

Physical retrieval for MODIS

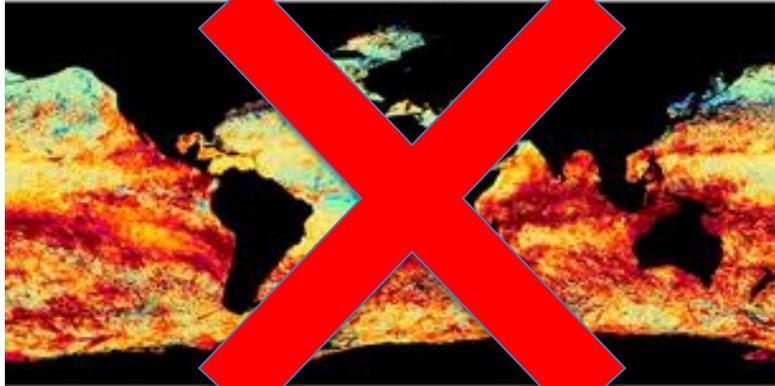
Andy Harris

Jonathan Mittaz

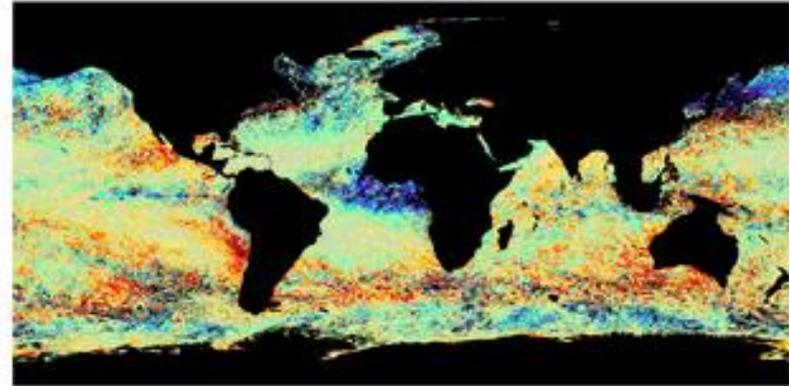
Prabhat Koner

MODIS - OSTIA, Feb 2012

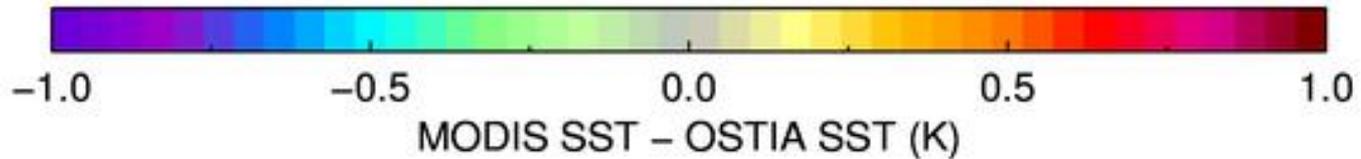
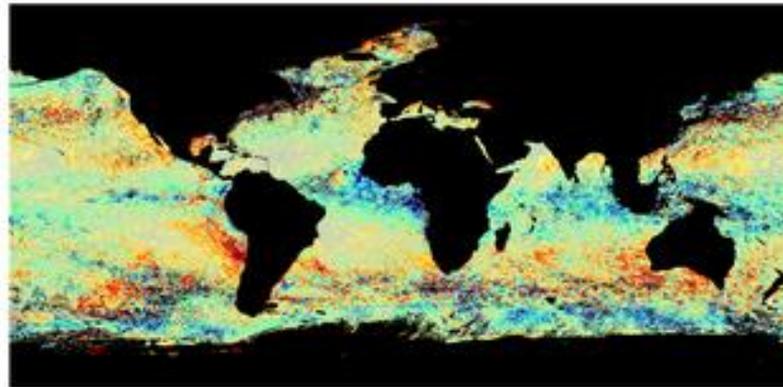
SST (Day)



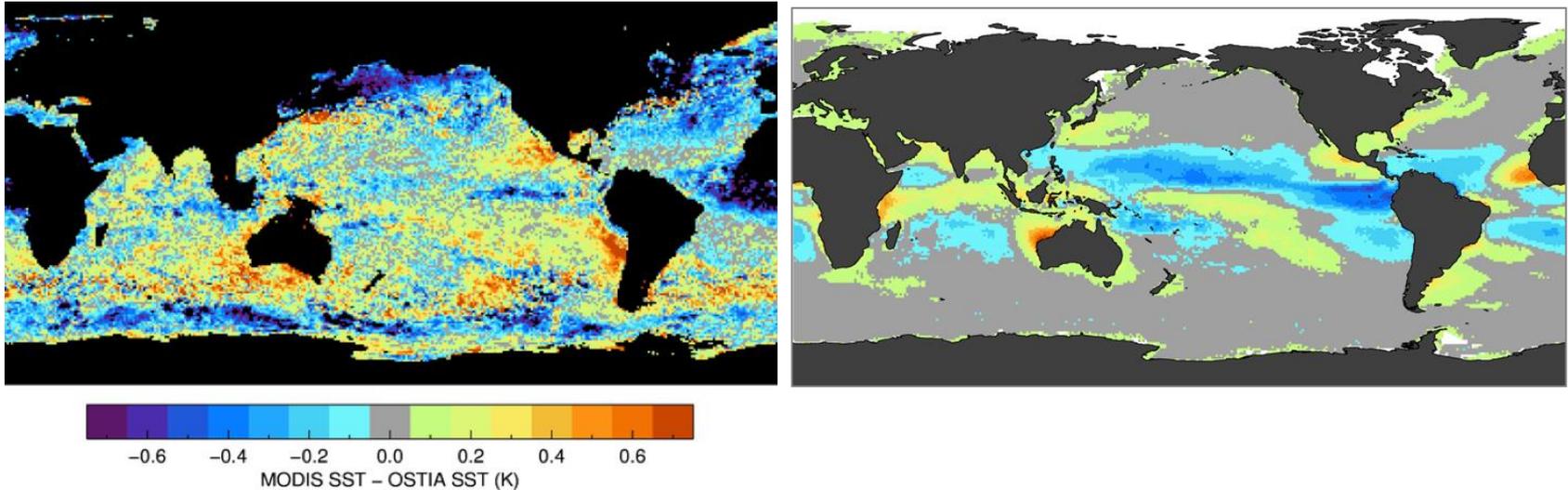
SST (Night)



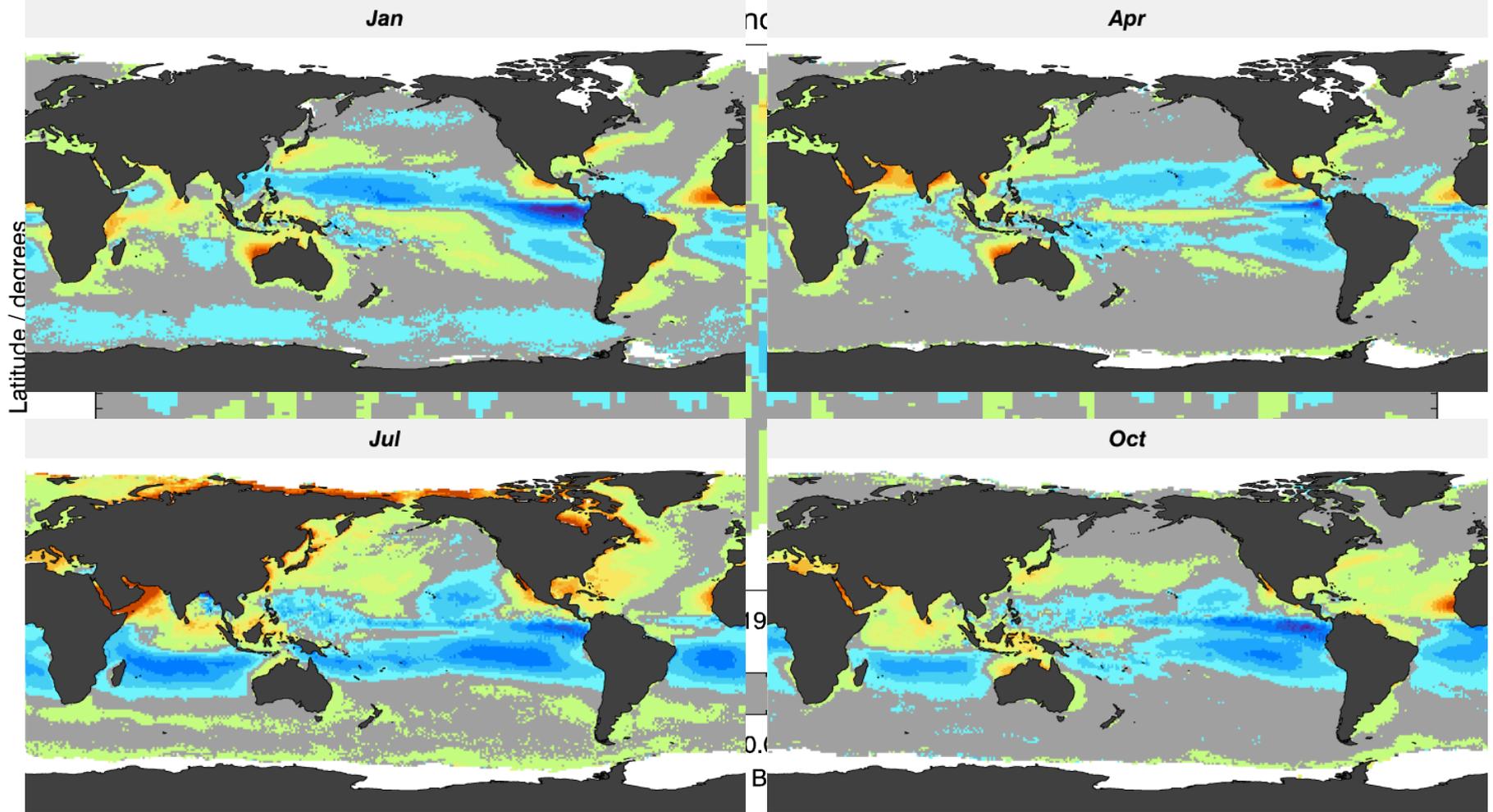
SST4 (Night)



[SST (night) – OSTIA] *cf.* modeled

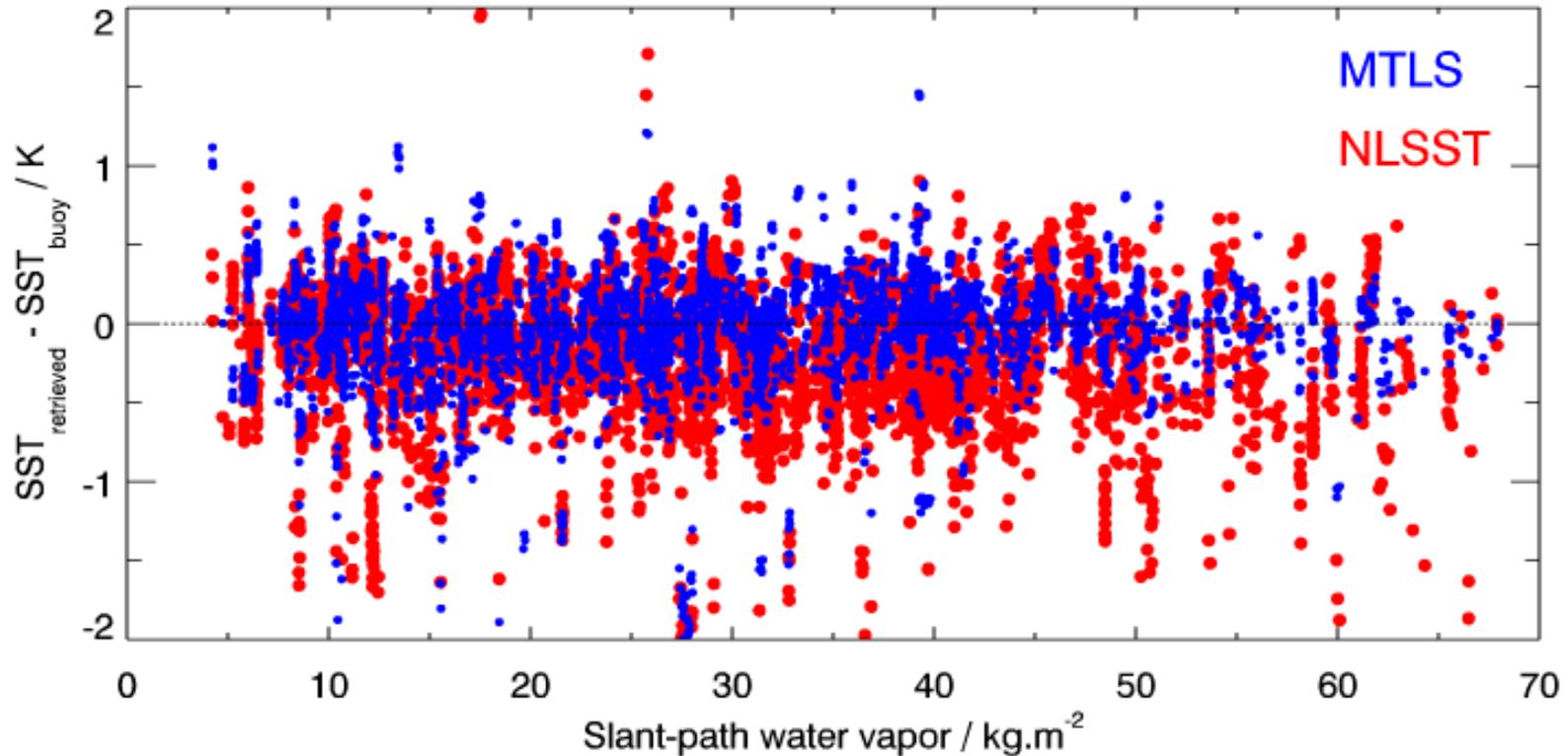


- Modeled clear-sky NLSST bias is February average for 1985 – 1999
 - No aerosols
- Several features common to both observed and modeled biases
 - Boundary currents → over-estimate of gamma
 - Cold tongue → under-estimate of gamma
 - High SST but low water vapor
 - (Decoupling of SST and air temperature)
- Modeling shows annual cycle of bias



- Hence Lat-band coefficients, *etc.*
- Employ a physical retrieval methodology
 - MTLs (Koner presentation)

MTLS applied to MODIS



- Validation against *i*QUAM
 - MTLS: -0.02 ± 0.36 K SST (night): -0.21 ± 0.47 K
 - Reduction of ~ 0.3 K of independent error
 - (SST4: -0.24 ± 0.44 K)
 - (Difference in bias due to skin effect)

Summary

- Inherent limitations in NLSST
- MODIS has 16 TIR channels
 - Currently, only a very few used for SST retrieval
- 1st cut physical retrieval shows promise
 - Initial result subject to MODIS cloud mask
- Extra channels permit more complex retrieval vector
 - WV scale height, air-sea delta-T, aerosol, *etc.*
 - Multiple iterations
 - Smoothed inputs (Merchant presentation)
- Prospect for direct uncertainty estimation (Koner)