

# SEACLID / CORDEX Southeast Asia

Gemma T. Narisma, Manila Observatory

On behalf of the SEA Regional Climate Initiative (SEARCI)

Coordinator: Fredolin Tangang (The National University of Malaysia)

Indonesia: Edvin Aldrian, Dodo Gunawan (BMKG)

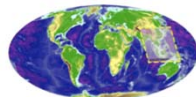
Malaysia: Fredolin Tangang, Liew Juneng (UKM)

Philippines: Gemma Narisma, Faye Cruz (Manila Observatory)

Thailand: Jerasorn Santisirisomboon (Ramkhamhaeng University)

Patama Singhruck (Chulalongkorn University)

Vietnam: Phan Van Tan, Thanh Ngo-Duc (NVU Hanoi University of Science)



YMC Workshop, 28-30 Jan 2015, CCRS Singapore



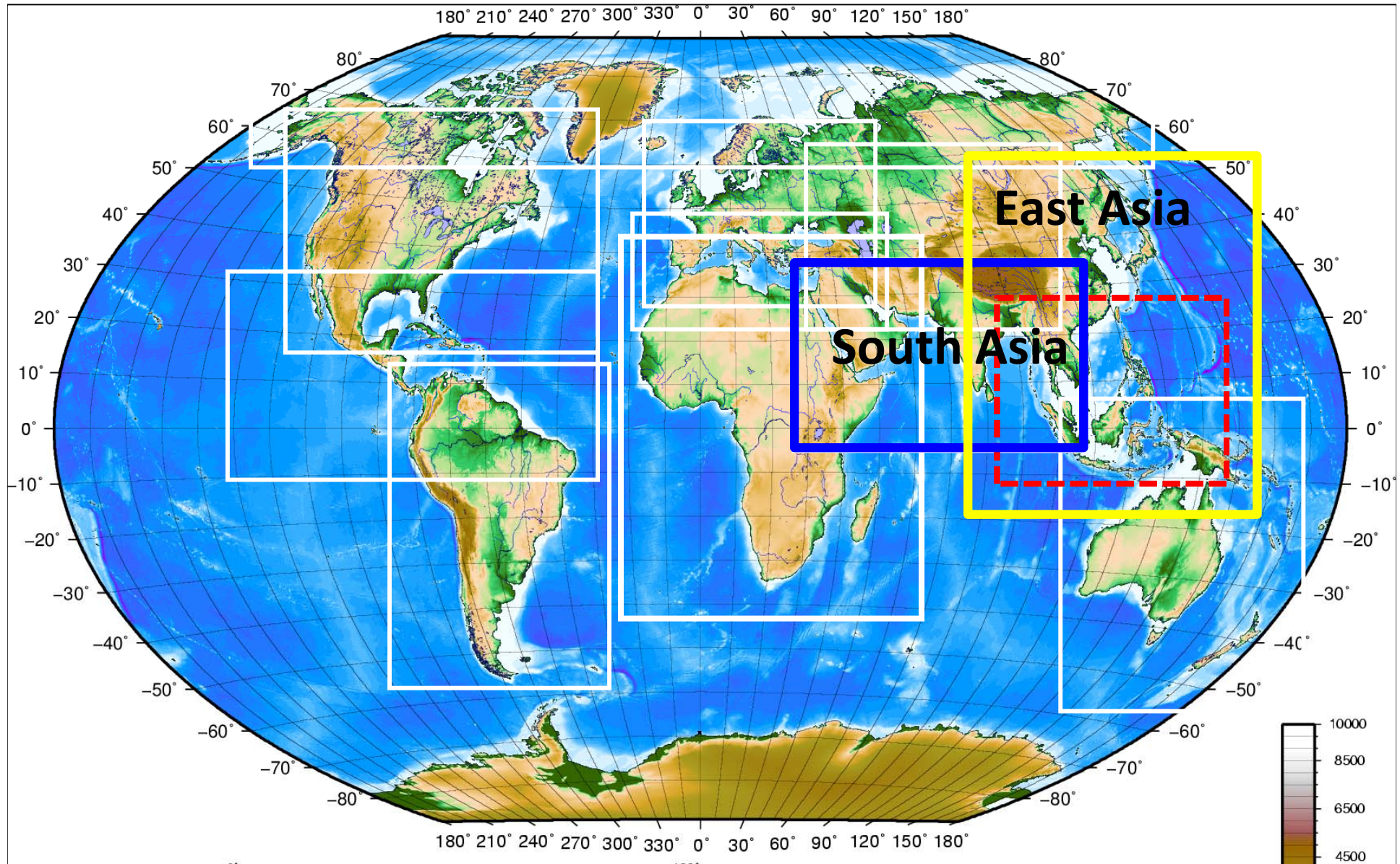
# Southeast Asia Regional Climate Initiative (SEARCI), August 2012

- Scientists from Vietnam, Malaysia, the Philippines, Indonesia and Thailand in workshop hosted by the VNU Hanoi University of Science
- Motivation: To have a platform for regional collaboration on climate related research for SEA and build the capacity of the region in regional climate science





# CORDEX domains



# CORDEX Southeast Asia

Nov 2012	Initial correspondence with WCRP (Michel Rixen) and CORDEX (Colin Jones)
May 2013	APN proposal approved for funding under the ARCP Programme for 3 years beginning October 2013
Jun 14, 2013	Formal invitation by Ghassem Asrar (WCRP) for SEACLID to join the CORDEX network

- SEACLID activities streamlined to CORDEX
- Possible contribution of additional simulations by CORDEX affiliated centers over SEACLID domain (e.g. India, Australia, UK)
- Capacity development and training for SEACLID in coordination with CORDEX-Asia

# Pledged Commitments in SEACLID / CORDEX SEA

Country	GCM	Institution & Country developed the GCM	RCP	RCM
Vietnam	CNRM-CM5	Centre national de Recherches Meteorologiques, France	RCP8.5, 4.5	RegCM4
Philippines	HadGEM2	Hadley Centre, UK	RCP8.5, 4.5	RegCM4
Thailand	MPI-ESM-MR	Max Planck Institute for Meteorology, Germany	RCP8.5, 4.5	RegCM4
Thailand	EC-Earth	EC-Earth consortium	RCP8.5, 4.5	RegCM4
Indonesia	CSIRO MK3.5	CSIRO, Australia	RCP8.5, 4.5	RegCM4
Malaysia	CanESM2	Canadian Centre for Climate Modelling and Analysis, Canada	RCP8.5, 4.5	RegCM4
Malaysia	IPSL-CM5A	Institute Pierre-Simon Laplace, France	RCP8.5, 4.5	RegCM4
Malaysia	GFDL-ESM2M	GFDL, USA	RCP8.5, 4.5	RegCM4
Australia	CNRM-CM5	Centre national de Recherches Meteorologiques, France	RCP8.5	CCAM
Australia	CCSM4	NCAR, USA	RCP8.5	CCAM
Australia	ACCESS1.3	CSIRO, Australia		CCAM
Hong Kong SAR	CCSM or CESM	NCAR, USA		WRF
United Kingdom	HadGEM2-ES	Hadley Centre, UKMO		PRECIS
South Korea	HadGEM2-AO	Hadley Centre, UKMO		WRF

**SEACLID implemented on a task-sharing basis among the seven countries.**

# RegCM4 Experiments Setup

- Domain: 36 km, 81.14°E-143.86°E; 15.04°S ~ 39.84°N
- PBL: Holtslag (1990)
- Radiation: CCSM
- Large scale moisture: SUBEX (Pal et al. 20)
- Land-surface treatment: BATSe

- Cumulus parameterization:

- Grell / Arakawa-Schubert (closure)
- MIT Emanuel
- MIT (O) / Grell (L)
- Grell (O) / MIT (L)
- Grell / Fritch-Chappell (closure)
- Kuo

- Ocean flux treatment:

- BATSe
- Zeng (iocnrough=1)
- Zeng (iocnrough=2)

18 Simulations (100% completed)

- Lateral boundary conditions: ERA Interim
- Run length: 1989 – 2008 (20 years)



DJF

Grell AS

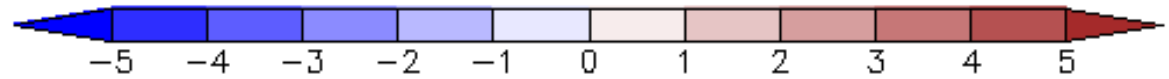
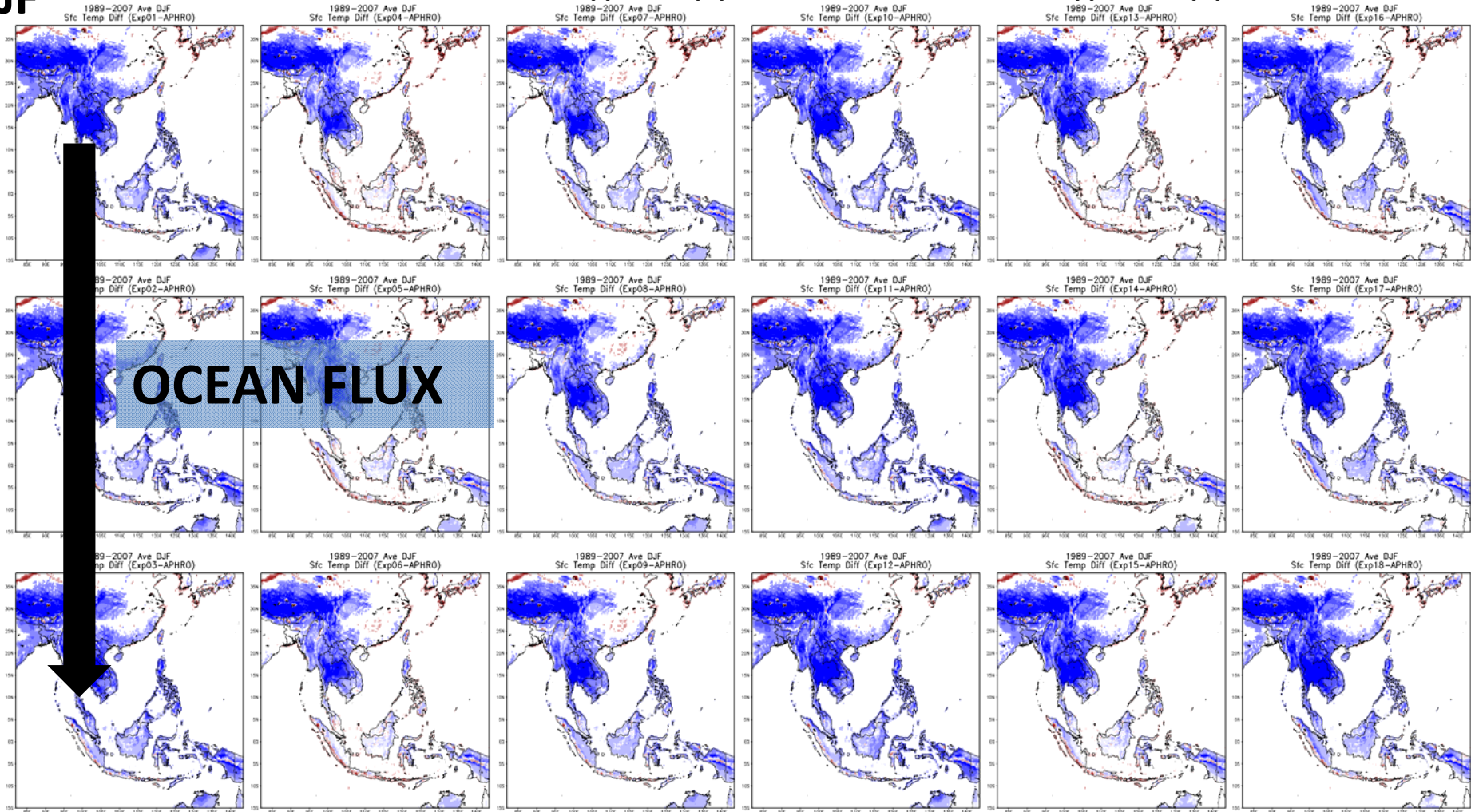
MIT Eman

Eman(I) Grell (o)

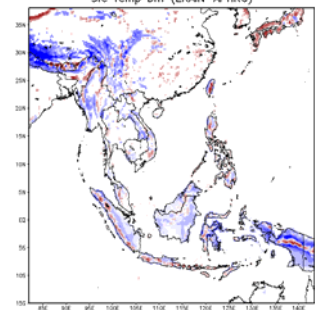
Grell FC

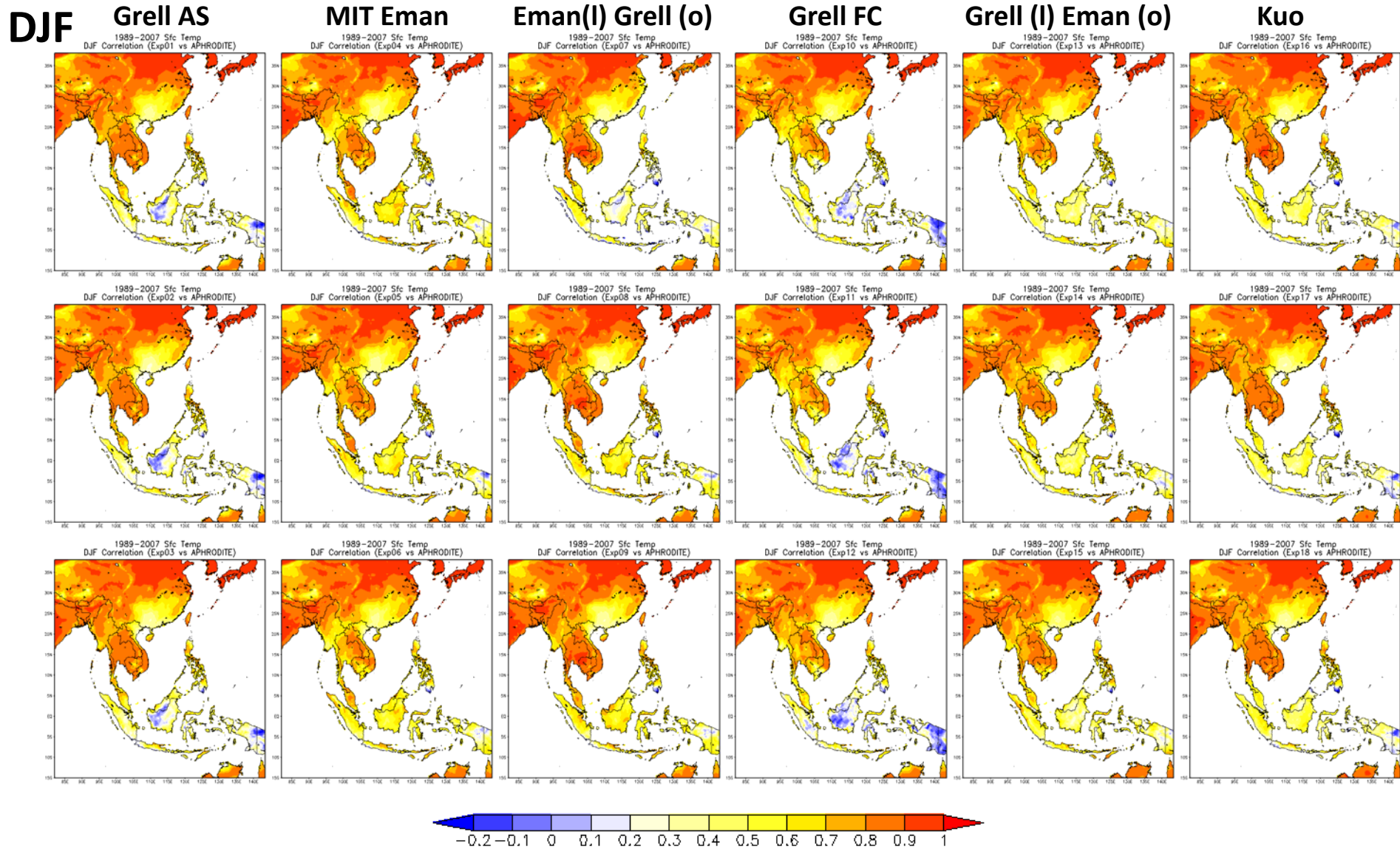
Grell (I) Eman (o)

Kuo



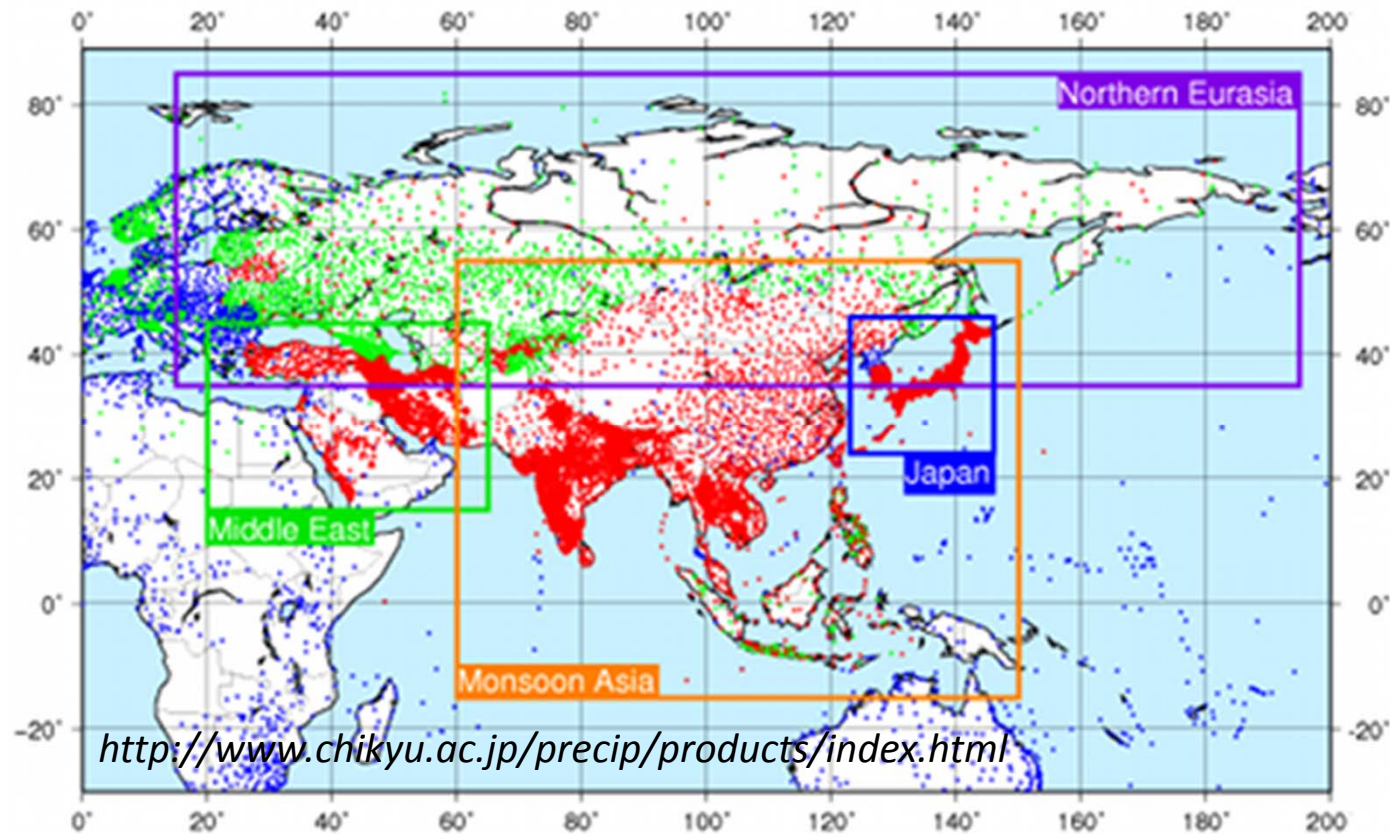
Model enhances the cold bias





High correlation for north half of domain  
 Poor correlation in south half of domain



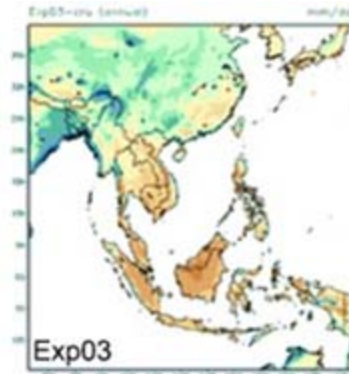
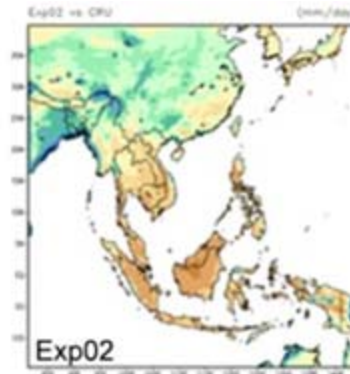
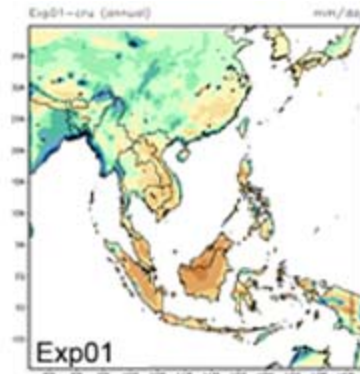


## APHRODITE data:

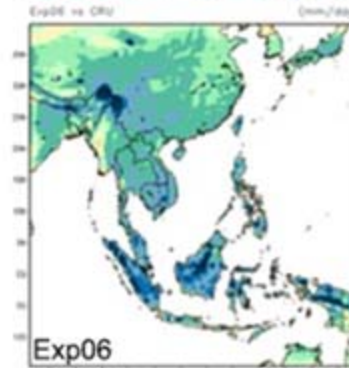
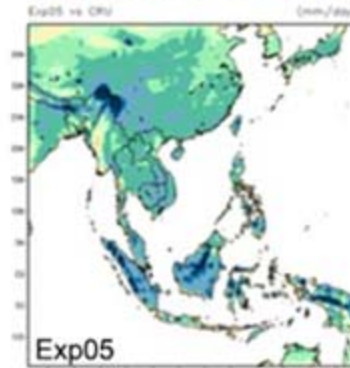
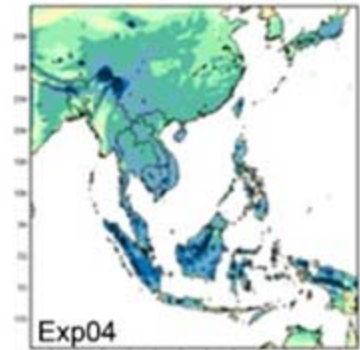
- daily rainfall (V1003R1), 1951-2007
- 0.25°
- Monsoon Asia (60E-150E, 15S-55N)

# Annual Precipitation Biases (vs CRU)

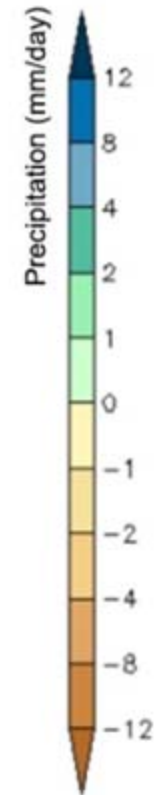
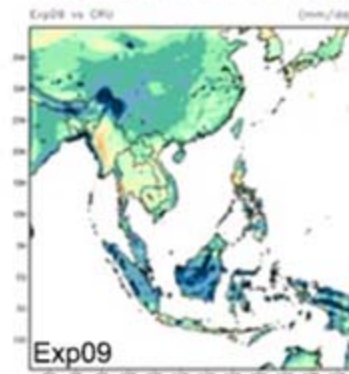
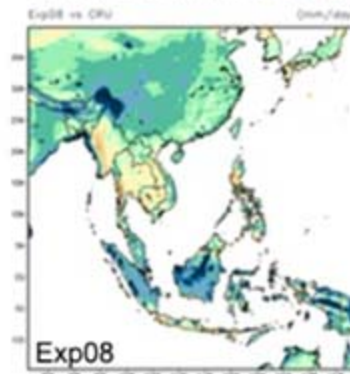
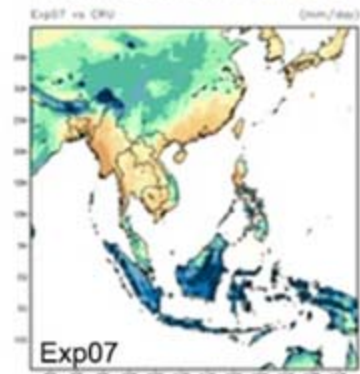
Grell/AS



MIT  
Too wet !!!



MIT(L)/Grell(O)  
Still too wet over  
the equatorial regions!



BATS1e

Zeng (iocnrough=1)

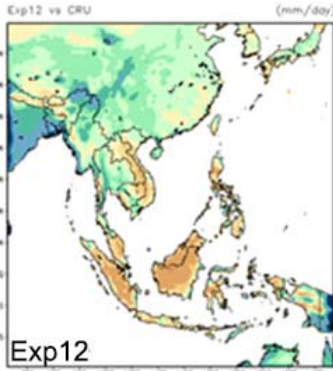
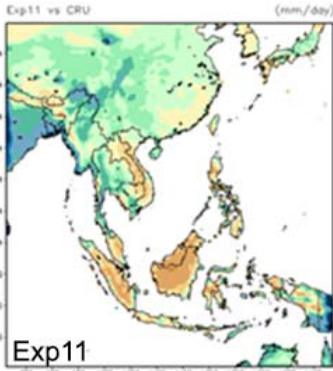
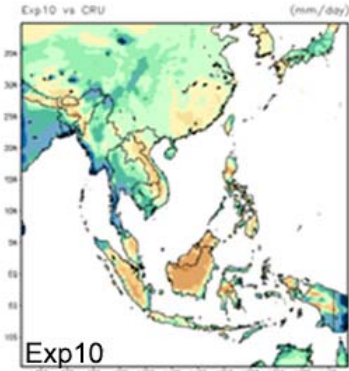
Zeng (iocnrough=2)

Slide courtesy of Juneng Liew, Malaysia

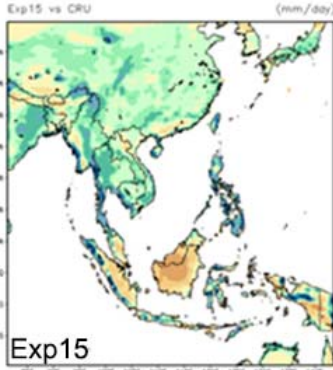
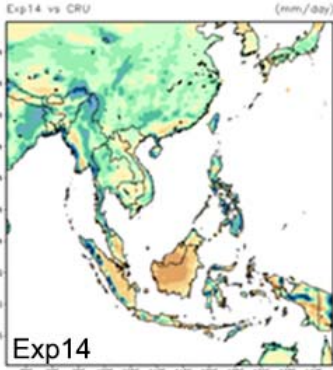
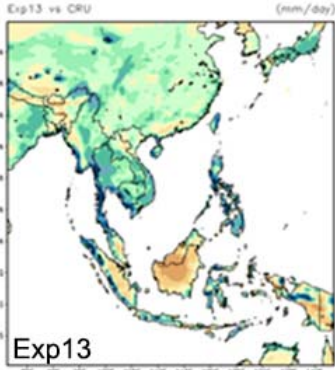


...cont.

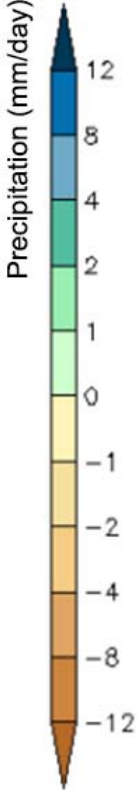
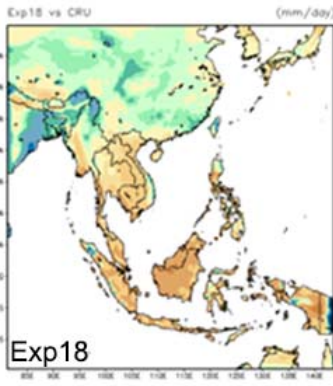
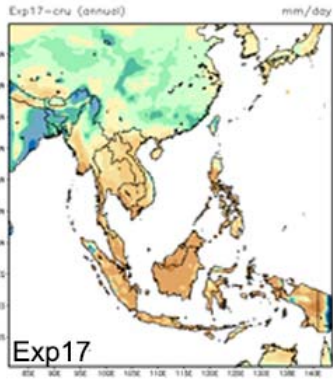
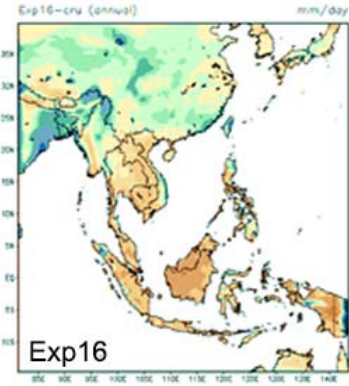
Grell/FC



Grell(L)/MIT(O)



Kuo



BATS1e

Zeng (iocnrough=1)

Zeng (iocnrough=2)

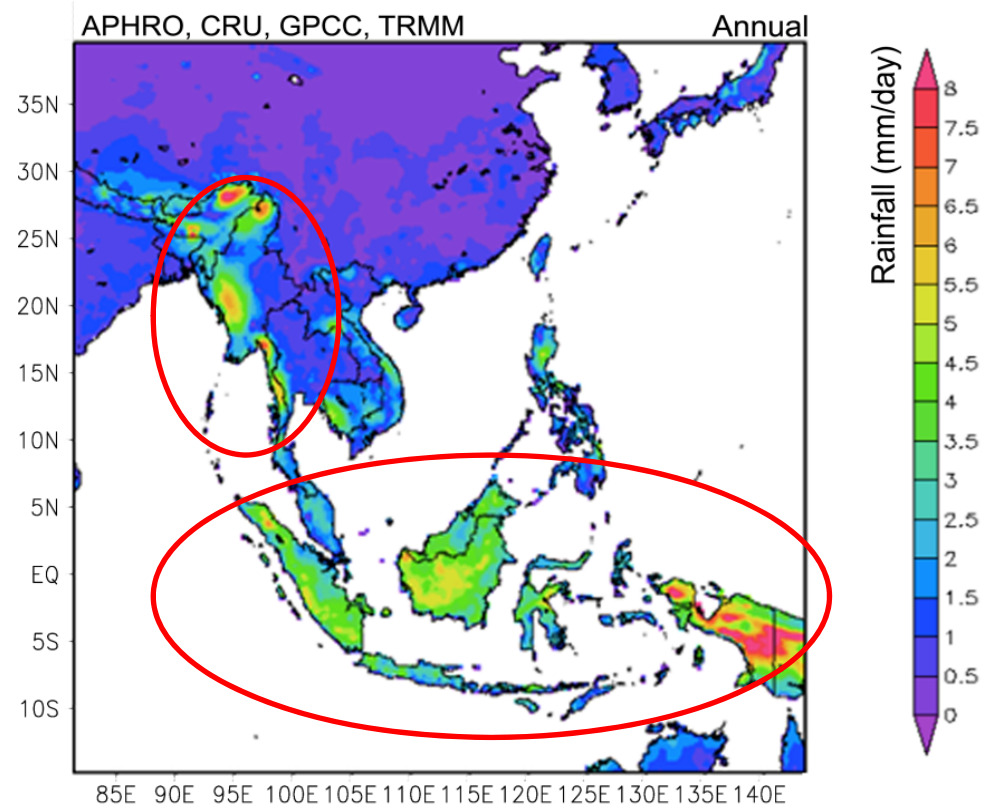


# Validation Issue

Observation datasets - APHRODITE, CRU, GPCC, TRMM (1999 onward)

Rainfall

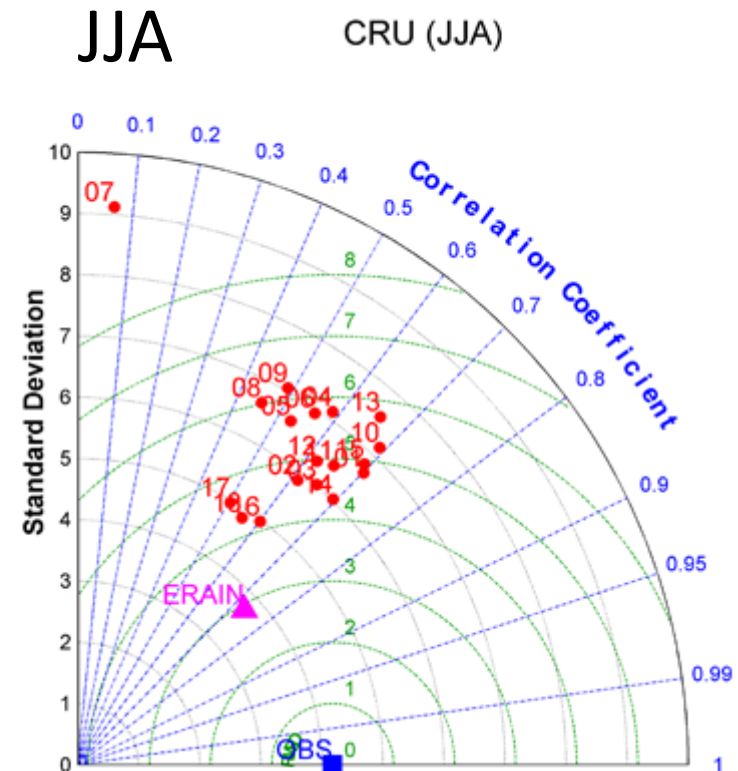
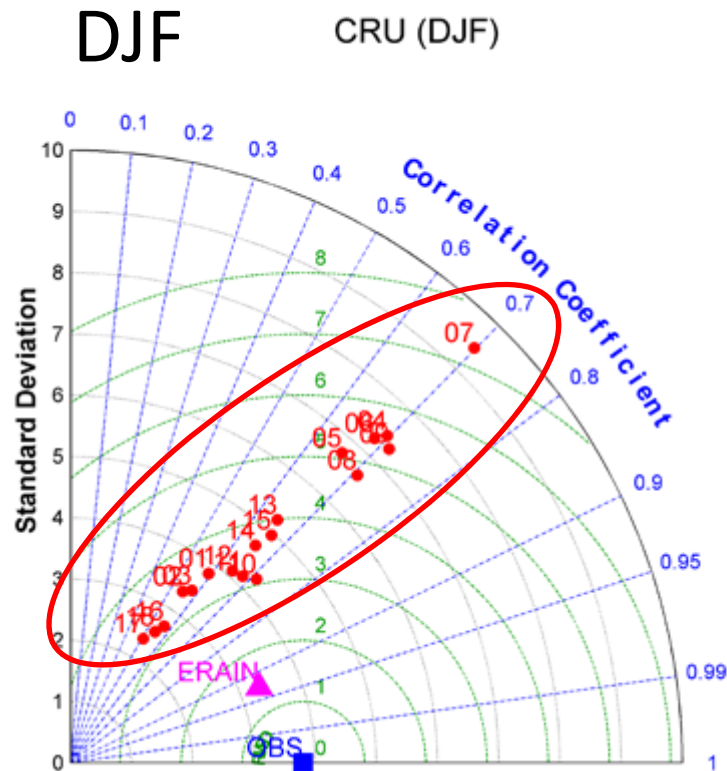
(Highest – Lowest)



- **Variations** among observational products can be **large**.
- Compare with all the available datasets.

Slide courtesy of Juneng Liew, Malaysia

# Seasonal Precipitation Spatial Comparison



- Correlation –  $\sim 0.5-0.7$
- Inter-model variations **higher** during the **winter season**.

## Key questions:

- What are the key processes and mechanisms in the MC that are not captured by the regional climate model, resulting to poor model performance and inability to capture seasonal dynamics?
- What are the appropriate adjustments and modifications to cumulus parameterization schemes for the model to properly simulate rainfall and rainfall dynamics?
- How do variations in SSTs affect the simulated model climatology in the MC?
- Does the model adequately capture the diurnal cycle, Madden-Julian Oscillation (MJO), and the extreme rainfall events associated with MJO and ENSO events and are the associated physical dynamics simulated well?