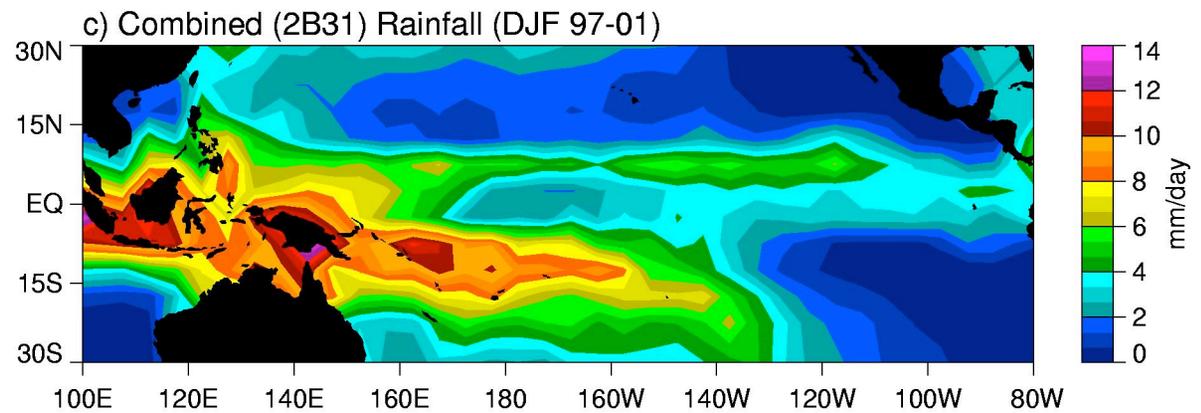
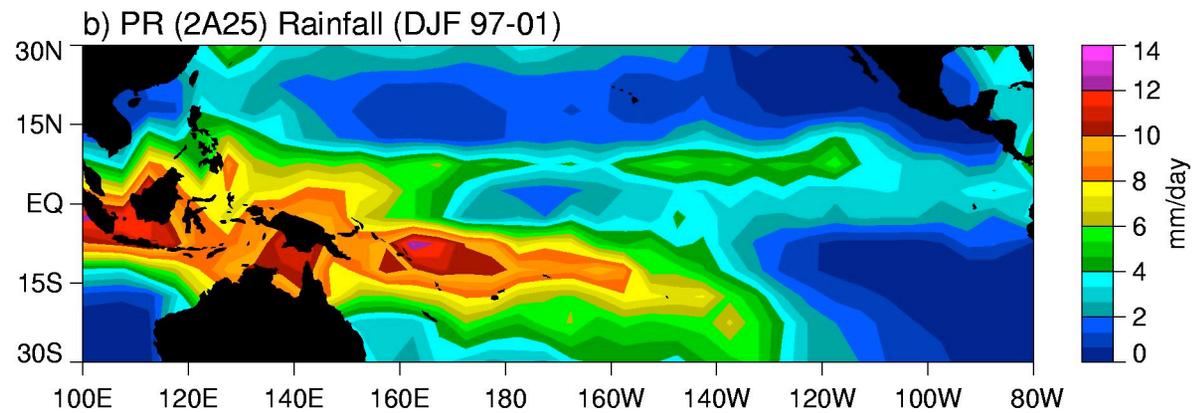
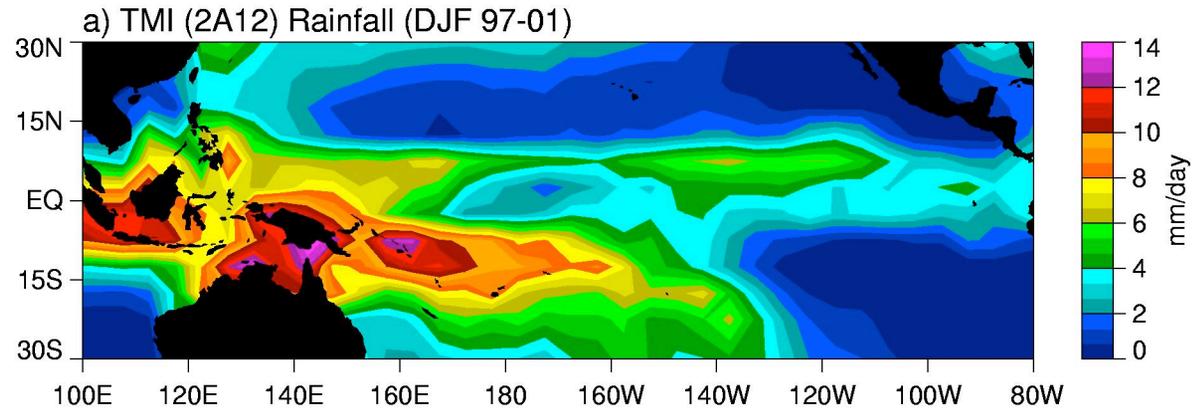
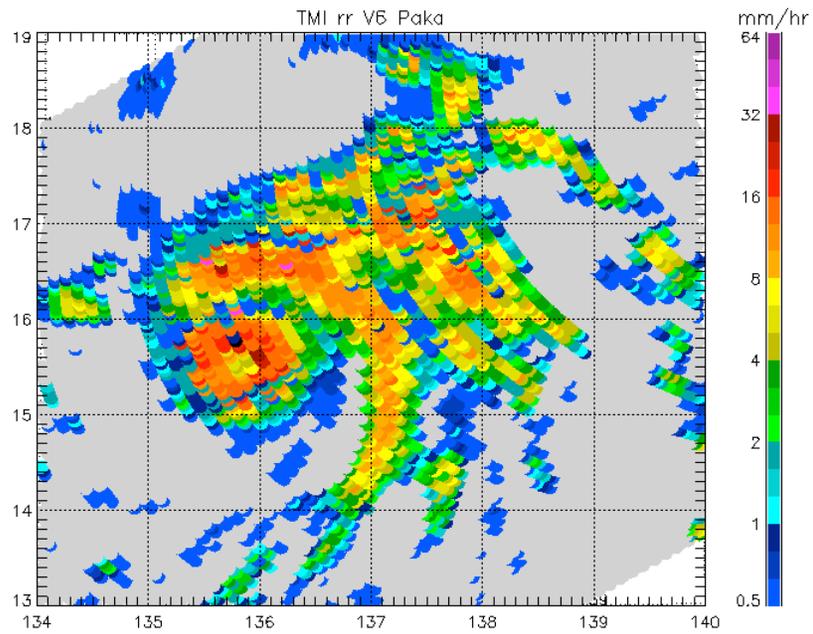


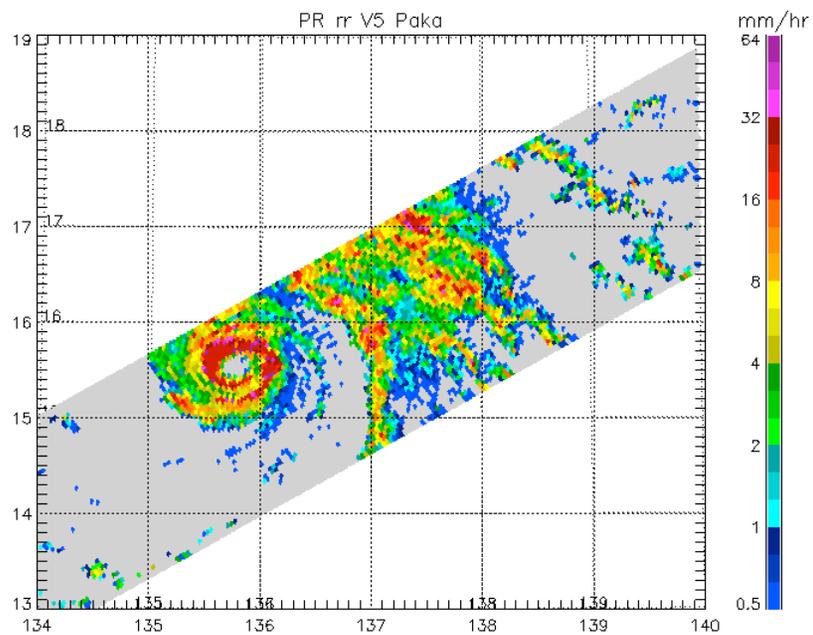
PR/TMI/Comb
(bias removed)



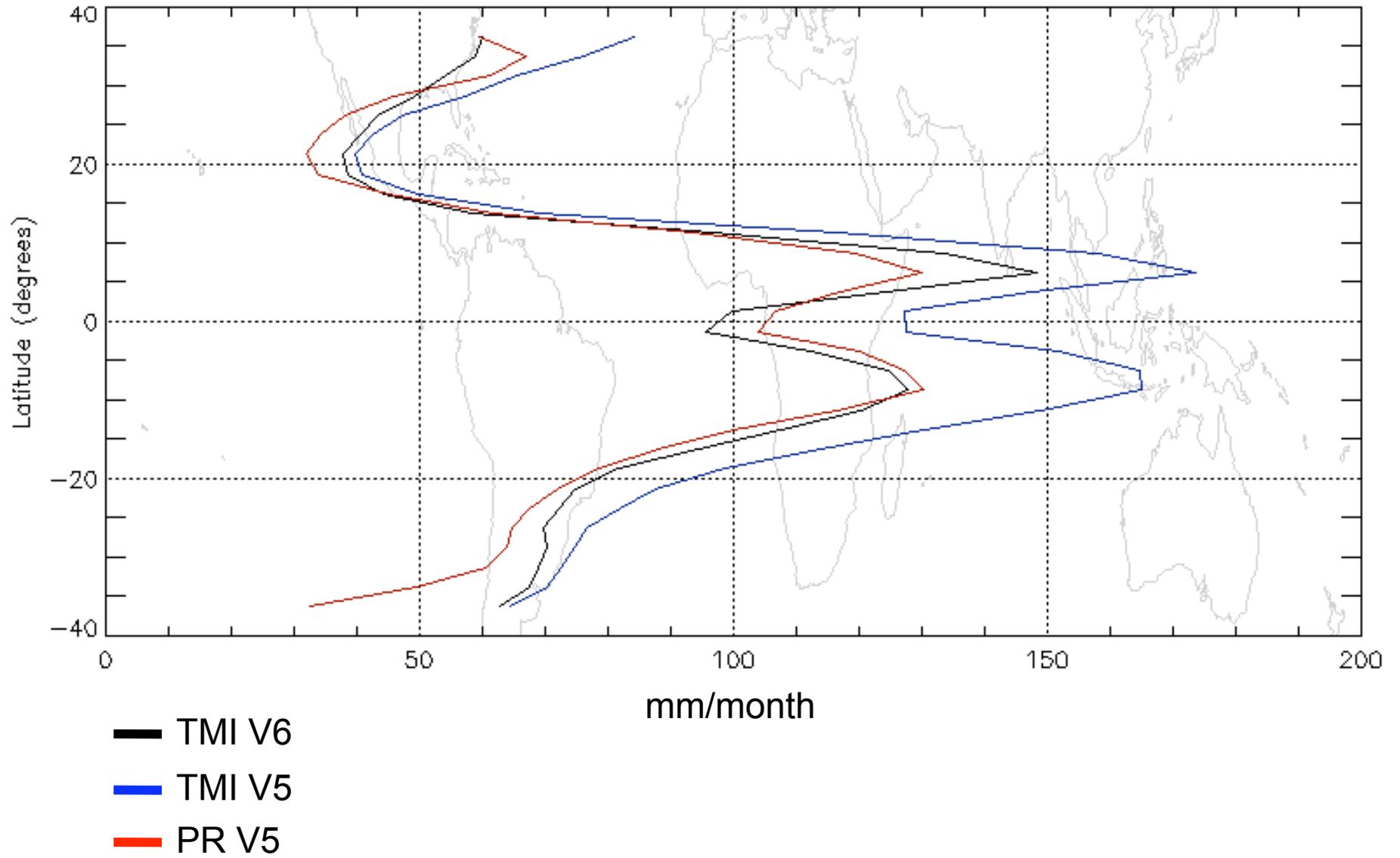


Super Typhoon Paka

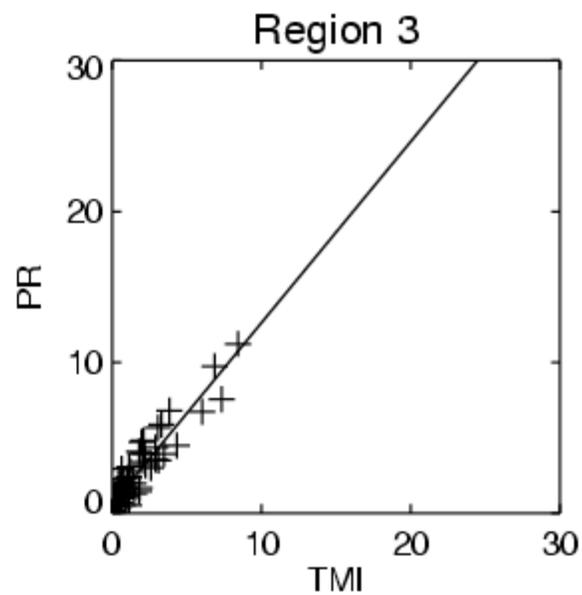
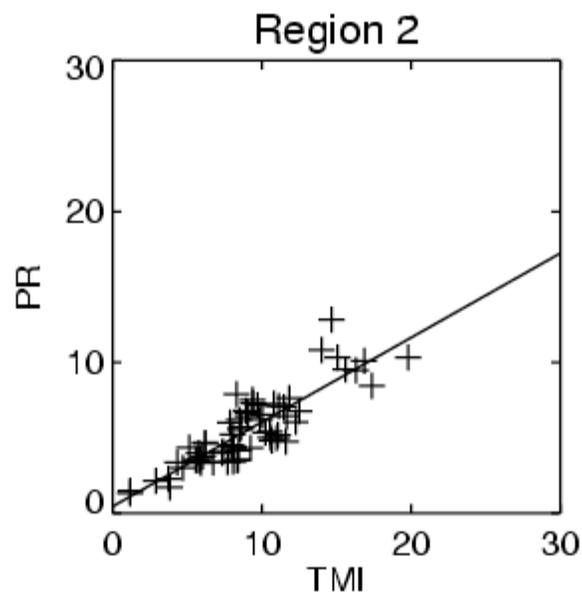
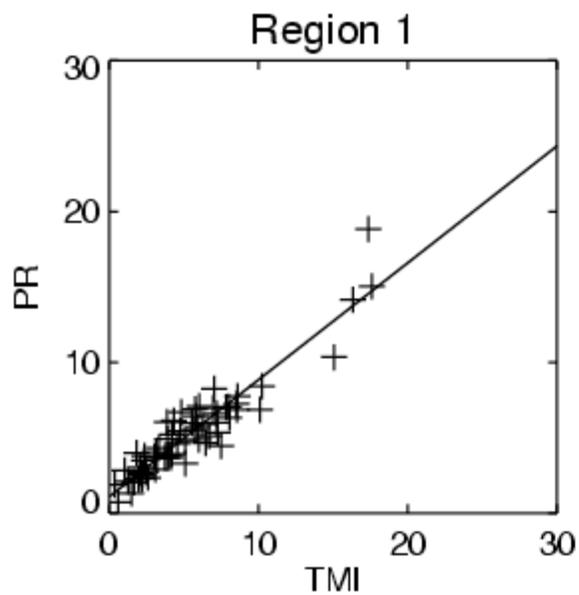
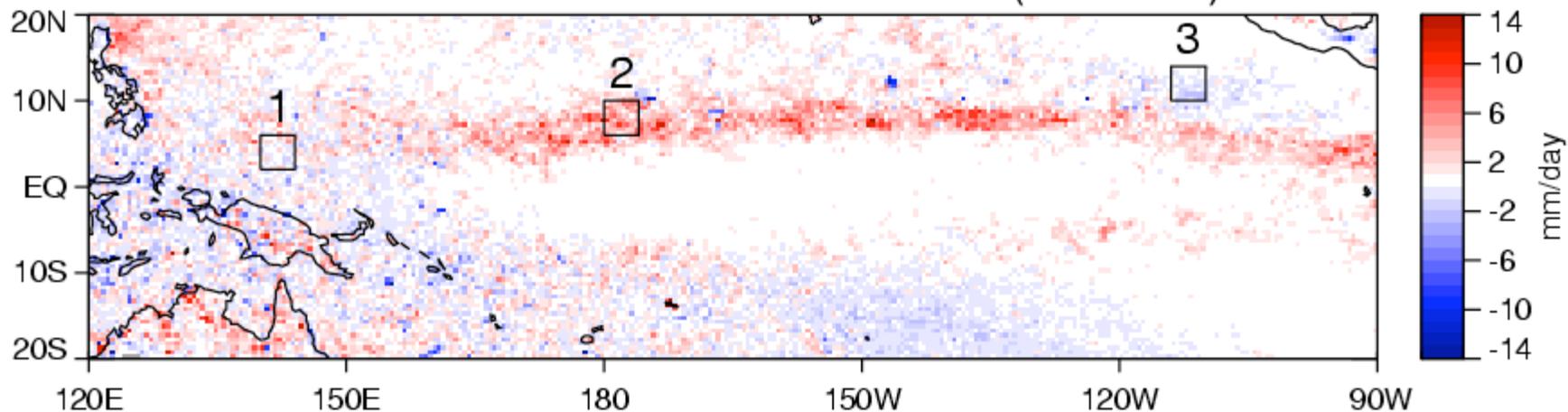
December 1997



December 1999

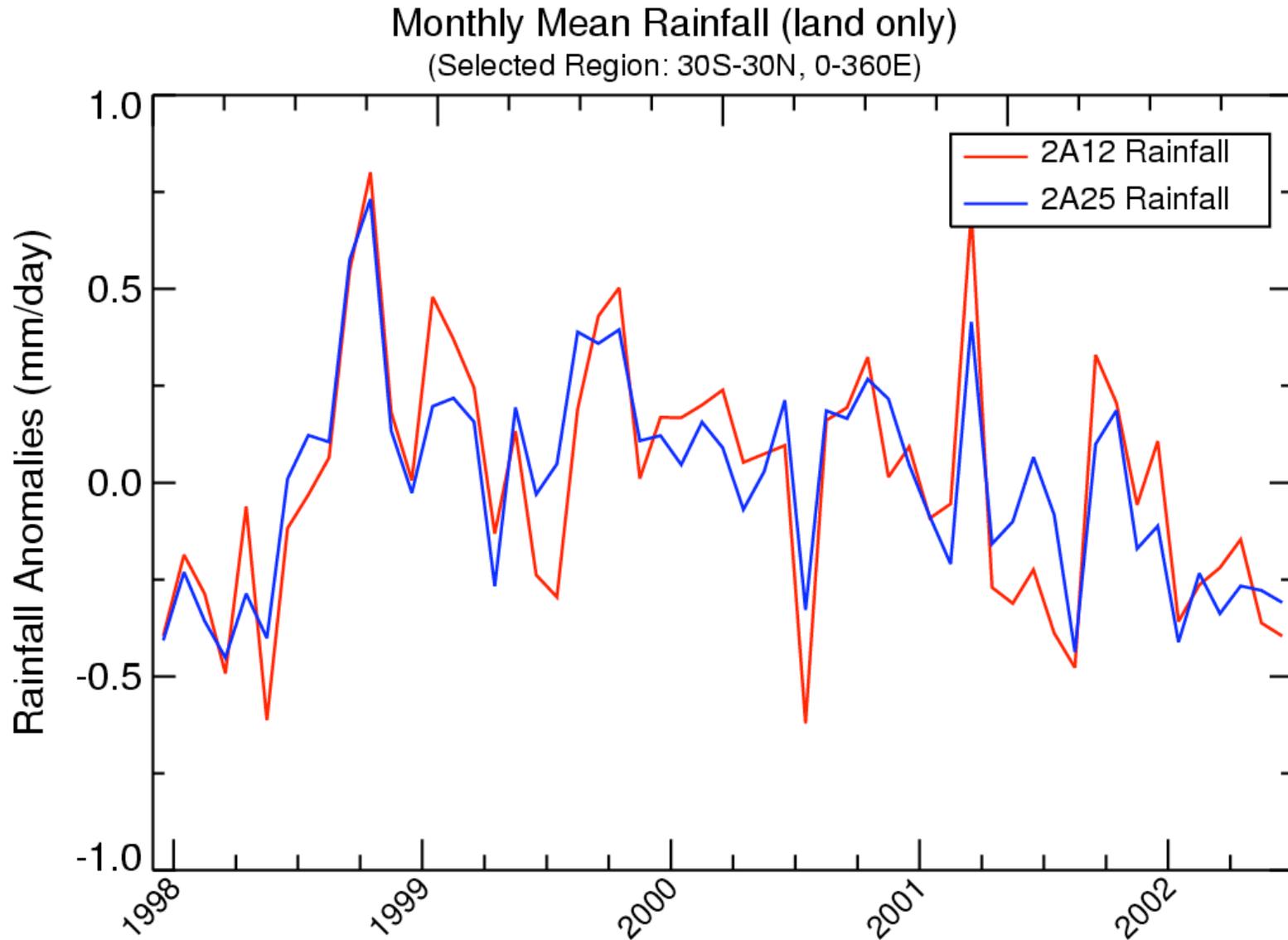


Dec-Jan-Feb 1999/2000 Rainfall Bias (TMI - PR)



Tropical Rainfall Anomalies

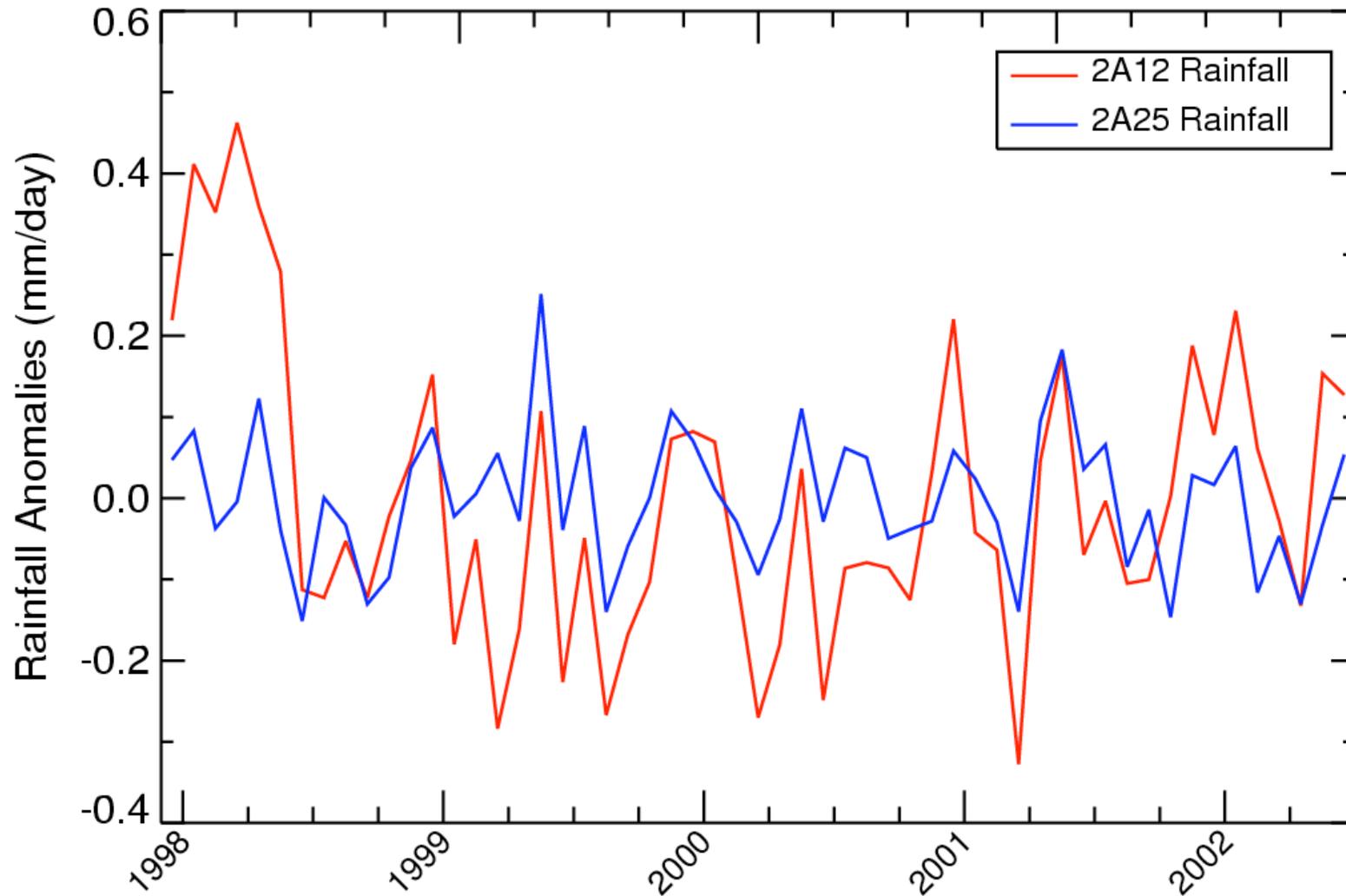
(TRMM Land Retrievals)

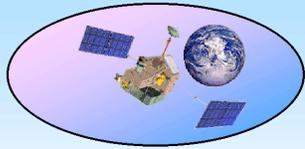


Tropical Rainfall Anomalies

(TRMM Ocean Retrievals)

Monthly Mean Rainfall (ocean only)
(Selected Region: 30S-30N, 0-360E)





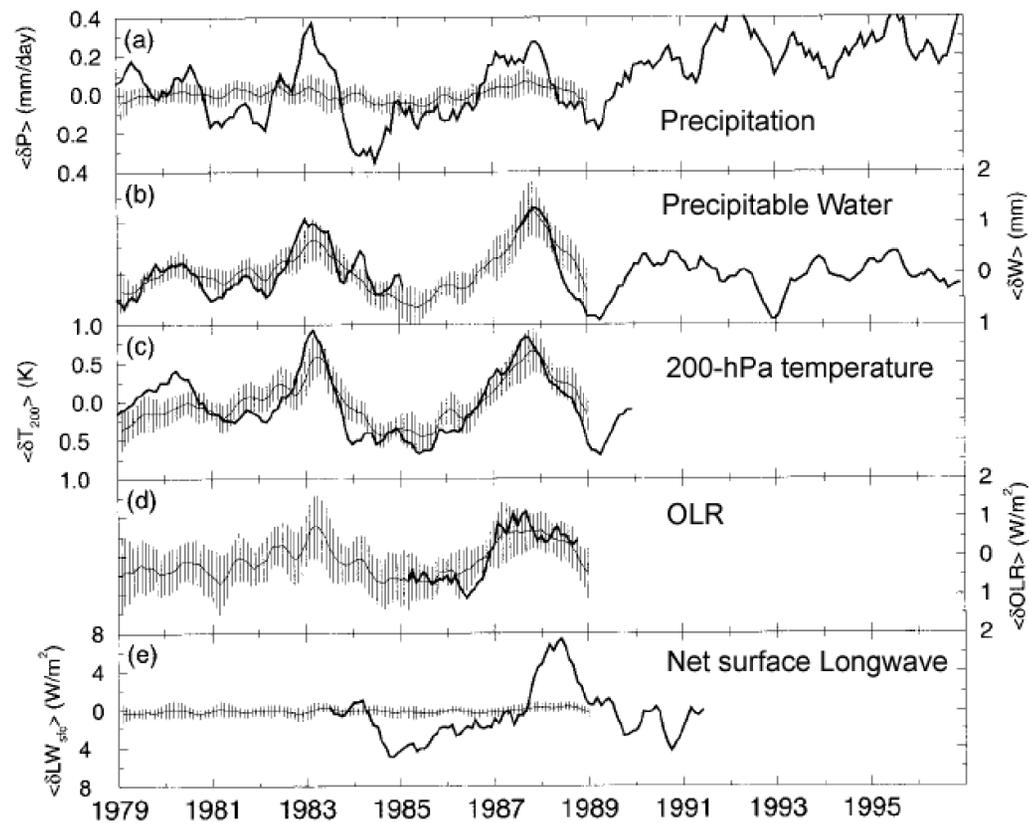
Climate Variability

Models vs. Observations

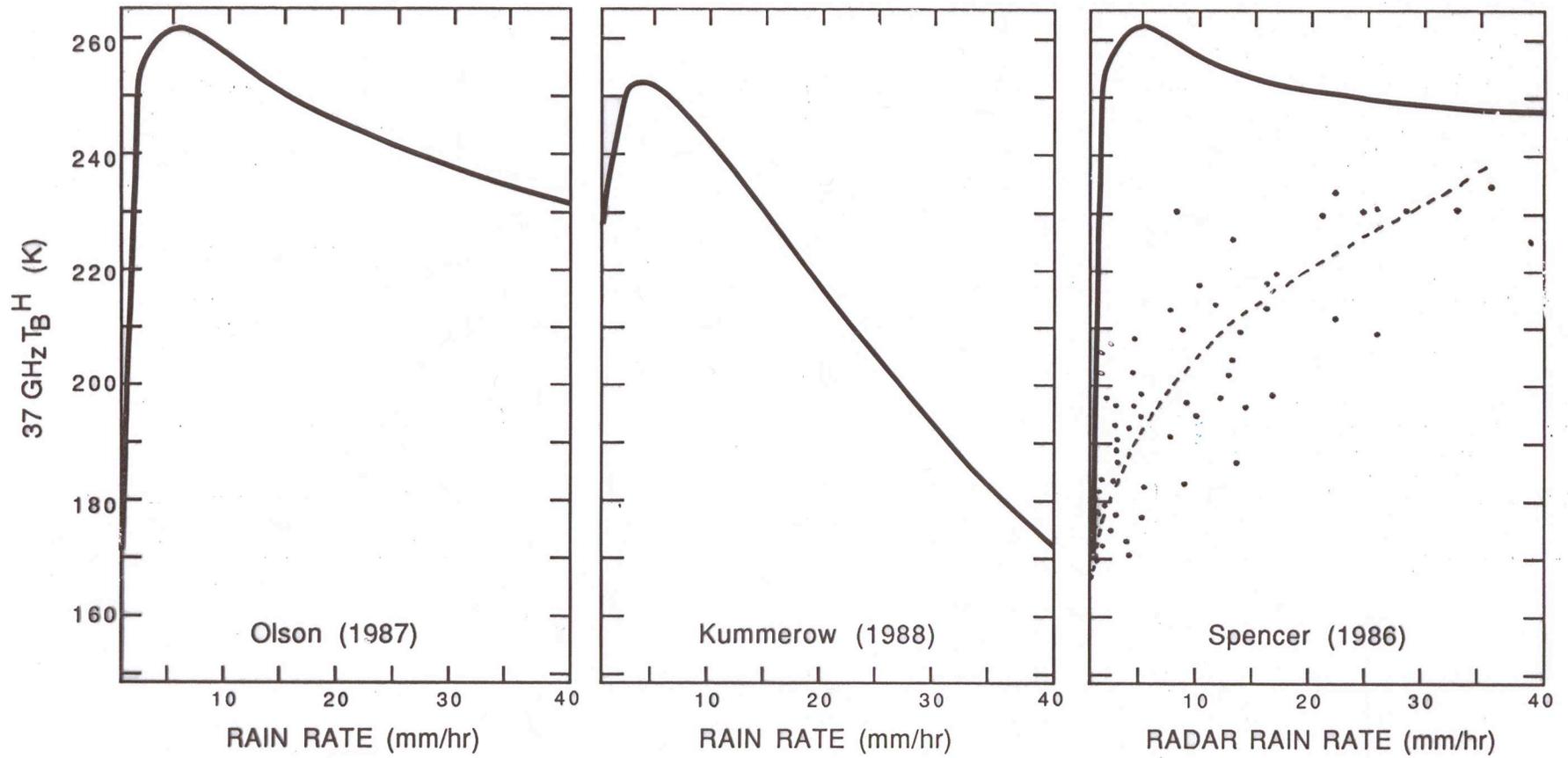


Soden, 2000

JOURNAL OF CLIMATE

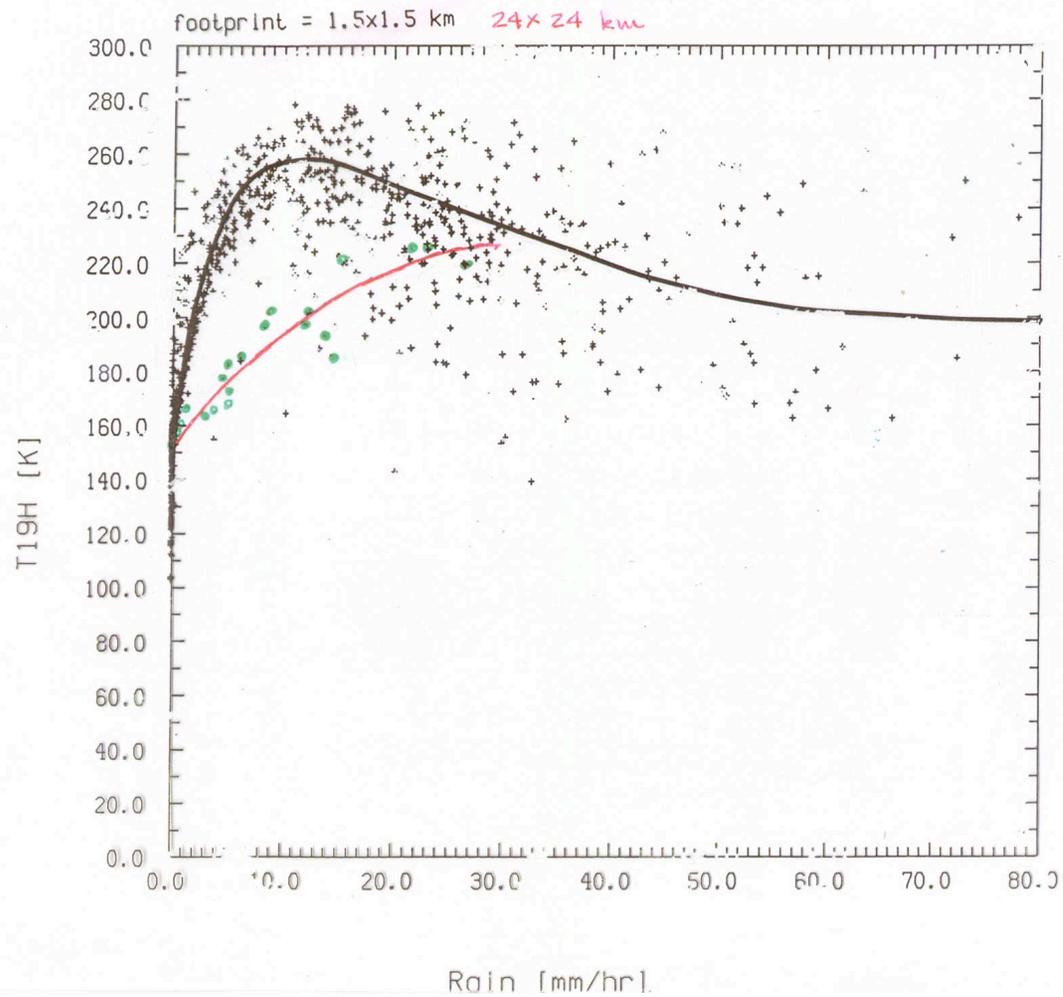


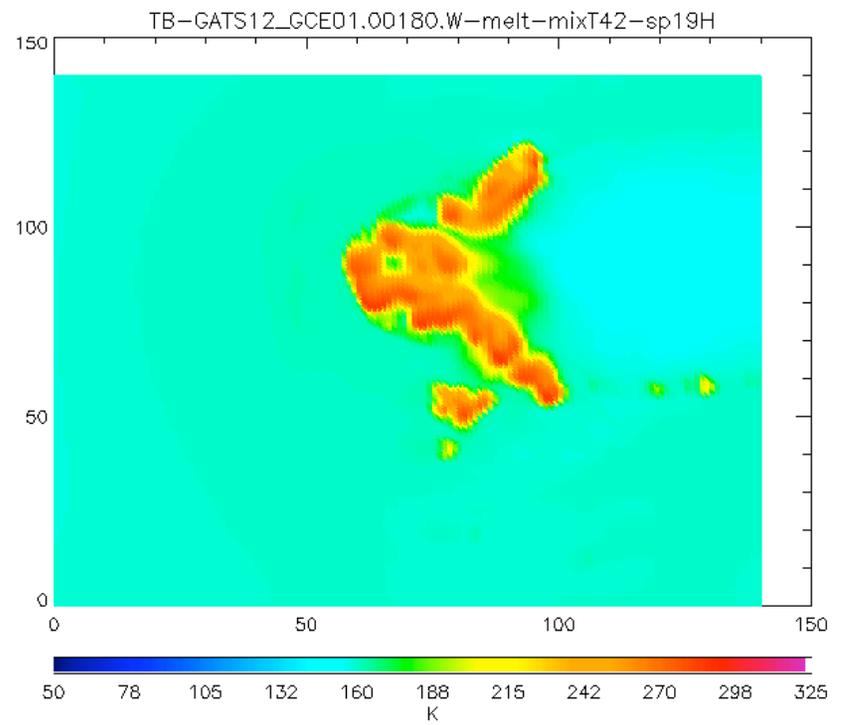
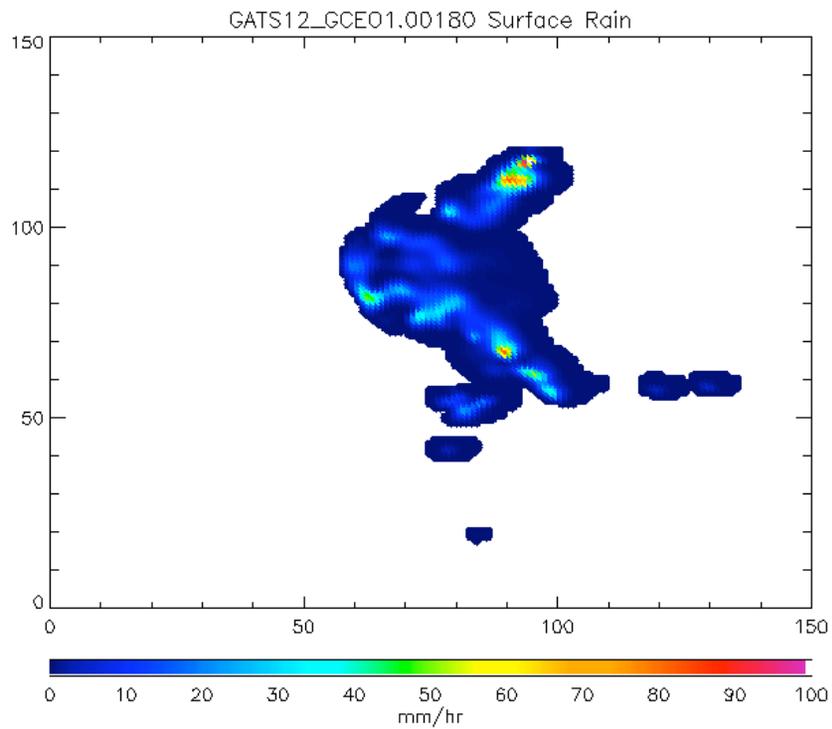
Microwave Radiometer



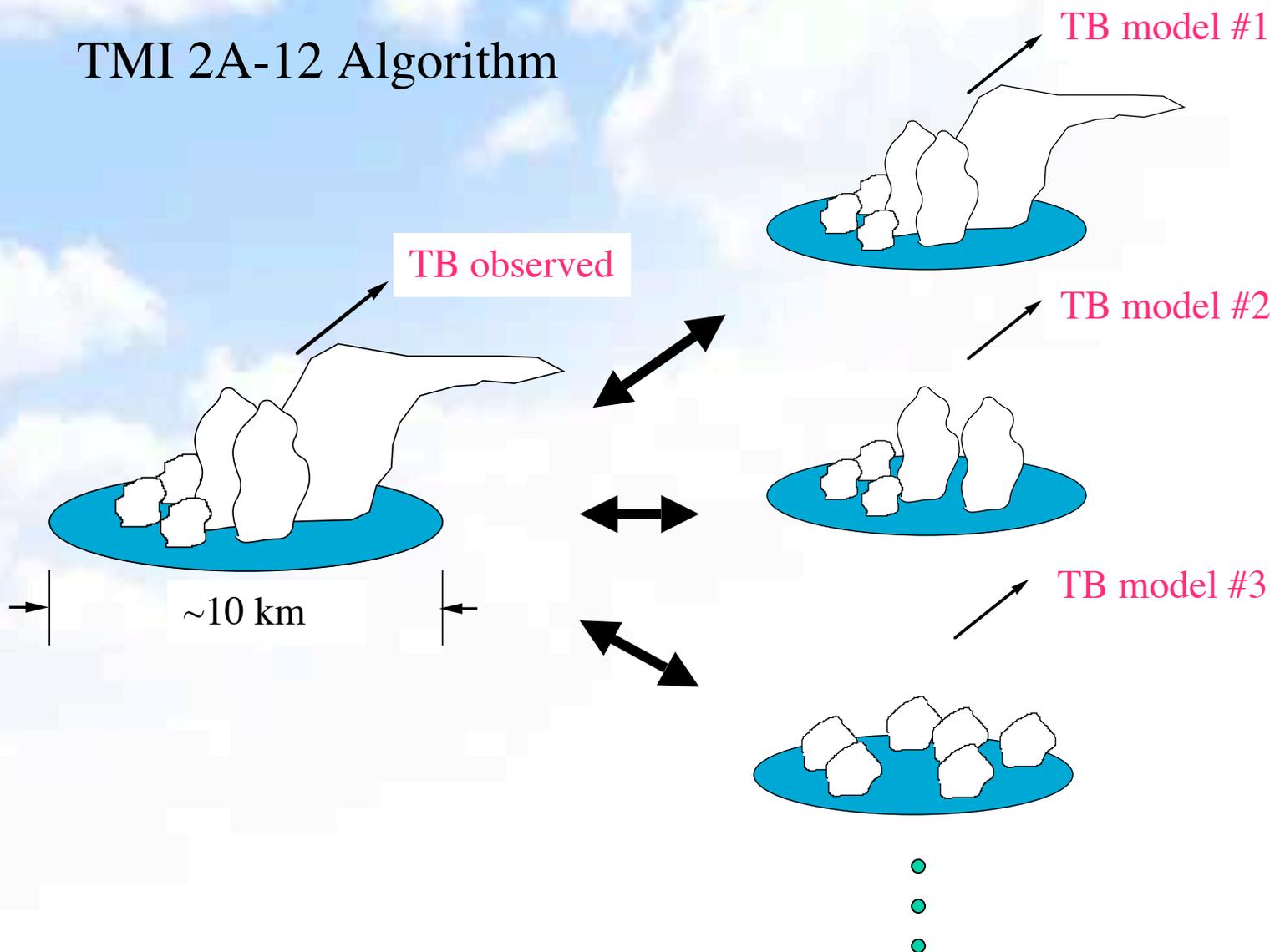
Microwave Radiometer

Theoretical Tb from dynamical cloud model.





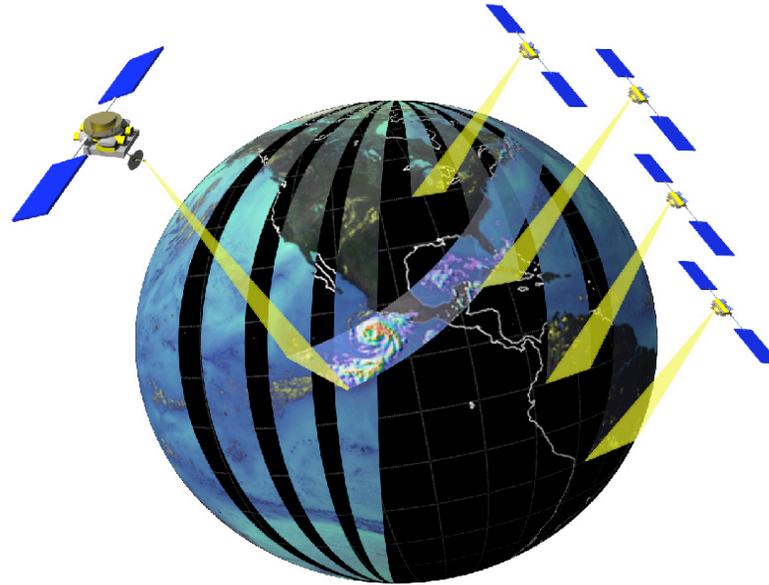
TMI 2A-12 Algorithm



Current Rainfall product Status

- 3-D CRM with 2-3 km spatial resolution & explicit ice microphysics forms basis of current retrievals
- Instantaneous rainfall products are good & enough observation are likely to have significant impact:
 - Data Assimilation
 - Forecast Model Initialization
- Sensitivity to regional & time dependent uncertainty is subject of current research

A New Algorithm for TRMM/GPM



CORE SATELLITE

- Dual frequency radar
- Multifrequency radiometer
- Non-sun synchronous orbit
- ~ 70° inclination
- ~ 400 - 500 km altitude
- ~ 4 km horizontal resolution
- 250 m vertical resolution

MISSION: Understand the horizontal and vertical structure of rainfall and its microphysical elements. Provide training for constellation radiometers.

CONSTELLATION SATELLITES

- 8 small satellites with microwave radiometer only*
- 3 hr revisit time
- Sun-synchronous polar orbit
- ~ 600 km altitude

*Some of the 8 small satellites may be replaced by existing radiometers (e.g., SSM/Is, AMSR, etc.)

MISSION: Provide enough sampling to reduce uncertainty in short-term rainfall accumulations. Extend scientific and societal applications.

2-D CRMs

- Observations provide statistical verification of rainfall and vertical structure. Direct radiance comparisons are possible. Probable impact on microphysical parameterizations.
- By GPM era (2008), if not before, observations will provide changes in cloud morphology associated with large scale circulation changes (currently known as regional biases).
- Observations can provide validation for 2-D CRM statistics for grid box applications.