Toward an Improved Understanding of the Tropical Energy Budget Using TRMM Atmospheric Radiative Heating Products

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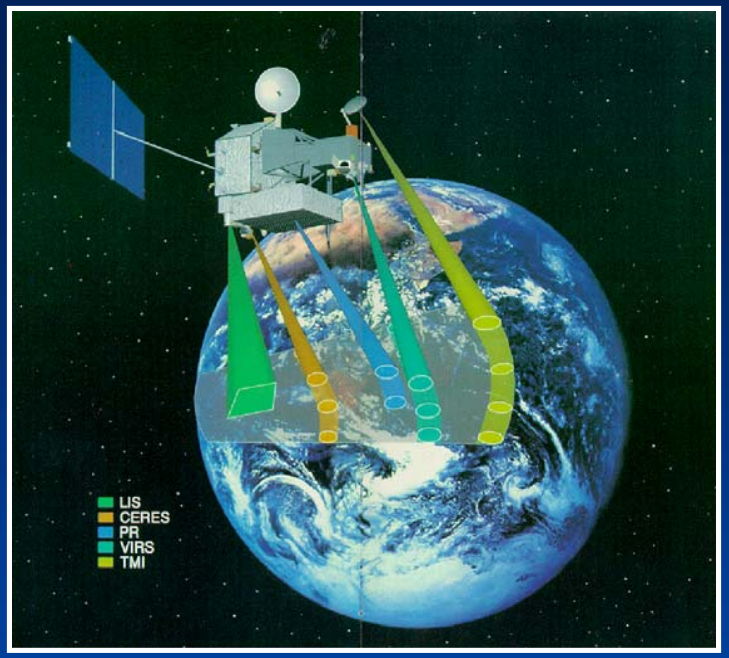
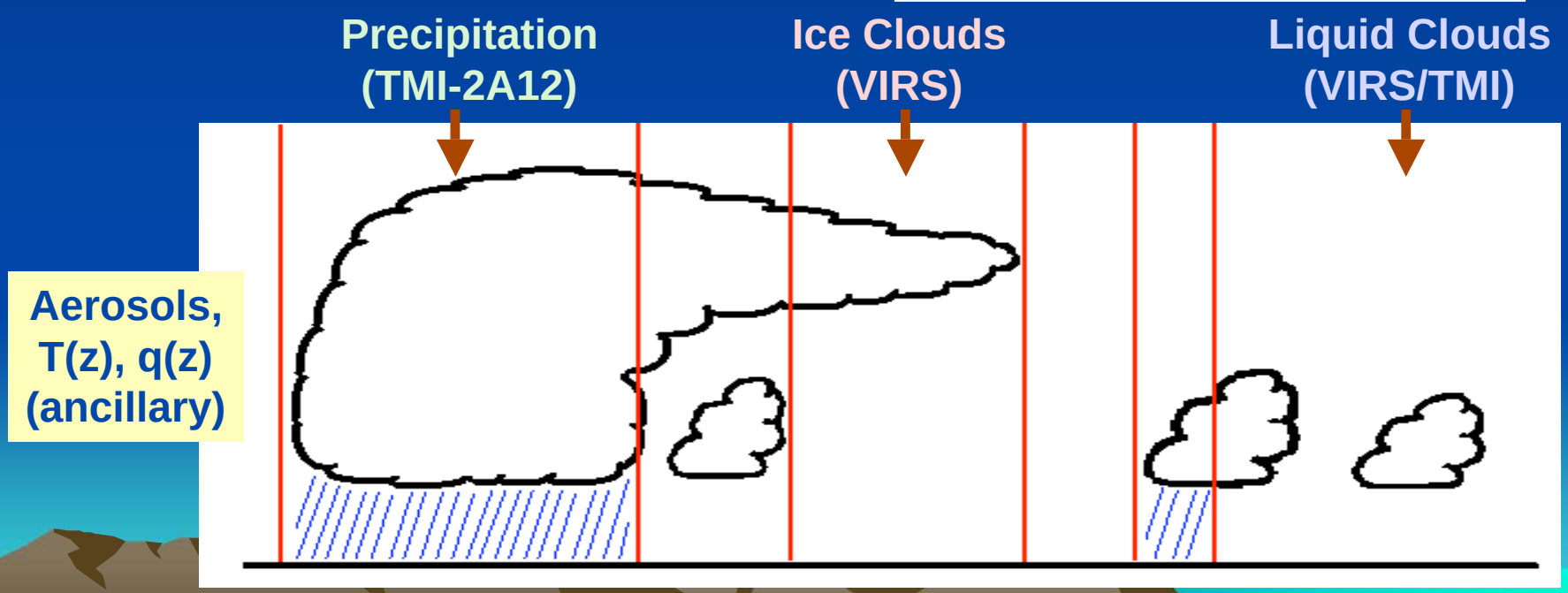
W. S. Olson, M. Grecu, C. L. Shie, X. Jiang,
D. Waliser, J. Li, and B. Tian

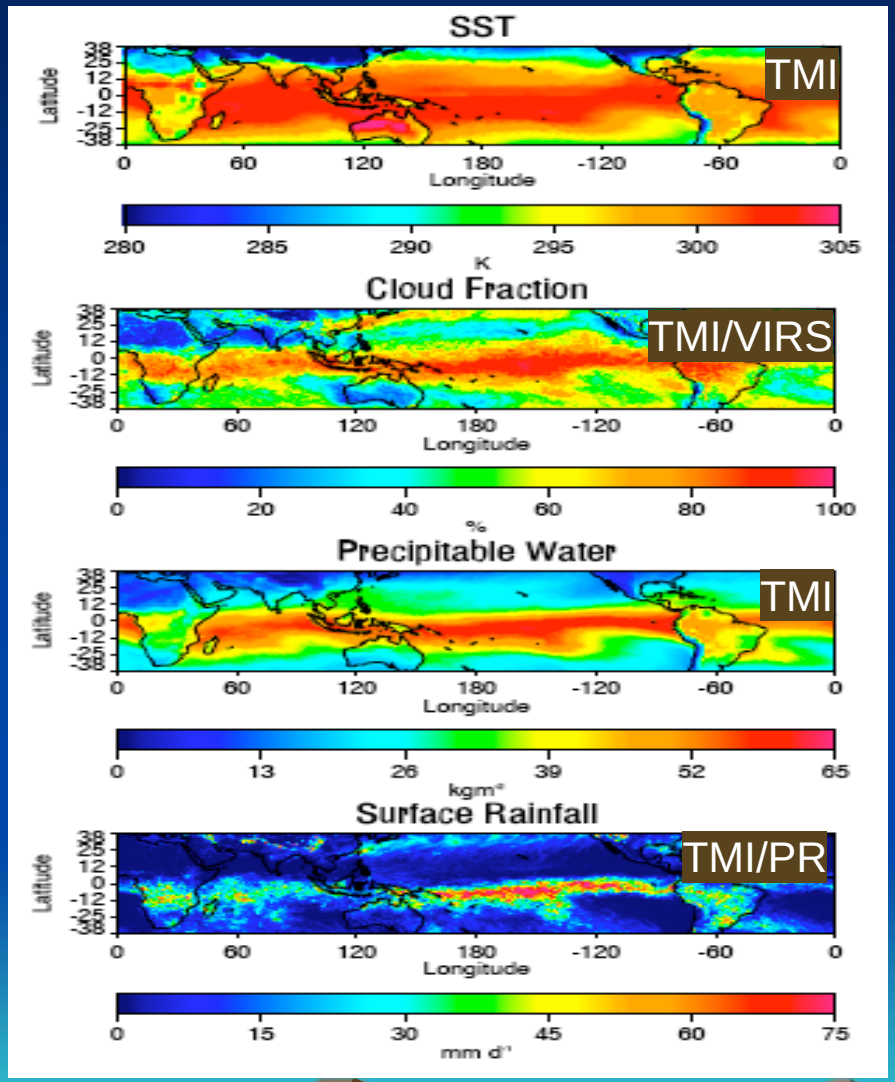
Estimating Q_R with TRMM

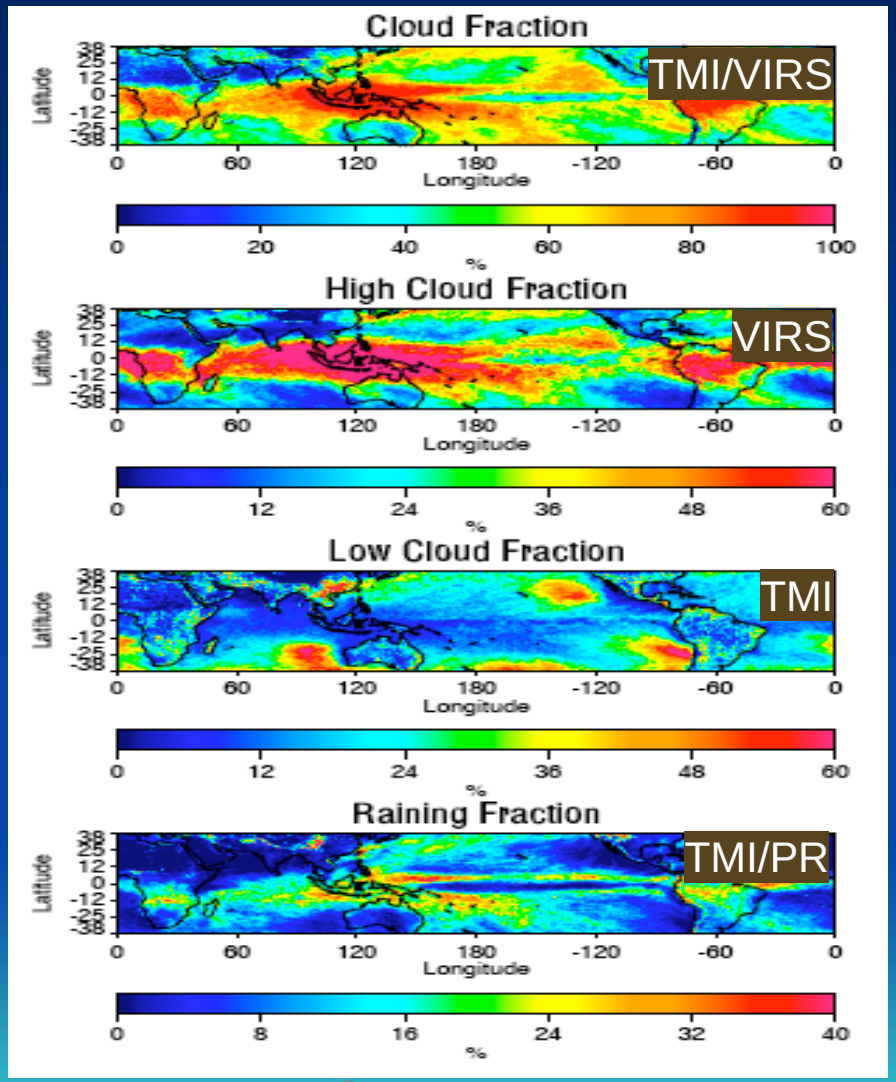




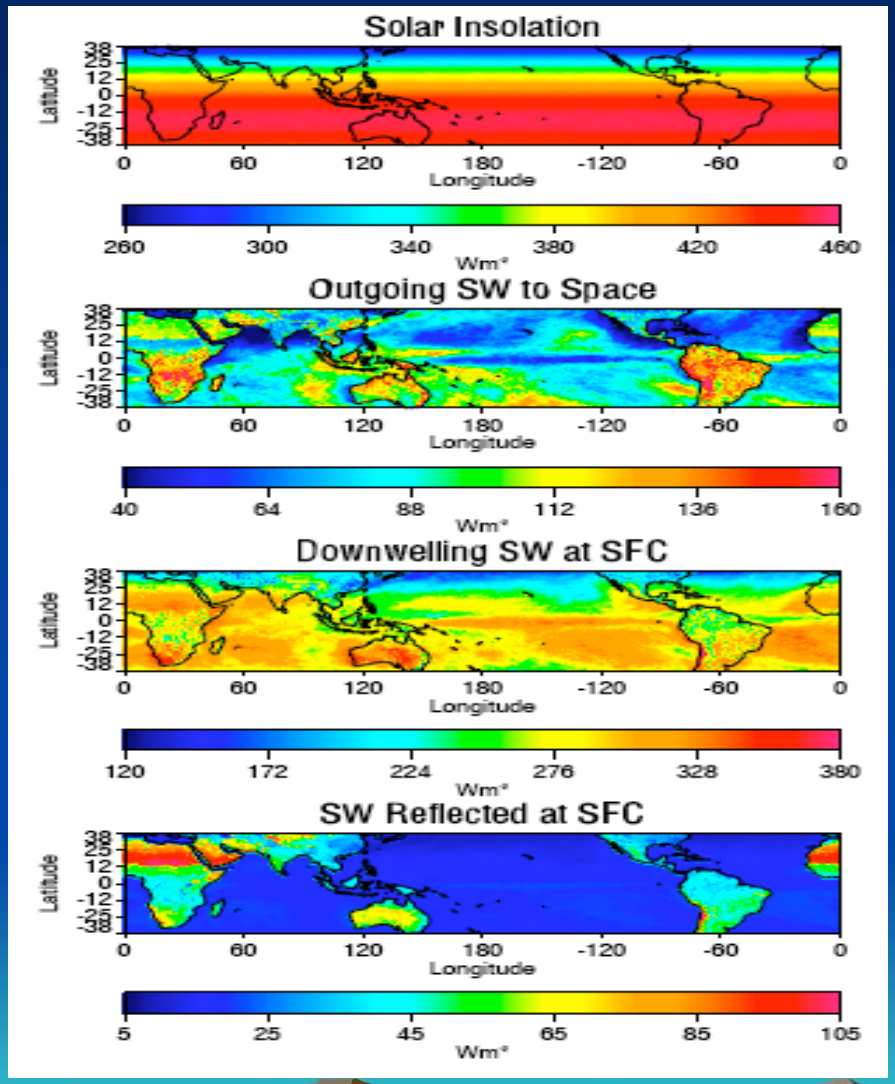
Precipitable water, SST, V_{wind} (TMI-Wentz)

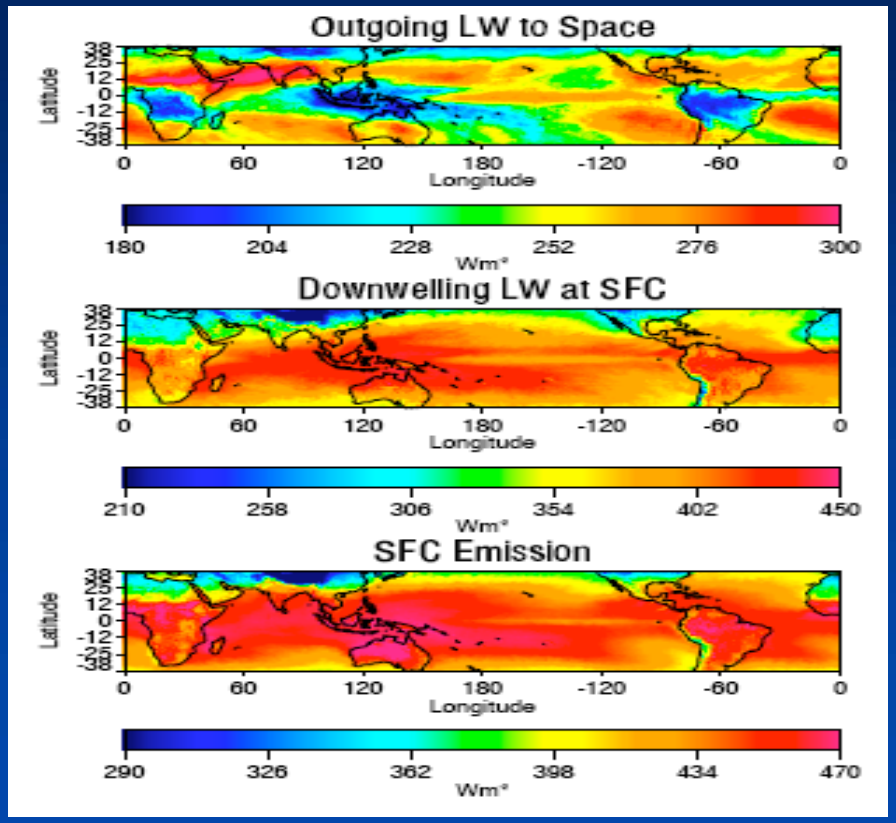
Algorithm Inputs





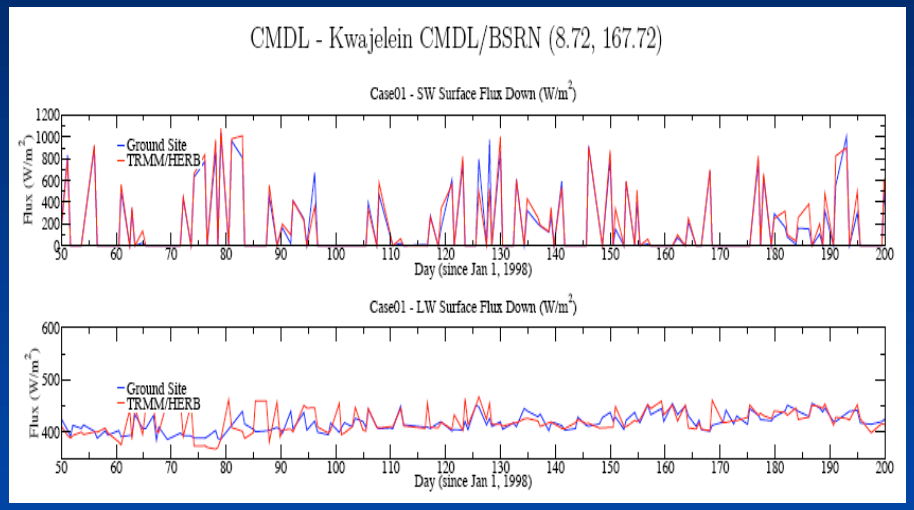
1. TOA and SFC Products

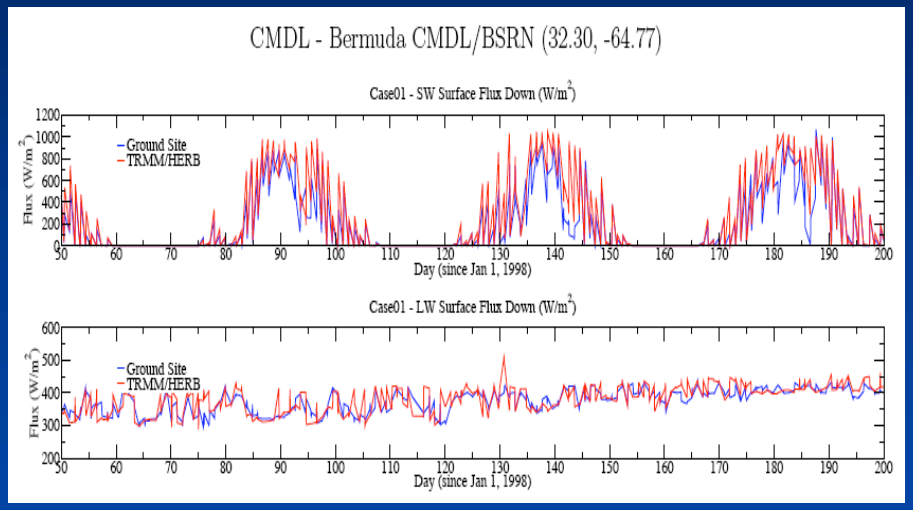


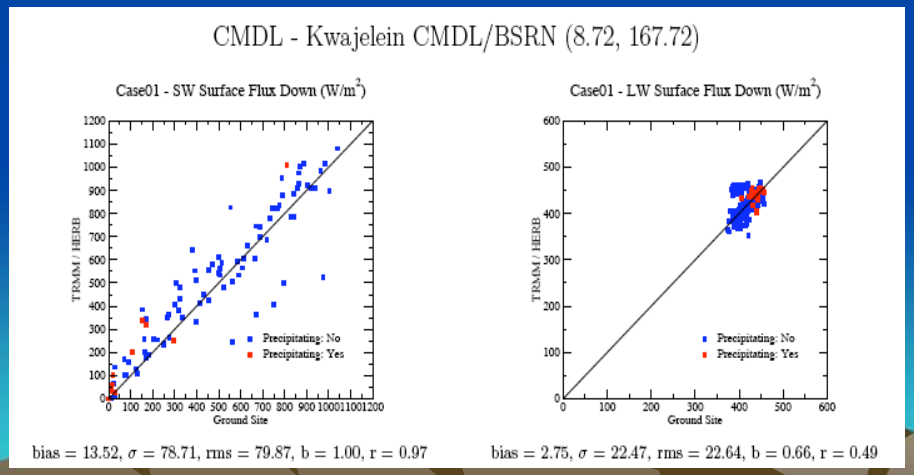


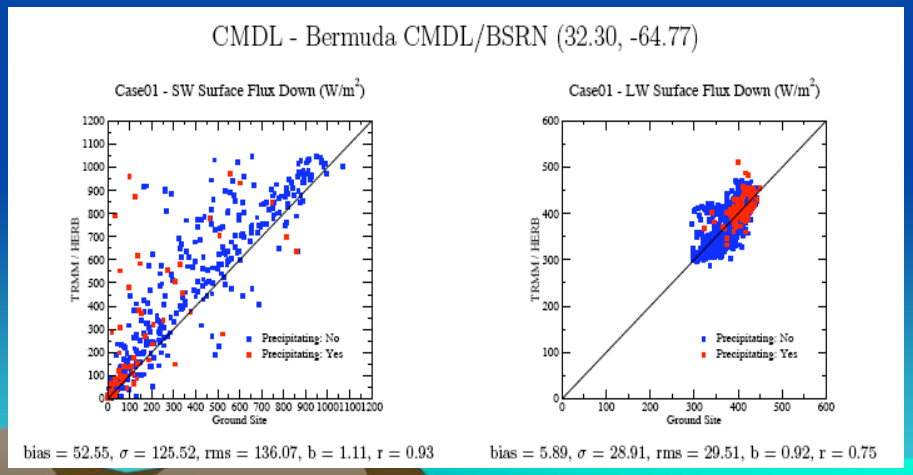
Evaluation Against BSRN

28 surface radiation sites spanning latitudes from 2-38°

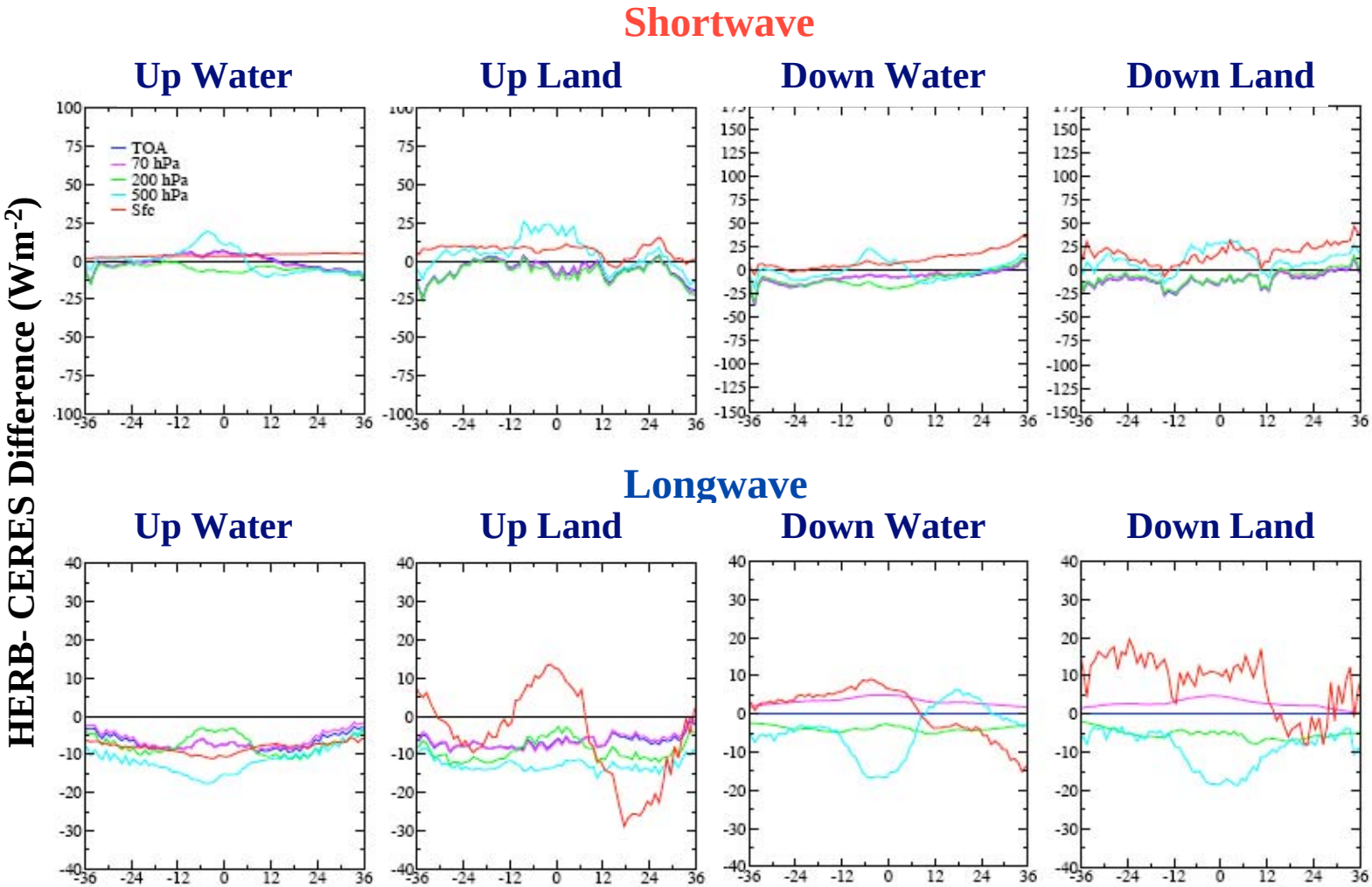






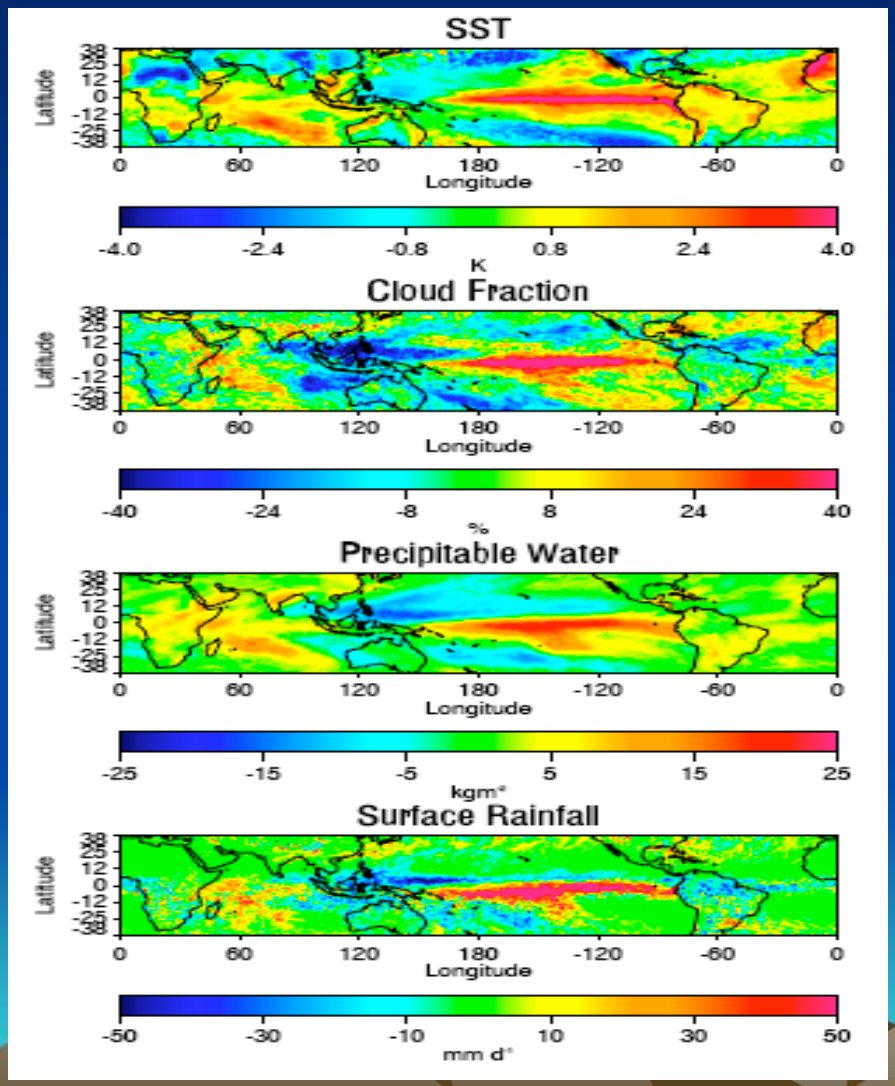


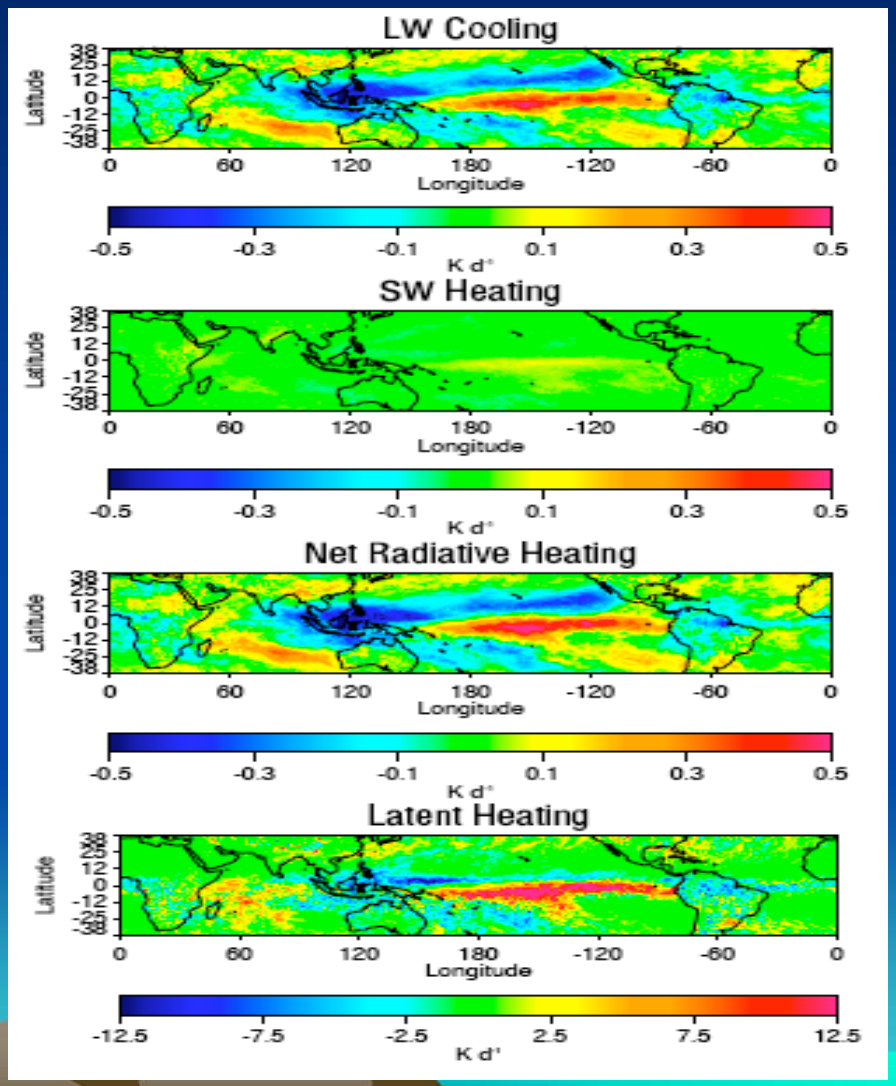
Comparisons with CERES



ENSO Modulation of Tropical ERB

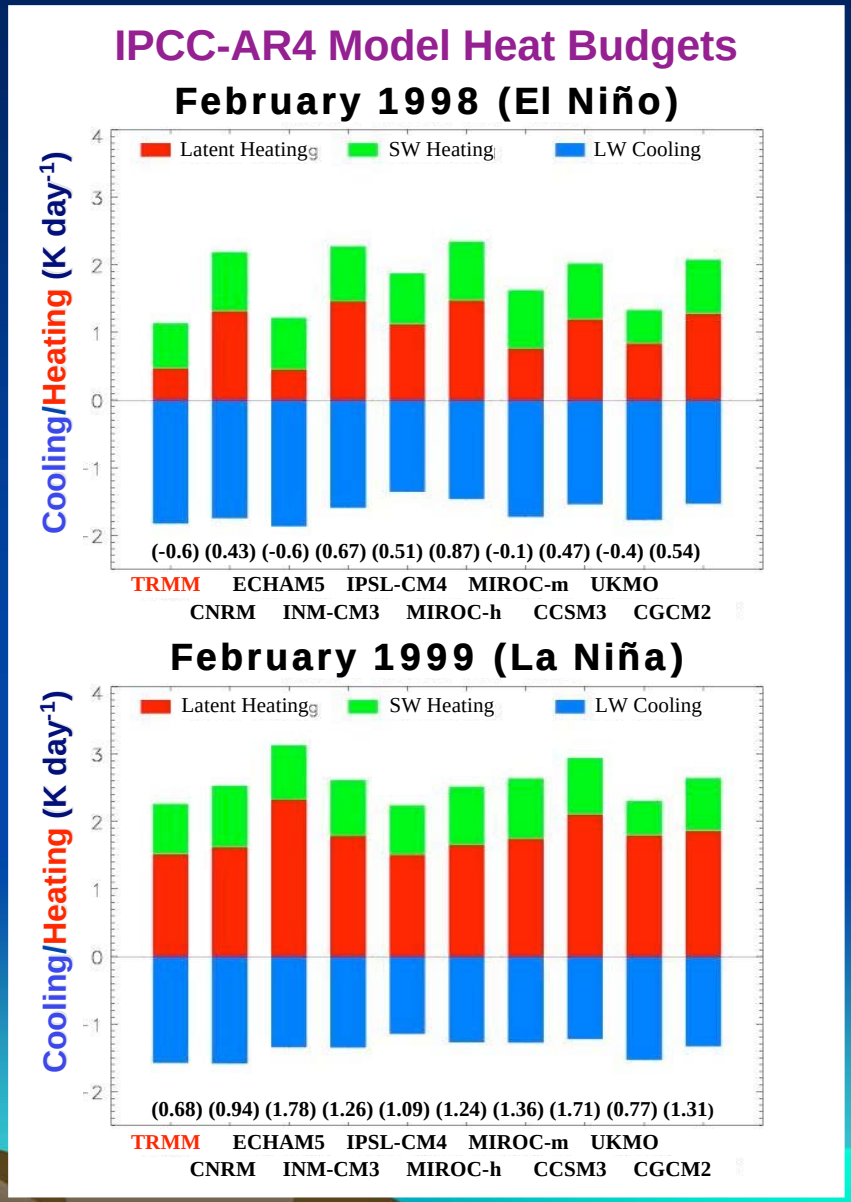
El Niño (Jan.-Mar. 1998) - La Niña (Jan.-Mar. 1999)





Comparison with Climate Models

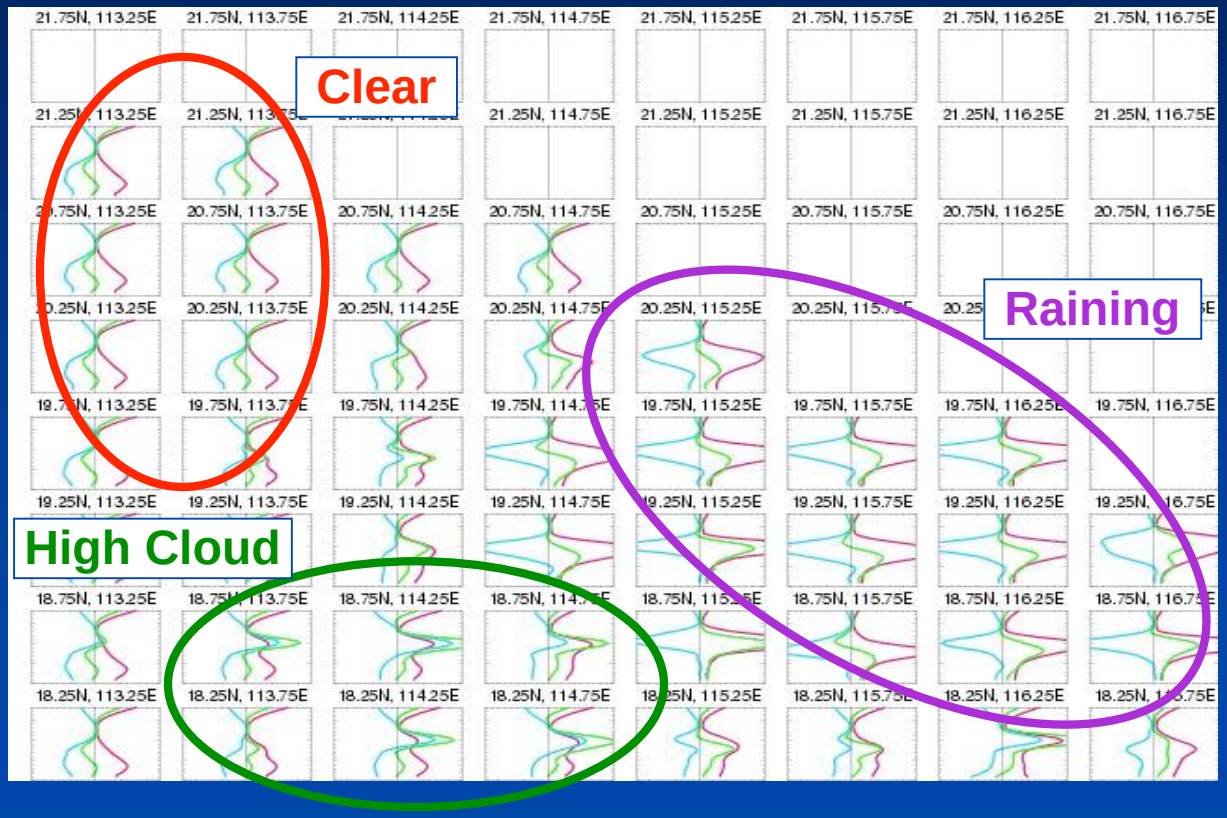
Most IPCC-AR4 models fail to simulate the magnitude of the observed suppression of heating in the west Pacific and the associated weakening of the Walker Circulation during the 1998 El Niño.

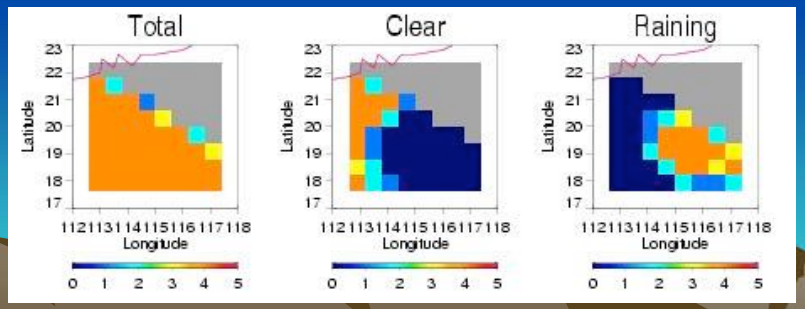


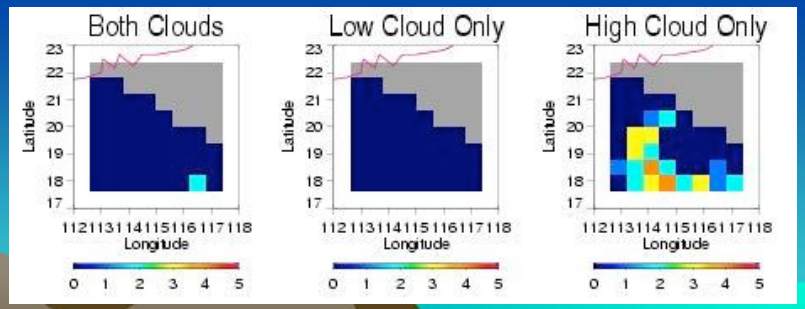
2. Radiative Heating Profiles

1-18 km

±5 Kd^{-1}

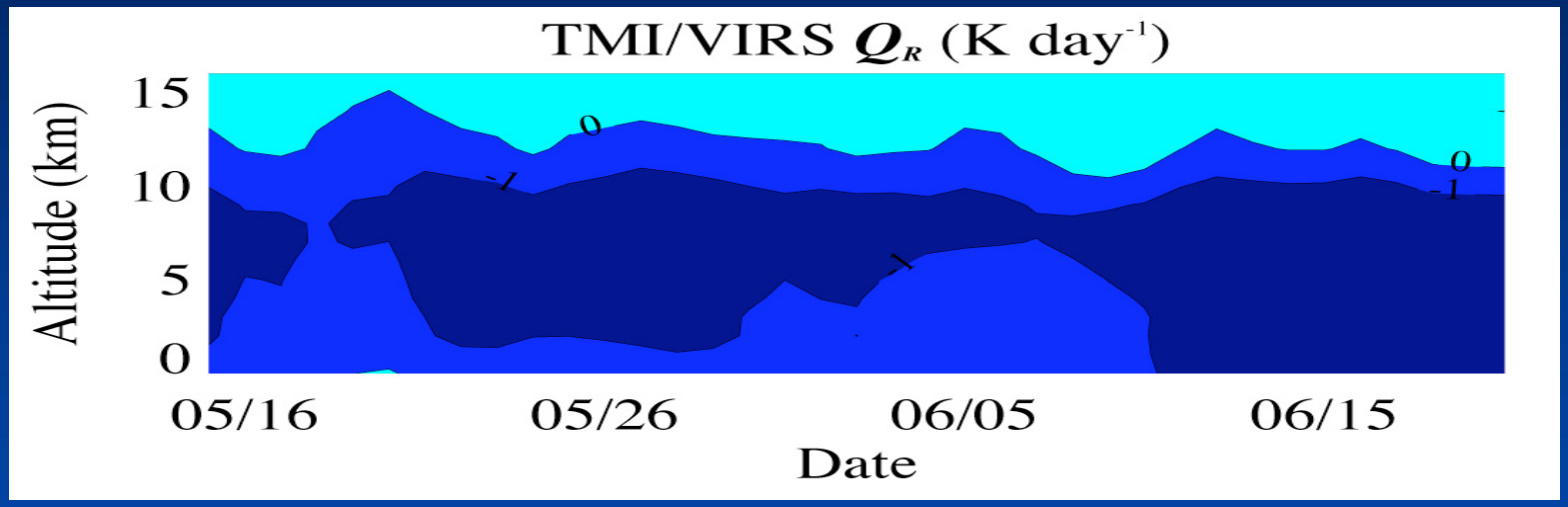


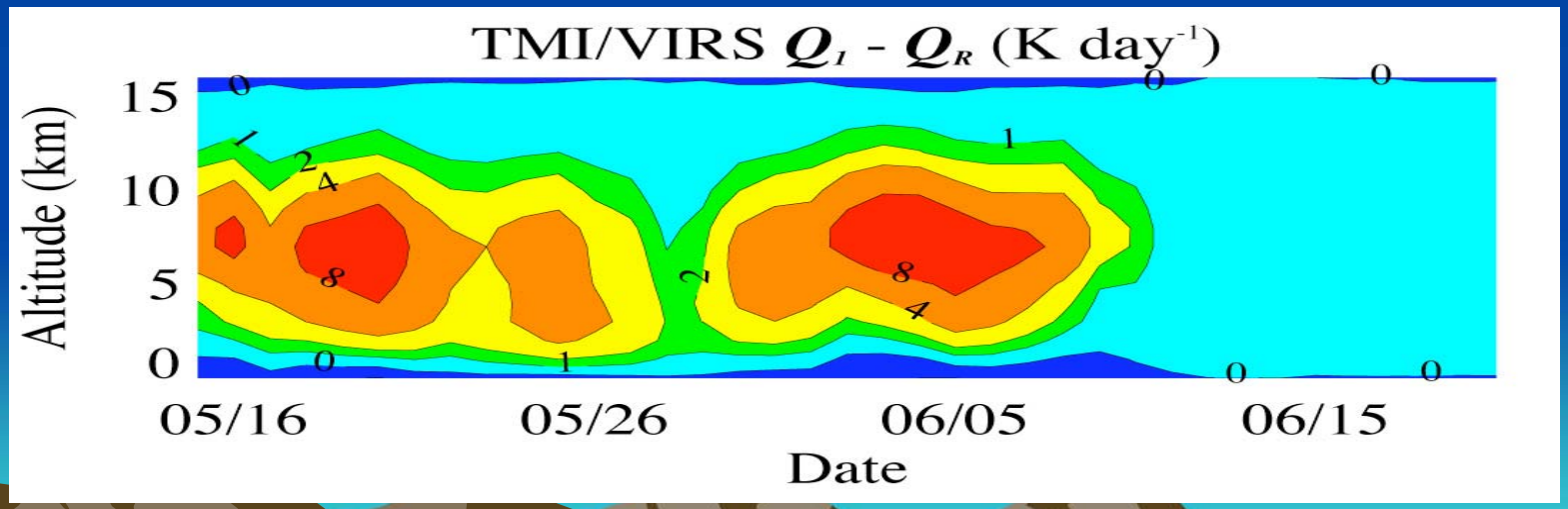




Toward a Tropical Q_1 Profile Product

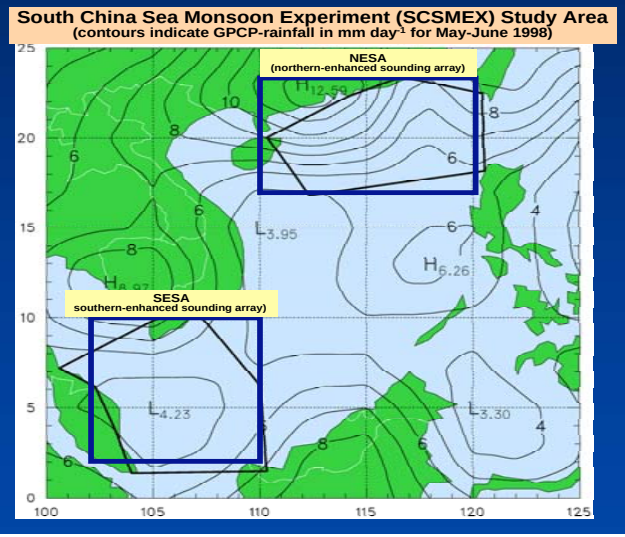
(with W. Olson, M. Grecu, and C. L. Shie)

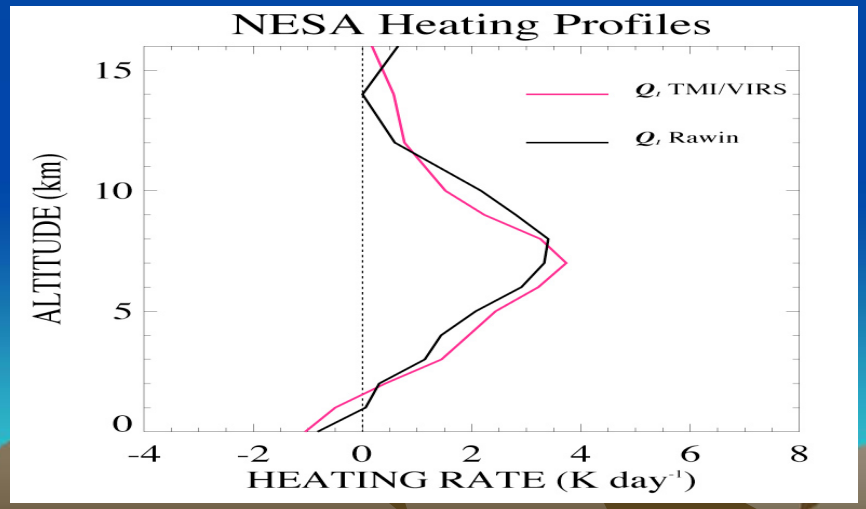


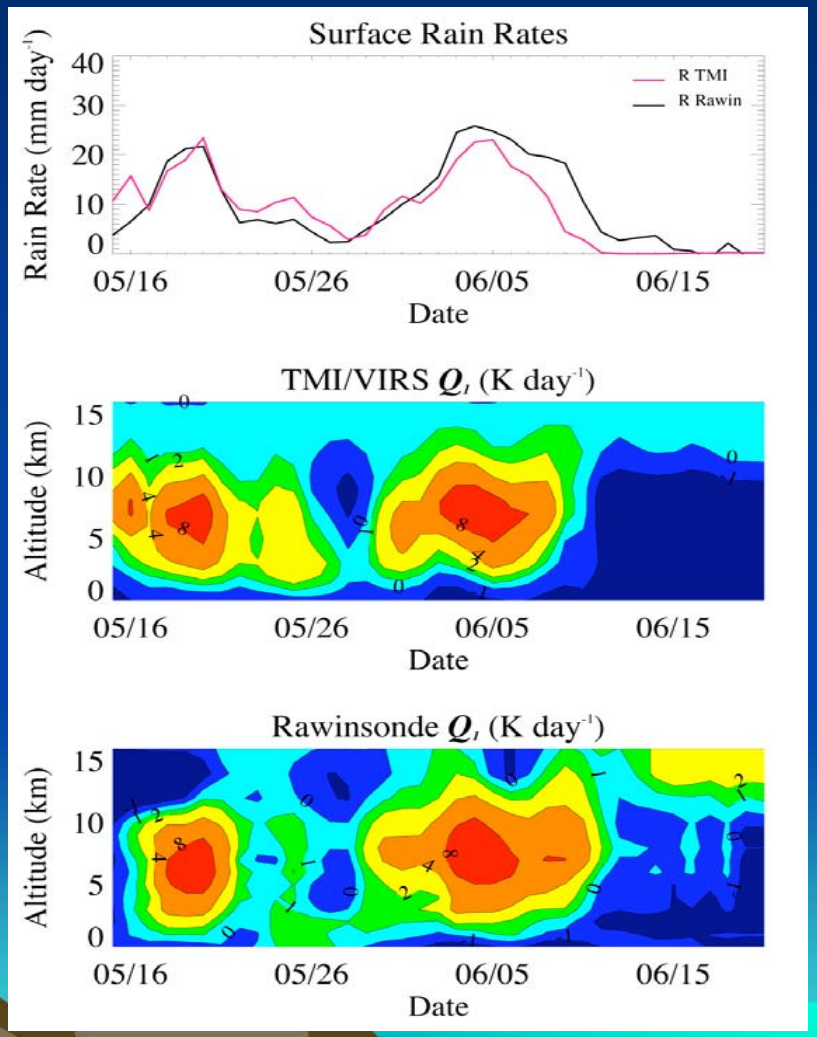


Evaluation: SCSMEX NESA

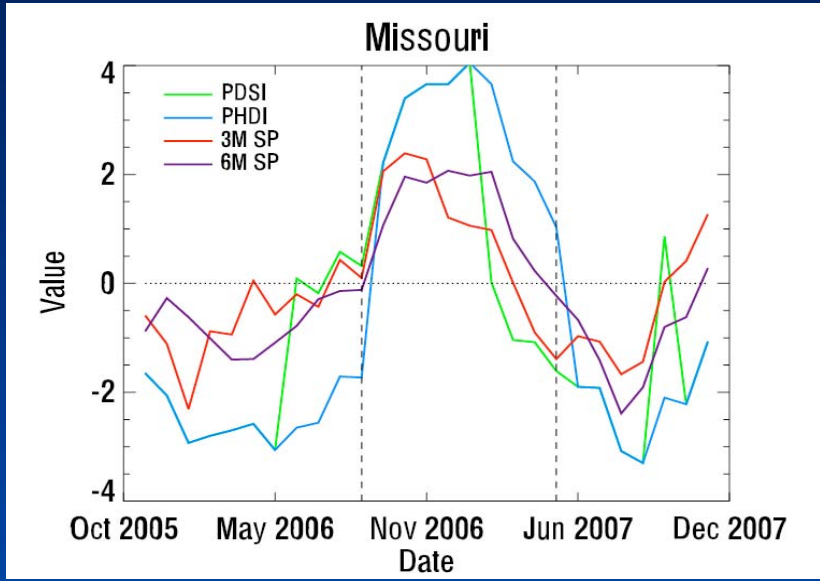
In collaboration with R. Johnson, P. Ciesielski, W.-K. Tao and the TRMM LH intercomparison project team

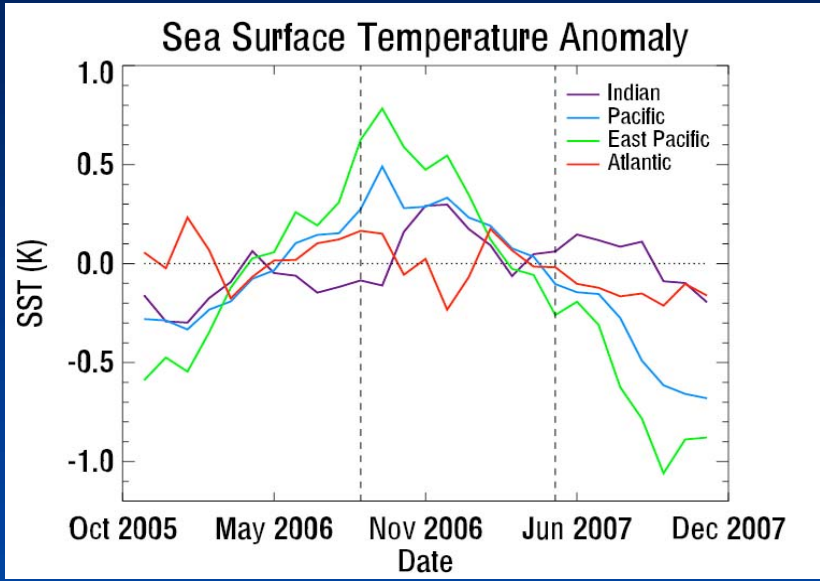


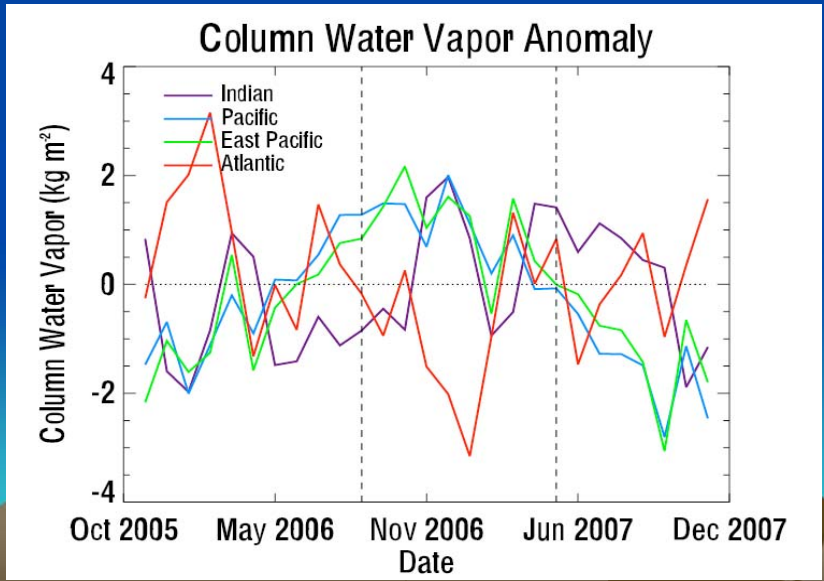


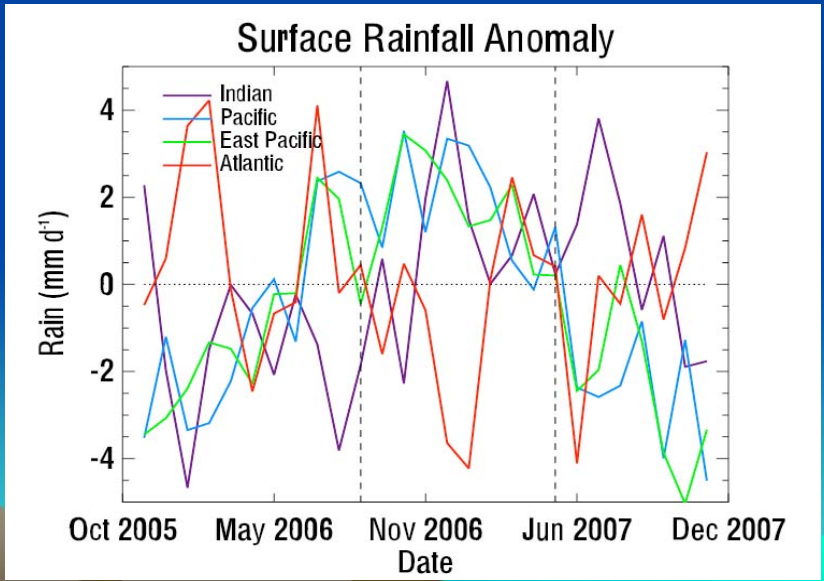


Tropical Heating and Drought



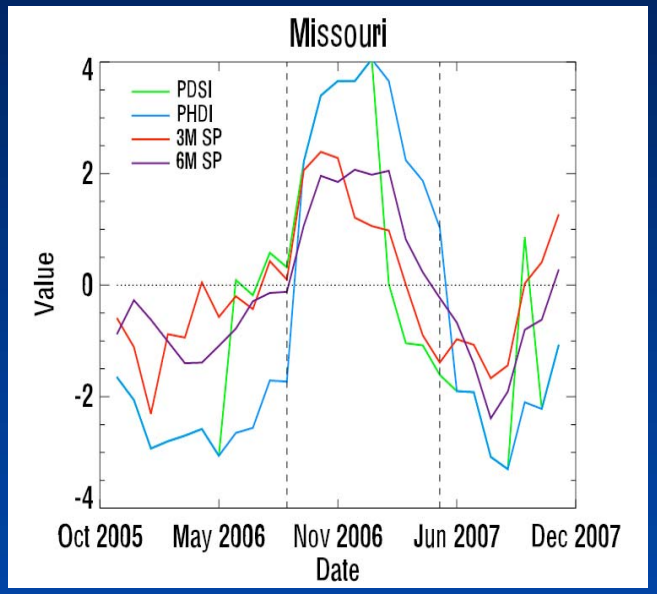




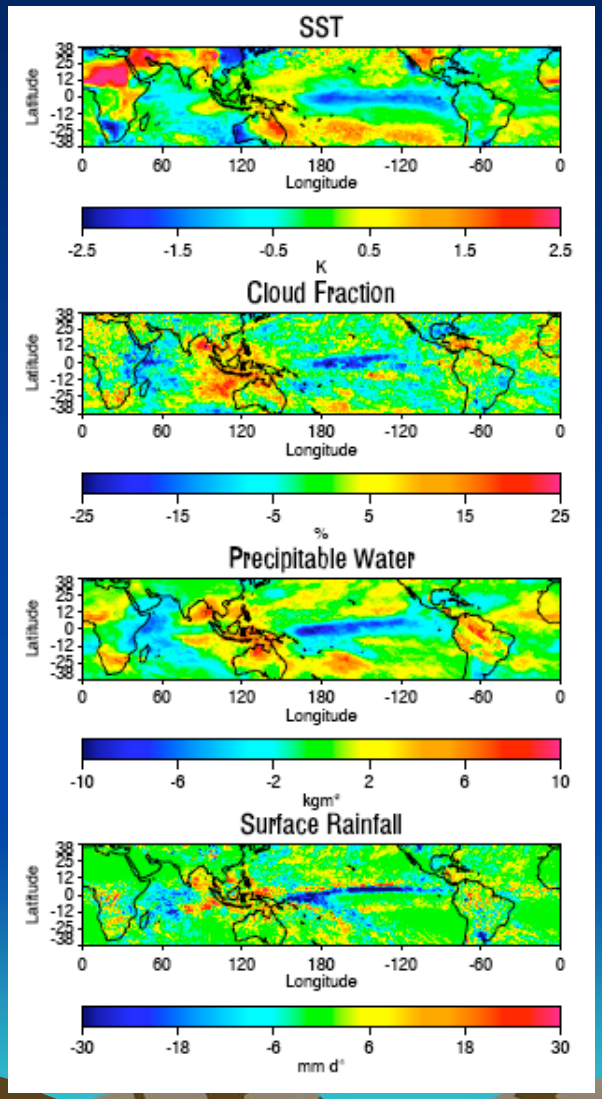


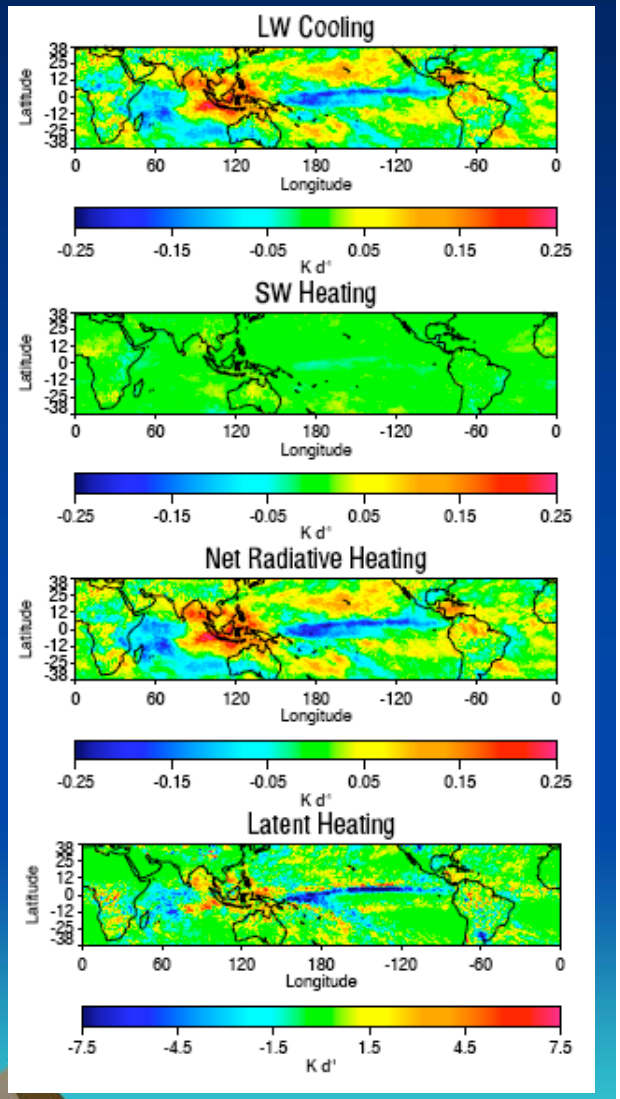
Drought data from NCDC.

Comparing Dry and Wet Periods



Focus on differences between drought (Oct.-Mar. 2005-06) - wet (2006-07) periods.

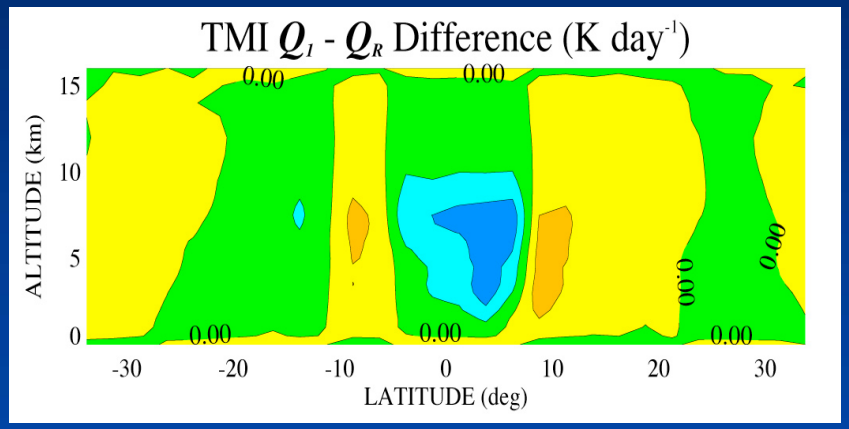




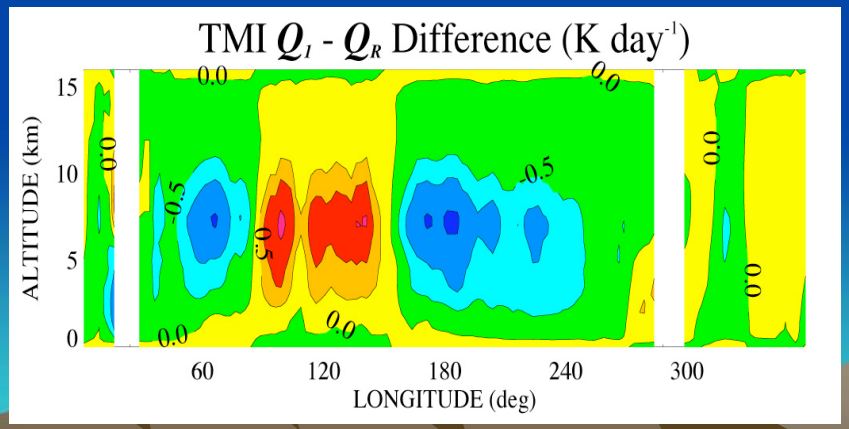
Vertical Heating Structure (Ongoing)

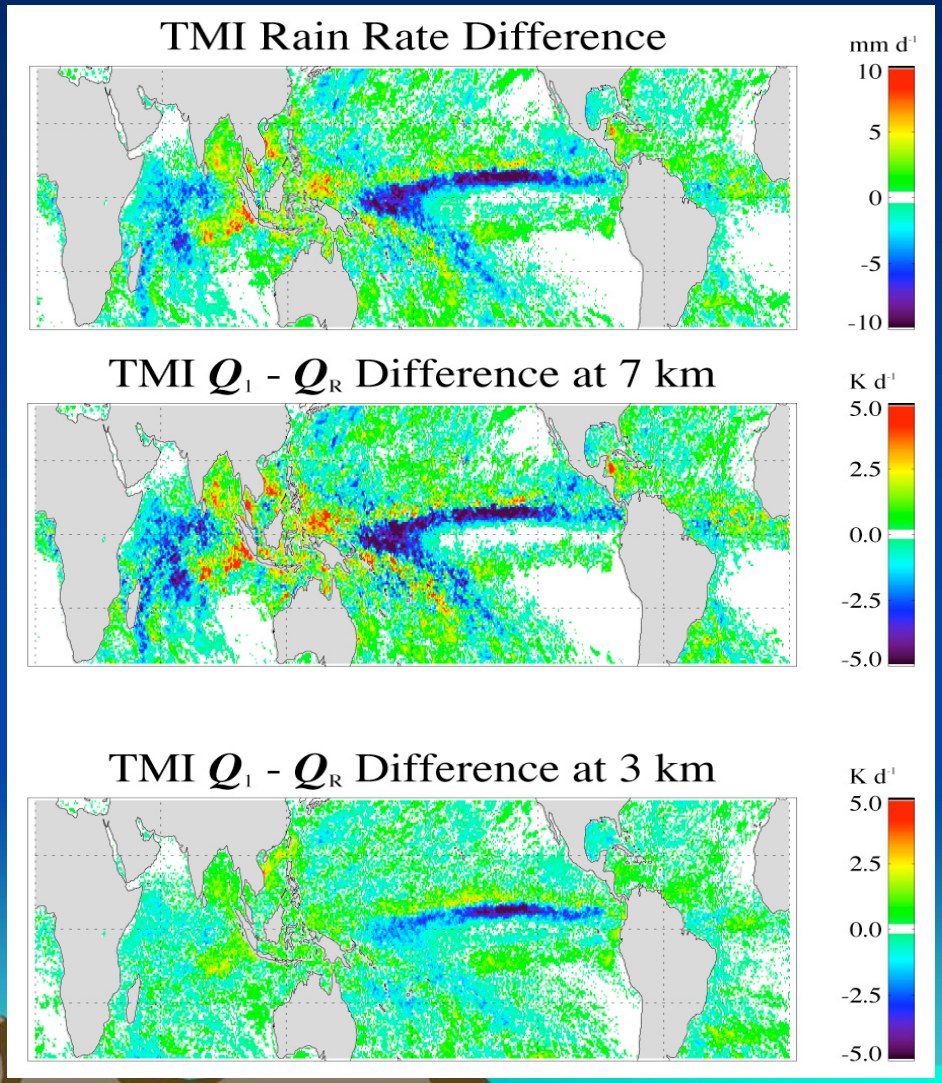
Drought (Oct.-Mar. 2005-06) - wet (2006-07) periods.

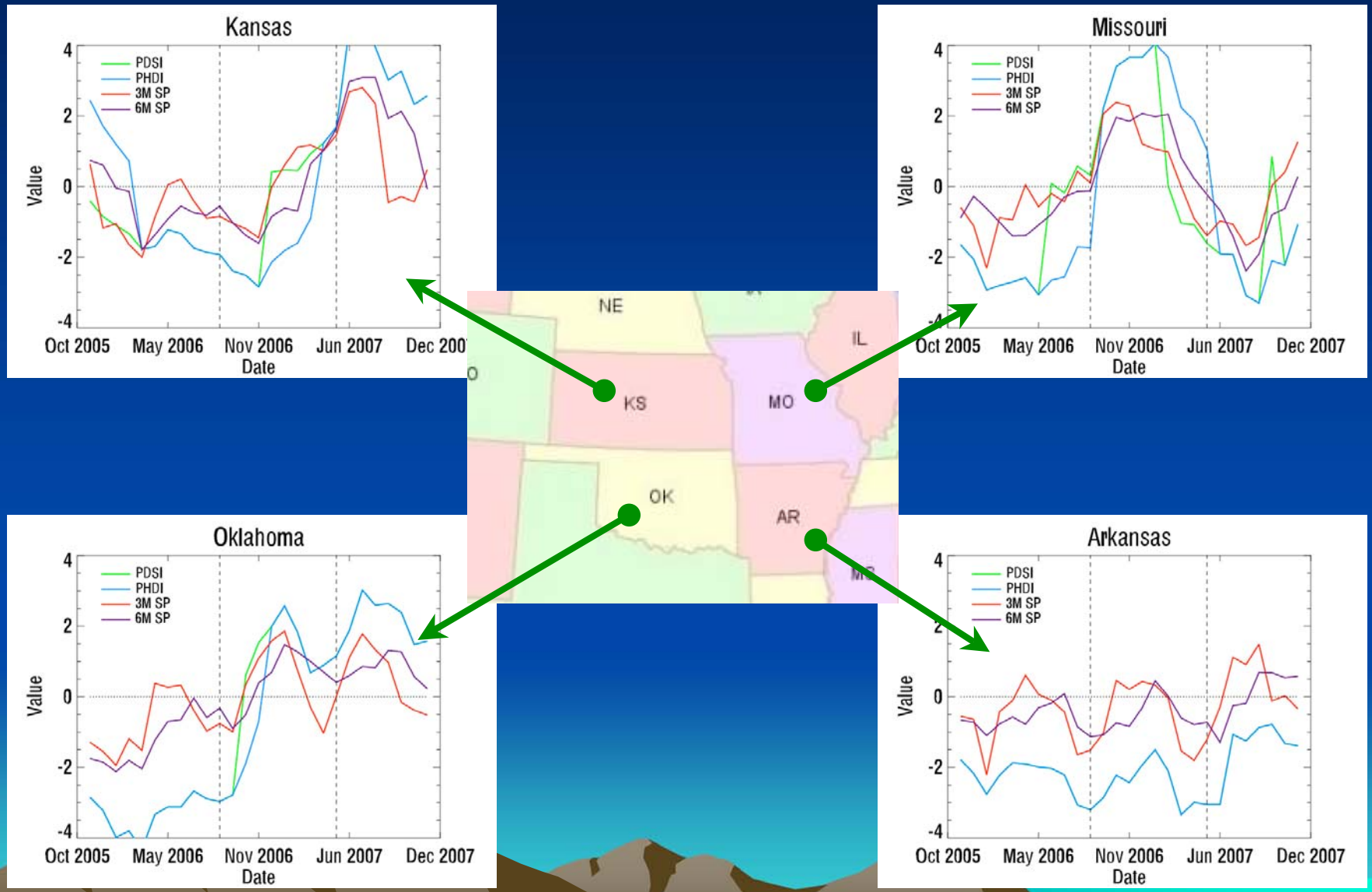
Zonal Cross Section



Meridional Cross Section





Extras

Regional Variability