

LS4P -II RCM Meeting Minutes

Date: 6th Jan 2025 (US) or 7th Jan 2025 (East Asia)

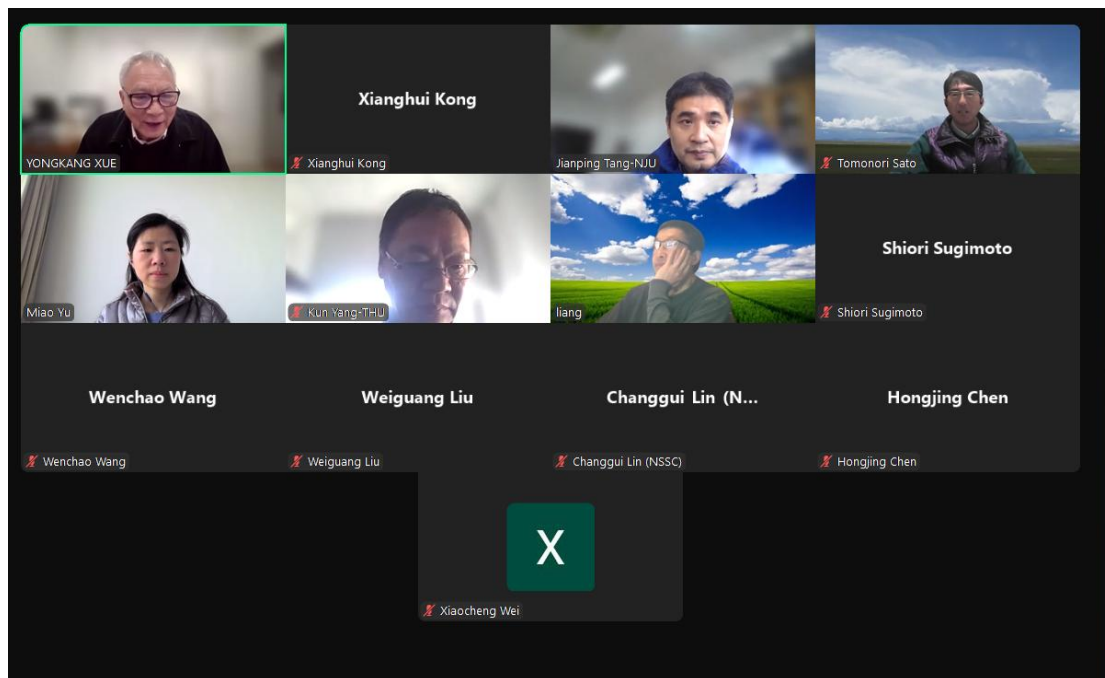
Venue: Zoom

Moderator: Yongkang Xue

Record by: Xianhui (Hui) Kong

Attendees

Hongjing Chen, Hui Kong, Xin-Zhong Liang, Changgui Lin, Weiguang Liu, Lixin Lu, Tomonori Sato, Shiori Sugimoto, , Jiangping Tang, Guiling Wang, Wenchao Wang, , Xiaocheng Wei, Yongkang Xue, Kun Yang, Miao Yu



Agenda:

Three short presentations

- Jiangping Tang
The LS4P-II Regional Climate Model Intercomparison
- Shiori Sugimoto
Research plan for the 3rd LS4P-RCM paper
- Miao Yu
Intercomparison of Regional Climate Models on the Interannual Variabilities in the GEWEX/LS4P Phase I

Discussion/Comments:

Sugimoto's presentation:

- Liang: the coupling between skin temperature and air temperature, soil moisture
- Yang: WRF's output includes skin temperature; MODIS .vs. model-output (clear sky).
Comparison in summer is difficult (Too much cloud over the TP)
- Changgui: MODIS maybe include the skin temperature.
- Xue: Shiori: please check if LS4P_I RCM has skin temperature output then discuss with Kun and Changhui.

Rough sketch of our goals

1. We compare the monthly-mean of T2m between models and observations again.
2. We investigate which variables control spatial distribution and year-to-year variation of T2m in the model.
3. We discuss whether land-atmosphere coupling process simulated in the model could be confirmed in the in-situ observations.

[Datasets]

Limited data is available for analysis

- In-situ flux station data (hourly, 2sites: 2005~, 1site: 2007~, 1site:2009~, 1site: 2010~, 1site: 2012~, 4sites: 2014~, 1site: 2015~, 1site: 2018~)
- Spatial distribution for evapotranspiration (monthly, 1982-2018)
- (Global daily soil moisture data: pending due to data volume is very large)
- The RCM products (1991-2015)

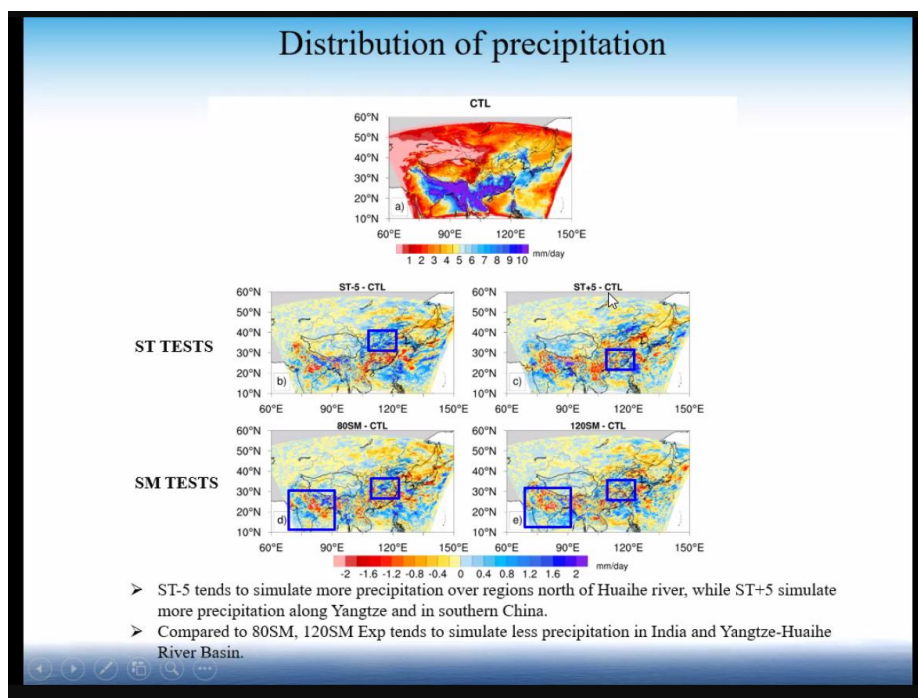
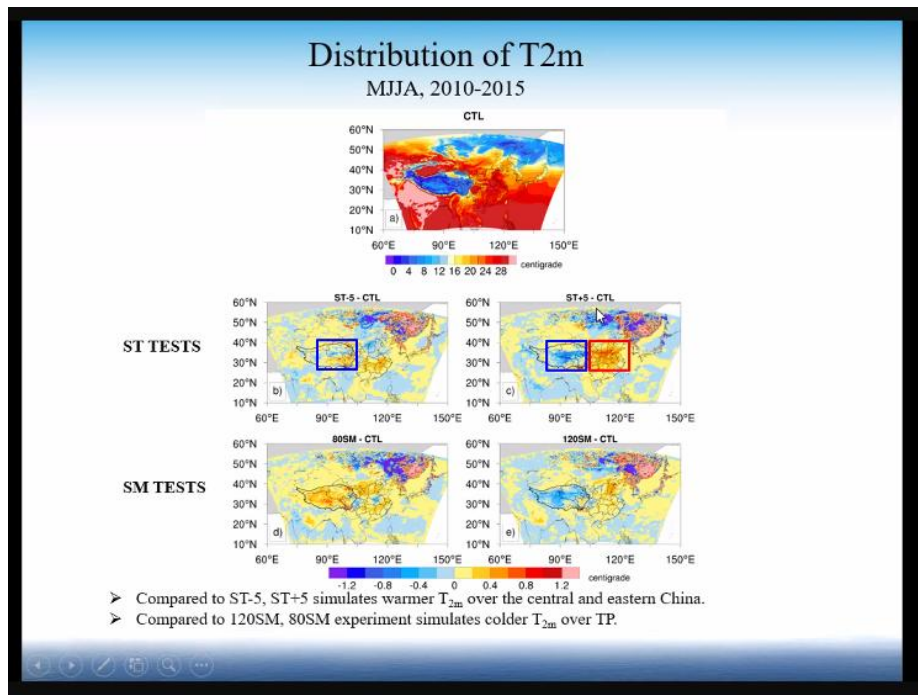
In-situ and satellite observation datasets have already been downloaded (thanks to Dr. Lin's support)
The RCM products are continuously downloaded still now (thanks to Prof. Tang & Prof. Pan's support)
We would intensively investigate in 2014 and 2015 using observation at 10 flux stations.
We should carefully consider how we could discuss annual variation for land-atmosphere coupling.



Tang's presentation

- Xue: The differences in near-surface air temperature between the cold case (soil temperature: -5°C) and control run is negative over the north and west TP, but positive over the southeast TP. However, the differences between the warm case (soil temperature: +5 °C) and control run is negative over the TP. Please check the time series of the temperature. Maybe the temperature in the cold case (warm case) is negative (positive) at the beginning of the simulation (e.g., the first 10 days).

The difference in precipitation is positive (negative) in the north (south) of the Yangtze River between the cold case and control run. It's a normal result. However, the signal between the warm case and control run is not very clear.
- Liang: The cold differences between warm case and control run is very strange. This may be related to the phases of soil water.
- Guilin Wang: Please add the significant test.

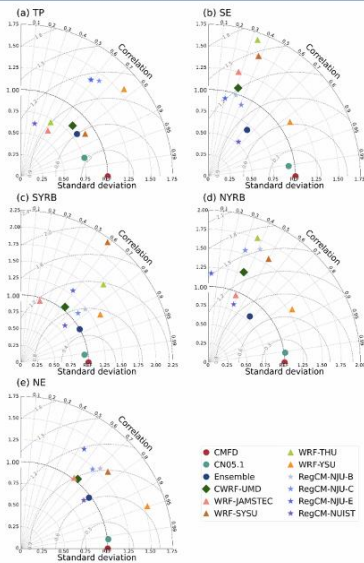


Yu's presentation:

- Liang: Don't specifically mention which model performed well or poorly, as there is insufficient evidence for the conclusion. Instead, you can mention which aspects the well-performing models simulate better, and which aspects the poorly performing models simulate inadequately.
- Tang: The simulations using WRF-SYSU is not continuously run.

3. Results

3.1 MJJA rainfall interannual variabilities



the centered *pattern* RMS difference by

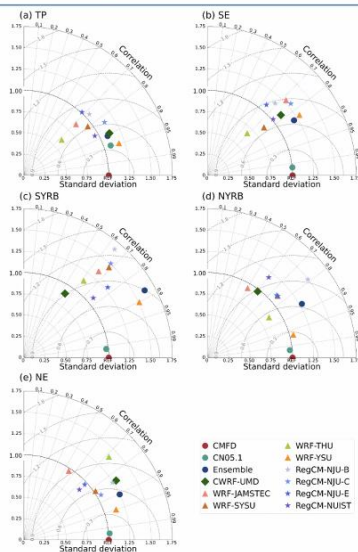
$$E' = \left\{ \frac{1}{N} \sum_{n=1}^N \left[(f_n - \bar{f}) - (r_n - \bar{r}) \right]^2 \right\}^{1/2}.$$

- ✓ WRF-YSU simulates more similar variability to CMFD and smaller RMSE than the other models particularly in eastern China.
- ✓ The WRF group shows a high correlation with observations in the TP, and NYRB, but this is not the case in the other three areas.
- ✓ Using CLM4.5 improved the model performance in the TP, SE only, and very limited (NJU-B vs. NJU-C).
- ✓ Using Emanuel scheme is better (NJU-C vs. NJU-E).
- ✓ Using WSM5 microphysics scheme and CCSM radiation scheme can simulate the variability better but results in a larger RMSE (NJU-C/E vs. NUIST).

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3. Results

3.2 MJJA T2m interannual variations



- ✓ WRF-YSU simulates more similar variability to CMFD than the other.
- ✓ The WRF and RegCM groups generally are comparable.
- ✓ Using CLM4.5 improved the model performance (NJU-B vs. NJU-C).
- ✓ Using Emanuel scheme is worse except in SYRB (NJU-C vs. NJU-E).
- ✓ Using WSM5 microphysics scheme and CCSM radiation scheme can improve the RegCM performance only in the TP, SE and SYRB (NJU-C/E vs. NUIST).

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Yongkang last remind:

We will have a paper in Science Bullitin very soon to promote the LS4P research.

We hope the model run can be done by October 1, 2025. So we will have a preliminary anaylases presentation in 205 AGU.

LS4P wil have a session and a workshop in 205 AGU, please prepare to attend.