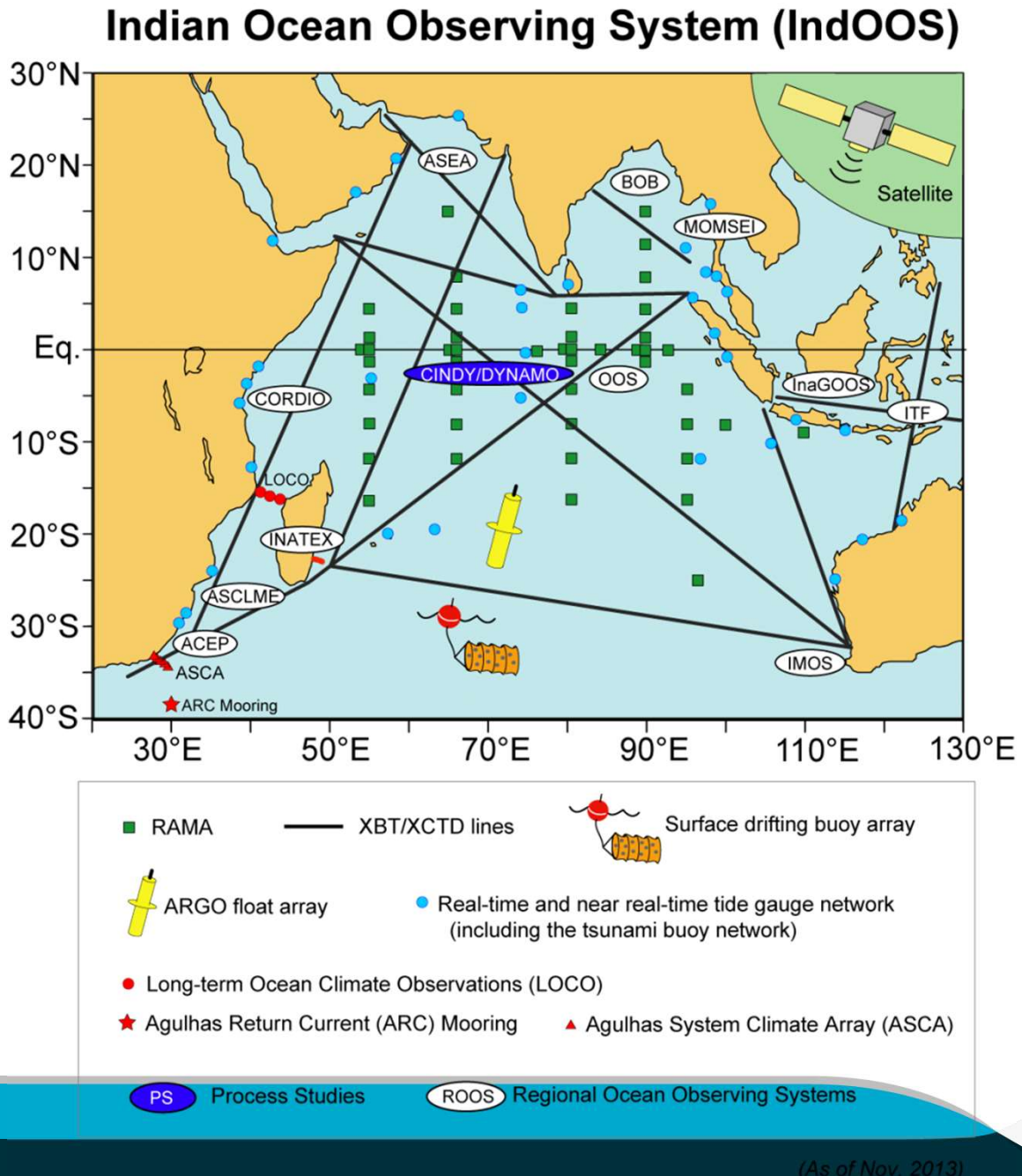
Indian Ocean Observing System (IndOOS) review - XBT network

MING FENG, CSIRO OCEAN AND ATMOSPHERE, PERTH, WESTERN AUSTRALIA, AUSTRALIA

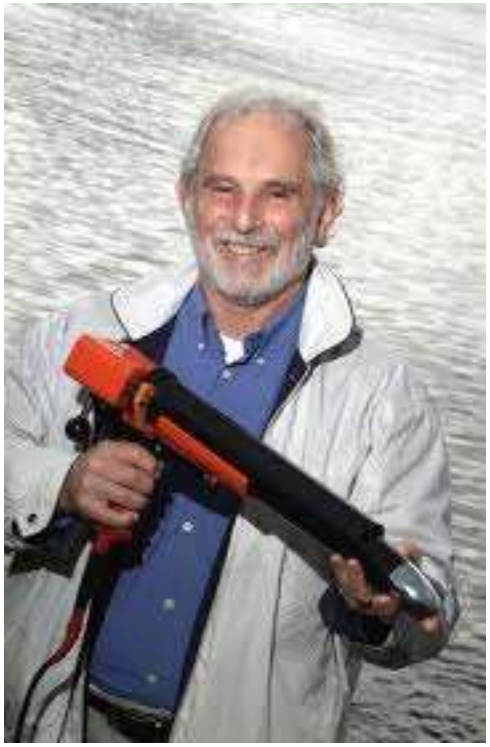
JANET SPRINTALL, SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIFORNIA, USA

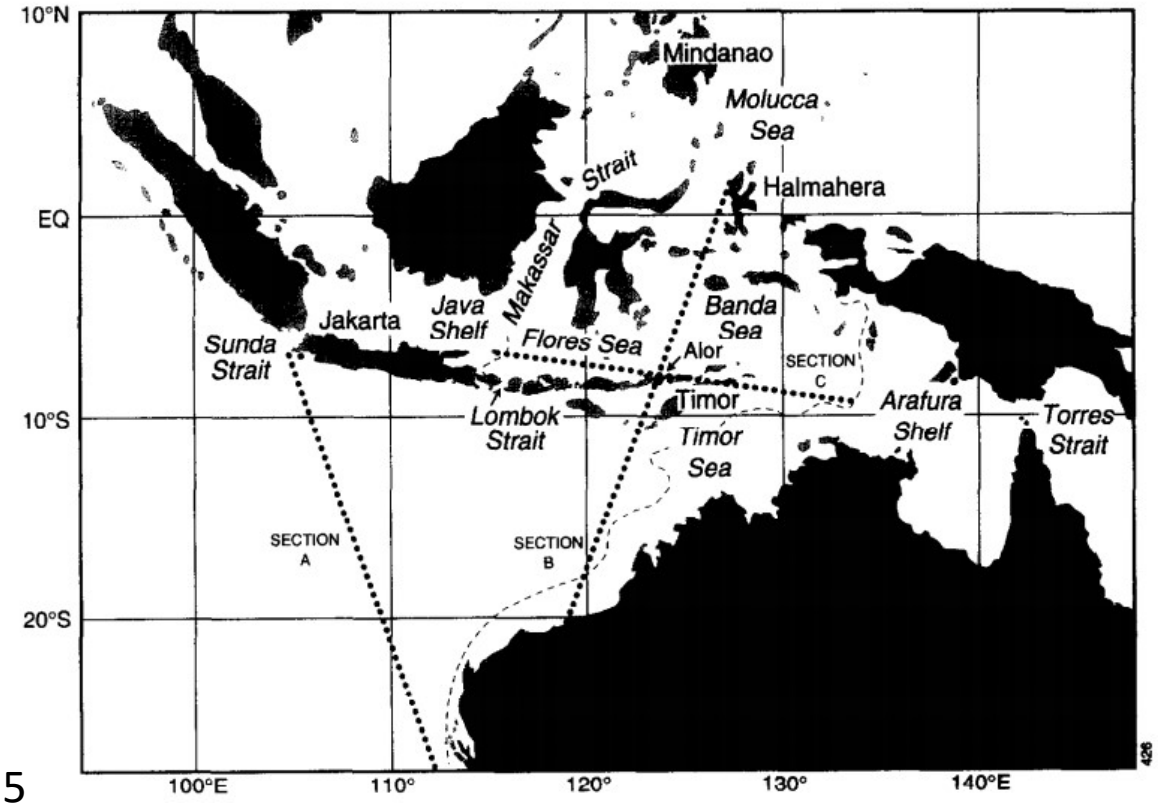
REBECCA COWLEY, CSIRO OCEAN AND ATMOSPHERE, HOBART, TASMANIA, AUSTRALIA

Existing observing systems



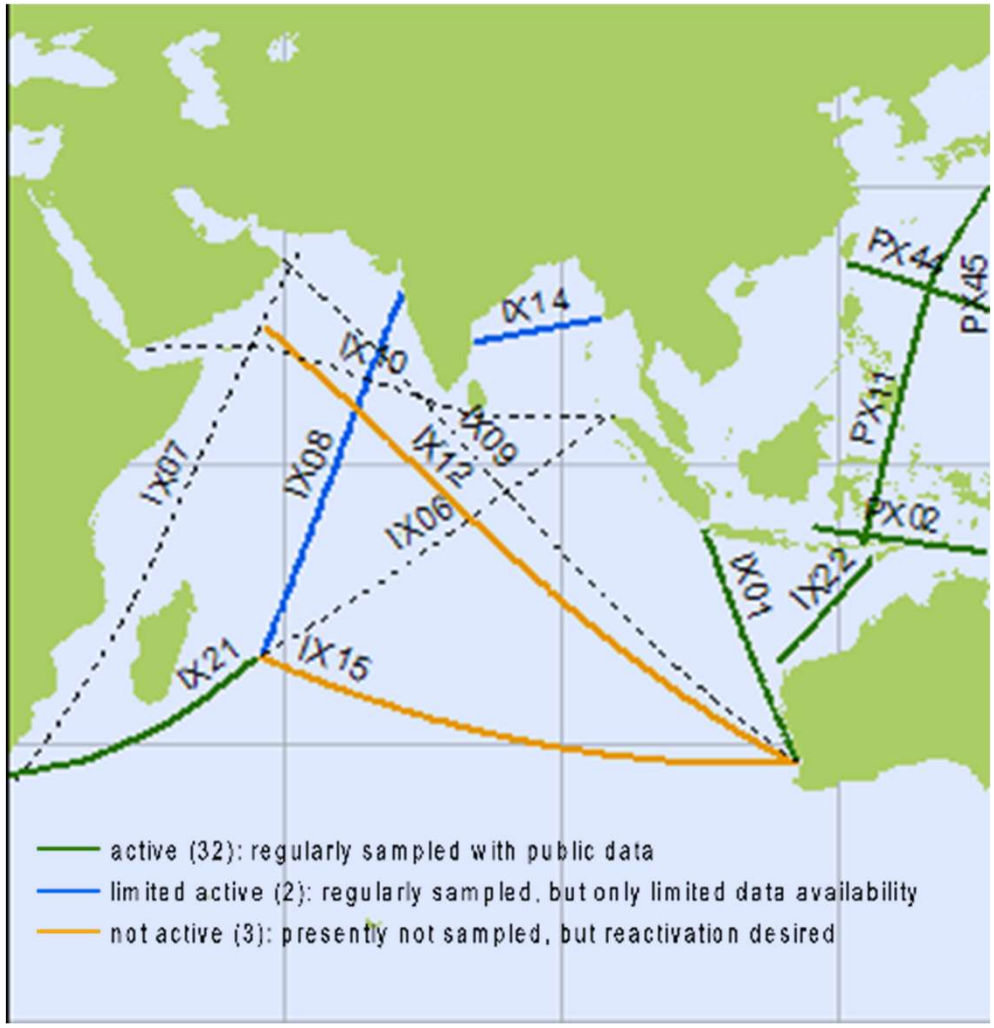
TOGA/WOCE XBT network from 1983



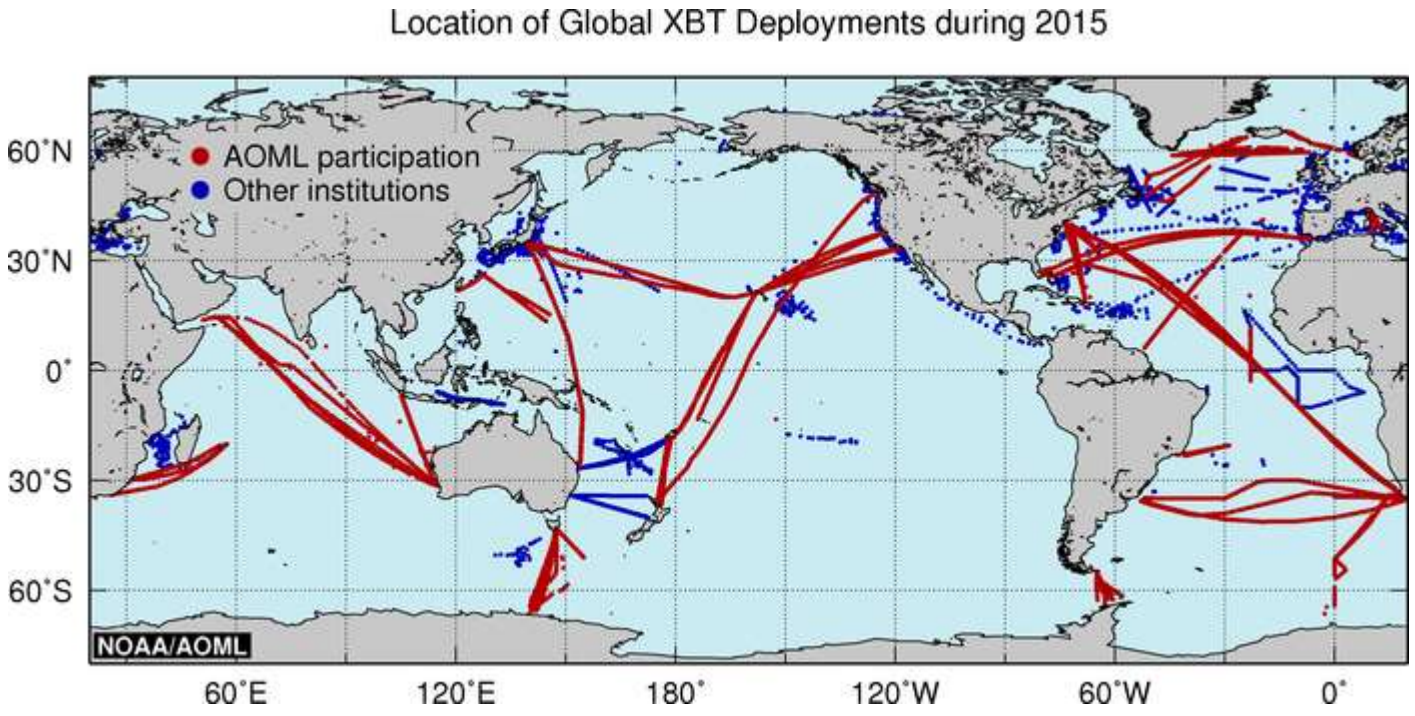


Meyers et al. 1995

XBT lines in operation



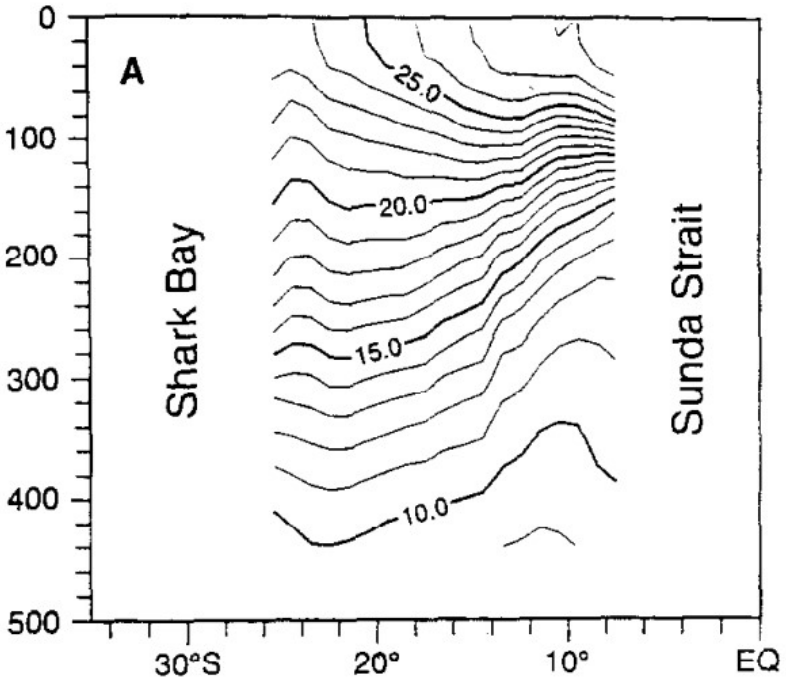
2015 XBT deployments – data availability



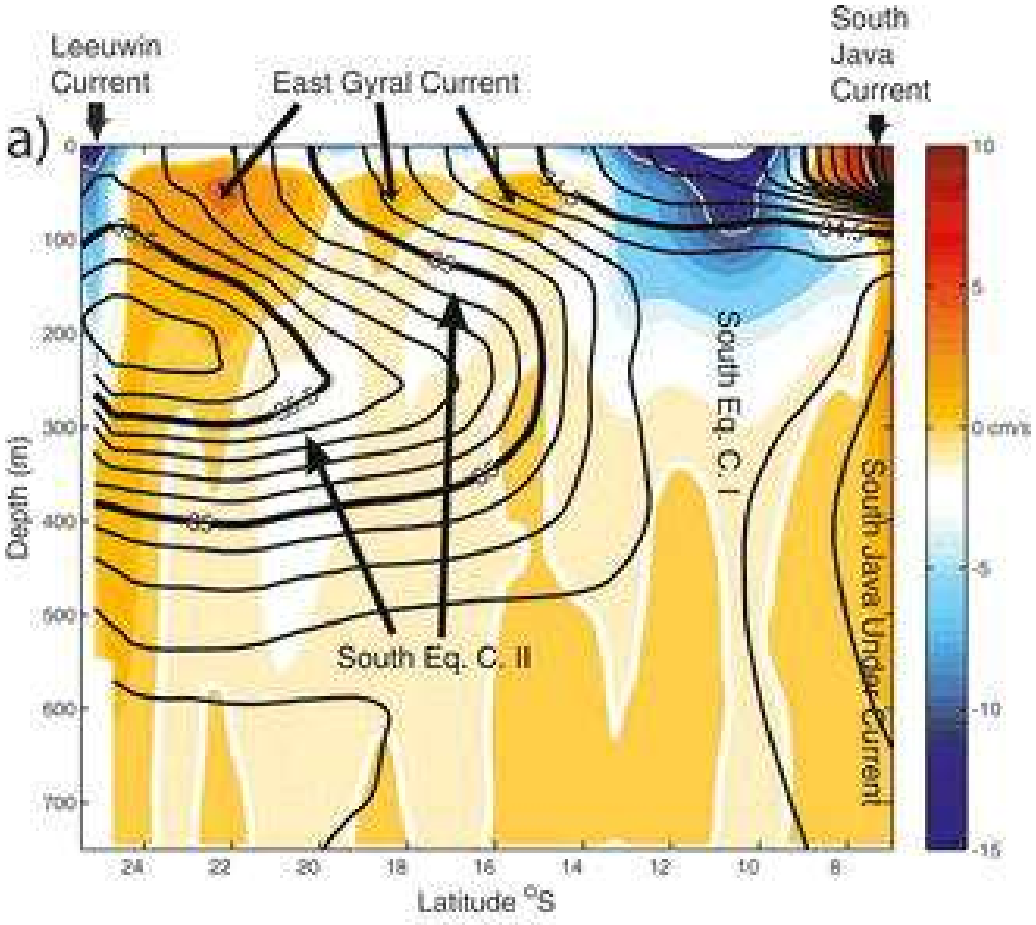
Data availability

Line	Status	Data years	Number of transects per year	Operator
IX01	Active	1983-present	FR and HD, >12	Australia
IX06	Ceased	Infrequent	-	USA
IX07	Ceased	Infrequent	-	France
IX08	Data unavailable	Unknown	-	India
IX09	Ceased	1990-1998	LD	-
IX10	Ceased	1990-1998	LD	-
IX12	Inactive	1986-2015	FR and HD, Up to 20	Australia
IX14	Data unavailable	Unknown	-	India
IX15	Inactive	1994-2013	HD, 4	USA
IX21	Active	1994-present	HD, 4	USA
PX02	*Active*	*1994-present*	*HD, 4*	*Australia*
PX11/IX22	Active	1986-present	FR, Up to 20	Australia

Geostrophic transport of the ITF

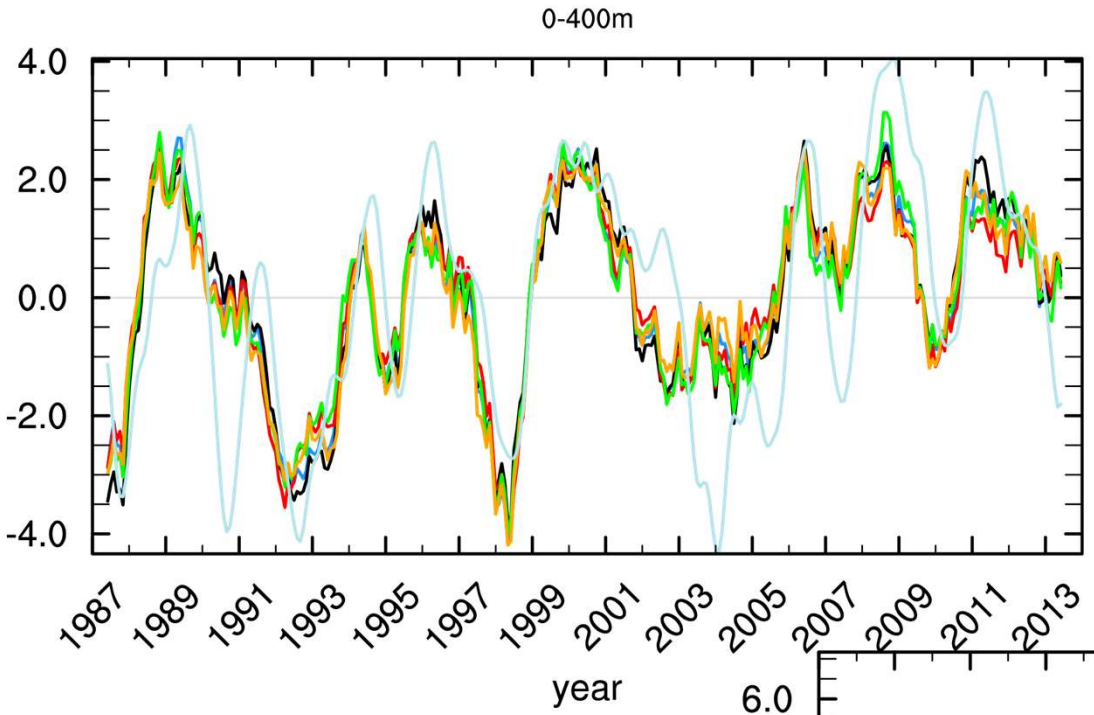


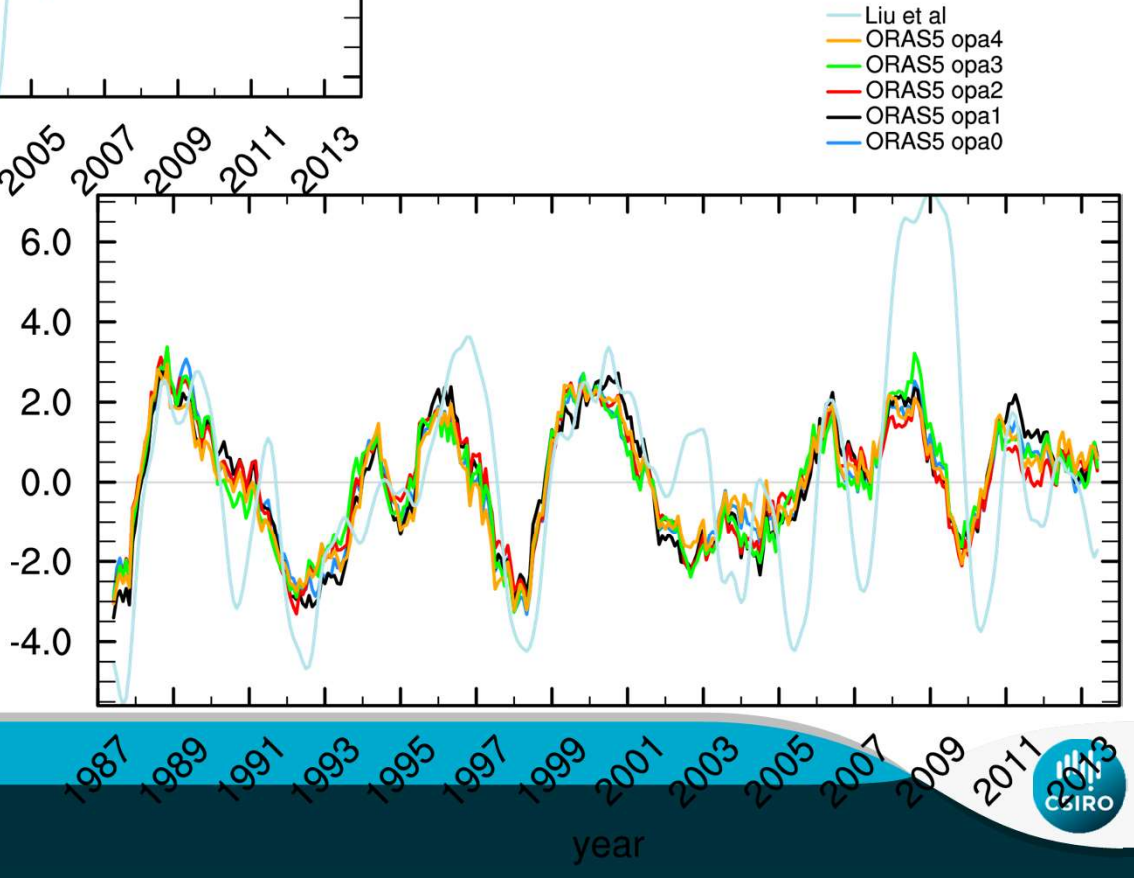
Meyers et al. 1995



Wijffels and Meyers 2008

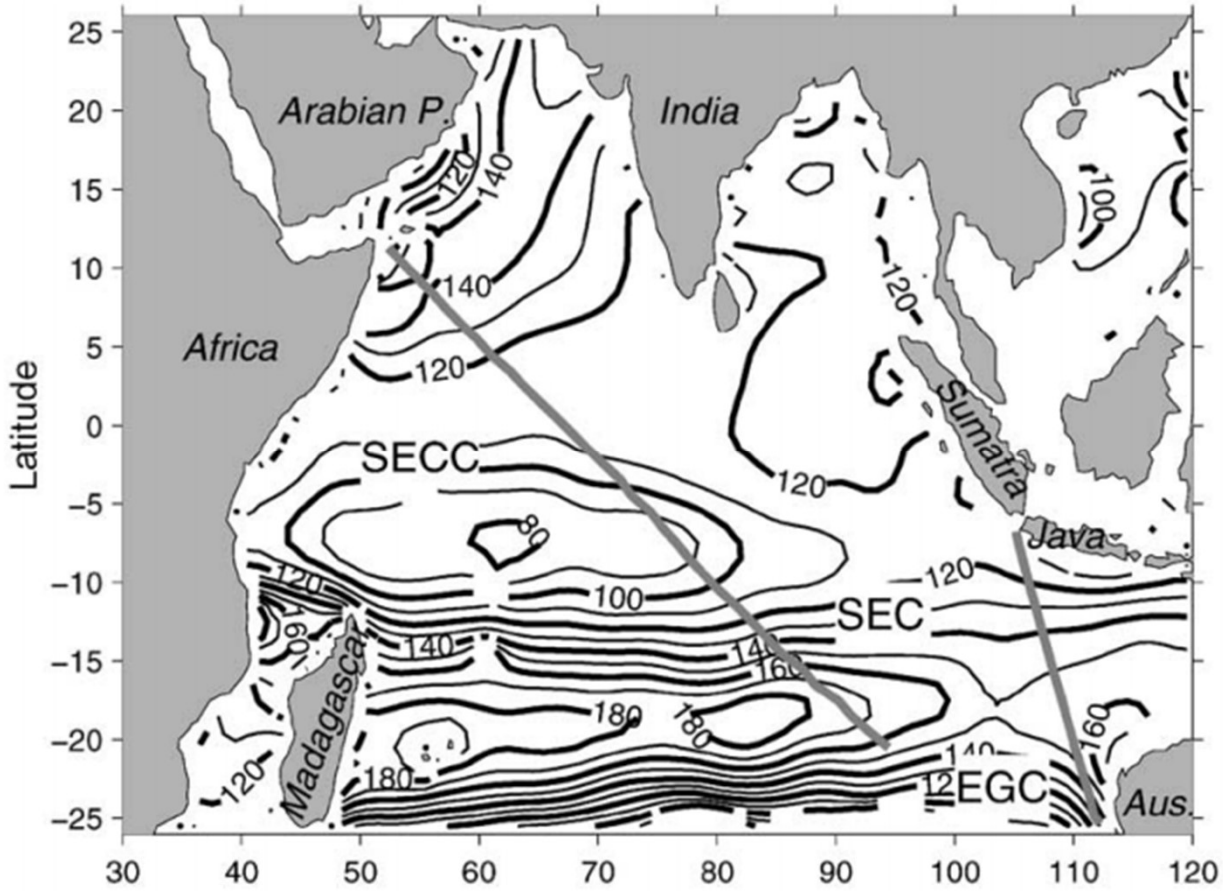
ITF transport compared with ORA-S5





Michael Mayer
ECMWF

IX12 – Somali Current + Seychelles Dome



Feng and Meyers 2003

XBT line and 20C isothermal depth

Recommendations

- Maintain the Frequently Repeated **IX01, PX02** and **IX22** XBT lines: permits monitoring geostrophic mass and heat transport of the ITF into the Indian Ocean;
- Enhance **thermosalinograph measurement** along the **IX01 line** (e.g. Phillips et al., 2005);
- Enhance **Argo deployment density along IX01 XBT line** to better resolve salinity variability related to the ITF;
- Maintain the High Resolution **IX21 XBT line** to monitor the long term changes of the Agulhas Current system.
- Reactivate the Frequently Repeated **IX12 XBT line** to detect long term changes in the tropical thermocline ridge as well as the boundary current system in the Arabian Sea

Recommendations

- Maintain the Frequently Repeated **IX08 and IX14** (Bay of Bengal) XBT lines which are important for model testing, ENSO, Indian Ocean Dipole, and Asian monsoon associated tropical ocean variability and prediction, and heat content and climate change estimates (Smith et al, 2001). Further, encourage the **public release of XBT data** along these two transects that are maintained by India.
- The implementation of automatic **XBT launchers** in the Indian Ocean, such as AXIS – the Automated eXpendable Instrument System (Frantantoni et al., 2017) that is operational in the Atlantic XBT program and the SIO Autolauncher that is operational on US maintained lines in the Pacific and Indian (IX21) Oceans, needs to be more fully explored to alleviate crew intervention on the SOOP vessels (Andres et al., this report).
- The installation of **ADCP velocity** measuring instruments on ships that participate in the XBT network should be encouraged where possible. Combined with simultaneous velocity measurements from hull-mounted ADCPs, this could provide a powerful way to monitor the upper ocean heat transport across key transects, such as the ITF, the Agulhas Current, and across the southern Indian Ocean (Beal, this report).