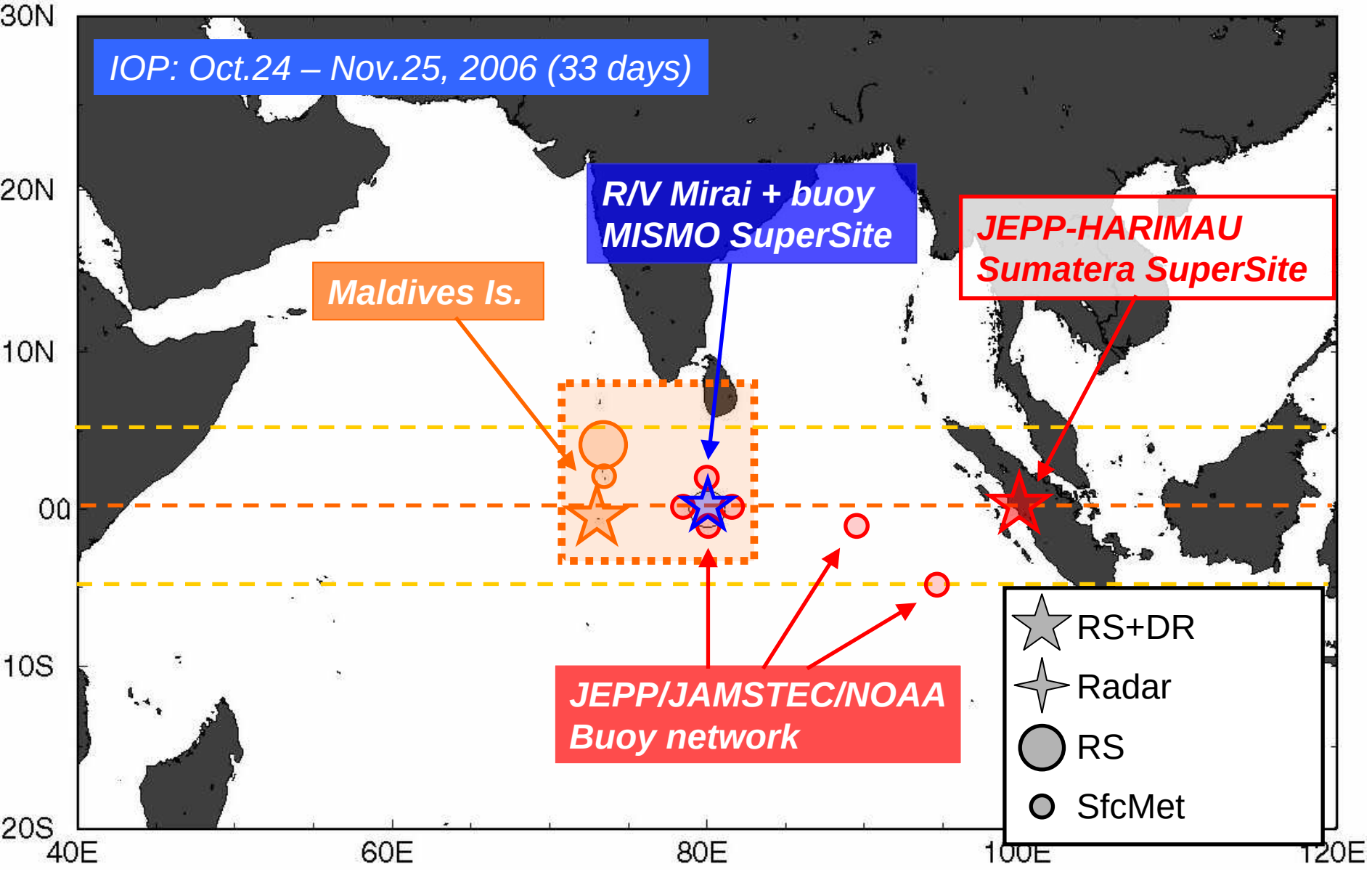
MISMO: Outline

Masaki Katsumata (JAMSTEC)
Richard H. Johnson (CSU)

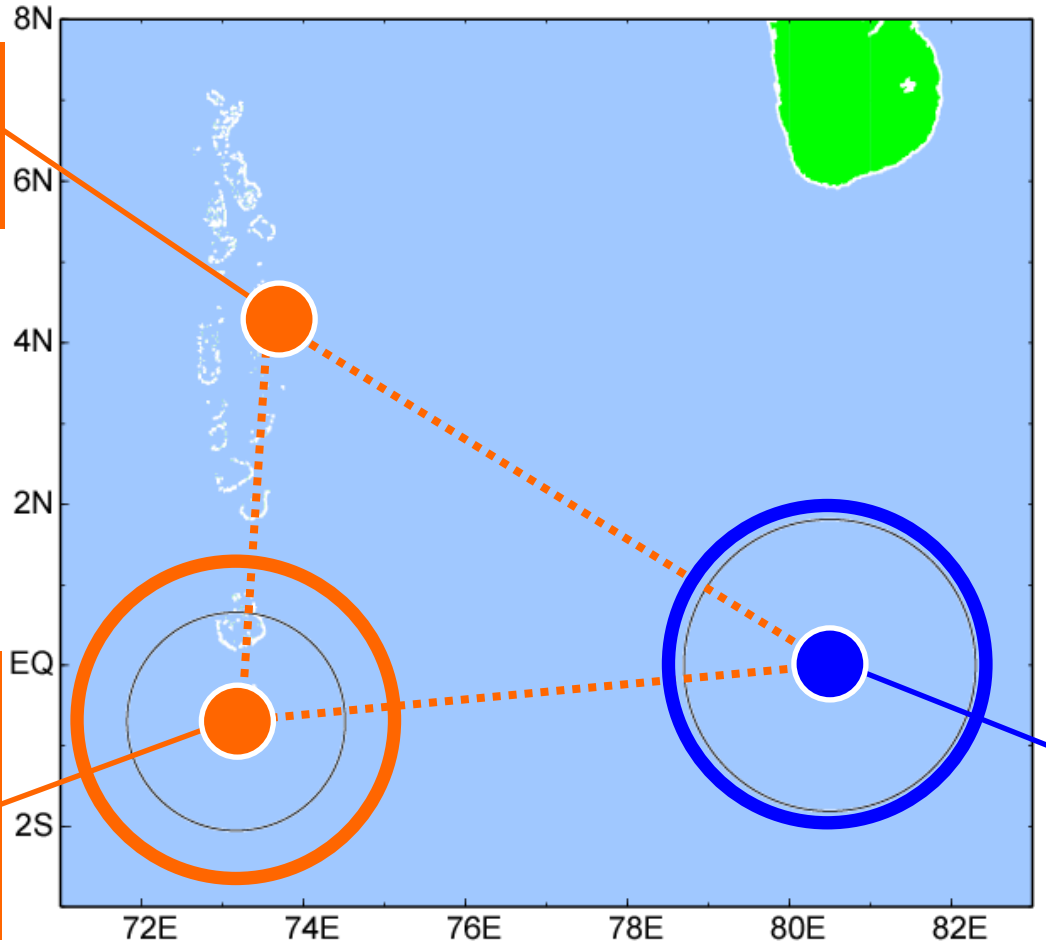
Kunio Yoneyama (JAMSTEC)
Kazuaki Yasunaga (JAMSTEC)

Sites in MISMO Intensive Observation Period



MISMO Core Observation Area

Hulhule Is.
Radiosonde
AWS、GPS

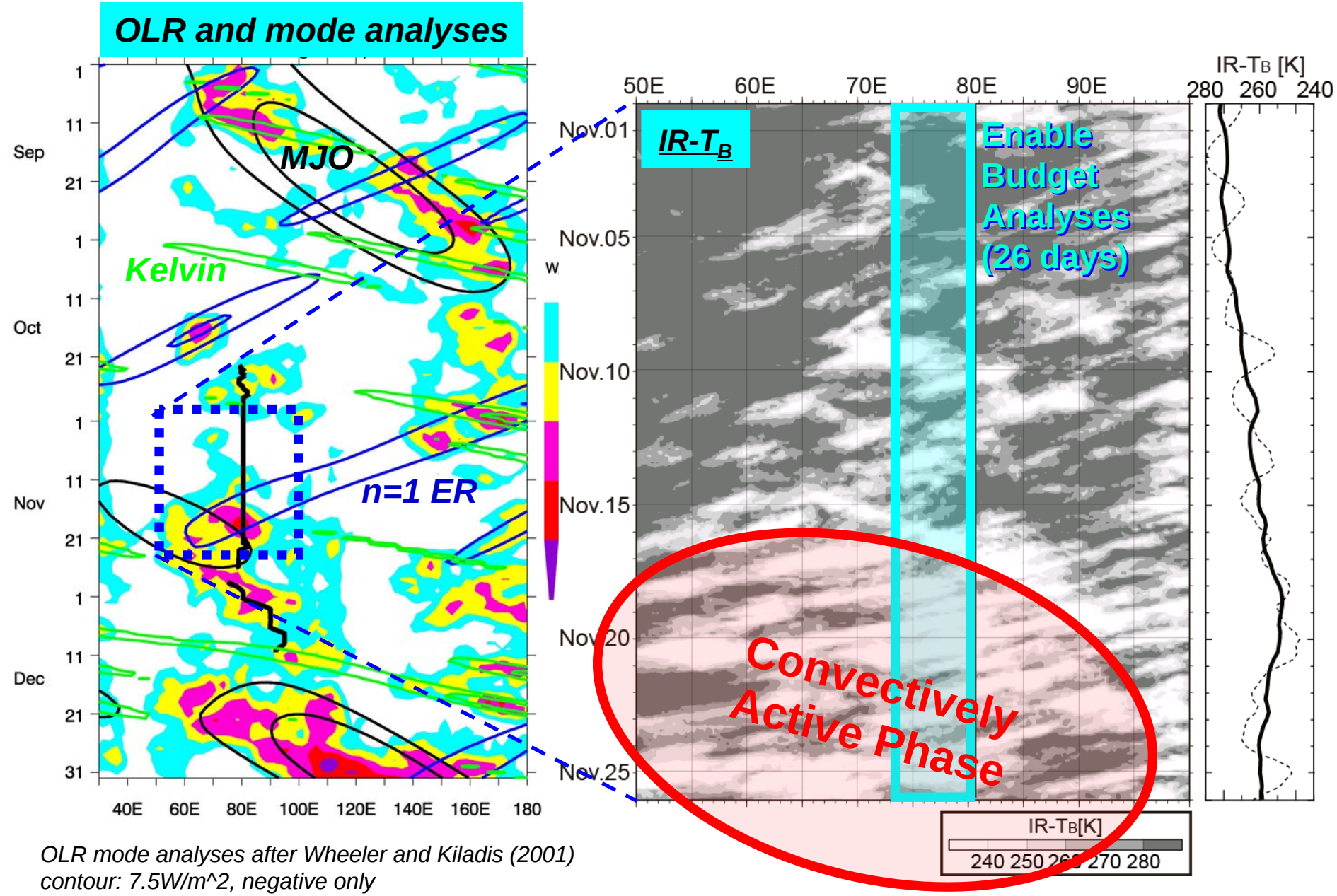


Gan Is.
Doppler Radar
Radiosonde
AWS、GPS、
Ceilometer, etc.

R/V Mirai
Doppler Radar
Radiosonde
Wind Profiler
CTD
etc.

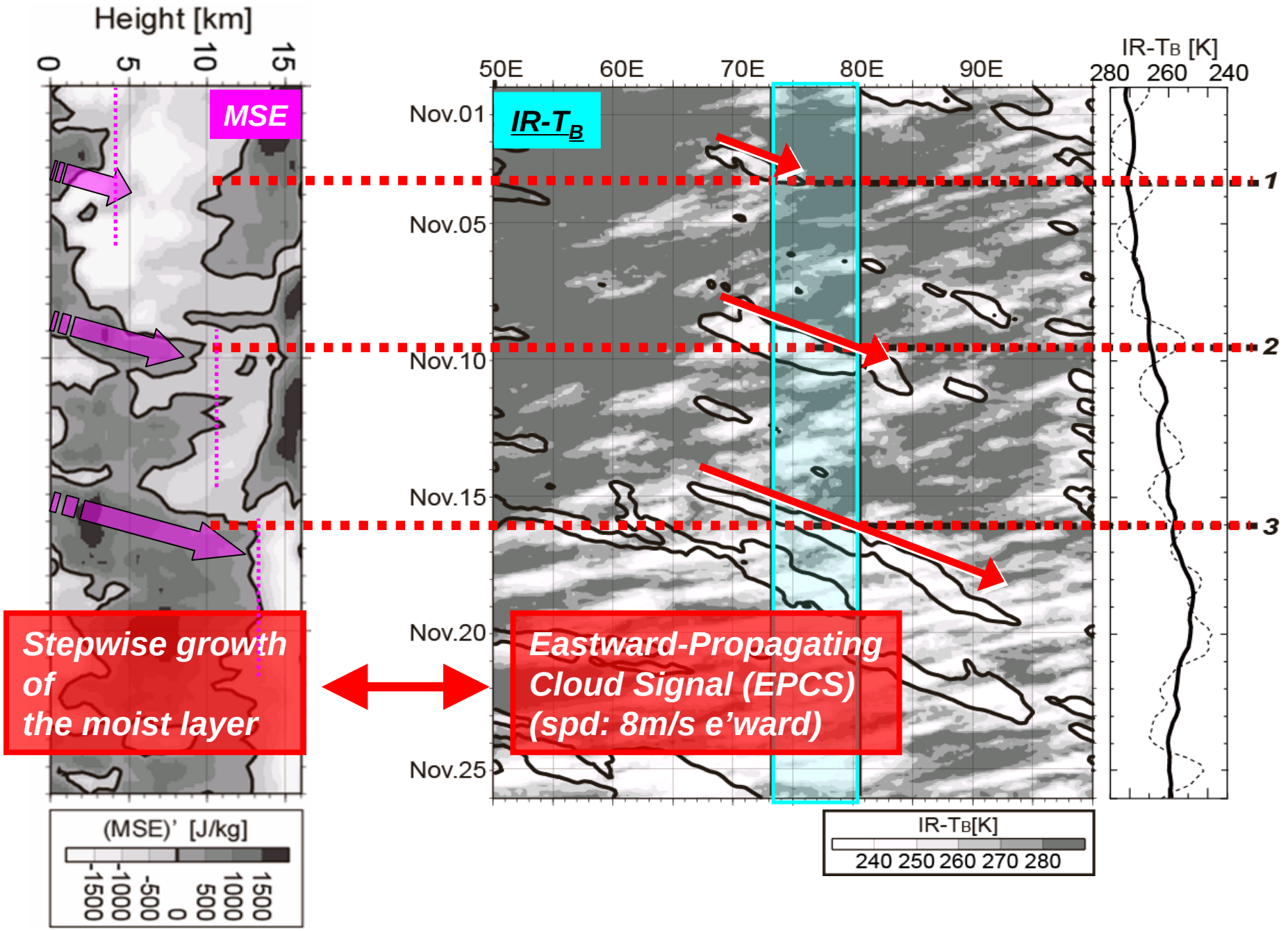
Three Radiosonde Sites – Array
(Oct.31-Nov.26)

Outline of the Observation Period

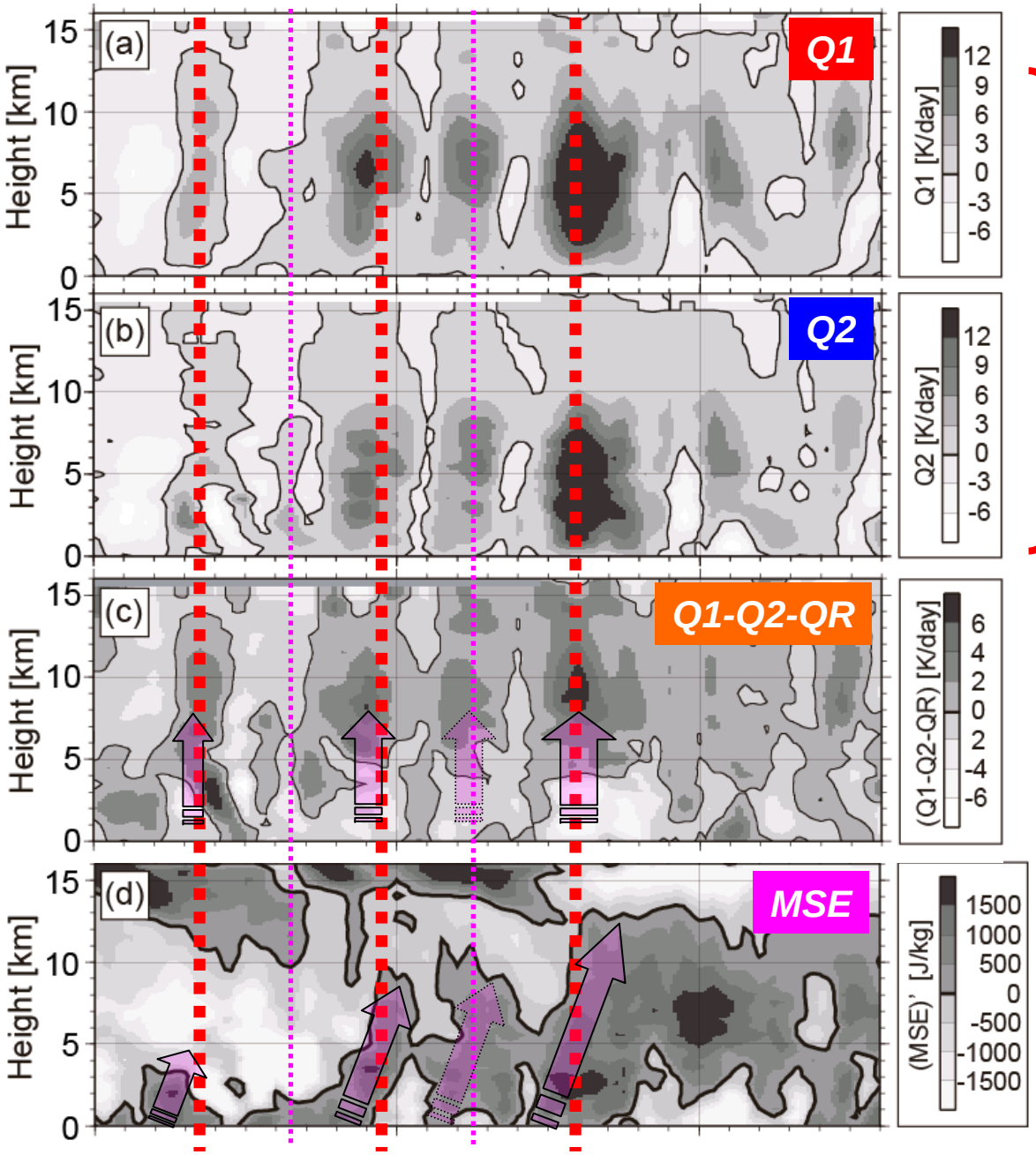


OLR mode analyses after Wheeler and Kiladis (2001)
contour: 7.5W/m^2, negative only

Stepwise Mostening <-> Eastward-Propagating Cloud



Synoptic-Scale Variance



Large heating and drying when EPCS passed

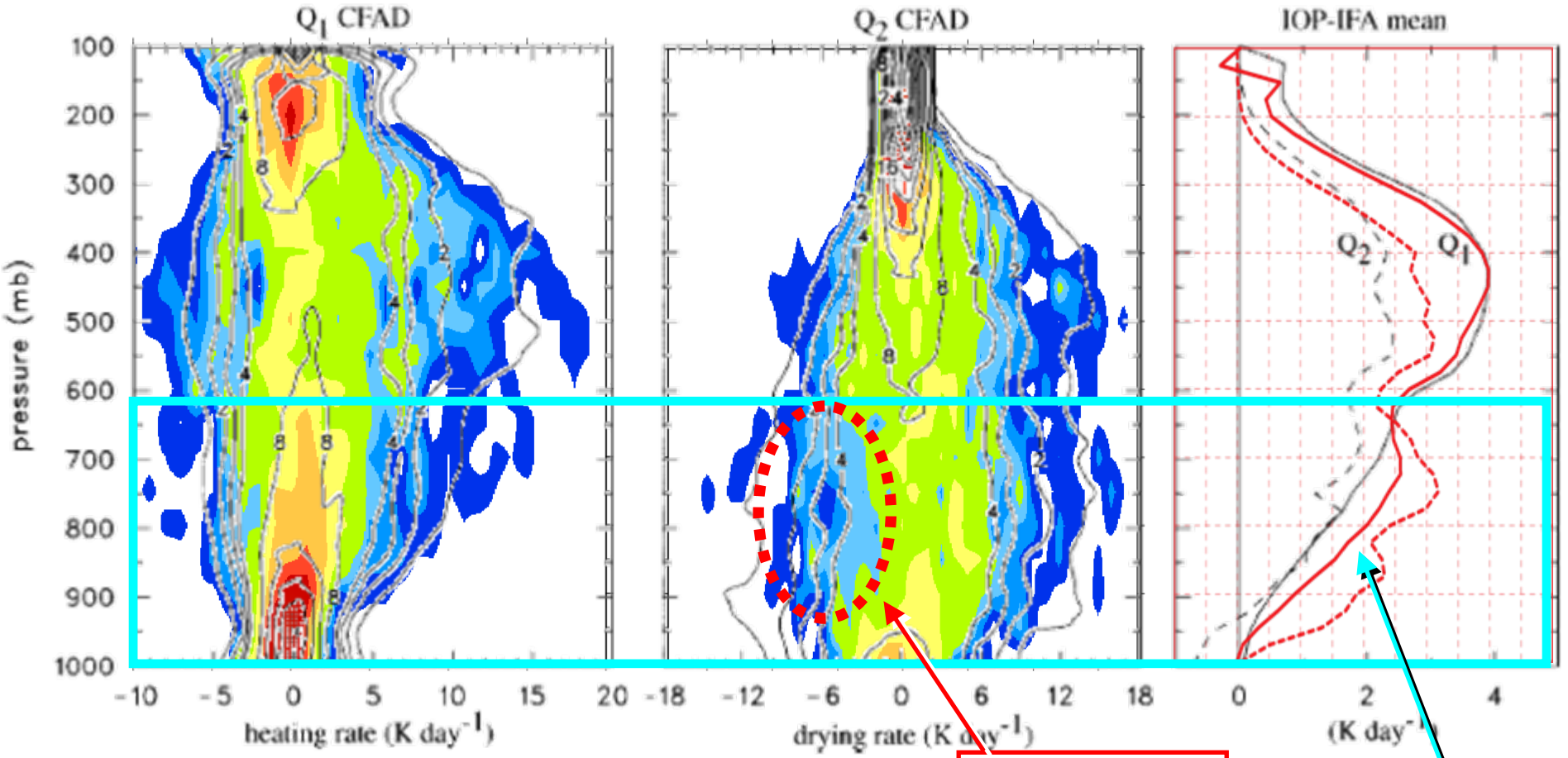
Active eddy transport of MSE when EPCS passed

Stepwise growth of the moist layer

Averaged profiles of Q1 and Q2 : MISMO and TOGA/COARE

color: MISMO
contour: TOGA/COARE

Red: MISMO
Black: TOGA/COARE



frequency [%]

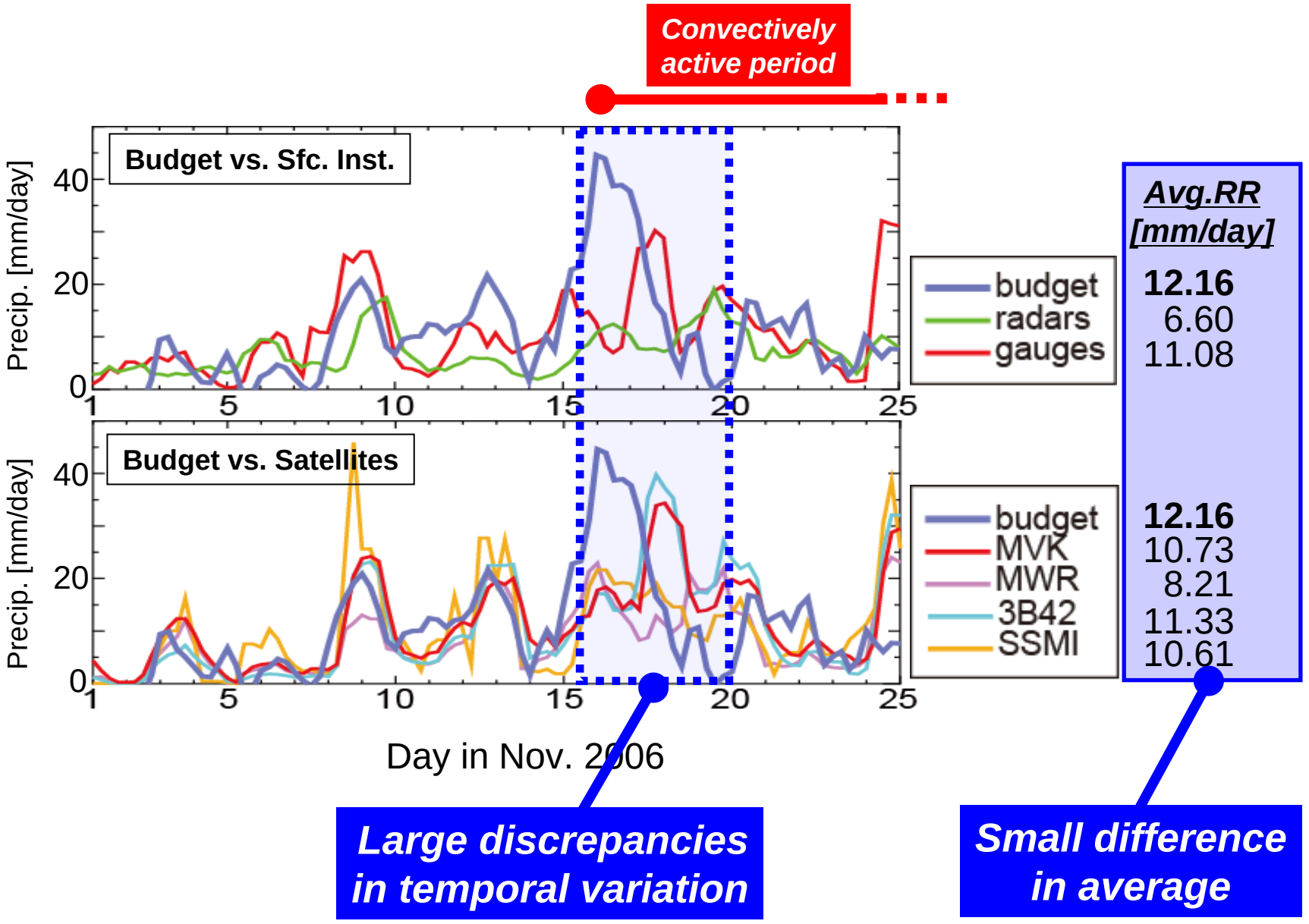
1 2 3 4 8 12 16 20

Less moistening in lower troposphere

Bottom-heavy Heating / Drying

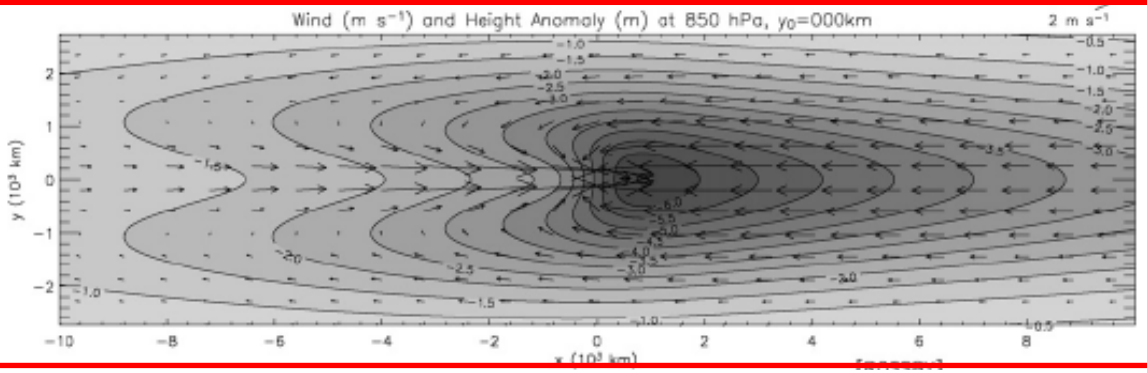
TOGA-COARE result is from Johnson and Ciesielski (2000)

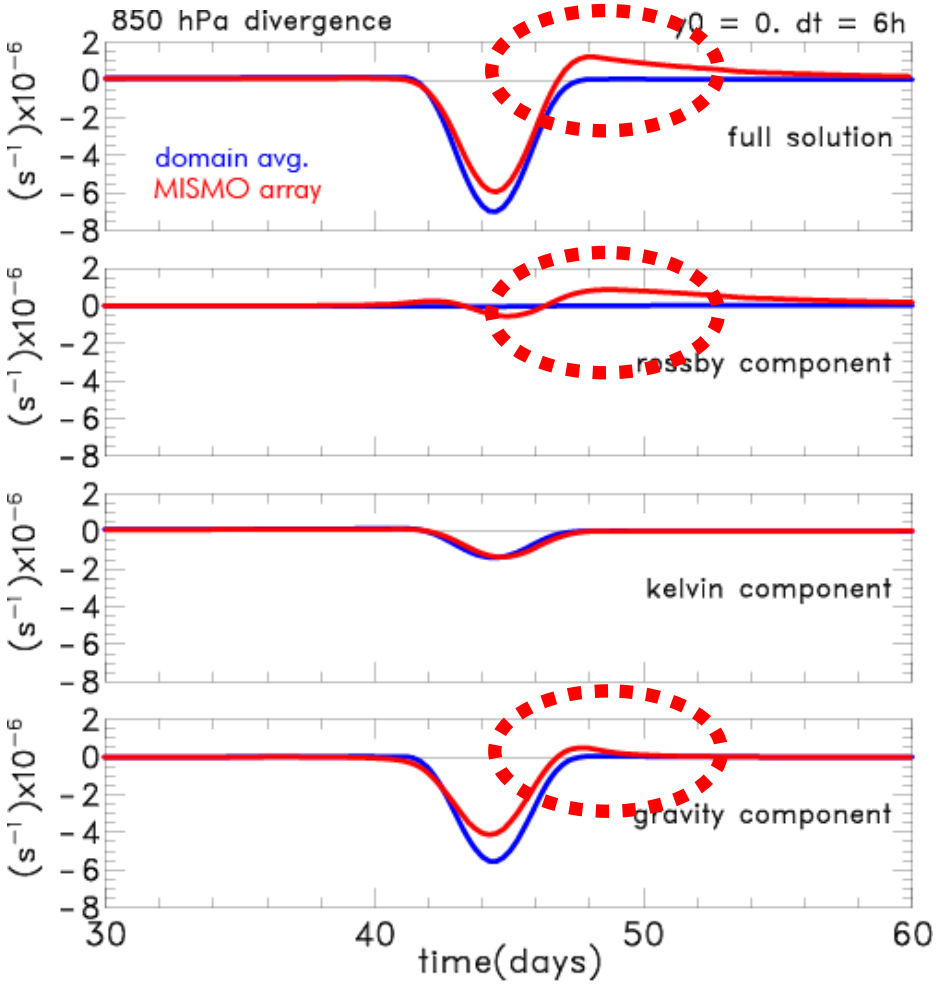
Rainfall: by budget analyses, satellites, and sfc instruments



Simulating budget analyses

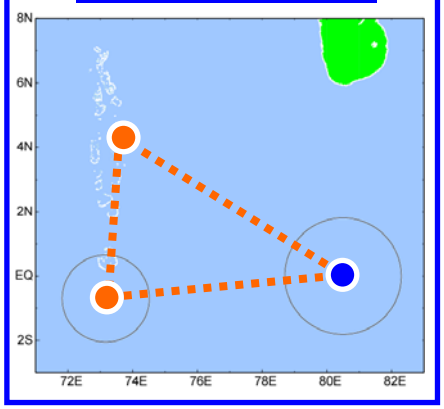
Theoretical Wind Field
with TOGA/COARE-like heating
(Schubert and Masarik 2006)

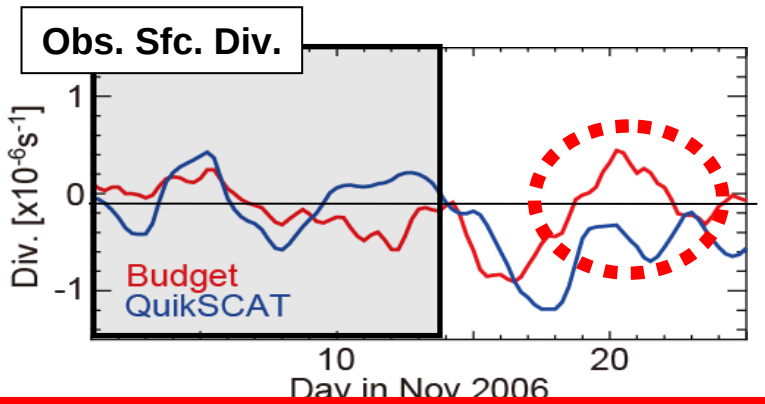




+

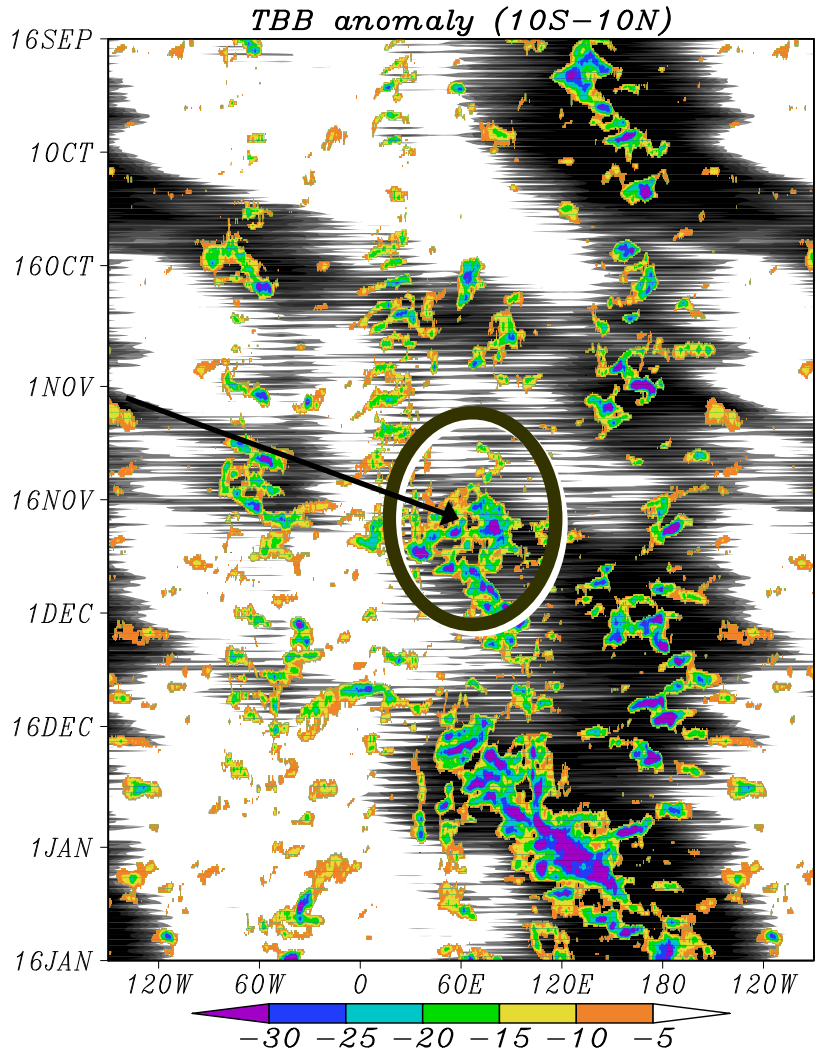
MISMO array

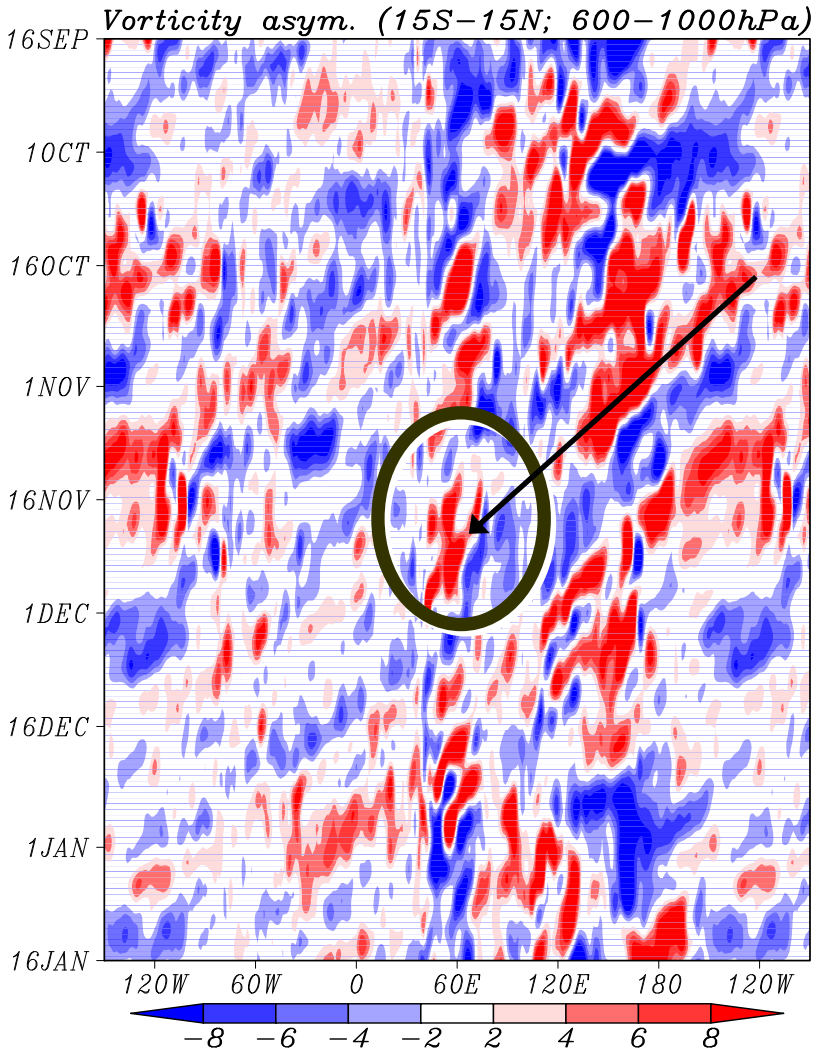




Westward-propagating signal of vorticity

- Vorticity shows the clear westward-propagating signal.
- Cloud clusters developed at the intersection of the eastward-propagating VP and westward-propagating Vor.





Summary

- **MISMO succeed to capture the period leading up to the ISO (MJO?) convectively active phase.**
- **Synoptic-scale stepwise growth of the moist layer was observed when eastward-propagating cloud signal (EPCSs) passed.**
- **The EPCS resembles to the frictional moist Kelvin wave.**
- **The Q1 and Q2 are relatively "bottom-heavy" than in TOGA/COARE. Especially moistening (negative Q2) appeared not frequently as in TOGA/COARE.**
- **The estimated Q1 and Q2 might ambiguous on the Rossby-wave component.**

KEYS

- Equatorial waves / disturbance
(both in synoptic- and large-scale)

- (relatively) bottom-heavy heating profile

Missing in MISMO / Desired in next

- *Capture end of active phase, or more significant event*
  next: LONGER PERIOD

- *Accurate Q1 and Q2 in active phase*
  next: ENHANCED SOUNDING ARRAY

- *Transformation and eastward moving to the Pacific*
  next: WIDER AREA

- *"normal" large-scale condition (without strong IOD)*
  next: MORE FINGERS TO BE CROSSED