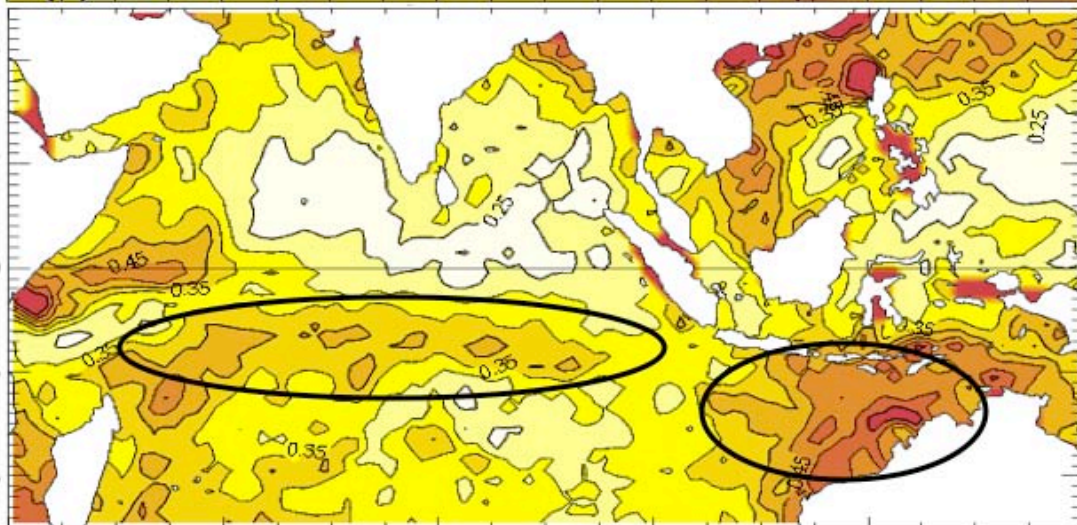
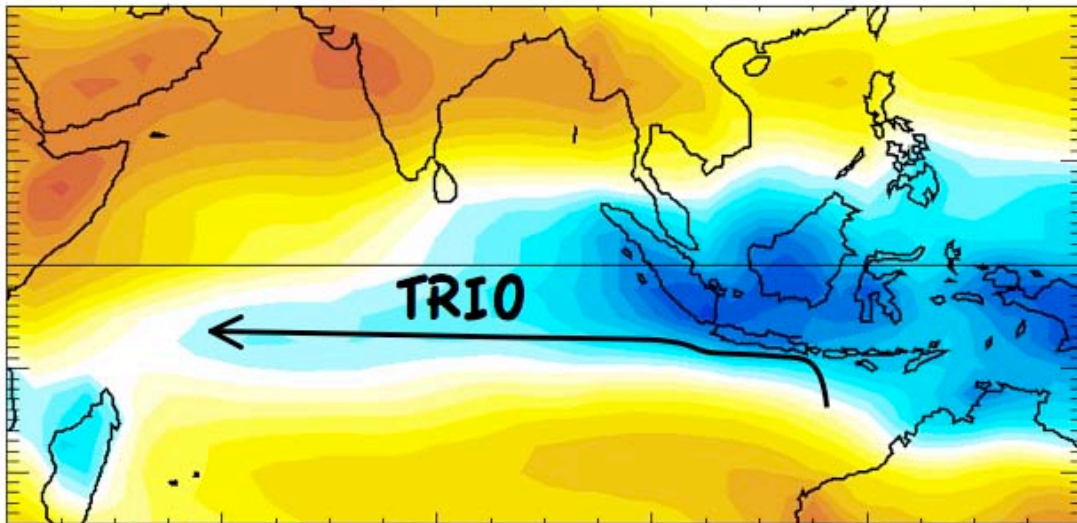


# *TRIO: Thermocline Ridge of the Indian Ocean*

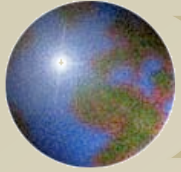


**Jérôme Vialard**  
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[jv@locean-ipsl.upmc.fr](mailto:jv@locean-ipsl.upmc.fr)

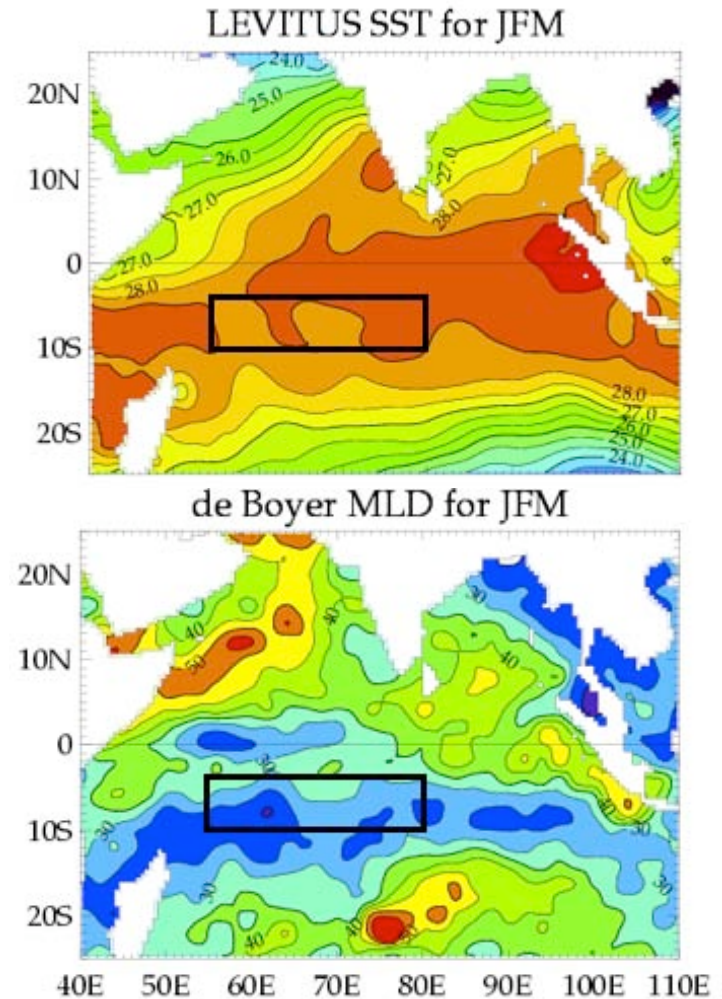
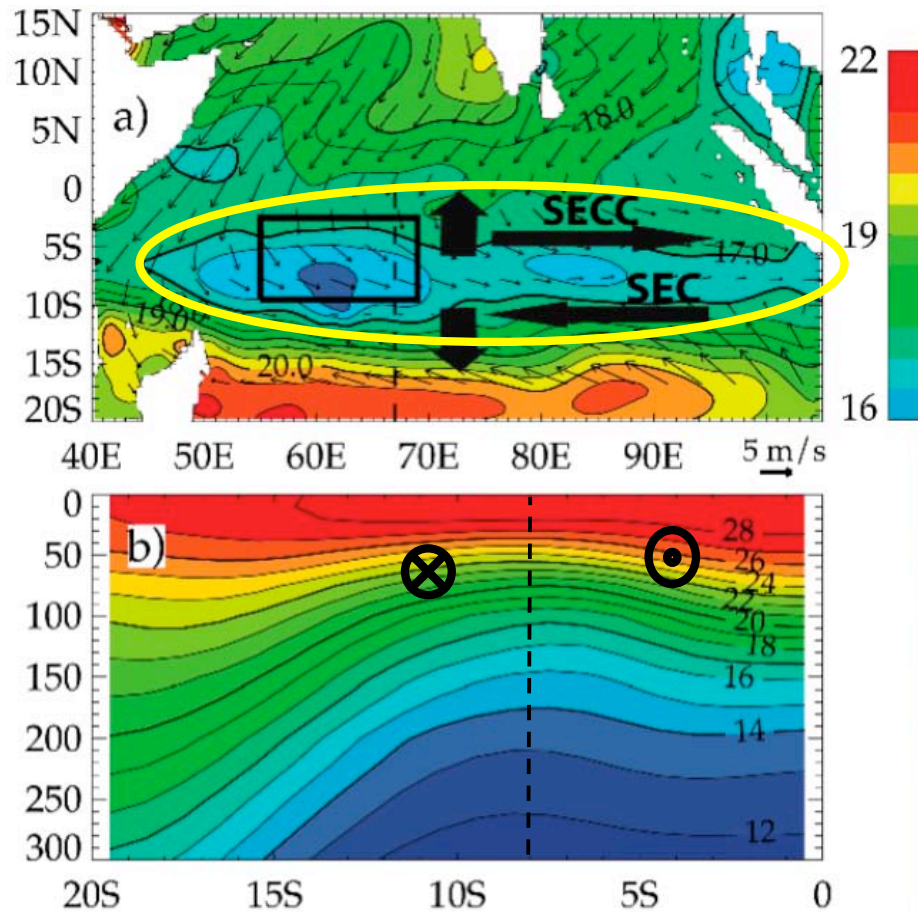
**Jean-Philippe Duvel**  
**LMD**

[jpduvel@lmd.ens.fr](mailto:jpduvel@lmd.ens.fr)



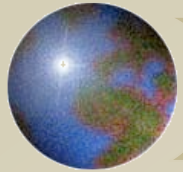
# The thermocline ridge and its phenomenology

## The Seychelles-Chagos thermocline ridge



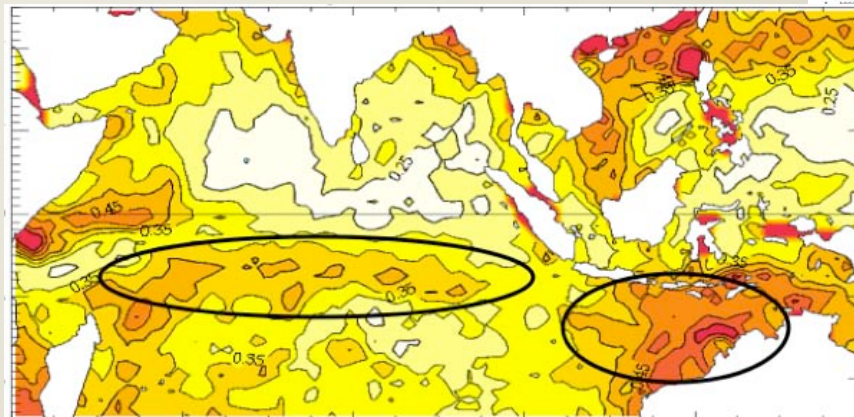
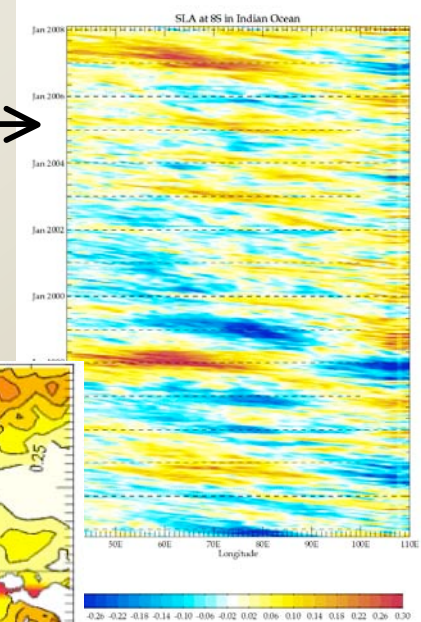
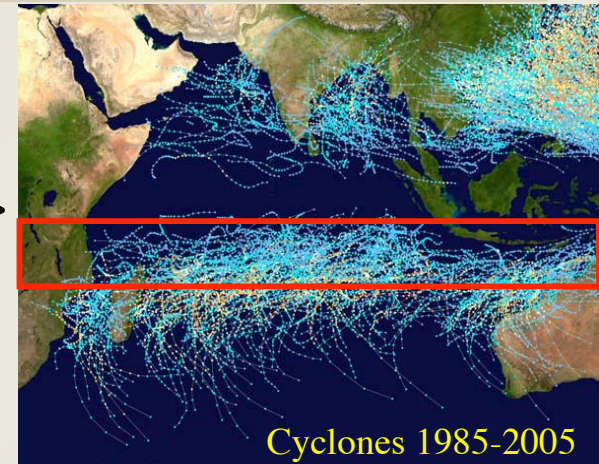
**High SST, shallow thermocline and mixed layer => strong Air-Sea coupling**

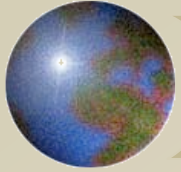
(Vialard et al. 2008a; in press in BAMS)



# The “SCTR” and its phenomenology

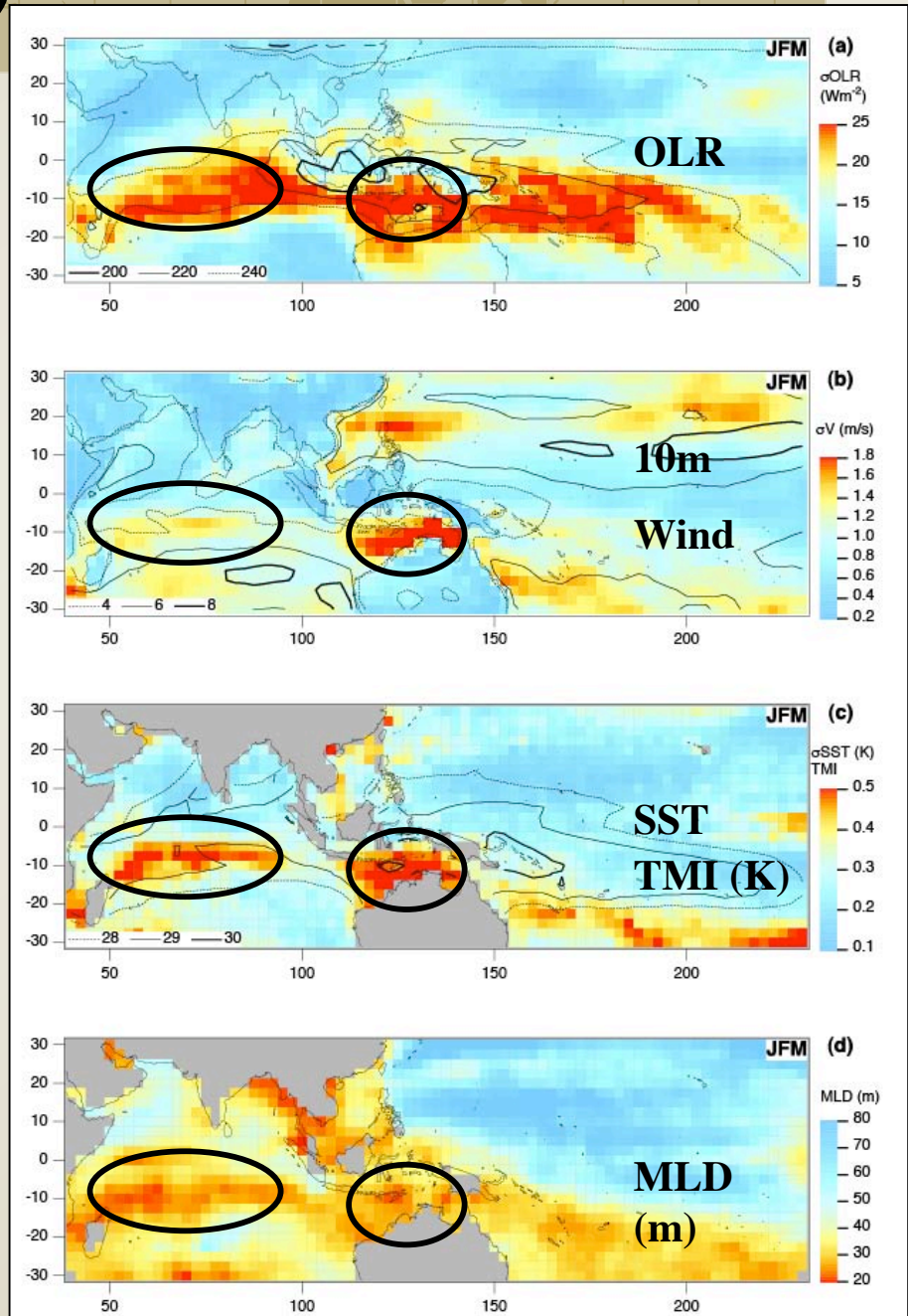
- Generation region for cyclones
- Strong SST signature to MJO at intraseasonal timescale
- Interannual variability: signature of IOD / ENSO with strong climatic consequences

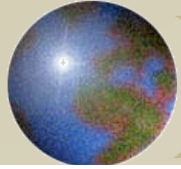




# SST signature of MJO

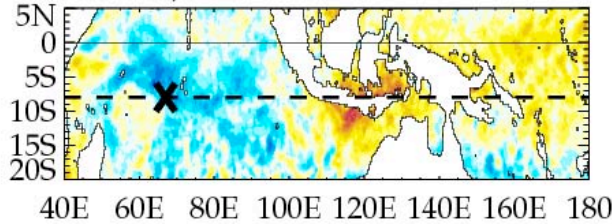
- Statistical study: **Duvel and Vialard (2007)**
  - Two regions of largest SST signature of the MJO in JFM are the thermocline ridge and North-Western Australian Basin



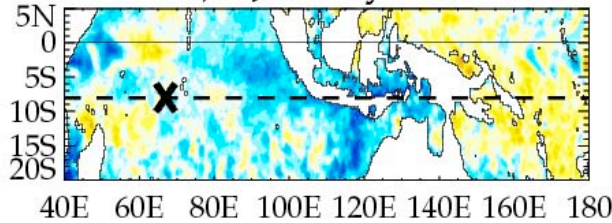


# SST signature of MJO in Thermocline Ridge

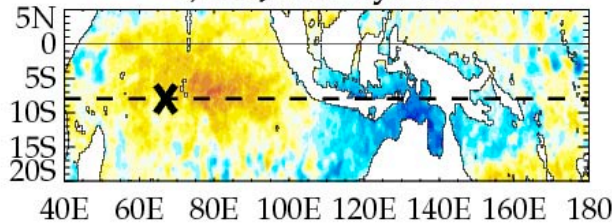
a) 18 December 2007



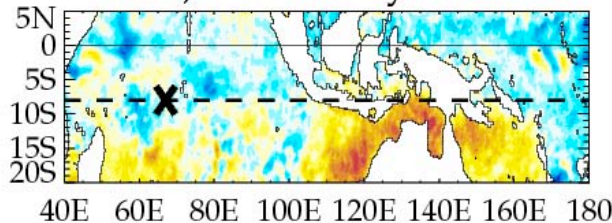
b) 3 January 2008



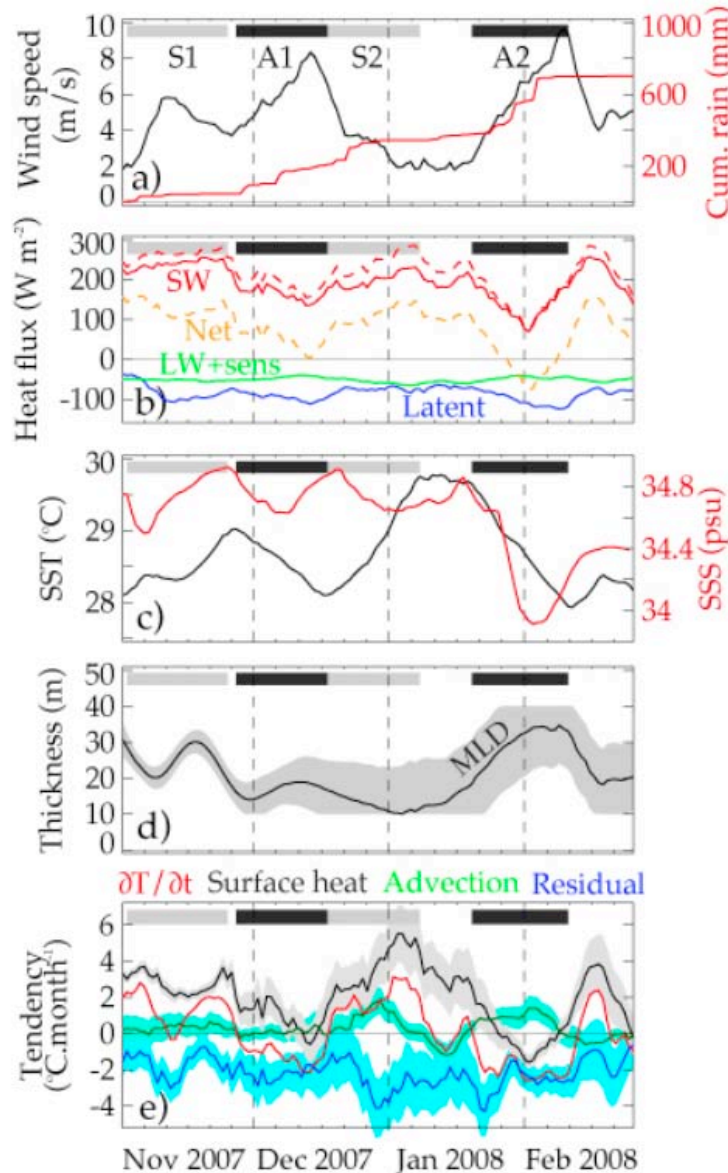
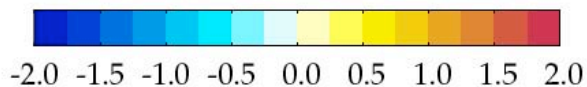
c) 15 January 2008



d) 07 February 2008

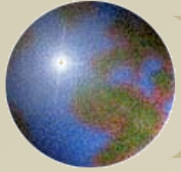


*Intraseasonally filtered SST*



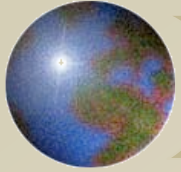
Cirene/RAMA provided first insights in the processes of the upper ocean response, but many questions remain unanswered.

From (Vialard et al. 2008b) (GRL, in press)



## *The TRIO project*

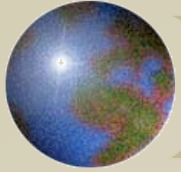
- ✿ TRIO: one framework to analyse the Cirene data and to address the science questions related to the thermocline ridge
  - ▣ **Modelling AND past observations**
- ✿ TRIO: a cruise in early 2011, coordinated with other scientific programs
- ✿ Science plan draft available at:  
<http://www.lmd.ens.fr/jpduvel/trio/>
- ✿ We welcome collaborative offers on either the cruise or the lab work!



## *TRIO: Thermocline ridge of the Indian Ocean*

### ✚ TRIO: three central timescales

- ✚ **Interannual** (IOD / ENSO signature in SCTR)
  - ✚ **Intraseasonal** (coupling at MJO scale)
  - ✚ **Synoptic** (tropical depressions, storms and cyclones)
- 
- ✚ ...and their interactions: e.g. impact of interannual variability on the MJO, but also influence of other timescales (e.g. diurnal)



## *Future field campaigns*

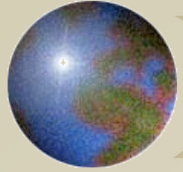
### ● **TRIO « Thermocline Ridge of the Indian Ocean »**

■ Early 2011

■ Link with other international programs:

- seek blessing from IOP & AAMP
- RAMA array (MJO SST signature, interannual variability)
- french SWICE project (cyclones)
- CINDY cruise (K. Yoneyama) & other Japanese cruise along 8°S in end of 2011
- Megha-Tropiques Indo-French satellite (study of convection)
- AltiKa Indo-French altimeter (clear signals along 8°S)
- Link SMOS satellite (Salinity front along 8°S)



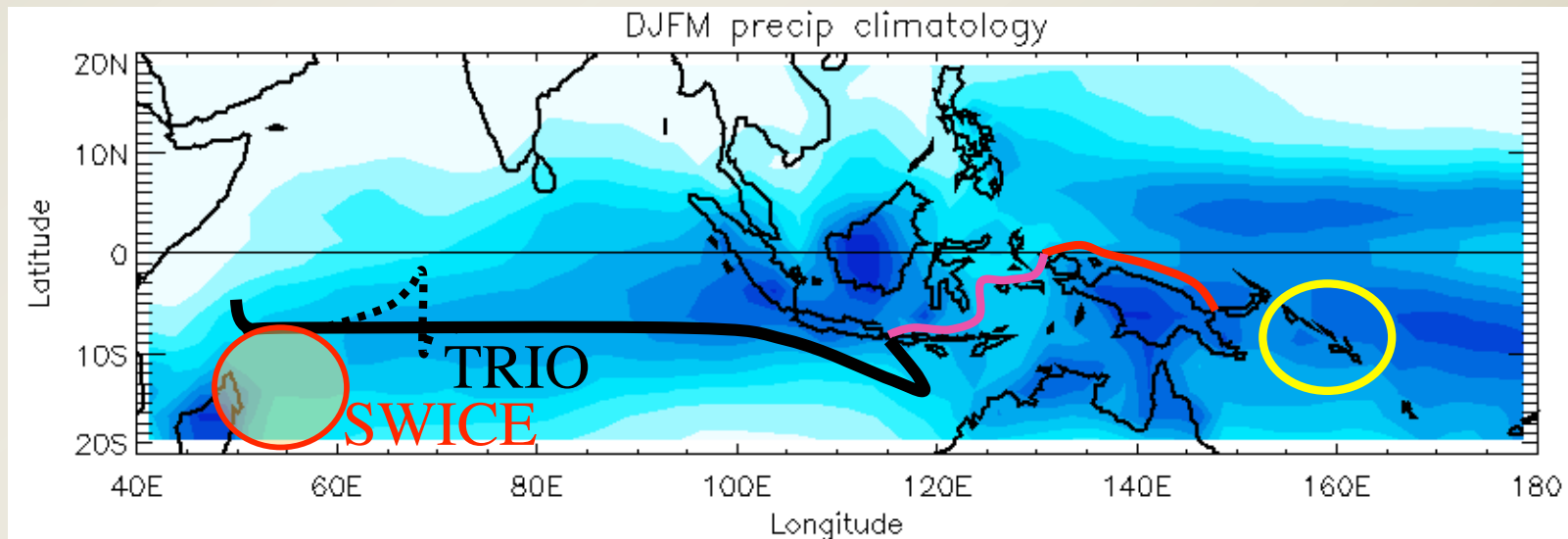


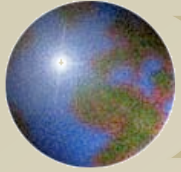
# The TRIO cruise



## Why early 2011?

- R/V Atalante will be in western Pacific in late 2010
- Already plans for oceanographic cruise near Papua-New Guinea-Indonesia and in throughflow in late 2010
- Swice (cyclone targeted field campaign) in early 2011
- Contribution to RAMA array (target date for full implementation: 2012)
- Japanese effort in the Indian Ocean in 2012

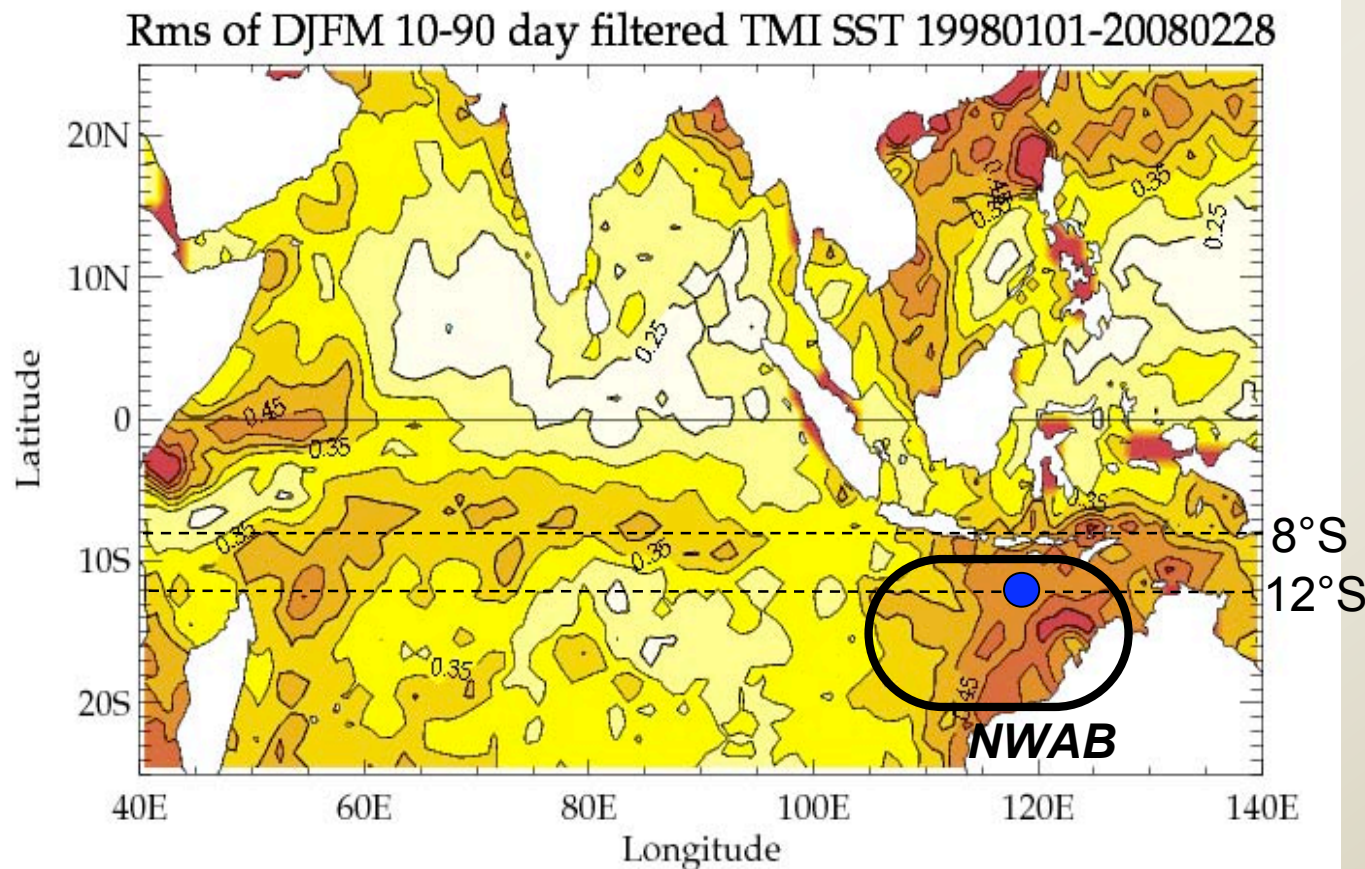




# Future field campaigns

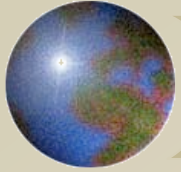


## ● A mooring in North Western Australian Basin



Region of strong MJO air-sea interactions, strong diurnal cycle, strong baroclinic tides

Mooring as part of process experiment (~1-2 years) and then seek blessing of IOP (easily accessible: Australia, Indonesia)

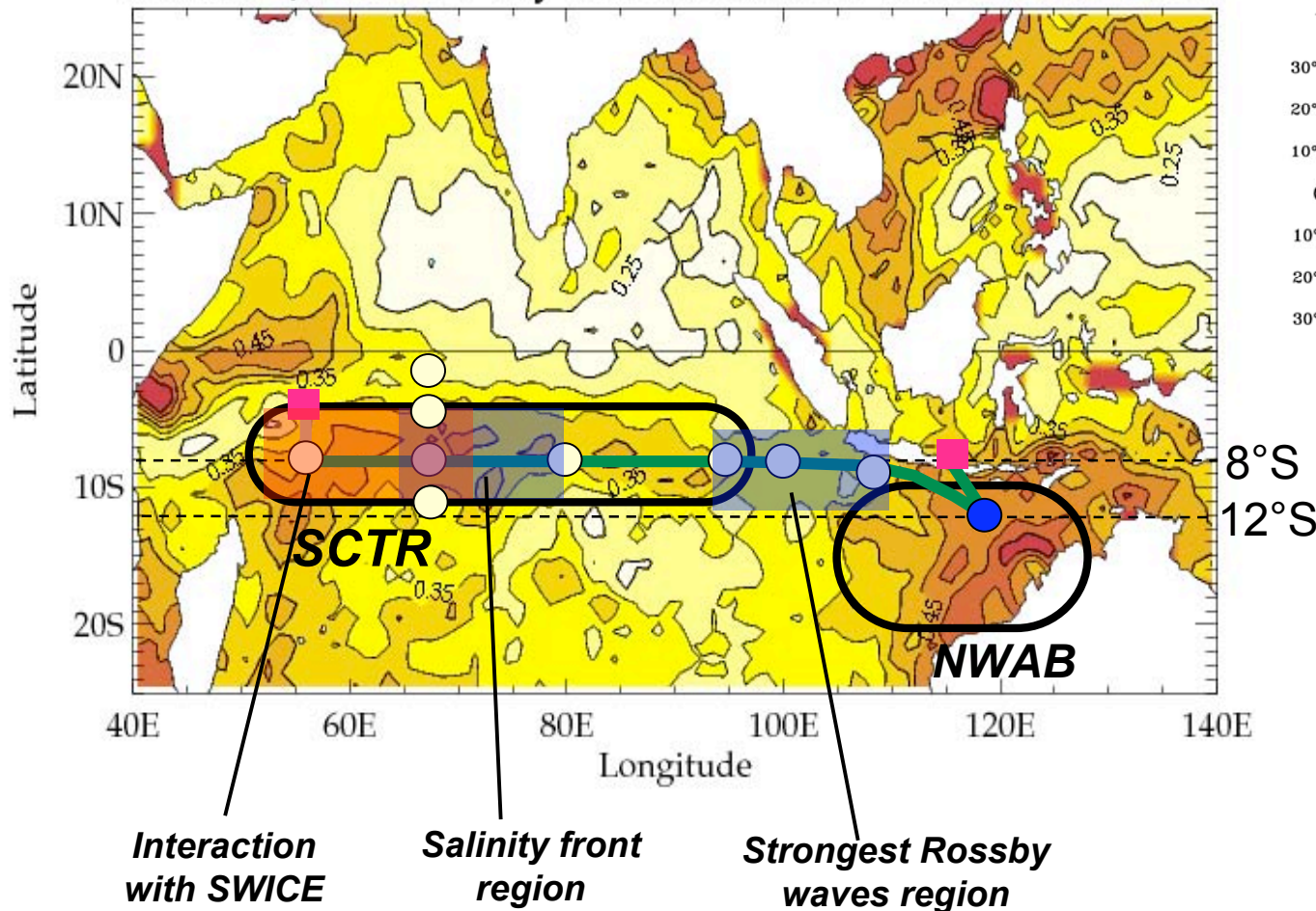


# Future field campaigns

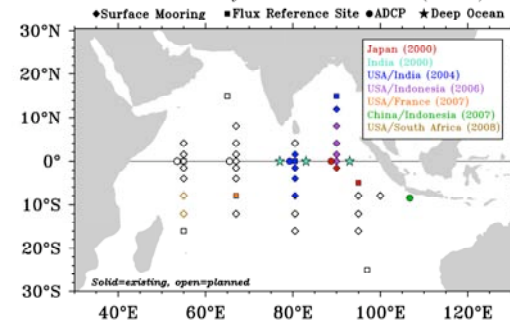


## TRIO: overview & contribution to RAMA

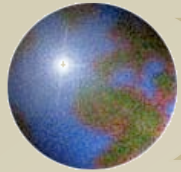
Rms of DJFM 10-90 day filtered TMI SST 19980101-20080228



Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA)



Cruise duration: ~46 days



# Future field campaigns



- TRIO: interaction with CINDY and SWICE
  - 2 Japanese cruises in late 2011
  - SWICE: South-West Indian ocean Cyclone Experiment

