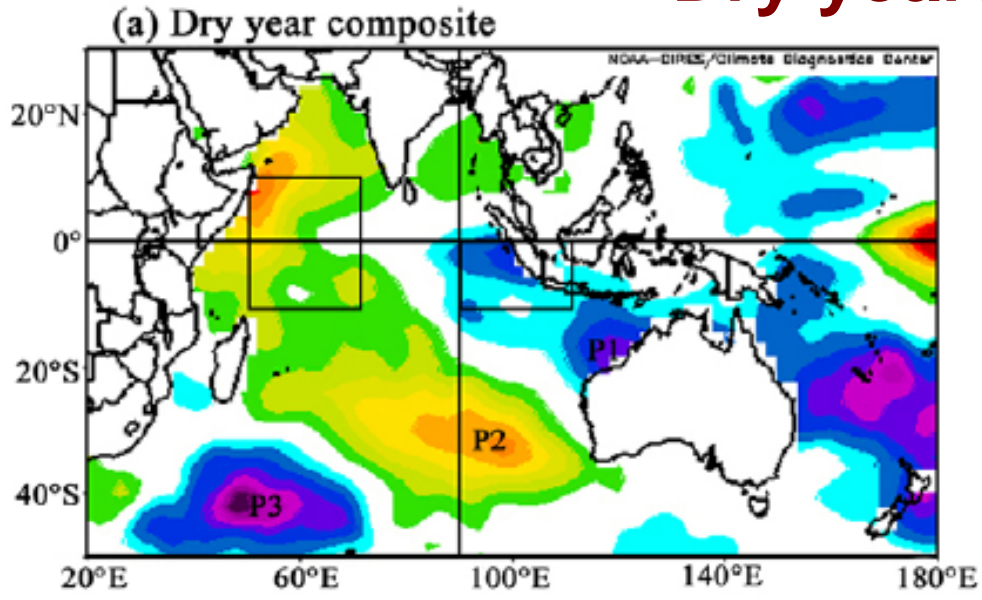
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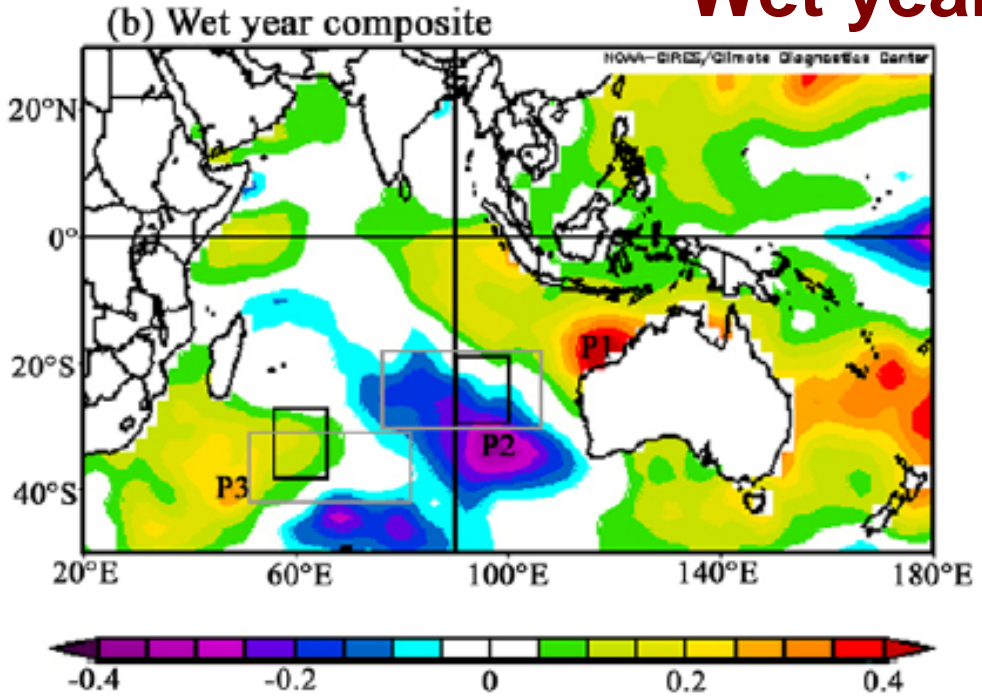


Dry years

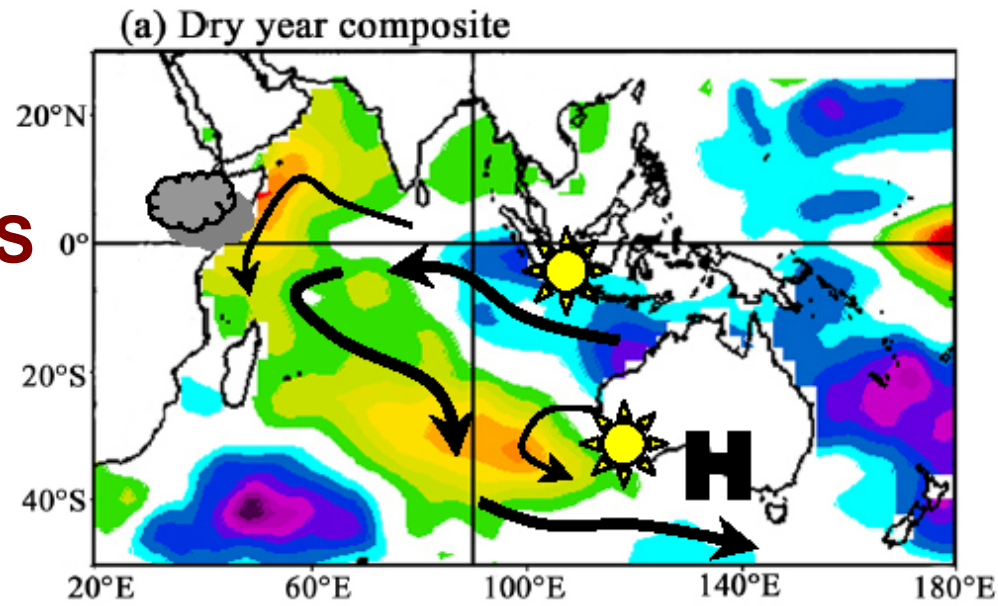
Sea surface temperature



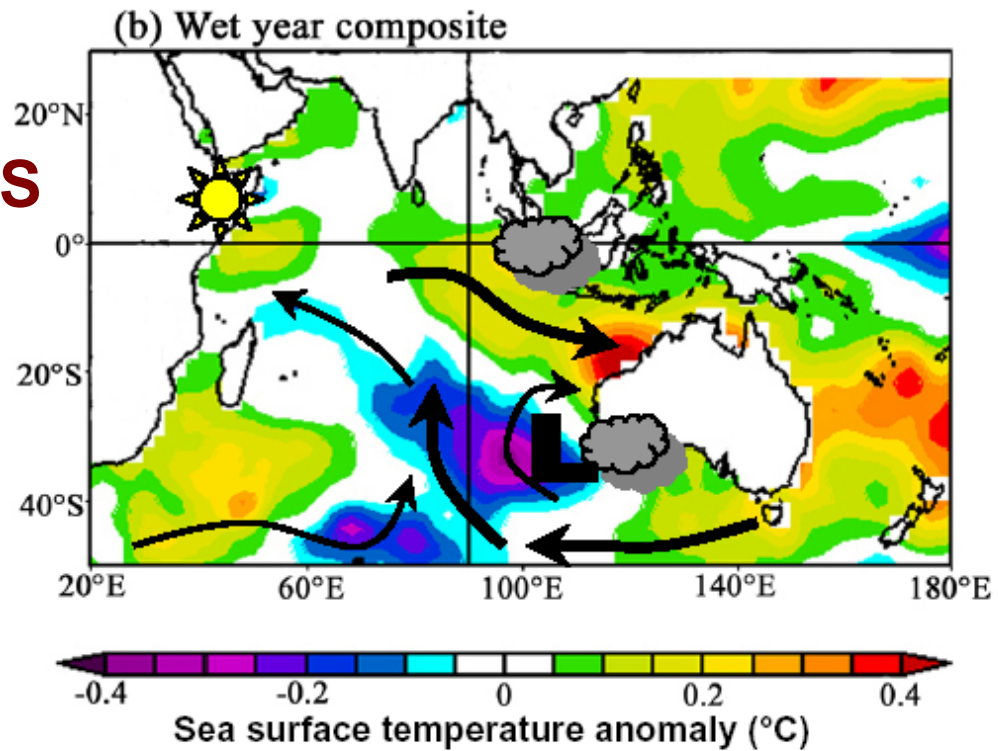
Wet years



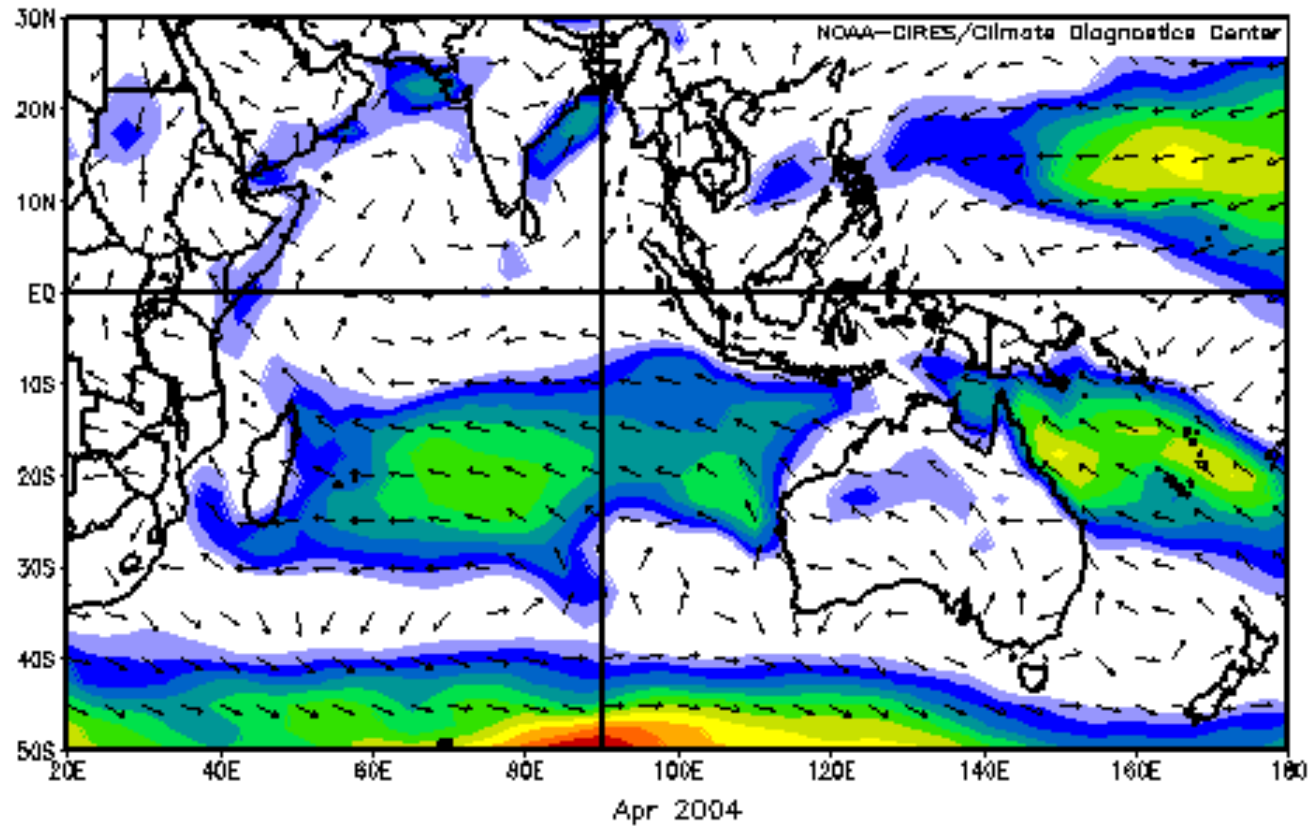
DRY YEARS



WET YEARS

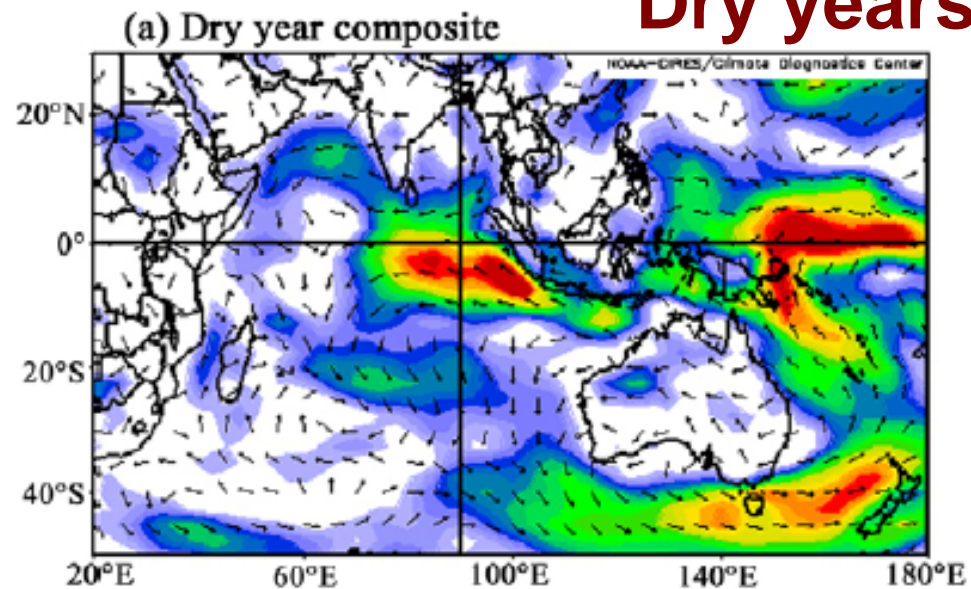


Climatological-mean wind stress

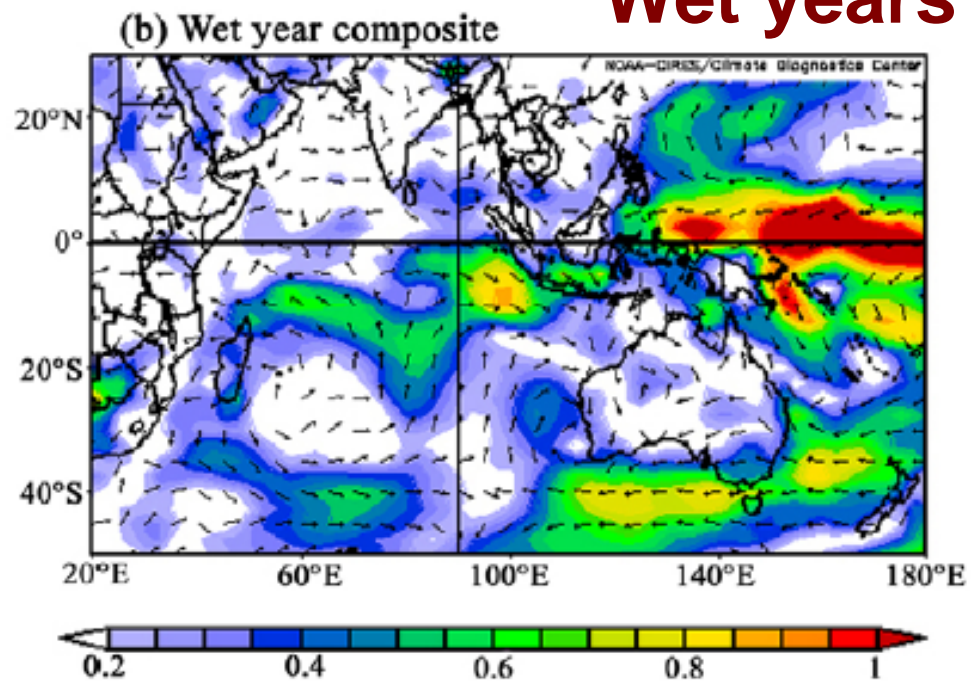


NCEP/NCAR wind stress

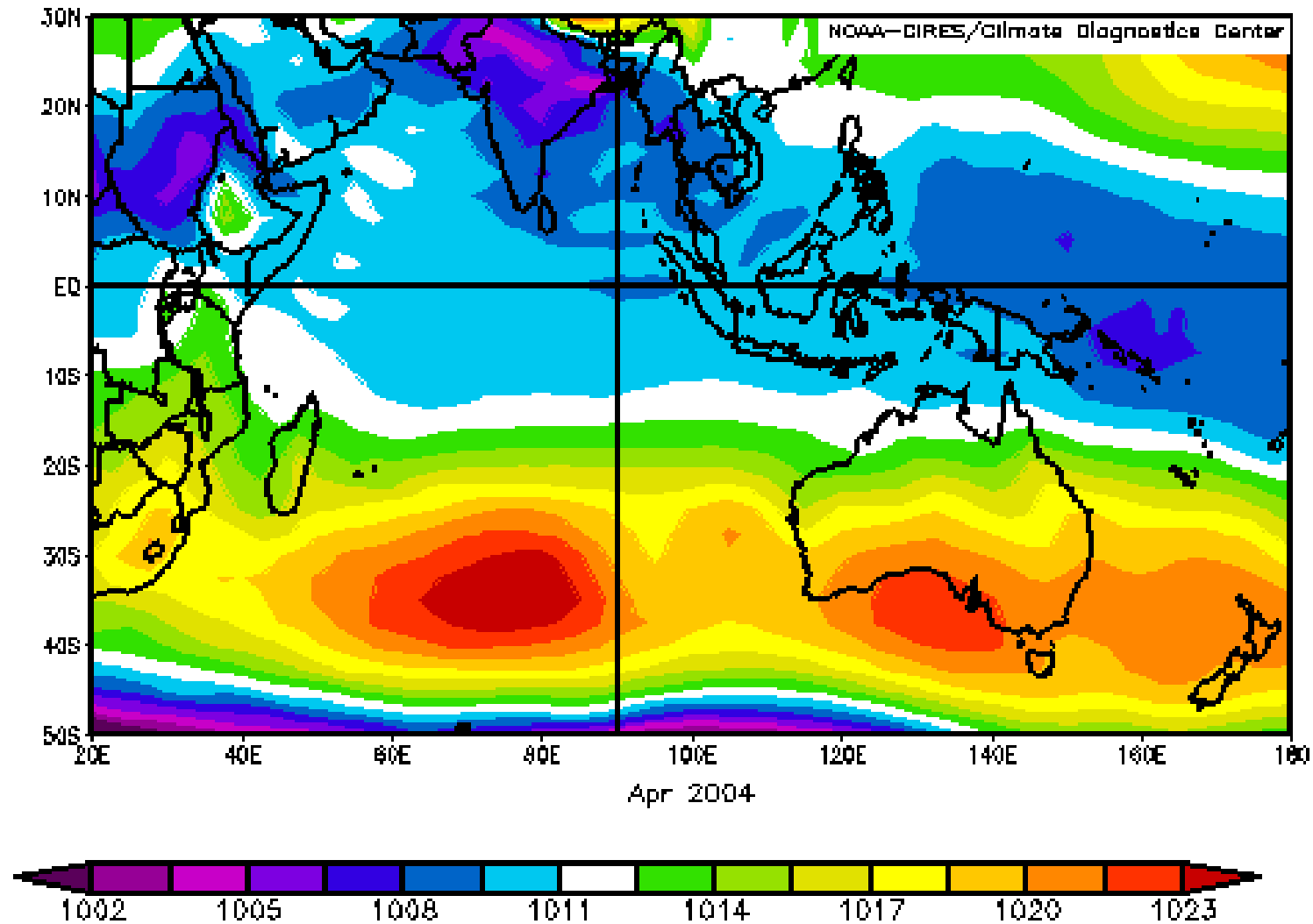
Dry years



Wet years

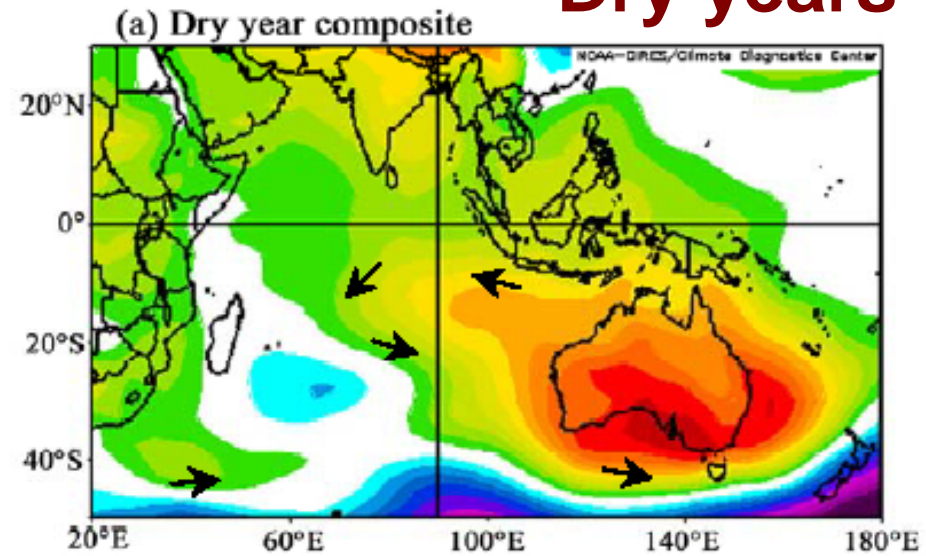


Climatological-mean sea level pressure

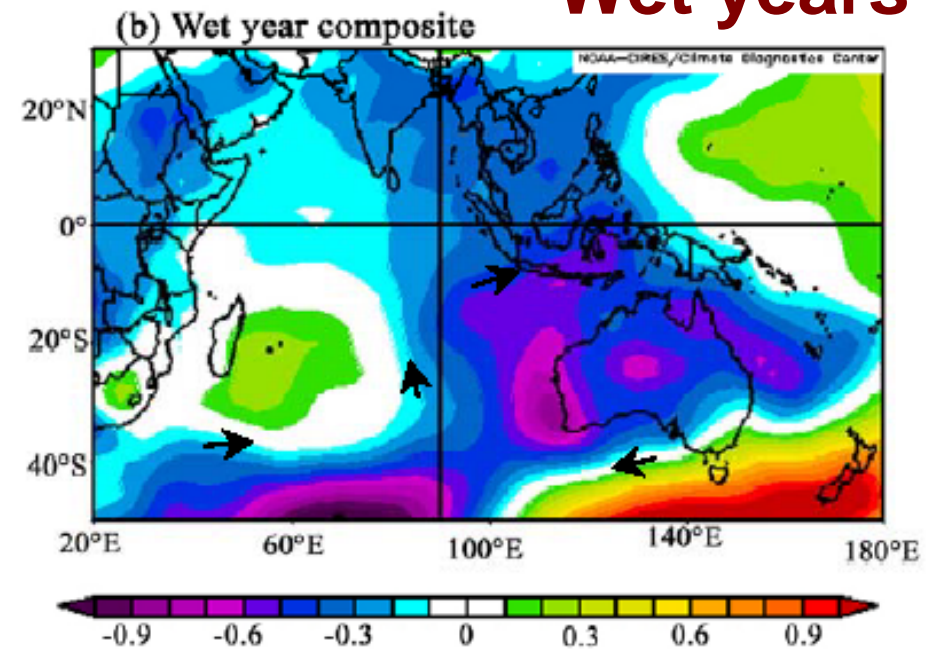


NCEP/NCAR sealevel pressure

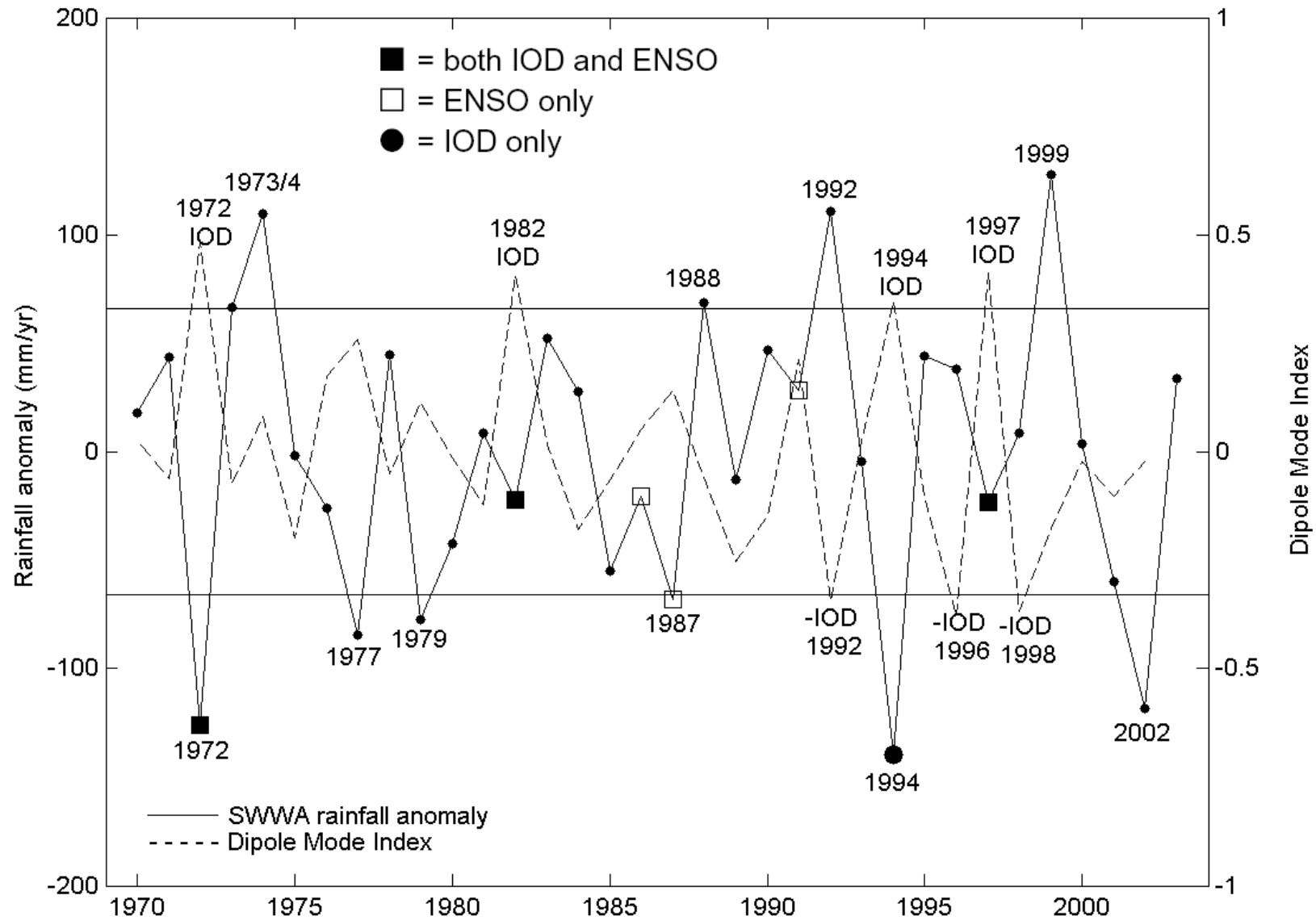
Dry years



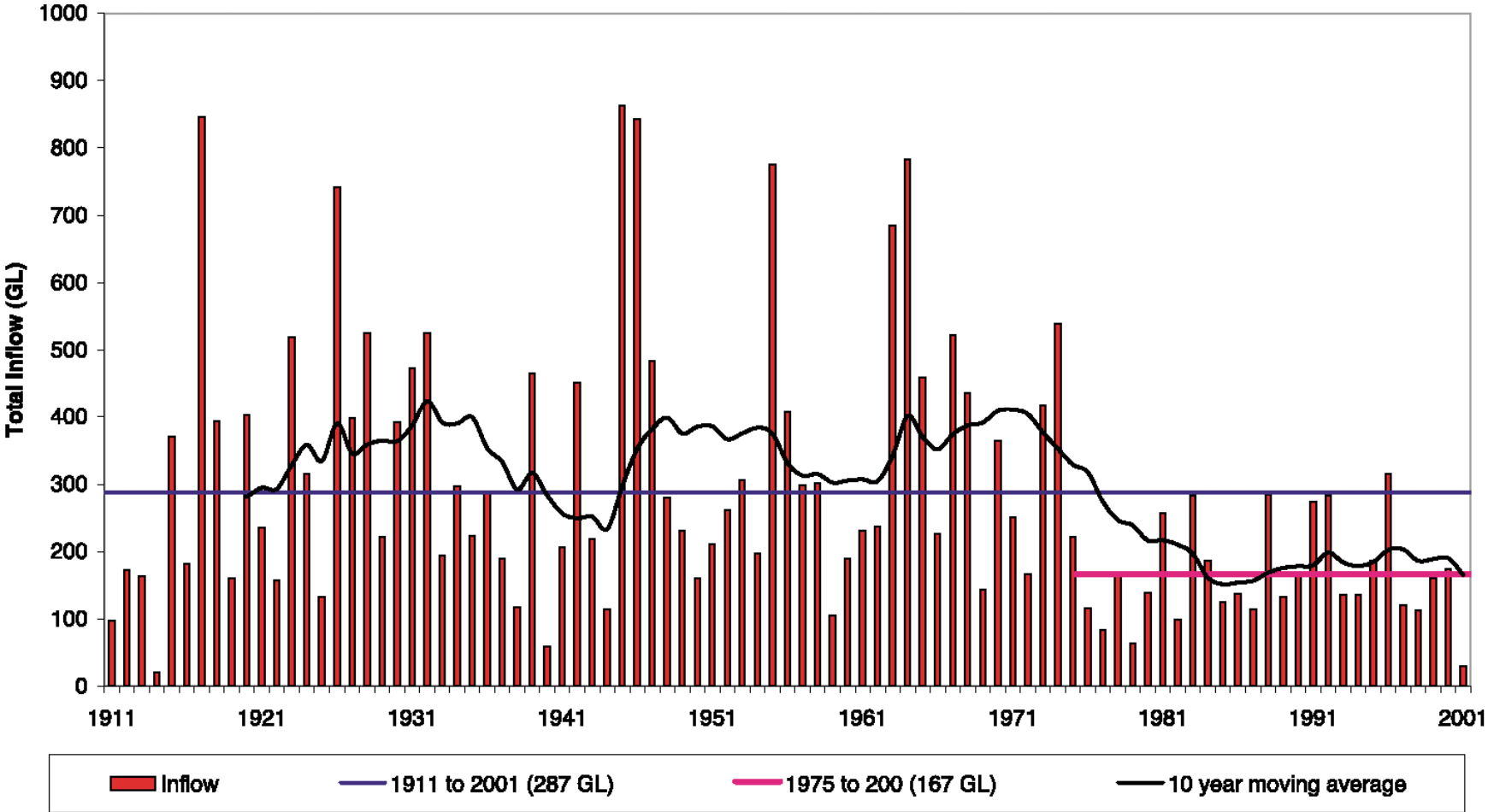
Wet years



SWWA Rainfall – observed annual anomalies

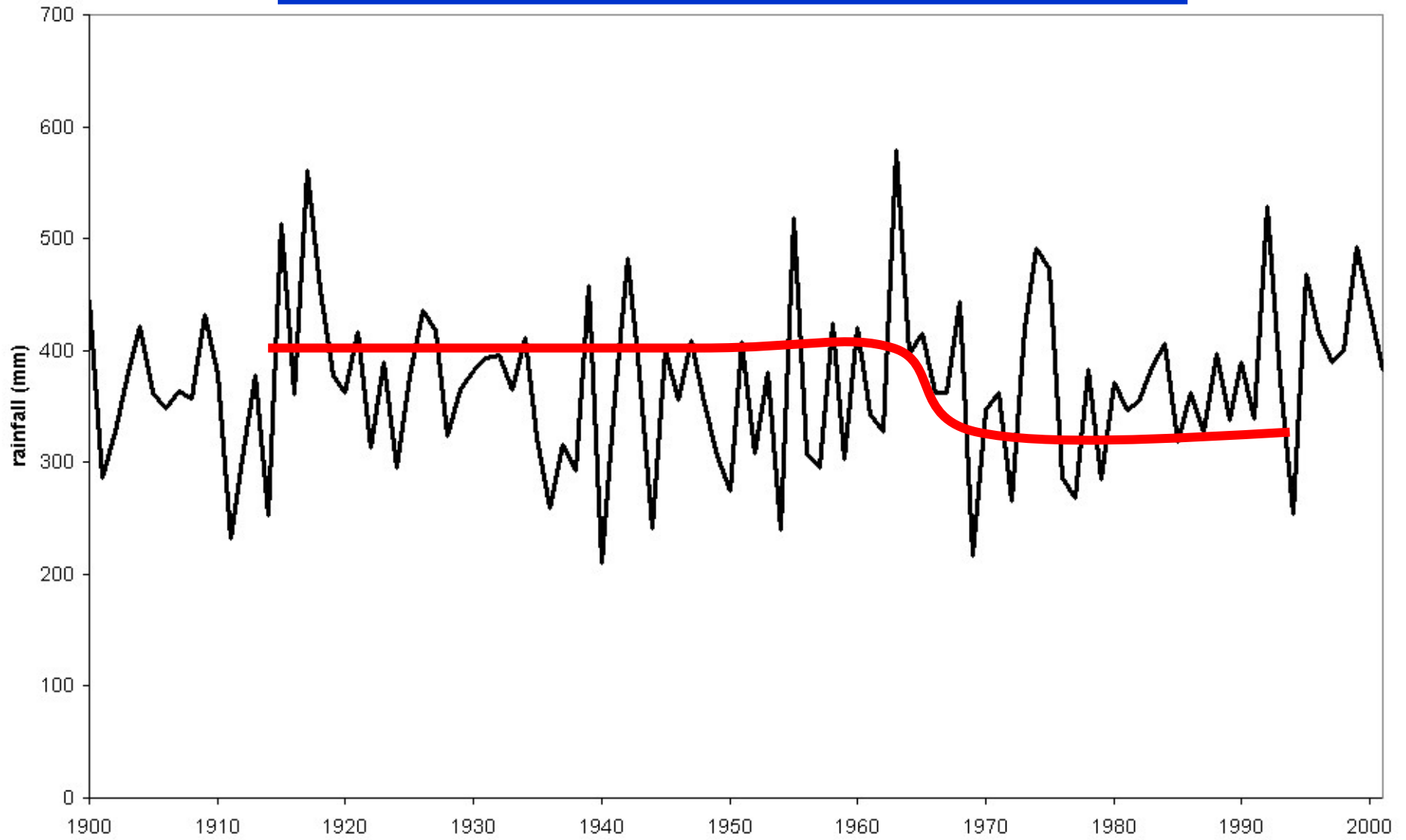


Yearly Streamflow for Major Surface Water Sources Perth Water Supply System

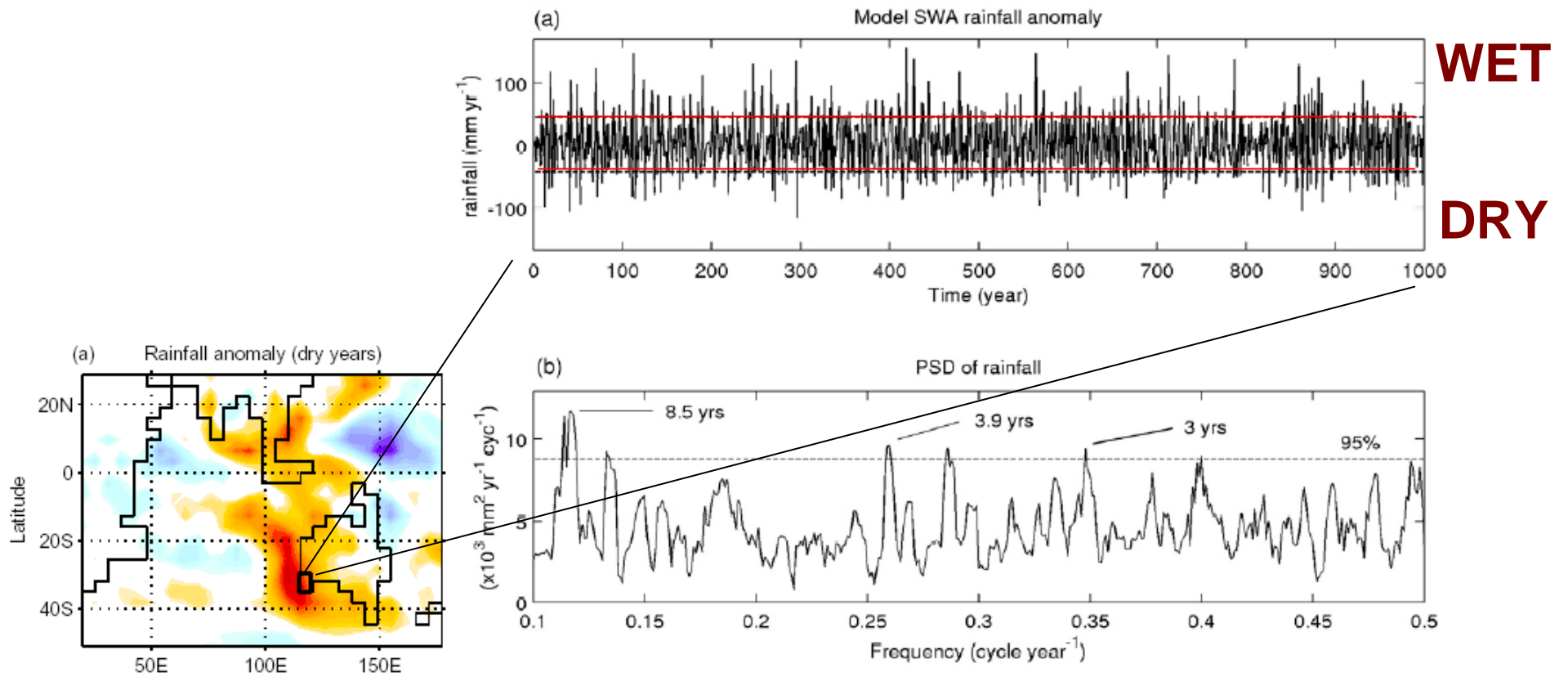


Note: A year is taken as May to April

Observed 20th Century SWWA Rainfall



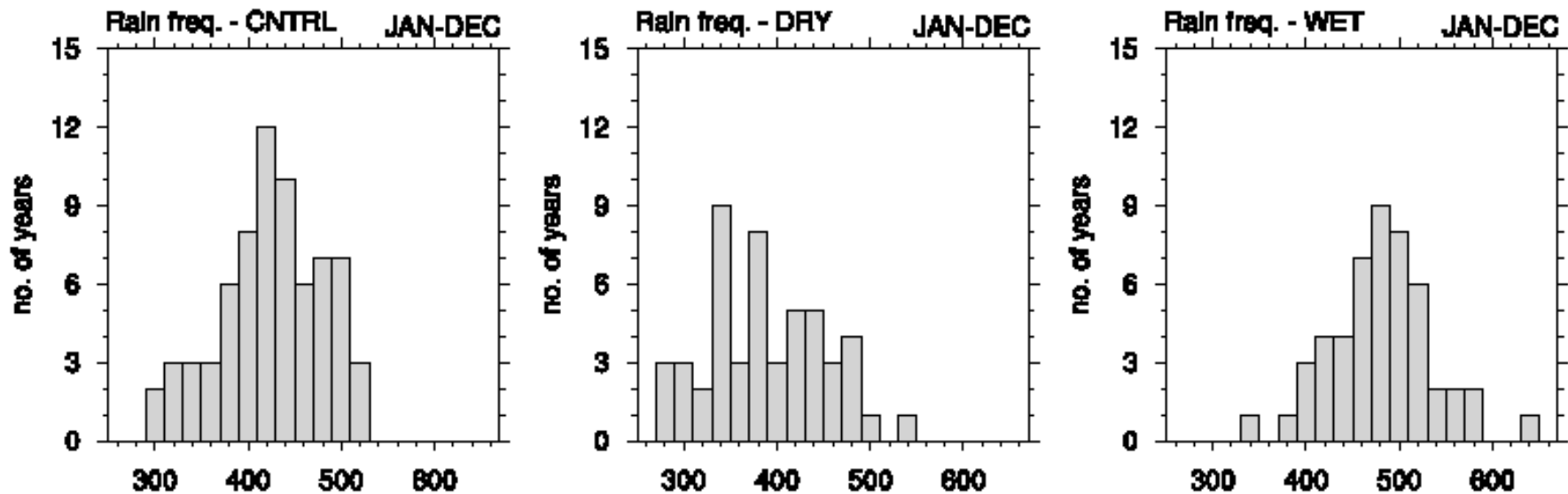
CSIRO Coupled Climate Model (Mark 2)



Predictability experiments

- 1-year atmospheric model runs
- Forced by control, “dry” and “wet” year ocean temperatures

Southwest WA annual rainfall – frequency distribution



Area (20-35S, 115-130E)

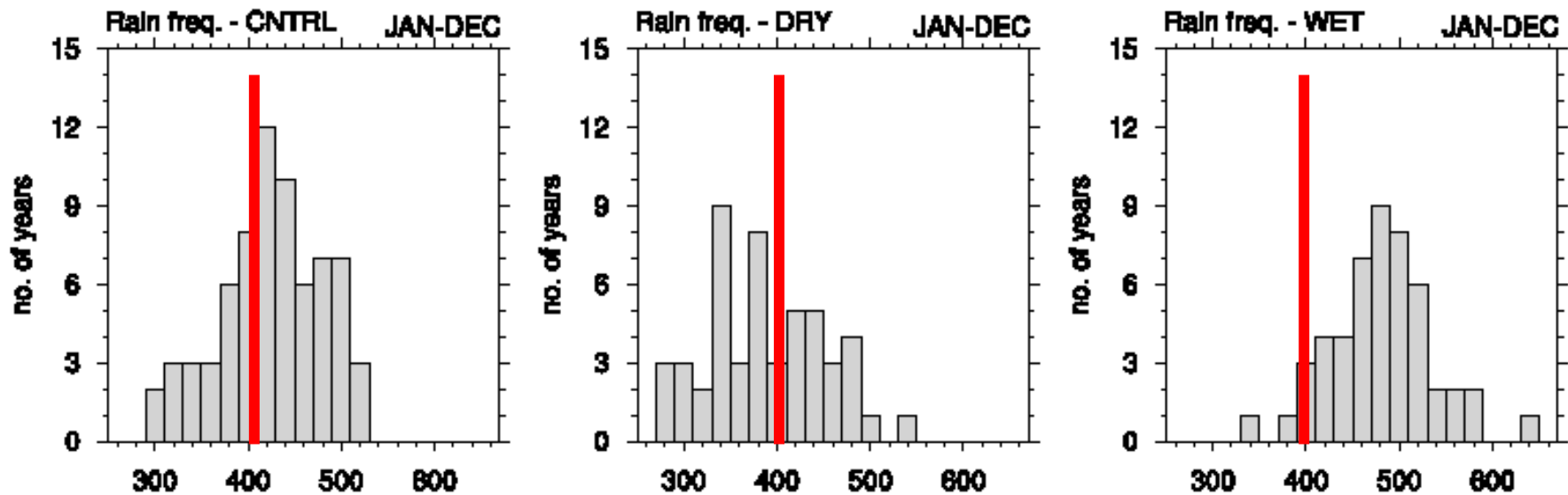


Figure 15. Frequency rainfall distribution for the control (left), dry-year (middle) and wet-year (right) perturbations for the region 20°–35°S, 115°–130°E for Jan–Dec. The number of years is indicated, in which a particular area-averaged rainfall (mm) summed over the period was received.

Significantly different from CTRL
at the 99% confidence level