

# MAHASRI Modeling Activity (planning level)

Objective: toward improvement up to seasonal prediction,

- To evaluate **topographic** forcing on atmospheric phenomena and **interactions** among atmosphere, land and **ocean**.
- To reduce bias of **diurnal variation** of cloudiness and rainfall.
- Aerosol effects on monsoon
- Urban pollution effects on local precipitation

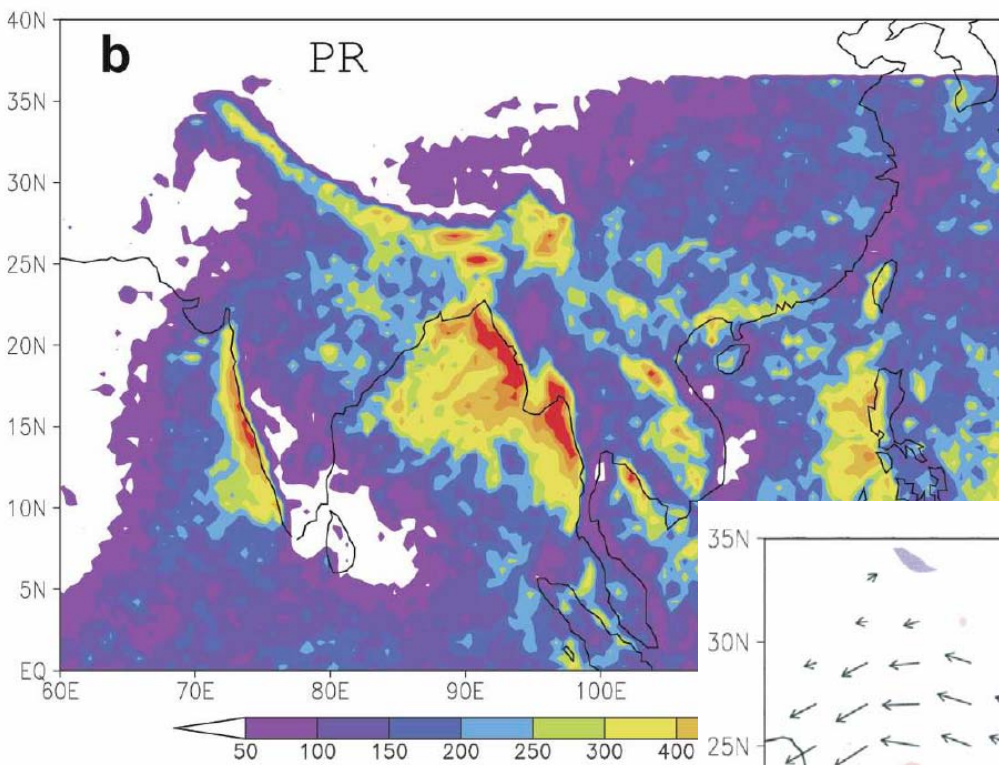
- Method

- **Global** models
- **Regional** models including **cloud-system resolving** models
- Coordinated research with CLIVAR/AAMP

- Problem

- **No fund** till now

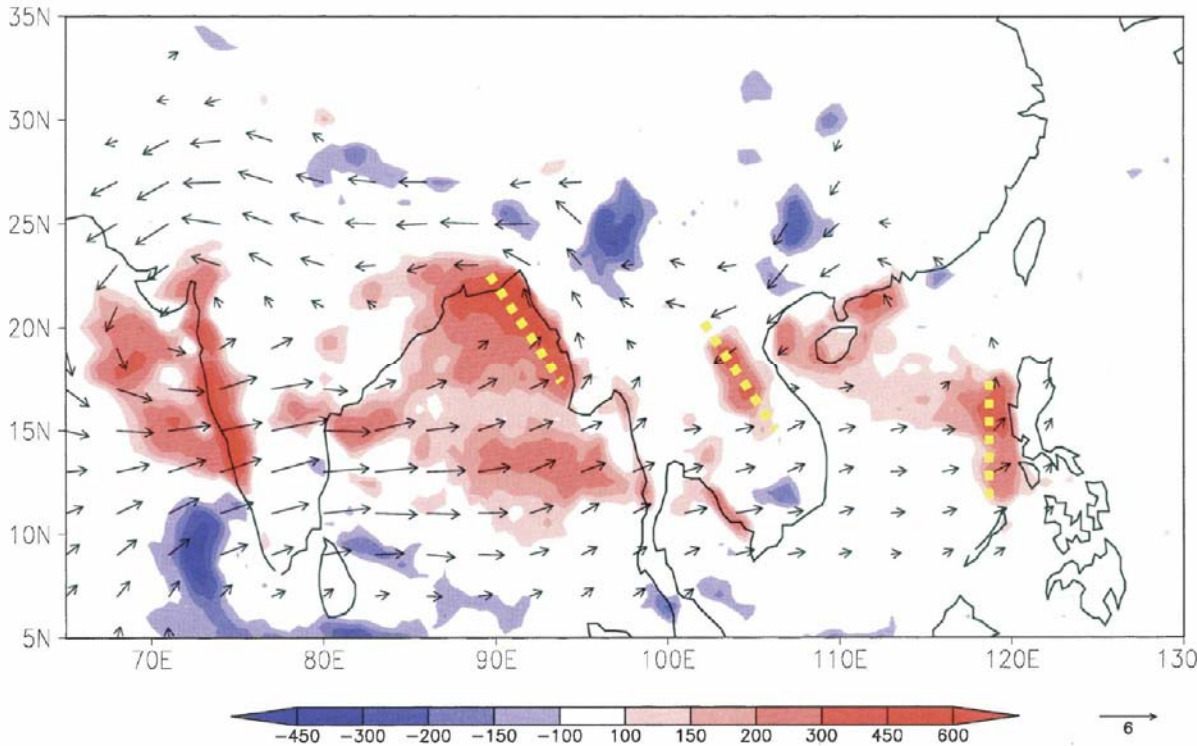
# Problem of topographic effects



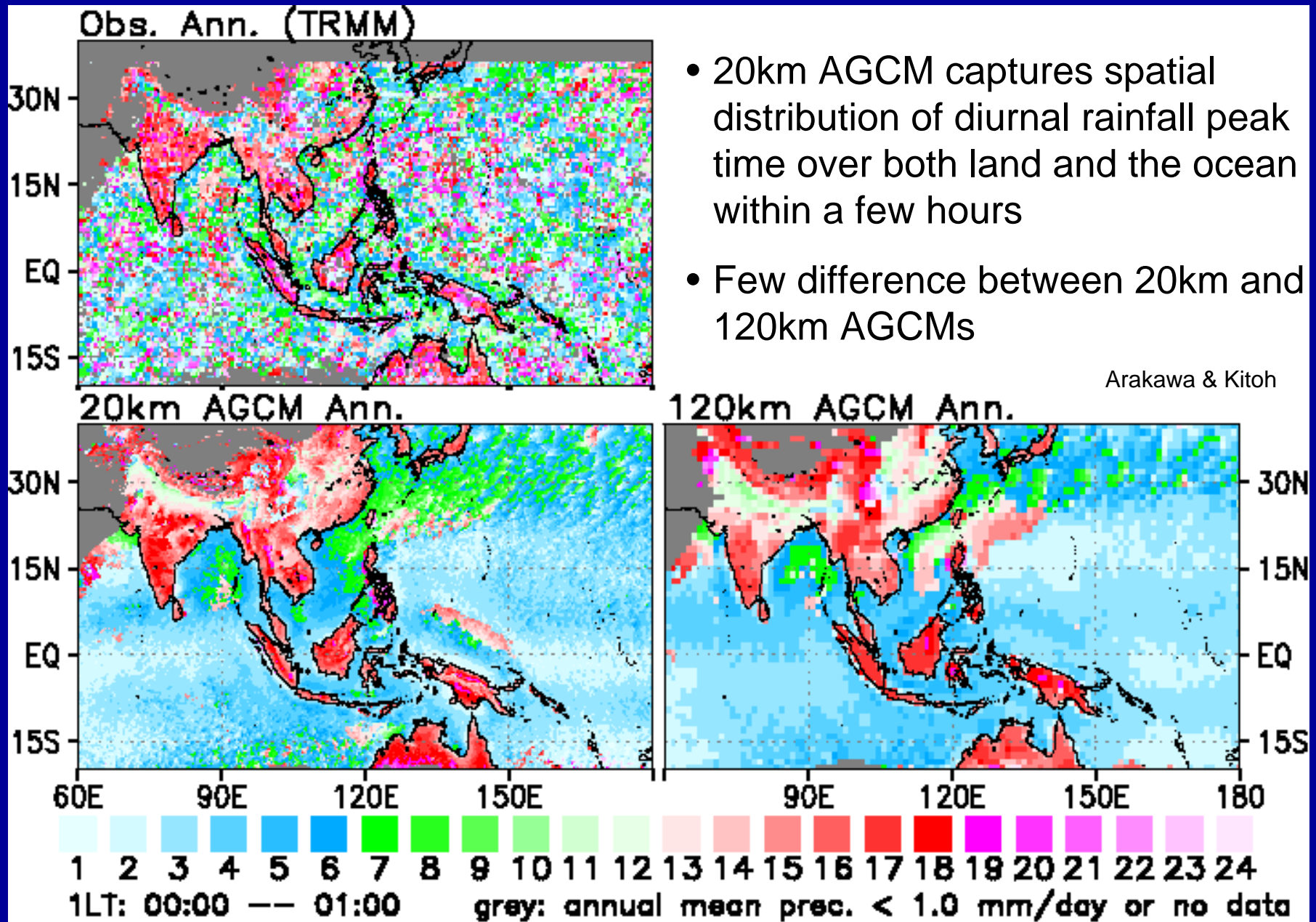
TRMM  
(rainy season average)

Xie et al. 2006

Effects of narrow  
topographic latent heating



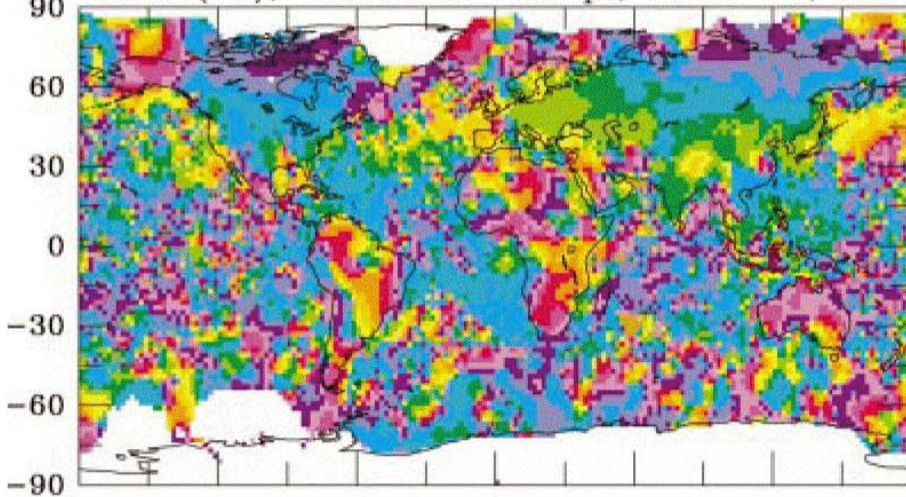
# Issues of rainfall diurnal variation



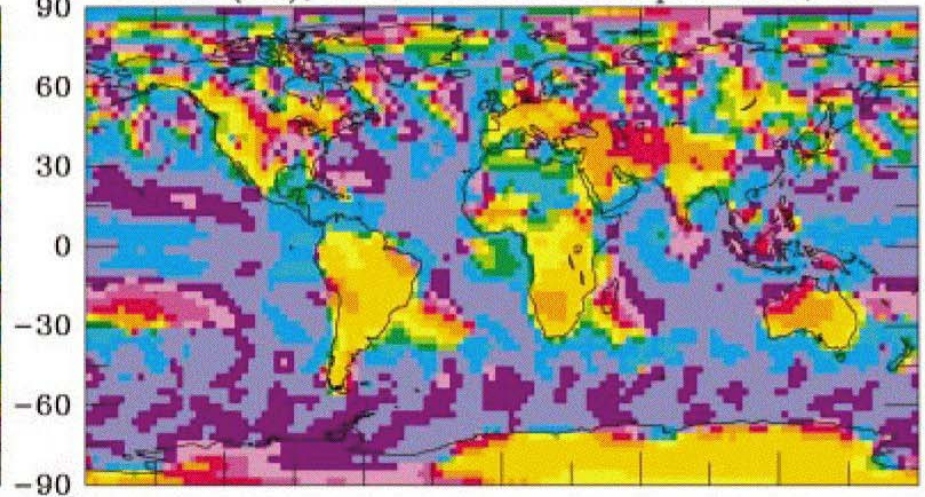
# Surface & COADS

# T42L26 + 1degL40

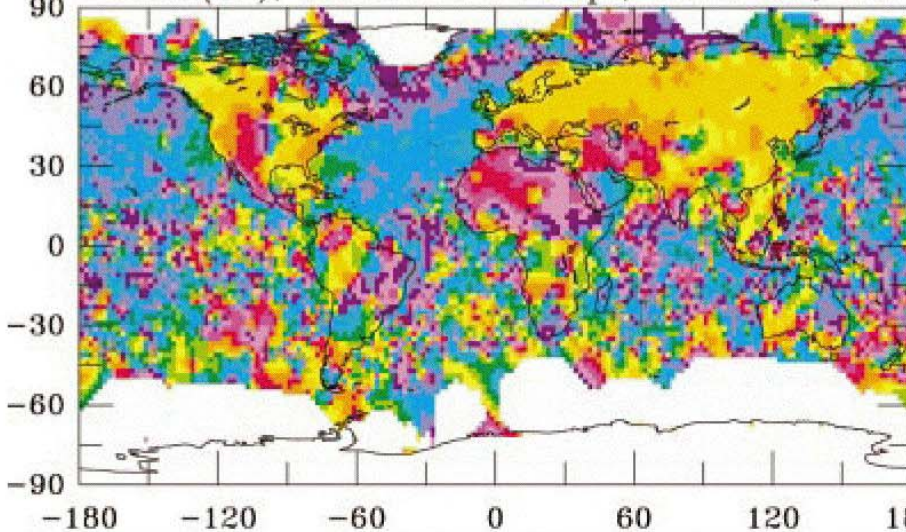
Tmax(hr), Observed Precip., 1976-97, DJF



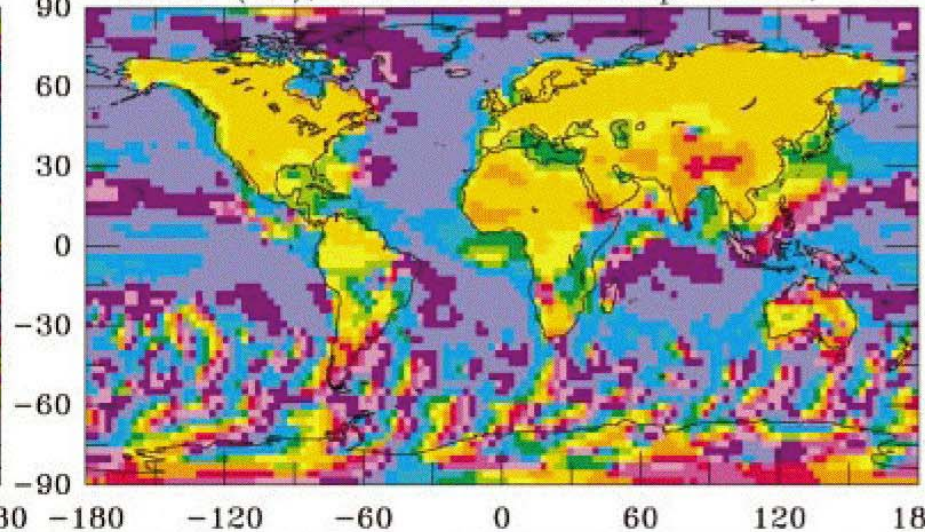
Tmax (hr), CCSM Total Precipitation, DJF



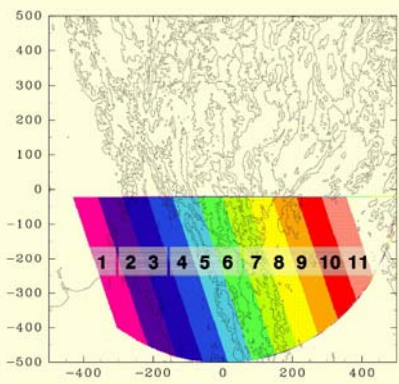
Tmax(hr), Observed Precip., 1976-97, JJA



Tmax (hr), CCSM Total Precipitation, JJA



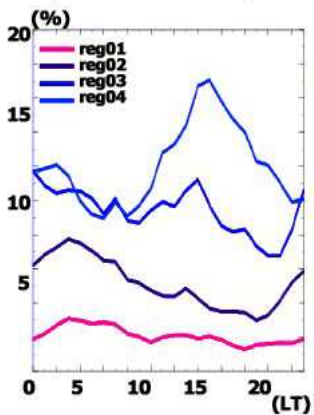
0 2 4 6 8 10 12 14 16 18 20 22 24



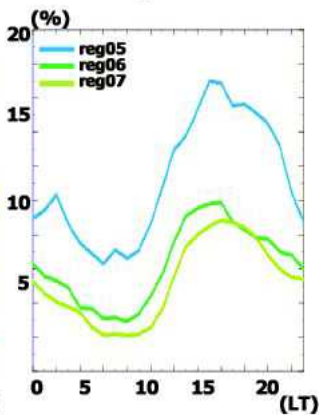
Windward side  
(western area)

Mountainous  
region

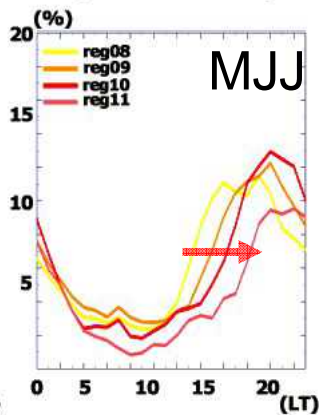
Lee side  
(eastern area)



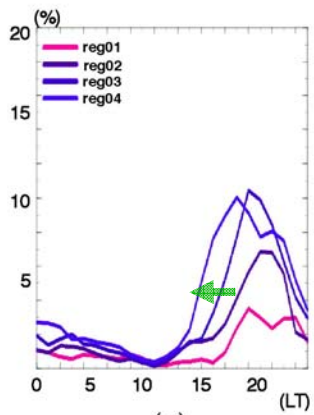
Lee side  
(western area)



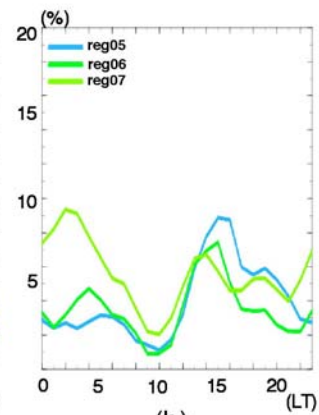
Mountainous  
region



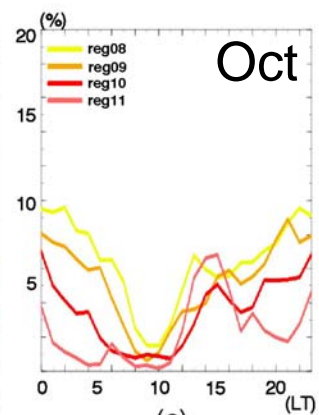
Windward side  
(eastern area)



(a)

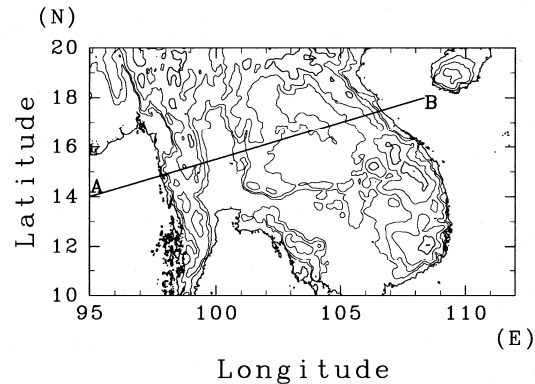


(b)



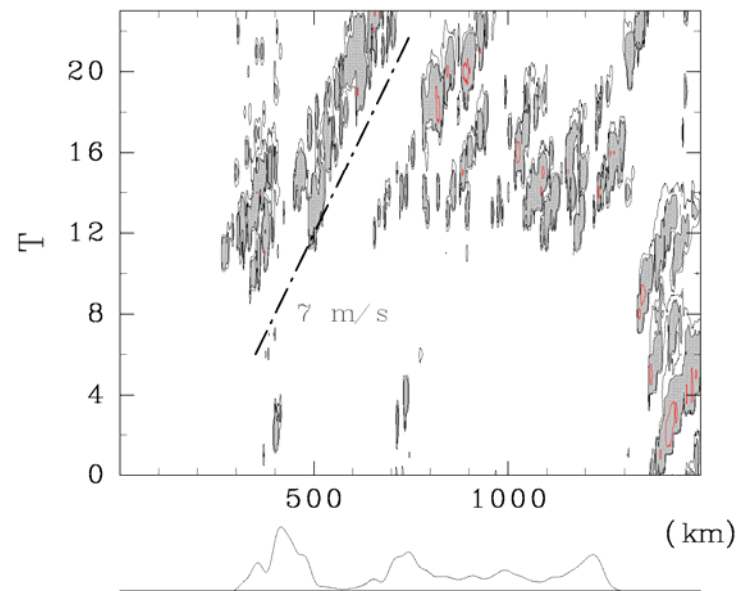
(c)

Okumura et al. (2003)

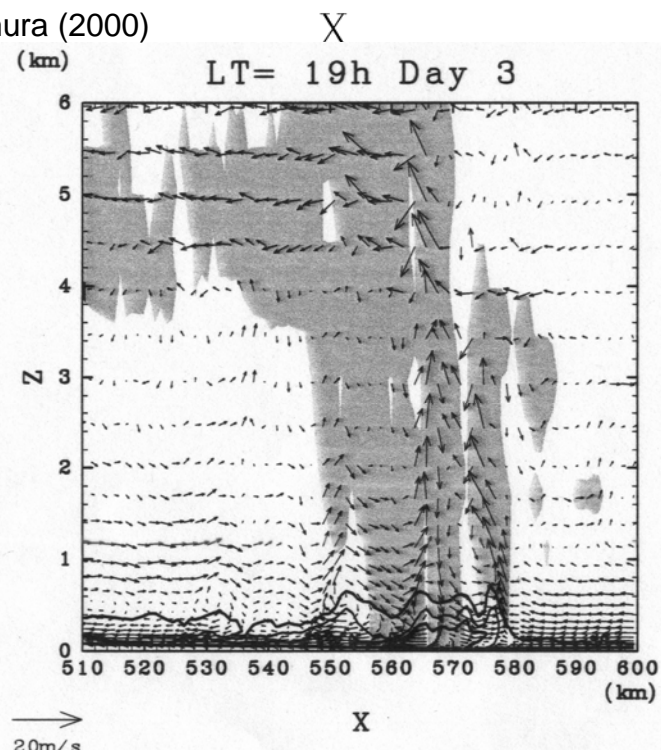


(hour)

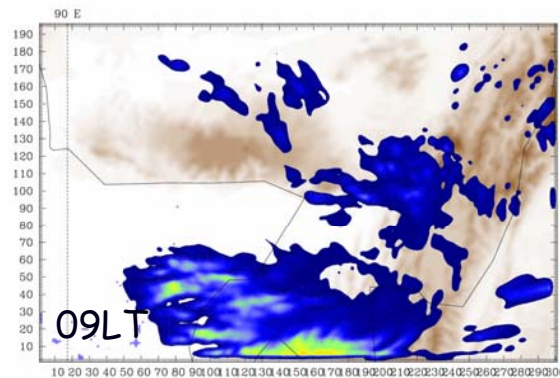
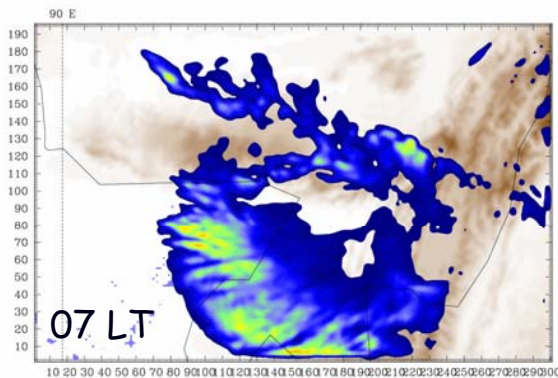
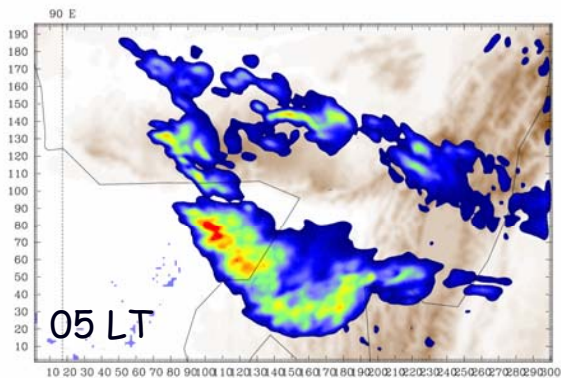
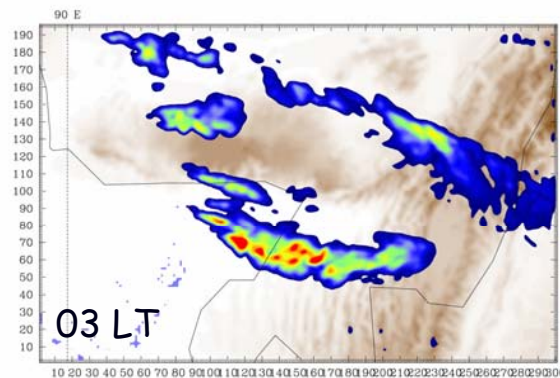
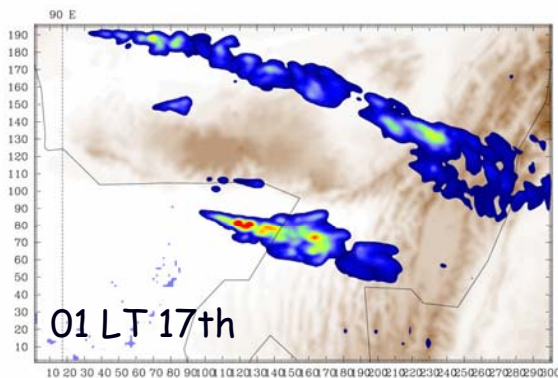
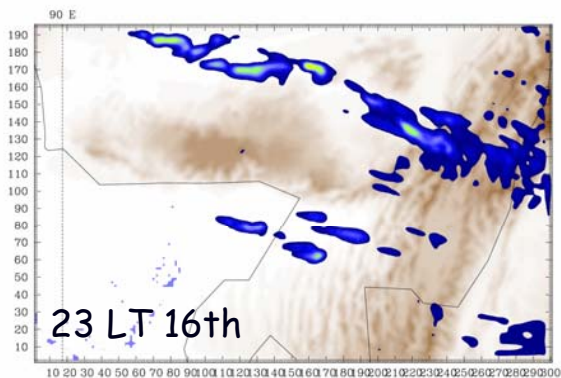
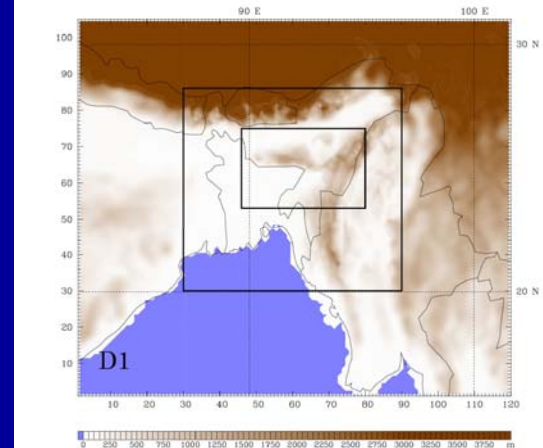
Ave Prec Rate



Satomura (2000)

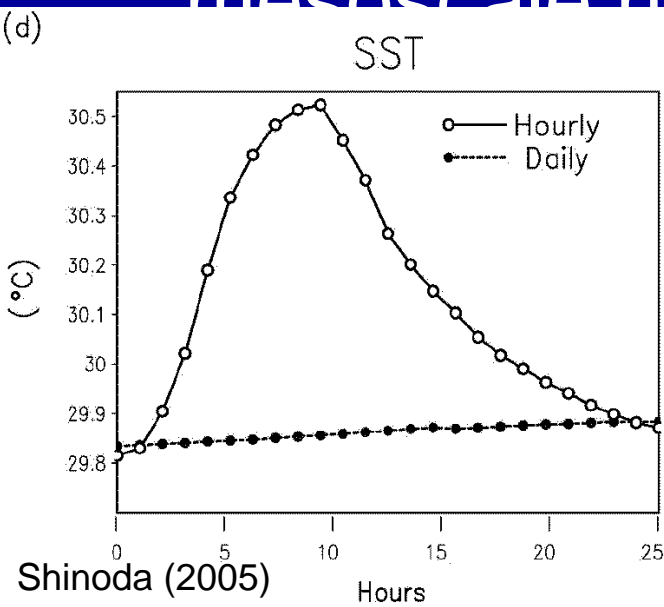


# 1 hour precipitation in the case of Bangladesh



# Issues of rainfall diurnal variation

- MRI GCM vs other GCMs
- Large scale hydrostatic systems  
vs  
mesoscale non-hydrostatic systems



variation  
ion error

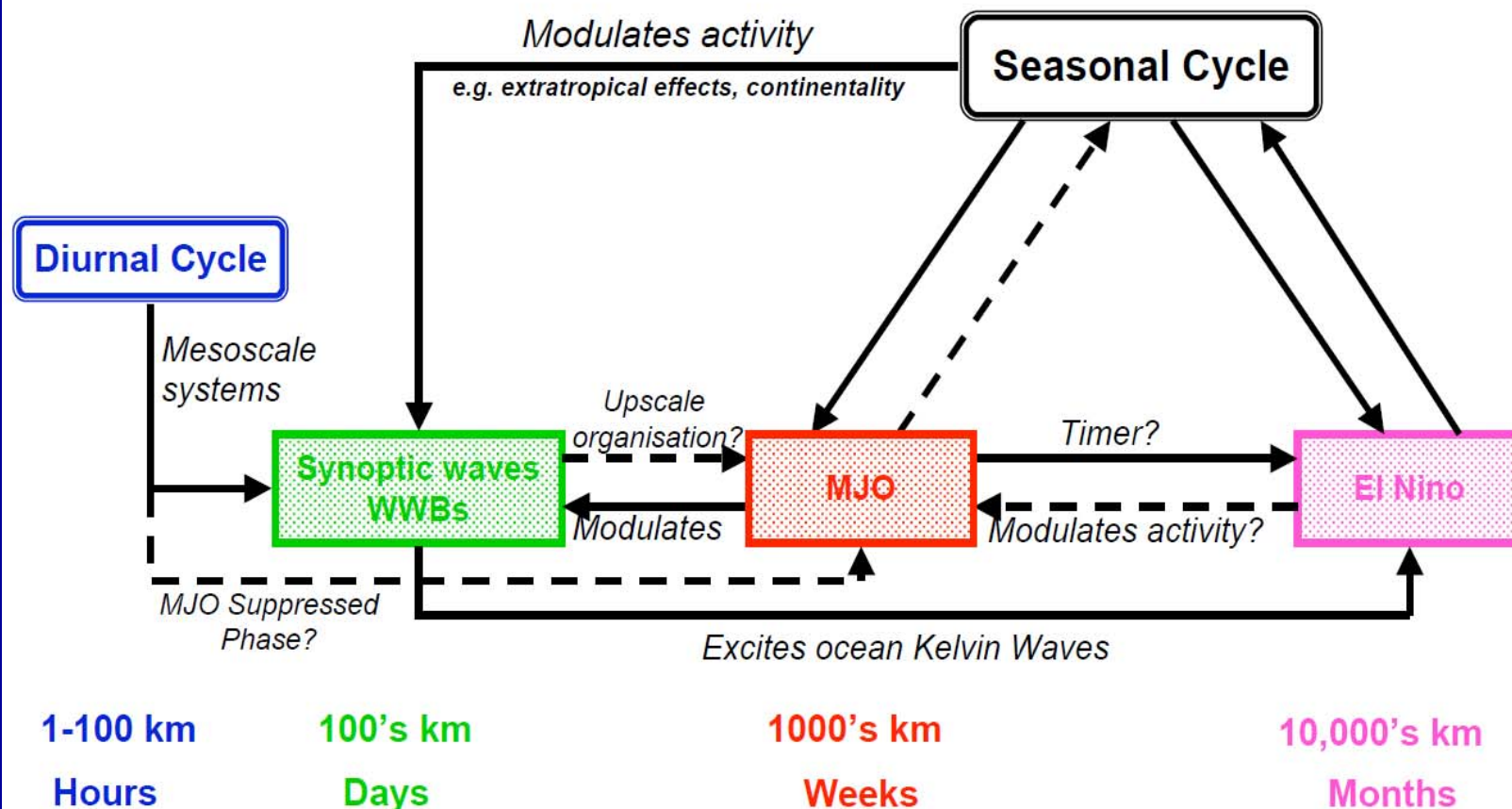
		Nakata & Satomura (2007)	
	DV	No DV	Diff (W/m <sup>2</sup> )
SH flux	50.32	43.04	6.7
LH flux	58.68	60.23	-1.5
Total	109.0	103.3	5.7

# Expectation

- Data which help resolve the issues itemized at the beginning
  - Modeling objective: toward improvement up to seasonal prediction,
    - To evaluate **topographic** forcing on atmospheric phenomena and **interactions** among atmosphere, land and **ocean**.
    - To reduce bias of **diurnal variation** of cloudiness and rainfall.

# One of targets: Multi-Scale Interrelation

Interactions between space and time scales of tropical convection



Slingo 2006: THORPEX/WCRP Workshop report

# JMA LRF Model Replacement (Plan)

- 1 months prediction
  - 2007: Improve initial data for ensemble fcst
  - 2008~ : dx=120km --> 60km
- 3 months prediction
  - 2007 : SST ensemble
- El-Nino prediction
  - 2007: Increase resolution:
    - T42L40, 2.5° L40 --> T95L40, 1° L50
  - 2008~ : develop unified 3-months & El-Nino prediction model with T159L60, 0.5° L60