Prediction vs Predictability

Regimes
Persistence
Teleconnections
Land-Atmosphere Interactions
Vegetation
Soil Moisture
S2S
Practicable Predictability
Scale Interactions
Constructive Interference
Orography

Ana P. Barros

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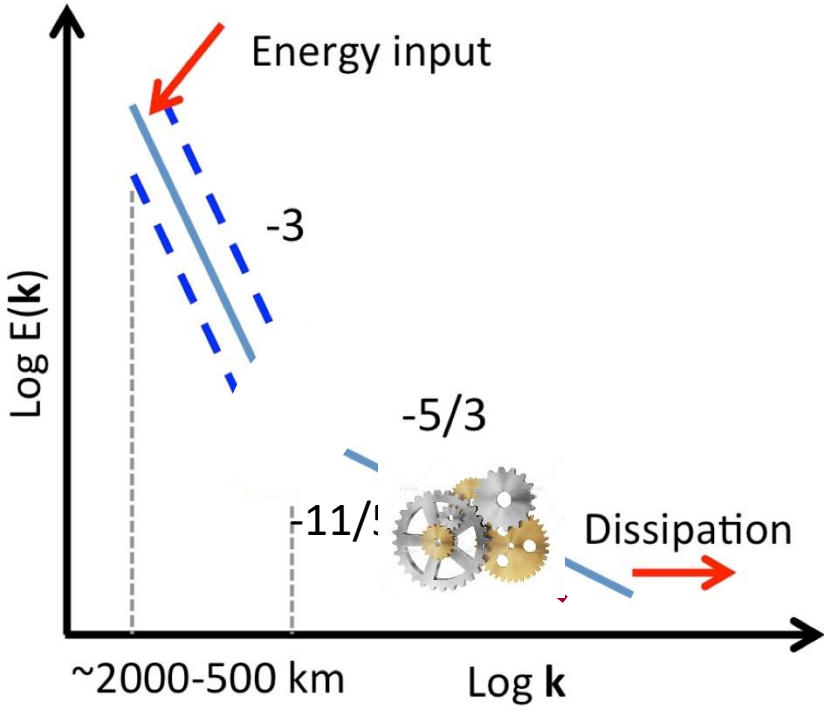
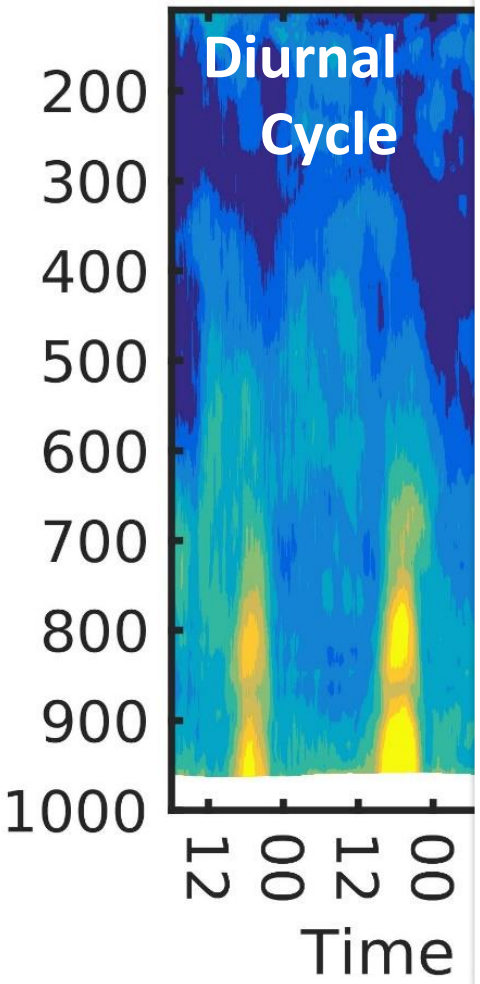
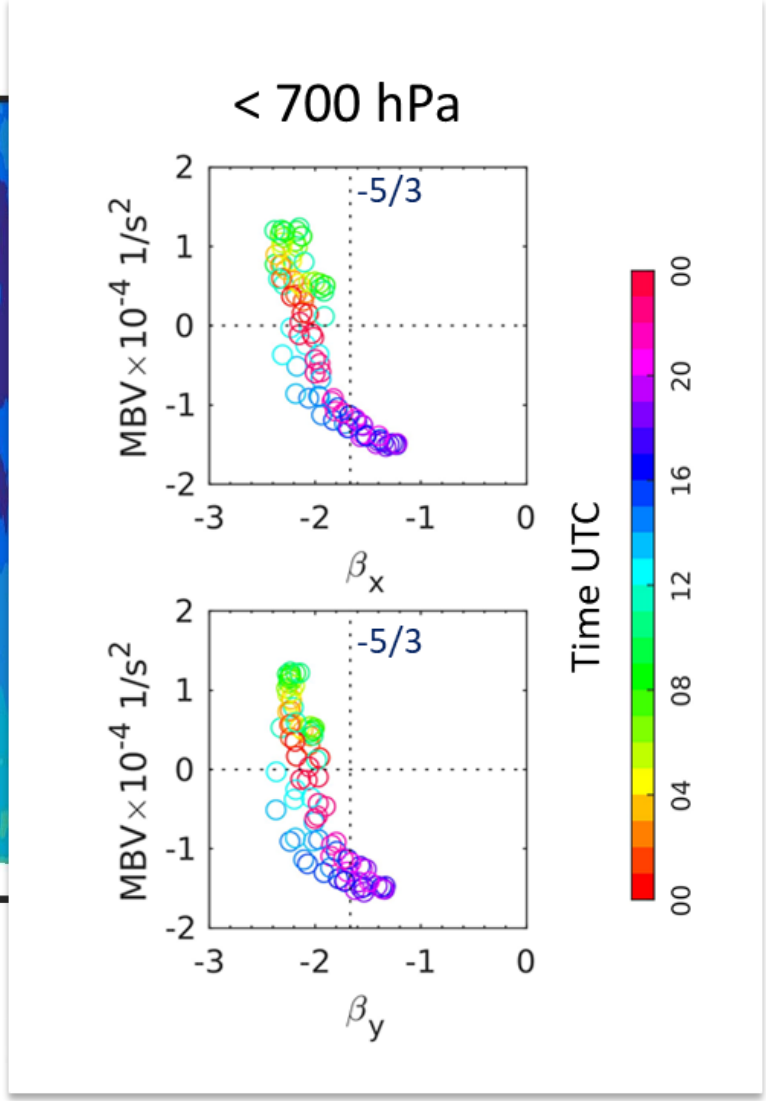
Predictability Across Scales



Nastrom and Gage (1985)





Eghdami et al. , JAS, 2018
Nogueira and Barros, JGR, 2014
Eghdami and Barros, ESS, 2019

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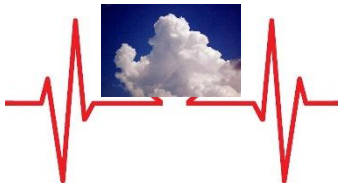
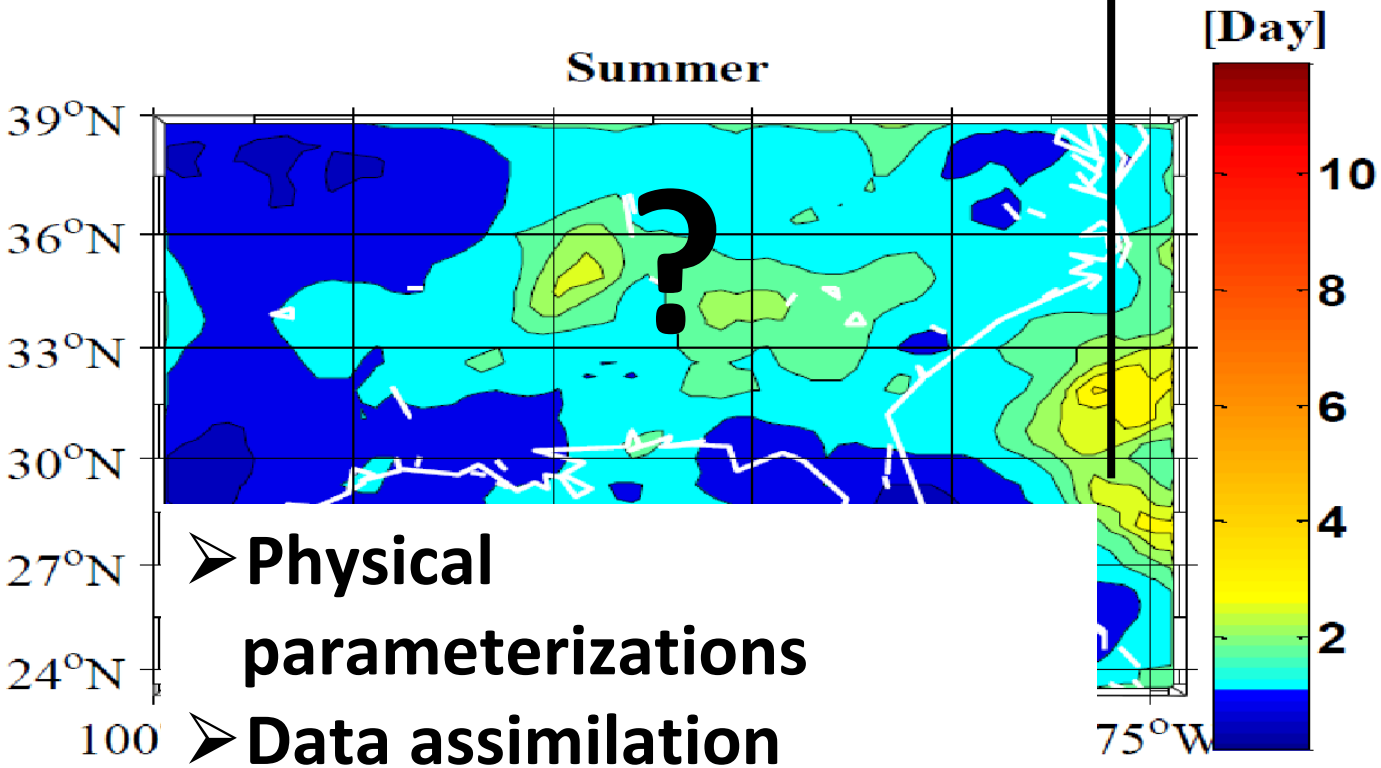
Instability Dynamics

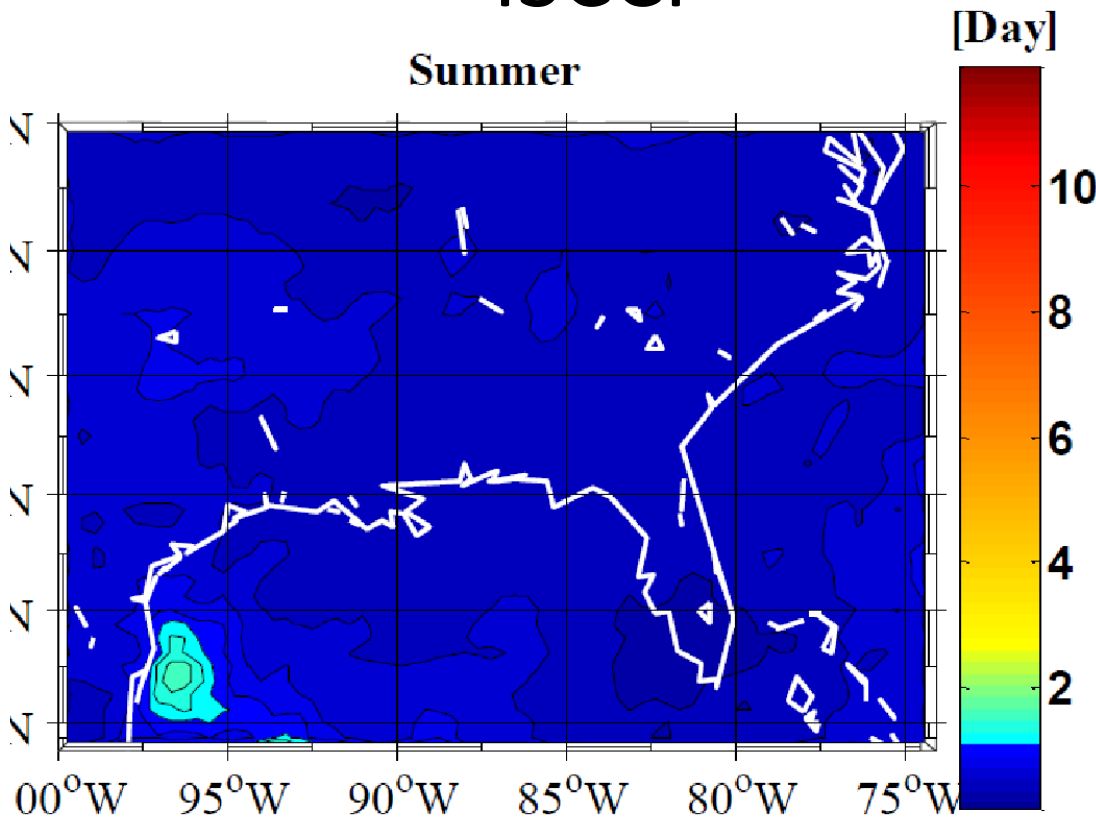


NARR

Specified SST



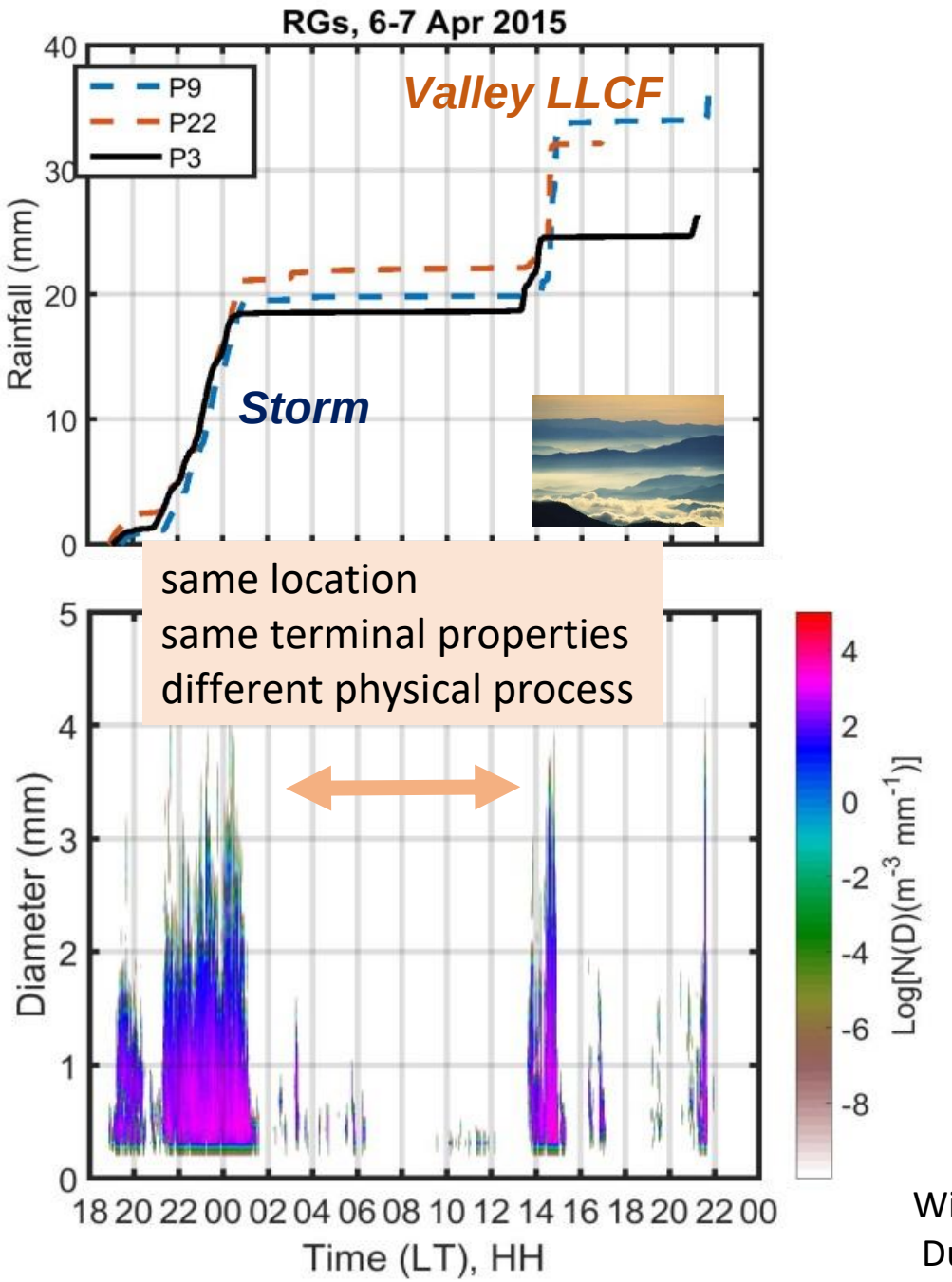
ISCCP



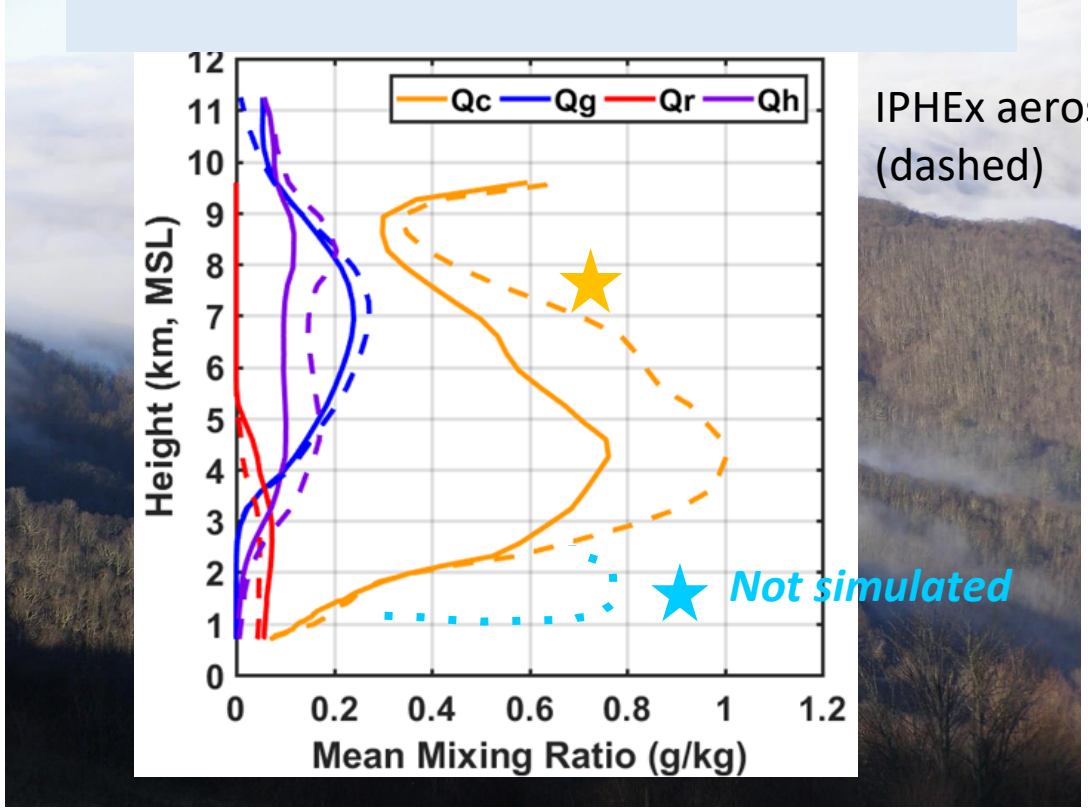
- Physical parameterizations
- Data assimilation
- Topography

Tao and Barros, JGR-Atmos, 2009

Predictability Across Scales



➢ **Seeder-Feeder Interactions**
Valley Fog and Low Level Cloud Immersion



IPHEx aerosols (dashed)

Microphysics

Wilson and Barros, JAS (2014), JHYDR (2015), JHM (2017);
Duan and Barros, RemSen(2017) and ACP (2020)

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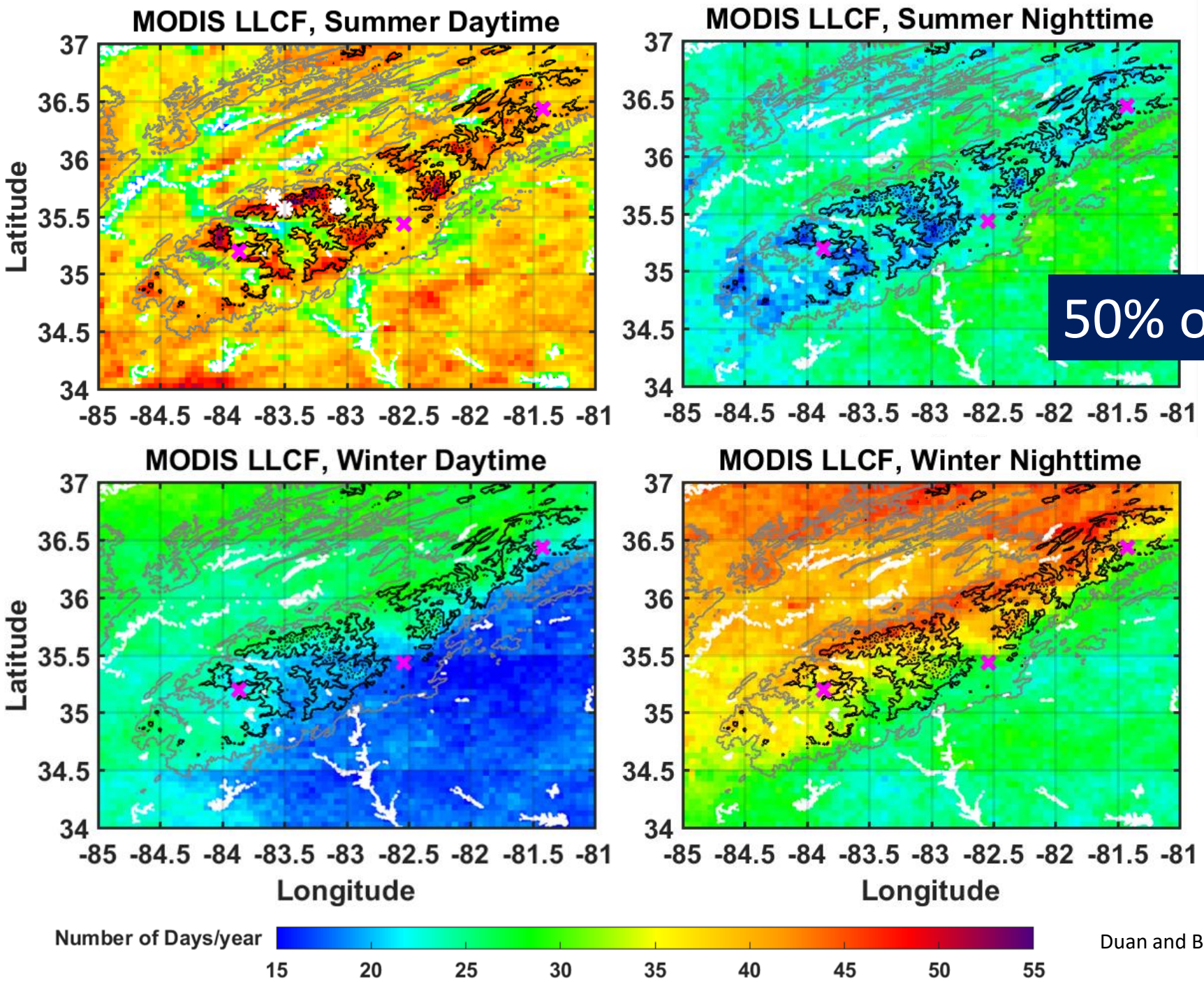
Climatology of Low level Clouds



50% of precipitation!

Duan and Barros, RemSen(2017)

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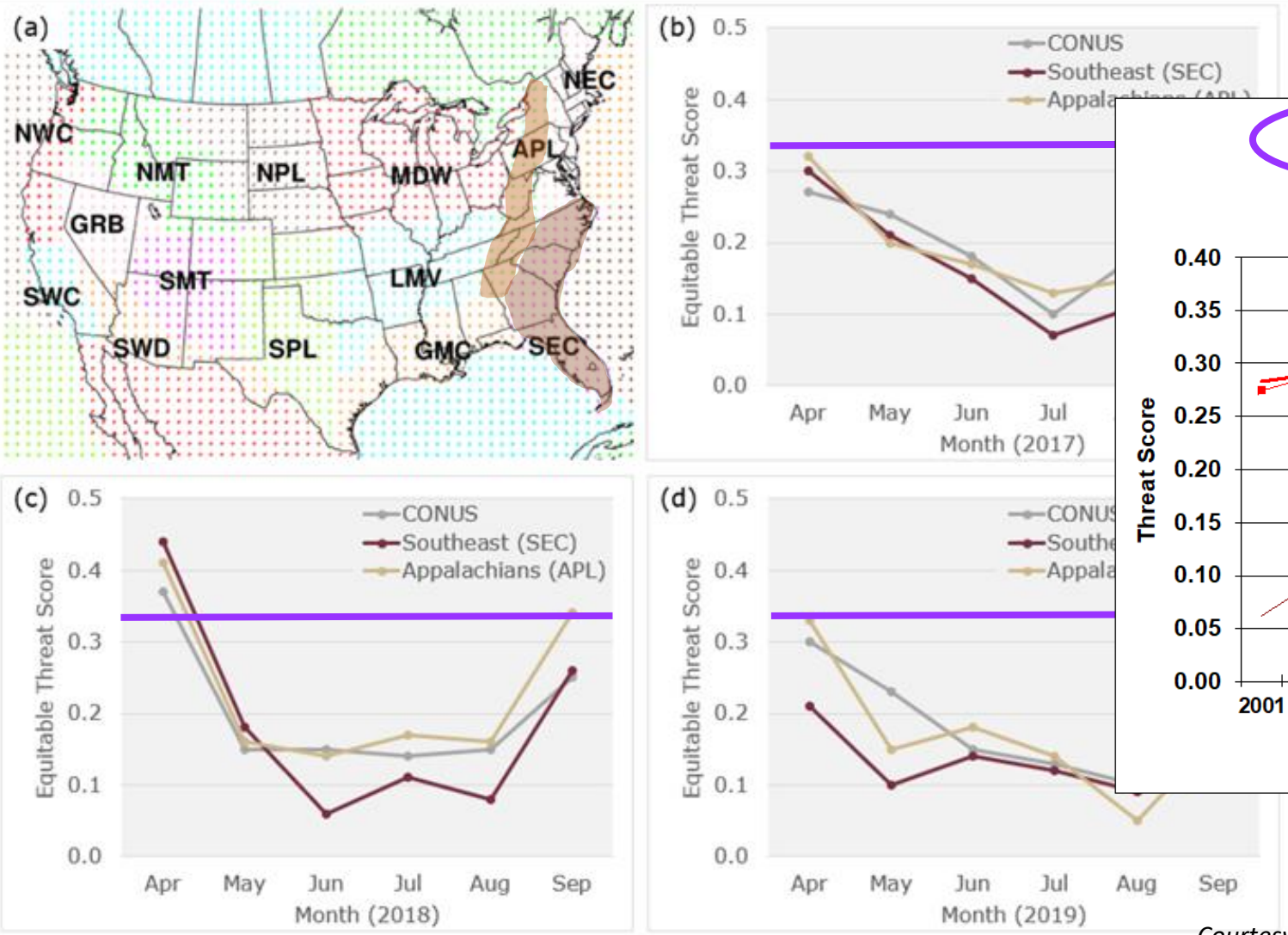
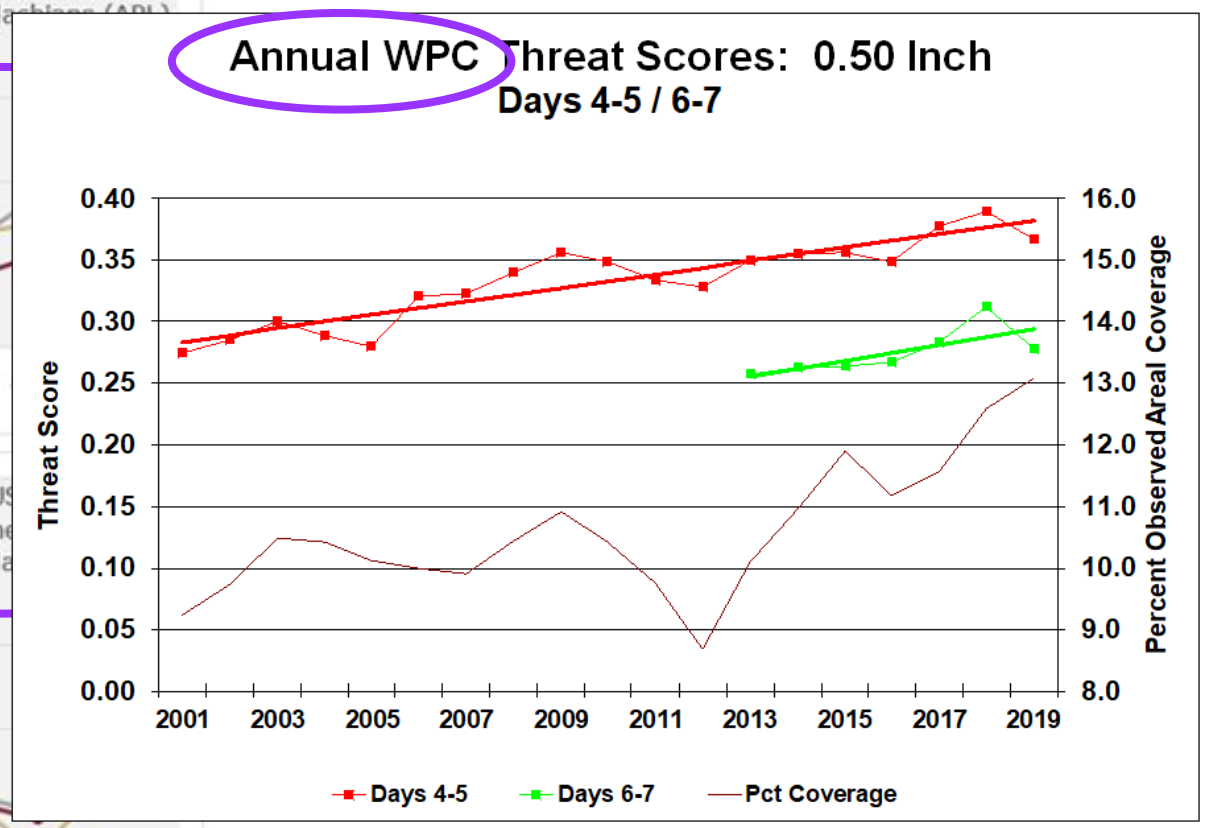
Practicable Predictability

NAM 24–hr warm season **monthly** QPF > 19 mm



Prediction vs Predictability



Courtesy Brian Mackey, Ph.D. Thesis, FSU

www.wpc.ncep.noaa.gov

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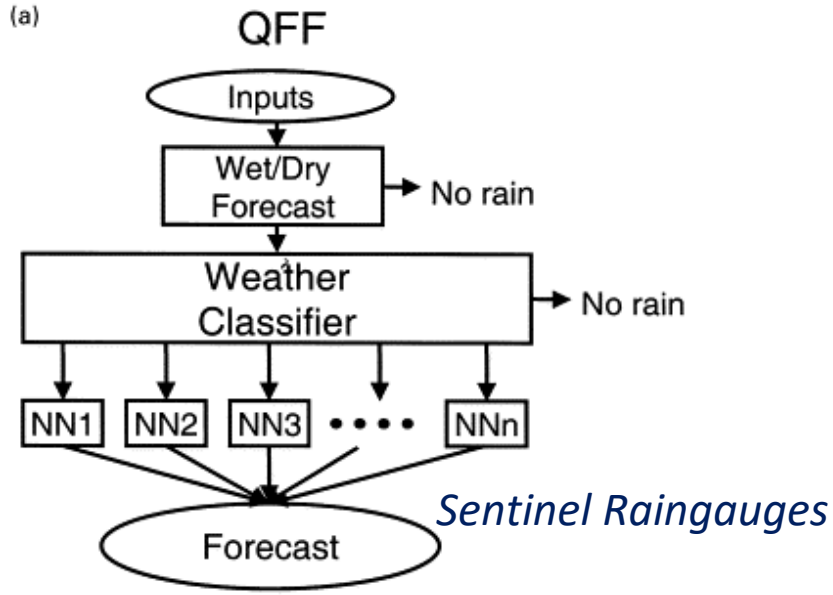
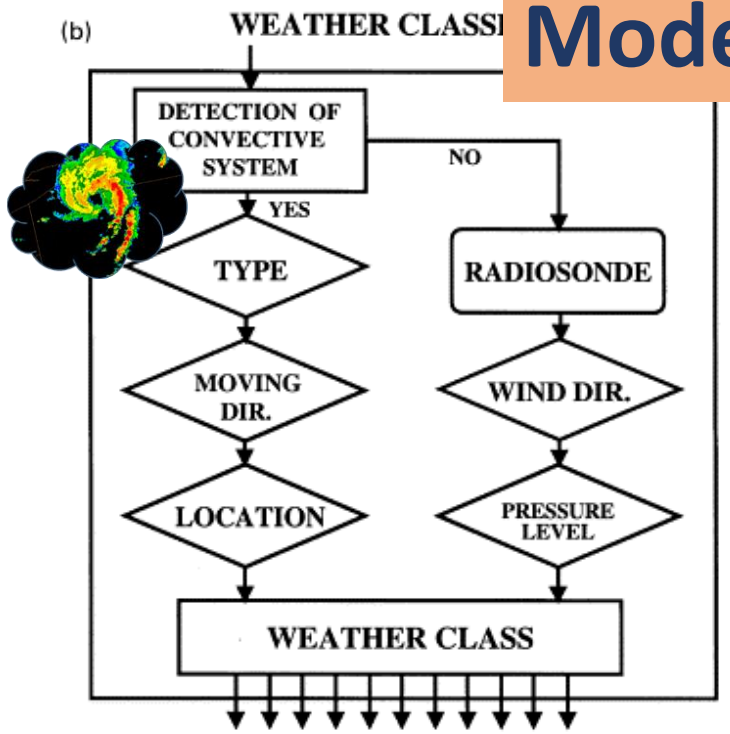
New/Old Machine Learning

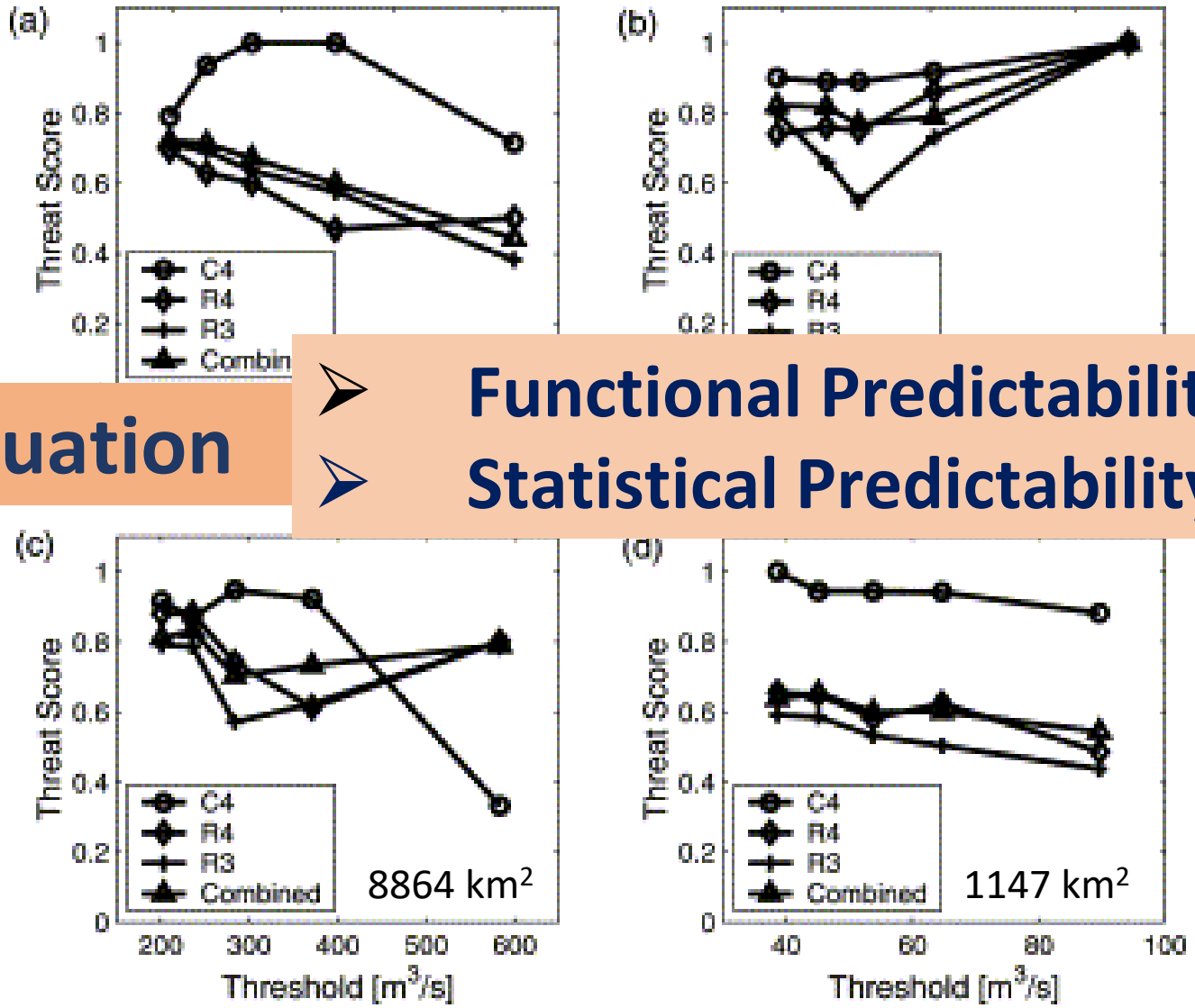
Practicable Predictability

18-hr (24-hr) Lead Time Flood Forecasts



Sentinel Raingauges





Model Evaluation

- **Functional Predictability**
- **Statistical Predictability**

Kim and Barros, J. Hydrology, 2001

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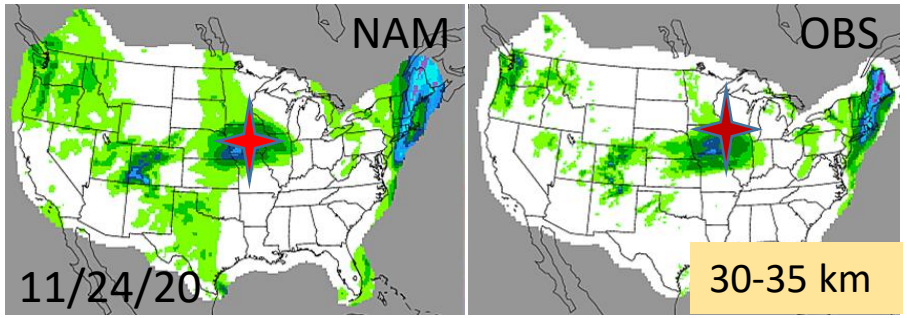
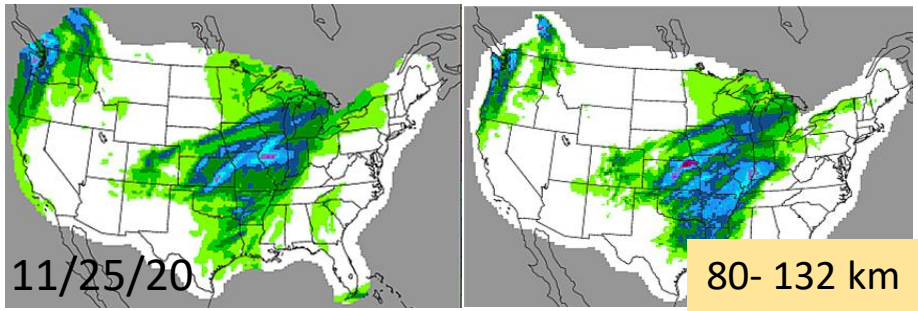
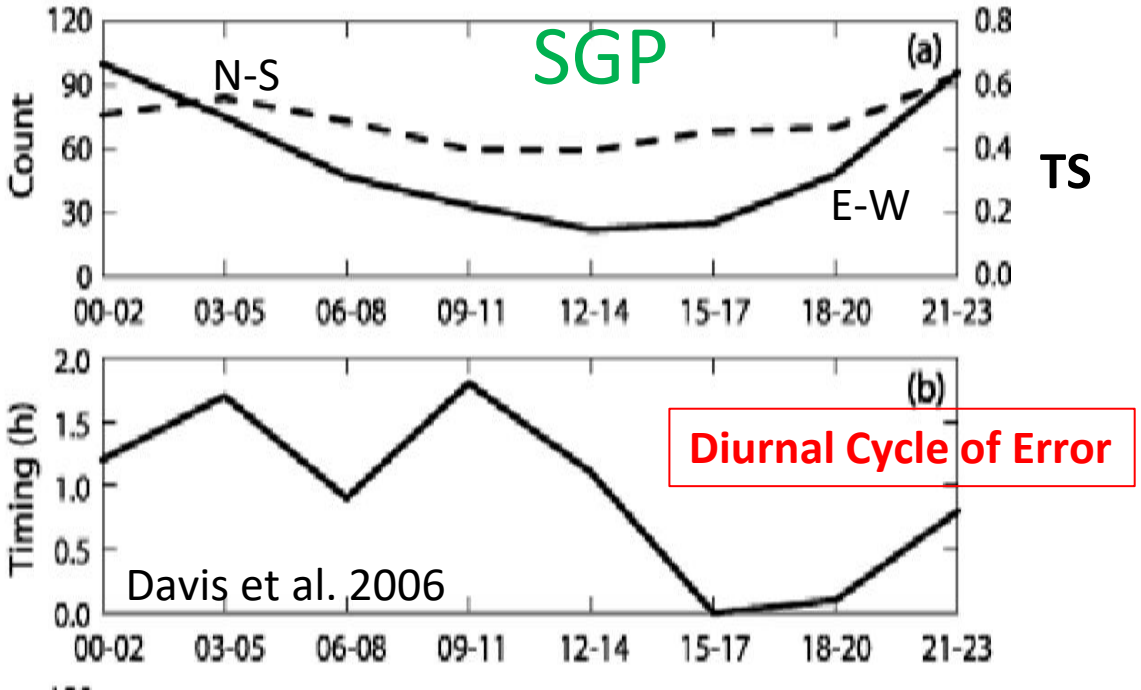
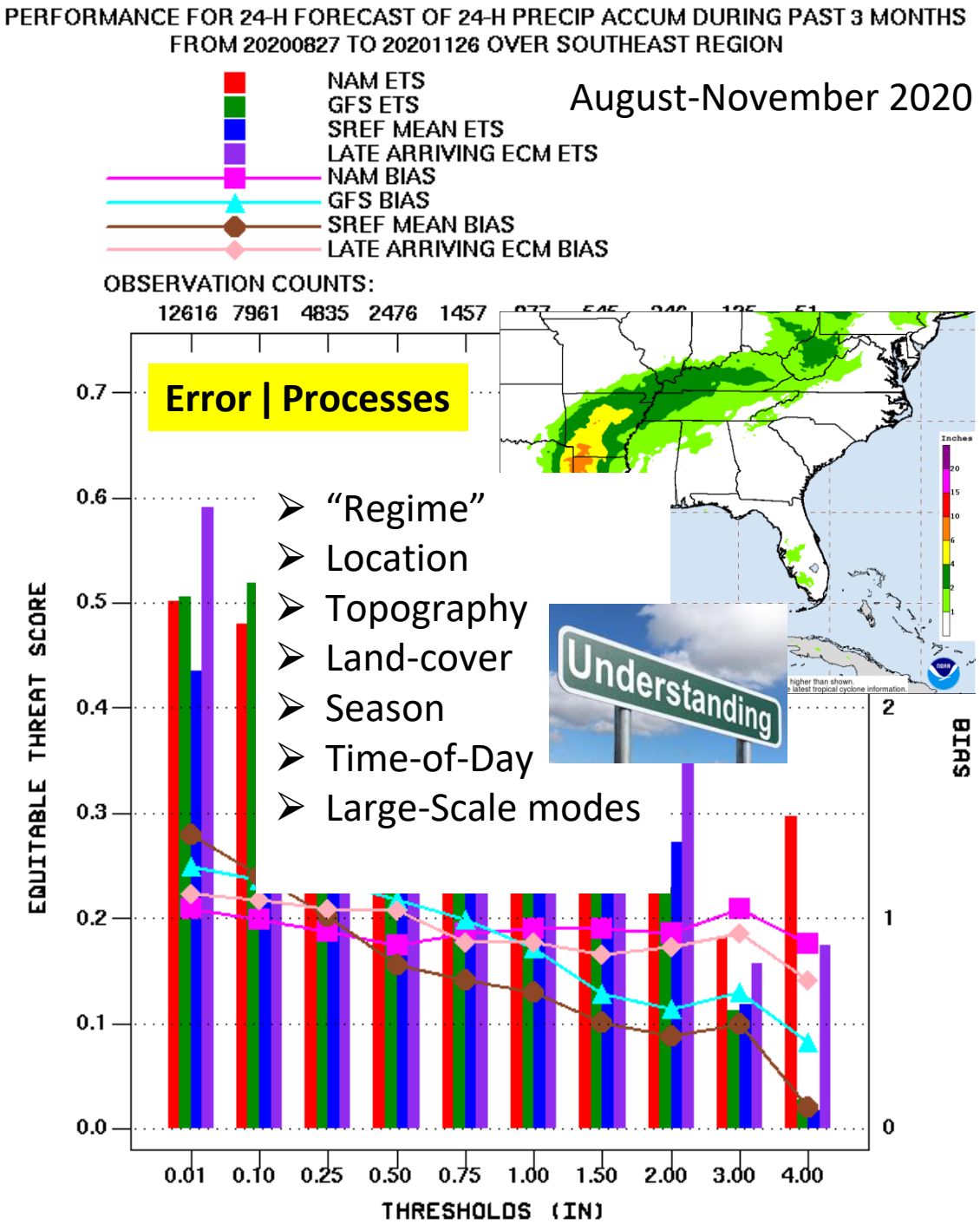


Timing

0-1.5 hr

Object Oriented Verification



3-5 hr