



Water Cycle and Agricultural Activities
during the Post-Monsoon Season
in the Stung Sangker River Basin
and Wider Area in the Western Cambodia

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SAFE prototyping in Cambodia

- [Approved in May 2009](#) as a new SAFE prototype activity
- Focusing on
 - Water cycle : particularly drought
 - Its impacts on [agricultural water](#) : primary occupation of 2/3 people
- Objectives:

To provide usable information for the agricultural activities in the western Cambodia by improving understanding of the mechanisms and various phenomena behind the unique [post-monsoon water cycle](#), that benefits the prevailing [rain-fed rice production](#) in that area.

Rainfall & agricultural activities during the post-monsoon season

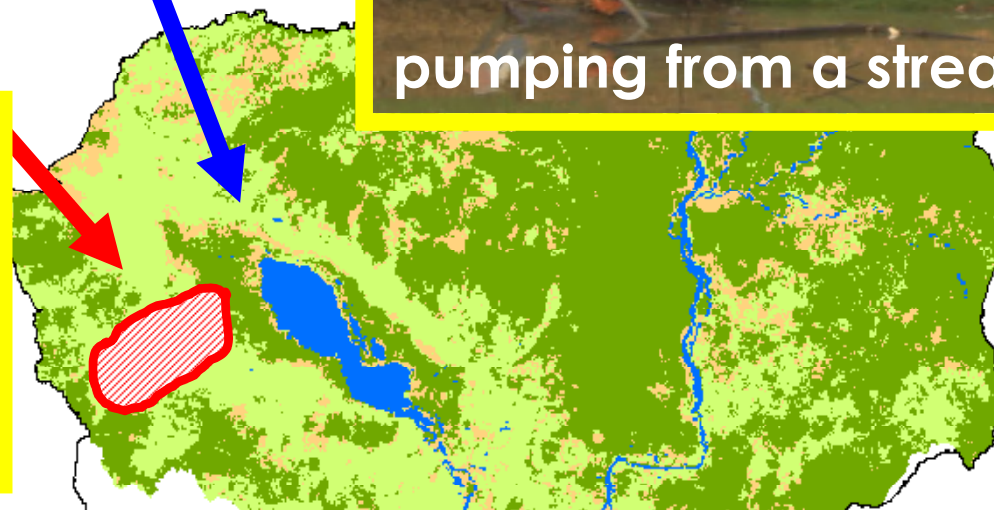
Sangker River Basin

Tonle Sap Lake

→ most productive area in the agricultural activities

"Cambodian rice bowl"

- ✓ rain-fed agric. lands
- ✓ dry-season agriculture
- ✓ direct rainfall & stream flows

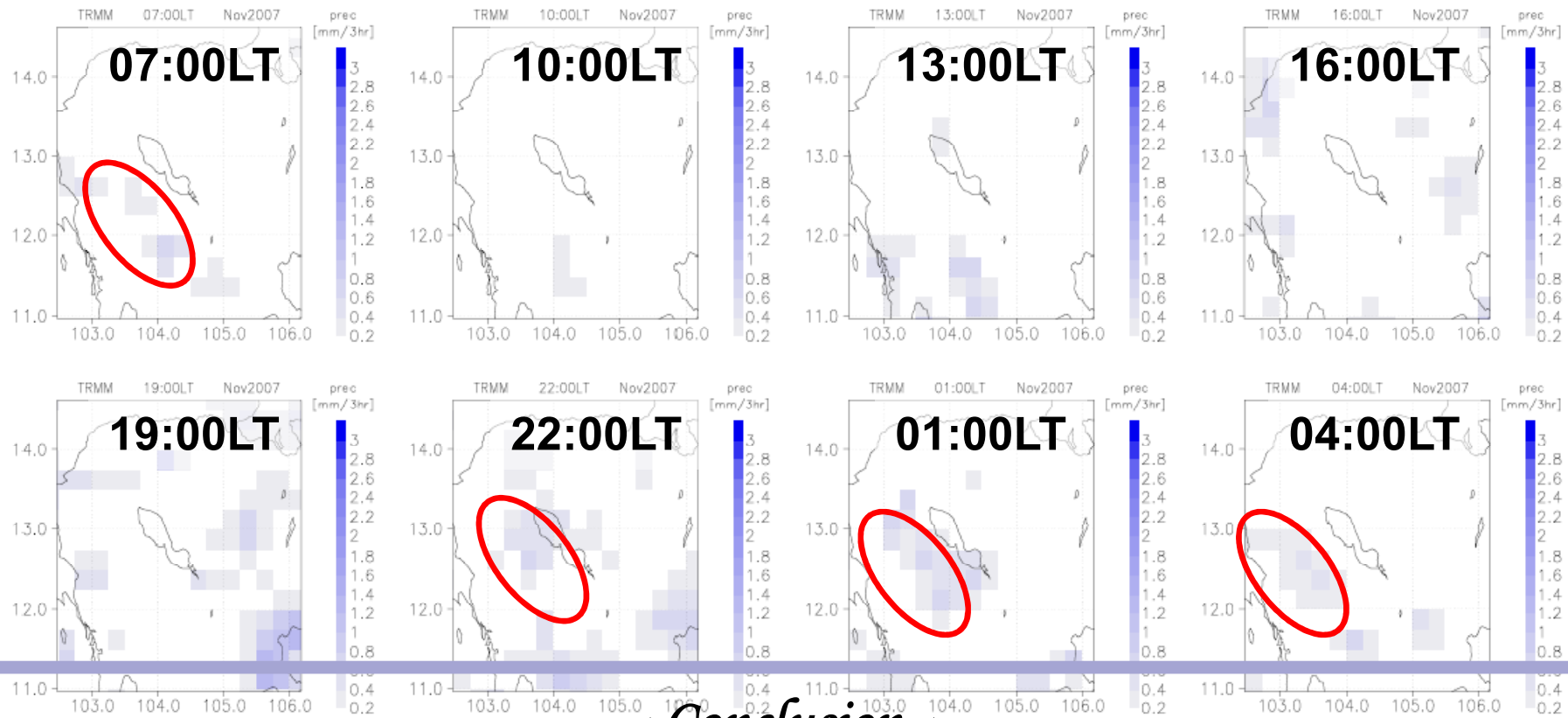


~ Target phenomenon ~

relationship between
Water Resource (rainfall, stream flow, etc.) & Agric. Activities
in the western Cambodia

Rainfall after the Rainy Season

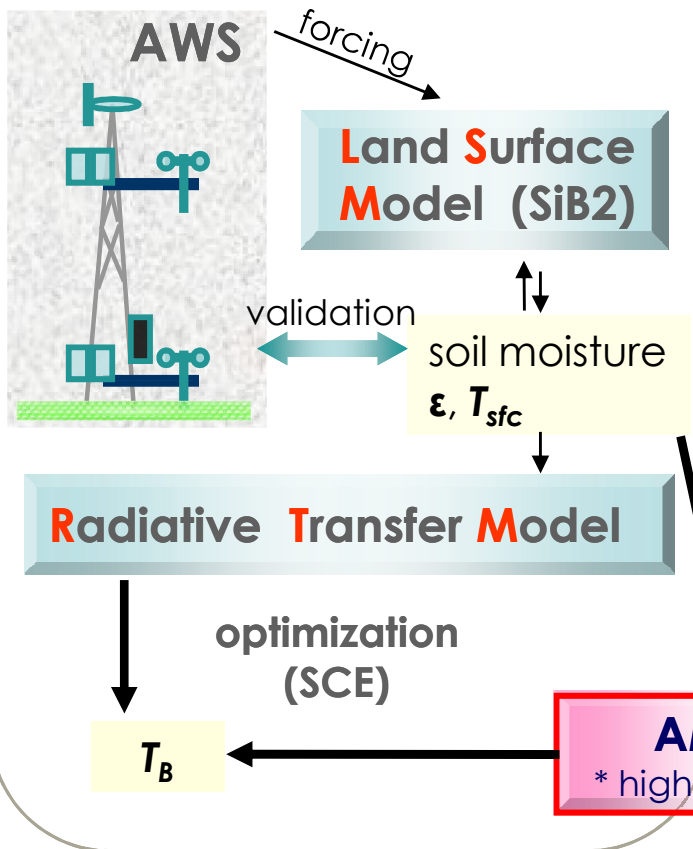
Post-monsoon rainfall from TRMM in 2007



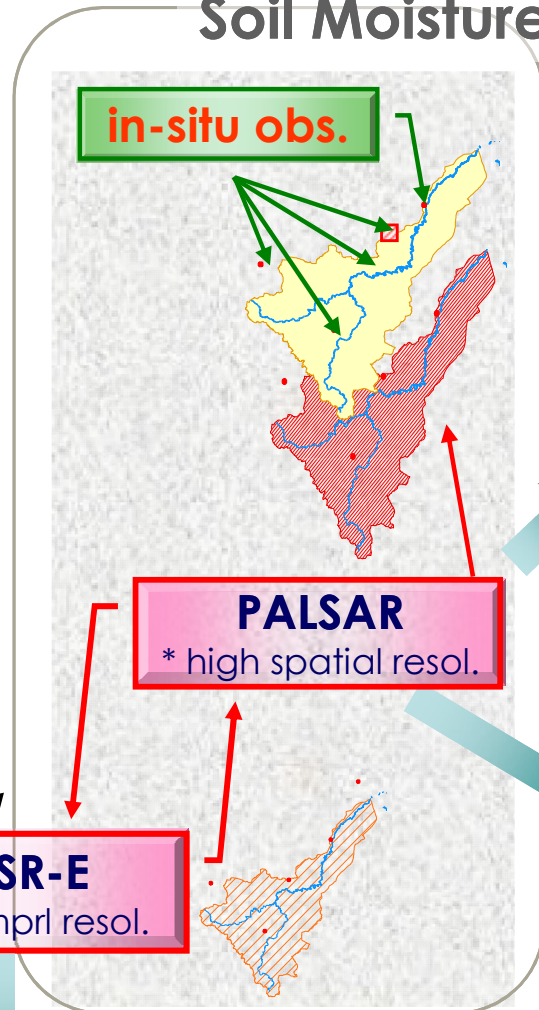
~ Conclusion ~

During the post-monsoon season:
-the night time precipitation is dominant
in the western side of Lake and supports the
productive agricultural activities during the dry season in this area.

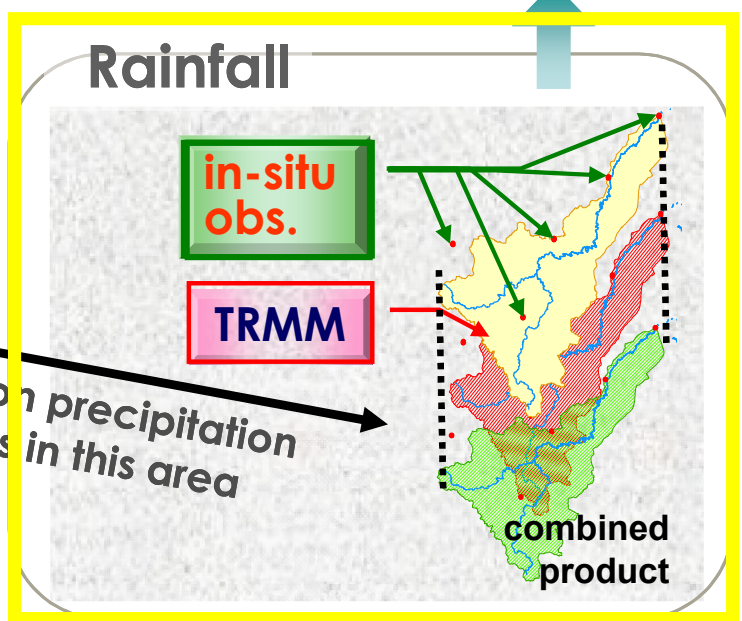
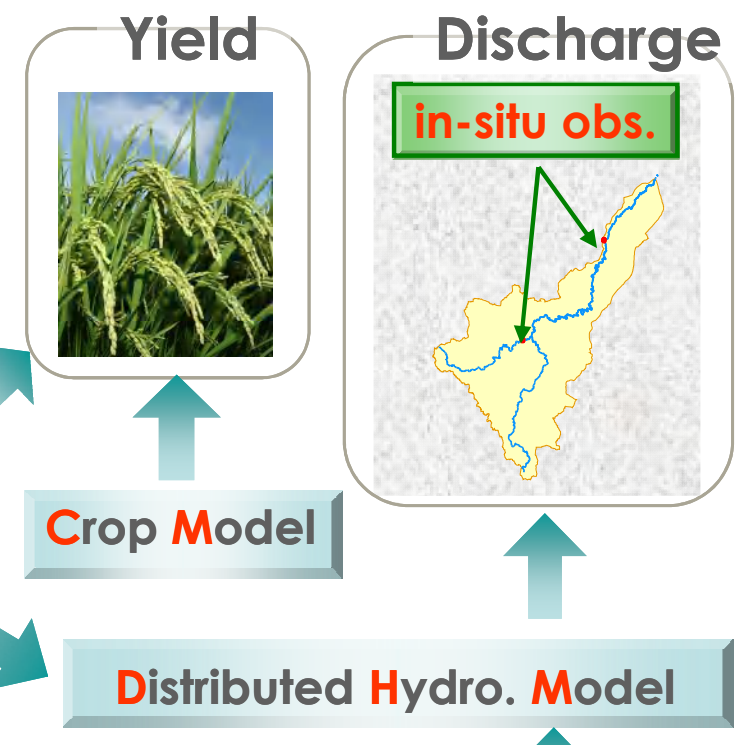
Land Data Assimilation System



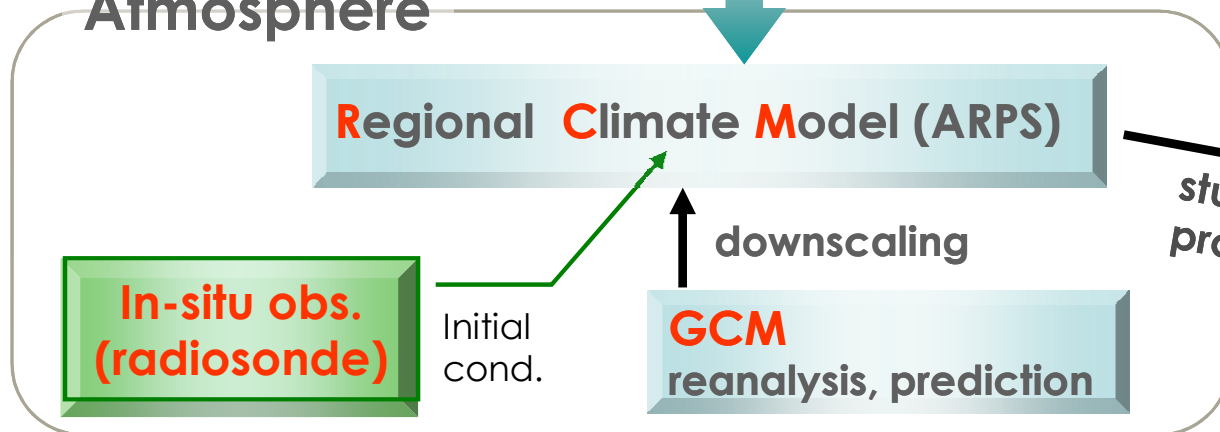
Soil Moisture



Water Resources Management

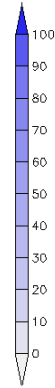
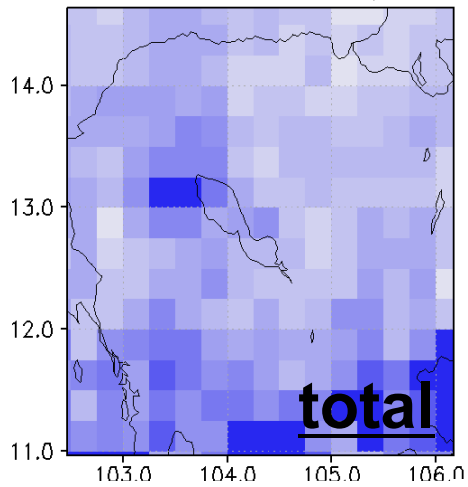


Atmosphere



study on precipitation process in this area

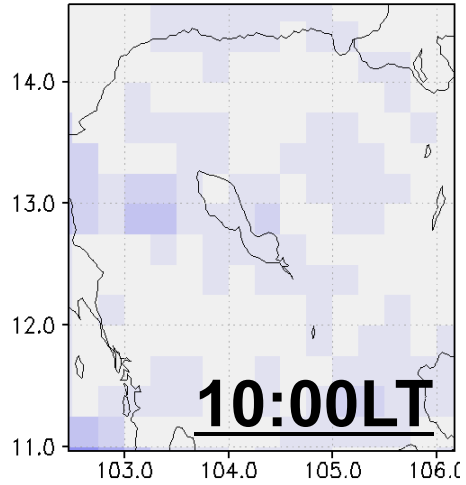
total rainfall 24Oct-31Dec,2009



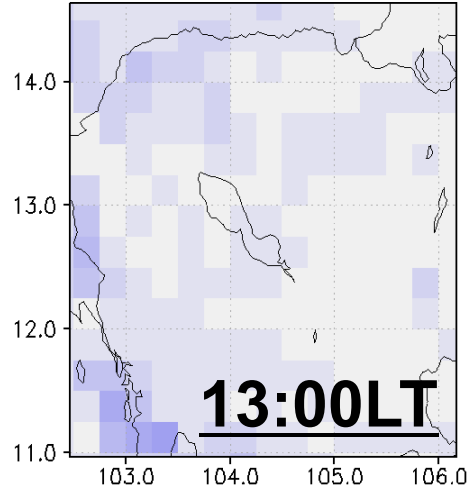
Total Rainfall Amount:
24 Oct 2009 ~ 31 Dec 2009

Total (left) & 3hourly (below)
From TRMM 3B42

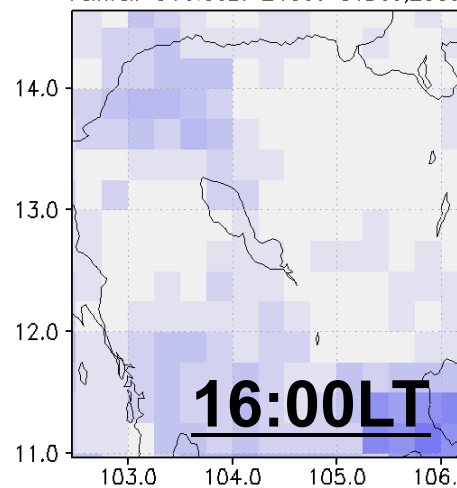
rainfall @10:00LT 24Oct-31Dec,2009



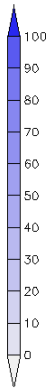
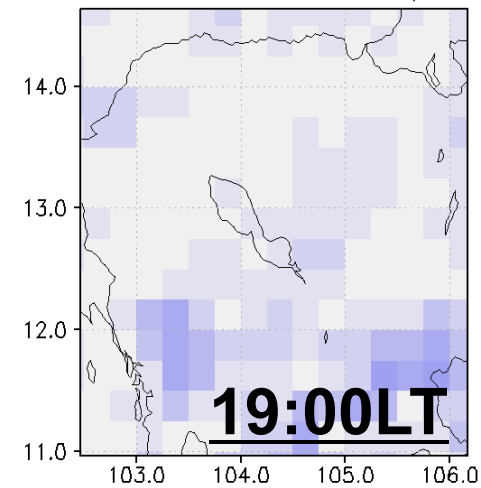
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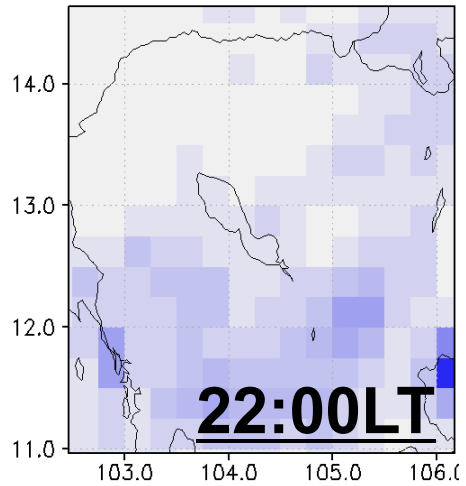
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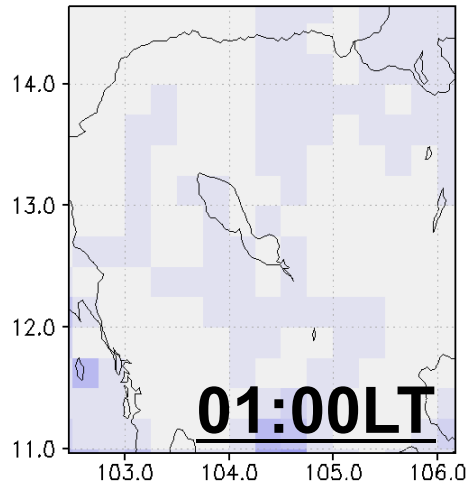
rainfall @19:00LT 24Oct-31Dec,2009



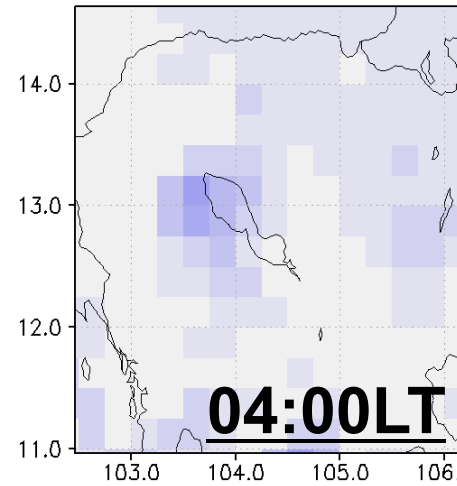
rainfall @22:00LT 24Oct-31Dec,2009



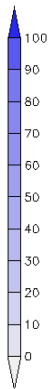
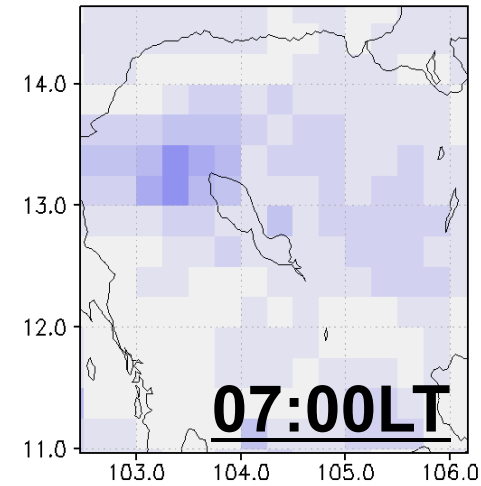
rainfall @01:00LT 24Oct-31Dec,2009



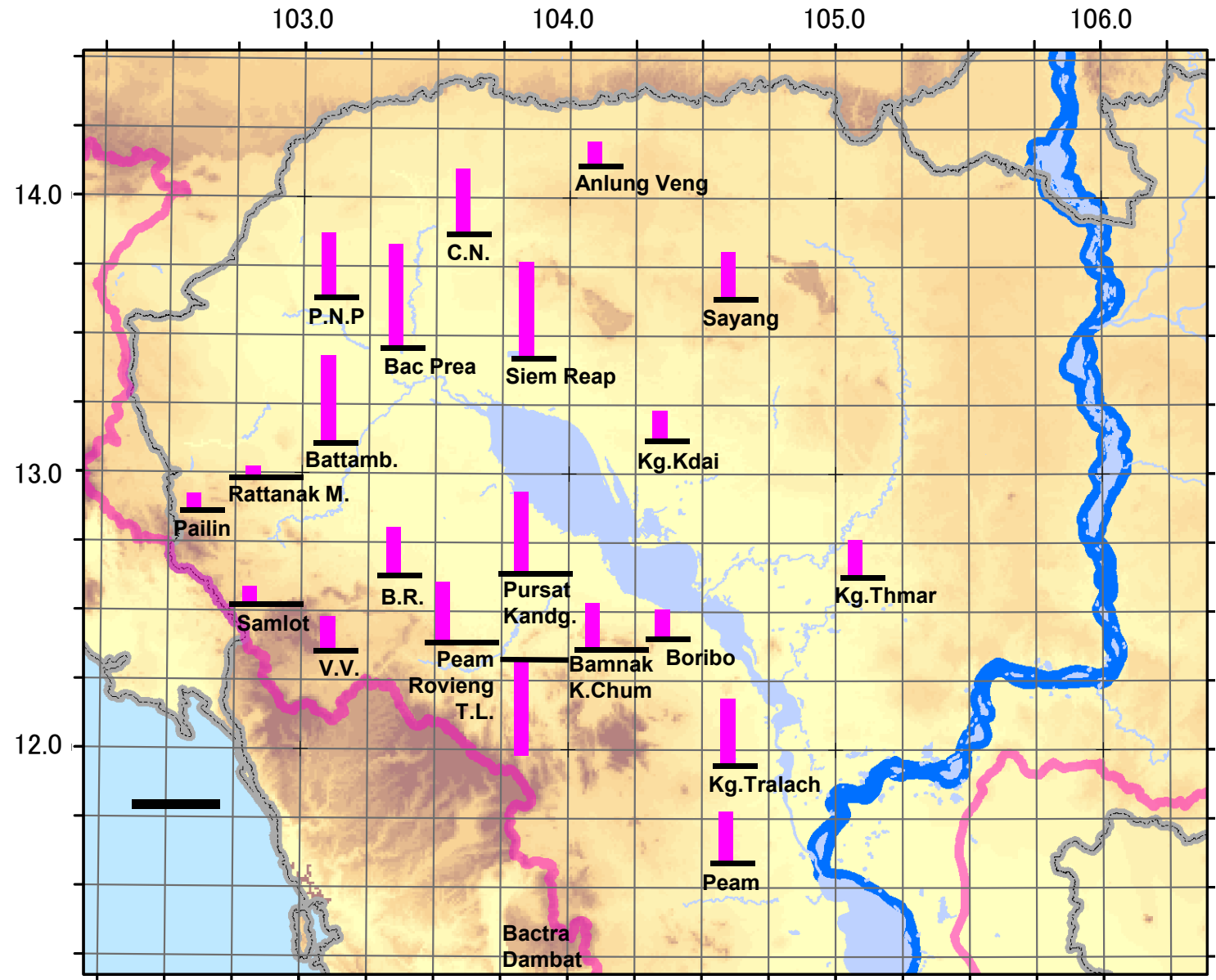
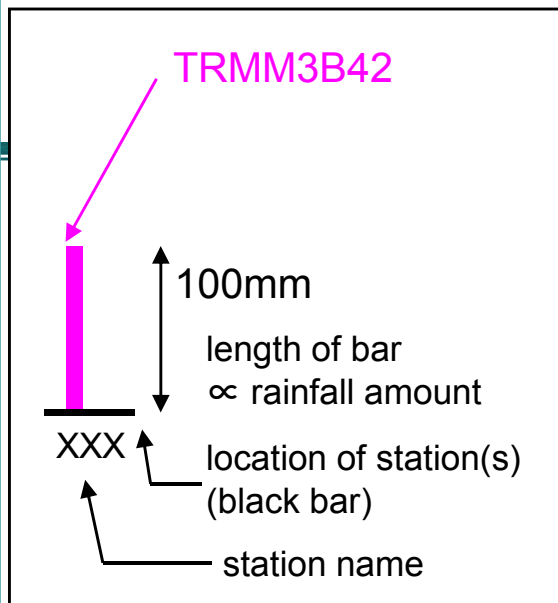
rainfall @04:00LT 24Oct-31Dec,2009



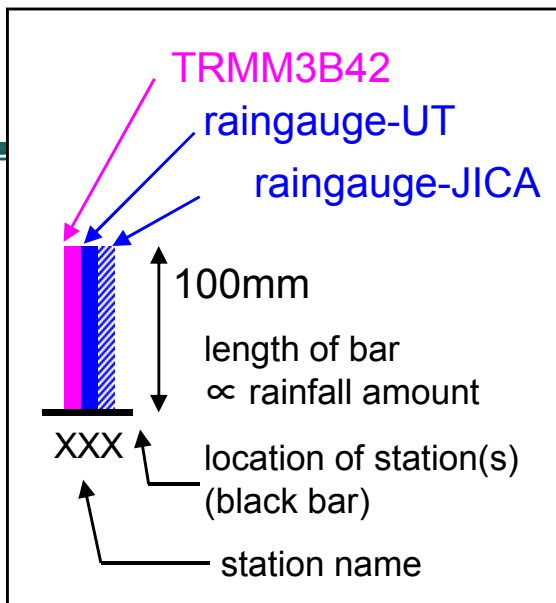
rainfall @07:00LT 24Oct-31Dec,2009



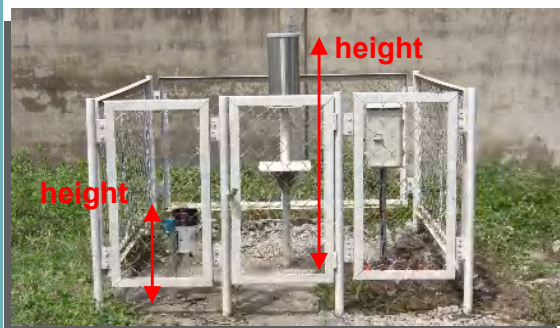
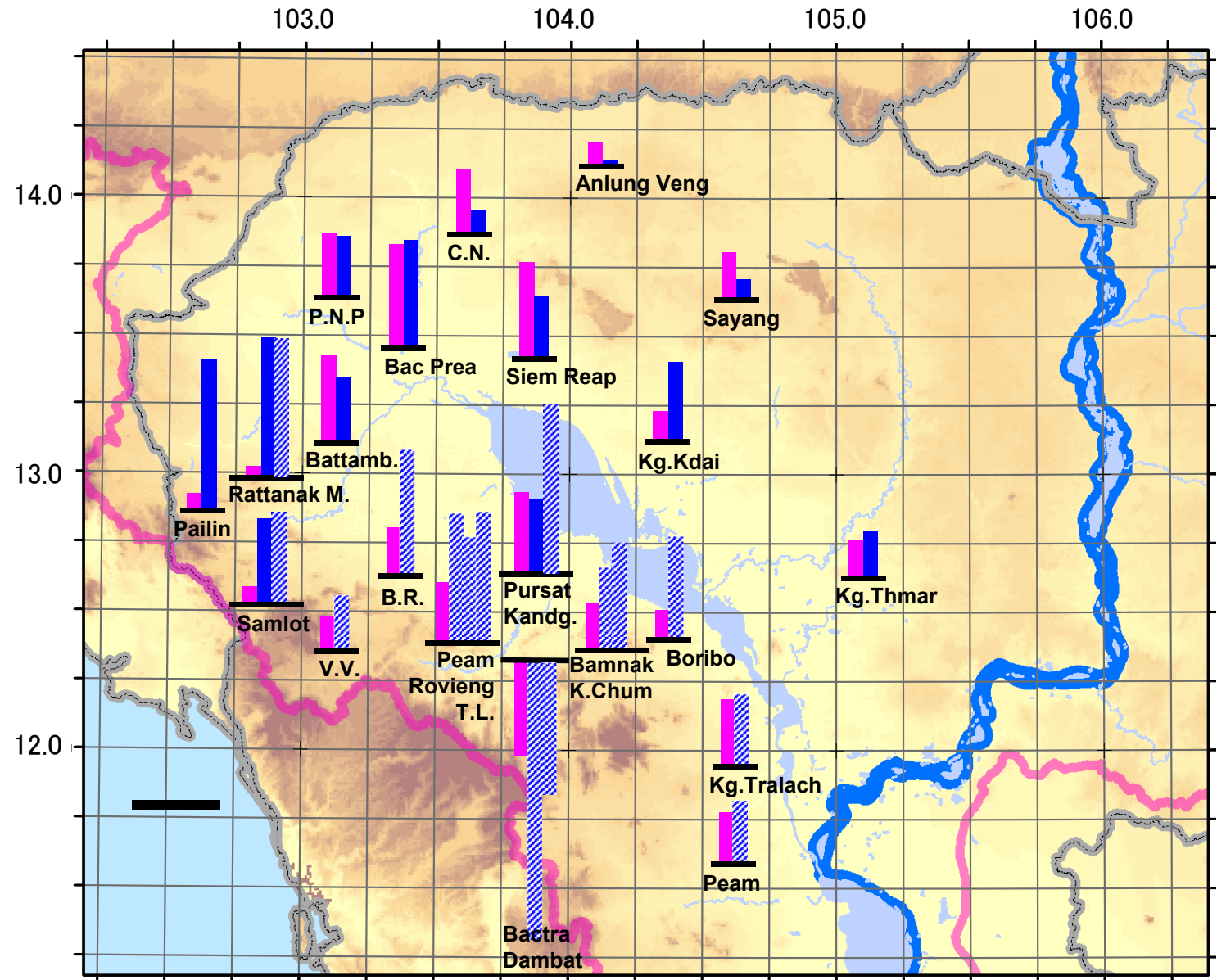
Total Rainfall Amount:
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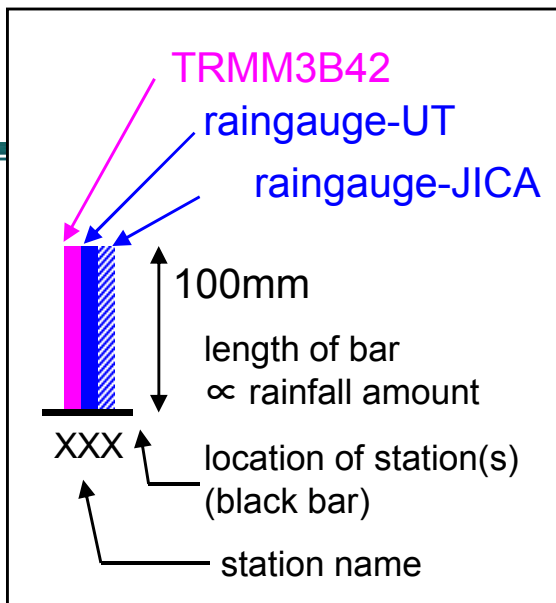


raingauge	UT	JICA
	ONSET RG3M	Ota Keiki
1pulse	0.2mm	0.5mm
installed on	Sep-Oct. 2009	2003- 2006
height	0.50m	1.50m

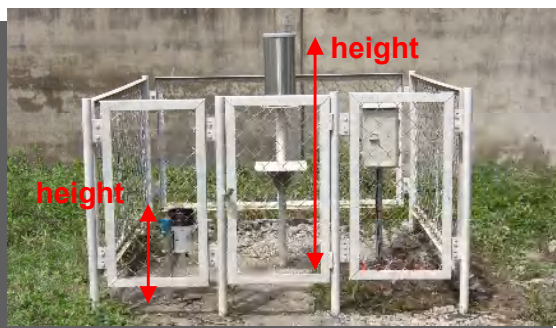


RG-UT RG-JICA

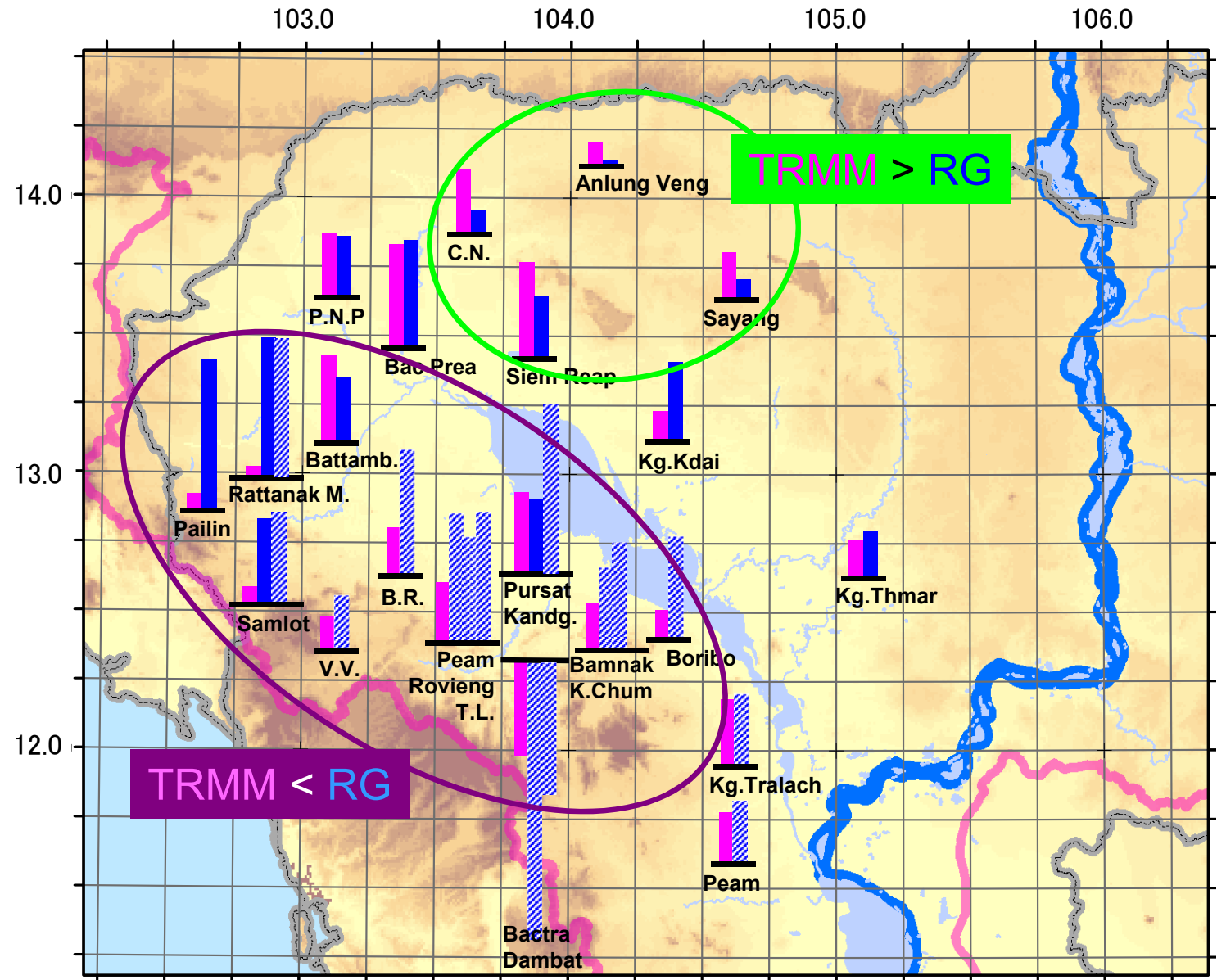
Total Rainfall Amount:
24 Oct 2009 ~ 31 Dec 2009

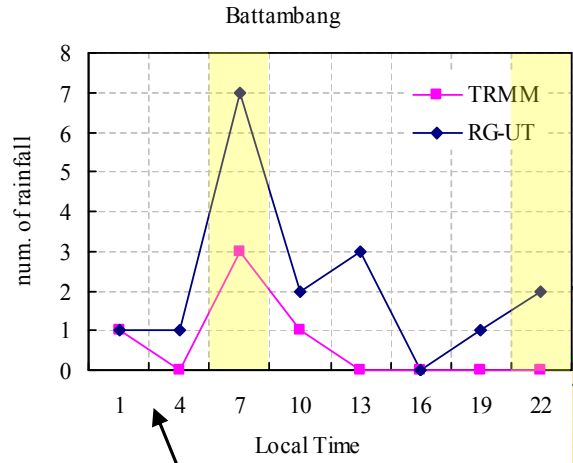
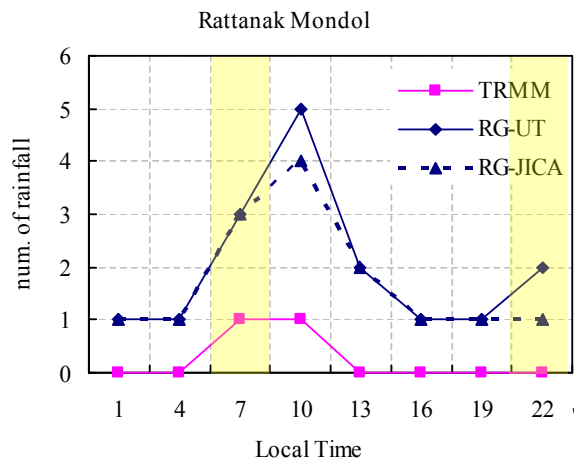


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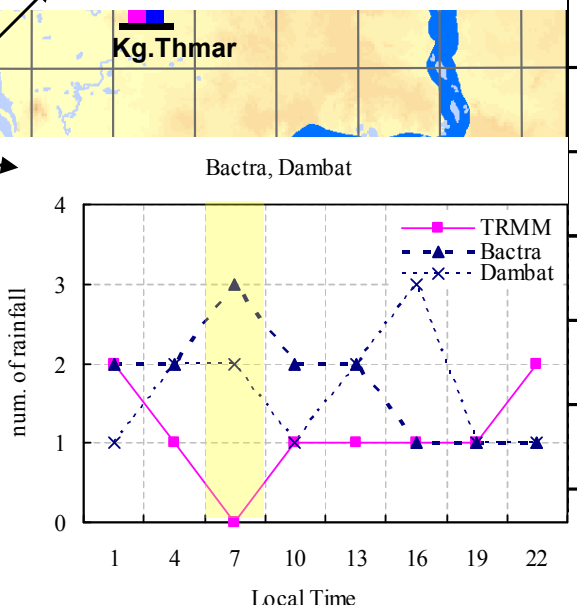
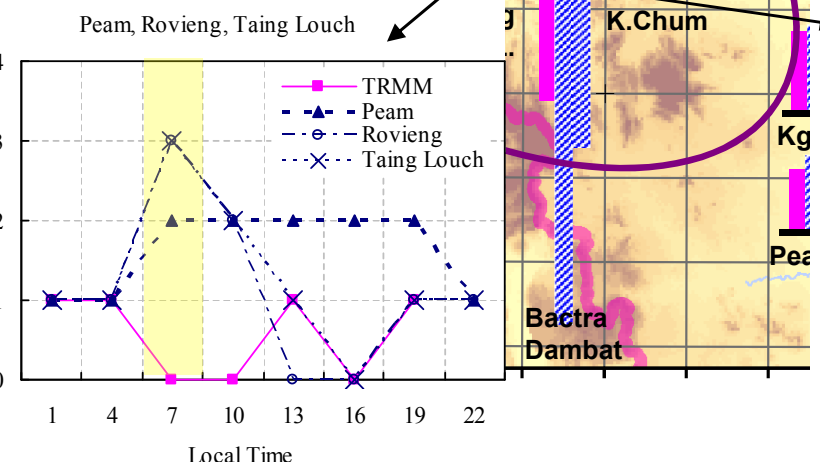
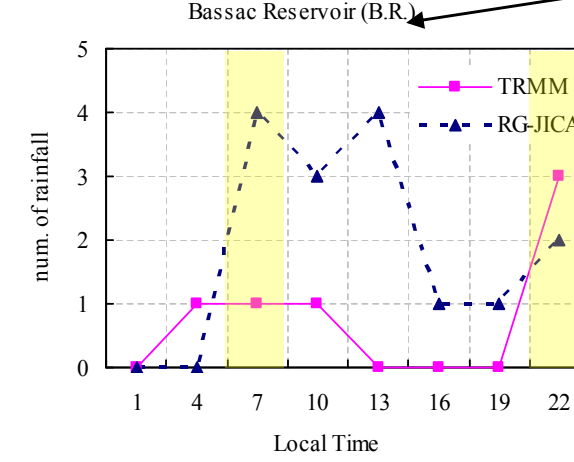
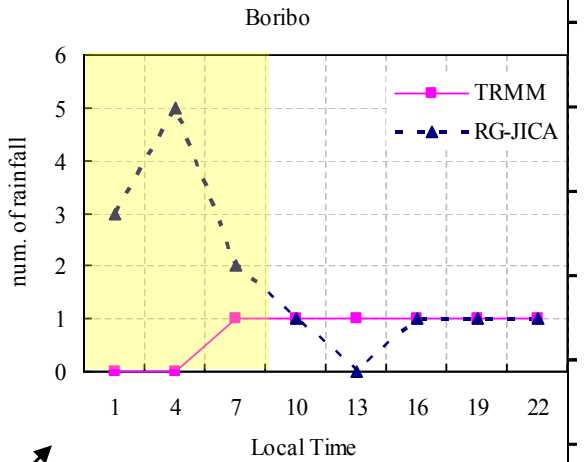
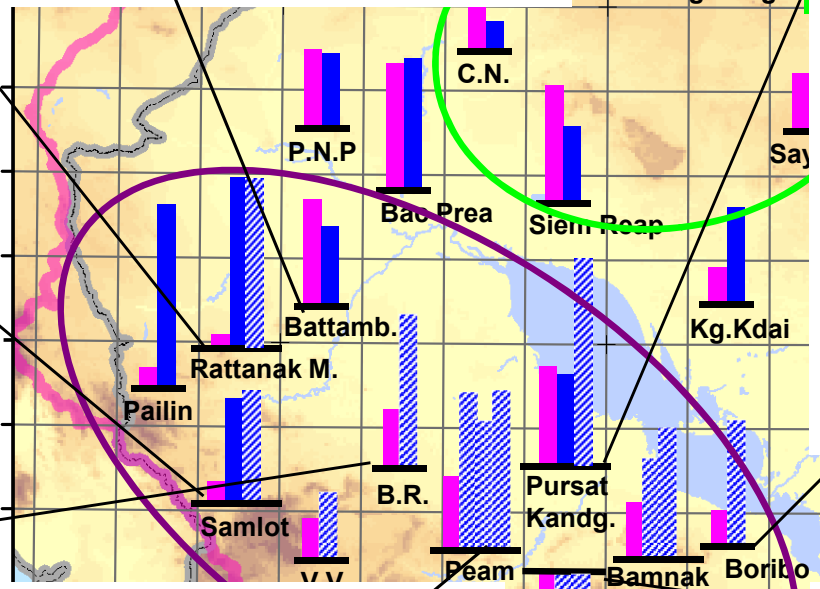
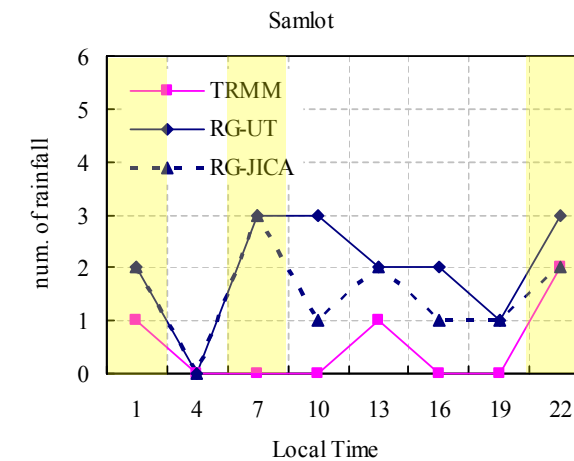
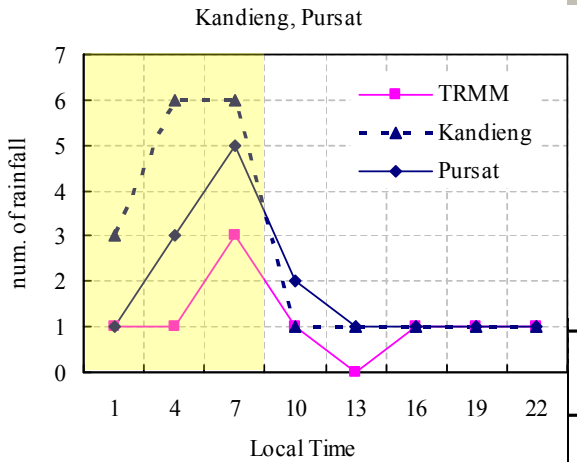


RG-UT RG-JICA





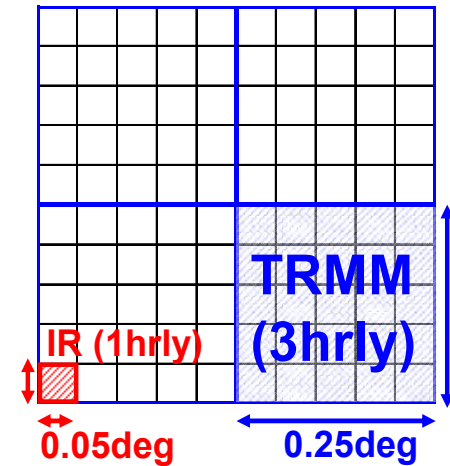
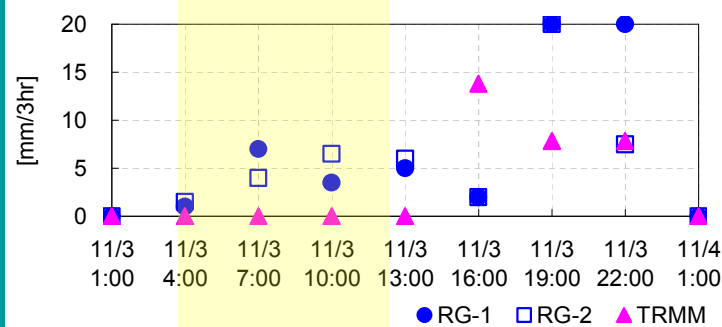
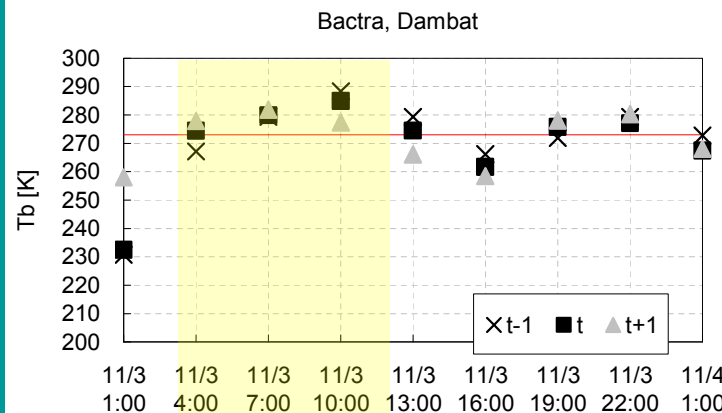
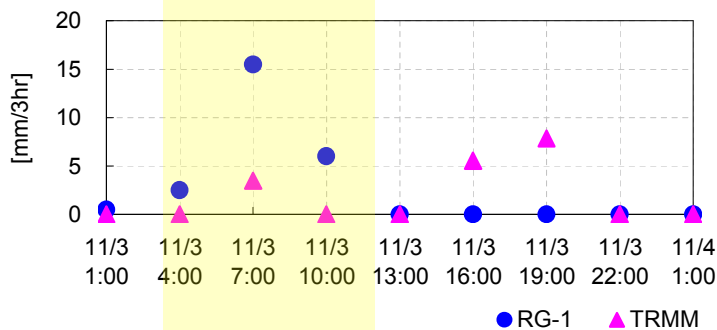
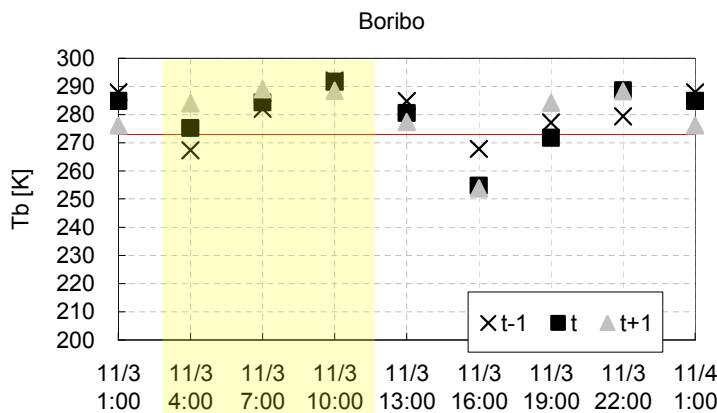
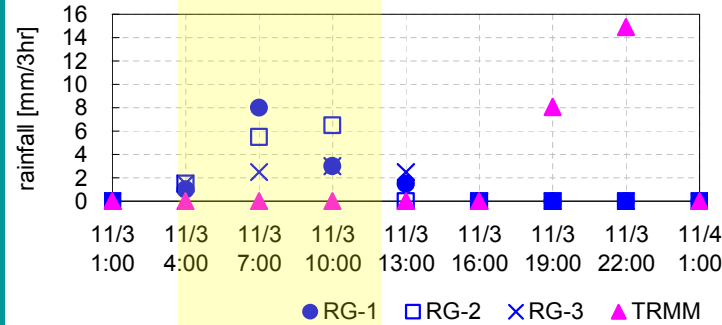
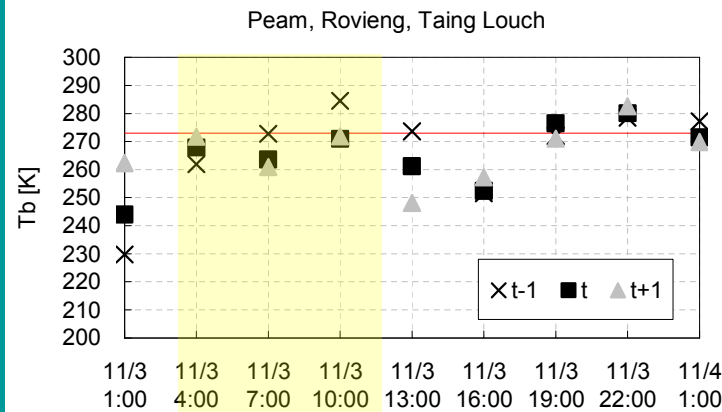
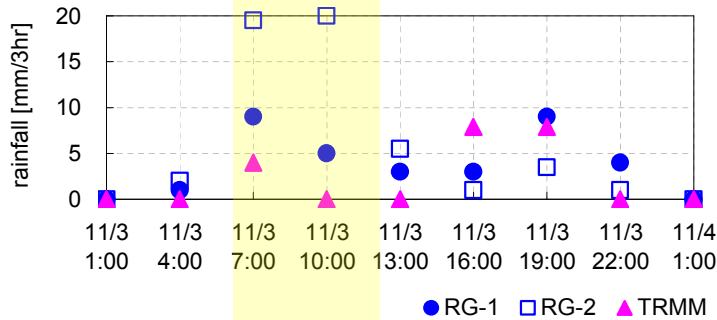
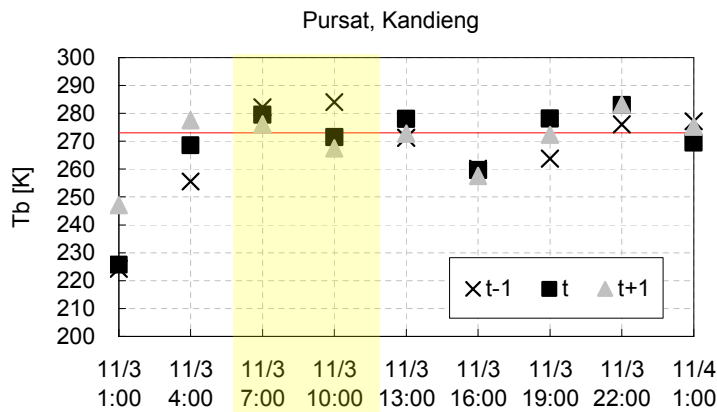
Total R
24 O



Rainfall & Cloud-Top temperature

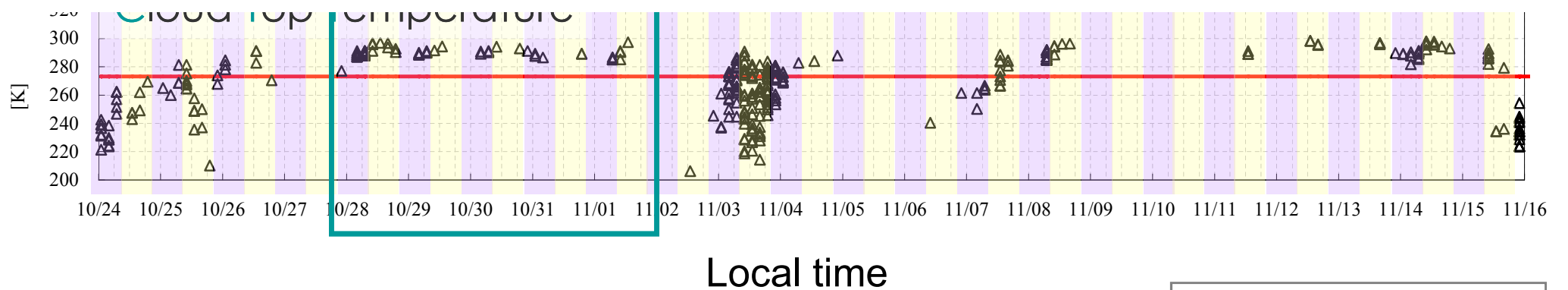
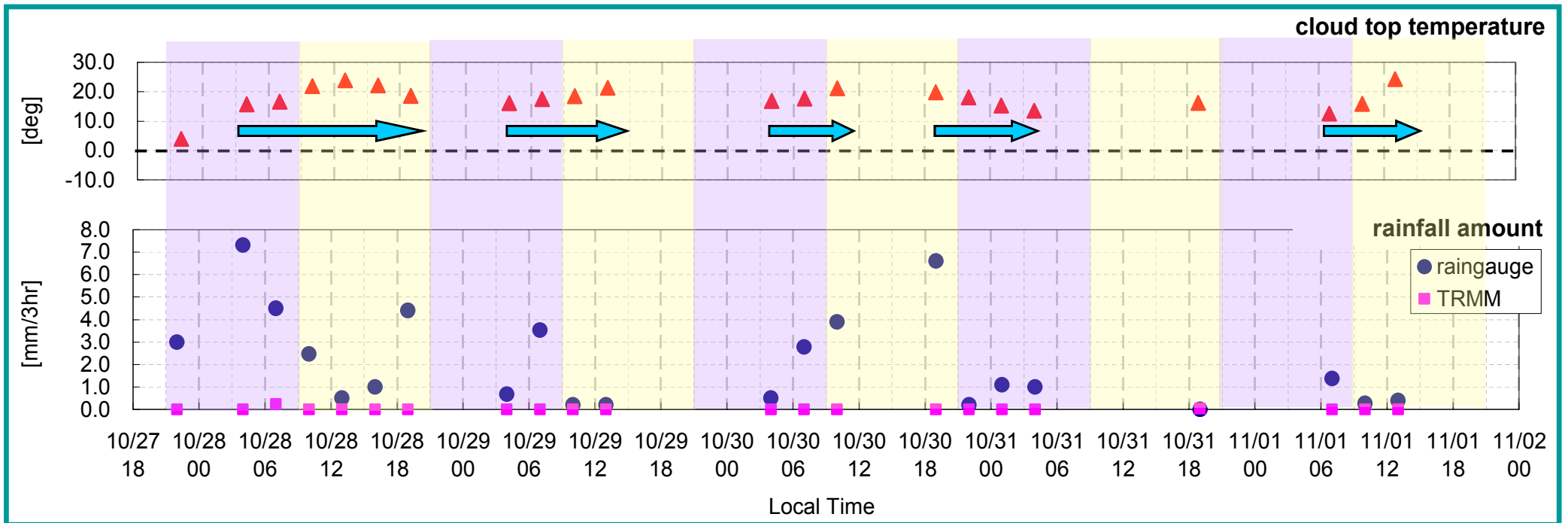


T_B from MTSAT-IR1

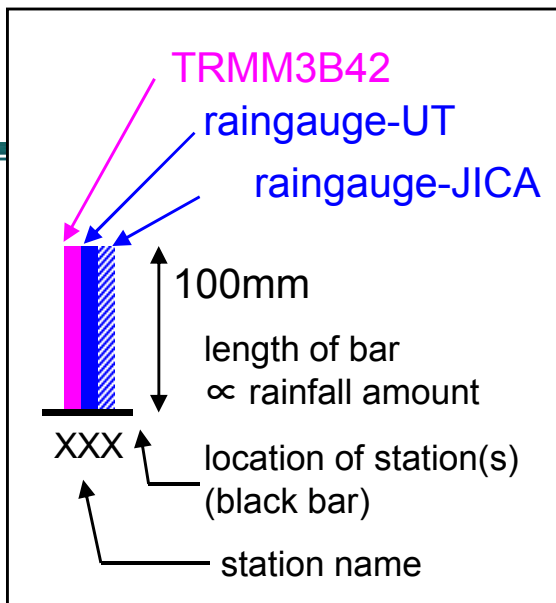


Rainfall from low-level clouds
 → Due to its unique rainfall system?

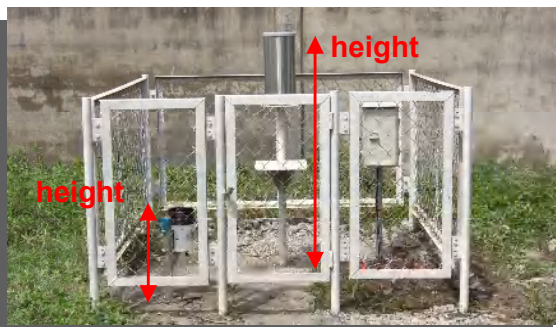
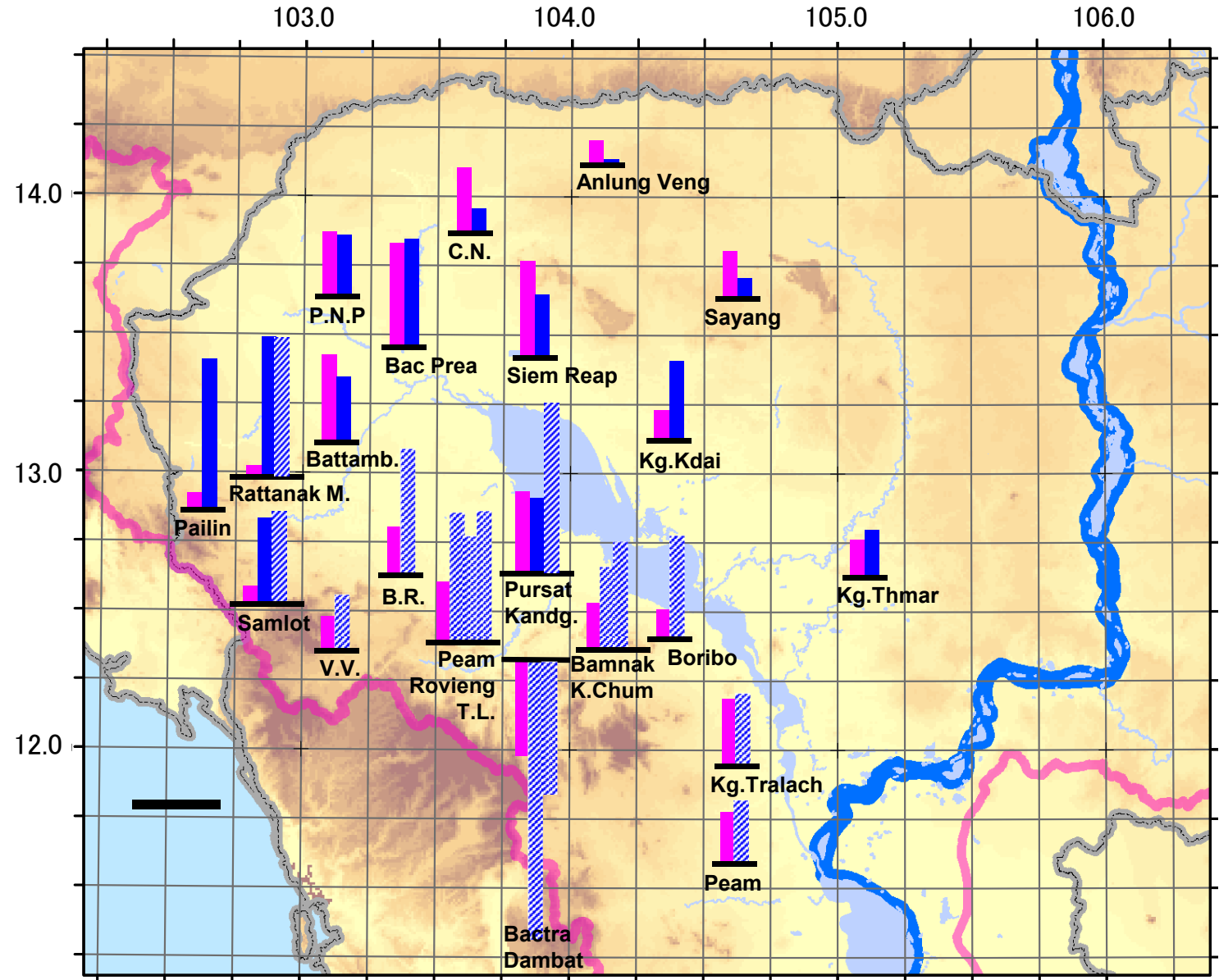
Post-Monsoon Conditions in 2009



Total Rainfall Amount:
24 Oct 2009 ~ 31 Dec 2009



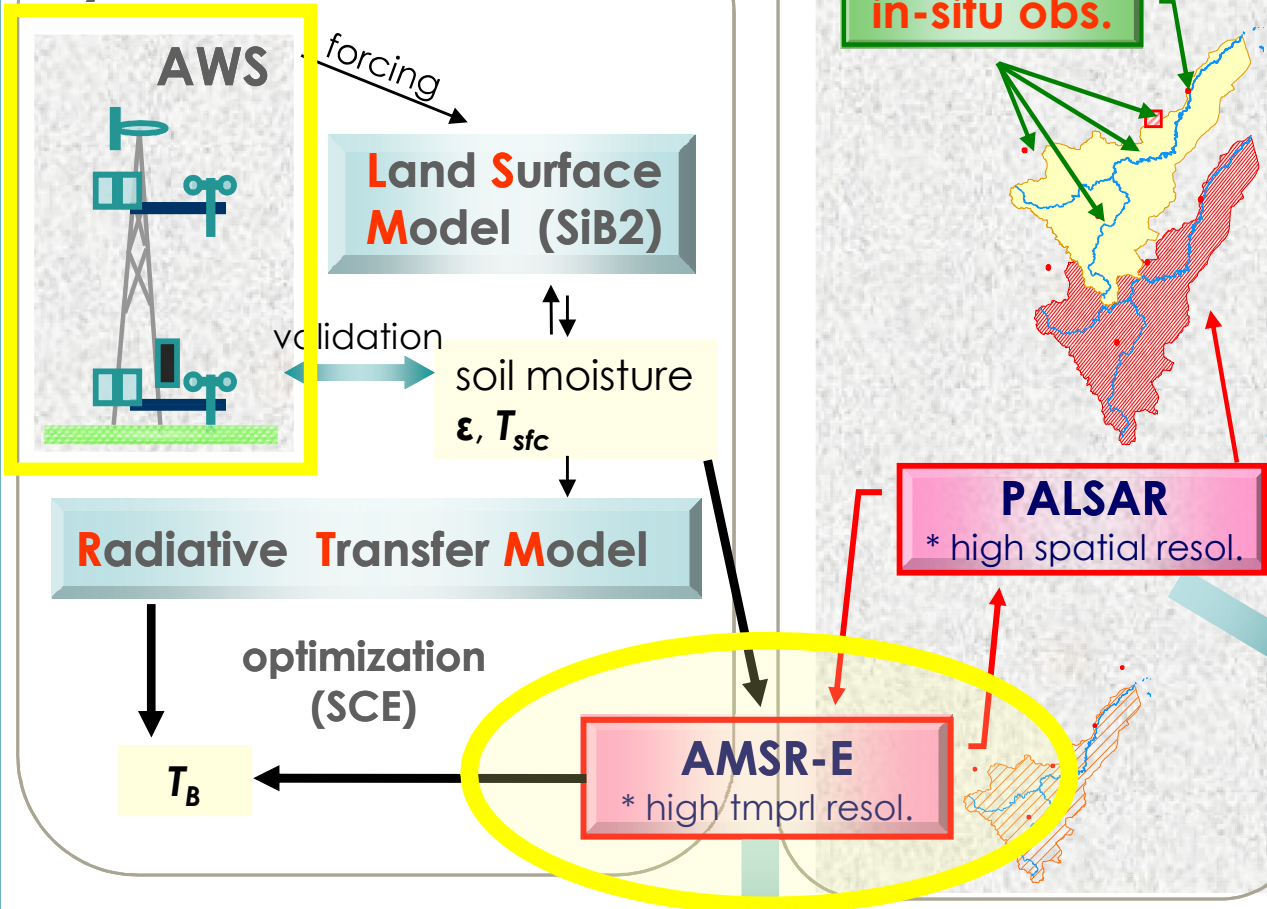
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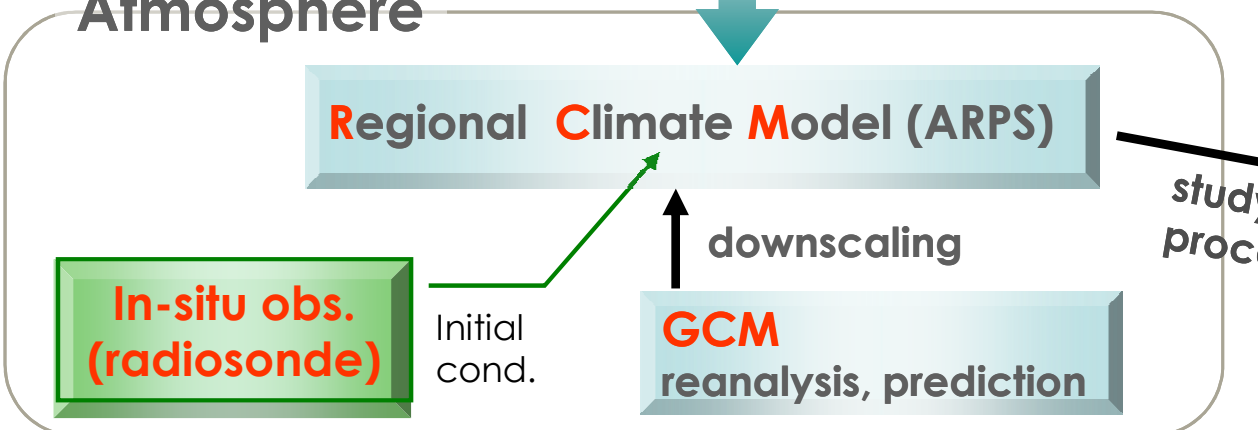
RG-UT RG-JICA

Land Data Assimilation System

Soil Moisture

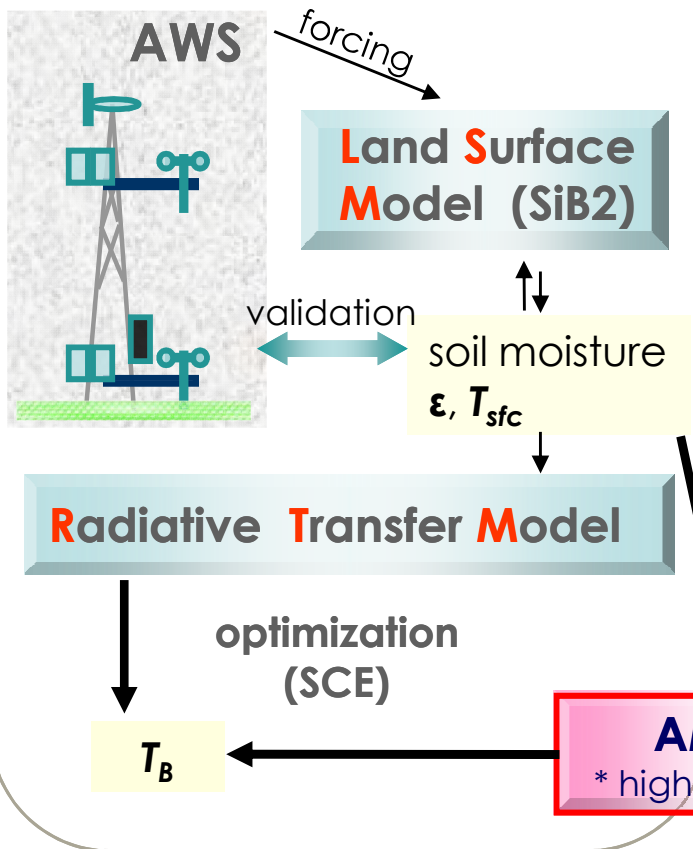


Atmosphere

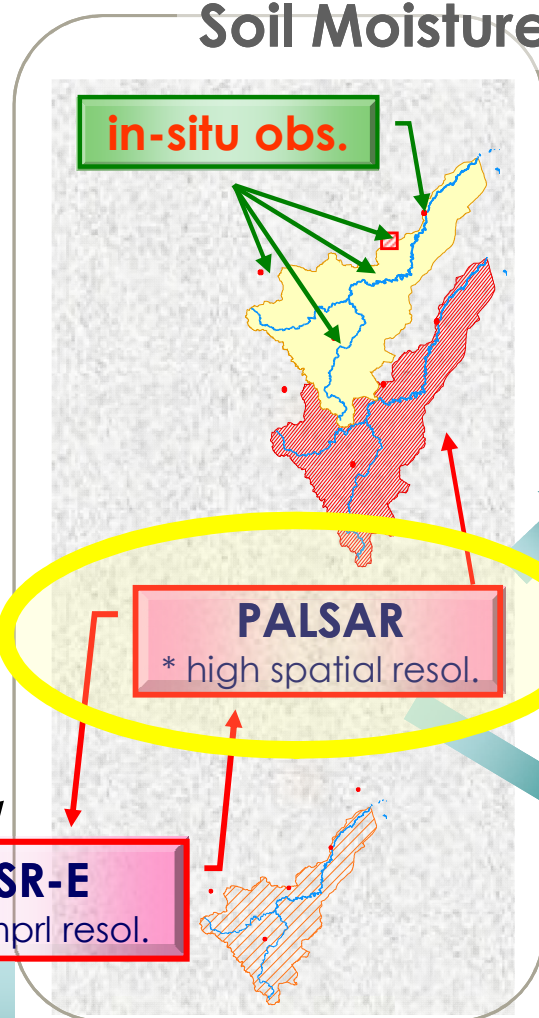


- ★ available on **high temporal resolution**
- ⇒ can be used **as the input to RCM**
- ★ algorithm is under development by using the **LDAS system & AWS obs.**
- * problem1: validation
- ⇒ **low spatial resolution**
- ⇒ heterogeneity within a footprint makes it difficult to validate the algorithm with the point-scale in-situ obs.
- ⇒ **Heterogeneity will be checked by using PALSAR**
- * Problem2: algorithm
- ⇒ **lake surface** would be included within a footprint, though current LDAS system assumes land-surface
- ⇒ percentage of lake area will be derived by PALSAR

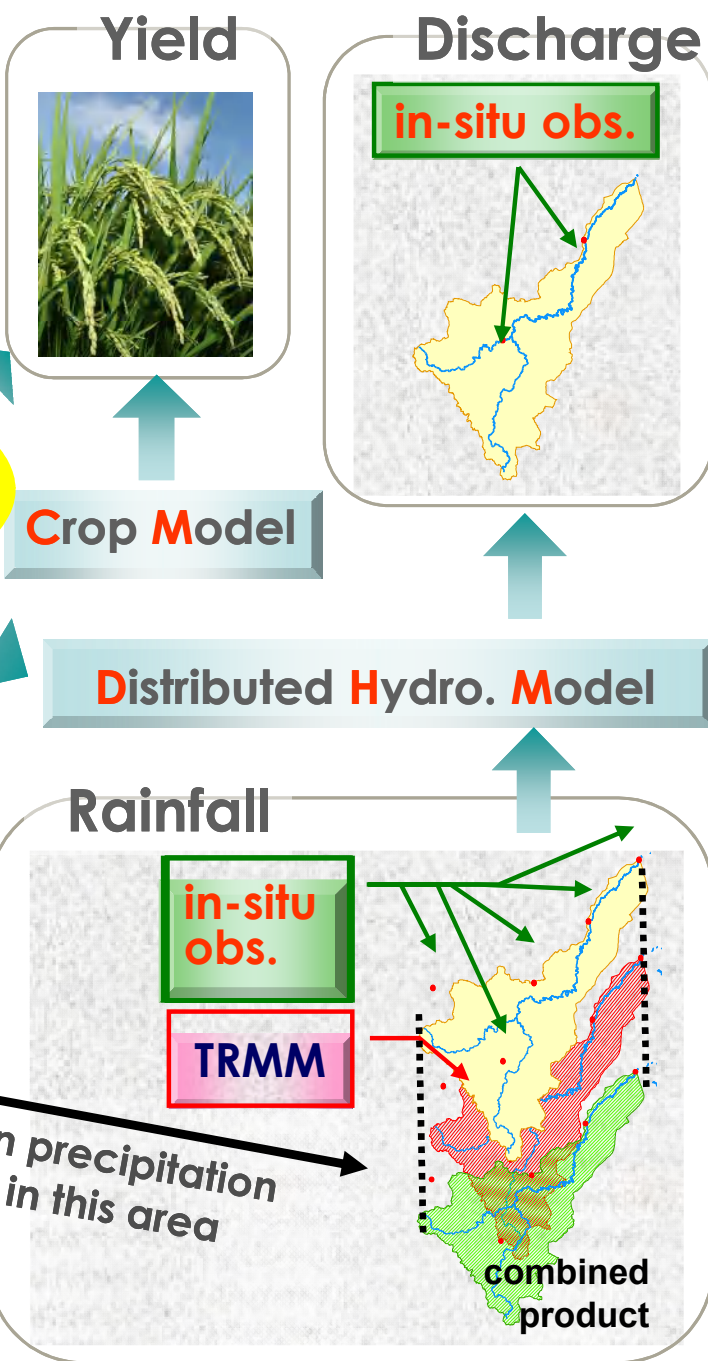
Land Data Assimilation System



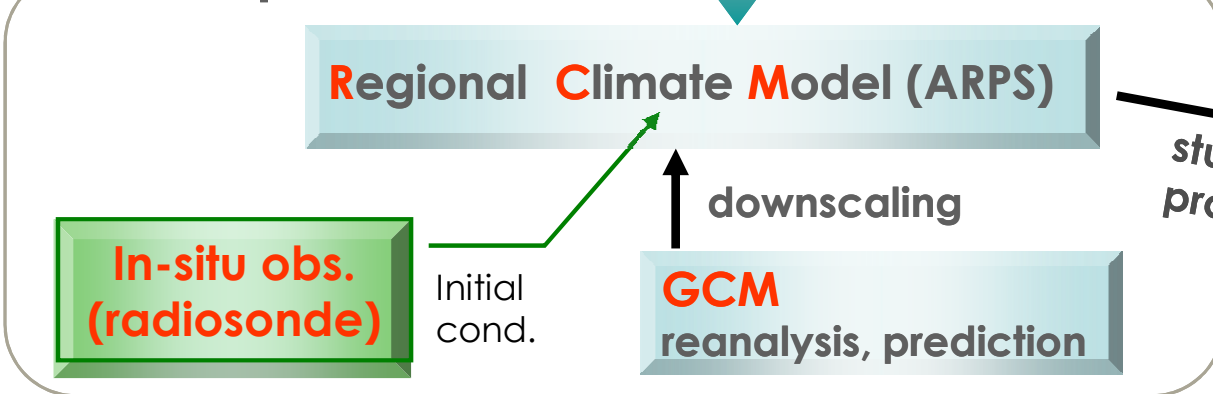
Soil Moisture



Water Resources Management

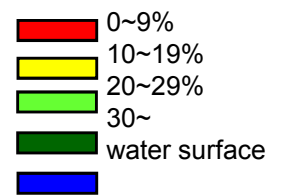


Atmosphere



study on precipitation process in this area

Soil Moisture Distribution by PALSAR

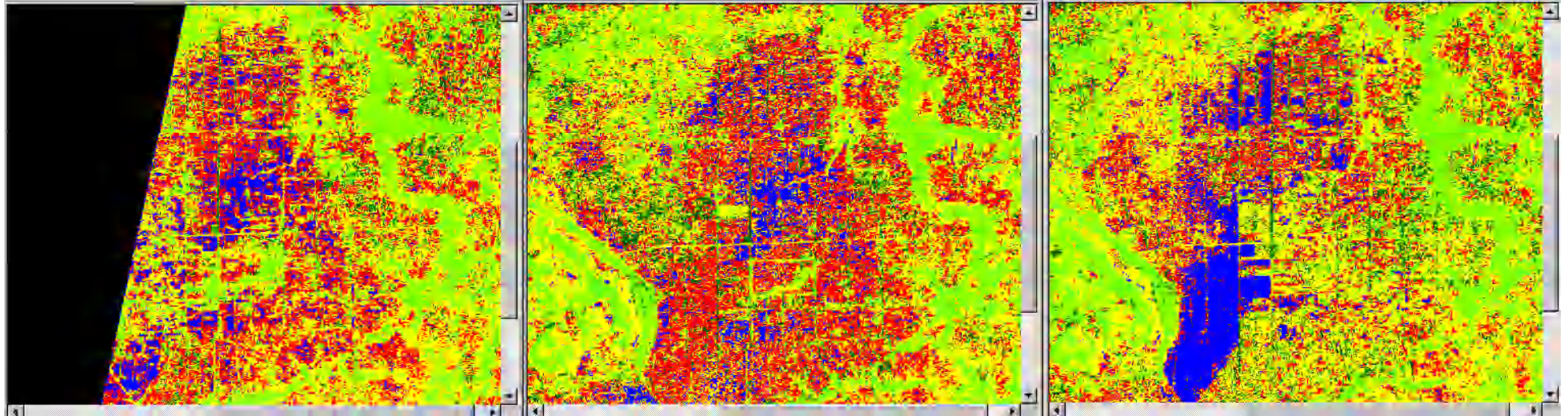


18th Feb. 2010

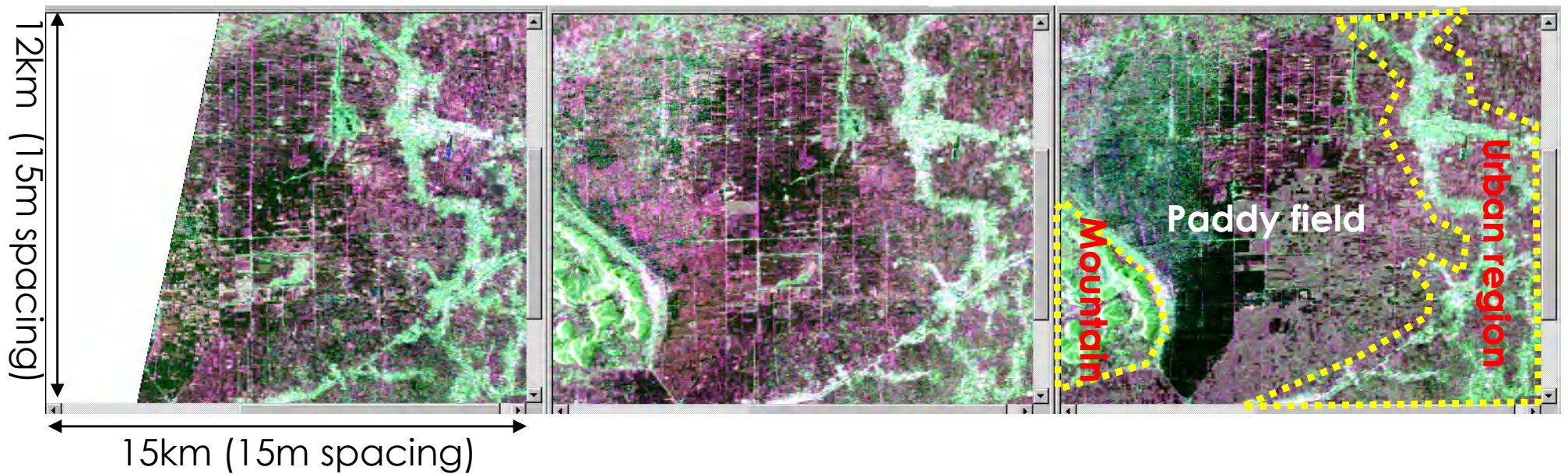
4th Mar. 2010

19th Apr. 2010

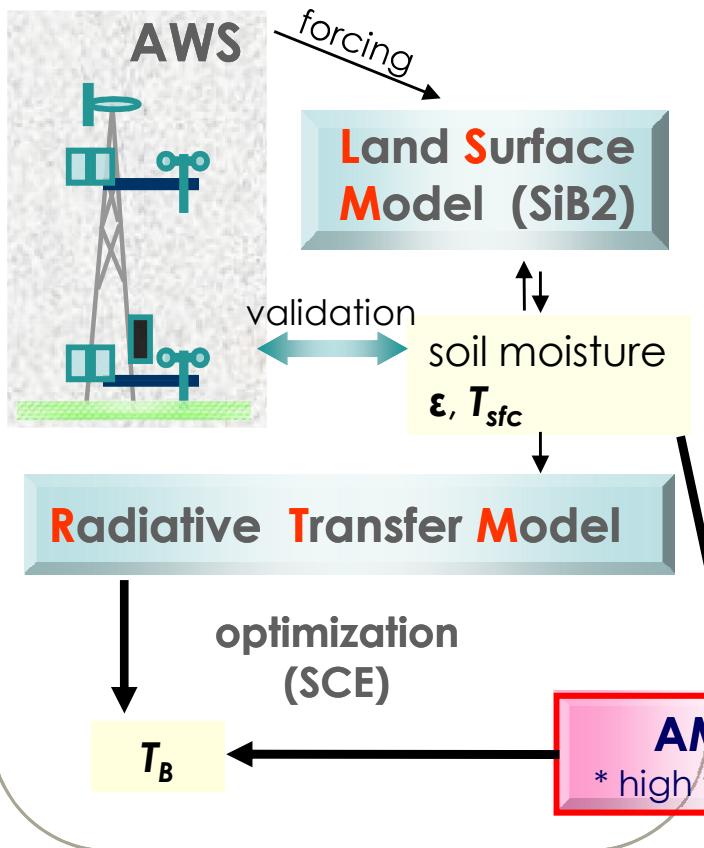
● Soil moisture map (trial)



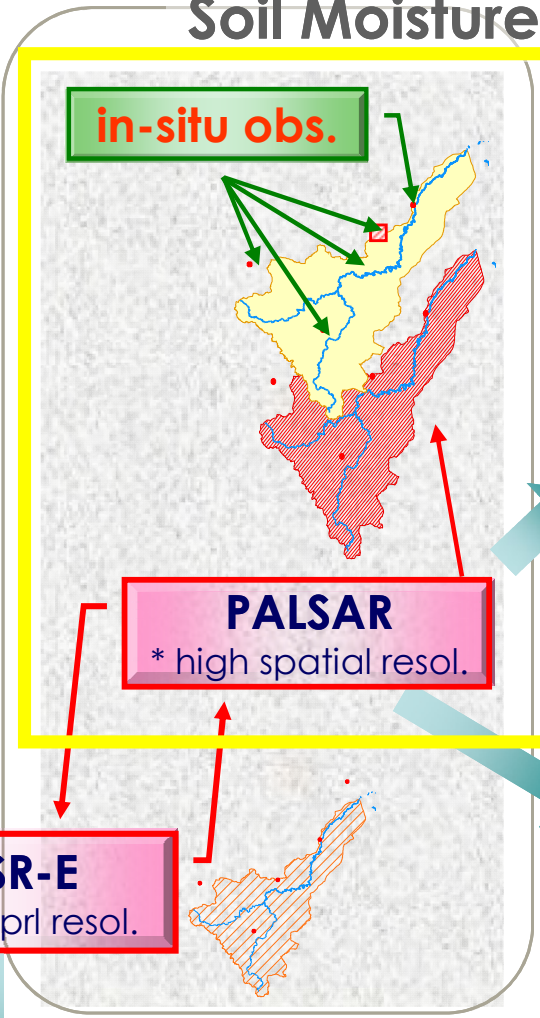
● PALSAR raw image



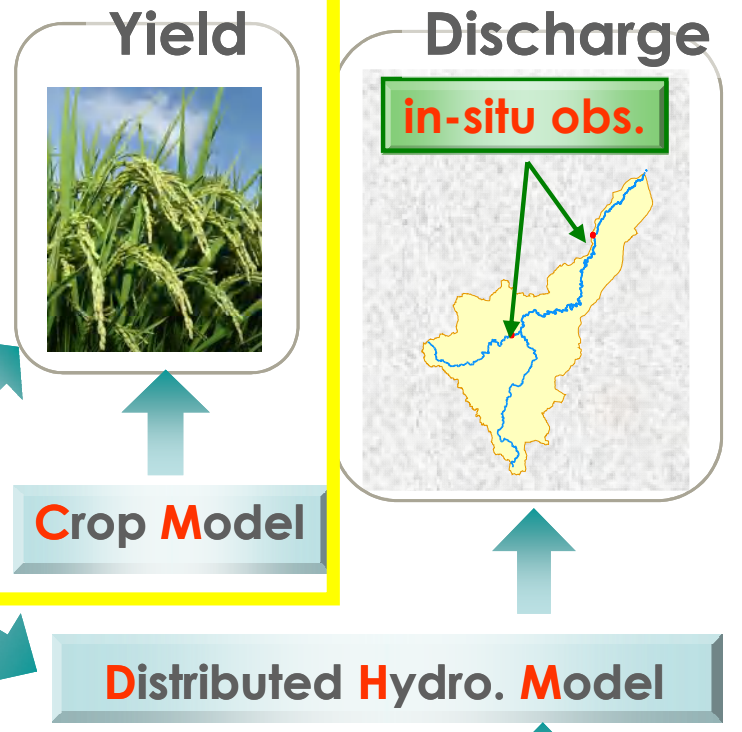
Land Data Assimilation System



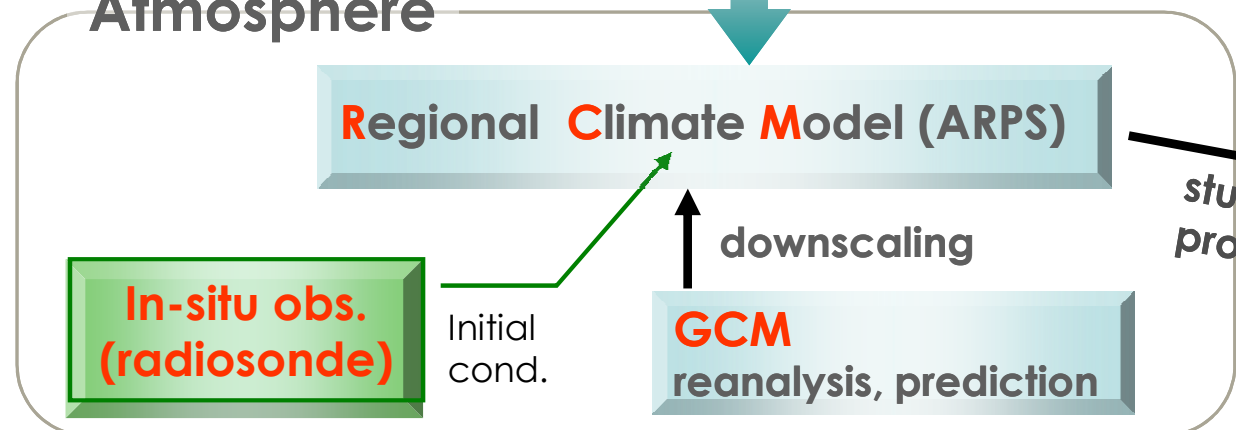
Soil Moisture



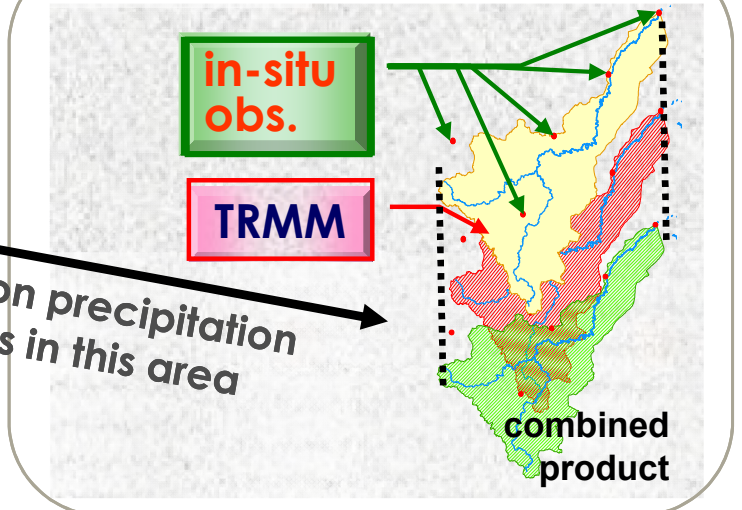
Water Resources Management



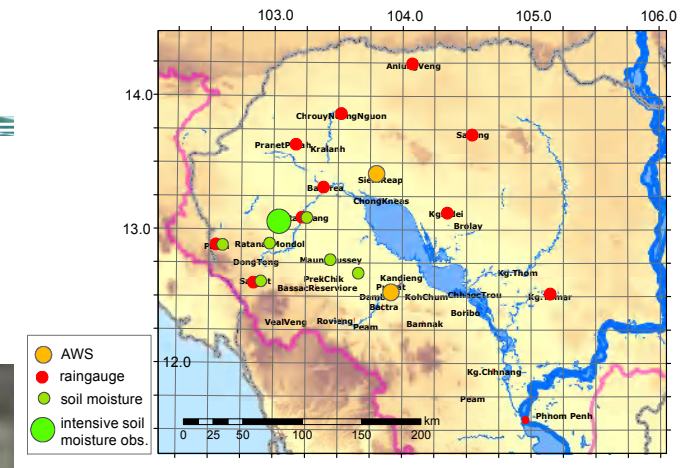
Atmosphere



Rainfall



Model Site for Field Observation

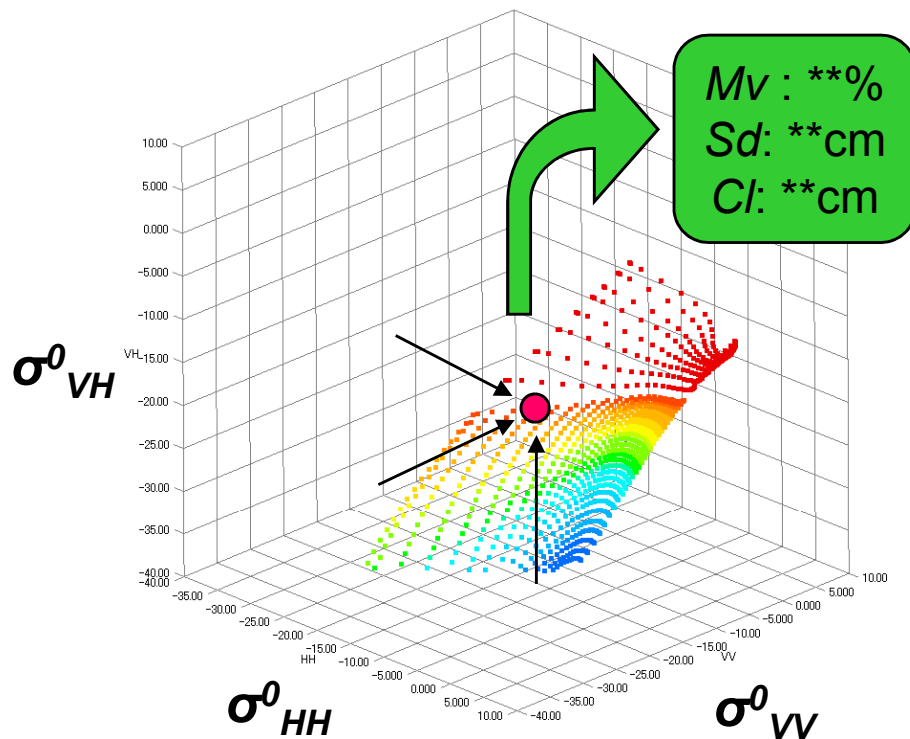


Model Site for Field Observation



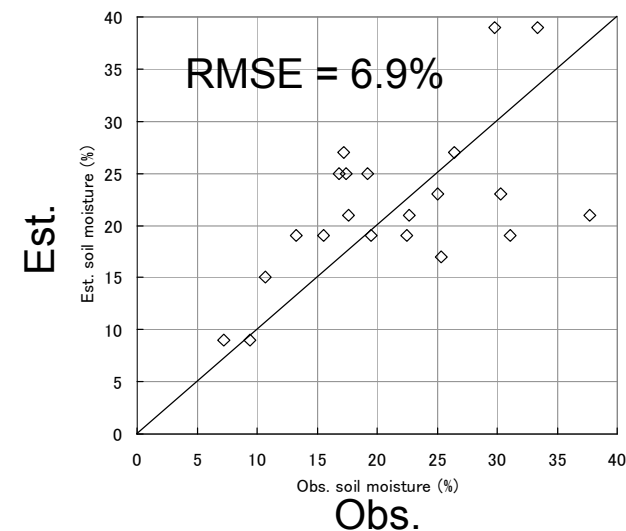
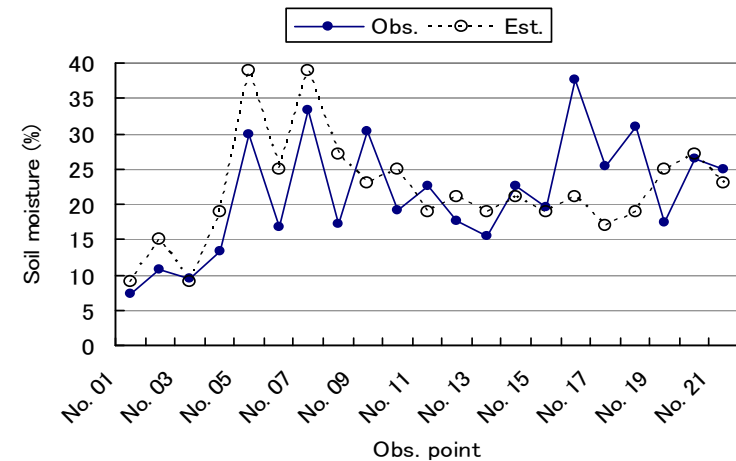
Result of soil moisture estimation

- The look up table for soil moisture estimation was obtained from the relationship between σ^0 and parameters. Following figure is a virtual image of the look up table.
- When the PALSAR σ^0 puts in, Mv is derived.

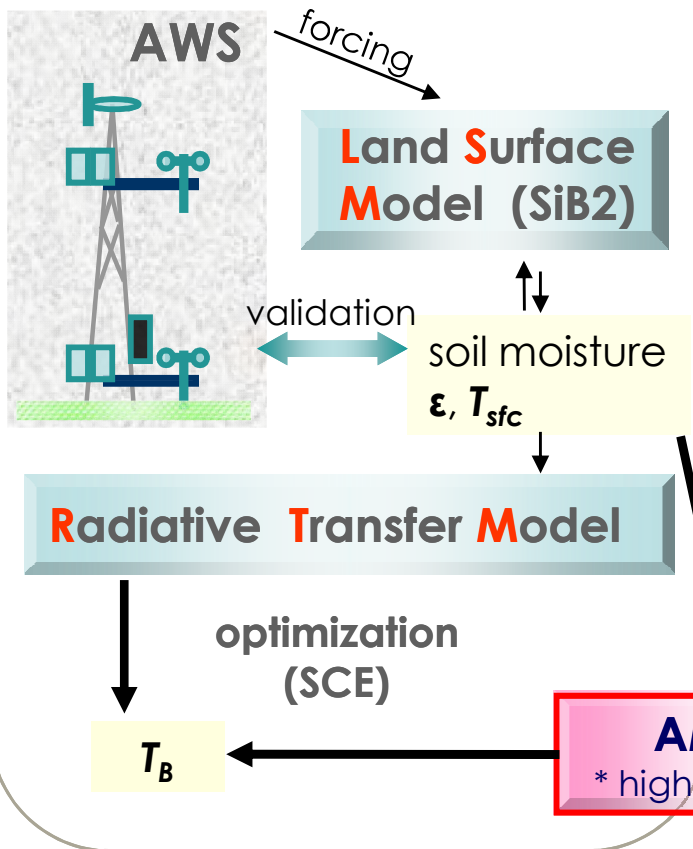


- Each points within figure are distributed depending on simulated σ^0 , and have the value of parameters.

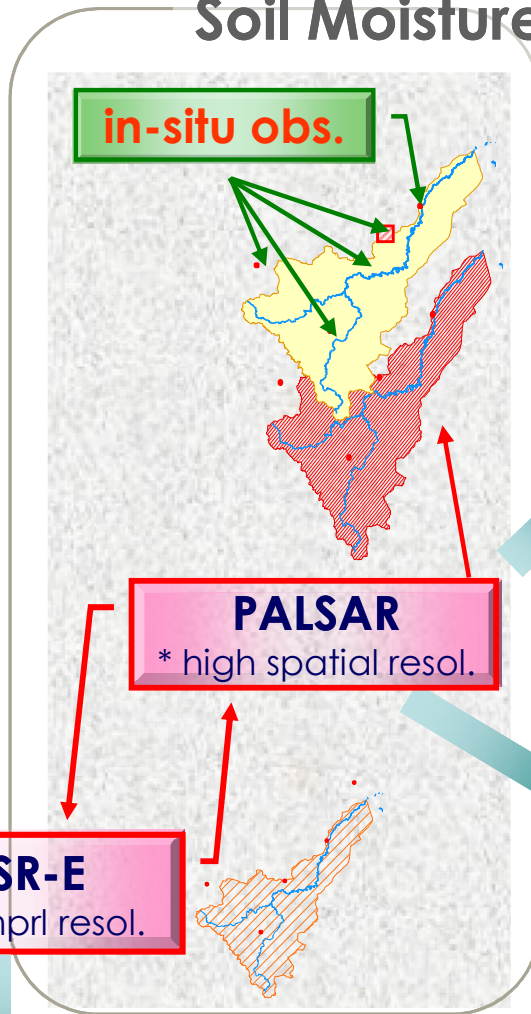
- Following figure shows the result of the soil moisture estimation in observation field.
- In the result, there is a large error between observations at point nos. 16 and 18. However, the trend of soil moisture distribution is expressed rather accurately.



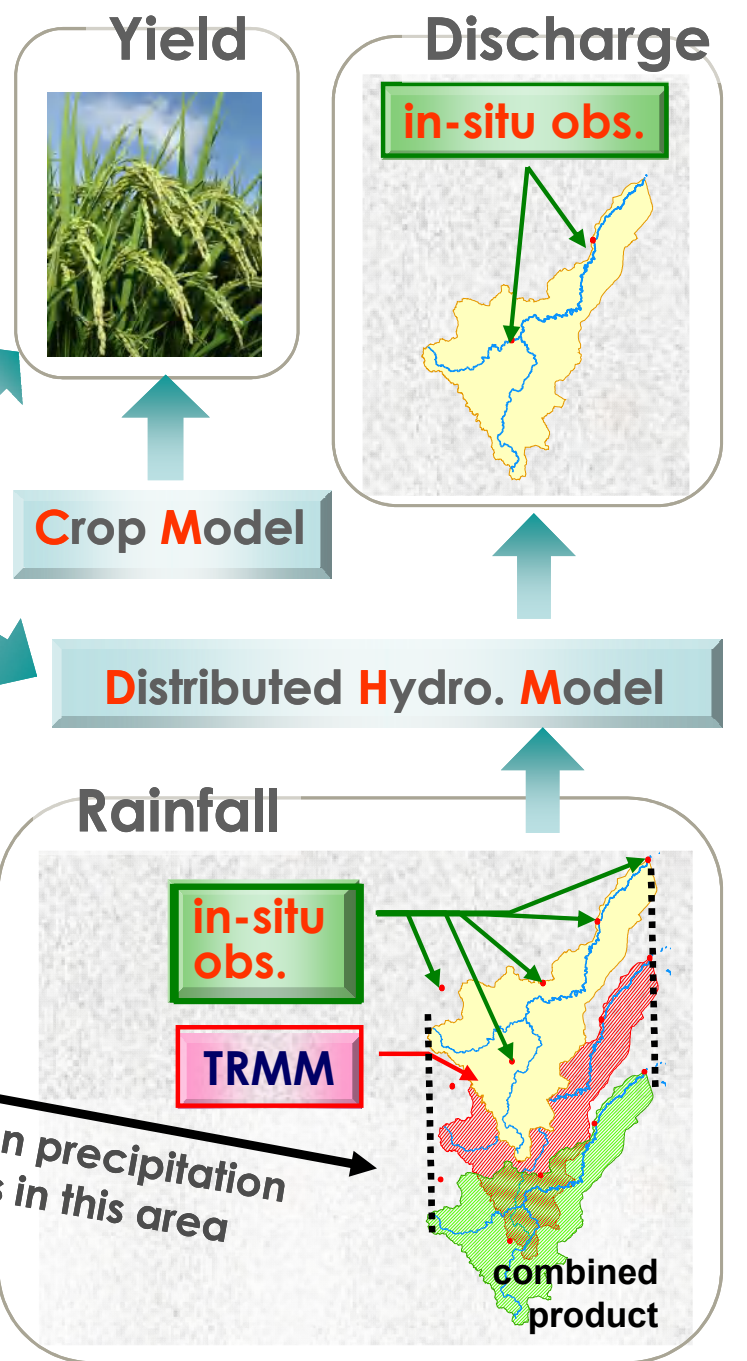
Land Data Assimilation System



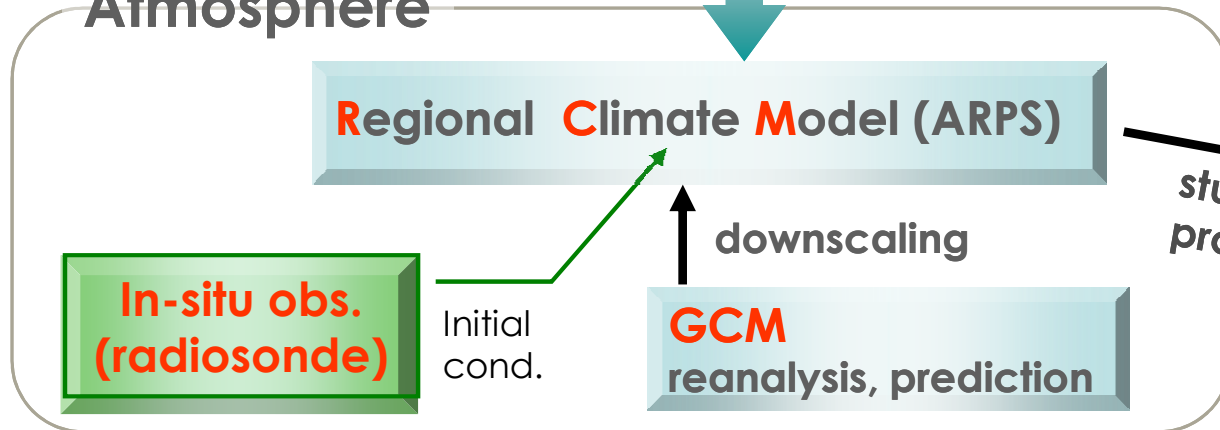
Soil Moisture



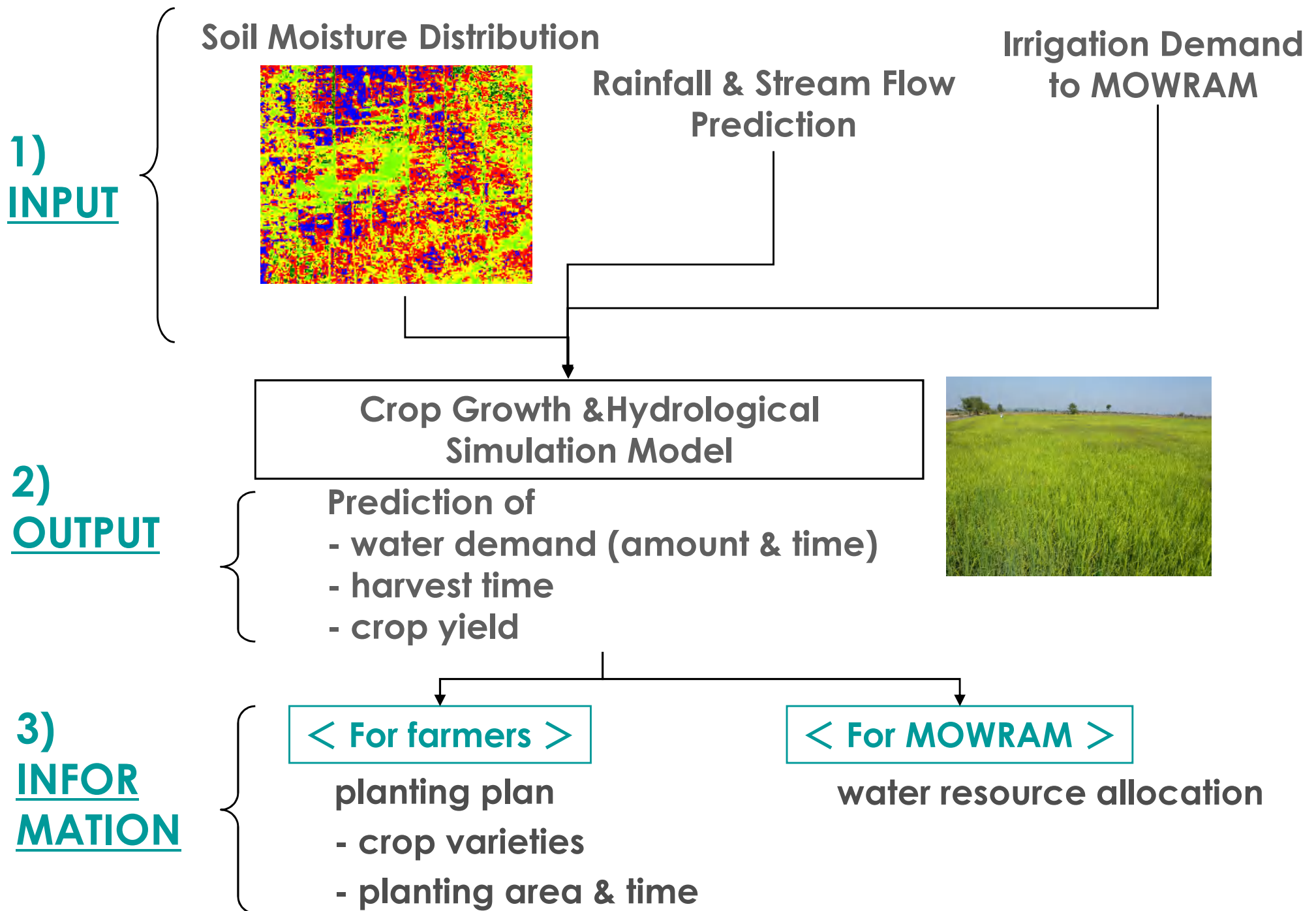
Water Resources Management



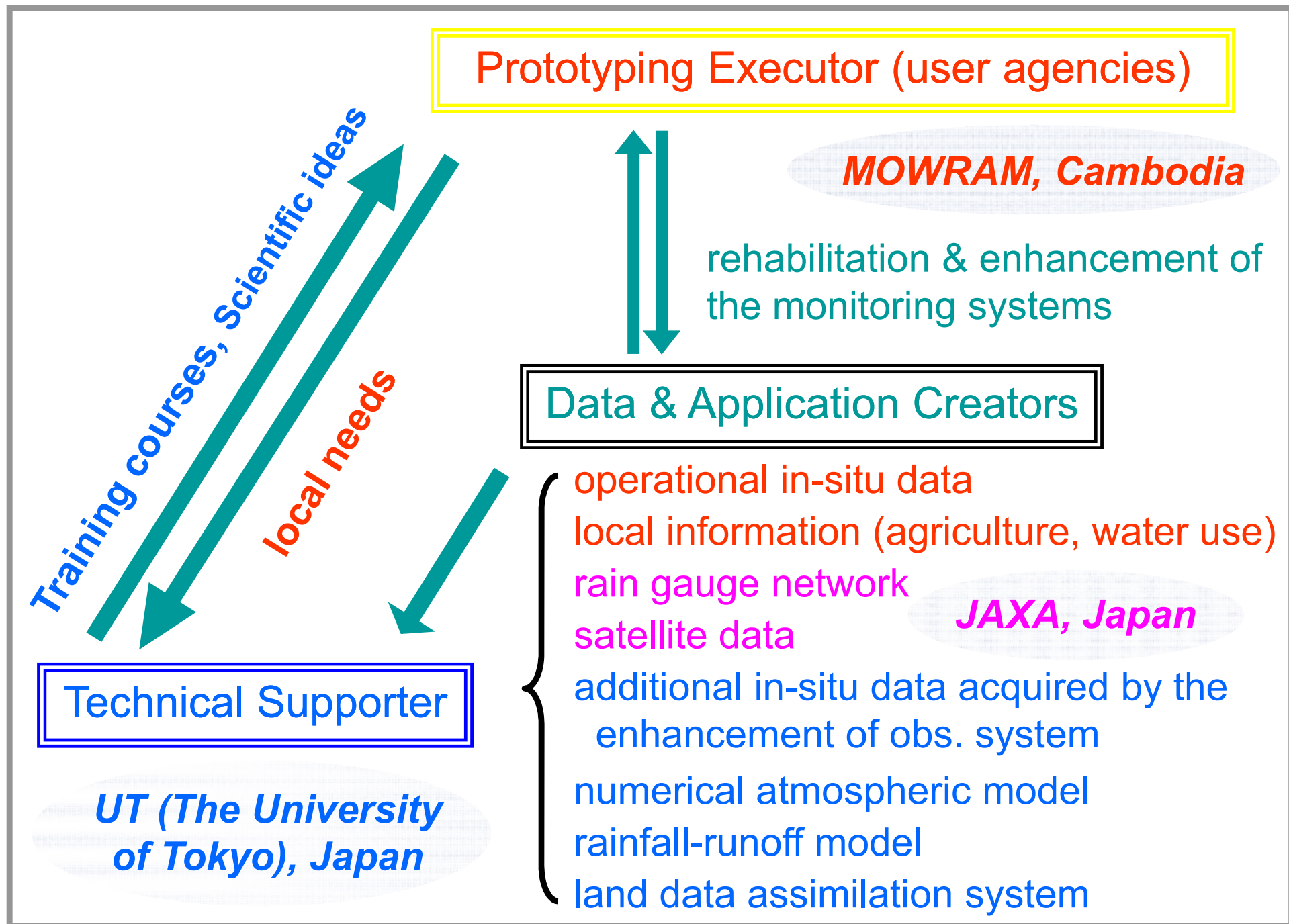
Atmosphere



Application on Farming & Water Allocation



Project Team & Relationship among Participants



+ Cooperation with other projects



Thank you very much
for your supports and cooperation

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