

Oceanic fluxes: Boundary currents and Indonesian Throughflow

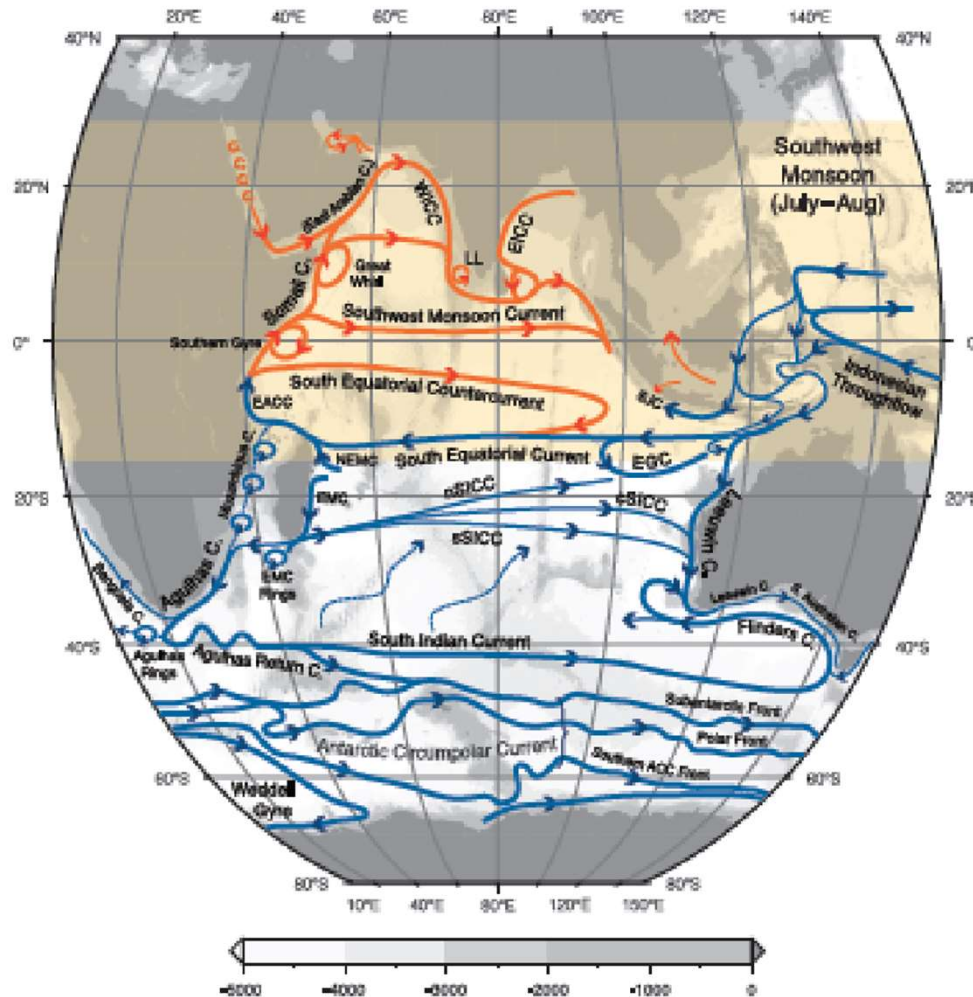
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Surface circulation pattern in boreal summer



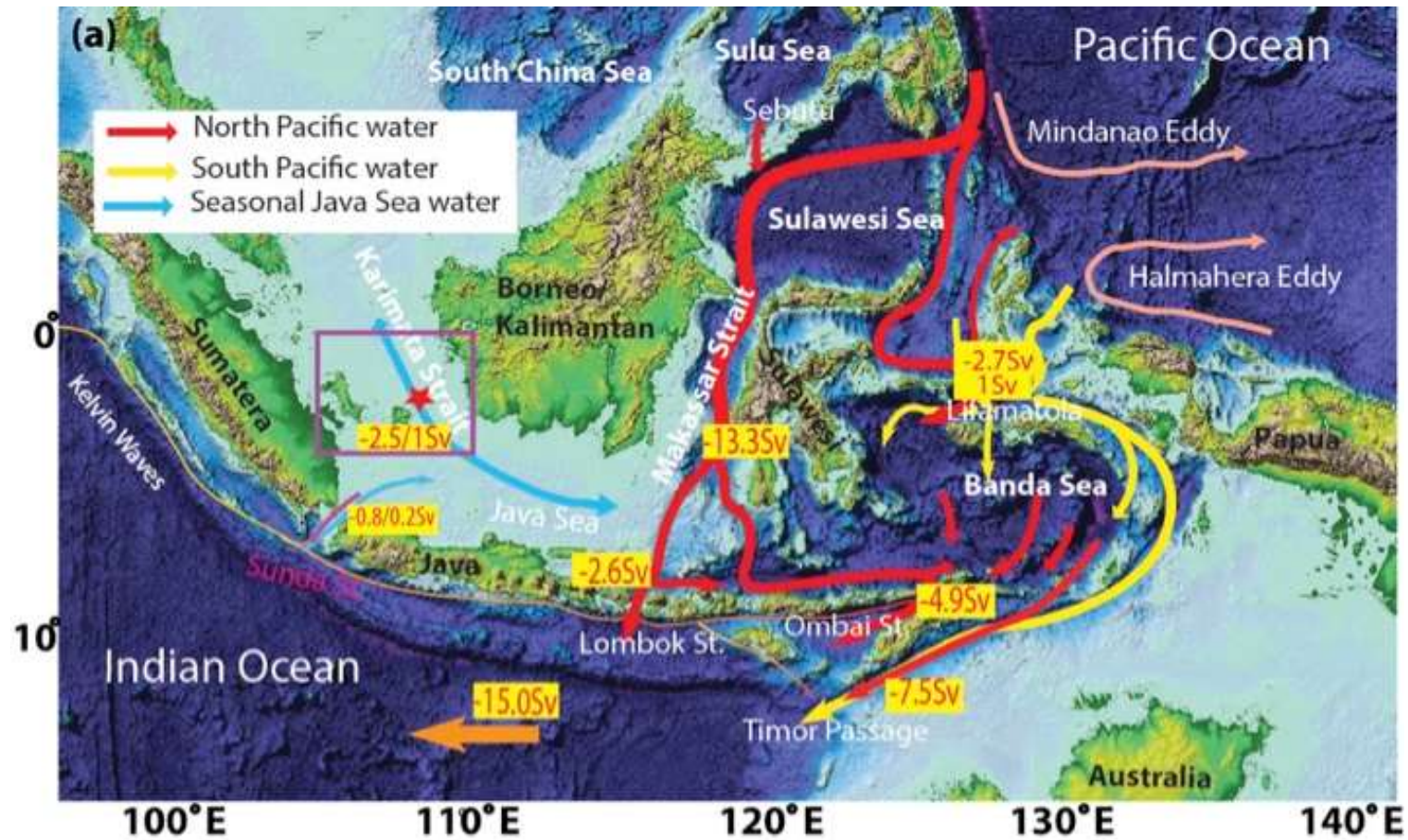
Indonesian Throughflow: warm route of global overturning circulation, brings warm, fresh Pacific waters to the IO

Somali Current system, South Java Current: meridional exchanges

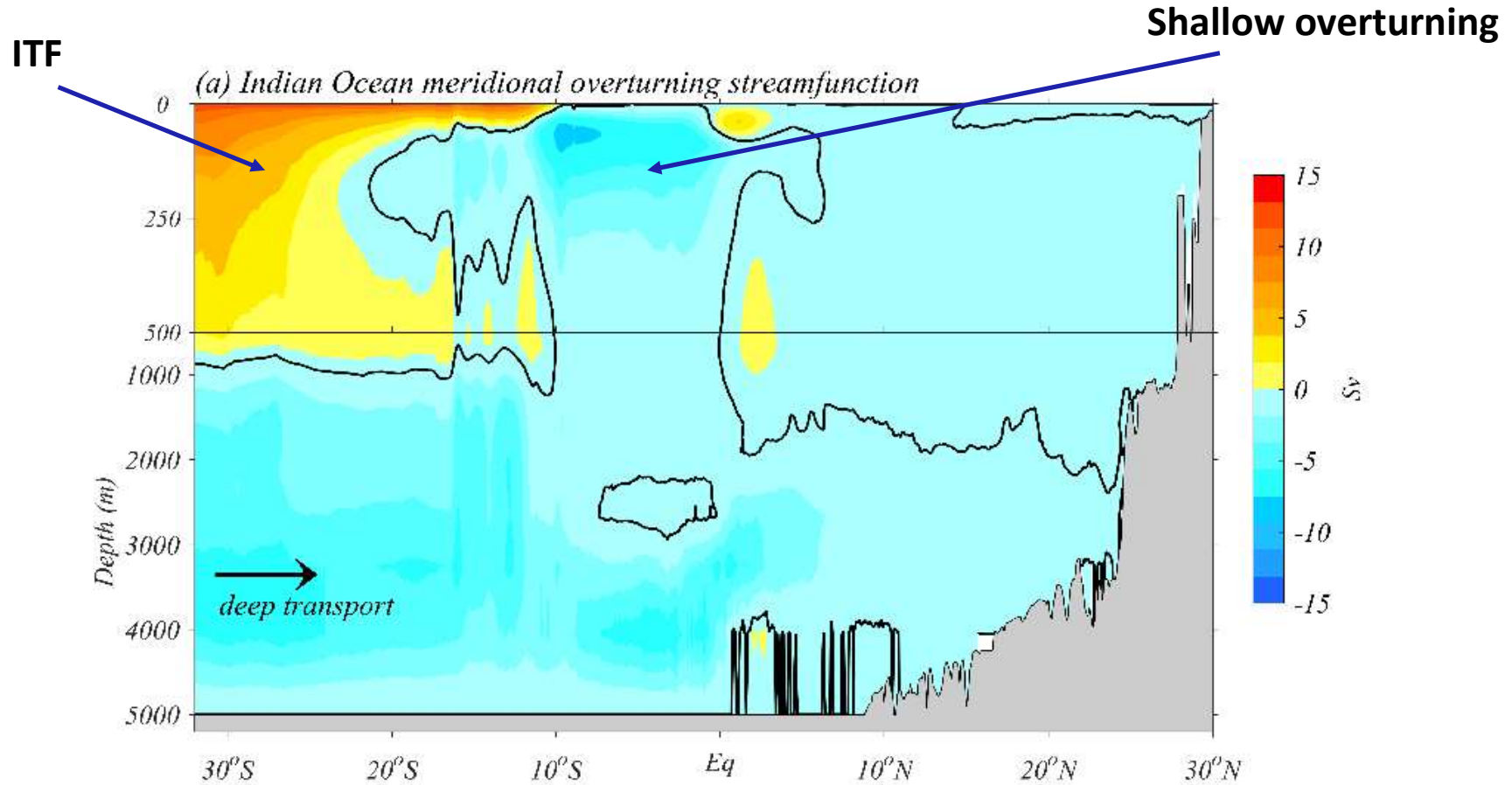
Agulhas Current system: Agulhas leakage contribute to the global overturning

Leeuwin Current: Influenced by Pacific-IO waveguide

ITF transport through different channels

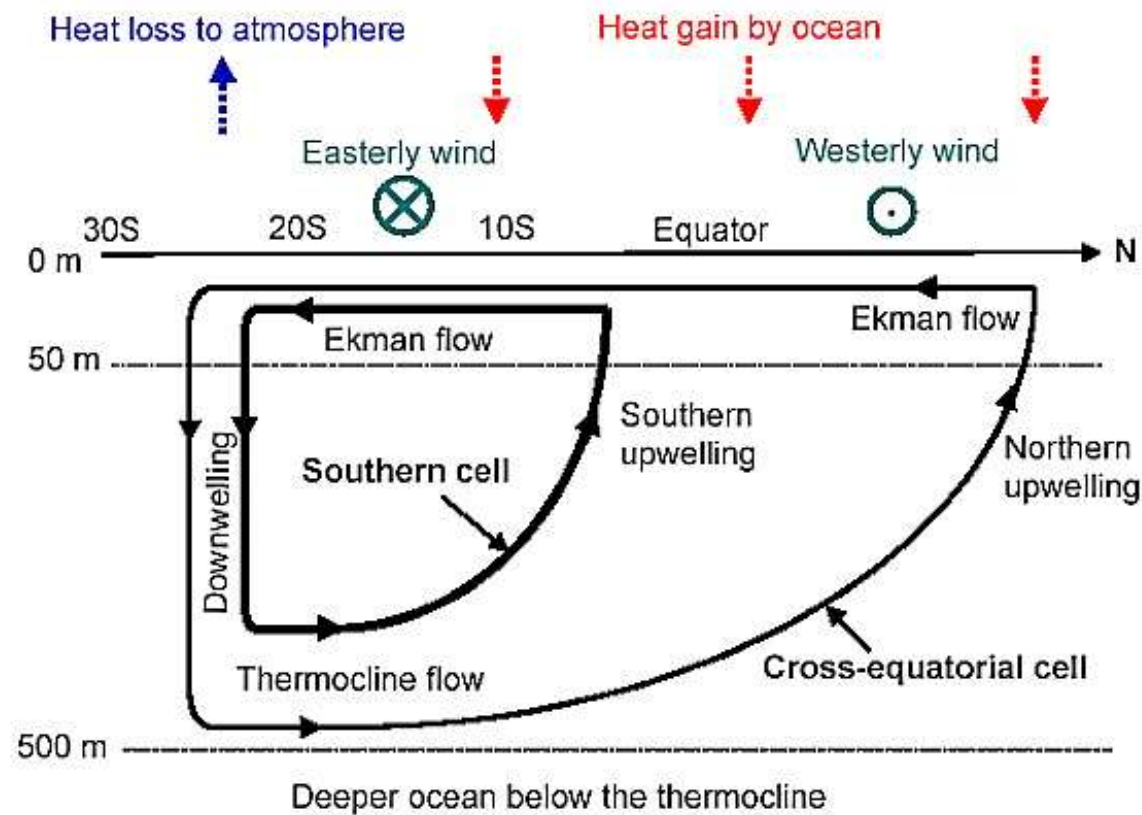


Indian Ocean overturning streamfunction from OFAM3

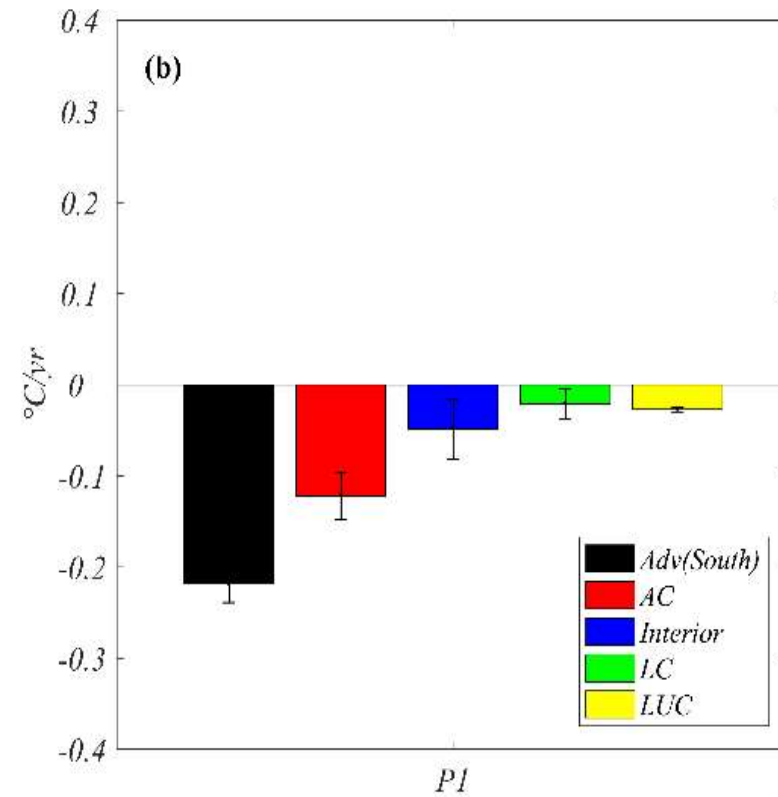
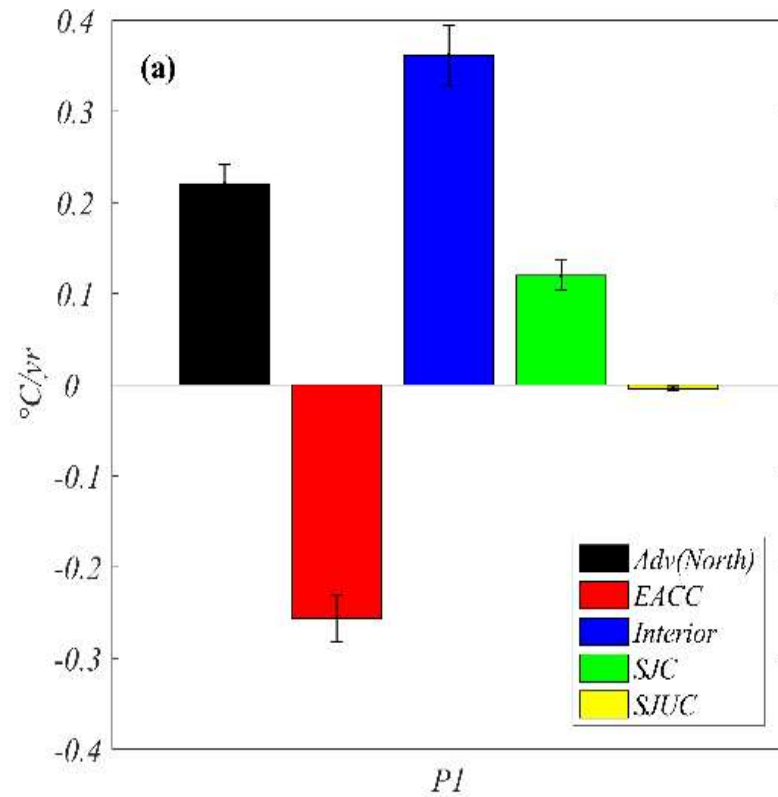


Jie Ma

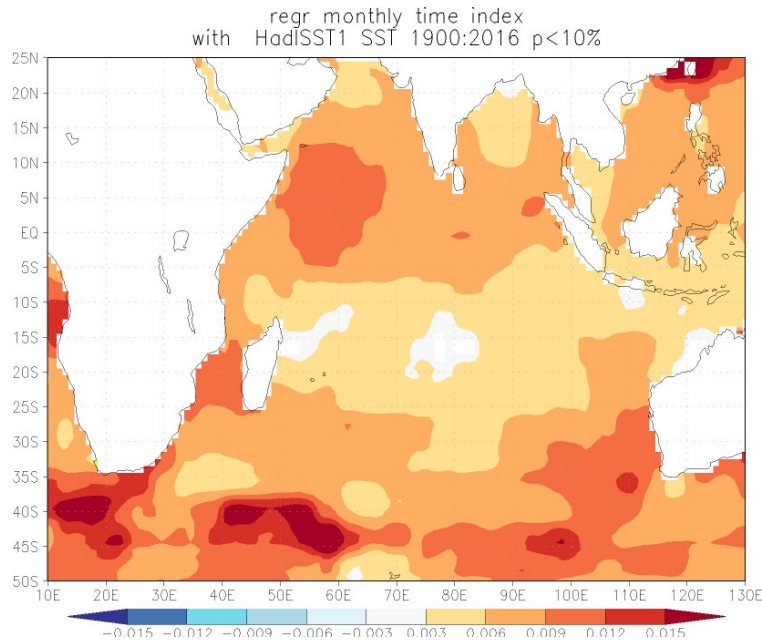
A simplified version of the shallow overturning cells in the Indian Ocean



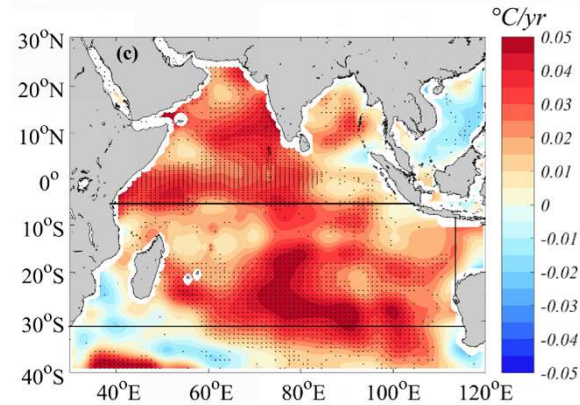
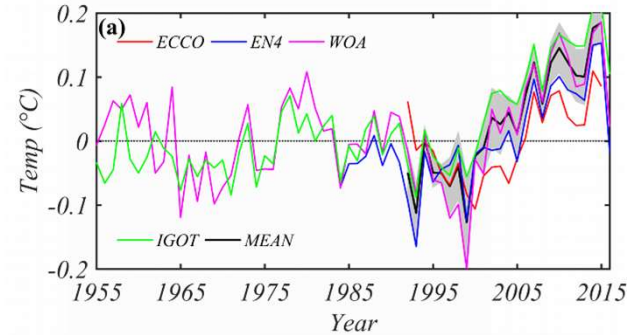
Contribution of heat advection into SIO upper 700m



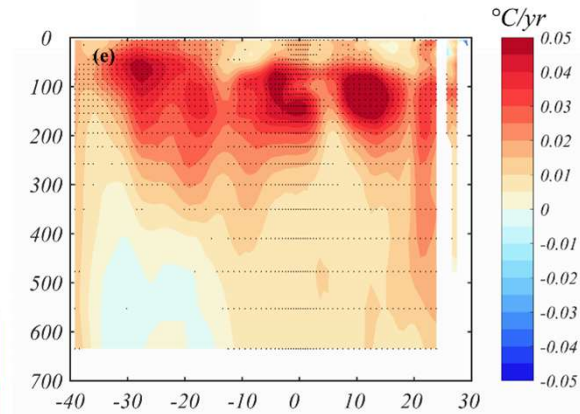
Fast warming trend in the Indian Ocean



SST trend during 1900-2016

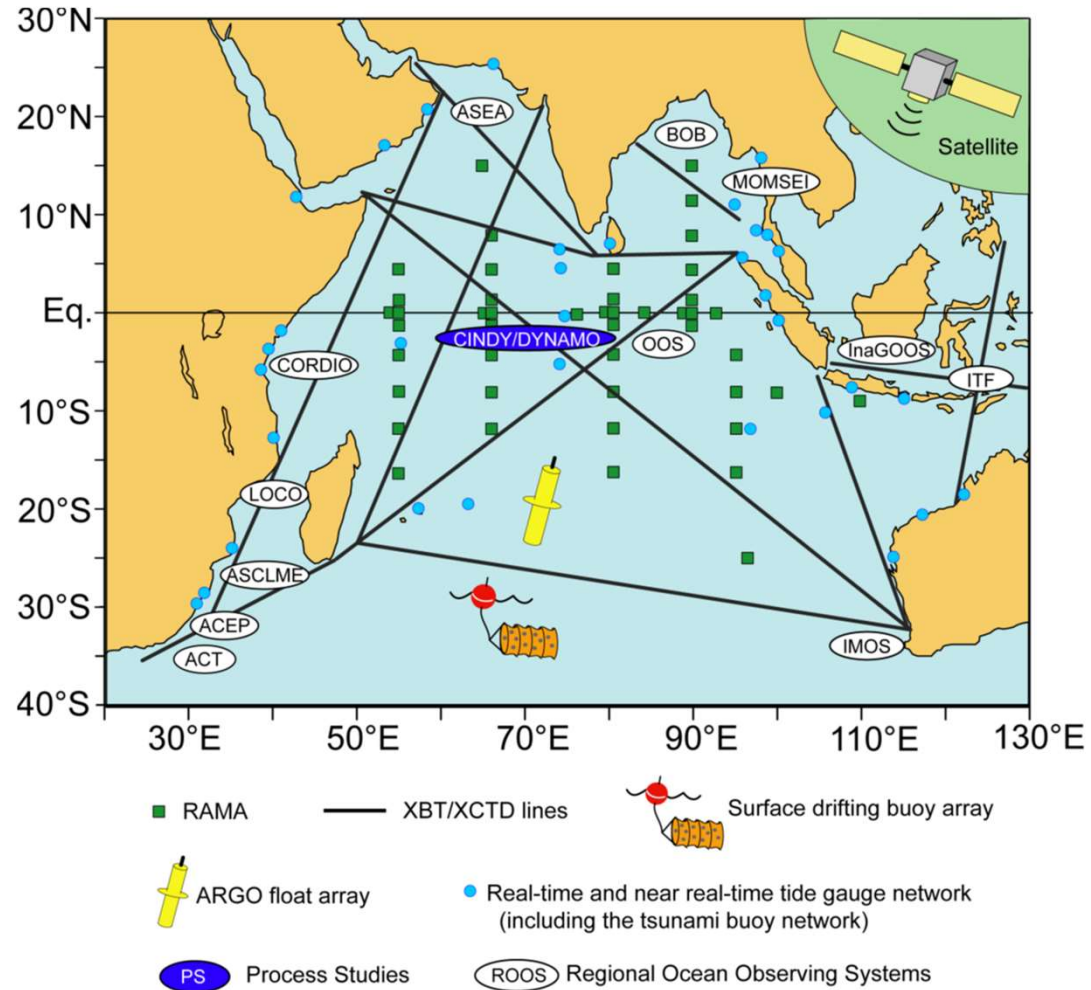


**Upper 700m
1992-2015**

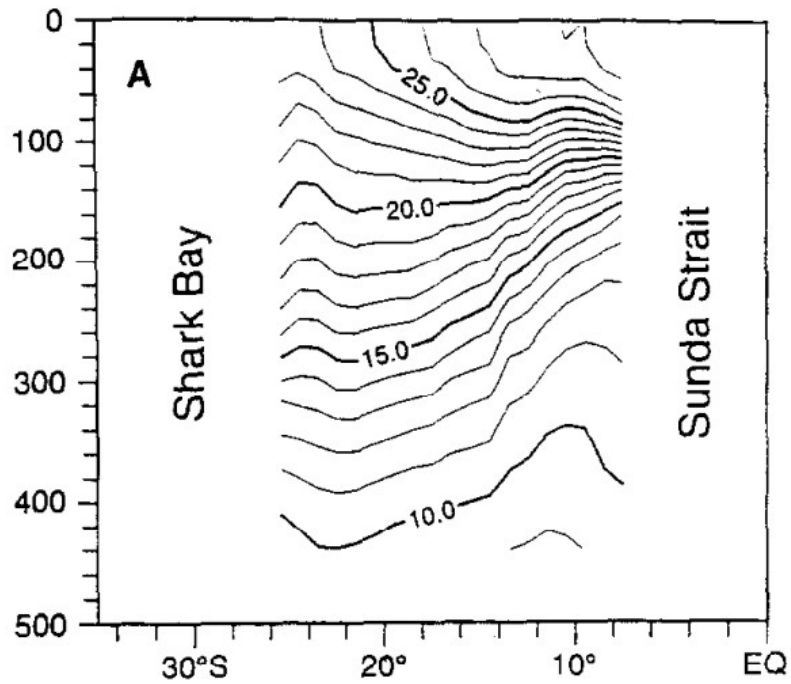


Ying Zhang

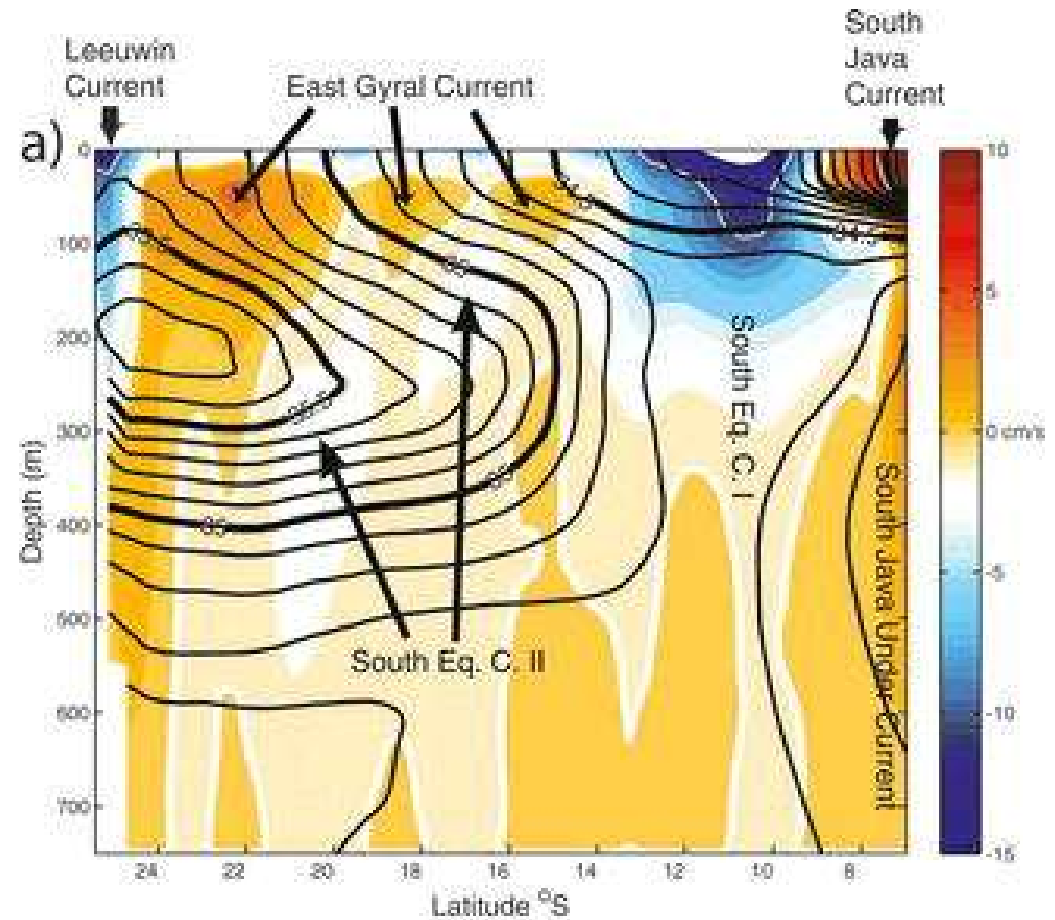
Indian Ocean observing system



Geostrophic transport of the ITF



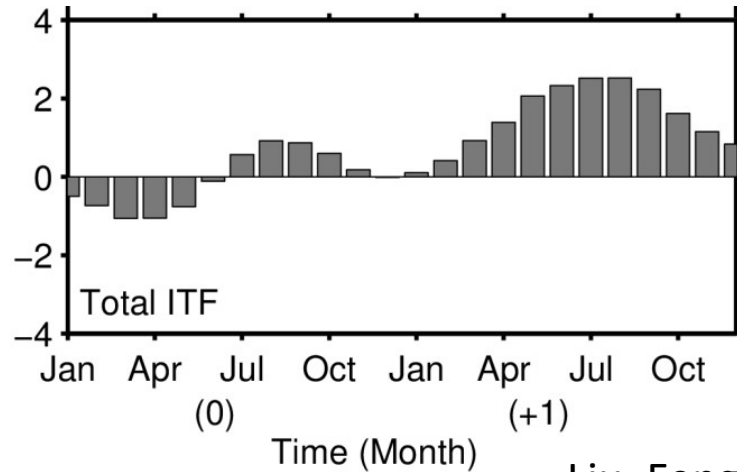
Meyers et al. 1995



Wijffels and Meyers 2008

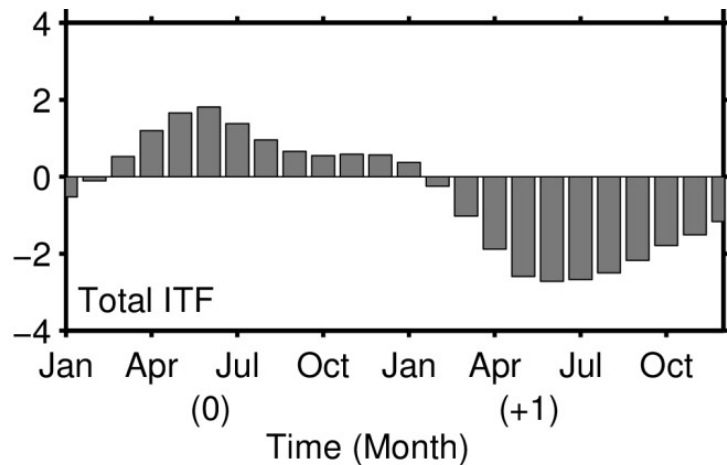
Composite of the ITF transports in El Nino

La Nina

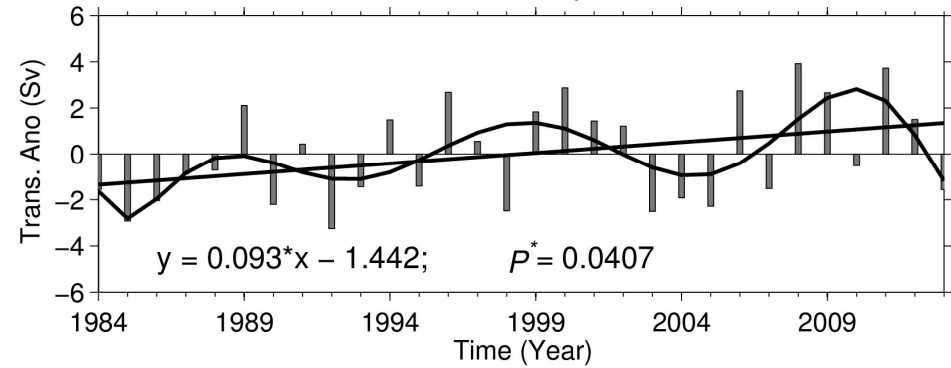


Liu, Feng, Wang,
Wijffels 2015

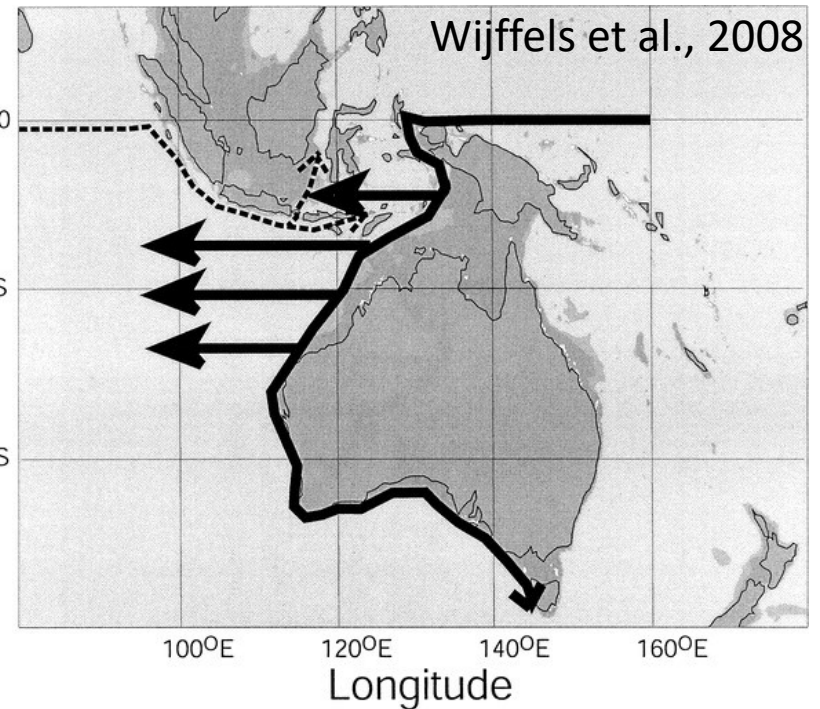
El Nino



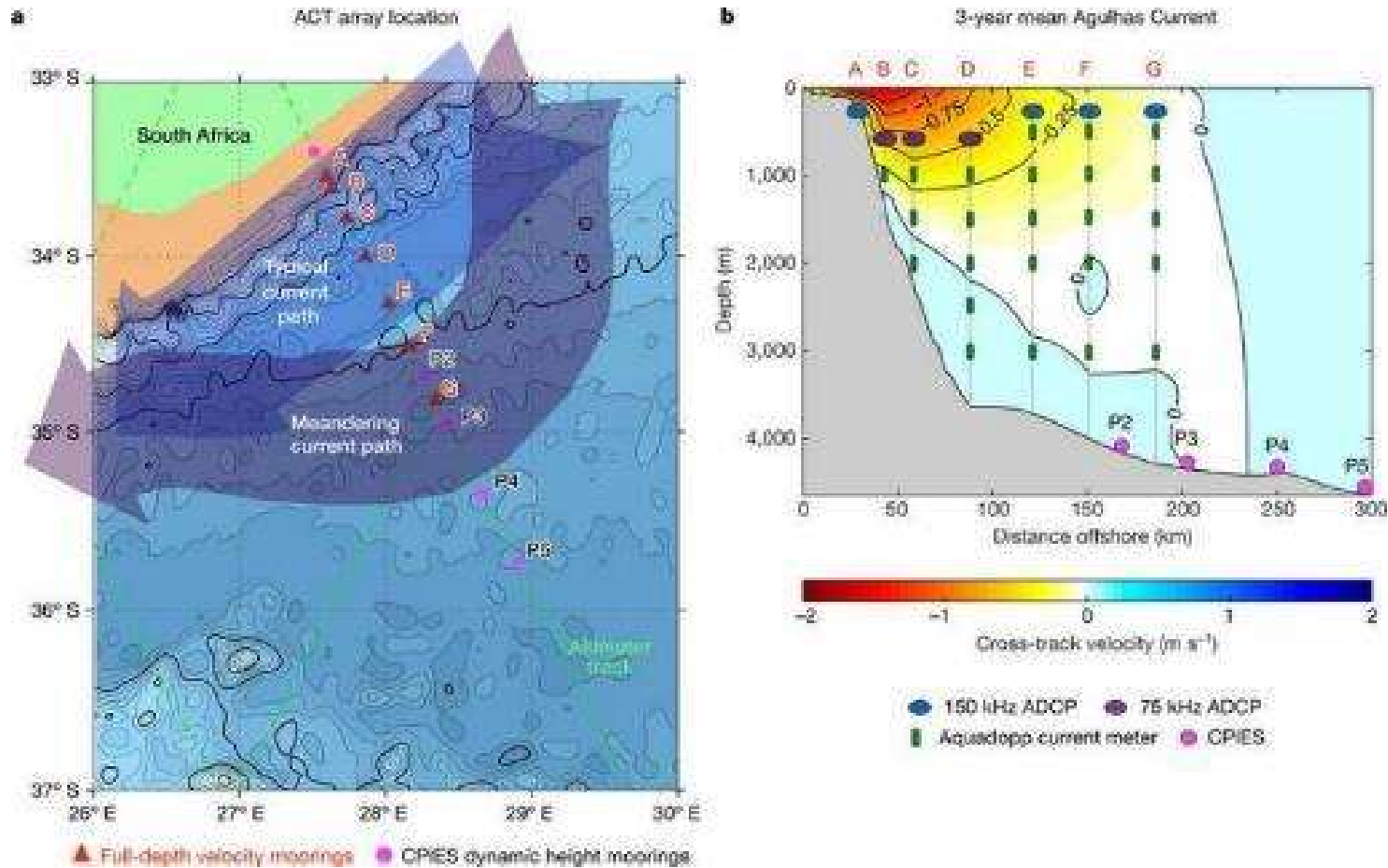
ITF Ano: Yearly Mean



Decadal trend



Geographical location and Vertical section of the ACT mooring array



L. Beal

Recommendations

- Maintain the frequently repeated **IX1 XBT section across the ITF**, and enhance the section with additional salinity measurements by using XCTDs and/or by increasing the density of Argo floats around IX1; There is a need to have more emphasis on the end point measurements of the IX1 section, especially at the northern end of the Sumatra-Java coast to resolve the **South Java Current**.
- *Maintain the frequently repeated IX12 XBT section across the **Somali Current system**.*
- *Establish an international alliance to coherently monitor the **ITF volume and heat transport** as well as **biogeochemical fluxes** in different inflow and exit channels, to aid the interpretation of the geostrophic transport estimates from the IX01 XBT section.*
- Maintain the ASCA mooring array for the **Agulhas Current system**; Integrated observing systems maintained through regional alliances and combining moorings, gliders, and periodic ship measurements are optimal.

Recommendations

- *Establish a boundary current array for **the Leeuwin Current** to monitor the coastal waveguide along the Australian coast to assess the influences of decadal Pacific climate on the Indian Ocean, and combined mooring and gliders observations will be optimal.*
- Maintain the existing network of island and **coastal sea level stations** and ensure open accessibility of sea level data from this network, so that historical boundary current transports such as the Leeuwin Current as well as the ITF can be estimated using **sea level proxies** – Fremantle sea level records have been crucial to monitor the Pacific influences on the interannual and decadal variability of the Leeuwin Current and their impacts on the interior southern Indian Ocean, as well as evaluating numerical model performance.
- Maintain satellite **altimeter missions** to characterize long term variations of mesoscale eddy energetics in the ocean boundary currents in the Indian Ocean.