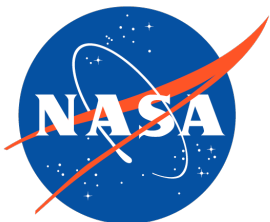
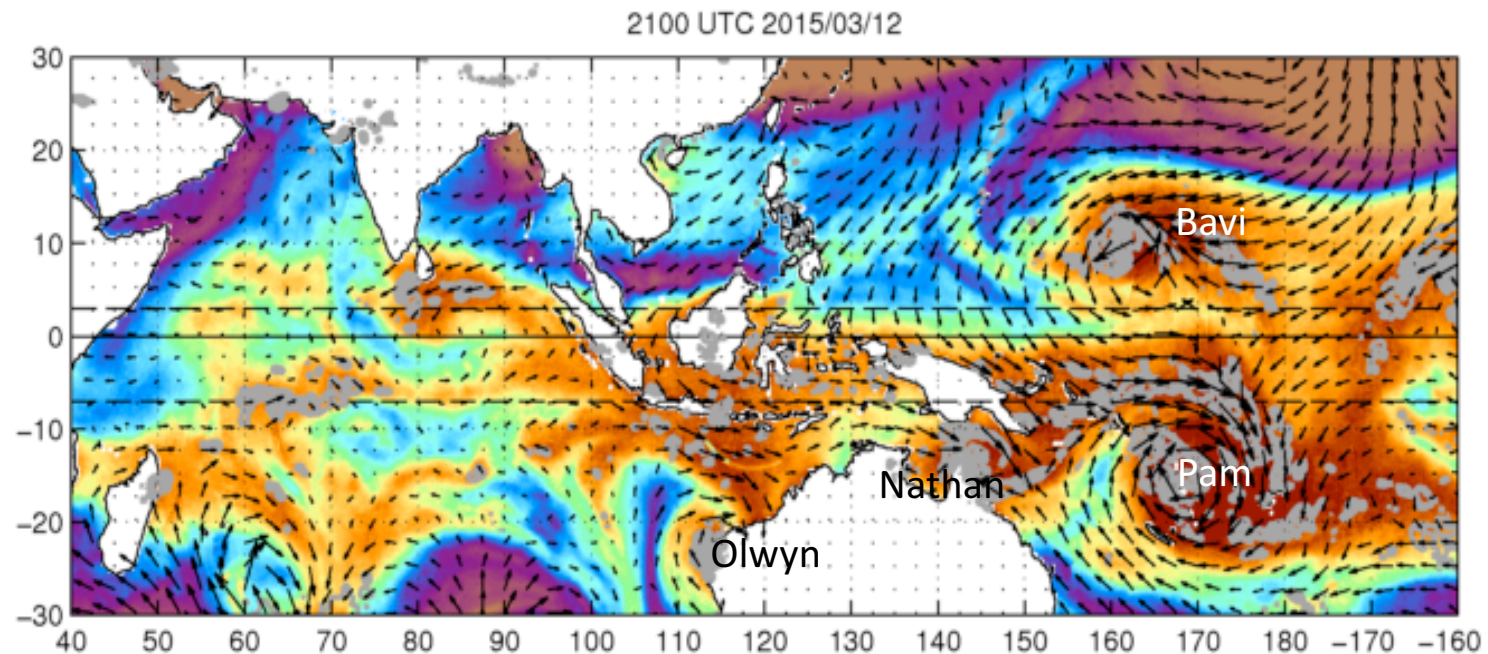


Evaluation of Multi-Satellite Surface Winds of MJO over the Indian Ocean using DYNAMO in-situ Observations

Shuyi S. Chen and Brandon Kerns

RSMAS/University of Miami



(IOVWST, Scripps, La Jolla, CA, 4 May 2017)



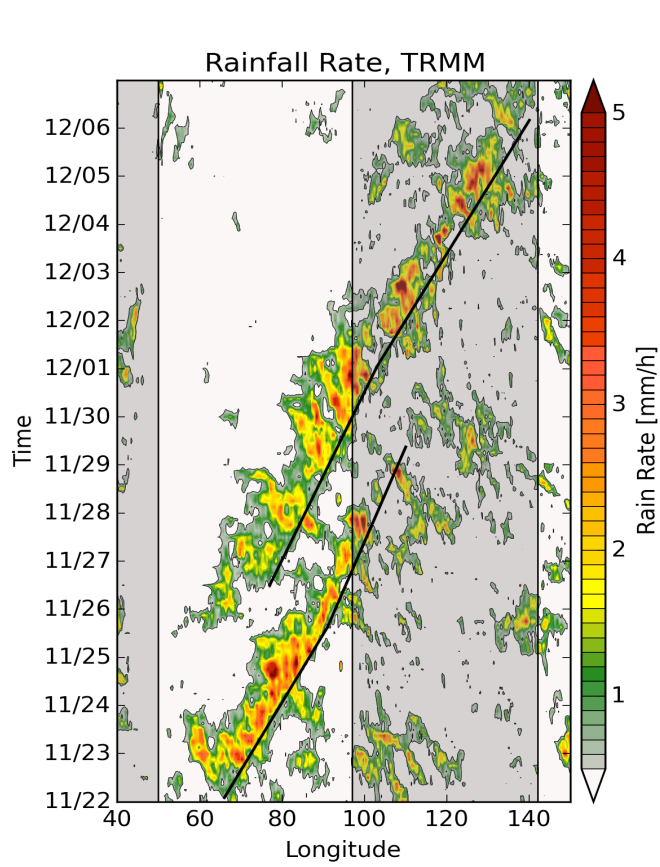
Goal:

- Better OBSERVE and PREDICT high-impact tropical weather systems (tropical cyclones, the Madden-Julian Oscillation)

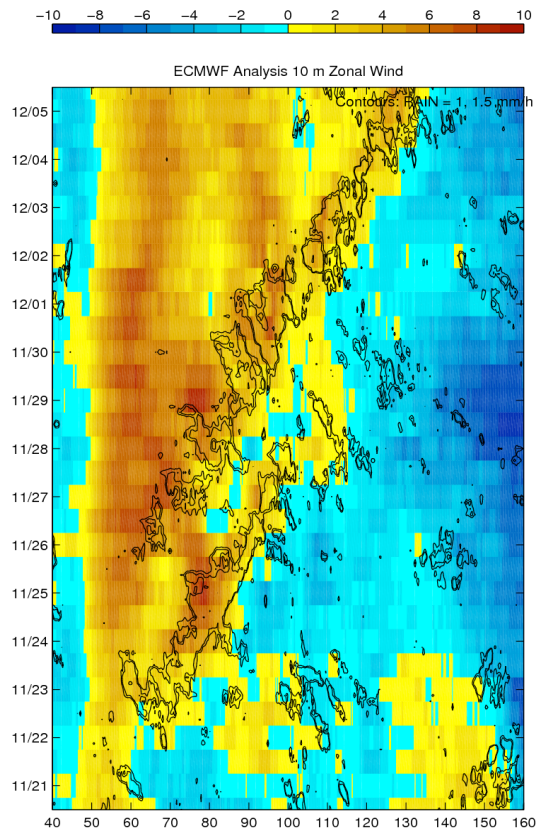
In this talk:

1. Develop an **MJO surface wind database** for weather and climate applications
2. Evaluate swathes (ASCAT, OSCAT, TMI) and multi-satellite products (CCMP and OAFlux) using DYNAMO in-situ surface winds observations

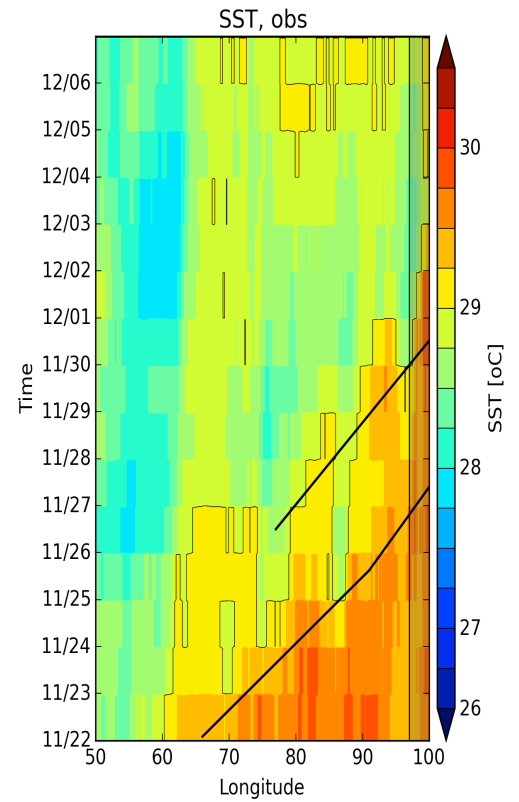
MJO



Rain



Surface zonal wind

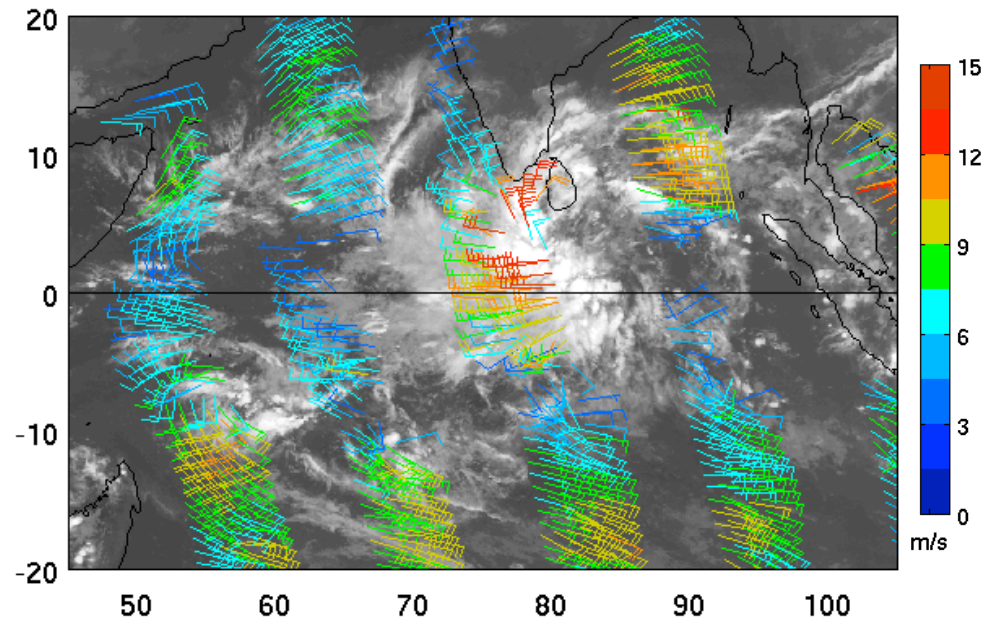


SST

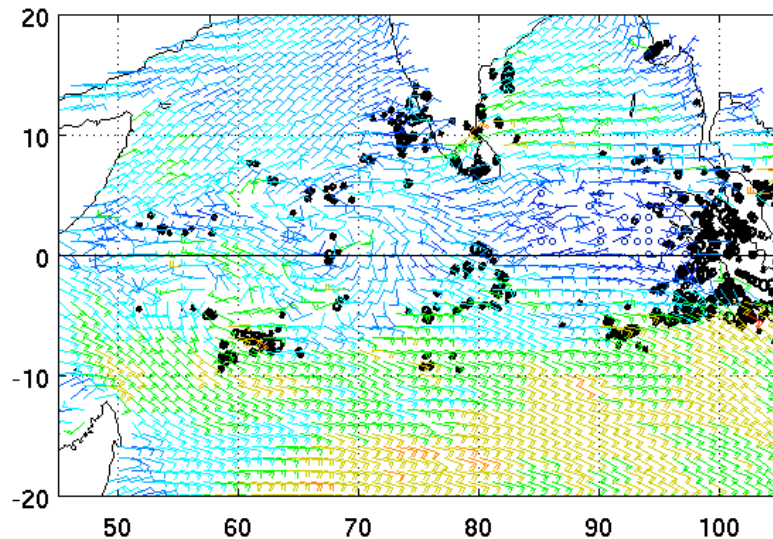
Surface wind in a tropical cyclone?
(no brainer!)

What is the MJO surface wind look like?

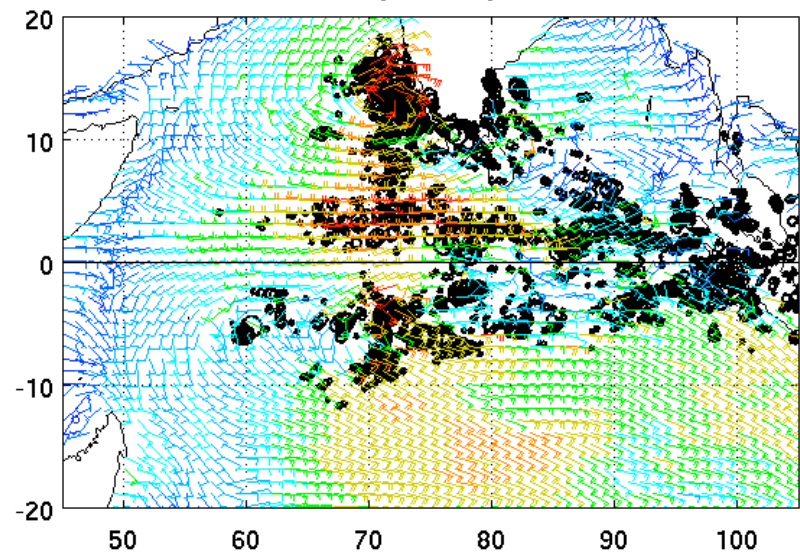
Infrared and ASCAT Within 2 Hours: 1500 UTC 20111124



QuikSCAT Mean Winds and Cloud Clusters > 5000 km²
for the 3 Days Ending 20091030

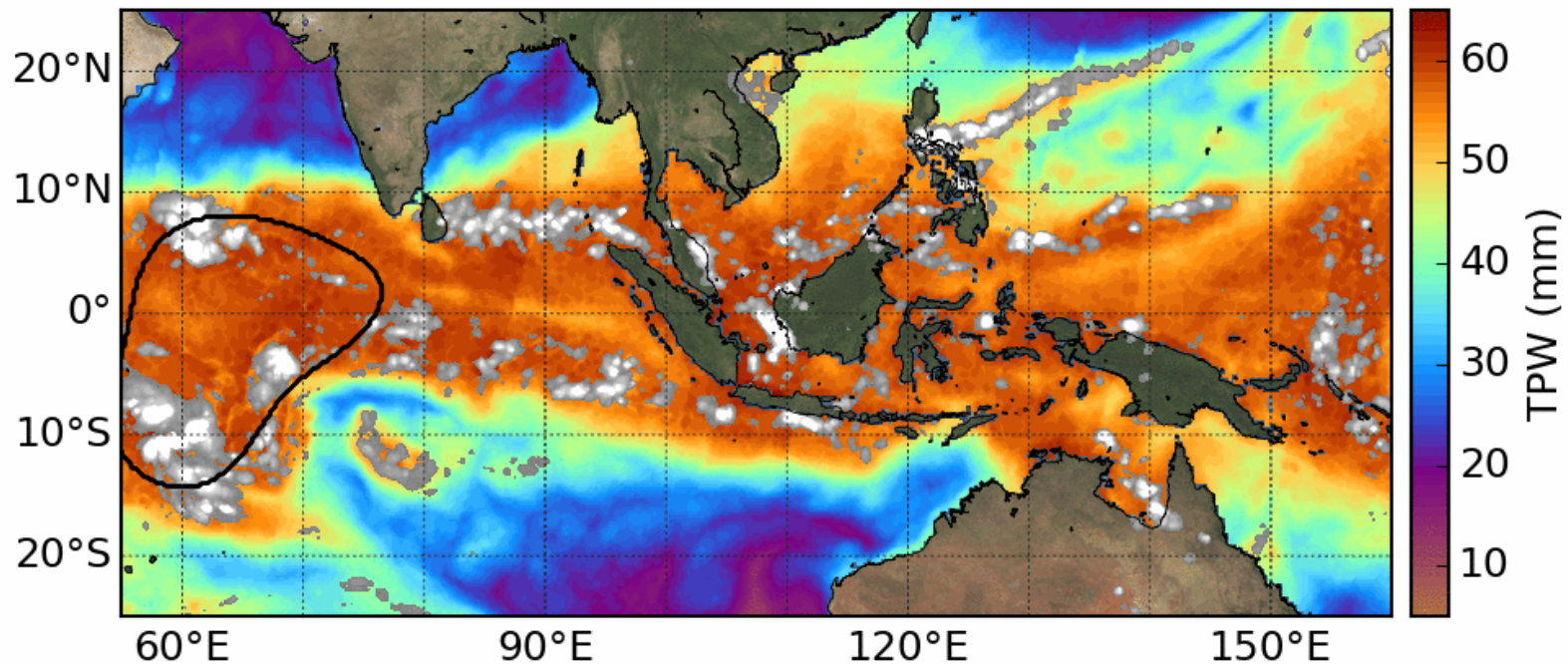


QuikSCAT Mean Winds and Cloud Clusters > 5000 km²
for the 3 Days Ending 20091110

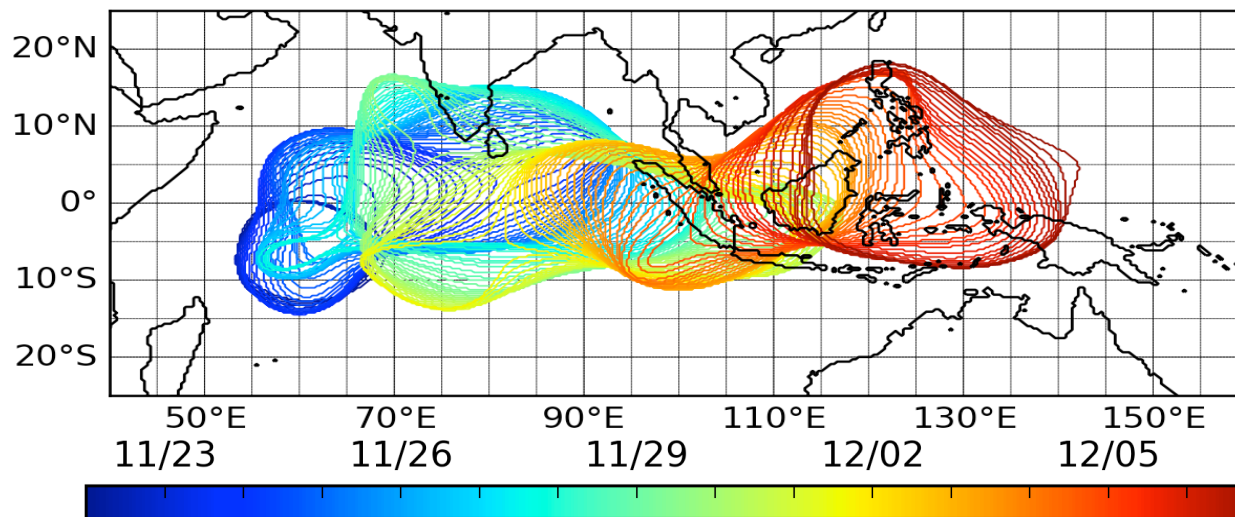


Large-scale Precipitation Tracking (LPT), Kerns and Chen (2016, JGR)

TPW and rainfall rate, 2011-11-22

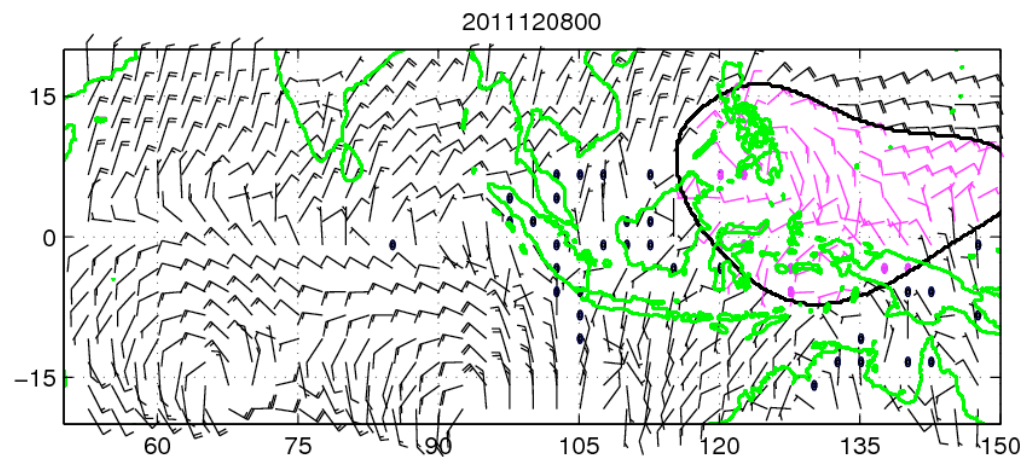
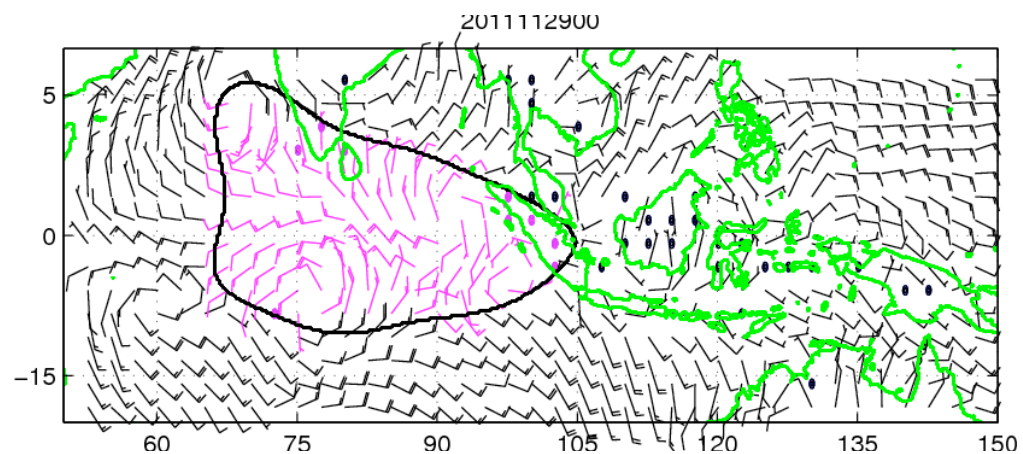
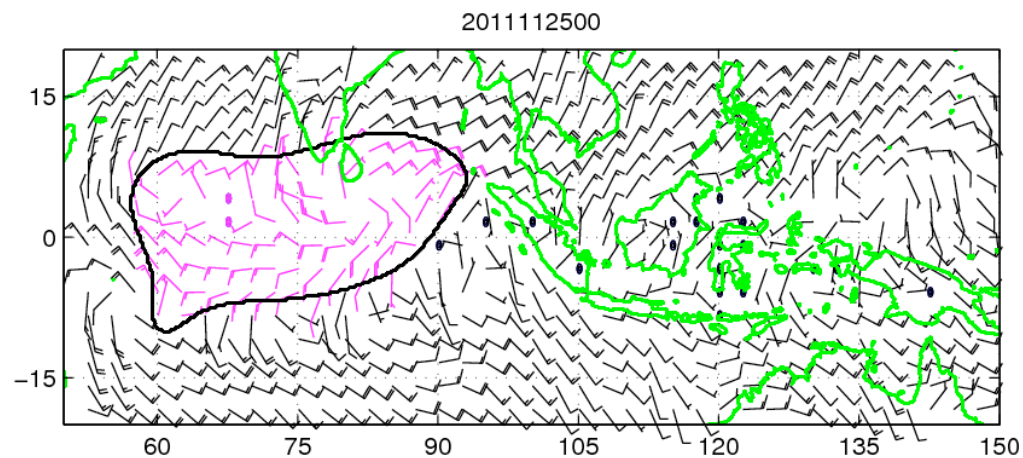
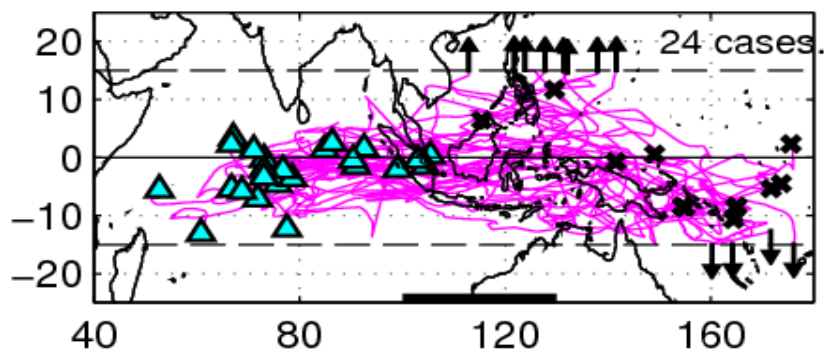


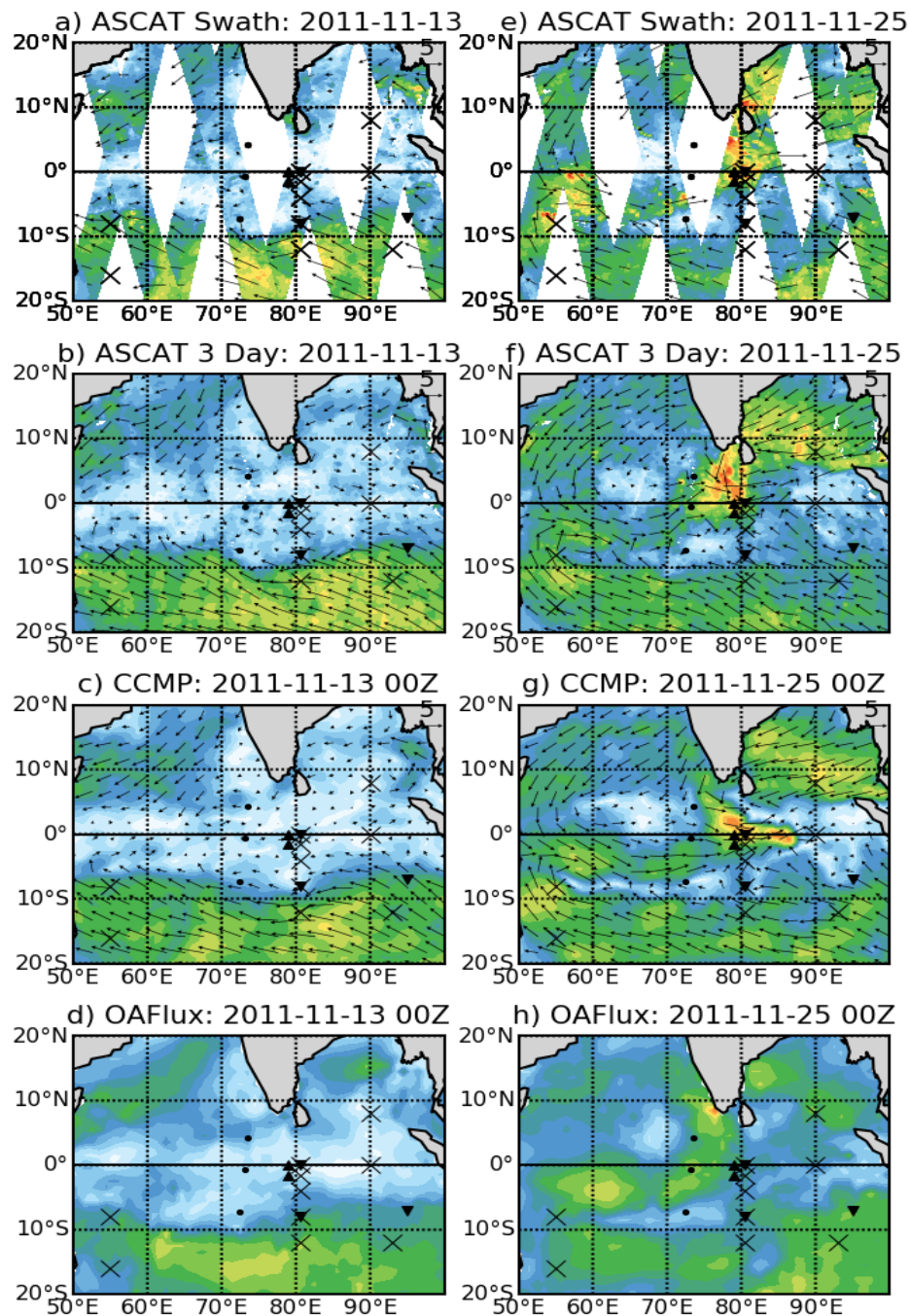
TRMM - 12mm



CCMP 6 hourly winds

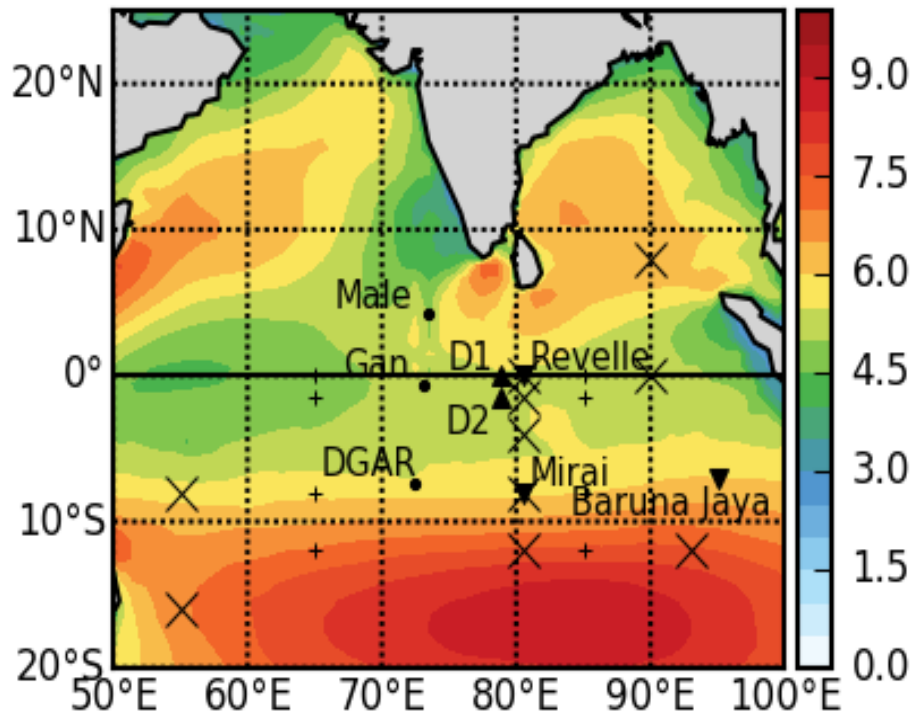
Kerns and Chen (JGR, 2016, 2017)



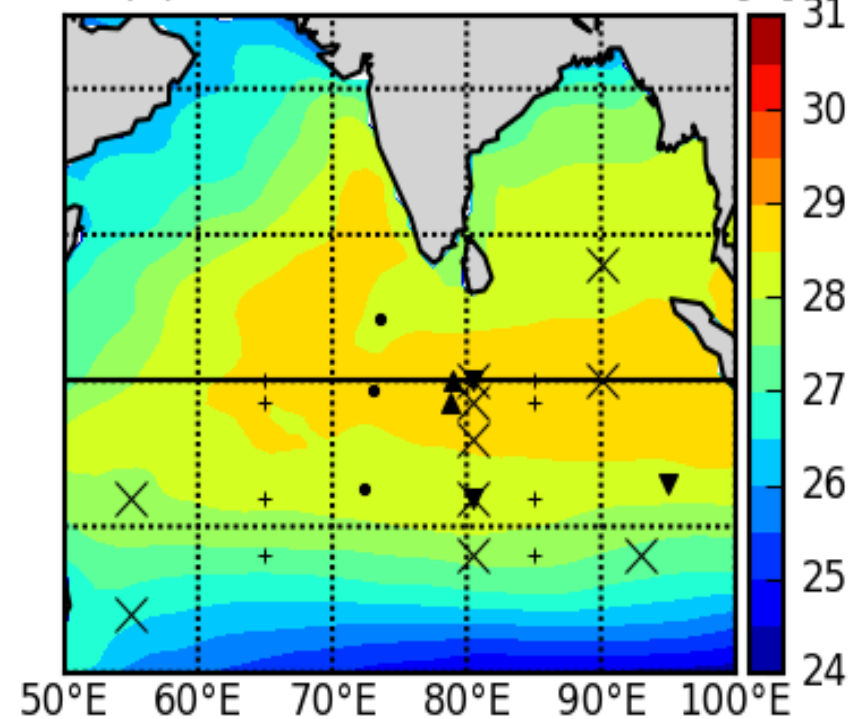


OAFlux

(a) 1980/81 - 2010/11 WSPD [m/s]



(b) 1980/81 - 2010/11 SST [C]



DYNAMO data (Sept 2011 – Jan 2012)

3 Ships:

R/V Revelle

R/V Mirai

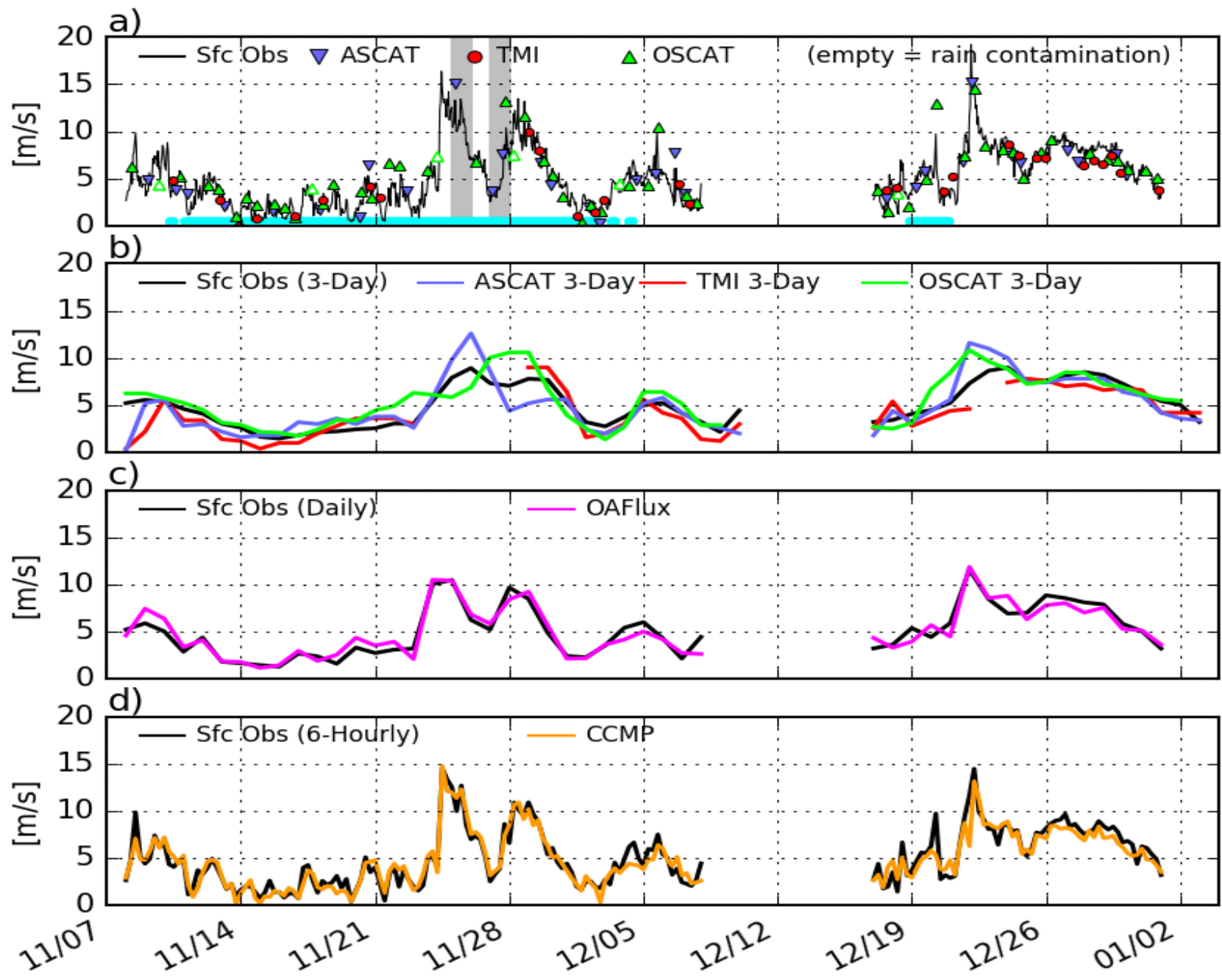
R/V Baruna Jaya

14 Mornings:

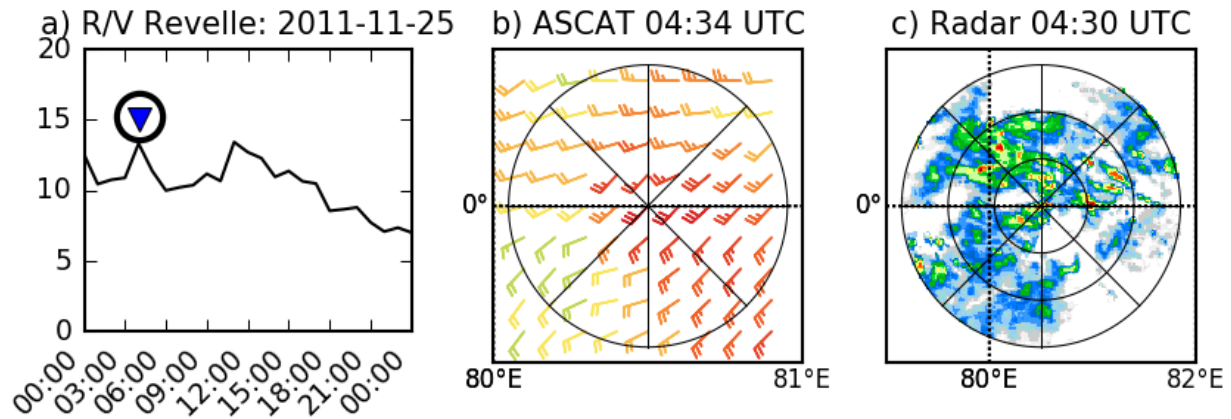
D1, D2, D3,

RAMA 1-11

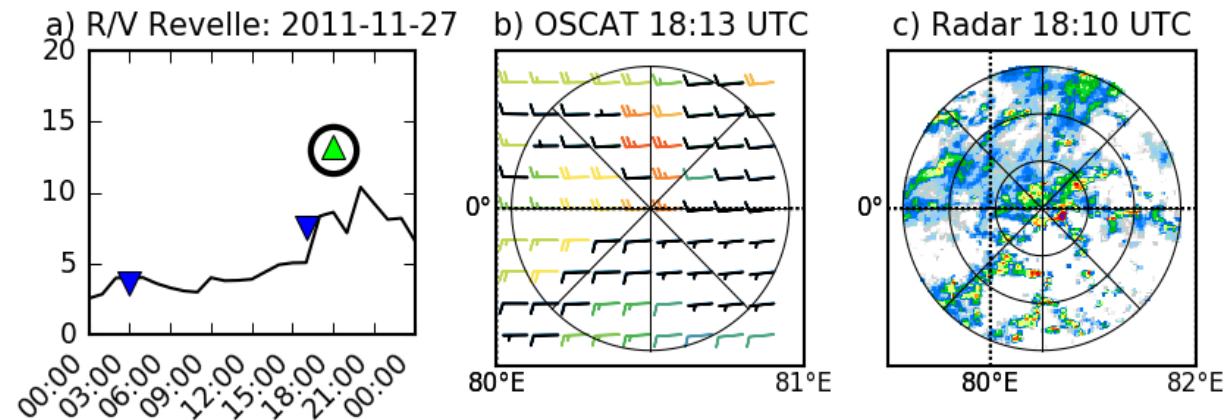
R/V Revelle



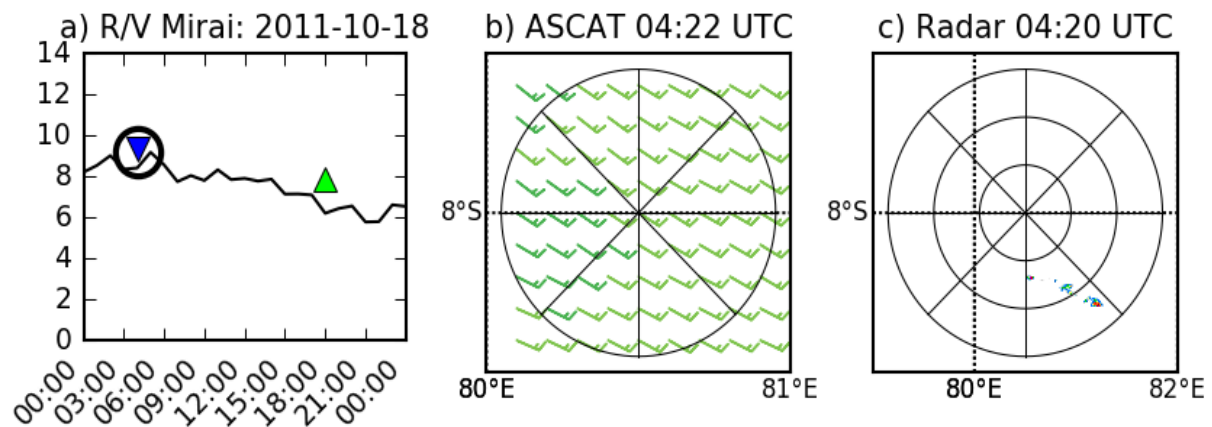
MJO (EQ)

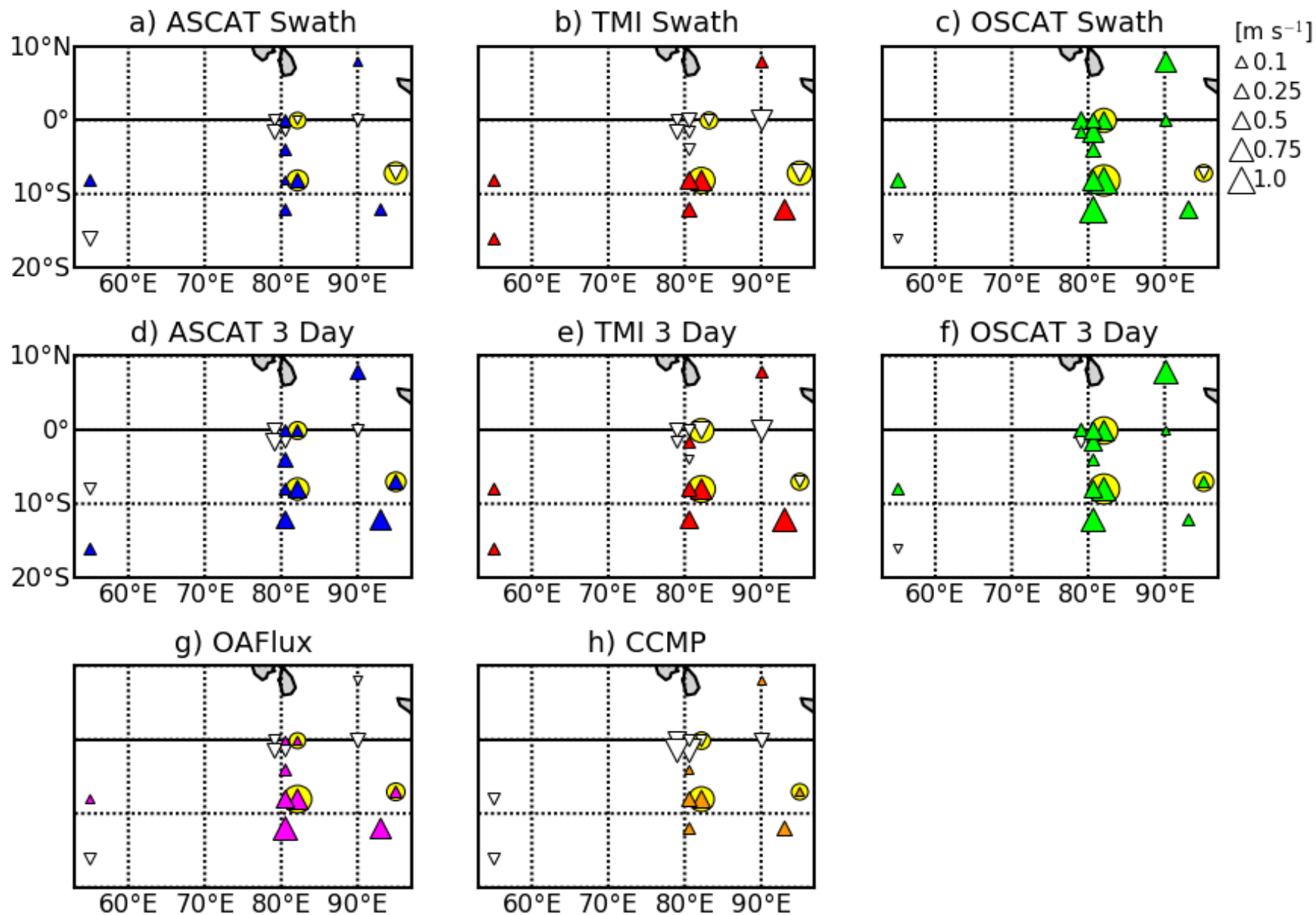


MJO (EQ)

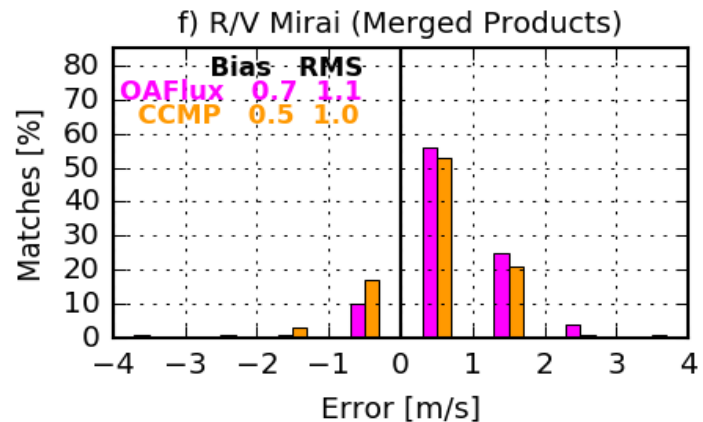
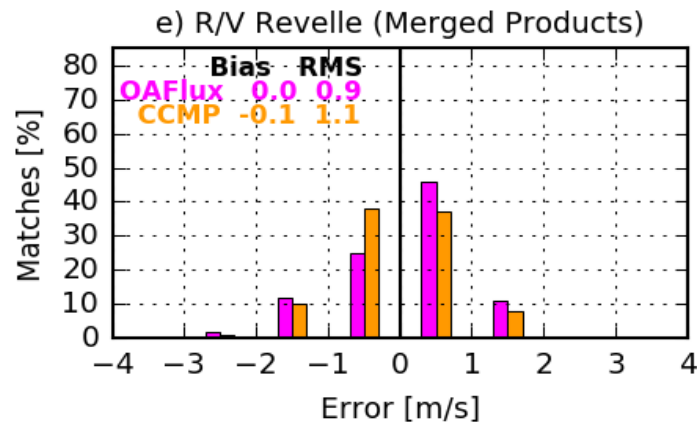
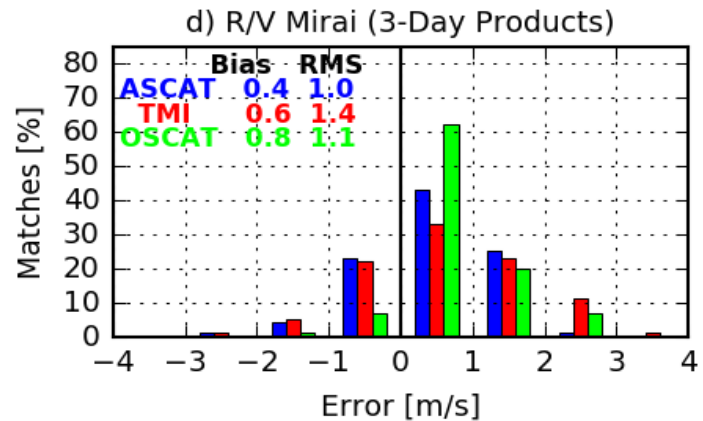
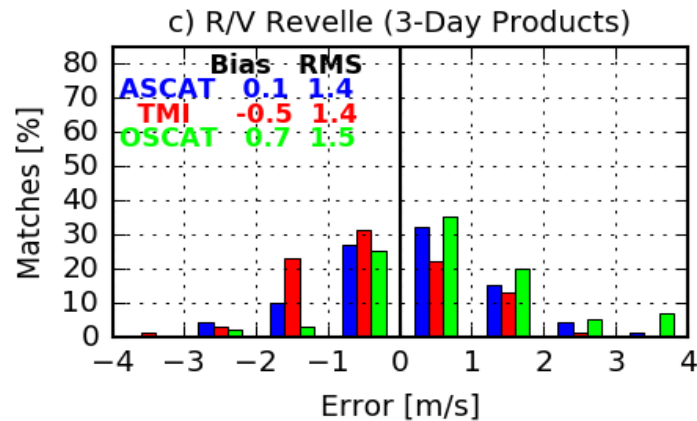
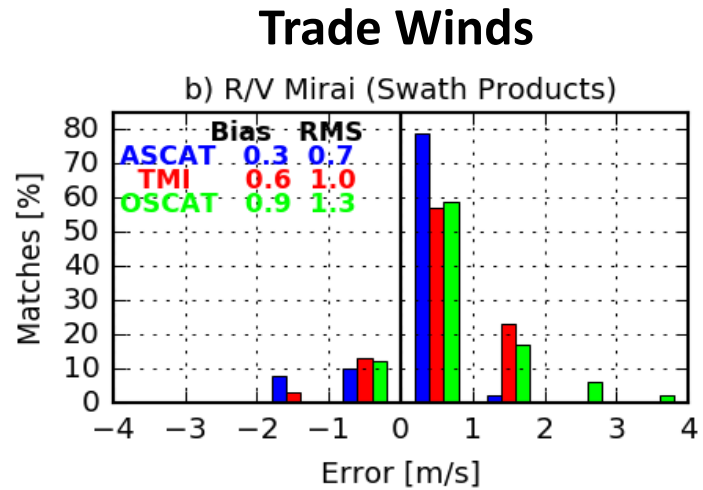
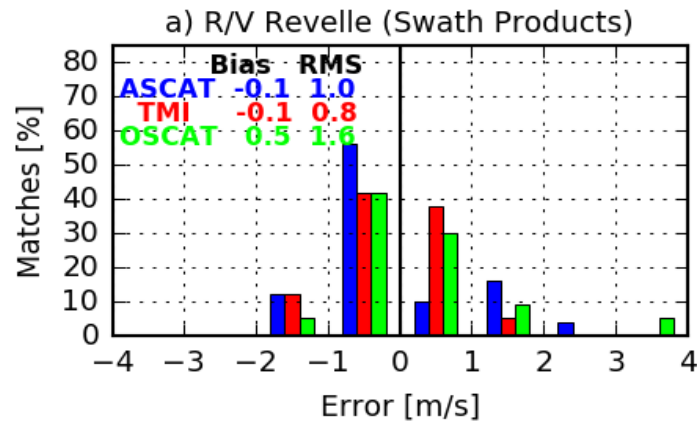


Trade winds

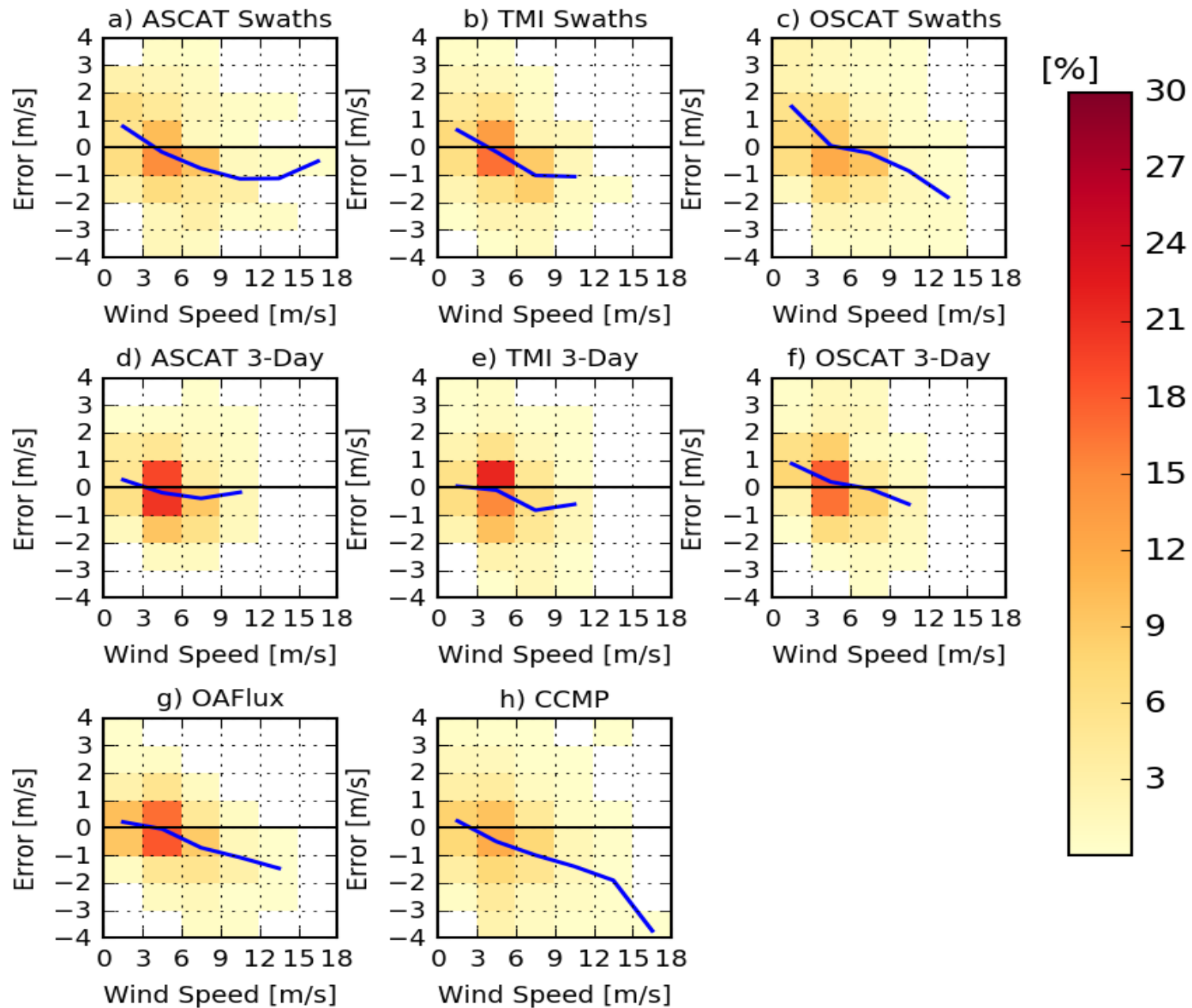




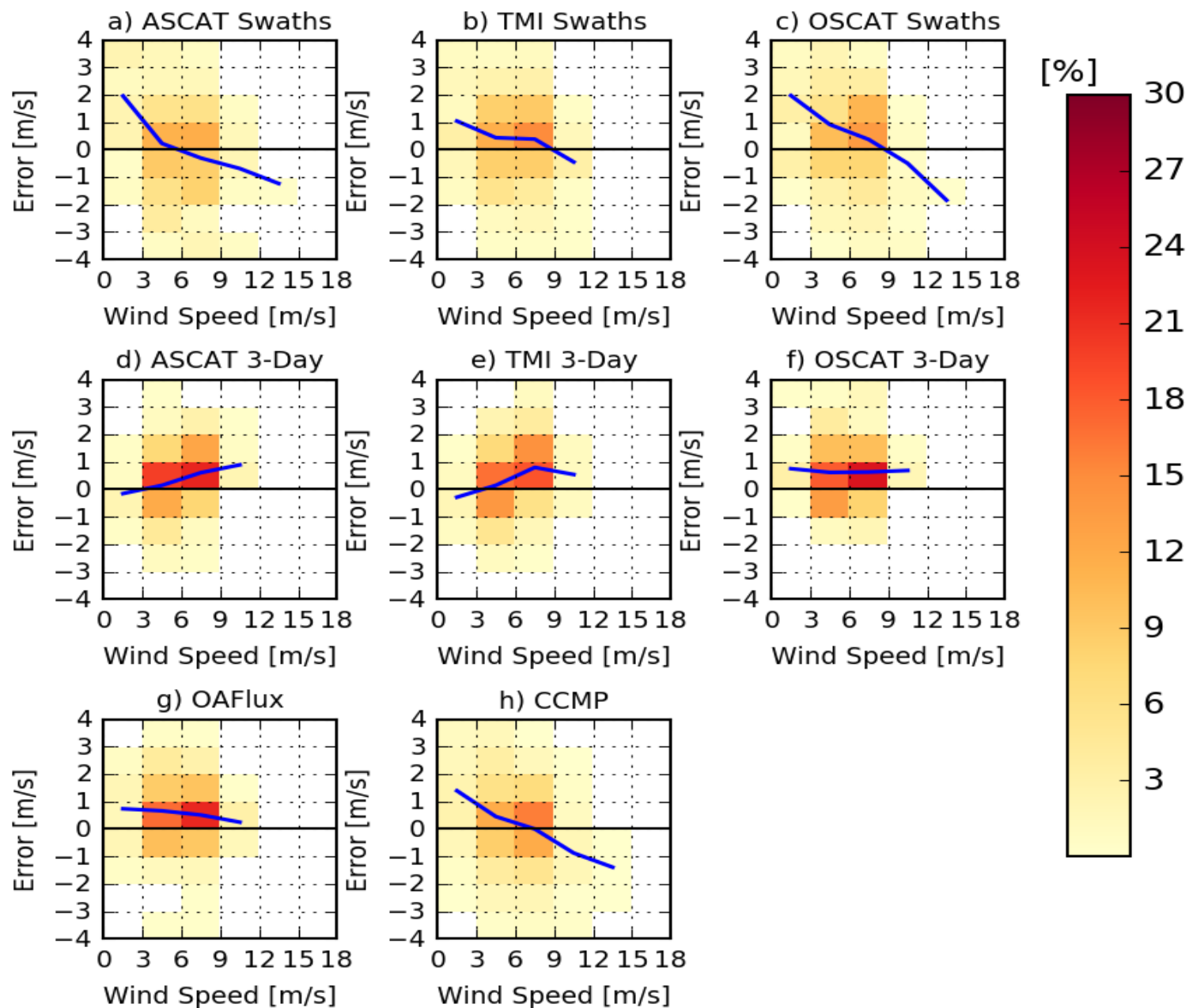
MJO (EQ)



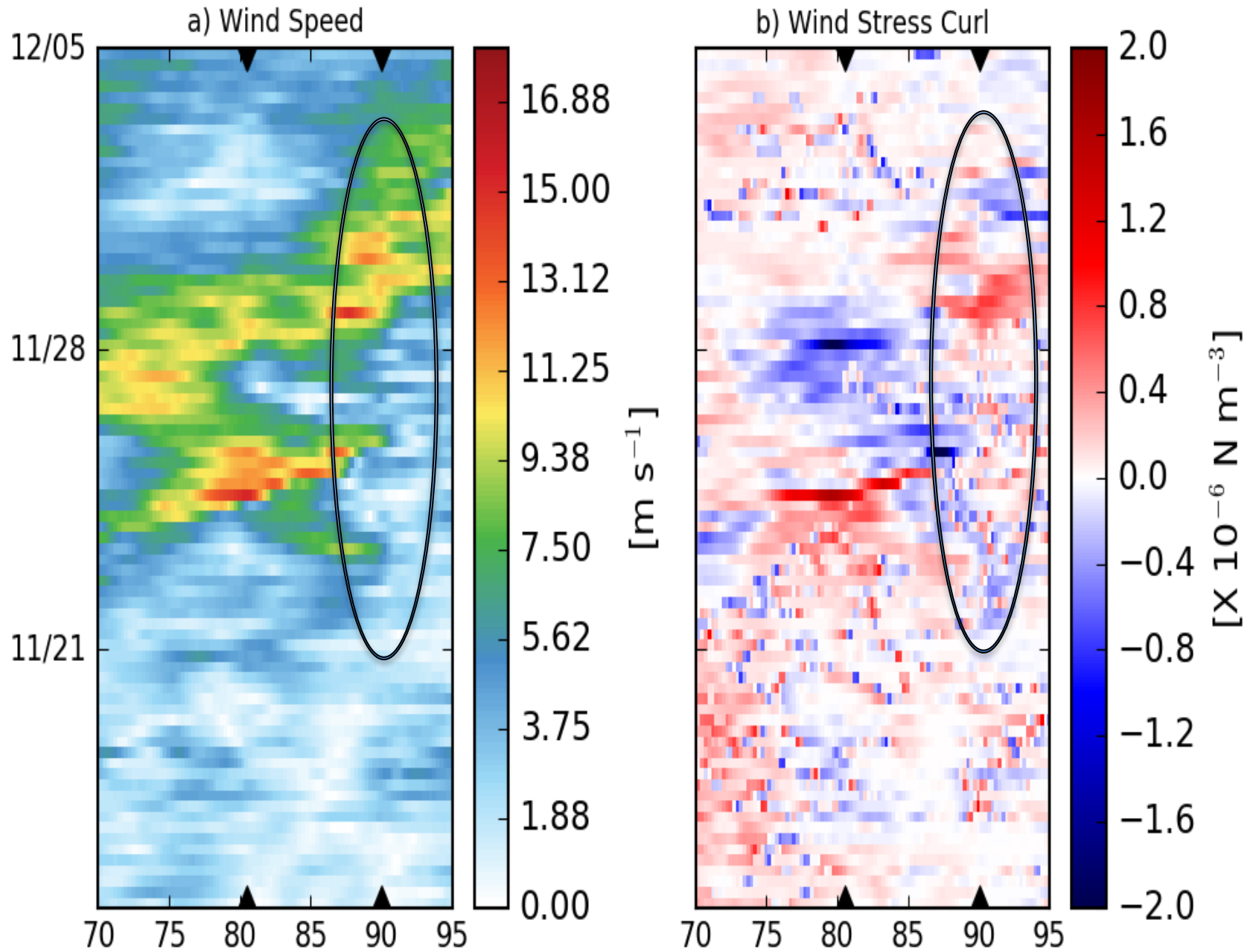
MJO (EQ)



Trade Winds



Unexpected “negative” impacts using in-situ observations in CCMP?



Summary

- **We have an MJO surface wind database based on Large-scale Precipitation Tracking (LPT) using CCMP!**
- **Both swath winds and merged multi-satellite gridded winds are biased low in MJO (due to rain?) and biased high in trade winds (?)**