DYNAMO/CINDY Sounding Network

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JAMSTEC

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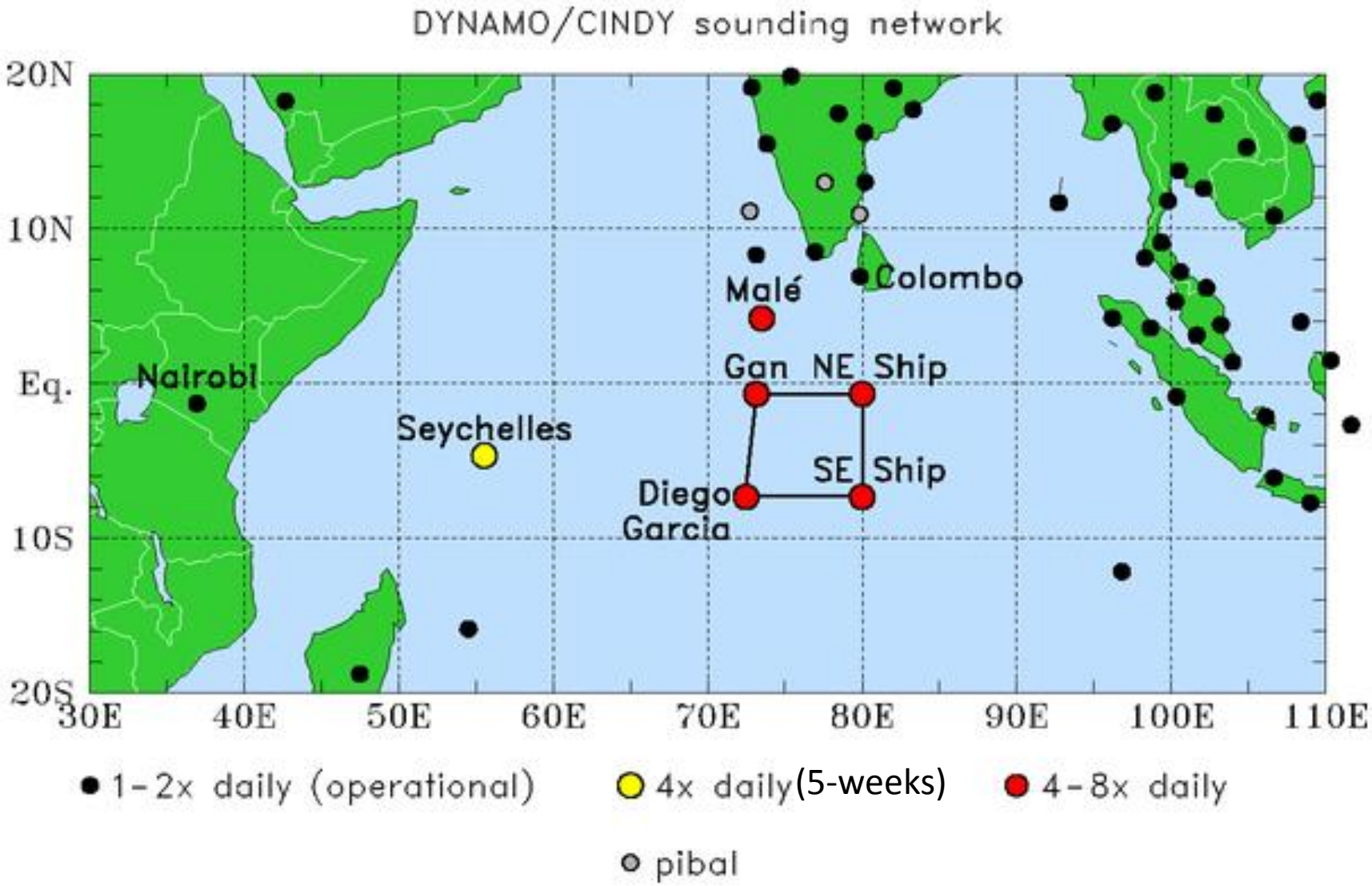
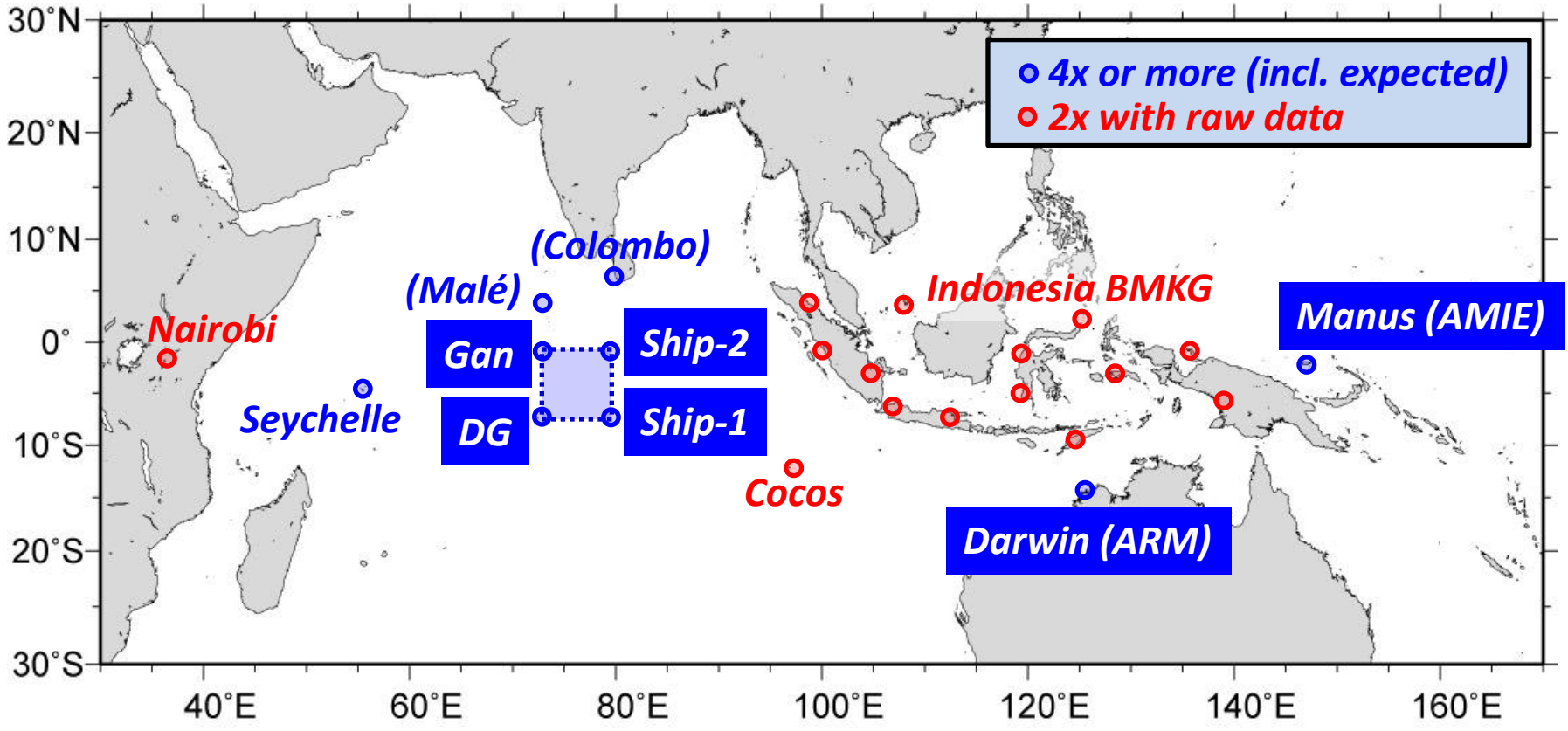
DYNAMO/CINDY Extended Sounding Array

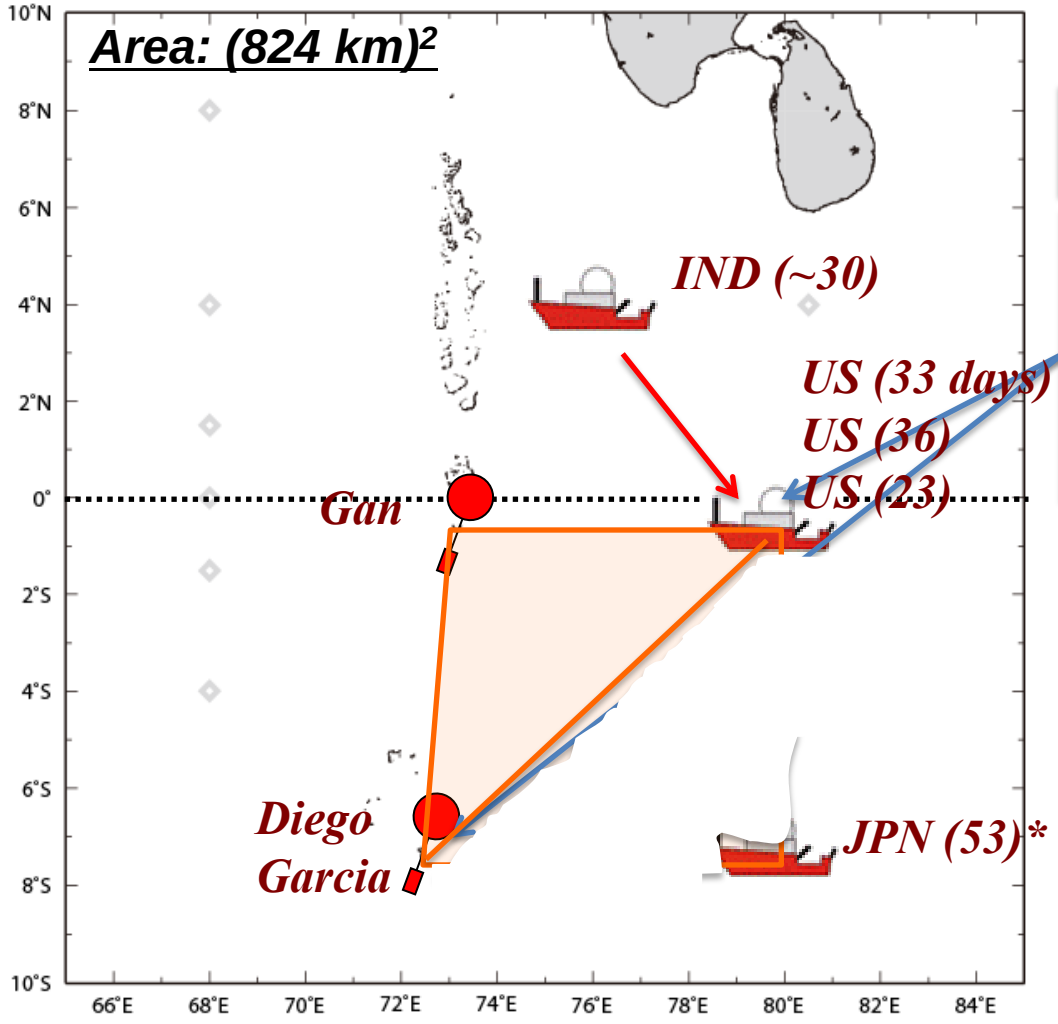


Sounding sites with (something) special on CINDY/DYNAMO



Enhanced sounding network extends over 120 degrees of longitude – SOP, IOP, EOP

DYNAMO Sounding Array



** Excludes 6-day port call*

Array beginning 29 Nov

Integrated Sounding Systems (ISSs) at Diego Garcia and Revelle

Frequency

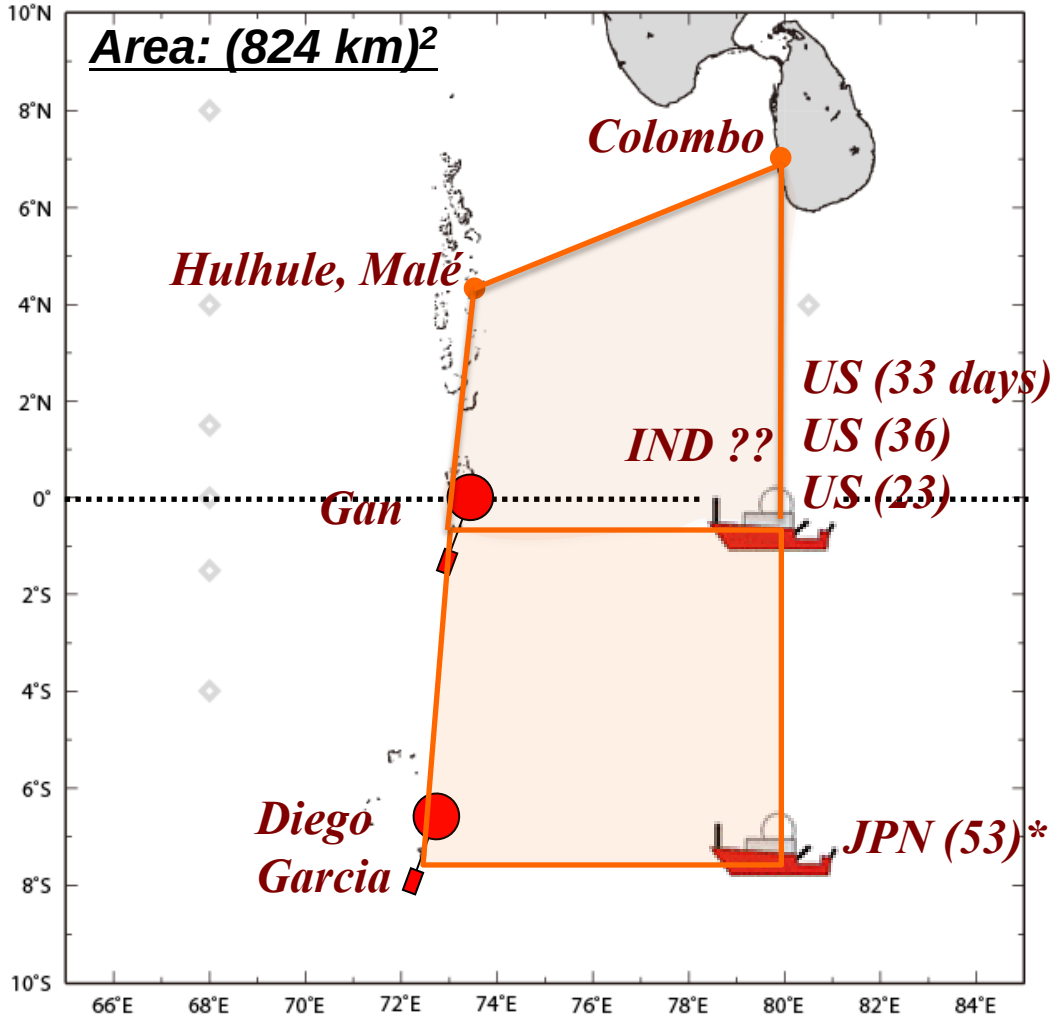
Gan Island: 8/day throughout EOP

Other sites:

SOP: 8/day (1 Oct – 28 Nov?)

IOP: 4/day (29 Nov – 3 Jan?)

DYNAMO Sounding Array



Proposed Extension of the Sounding Network October - November

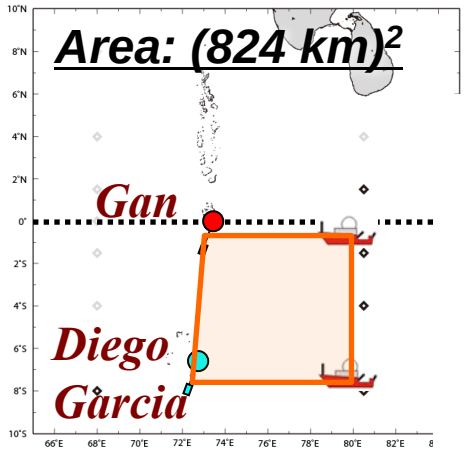
Frequency

Malé: 4/day Oct-Nov (NCU, CSU, NSF?)

Colombo: 4/day Oct-Nov, 2/day Dec? (Japan, WMO?)

** Excludes 6-day port call*

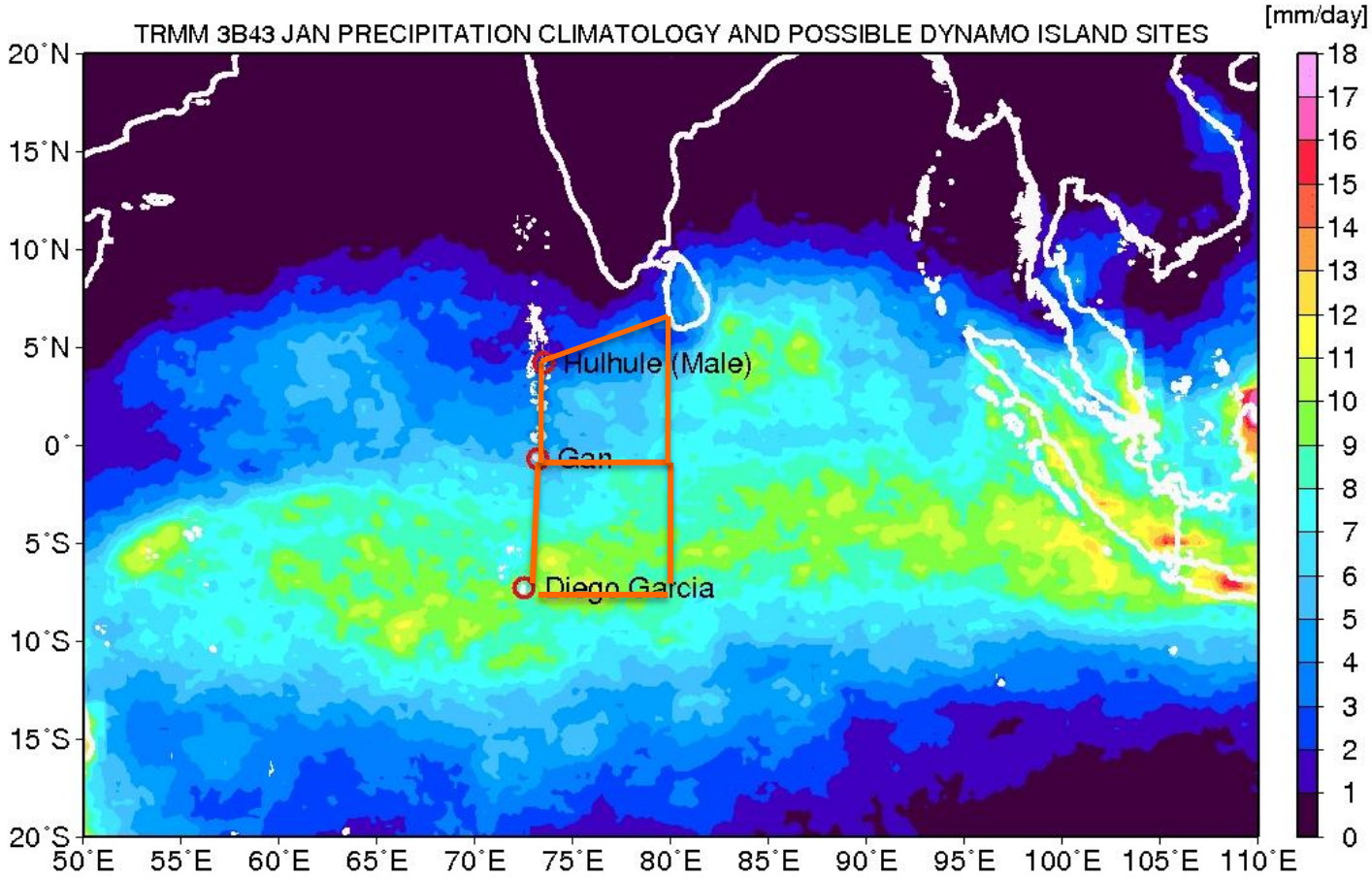
Rectangular Array



Area of southern quadrilateral: 75% greater than TOGA COARE IFA

10-year TRMM Precipitation climatology

(from Socorro Medina)



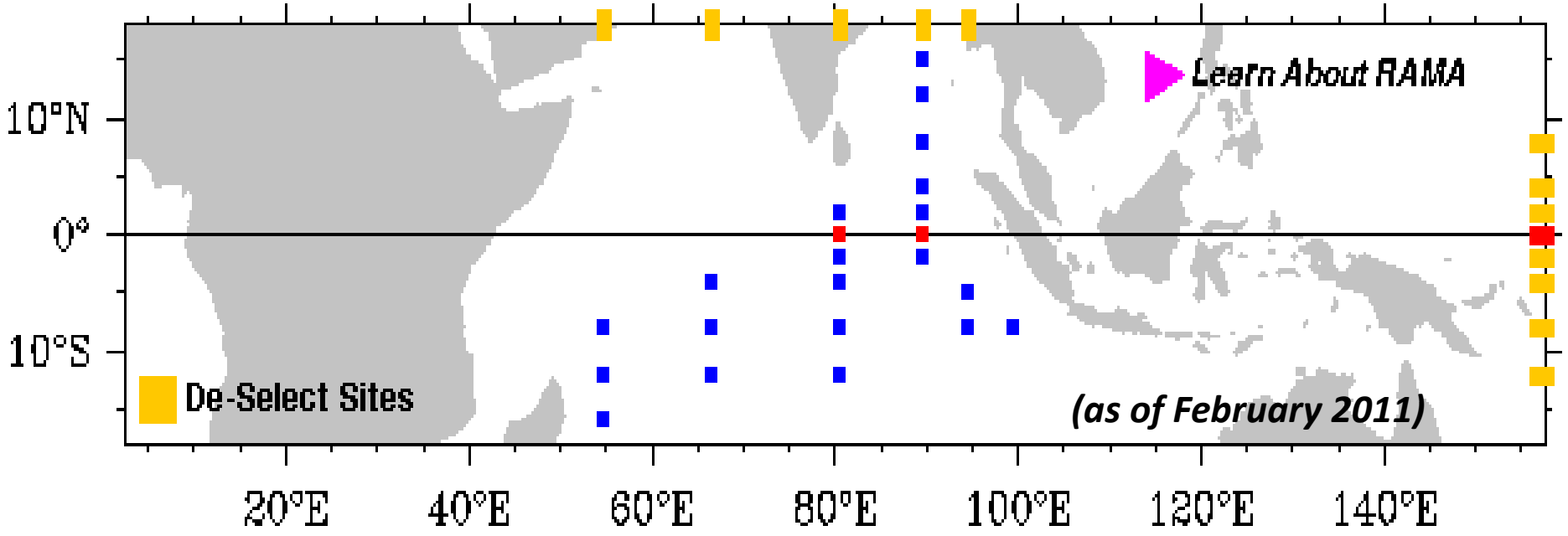
Land Soundings and Supporting Observations

Instrument /measurement	Gan	Diego Garcia	Nairobi	Malé/ Colombo	Seychelles
Operational GPS sondes (12 hr regularly)	H2 gener-ator out		12 hr, IOP	6-12 hr, IOP	6 hr, 5-wk; then 12 hr
Sonde type, software, version	Vaisala RS92	Vaisala RS92, NCAR GAUS	Vaisala RS92, MW15	Vaisala RS92/Mei-sei RS-06G	Vaisala RS92, MW31
ISS:		**IOP**			
GPS sondes		3 hr, SOP 6 hr, IOP			
rain gauge		1 min			
10-m surface met		1 min			
915 MHz wind profiler		30-min winds			
RASS		30 min			
GPS water vapor		10 min			
ceilometer					
AMF2:	**EOP**				
GPS sondes	3 hr				
rain gauge	10 min				
10-m surface met	10 min				
micropulse lidar	10 min				
microwave radiometer	20 sec				
ceilometer	20 sec				
915 MHz wind profiler	10min				

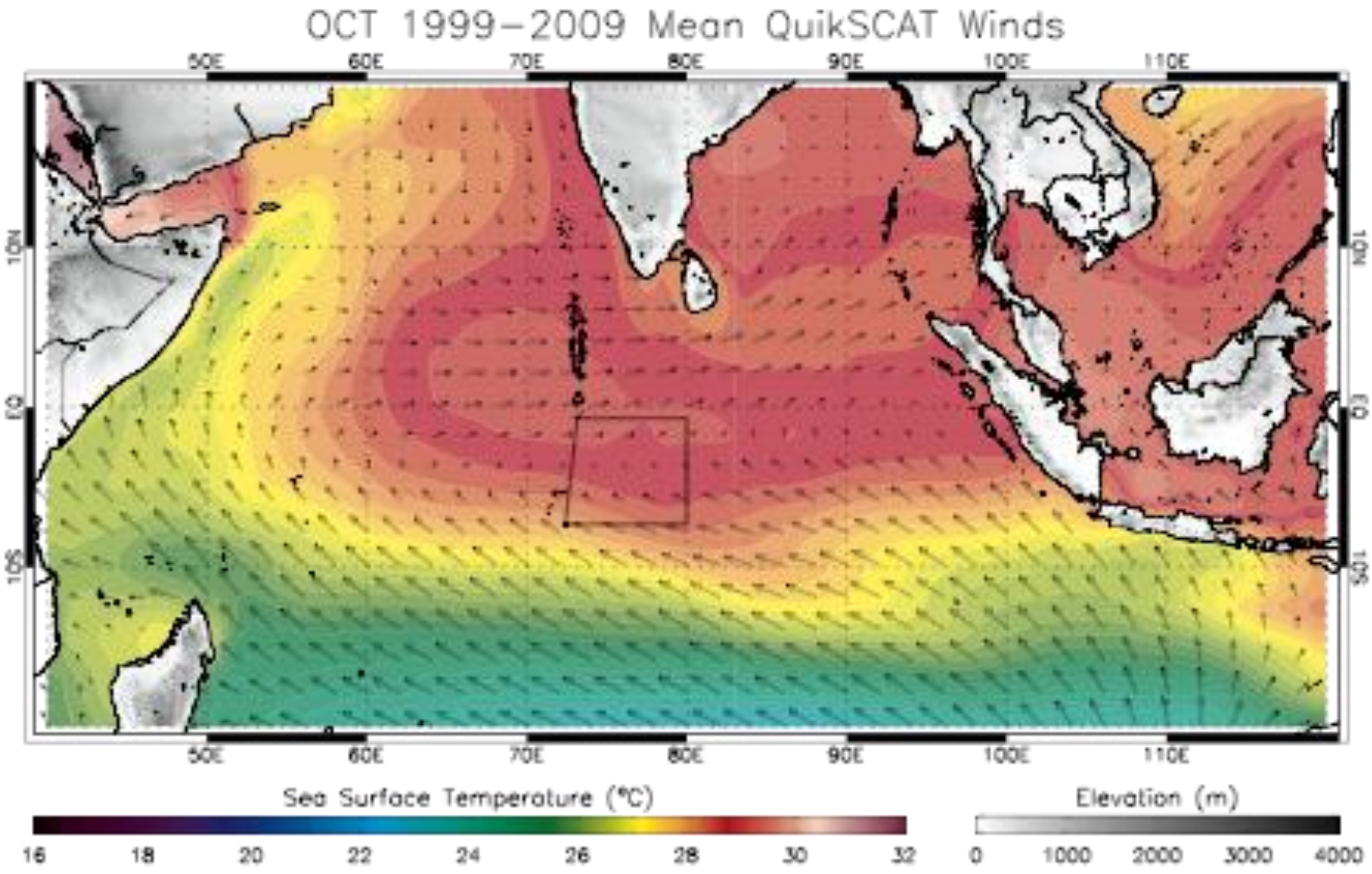
Ship Soundings and Supporting Observations

Instrument/ measurement	*R/V* Revelle	*R/V* Mirai	*R/V* Sagar Kanya
radiosondes	3 hr (SOP) and 6 hr (IOP)	3 hr	6 hr
sonde type, software, version	Vaisala RS92, NCAR GAUS	Vaisala RS92, MW31, v3.64	Vaisala RS92
surface met/bulk flux	1 min	10 min	1 min
turbulent flux	10 min	10 min	
scanning Doppler lidar (HRDL)	20 min (wind, turbulence, and aerosol backscatter intensity); 10 min (clouds, precipitation, vertical velocity)		
Mie-scattering Lidar	Continuous	Continuous	
wind profiler (915 MHz)	30 min winds		
water vapor radiometer	20 sec		
Ceilometer		1 min	
Solar/IR radiometer	10 min	10 min	
GPS water vapor	10 min	10 min	10 min
video sondes		15 times	
ozone sondes		15 times	
SST		10 min	

Extension of Surface Met and Flux Observations over Larger Domain



- *Unlike the western Pacific warm pool, DYNAMO/CINDY is in a region of SST gradients and boundary layer air mass transformation*
- *Use dropsonde missions to extend mapping of boundary layer variability and its role in convective development (??)*


OCT 1999–2009 Mean QuikSCAT Winds
50E
60E
70E
80E
90E
100E
110E
10N
EQ
10S
Sea Surface Temperature (°C)
16
18
20
22
24
26
28
30
32
Elevation (m)
0
1000
2000
3000
4000

Sounding Issues

- Sounding sites
  - R/V *Sagar Kanya* (cruise timing, location)
  - ISS on R/V *Revelle* 4th leg (Pinkel cruise)??
  - Malé (support, staffing, duration, frequency)
  - Colombo (support, staffing, duration, frequency)
  - Gan operational site (H2 generator down)
- Duration of SOP (8/day soundings), IOP (4/day soundings)??
- Staffing for ISS and other sounding sites
- GPS water vapor systems at sounding sites
- Getting sounding data from all sites onto GTS

Sounding Issues (cont.)

- Standardized launch procedures
- Required max altitude of sounding data
- How best to enhance sounding array measurements with dropsonde missions
- Sounding monitoring system, communication of issues/products to operations center
- Software upgrades for humidity corrections
- Status of Megha-Tropiques?
- Pursue WMO support for soundings at Colombo, operational soundings at Gan Island

Discussion Items for Breakout Session

- Status of GPS system at Gan Met Office left behind during MISMO
- Should CSU real-time products be password protected?
- Should all sites install Vaisala's latest software to correct for time lag and daytime dry bias errors?
- Should there be one launch per day at Gan using 350 g balloon to get to 25 km?
- Is support for operational 1200 UTC Gan sounding needed?
- Standardize sonde launch times at all sites (X min before hour)

Discussion Items for Breakout Session

- When to use “research mode”
- Raw data availability from Indonesia
- Calibration of RS92 (CFH, Snowwhite, etc.)
- Correction of daytime ship heating effect
- Tips for precise radiosonde measurement (next slide – Yoneyama)
- Indonesian ship (timing, location)

Tips for Precise Radiosonde Measurement

Below are some recommendation to obtain precise radiosonde data. Some of them are noted in Yoneyama et al. (2002, JAMSTECR) and Miloshevich et al. (2009, JTECH).

1) Use "new" radiosonde as much as possible. Old aged sondes degrade easily due to a chance of contamination. It is recommended to use sondes younger than 1 year from the manufacture calibration. Serial number indicates sonde age.

2) Keep desiccant dry (use fresh one), which is used for ground check. Calibration chamber should be tightly sealed.

3) Save and archive raw PTU data in case correction is needed in future.

4) Record the surface meteorological parameters when launch, as much as possible. These data may be used to develop a correction scheme when dry bias is found.

5) To avoid round-off error of ±0.5%, it is recommended FLEDT data (with two decimal places) be archived.

Can we believe in Vaisala radiosonde humidity data, after all ???

(1) CIMO Inter-comparison 2010 and Miloshevich method are based on the mid-latitude experiment. How about the tropical condition ?

(2) During CINDY, perform the inter-comparison with

- (a) CFH in various conditions,
- (b) GPS-derived Precipitable Water Vapor, and
- (c) Surface Meteorology.

(3) Check DigiCORA software version in all sites.

(4) Who will be the operator ?

Hi Dick and Bill,

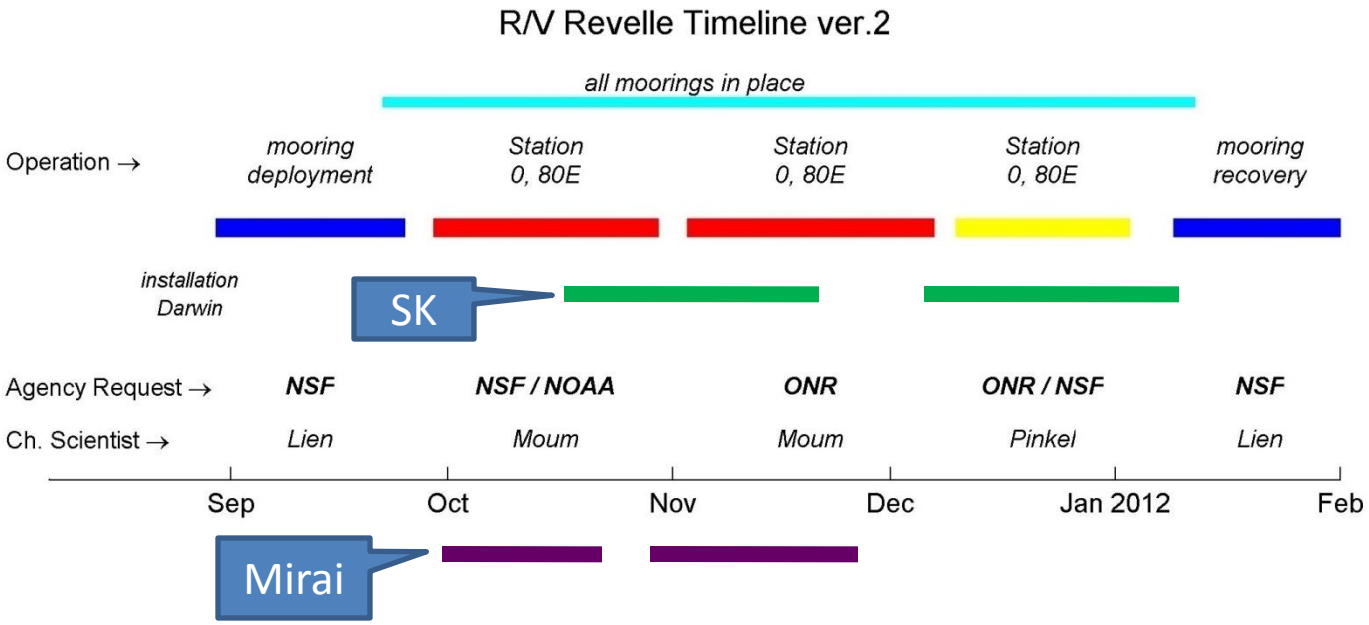
This list includes issues that you may consider in sounding breakout discussions. AI is action item from the JAMSTEC CINDY meeting November last year.

1.Standardized launching procedure (AI 1)
2.Soundings from S. Kanya (AI 3, 13)
3.Backup facilities (AI 4)
4.Soundings from Male (AI 7)
5.Sounding from Sri Landa (AI 11)
6.Personnel rotation schedule (AMF2, participation from JAMSTEC, AI 6)
7.Raman lidar?

Chidong

R/V Roger Revelle Schedule

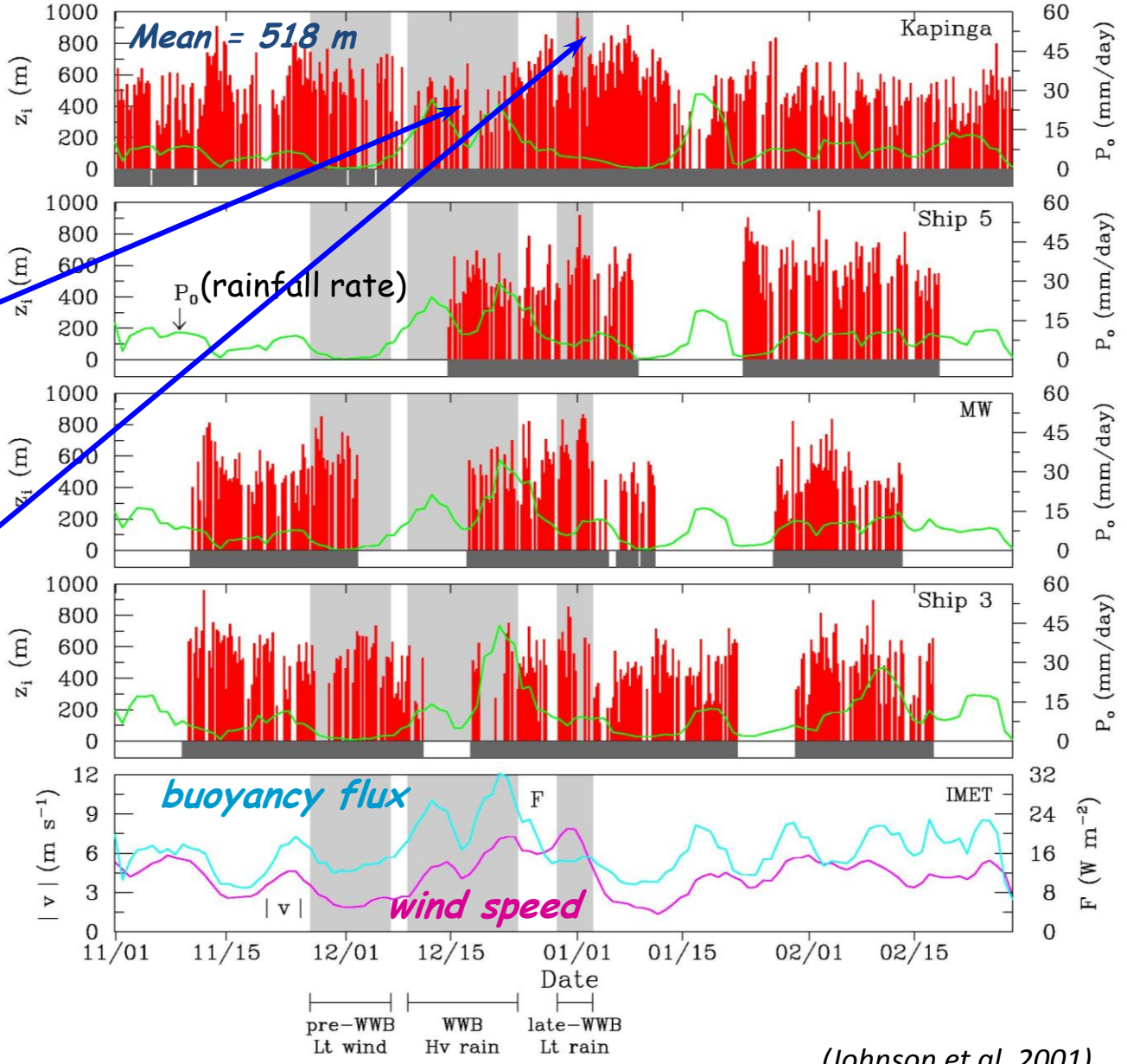
Installation 23 Aug – 30 Aug
Deployment 30 Aug – 25 Sep
Moum Leg 1 28 Sep – 30 Oct
Moum Leg 2 03 Nov – 08 Dec
Pinkel Leg 3 12 Dec – 03 Jan
Recovery 09 Jan – 03 Feb



TOGA COARE Results

Mixed-layer depth (m)

- Large variation in mixed-layer depth
- Shallowest mixed layers during WWB heavy rain
- Deepest mixed layers at end of WWB, when surface buoyancy flux F is small (F decreases due to SST cooling)



(Johnson et al. 2001)