

FRESHWATER FLUX FROM BAY OF BENGAL AND SOUTH CHINA SEA AND ITS IMPACTS ON THE ITF

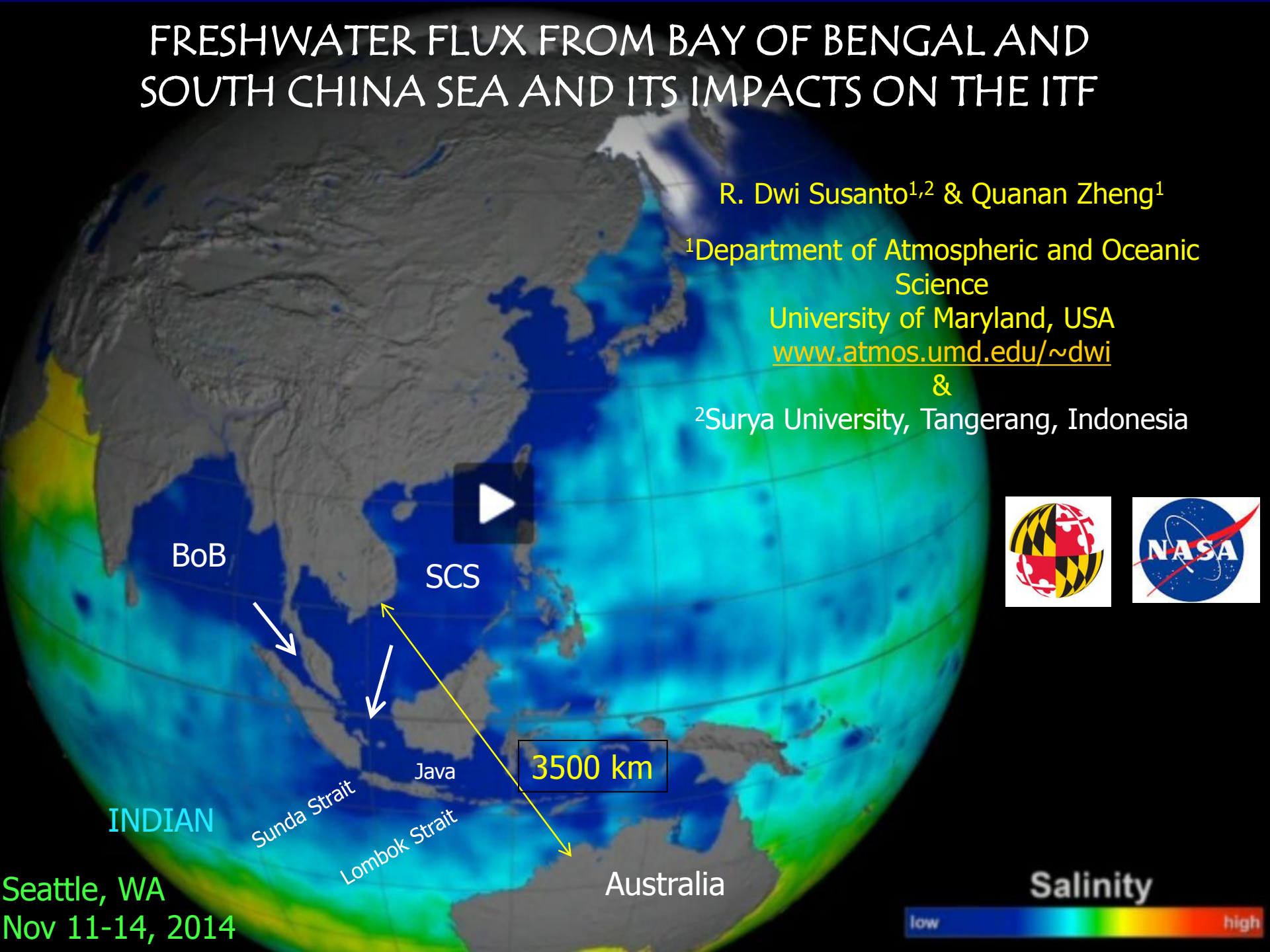
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&

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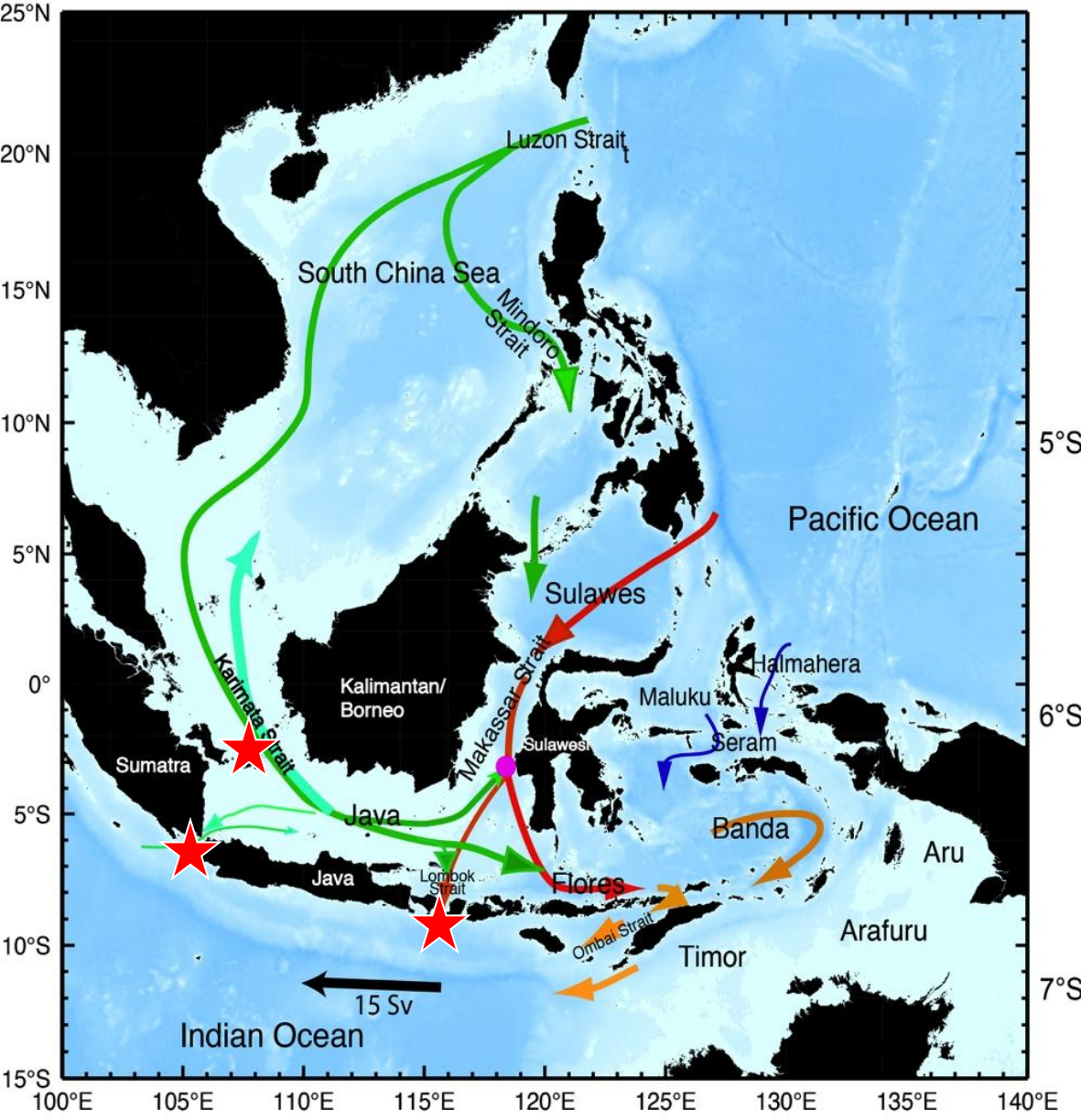
Seattle, WA
Nov 11-14, 2014



Objectives

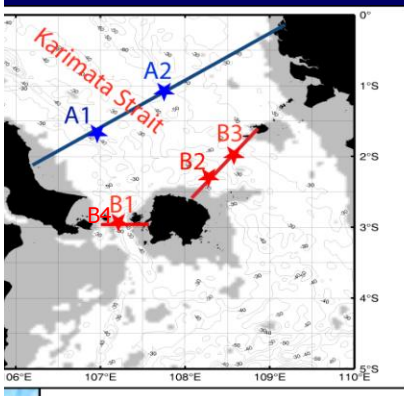
- ✓ Derive stratification of Sunda, Karimata and Lombok Straits based on Aquarius/SAC-D satellite (S,T), in situ measurements, and numerical model results.
- ✓ Determine spatial and temporal variability heat and freshwater budget between Bay of Bengal and South China Sea into the Indonesian Seas
- ✓ Determine volume transport in the Karimata, Sunda and Lombok Straits and their impacts on the regional ocean stratification and circulation.

Integrated satellite data (Aquarius/SAC-D), in situ measurements, and numerical

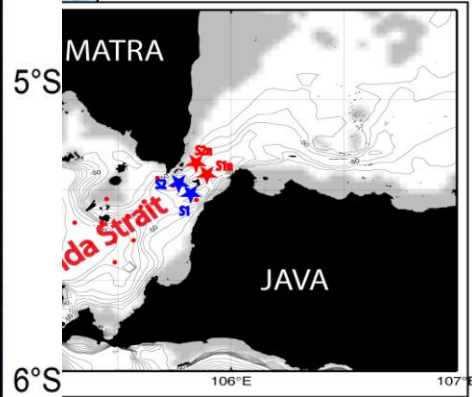


South China Sea throughflow: Susanto et al., 2010; 2013 & Fang et al., 2010.

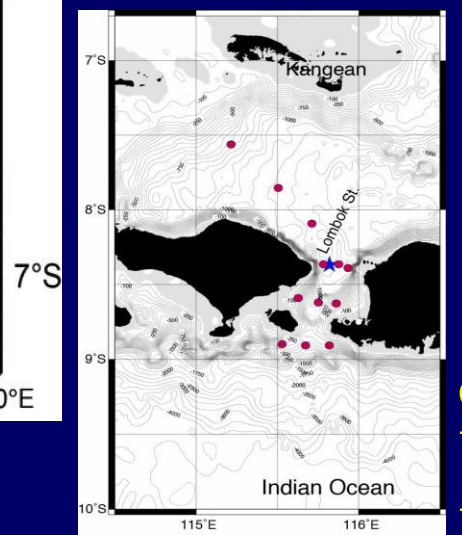
Main ITF in Makassar: Susanto et al. 2005, 2012; Gordon et al., 1999, 2008.



Karimata



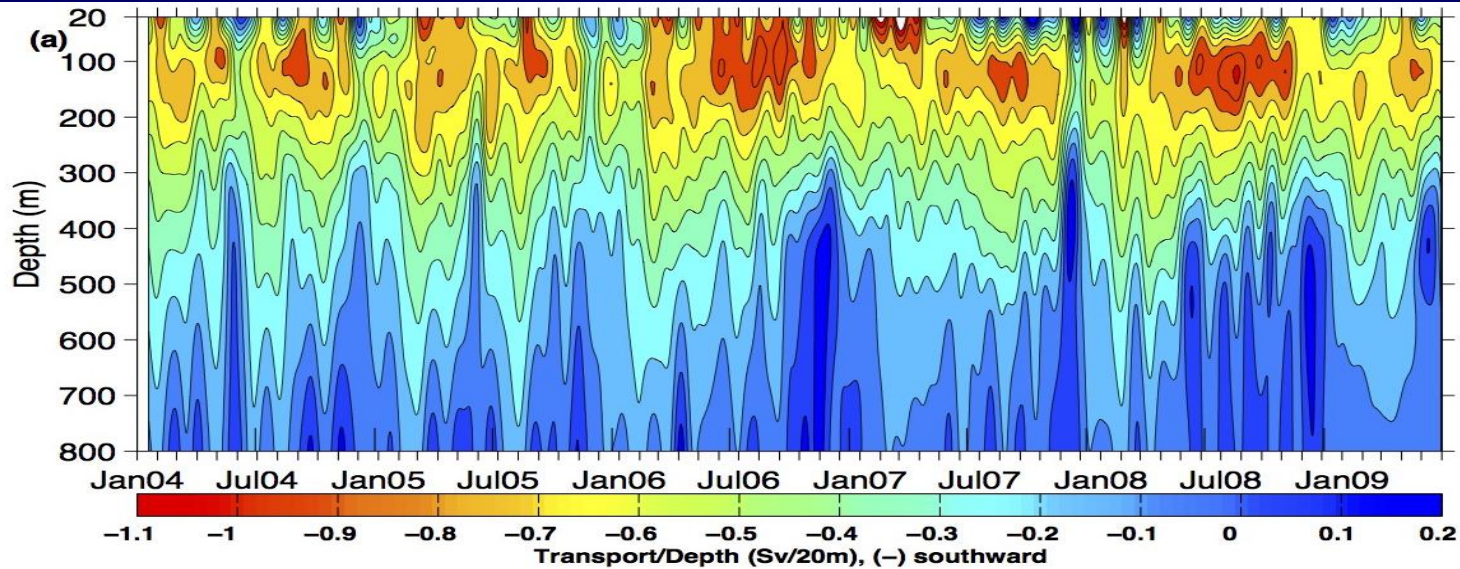
Sunda



Lombok

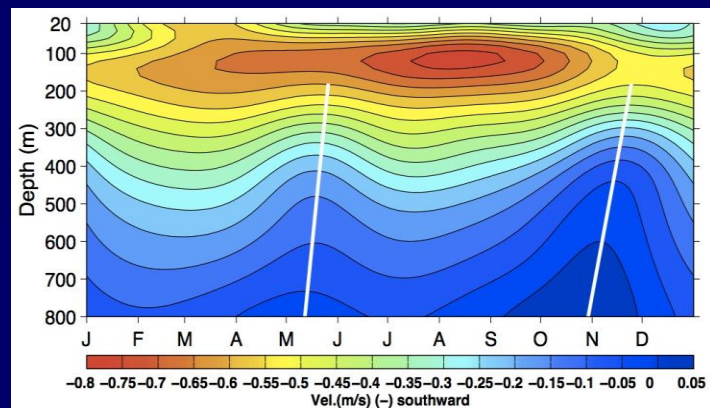
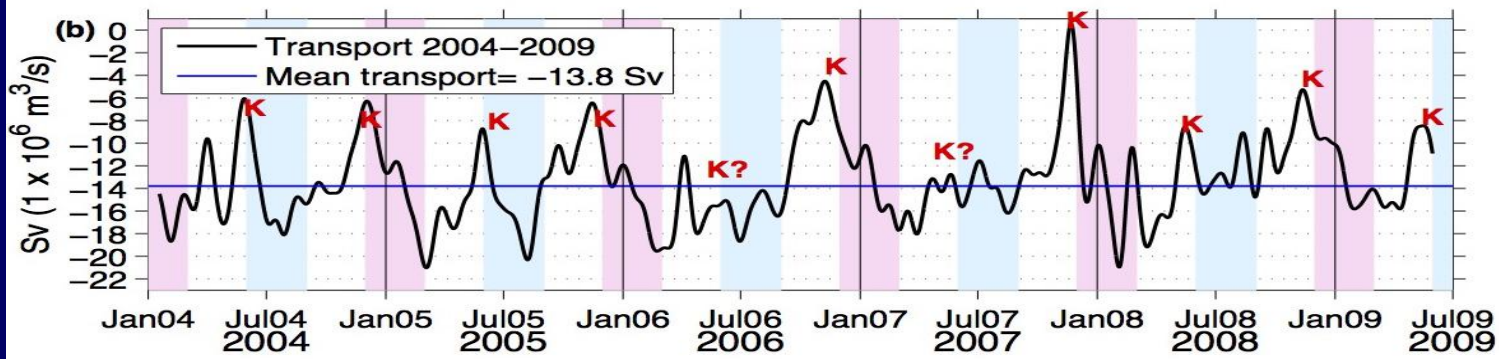
Collaborators:
- BalitbangKP, Indonesia

- First Institute Oceanography, China



Makassar Strait
Transport

~14 Sv



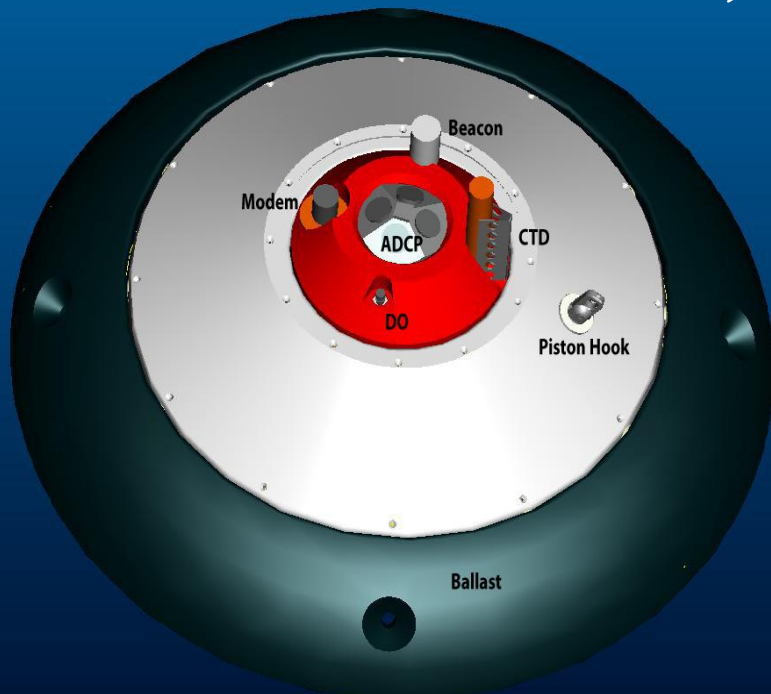
Susanto et al., 2012

Semi-annual Kelvin waves

Trawl Resistance Bottom Mount ADCP & CTD



→ 2m



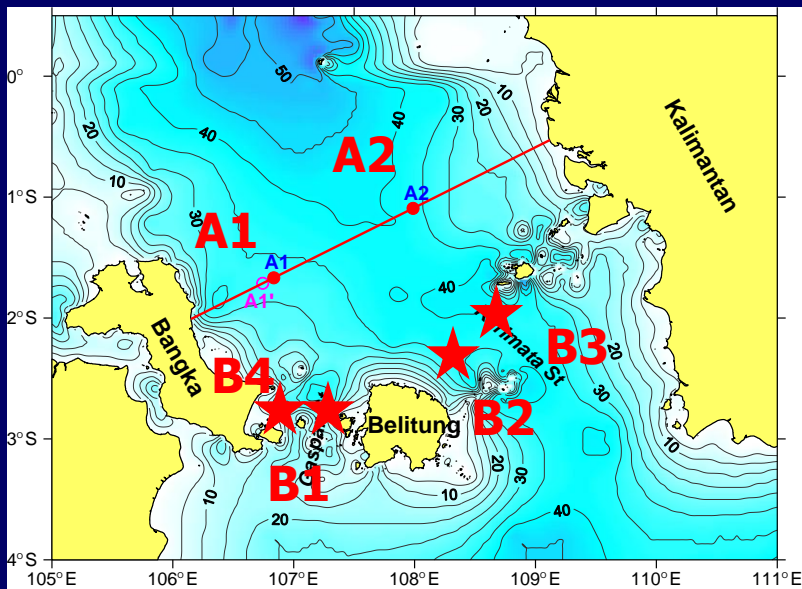
ADCP (Velocity, T, P), CTD, Modem, GPS-Iridium beacon, Dissolved Oxygen, Acoustic Releases.

Karimata Transport

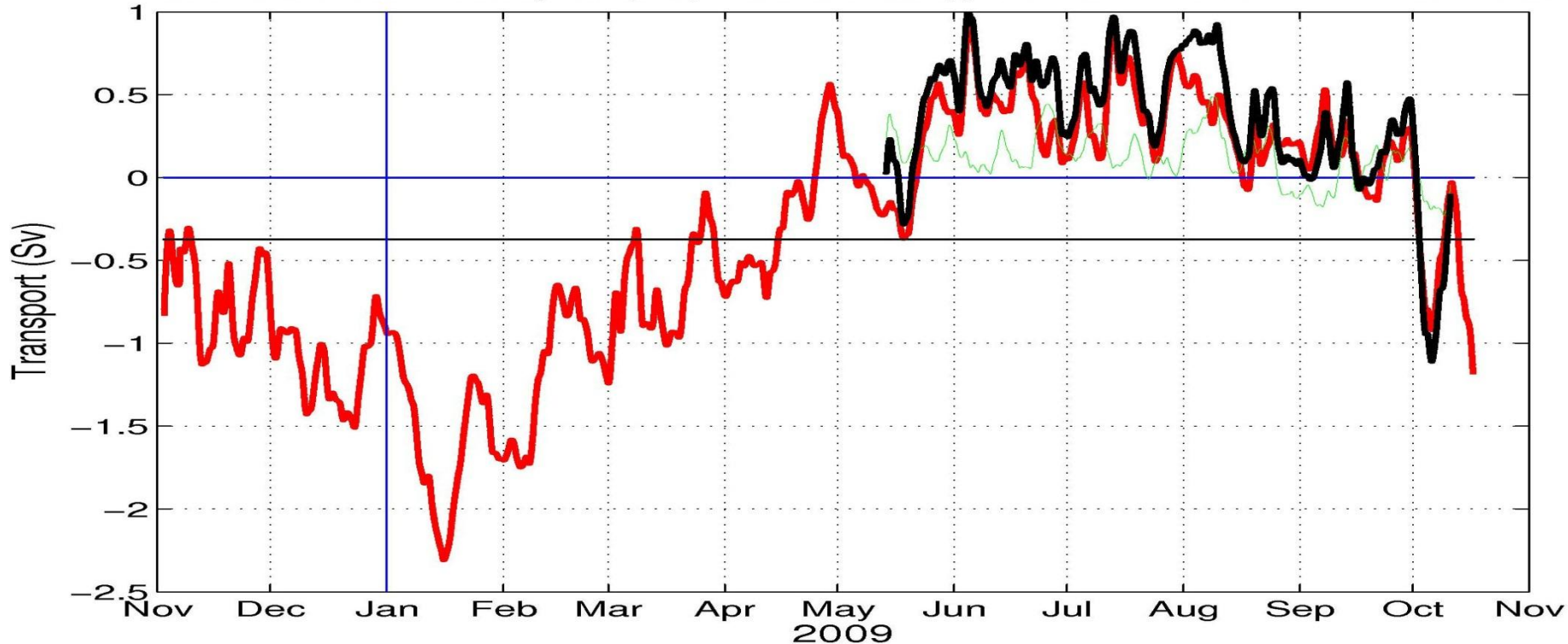
The one month 2007/2008 winter SITE volume transport is about -3.4 ± 1.2 Sv ($\text{Sv} = 10^6 \text{ m}^3/\text{s}$), $\text{Sv} \sim 1/3$ of the Makassar Strait volume transport. The corresponding transport-weighted temperature is 27.75°C . $\text{HT} = \sim 0.34\text{PW}$. (Fang et al., 2010)

Karimata transport vary from -2.4 Sv to $+1$ Sv

(Susanto et al, 2013)

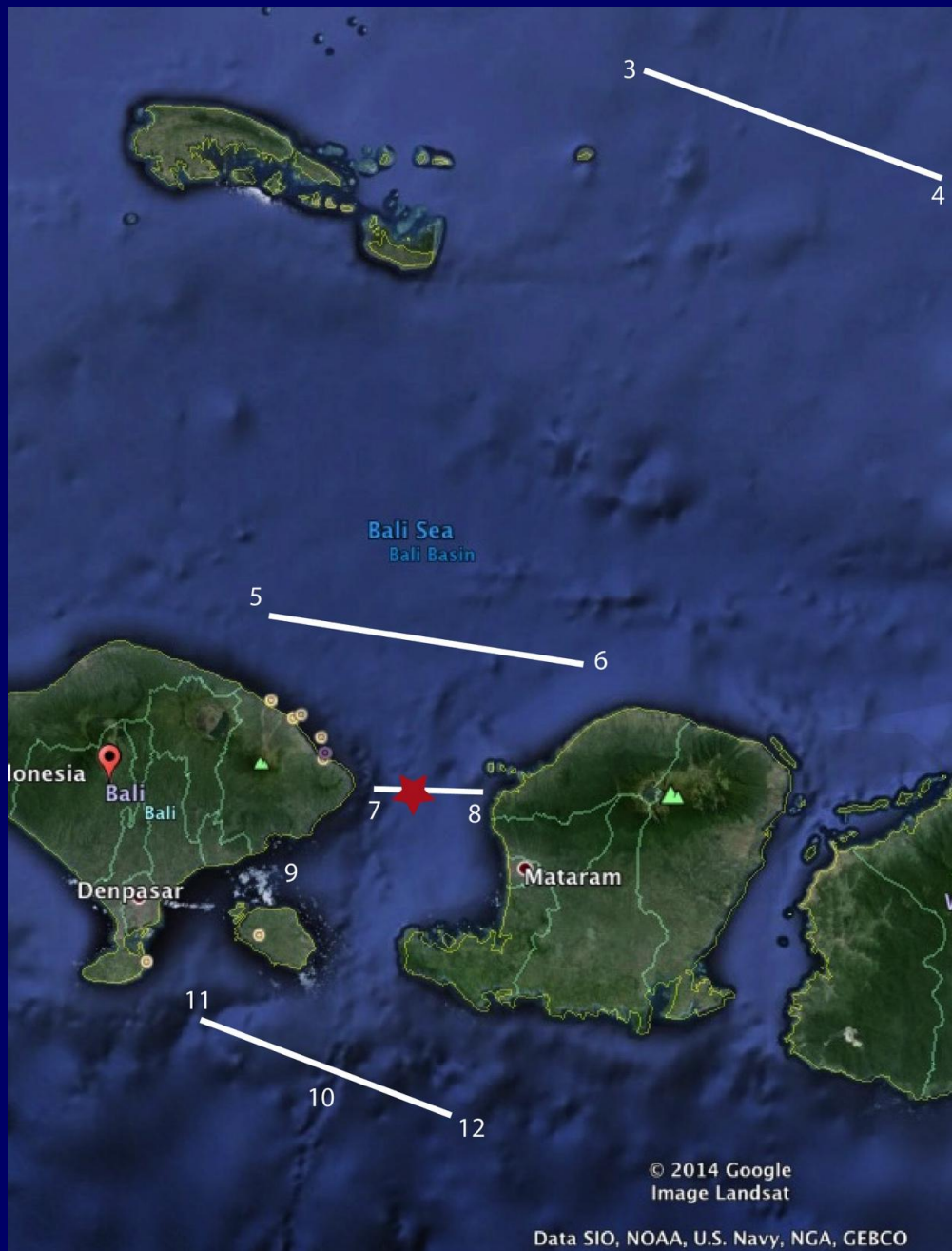


Karimata Strait Transport (Sv; – southward), 02–Nov–2008 – 17–Oct–2009



September 10-22, 2014

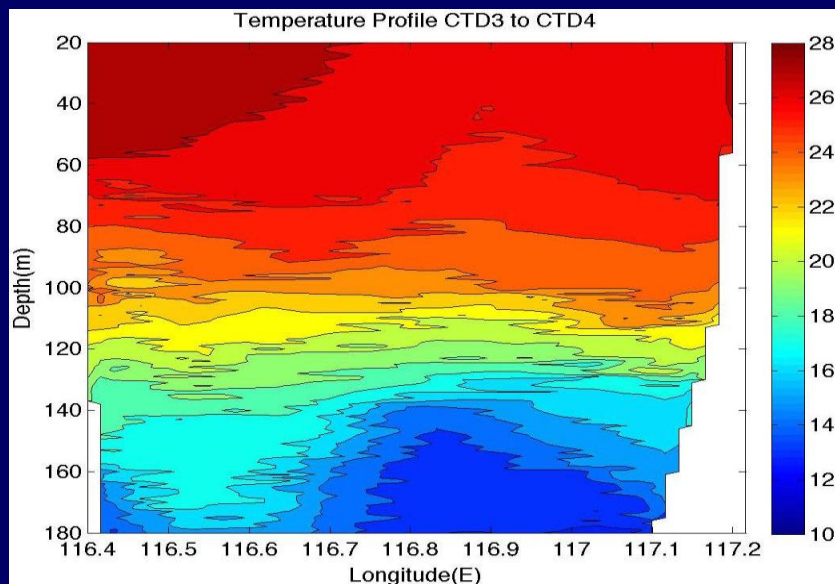
9 CTD and water samples & LADCP
4 sections of towing system



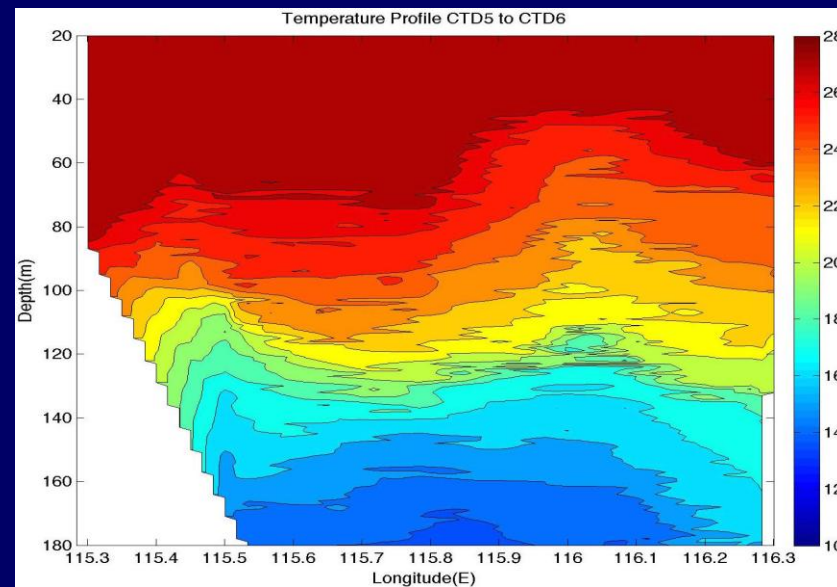


Towing system: underway CTD system to measure various water properties (Salinity, Temperature, depth, chl-a, turbidity, dissolve oxygen, pH)

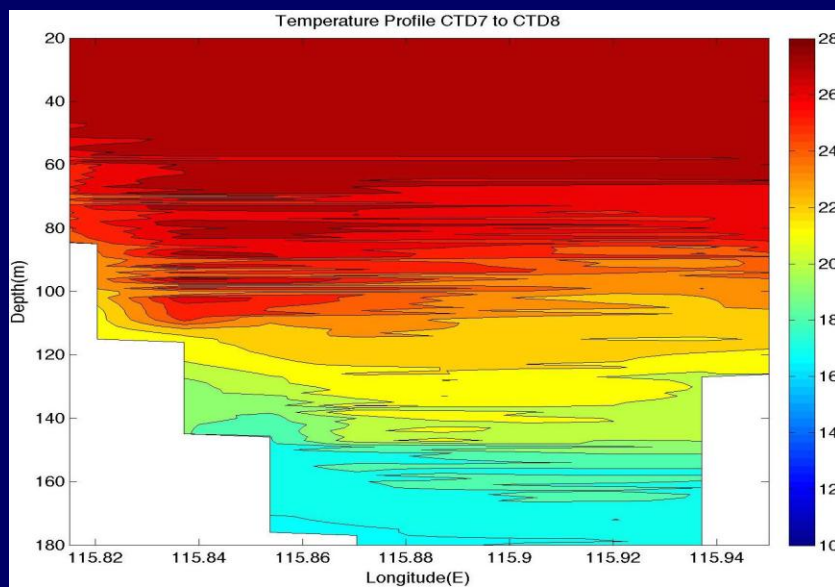
Temperature Profiles, Lombok Strait September 2014



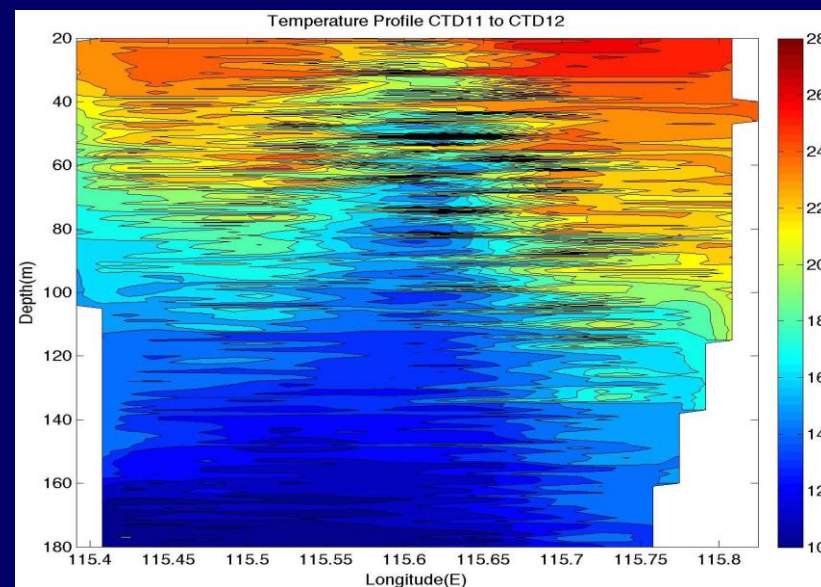
Section 2 (CTD#3-4)



Section 3 (CTD#5-6)

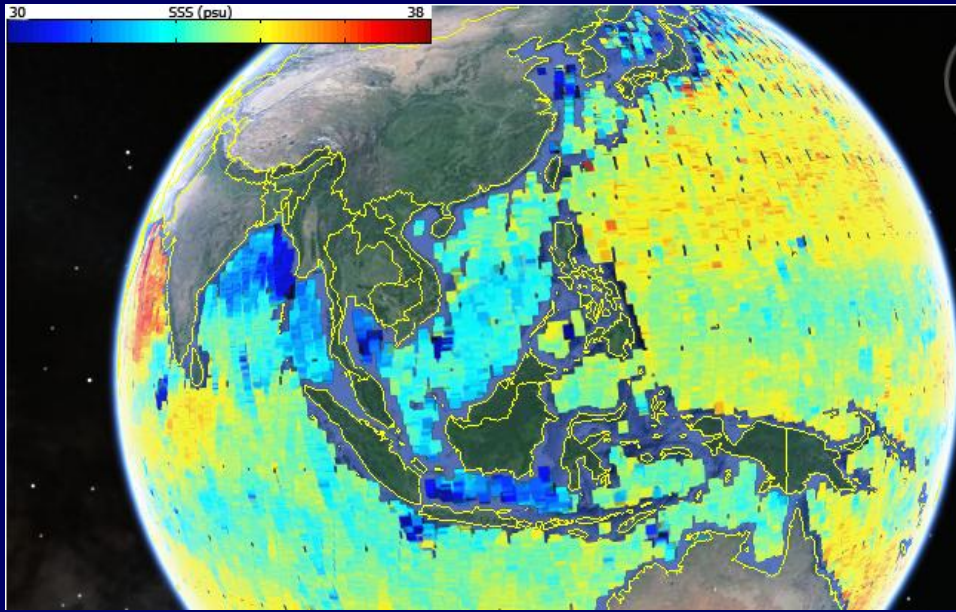


Section 4 (CTD#7-8)

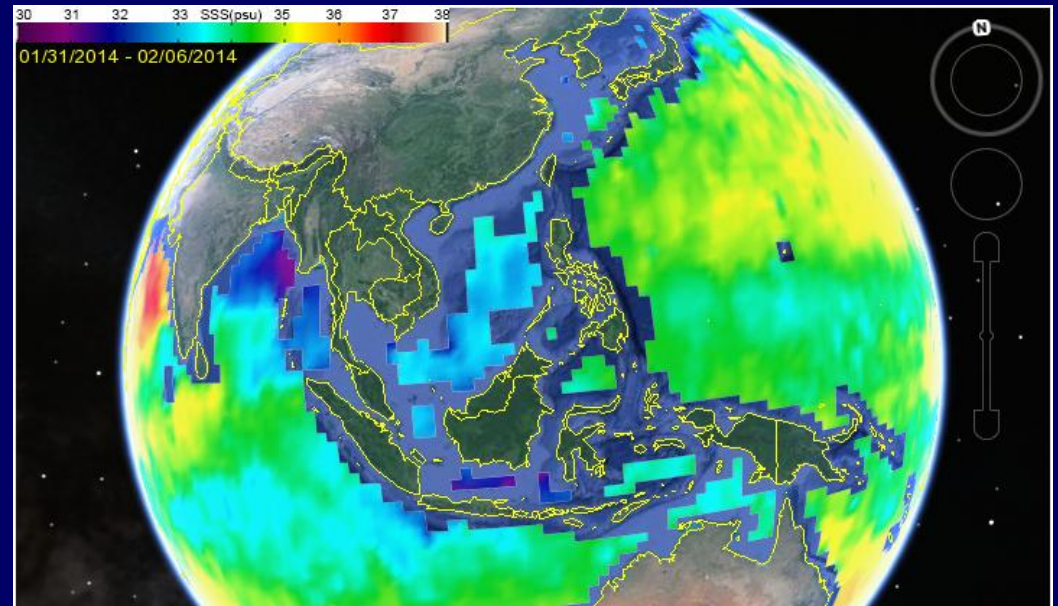


Section 5 (CTD#11-12)

L2: 7 Day (V3.0 CAP)



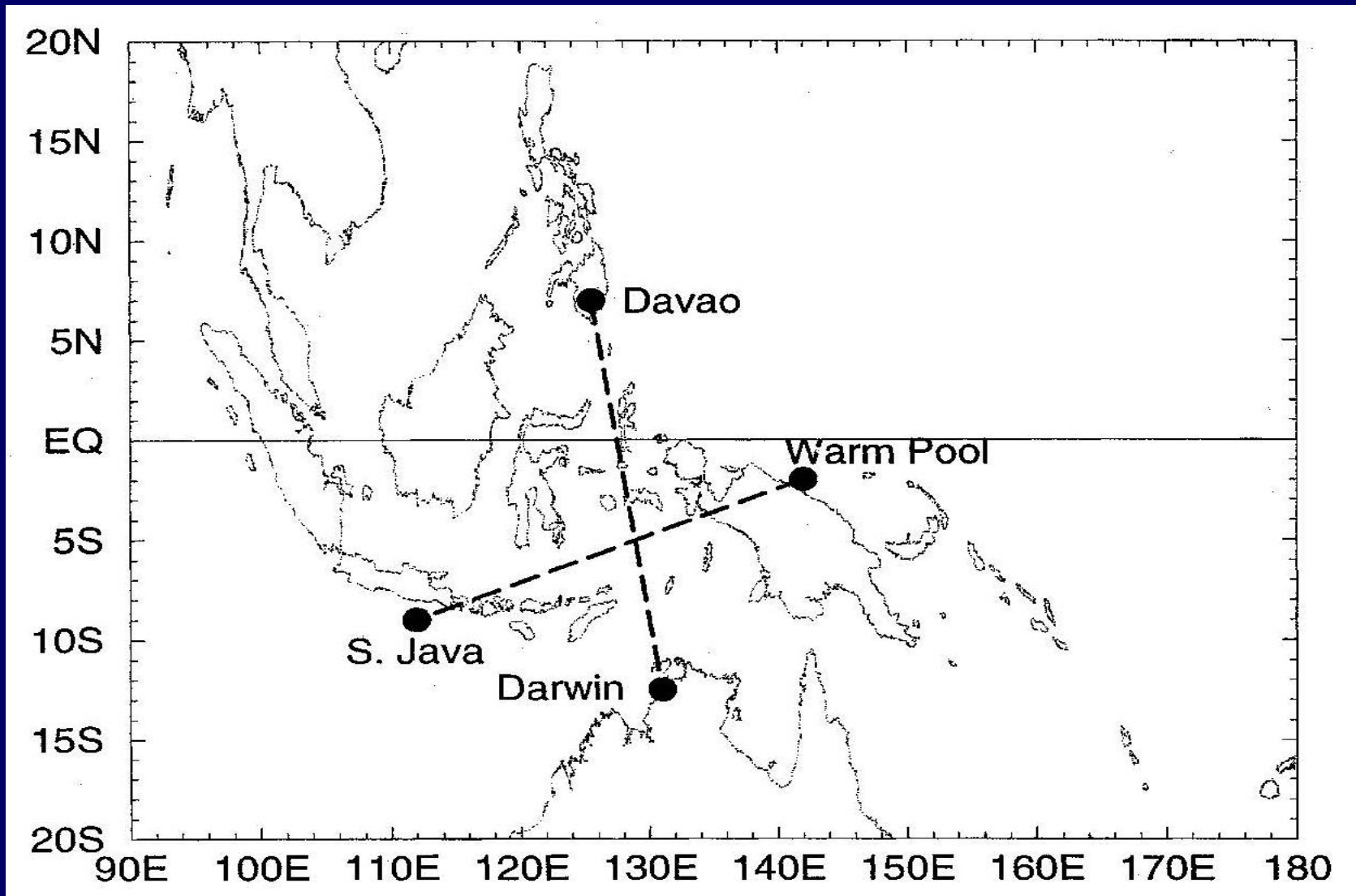
L3: 7 Day (V3.0 CAP)



We plan to use the rainfall
Data from rainfall gauges over
the Indonesian seas

Indonesian Throughflow Proxy

Pressure gradient between Pacific and Indian Ocean



Wyrcki, 1987; Potemra et al., 1997, 2005; Sprintall et al., 2013

Summary

If main ITF is a cup of **Coffee**, the BOB, SCS and Sunda Strait throughflow is the **Creamer**, **the annual mean may be small but the seasonal variability is large & important**, it controls the taste (regional stratification and circulation) into the Indian Ocean

Work Plan

We will use an integrated approach (satellite Aquarius/CAC-D data, in situ measurements and HYCOM numerical model):

to determine the spatial and temporal variability of heat and freshwater fluxes as well as volume transport from Bay of Bengal and South China into the Indonesian Sea and their impacts on the main ITF, regional ocean stratification and circulation

to derive ITF proxy based on satellite altimeters, gravimeters and salinity