

Planned observation by R/V Mirai: in 2017/18 and in 2015

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PIs of piggy-bag missions, incl. Yugo Kanaya (JAMSTEC)

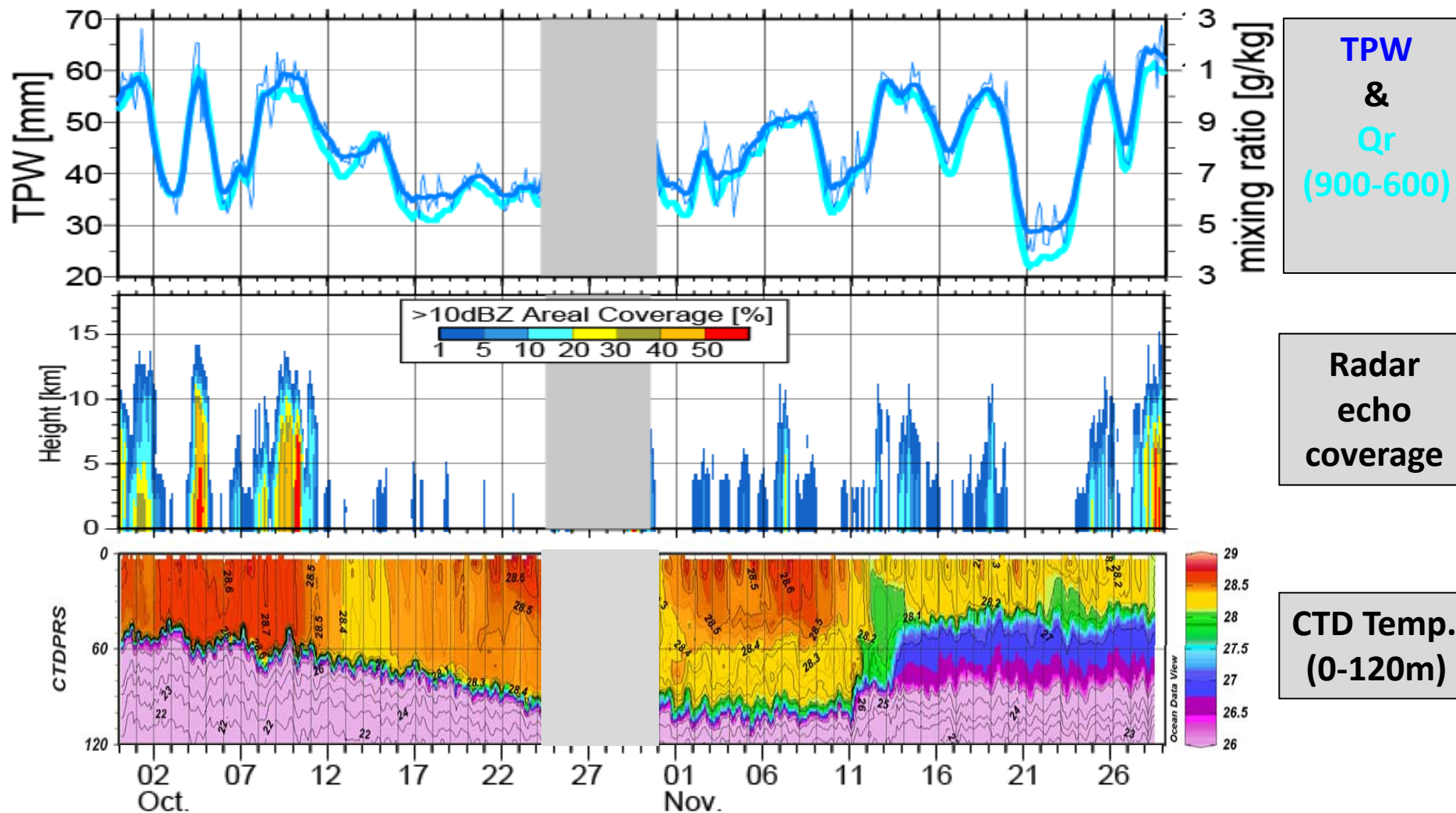


Mirai equips

- C-band dual-pol. radar: pre-installed, brand-new
- radiosonde and CTD: enable 3- / 6- hourly obs.
- piggy-bag instruments:

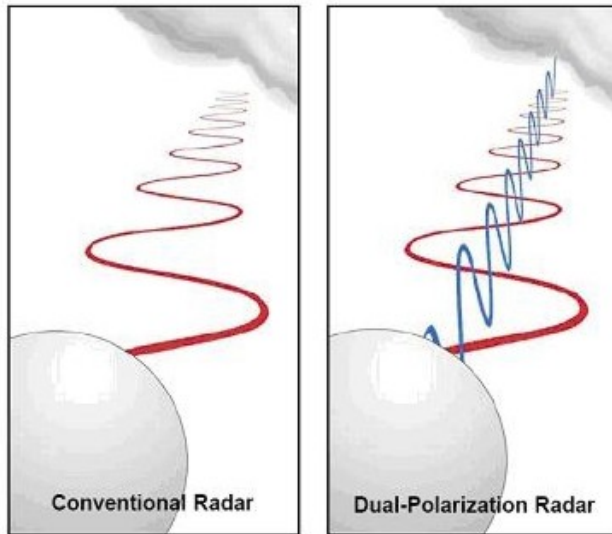
*Photo by Dr. Djamal Khelif
from WP-3D during CINDY/DYNAMO*

Example of time series in CINDY/DYNAMO



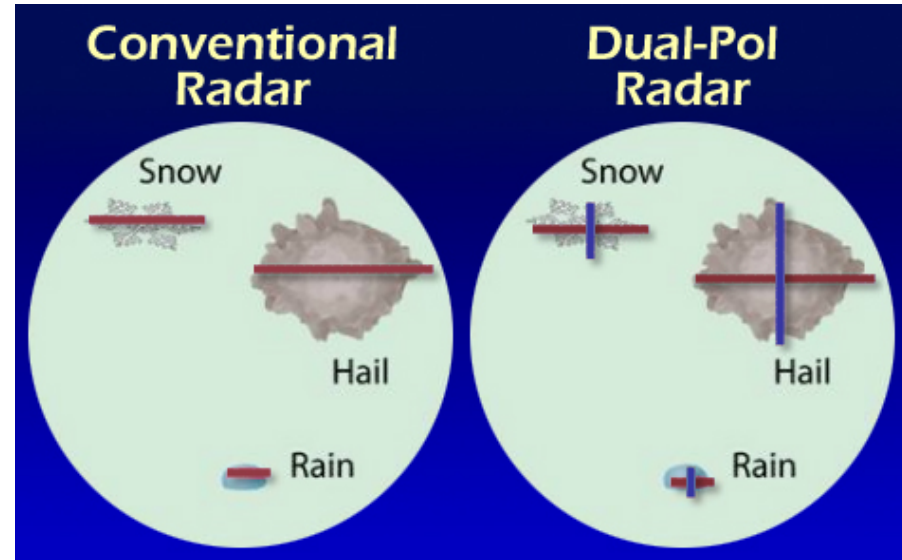
New & key equipment: C-band dual-polarized radar

Schematic of dual-pol obs.



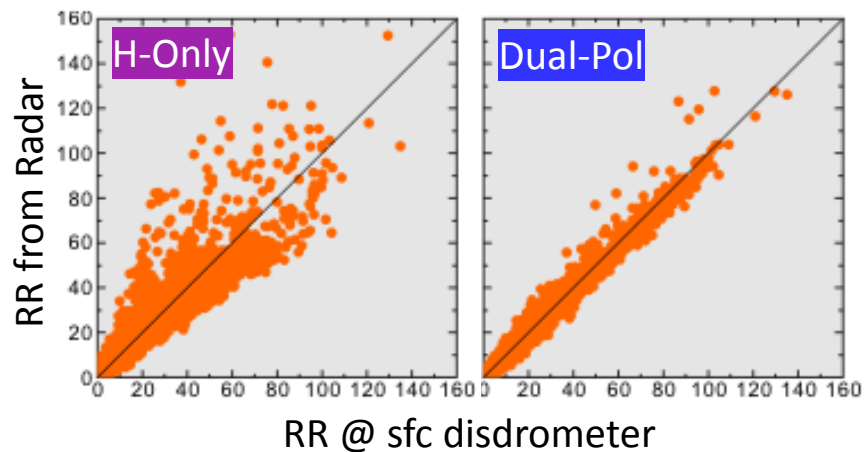
web of NOAA/NWS

Estimate of particle shape (H/V ratio)



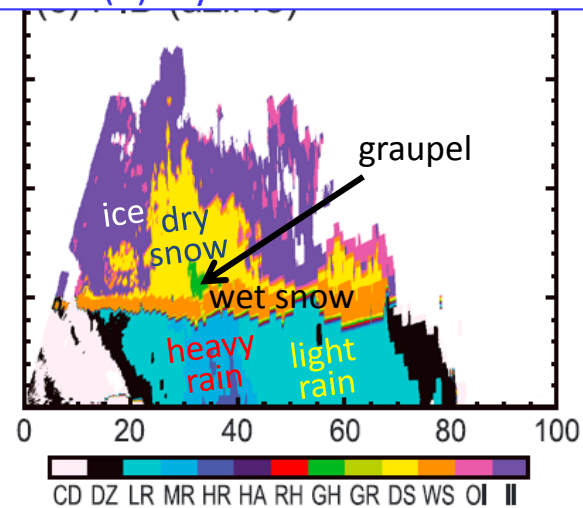
Web of NOAA/NWS

Benefit(1): better estimate rainrate



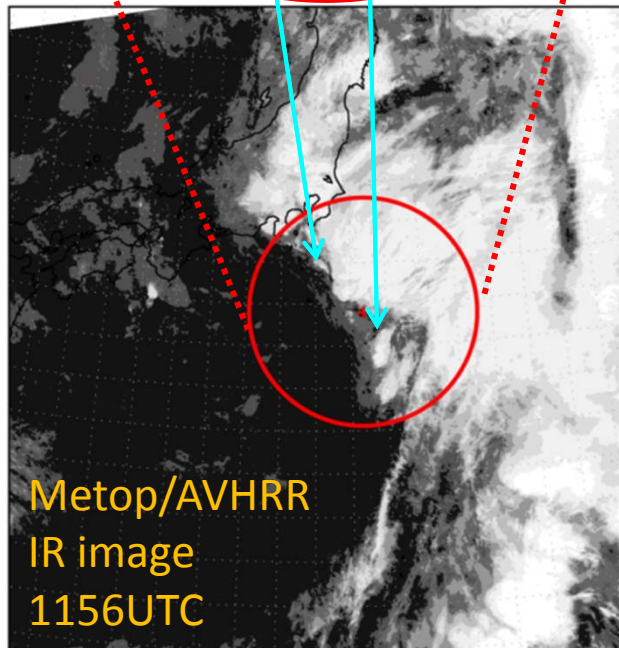
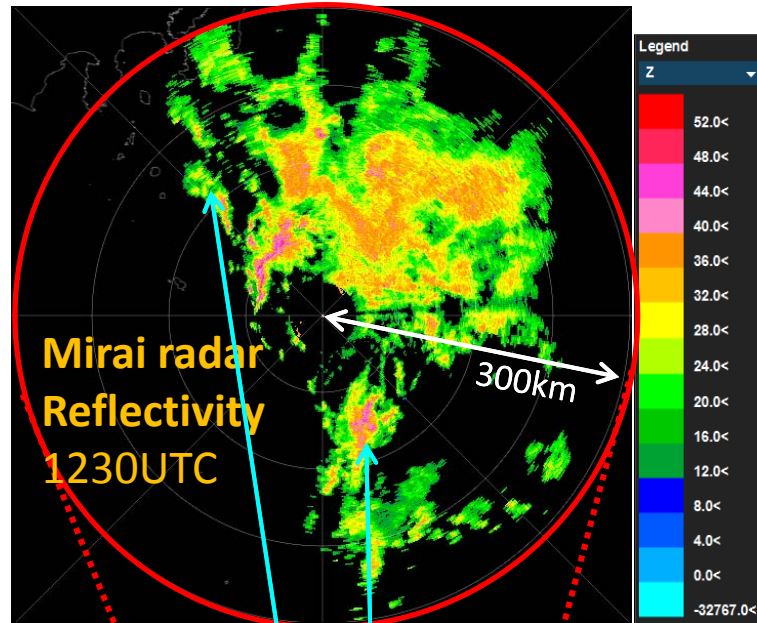
web of NIED, Japan

Benefit(2): hydrometeor identification

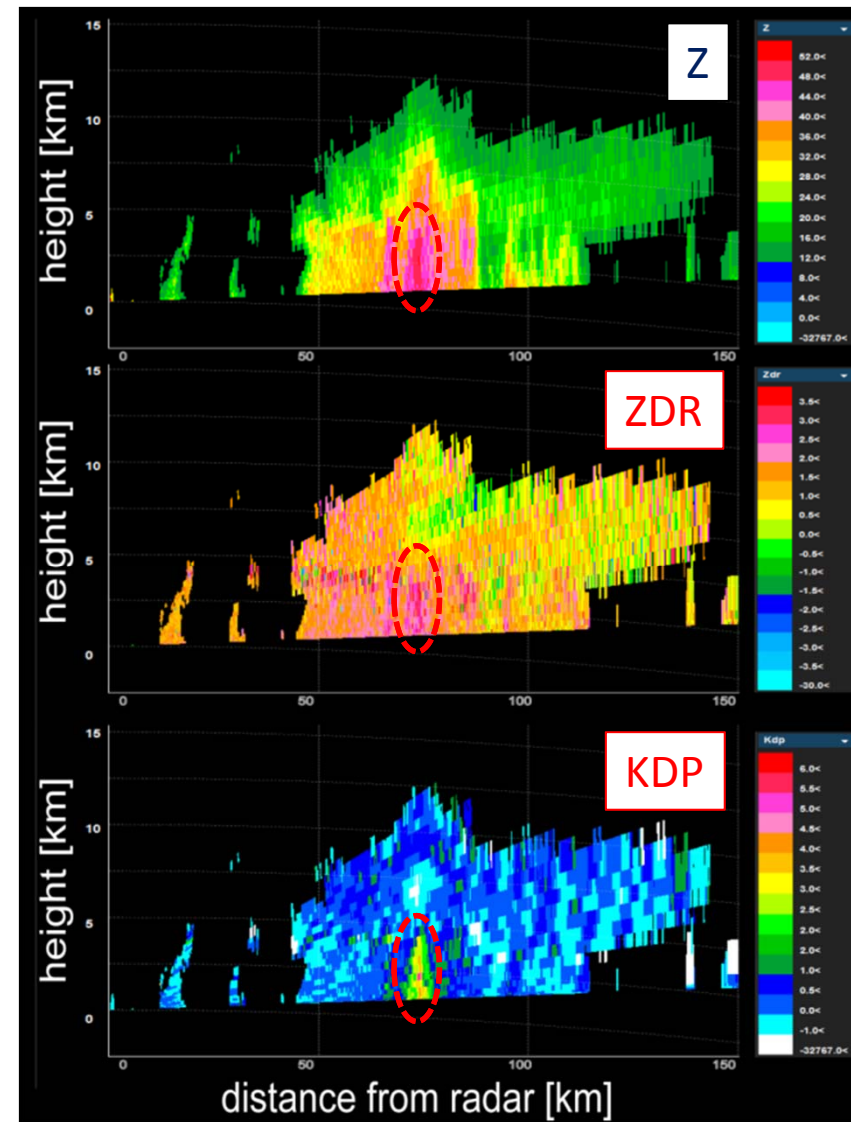


Rowe and Houze (2014)

PPI (horizontal map)



RHIs (vertical cross section)



Intensive Observation off and on Sumatra by JAMSTEC in 2017/2018

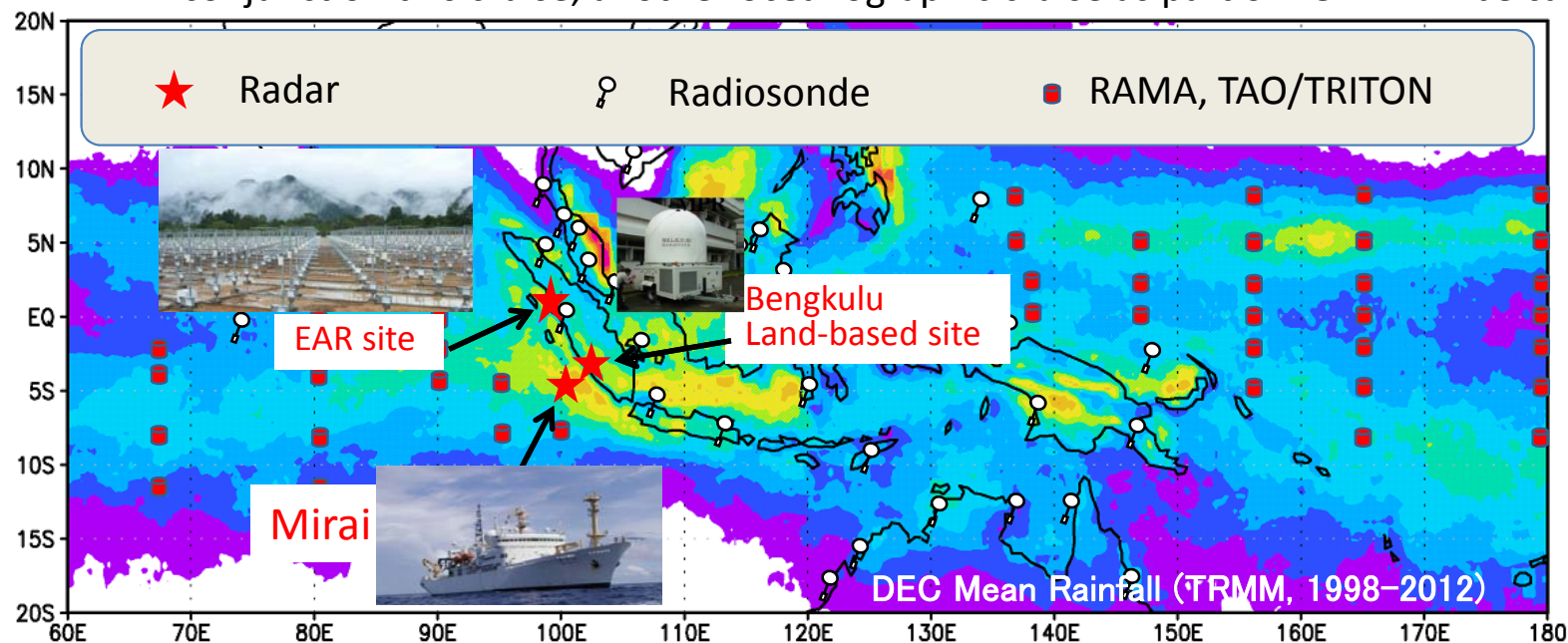
Purpose: Study of precipitation mechanism off and on Sumatra, with focus on the relationship with
1) local atmospheric circulation associated with the Maritime Continent,
2) MJO, and
3) IOD (SST condition over the oceanic upwelling region).

Period: Dec 2017 - Jan 2018

Location: R/V MIRAI on station off Sumatra
Land-based Site at Bengkulu

Observations: R/V Mirai C-band Polarimetric Doppler radar, Radiosonde, Surface Meteorology, CTD + water sampling, LADCP, etc.
Bengkulu X-band Polarimetric Doppler radar, Radiosonde, Surface Meteorology, etc.

Remarks: Decision to the R/V Mirai cruise proposal is in pending.
EAR is operated at Kototabang by Kyoto University. Additional obs will be done there.
In conjunction this cruise, another oceanographic cruise as part of IIOE-2 will be carried out.



R/V Mirai Pre-YMC Cruise in 2015

< Atmospheric Measurements >

- 1) C-band dual-pol. scanning Doppler Radar
- 2) Ka-band VP cloud radar
- 3) Radiosonde (3-hrly)
- 4) Surface Meteorology
- 5) Skin SST (Radiometer, Seasnake)
- 6) GPS water vapor
- 7) Disdrometer
- 8) Ceilometer
- 9) Mie / Raman Lidar
- 10) Videosonde (20-30 times)
- 11) Sky Radiometer
- 12) Solar Tracker & Telescope / Optical Spectrum Analyzer
- 13) MAX-DOAS (NO₂, AOD)
- 14) High Volume Air Sampler & Gas Analyzers

< Oceanographic Measurements >

- 1) CTD (6- or 3-hrly)
 - + water sampling (Nutrients, DO, Chl-a)
 - + LADCP
- 2) Underway CTD (prior to on-station obs)
- 3) Ocean surface turbulence (6-hrly, TBD)
- 4) Shipboard ADCP
- 5) Sea Surface Monitoring (T, S, DO, Chl-a, etc.)

< Others >

- 1) Sea Skater Sampling (10 times)

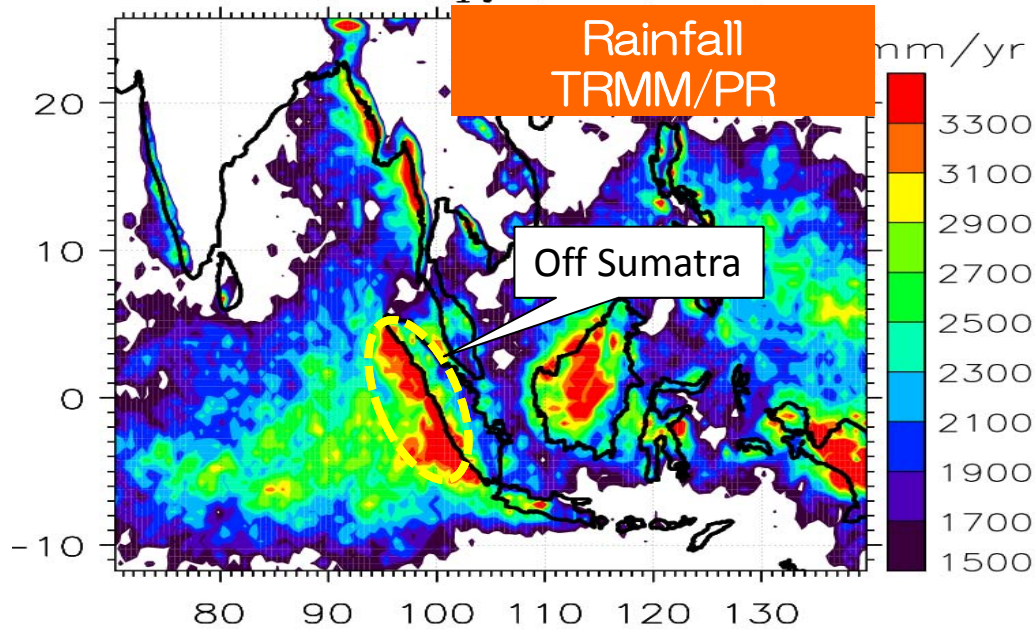
On-board Personnel from

JAMSTEC, JAXA, Indonesia (BPPT and/or BMKG),
Univ. Tokyo, Univ. Toyama, Yamaguchi Univ., Kochi Univ.

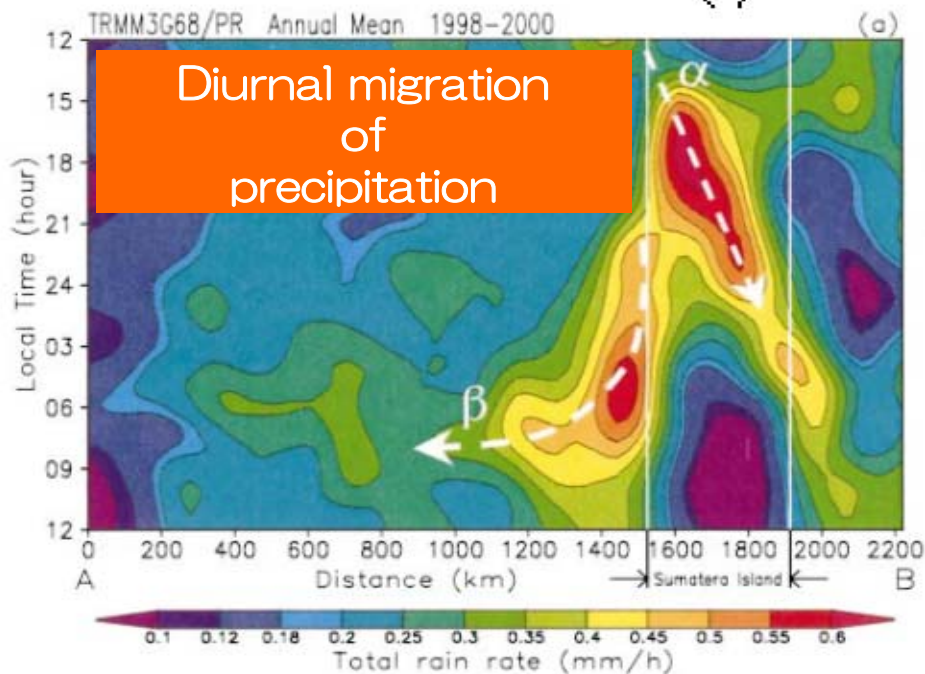
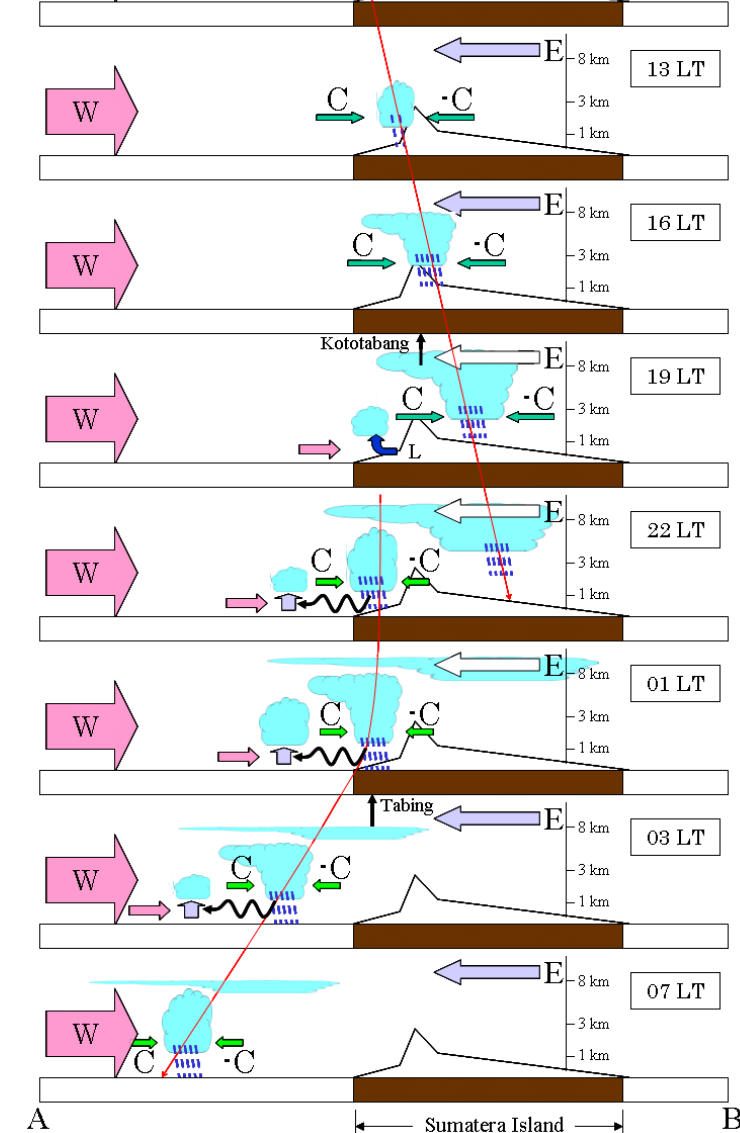


Coastal heavy-rain system, migrating diurnally

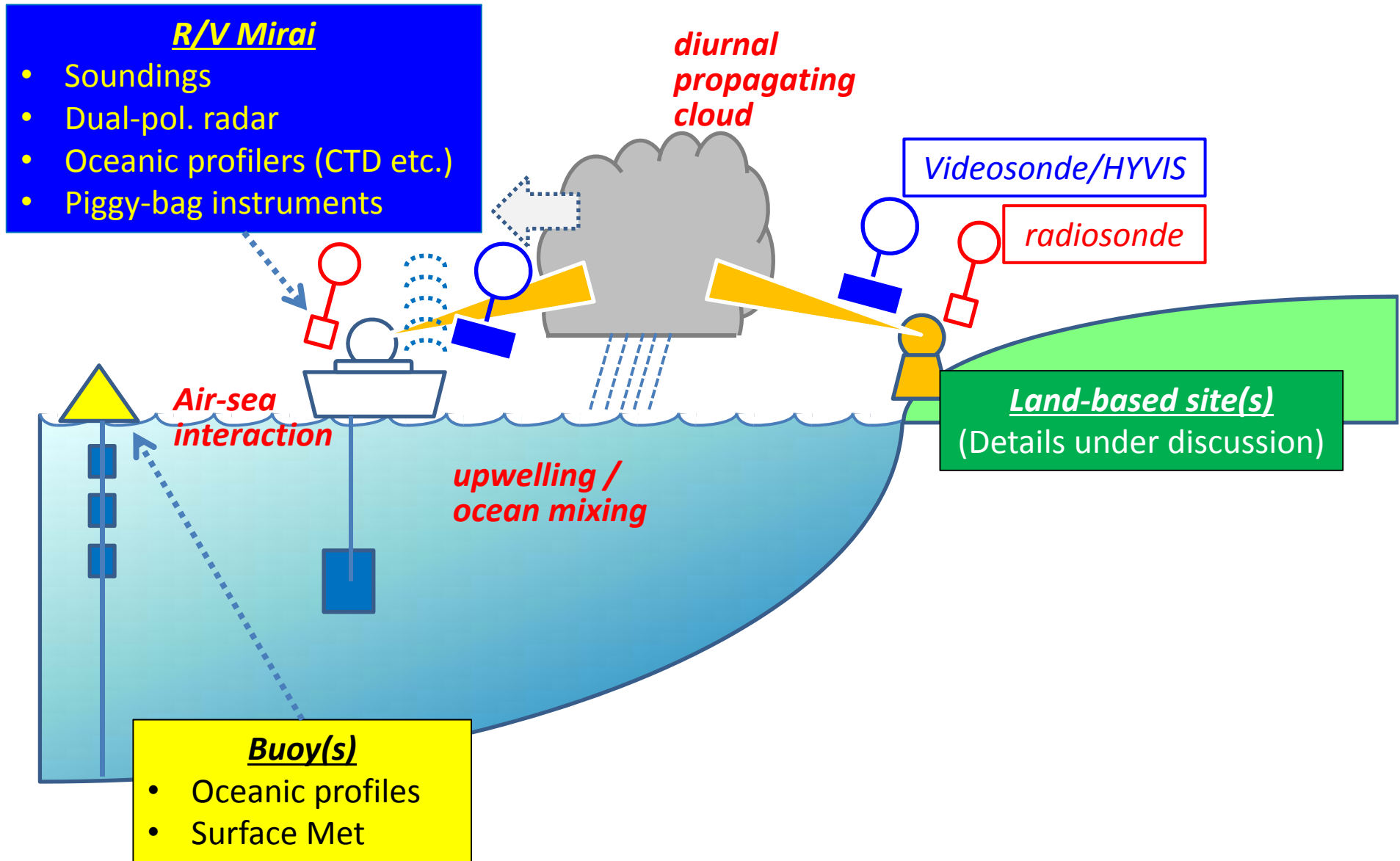
Mori et al. (2004)



Schematics of diurnal migrating precip. system



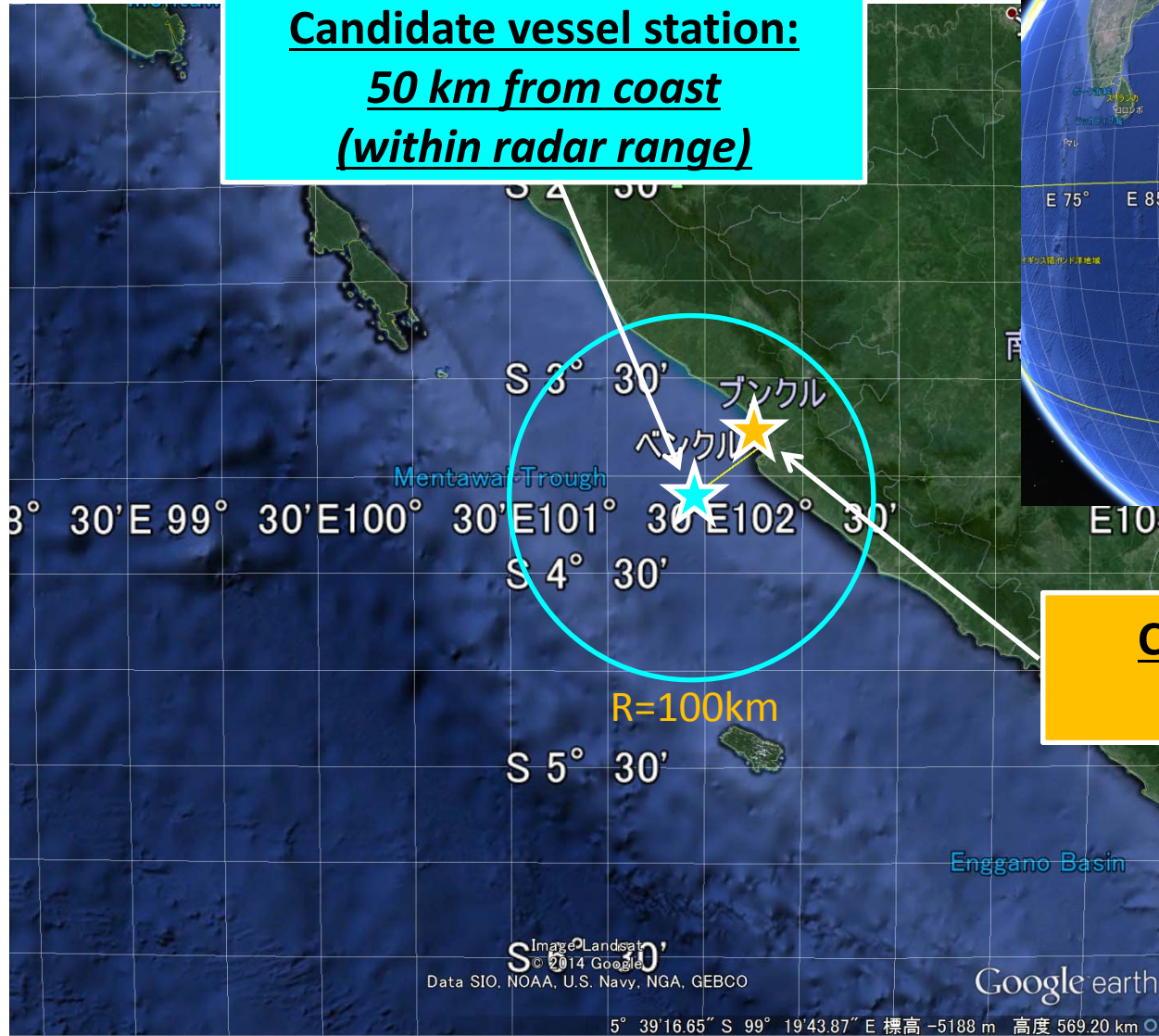
2D schematics of observation in Nov. / Dec. 2015



Candidate Position for "Station"

Helps by Indonesian Agencies are essential to get permission

Candidate vessel station:
50 km from coast
(within radar range)



Candidate land-site:
Benkulu

Aerosols: remote/in-situ obs. on R/V Mirai

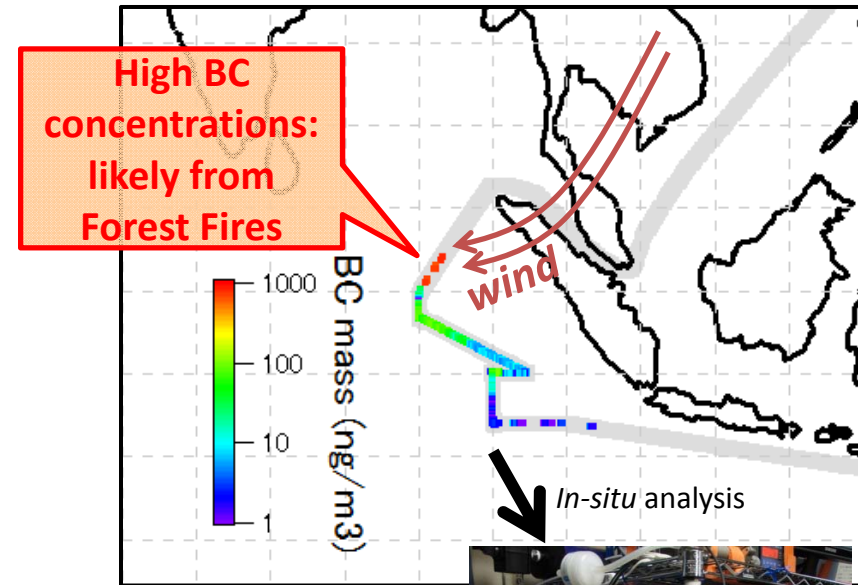
1. Elucidate spatio-temporal variation & origins (Forest Fires/Industrial)
2. Identify "Seeds" of clouds/rain (Cloud Condensation Nuclei/ Ice Nuclei)



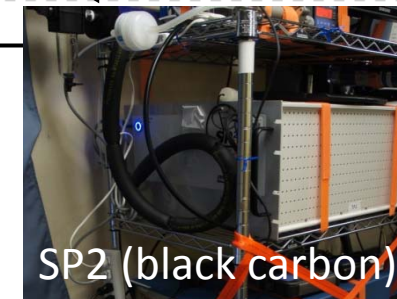
parameters	instruments	Priority (tbc)
AOD & its vertical profile	Mie Lidar/ Skyradiometer/ MAX-DOAS	H
Black carbon (BC)	SP2	H
Fluorescent bioaerosol particles	WIBS	H
Rainwater (BC, bioaerosol)	Sampling	H
CO (Pollution tracer), O ₃ , NO ₂ , etc.	NDIR, UV abs, MAX-DOAS	H
CN number density	CPC	M
Particle size distribution	OPC	L
Water soluble ions/metal	High-Vol air sampler	L

Preliminary Black carbon obs. by SP2

(MR14-01/02, Jan/Feb 2014)



Taketani, Miyakawa et al.
In preparation



Below cloud rain water sampling



offline post-analysis

"Single-Particle" characterization

offline post-analysis



(also In-situ)

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