NCEP/Climate Prediction Center ATLAS No. 11.

North American monsoon Model Assessment Project: (NAMAP)

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NAME Modeling and Diagnostic Activities

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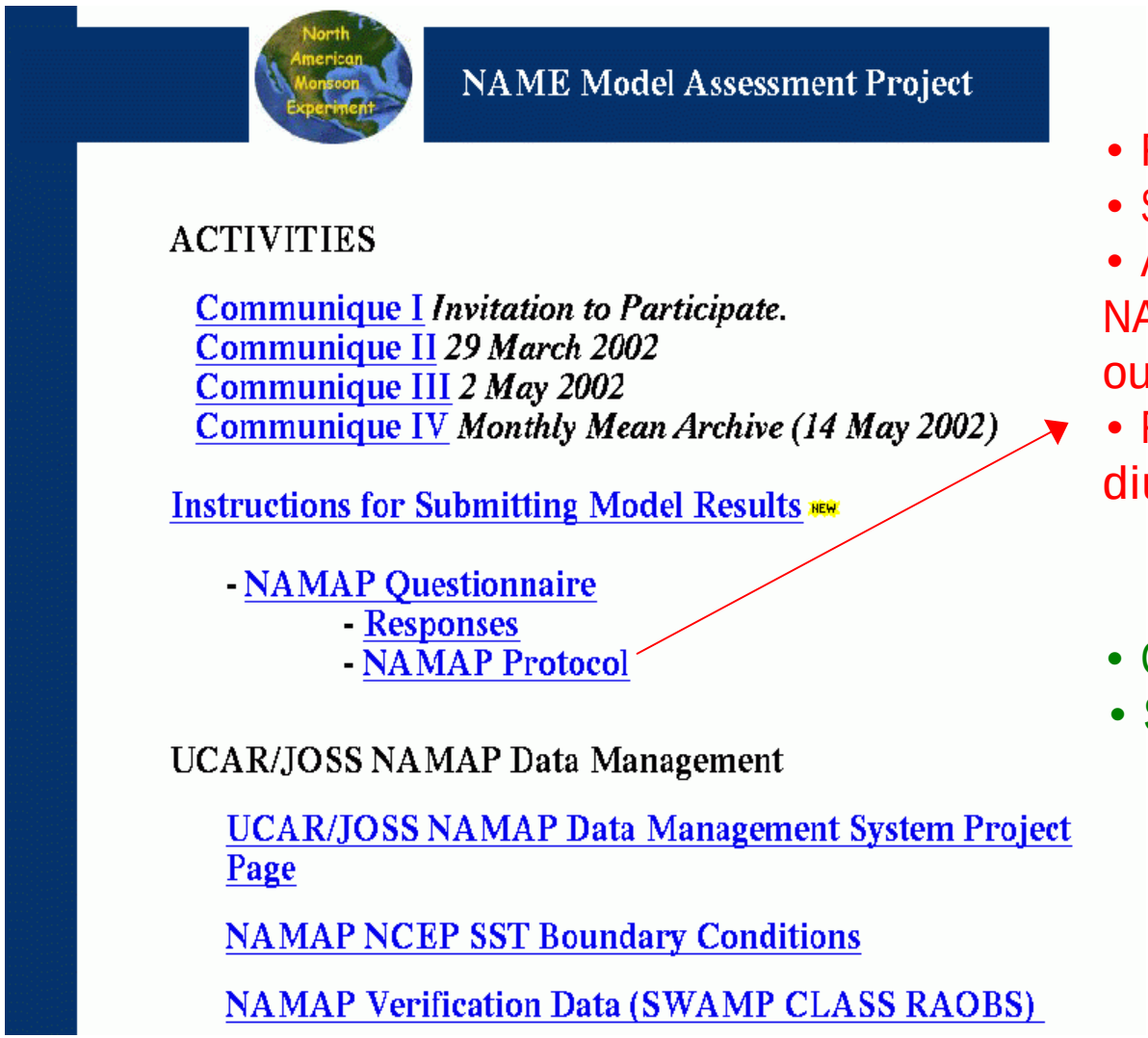
NAMAP: integrating modeling and field activities in the North American Monsoon Exp.

http://www.cpc.ncep.noaa.gov/research_papers/ncep_cpc_atlas/11/index.html

NAMAP timeline & protocol

http://www.joss.ucar.edu/name/namap/



NAMAP protocol

- Focus on Tiers I, II
- Specify year (1990), SST
- Analyze monthly-averaged NAMS atmospheric and surface output
- Resolve monthly-averaged diurnal cycle in Tier 1

Goals

- Common control simulations
- Show common uncertainties and modeling challenges

NAMAP participating models/groups

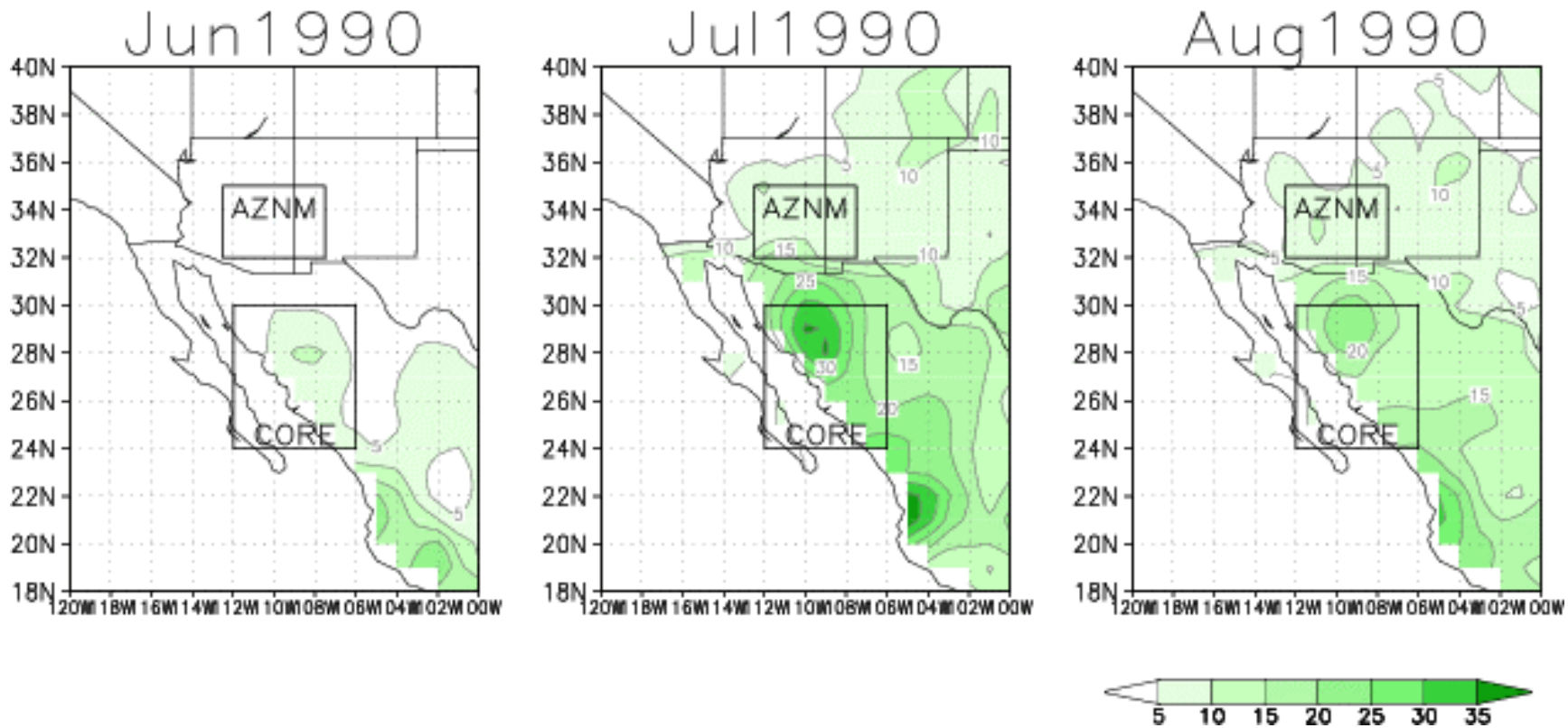
	Model	Institution / Group	Resolution	Moist Convection
Regional	RSM	NCEP / Juang et al.	20 km / 28L	Arakawa-Schubert
Regional	RSM	SIO ECPC / Kanamitsu	20 km / 28L	Arakawa-Schubert
Regional	MM5	UNM / Ritchie	15 km / 23L	Kain-Fritsch
Regional	Eta	NCEP / Mitchell & Yang	32 km / 45L	Betts-Miller-Janjic
Global	SFM	NCEP / Schemm	2.5×2.5° / 28L	Arakawa-Schubert
Global	NSIPP	NASA / Schubert & Pegion	0.6×0.5° / 34L	Relaxed A-S

Summer 1990 simulations

Lateral boundary conditions: Reanalysis
SST: NOAA OIv2 1×1° weekly analysis
Land surface treatments vary

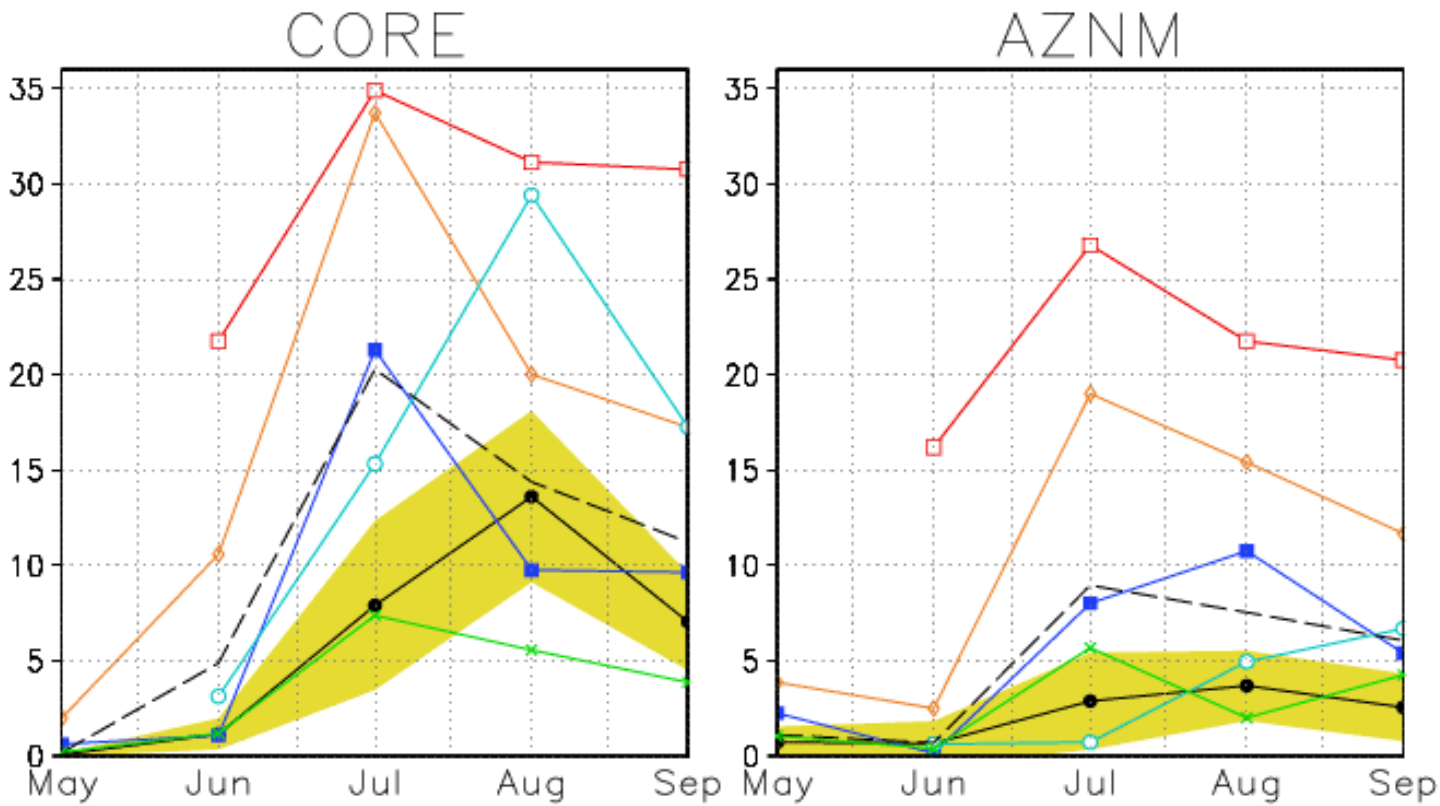
Seasonal cycle of SWNA precipitation

(observations: Higgins & Shi 1°×1° daily gridded fields)



- Jun: dry north of 30°N
- Jul: month of maximum precipitation
- Aug: somewhat diminished continuation of monsoon

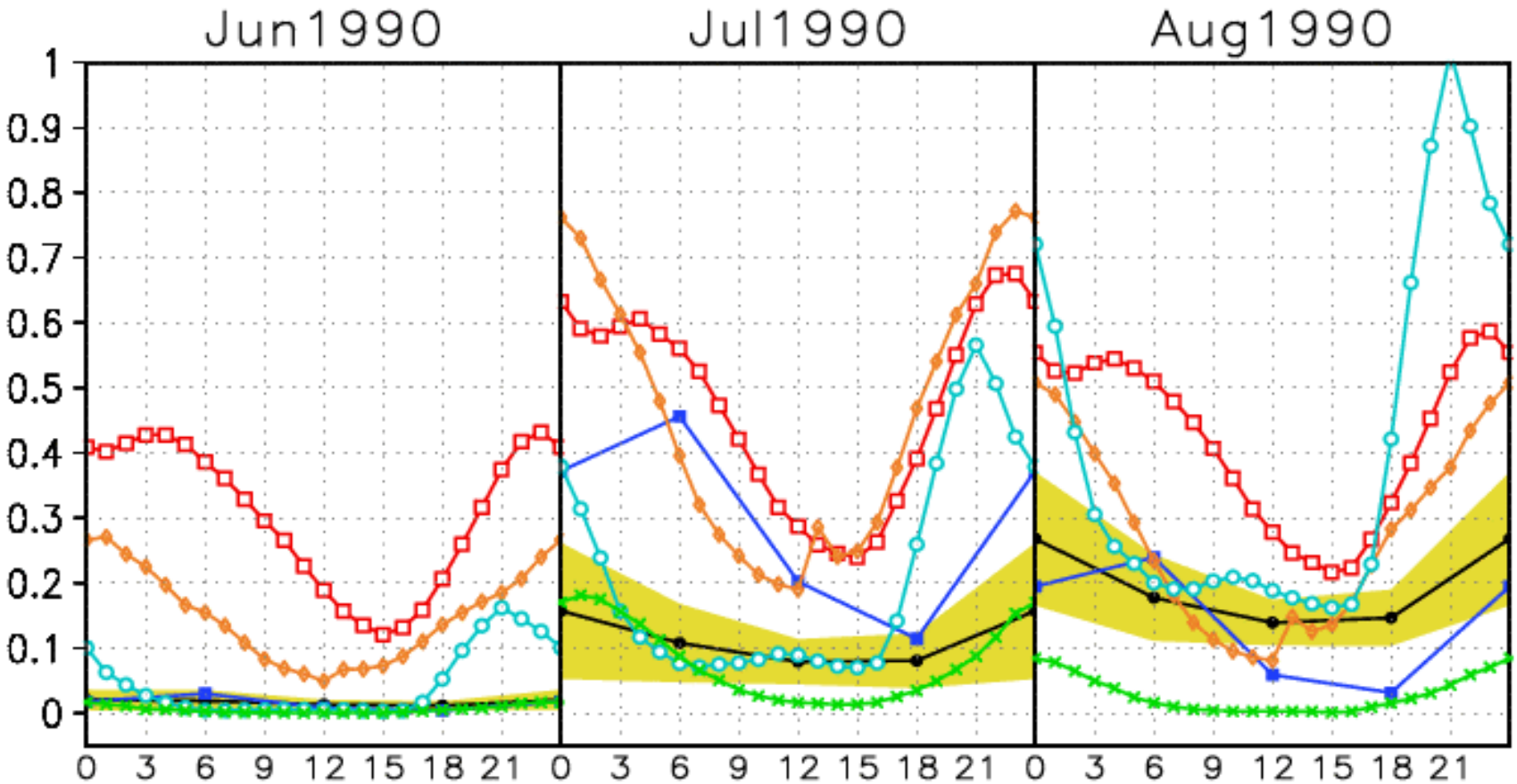
Total Monthly Precip. [cm] (Tier I)



All models generate a summer (Jul or Aug) precip max in both averaging areas

Both global models initiate monsoon rainfall later in the season (Aug max instead of July) … Sensitive to soil moisture?

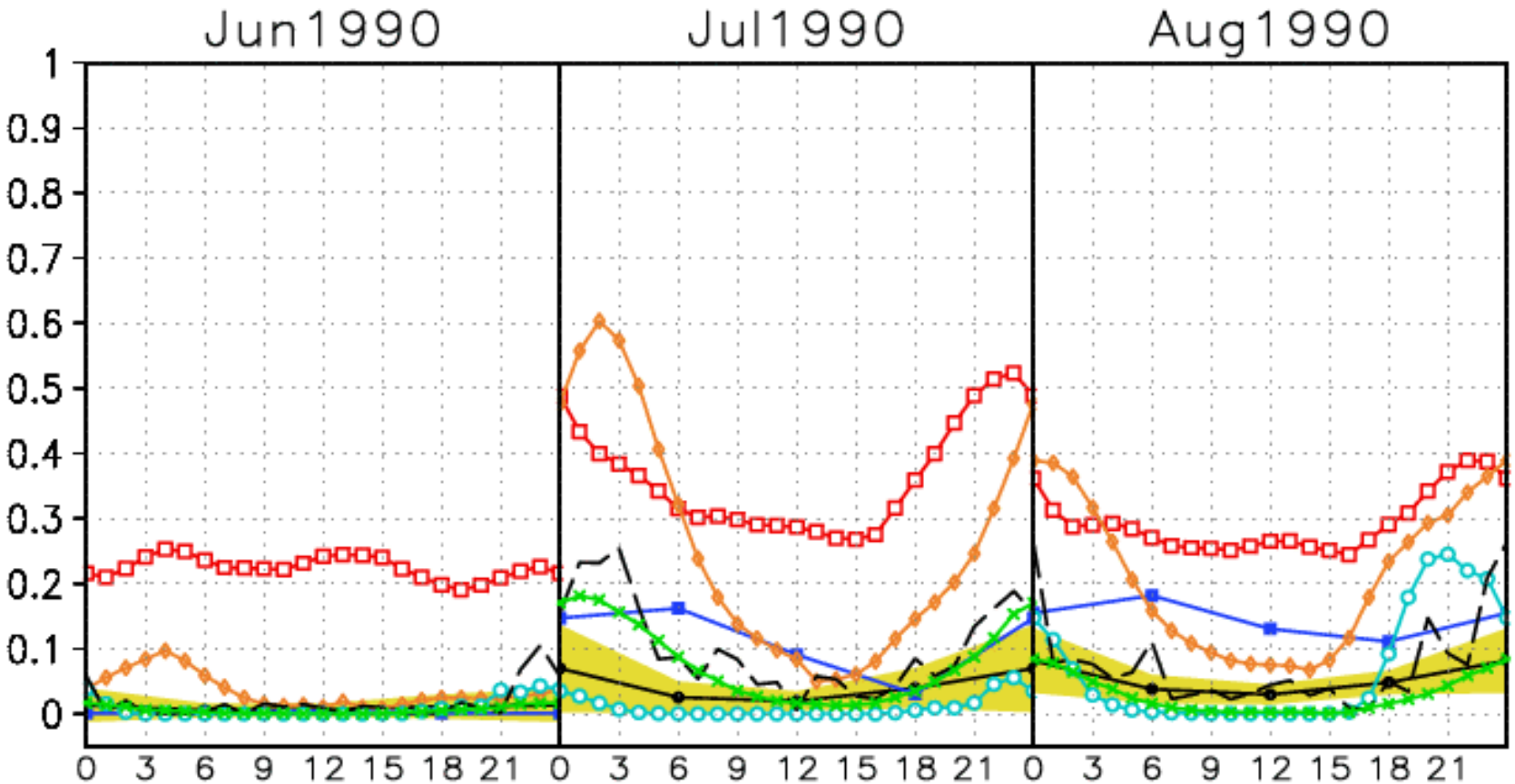
Diurnal cycle of Precip. [mm/hour]: CORE



- No obs here! What is the "true" diurnal cycle?
- All models show convective max between 21Z-04Z
- How much nocturnal rain should be falling?

EXPERIMENTO DEL MONZÓN DE AMÉRICA DEL NORTE
NAME
WCRP/CLIVAR – VAMOS/GEWEX
NORTH AMERICAN MONSOON EXPERIMENT

Diurnal cycle of Precip. [mm/hour]: AZNM



- Observed late-day convective max, esp in July
- How much do obs underestimate "true" total?

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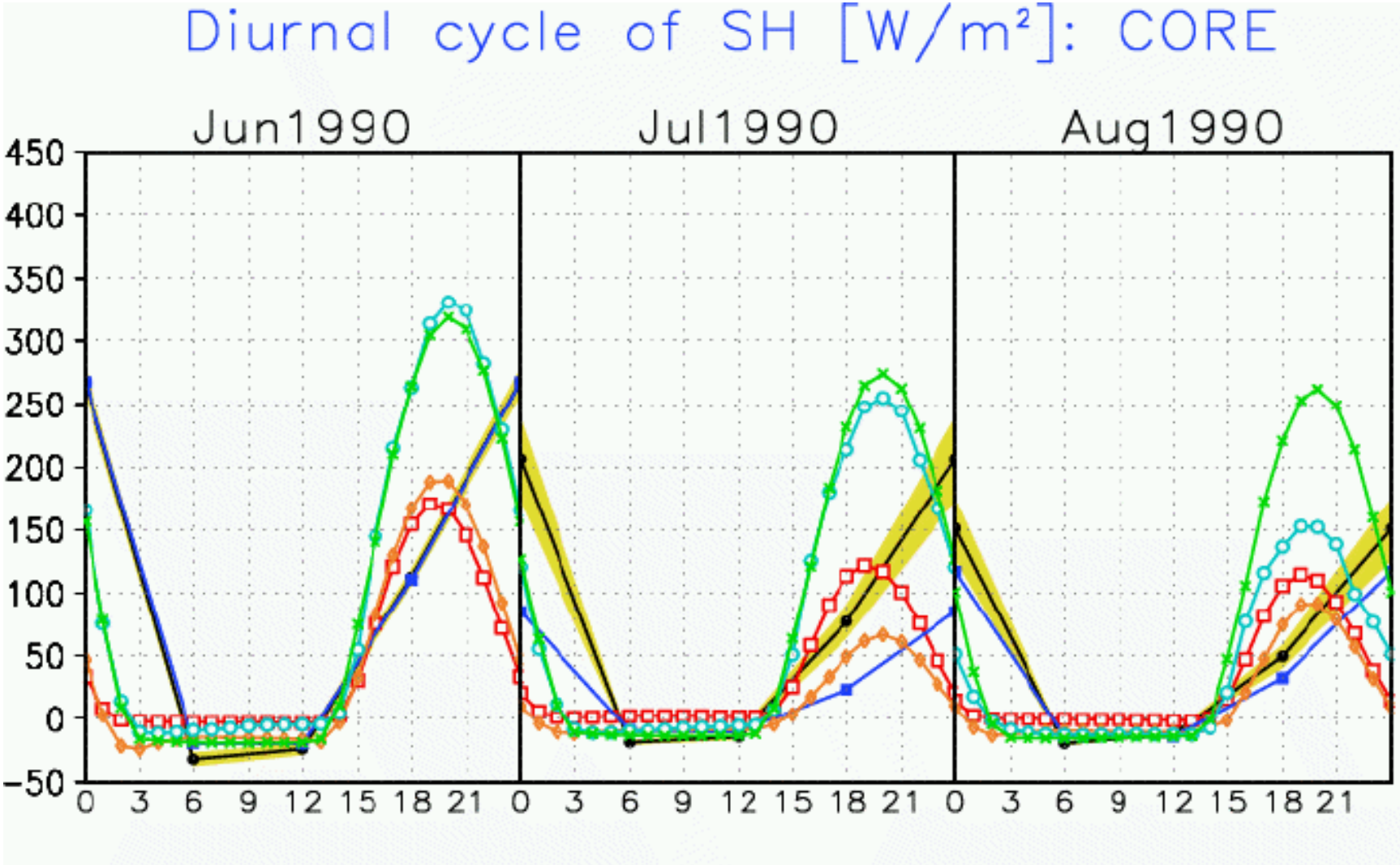

Large variability among models,
also manifested in Bowen Ratio (SH/LH)

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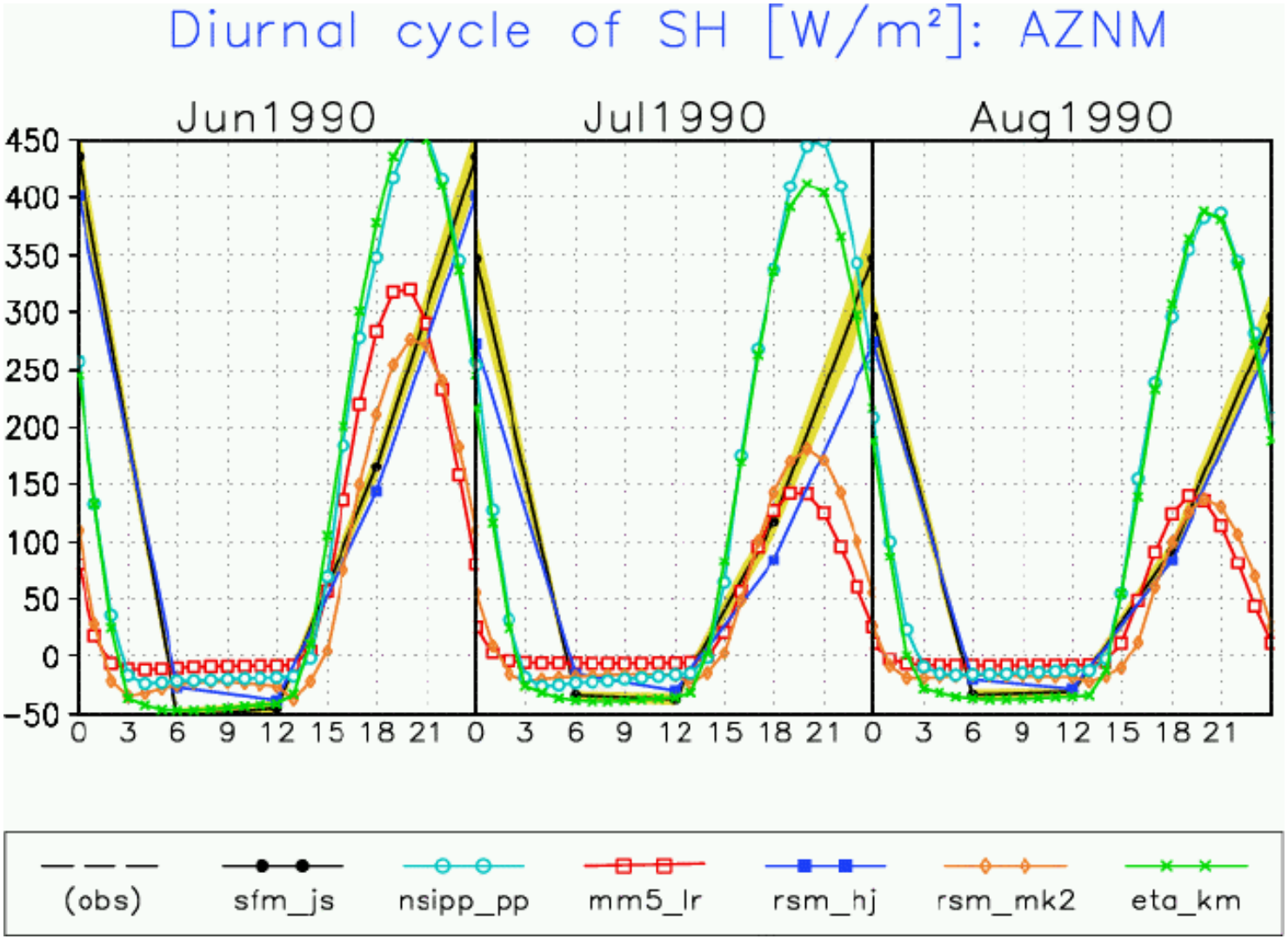

Huge differences again, analogous to results from the CORE average but with even larger amplitude

NAMAP Analysis: Some key points

- All models simulate a summer precip maximum; the two global models exhibit delayed monsoon onset (Aug instead of Jul)
- Precip diurnal cycle issues: magnitude of late-day convection, amount of nocturnal rainfall?
- Surface quantities (T, LH, SH fluxes) seem very poorly constrained; huge model differences (no validation data)
- Great Plains LLJ weakens after monsoon onset
- Low-level (slope?) jets occur -- but only weakly tied to NAME precip? Needs additional analysis, and close observation in 2004 field season

NAMAP Analysis: Metrics for model development

- Improved simulation of monsoon onset, especially in global models
- Goals for improvement of precipitation (total amount and diurnal variability) and surface flux simulations, tied to improvements in ground truth to be achieved from NAME 2004 field observations
- Questions regarding the structure of low-level jet circulations and their importance for proper precipitation simulation

Guidance for future modeling activity

… to be developed in breakout sessions

- Extend NAMAP-style activity as NAME 2004 field campaign gets underway
  - *Establish baseline simulations of the 2004 summer monsoon season* to promote sensitivity studies and model development efforts by each individual modeling group.
  - *Link to model development research* emphasizing the diurnal cycle of precipitation
  - *Link modeling to enhanced observations* of precip, low-level wind, and surface fluxes
- Expand participation
- Define needs for, and source of, support

NAMAP-2
issues to consider (1)

- *Establish baseline simulations of the 2004 summer monsoon season*
  - period to simulate: *June-Sept 2004? Special IOP runs?*
  - Extend analysis to examine *submonthly transient variability?*
  - Increase emphasis on *continental-scale variability (esp. Tier 3)?*
  - Carry out *sensitivity studies* (to SST, etc.) or leave such efforts to individual modeling groups?
  - Define *specific indices or subregions* to examine? For example, metrics defined in NAMAP Atlas
    - **... monsoon onset date**
    - **... afternoon convective peak**
    - **... amount of nocturnal precip**
    - **... structure of Gulf of Calif LLJ**
    - **... time-averaged surface fluxes (pre and post onset)**

NAMAP-2
issues to consider (2)

- *Link to model development research*
  - merge or integrate NAMAP-2 with *CPT effort?*
  - hence enhance focus on the *diurnal cycle (of precipitation)?*
  - Link NAMAP-2 to *enhanced observations* of precip, low-level wind, and surface fluxes
- *Expand participation*
  - Entrain international participants (what incentives are needed?)
- *Define needs for, and source of, support*
  - possible OGP support ... for what/whom? proposal deadline this summer?