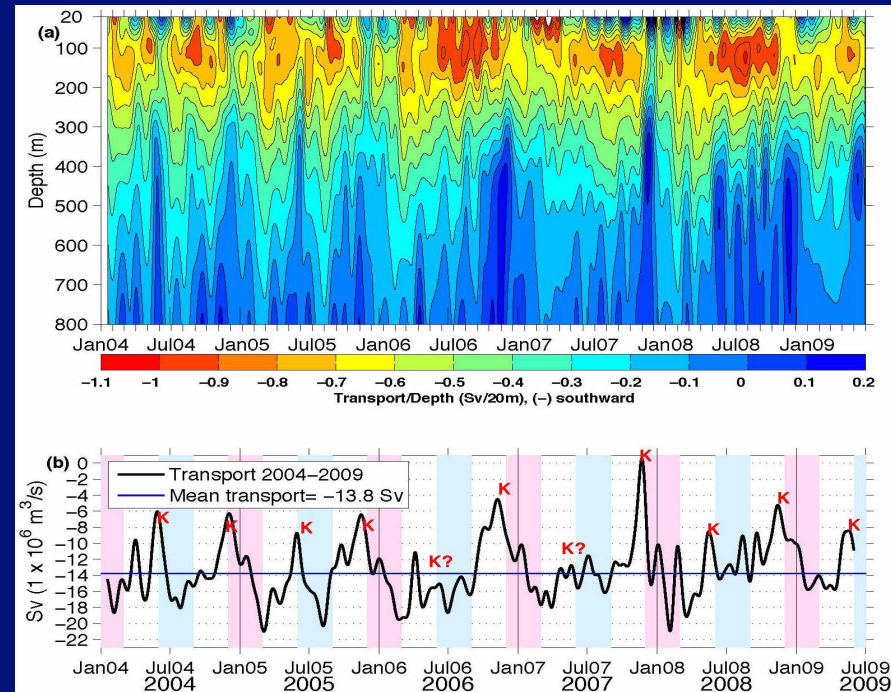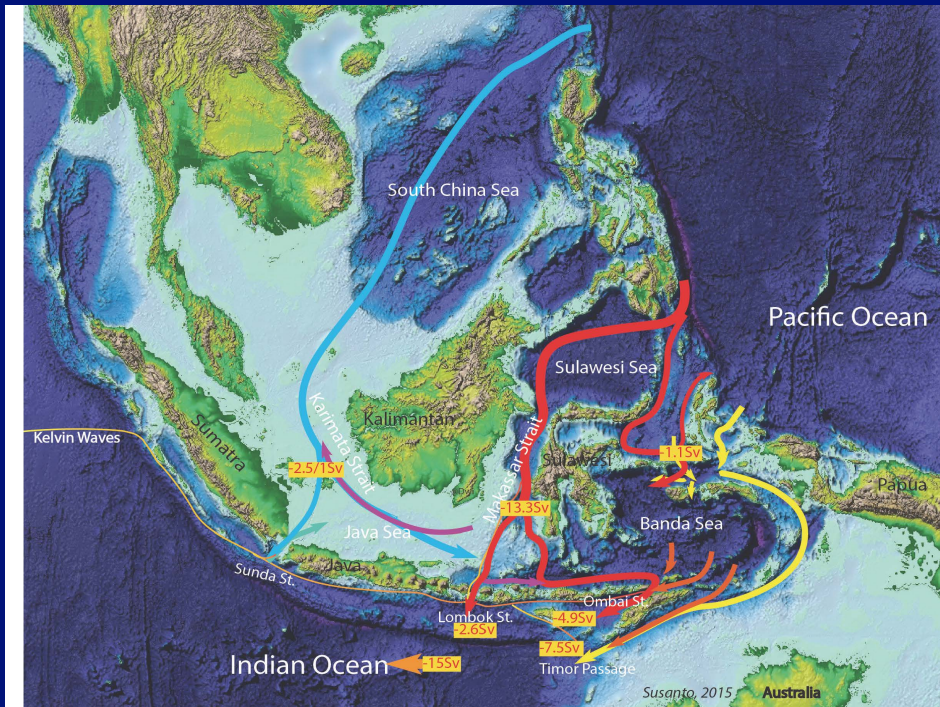# INDONESIAN THROUGHFLOW AND ITS PROXY

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Makassar ITF Susanto & Song, 2015

- ✓ ITF strongly influences the heat and freshwater budgets of Indian and Pacific Oceans, and may couple with ENSO and monsoon phenomena, altering global ocean circulation and climate.

- ✓ Change in ITF magnitude is expected to alter the SST, and therefore altering the ocean-atmosphere fluxes.

- ✓ ~15 Sv of ITF water flushes the Indian Ocean thermocline waters, boosting transport of the Agulhas Current [by ~15%], increasing southward ocean heat flux across 20-30°S over the no-ITF condition, thus altering the meridional overturning of the Indian Ocean

- ✓ To get the ITF amplitude and variability right are challenge for numerical models.
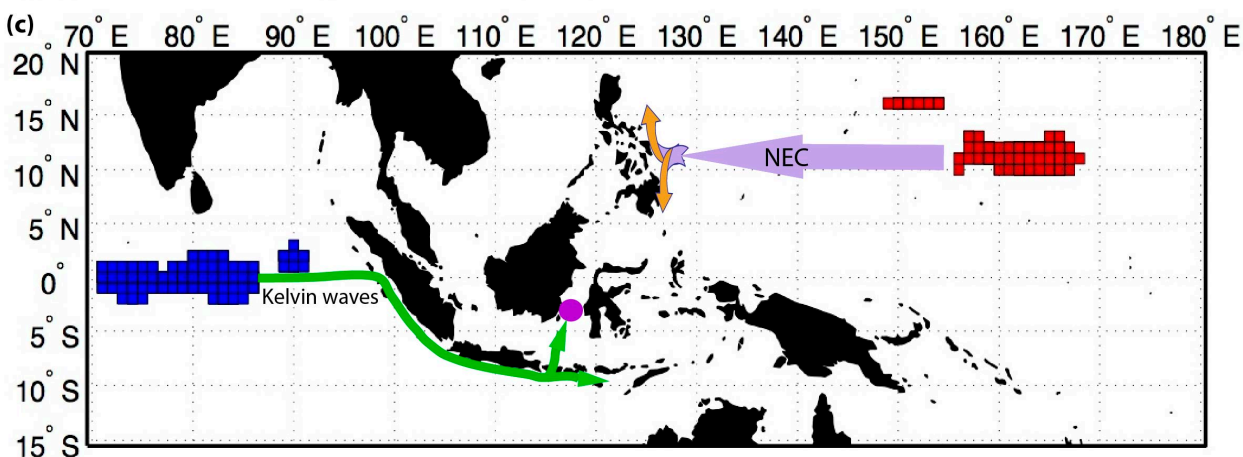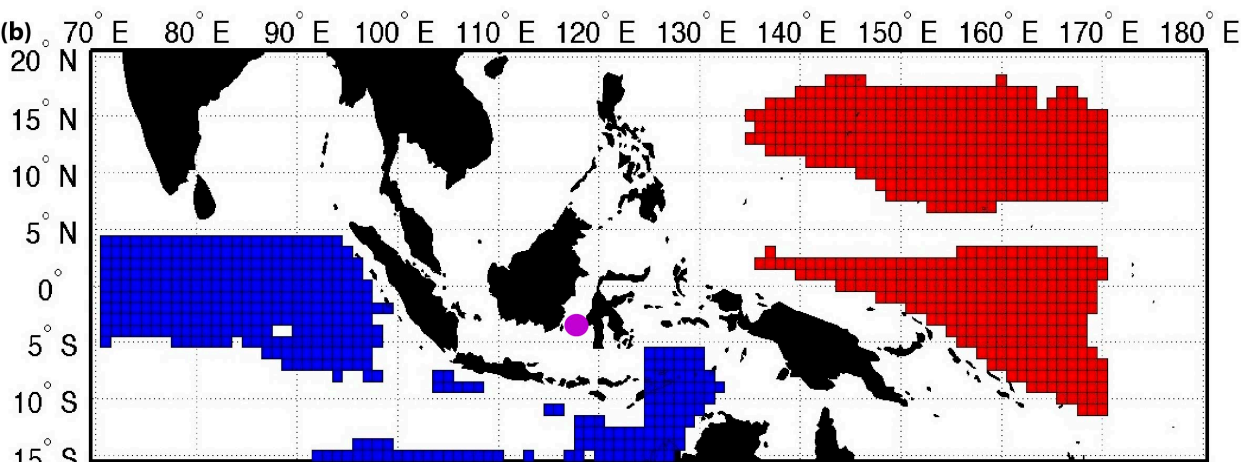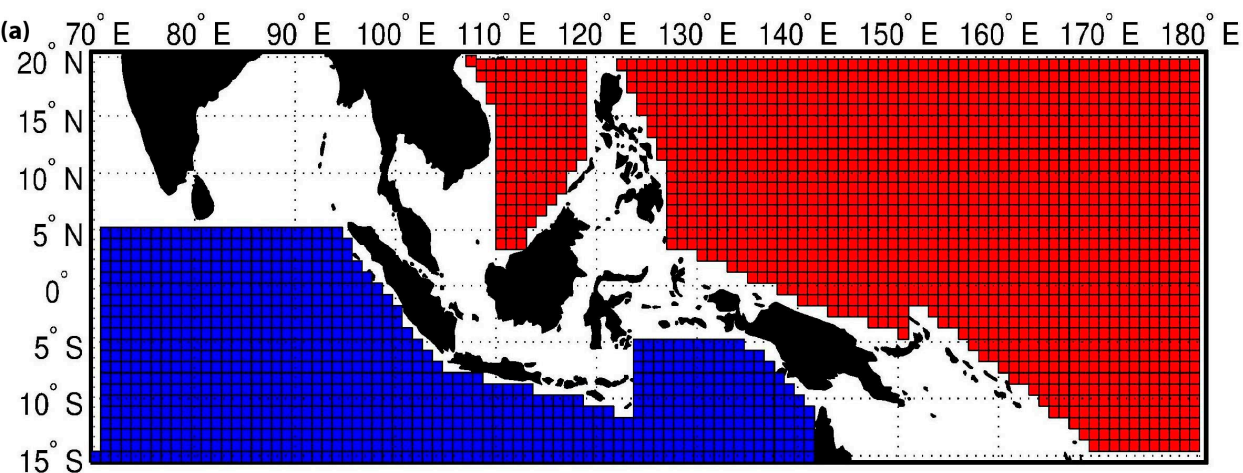
ITF Inflow:
Makassar (Susanto et, 2013, Gordon et al., 2010)
Lifamatola (van Aken, 2009)
Karimata (Susanto et al, 2010; 2012, Fang et al., 2010)

ITF Outflow
Lombok, Ombai, Timor
(Sprintall et al., 2009)

ITF proxy from satellite altimeters and gravimeter (Susanto & Song, JGR, 2015)

• ITF is controlled by both Pacific & Indian Ocean (SSH Pacific only is not sufficient)

• Optimal location for proxy: Pacific: 10N and 160-170E & Equatorial Indian Ocean.
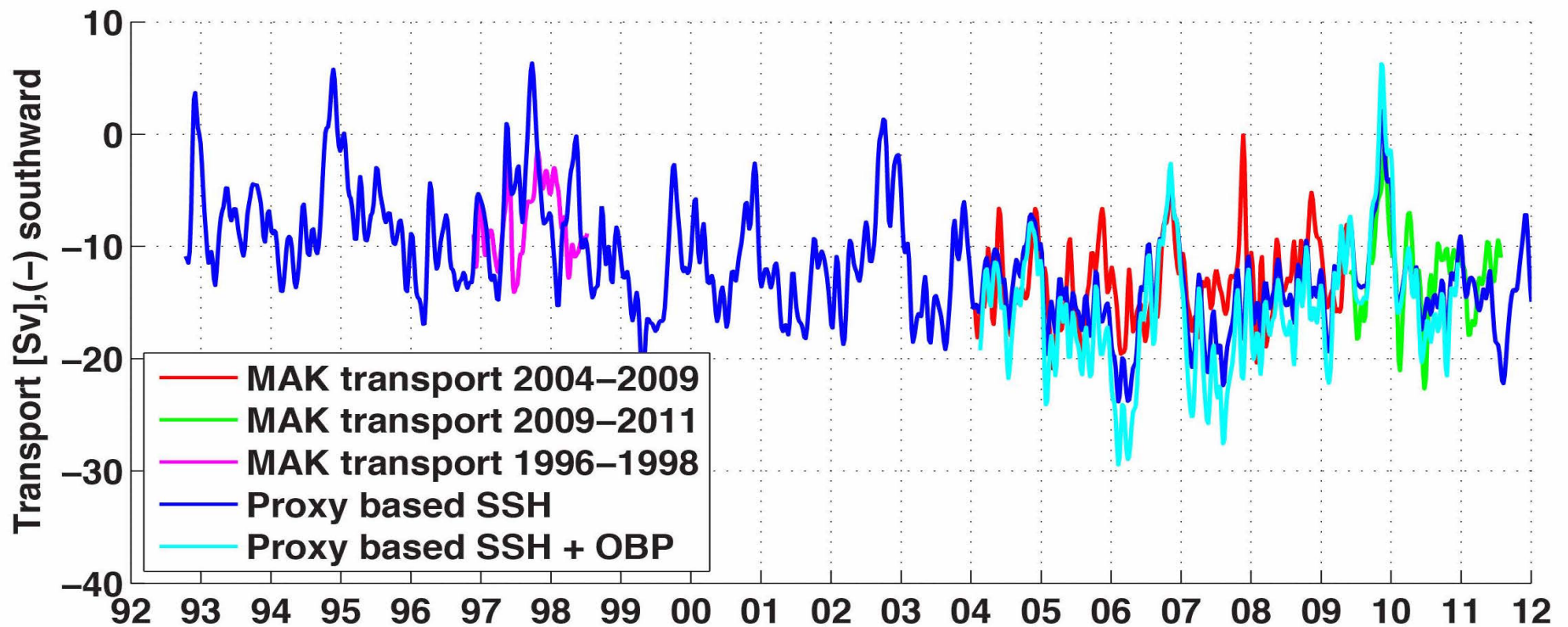
Susanto & Song, 2015

Potential uses at NCEP

- ✓ SSH and ocean bottom pressure from satellite Altimeters and Gravimeters can be used as ITF Proxy couple months/year ahead of time.
- ✓ The ITF proxy can be calculated every week/month as soon as satellite derived altimeter and ocean bottom pressure data available, and should be assimilated into the NCEP climate model
- ✓ The ITF proxy can be used to estimate the heat and fresh water as well as biogeochemical fluxes to the Indian Ocean.