



# Some challenges for monsoons and new hopes in working together

Andy Turner

***Trending Now: Water***

**7<sup>th</sup> International Scientific  
Conference on the  
Global Water and Energy Cycle**

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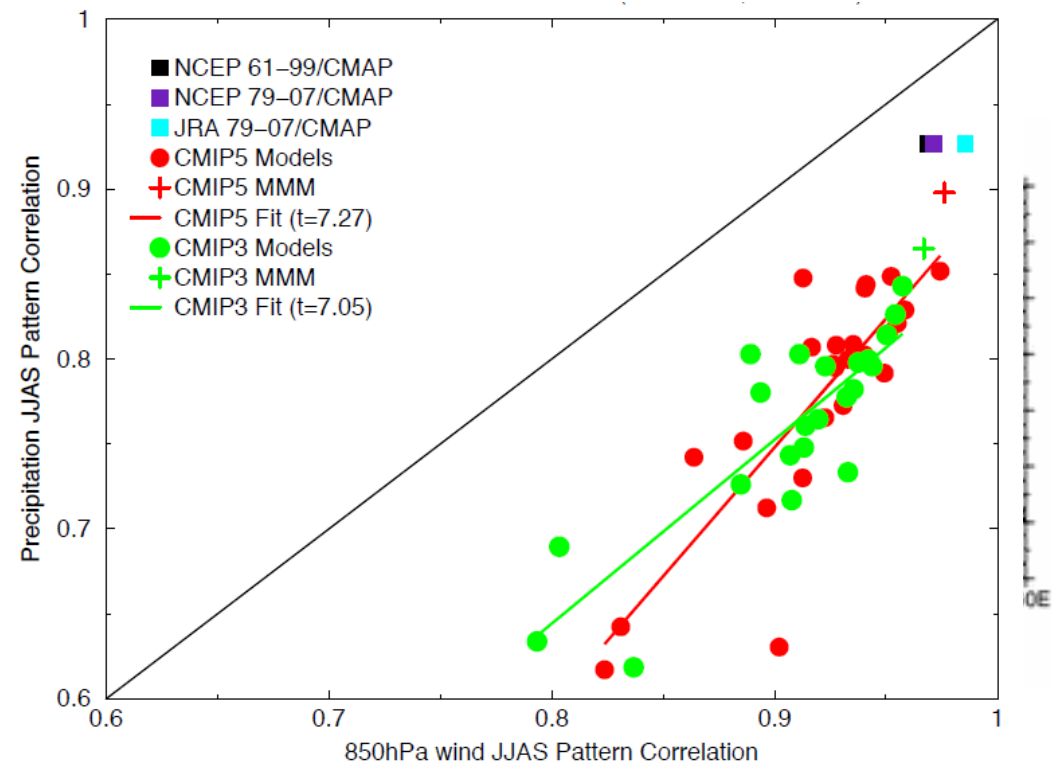
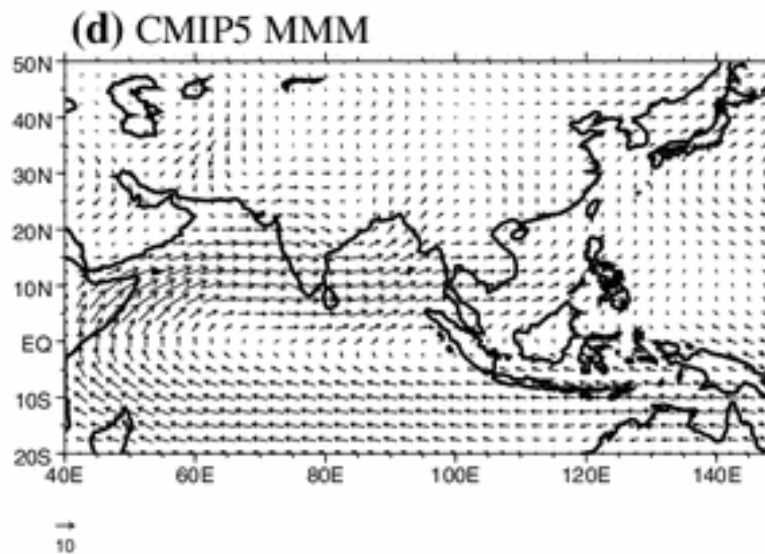




# Asian monsoon simulation



- Poor simulation of the mean flow and precipitation

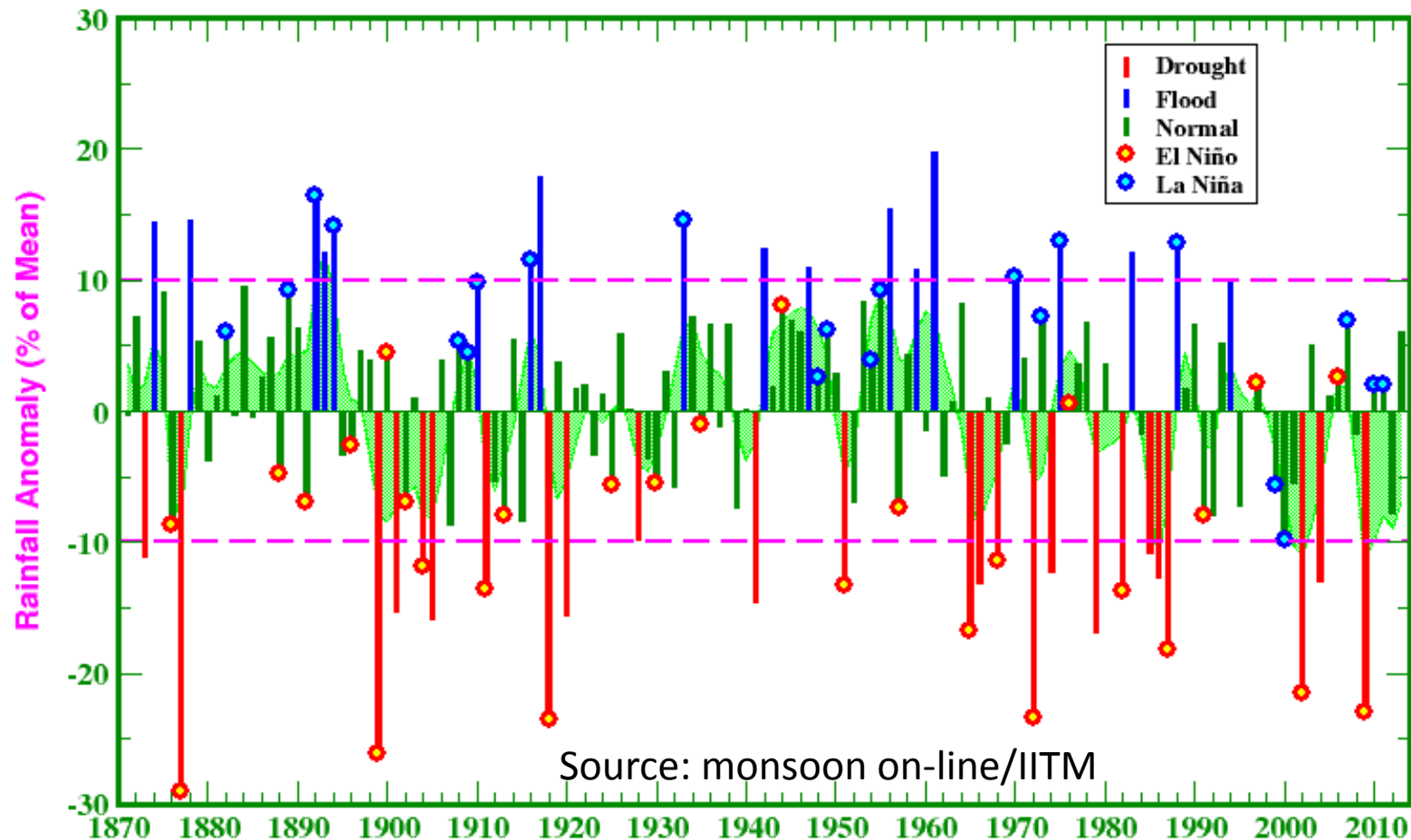


Sperber et al. (2012, Climate Dynamics) – example of activity spun out as a task team from CLIVAR AAMP



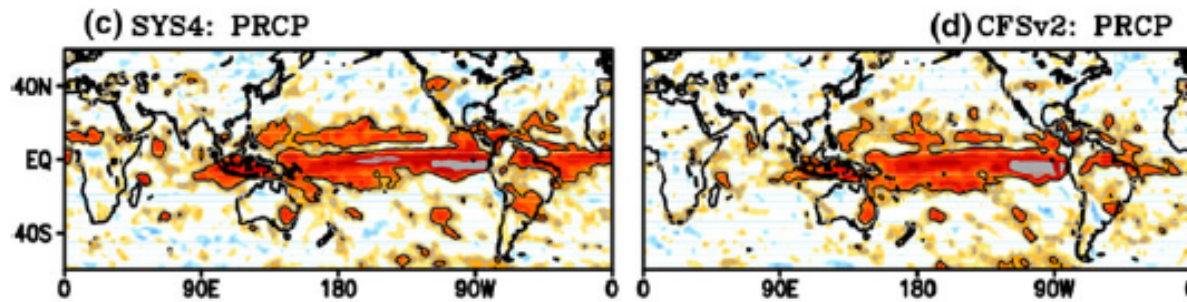
# Seasonal variation

- Can we predict variations in the monsoon?



# Skill at the seasonal scale

- Current levels of skill are low

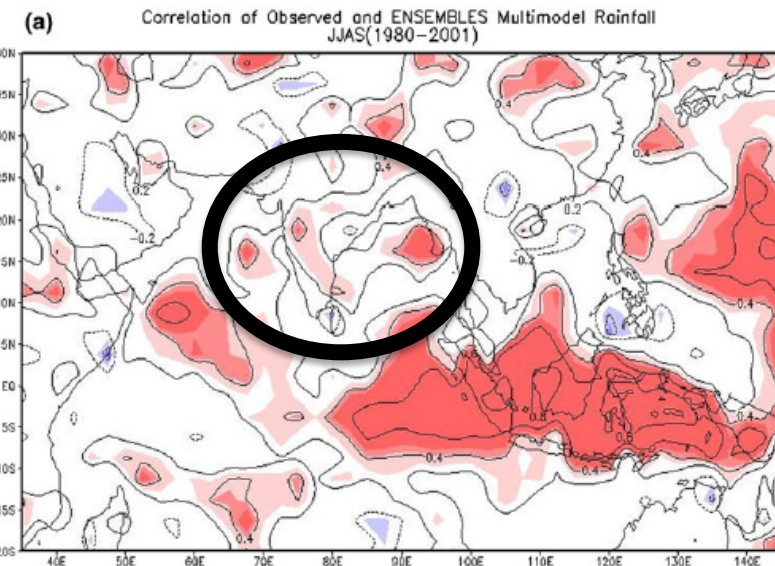


**Fig. 4** Correlation coefficients for (first line) SST (second line) precipitation and zonal wind at 850 hPa with (third line) ERA interim and (fourth line) CFS reanalysis for (left) SYS4 and (right) CFSv2. Solid black (gray) line represents statistical significance of the correlation coefficients at 99 % (95 %) confidence level

Kim et al. (2012, Climate Dynamics)

Rajeevan et al. (2012, Climate Dynamics, ex-CLIVAR AAMP)

**Fig. 9** Spatial pattern of correlation coefficient between observed rainfall and **a** ENSEMBLES MME (above) and **b** DEMETER MME (below) for the period 1980–2001

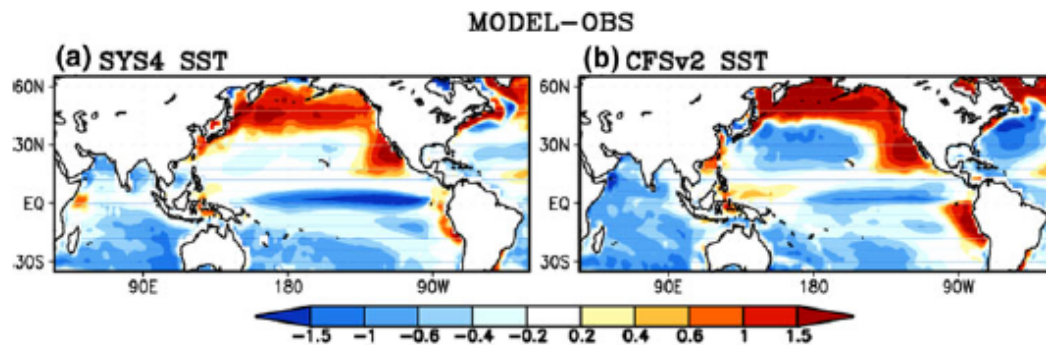






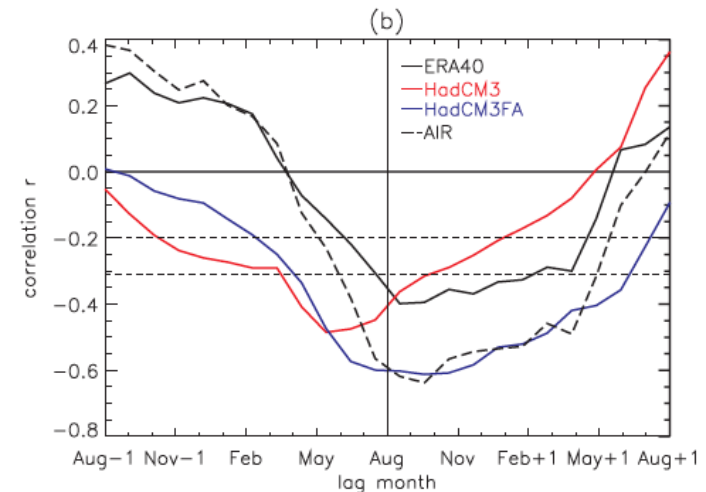
# Model systematic bias

- Large systematic coupled biases even at seasonal prediction scales in initialized systems



Kim et al. (2012, Climate Dynamics)

**Fig. 1** Climatological summer mean (JJA) bias (model-observation) of (top) SST (K) and (bottom) precipitation (mm/day) for (a, c) SYS4 and (b, d) CFSv2

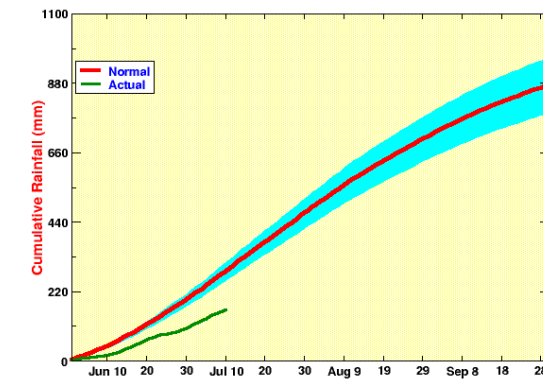
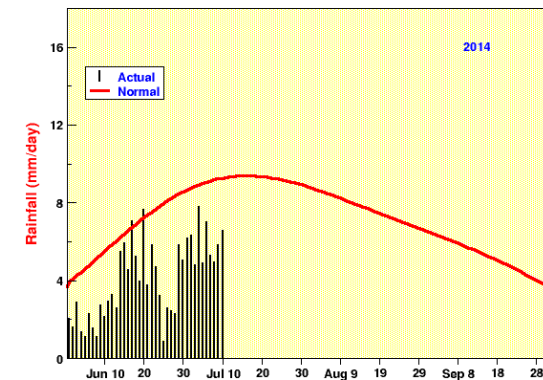
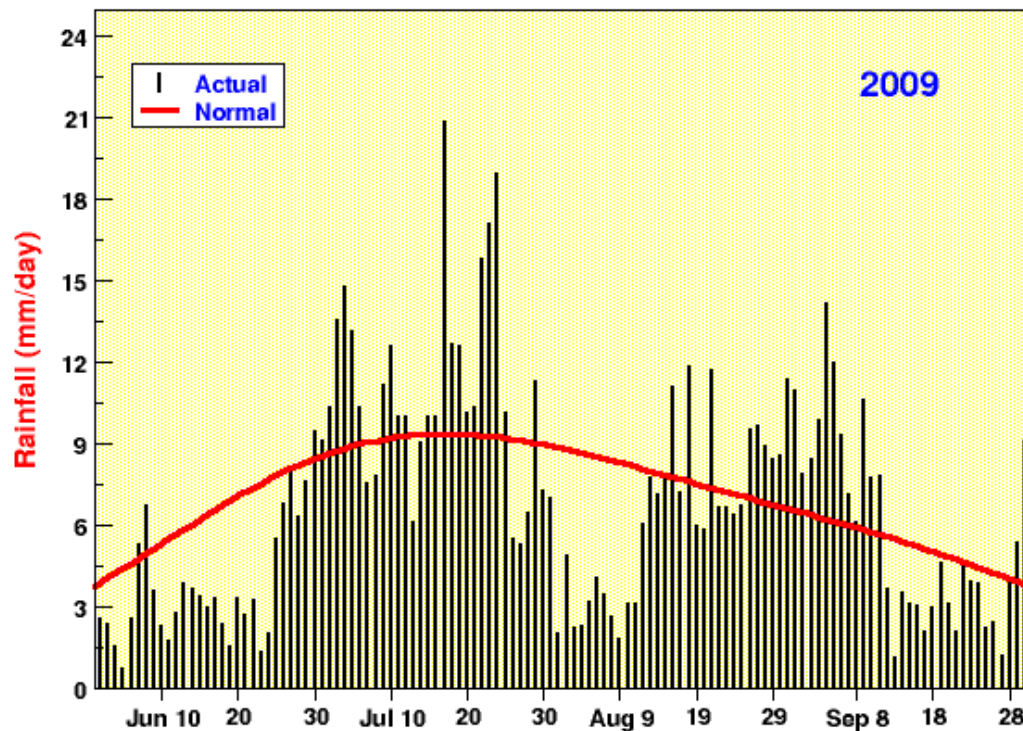


Turner et al. (2005, QJ) Correction of coupled biases can improve teleconnections



# Intraseasonal variation

- Huge impact on society; much larger variance that interannual scales



Source: monsoon on-line/IITM



# Skill at intraseasonal prediction

- Rapid deterioration of skill

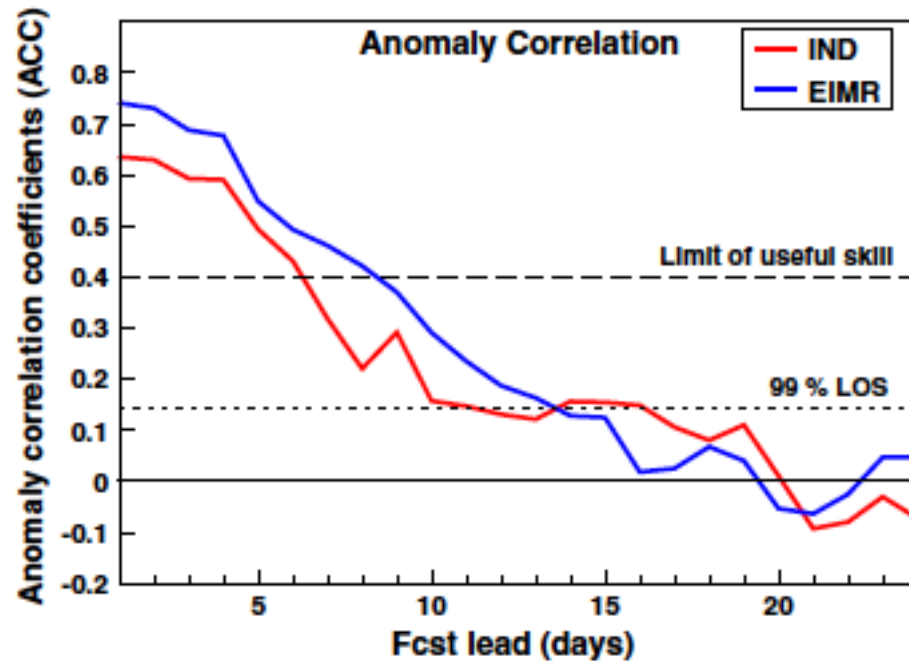


Fig. 7 Anomaly correlation coefficient (ACC) of the area-averaged rainfall over MZI and EIMR region as a function of forecast lead in days

Abhilash *et al.* (2014)



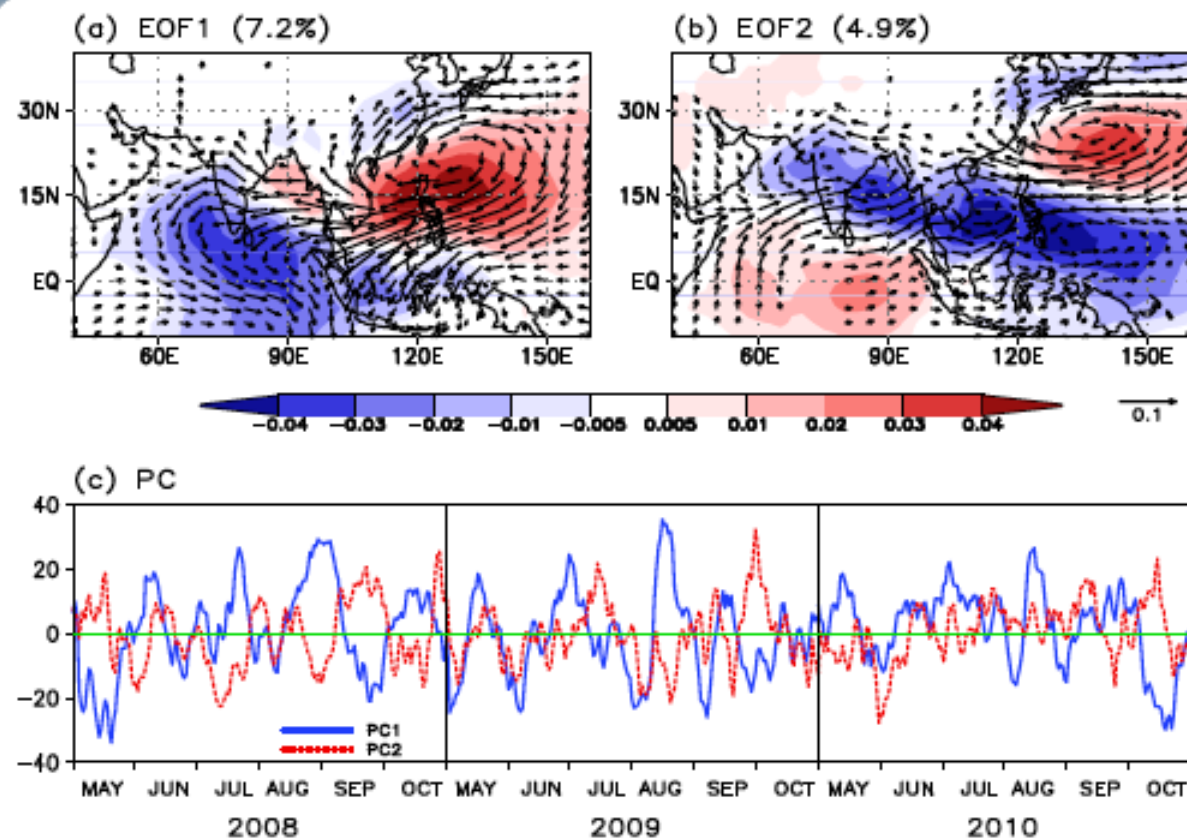
# Progress in understanding ISV

- Basis functions to help understand observed and modelled boreal summer intraseasonal variability

Bin Wang/June-Yi Lee/Ken Sperber *et al.* CLIVAR-supported work related to the ISVHE

Also CLIVAR AAMP-led monsoon workshop on monsoon ISV, Busan, Korea, 2009

Also new S2S-monsoons subproject initiative



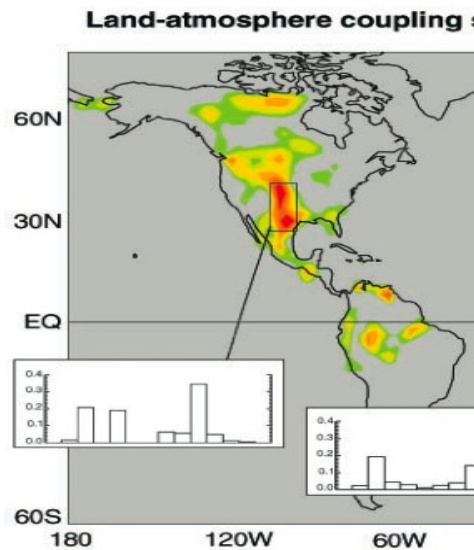




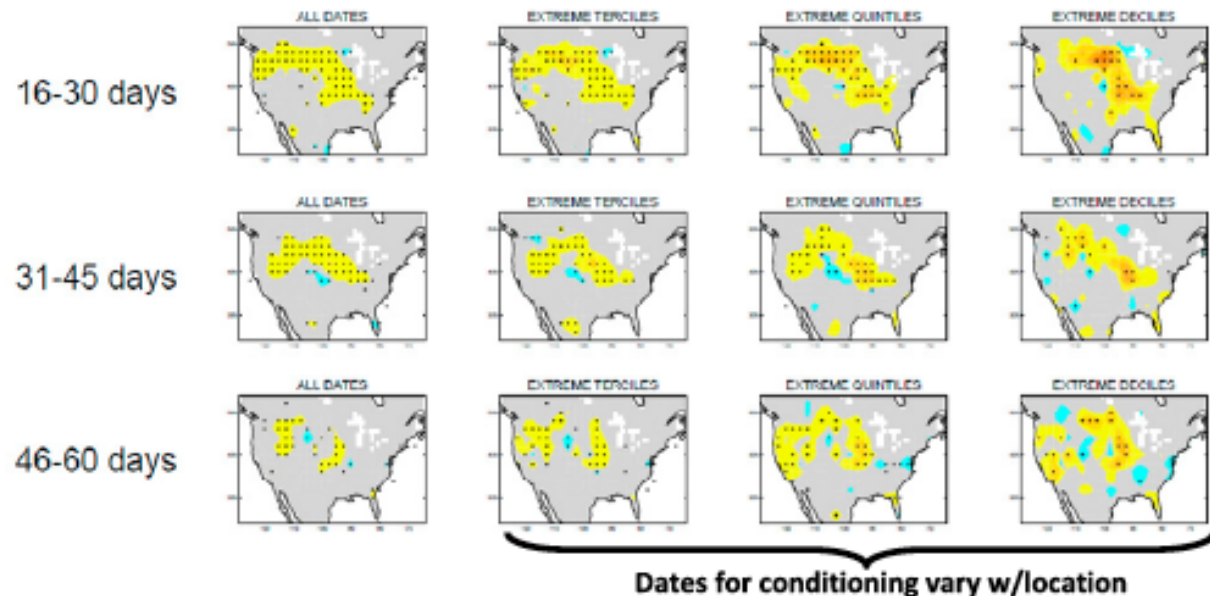
# Cooperation

- Working together across GEWEX and CLIVAR to advance understanding of monsoon variability & prediction – what is the role of the land s

1a. PRECIPITATION FORECAST SKILL ( $r^2$  with land ICs minus  $r^2$  w/o land ICs)



Koster *et al.* (2004)



Koster *et al.* (2009)



# New Monsoons Panel

- Joint GEWEX/CLIVAR Monsoons Panel is convened as of Tuesday
- Continuing push for equitable membership
- A joint GEWEX GLASS/CLIVAR Monsoons land surface initiative for modelling and understanding is already being spun-up; a long-term initiative