

Simulation of East Asian Summer Monsoon (EASM) in SP-CCSM version 4

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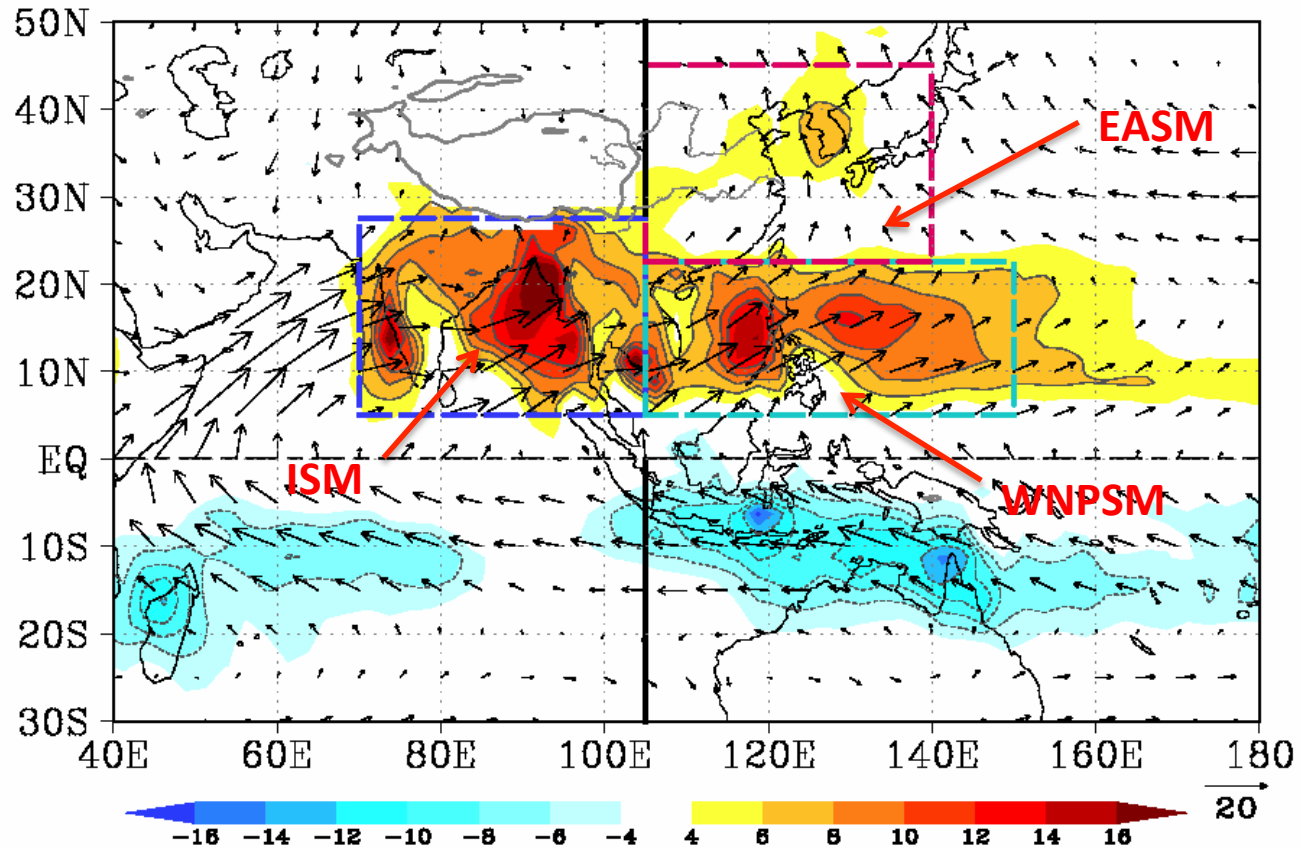
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Outline

- Introduction of East Asian Summer Monsoon
- Experimental design
- Model results and comparison with observations
- Conclusions
- Future work

A. Introduction of East Asian Summer Monsoon

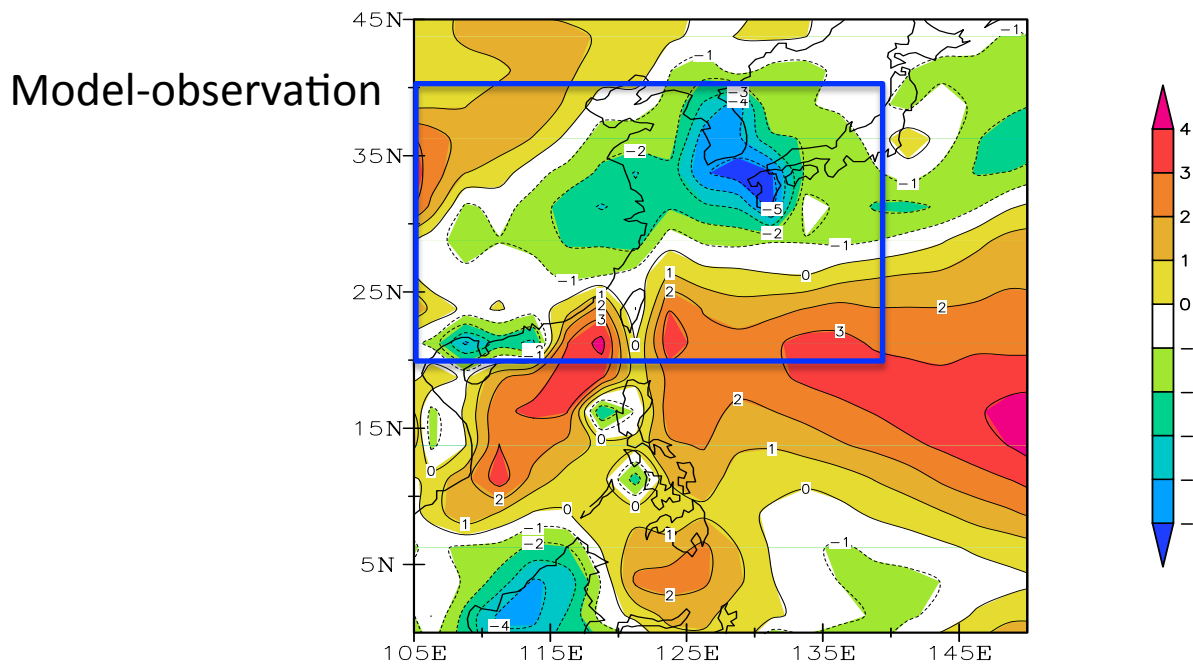
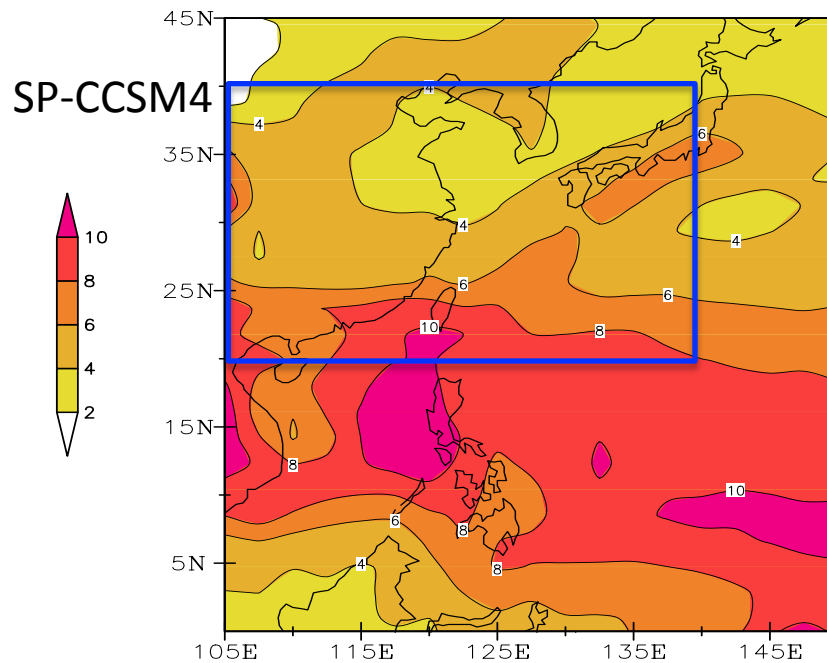
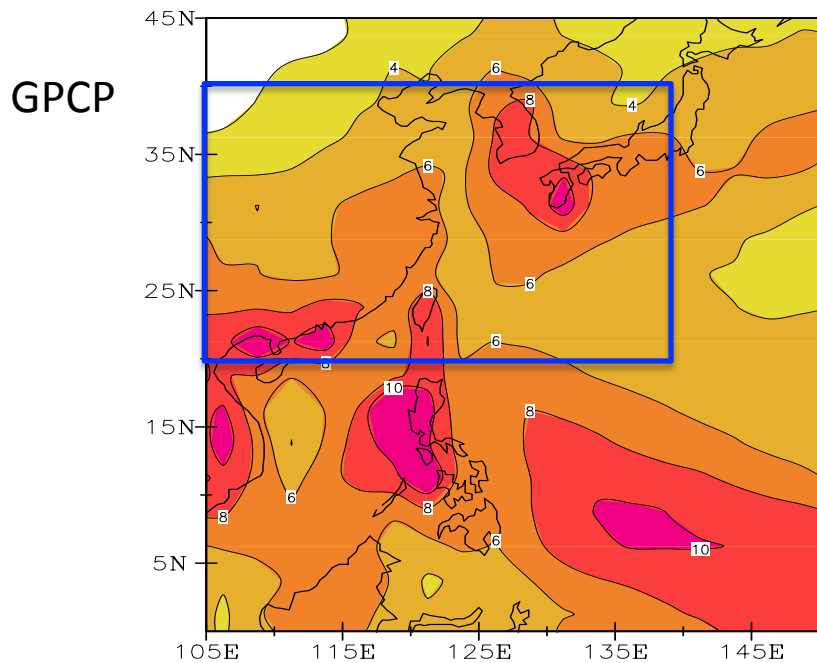


-----from *The Global Monsoon System: Research and Forecast* P74
Bin Wang, Tim Li, et al, East Asian-Western North Pacific Monsoon:
A distinctive component of the Asian-Australian monsoon system.

B. Experimental design

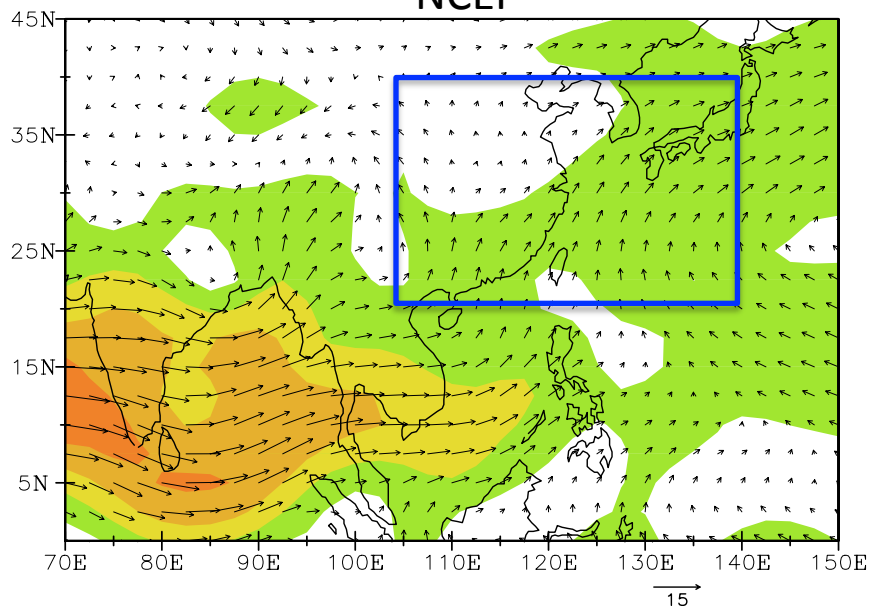
	SP-SSCM4 (2006-2060)
ATM/LND resol.	fv1.9x2.5°/30levs
OCN/ICE resol	1°
Initial Conditions	CCSM4 2° 20th Century/b40.20 th .track1.2deg 001.2005-01-01-00000
CRM resol.	4km

C1: JJA mean precipitation rate (mm/day)

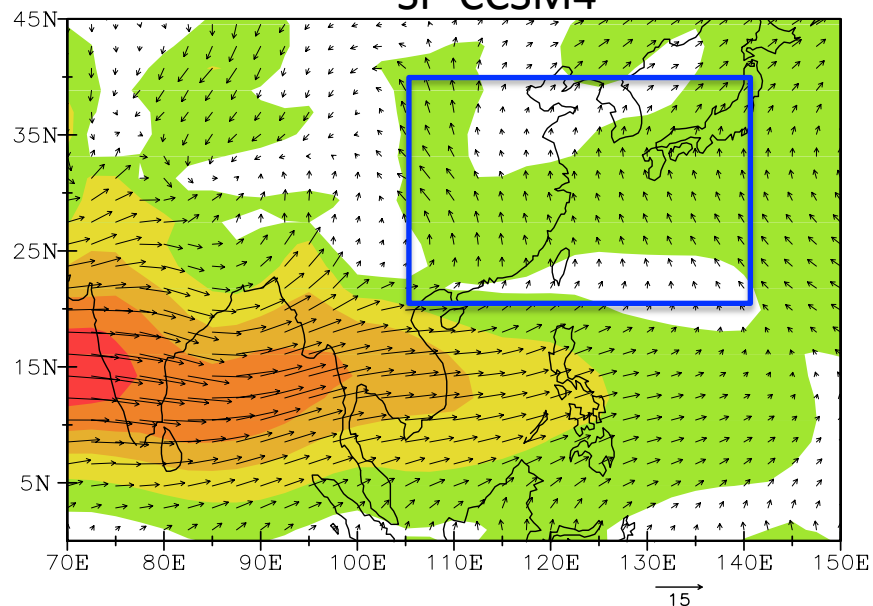


C2: JJA mean 850hPa wind (ms^{-1})

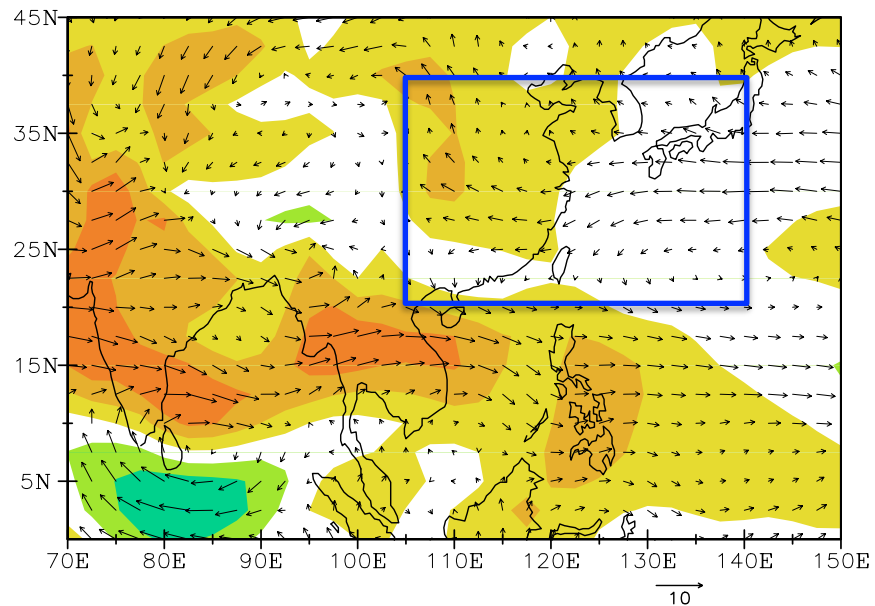
NCEP



SP-CCSM4

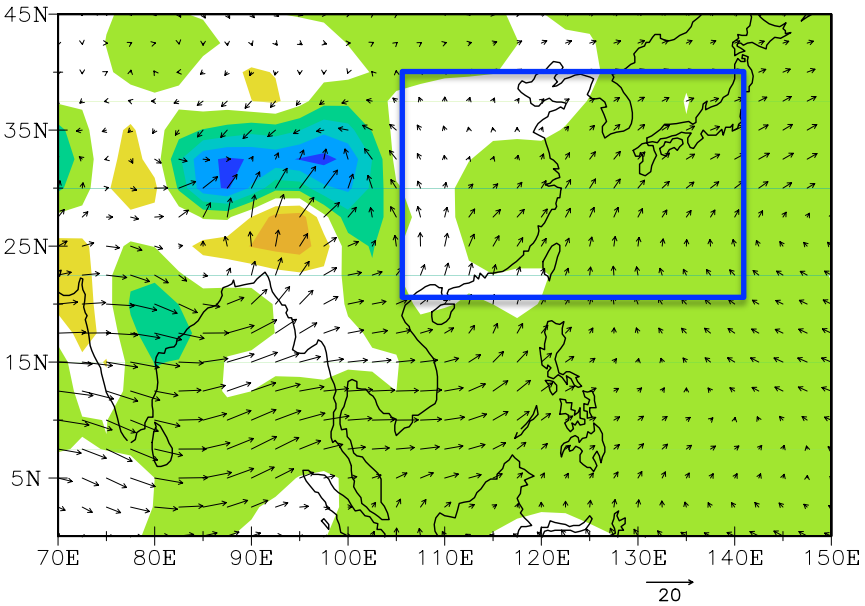


Model-observation

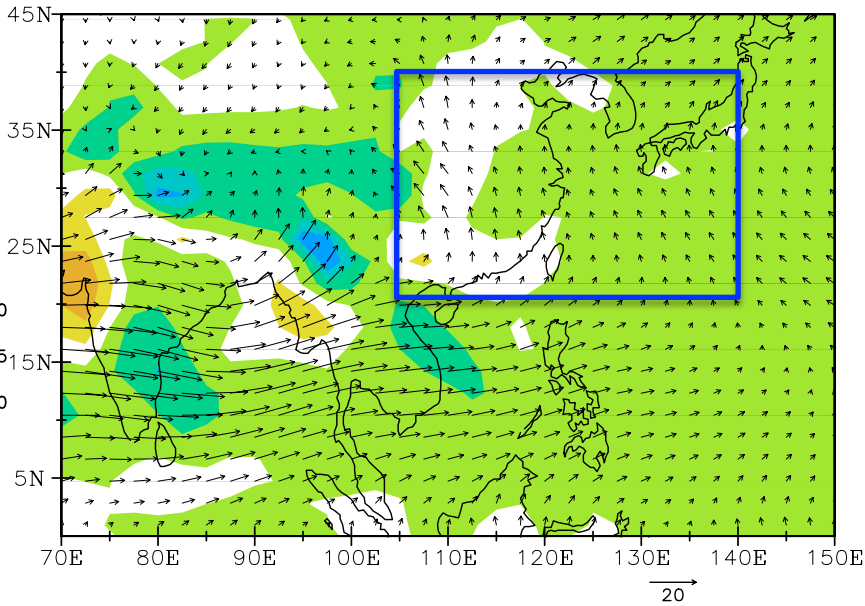


C3: moisture transport ($\text{ghPa}\cdot\text{s}^{-1}\cdot\text{cm}^{-1}$) & moisture flux divergence ($10^{-5} \text{ g hPa}^{-1}\cdot\text{s}^{-1}\cdot\text{cm}^{-2}$)

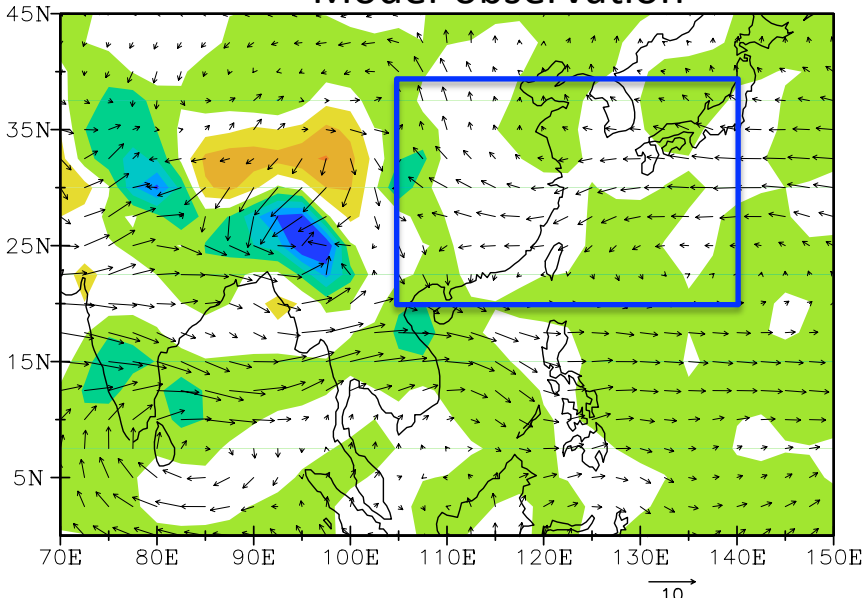
NCEP



SP-CCSM4

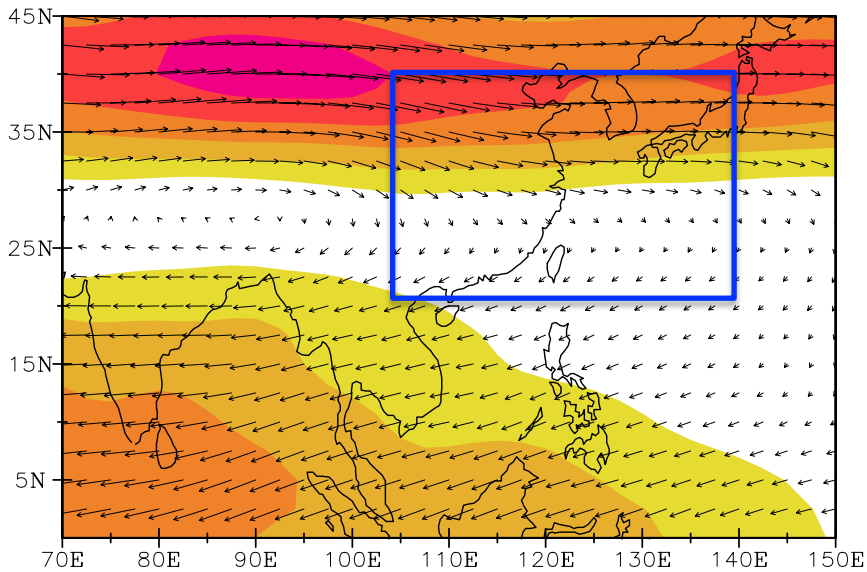


Model-observation

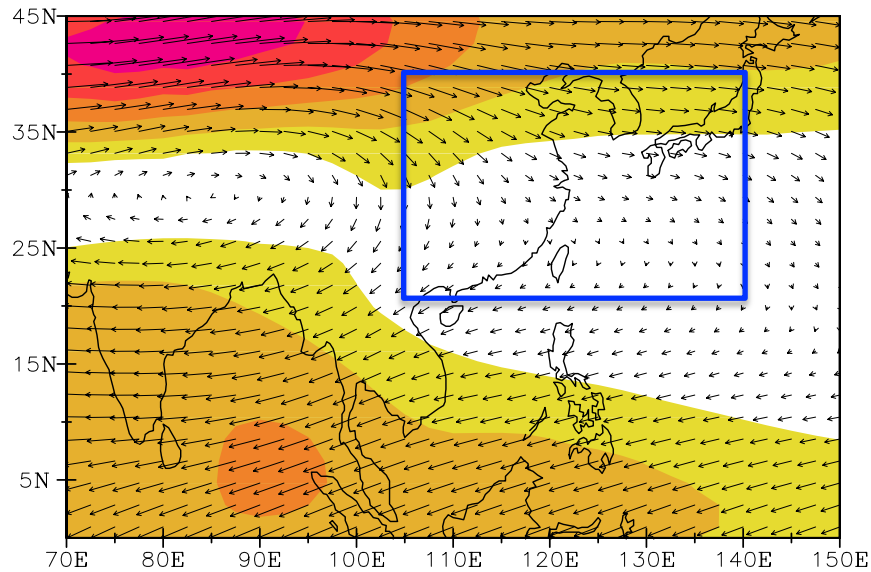


C4: JJA mean 200hPa wind (ms^{-1})

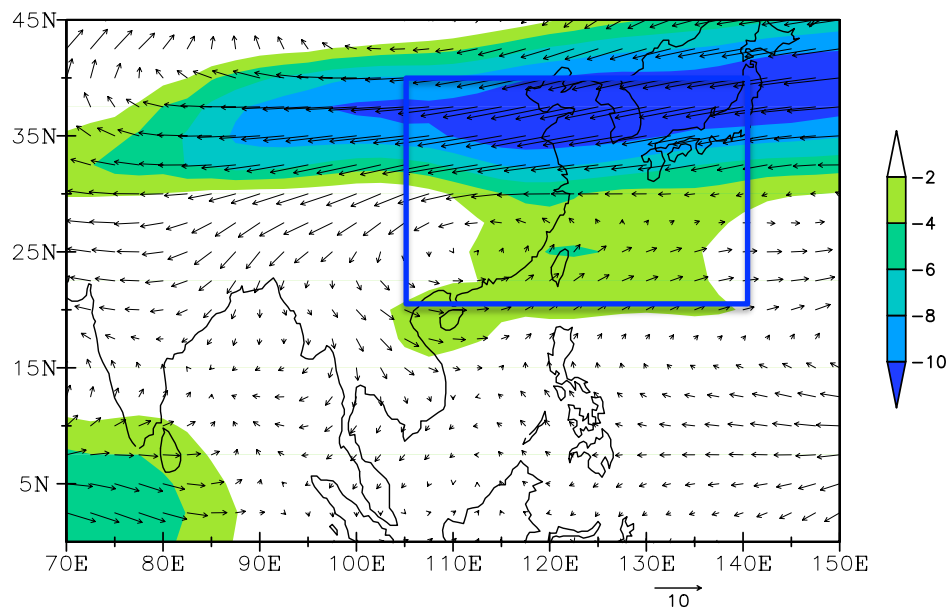
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SP-CCSM4

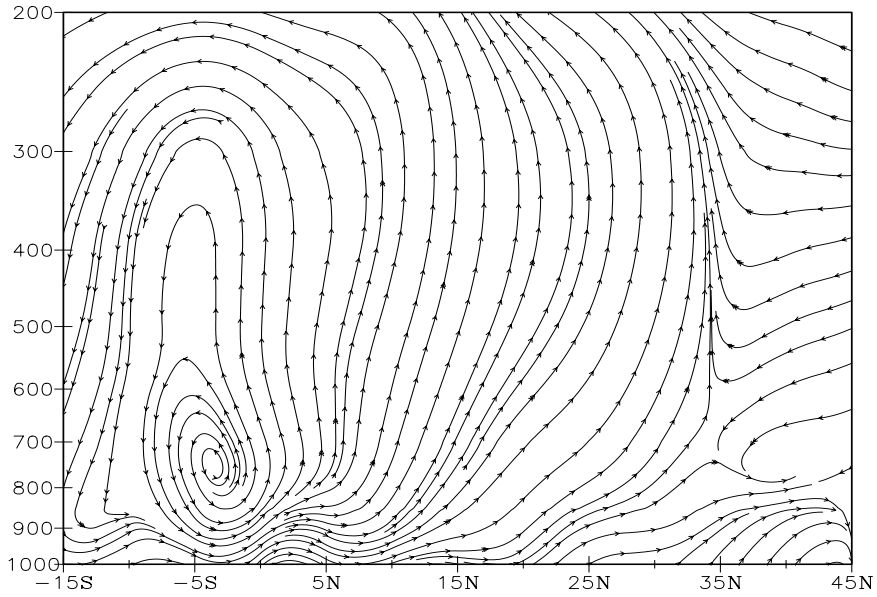


Model-observation

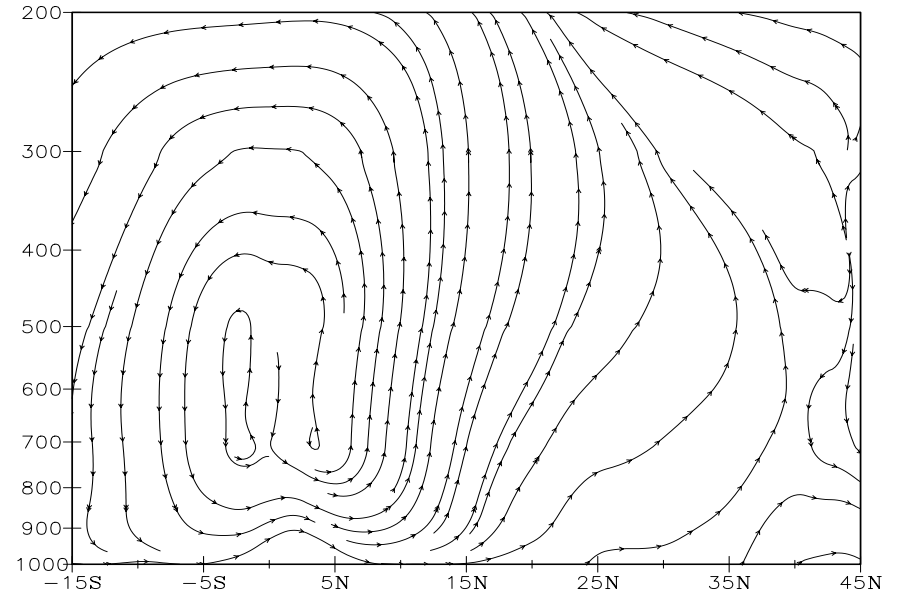


C5: JJA mean vertical circulation over eastern China (110 -120 °E)

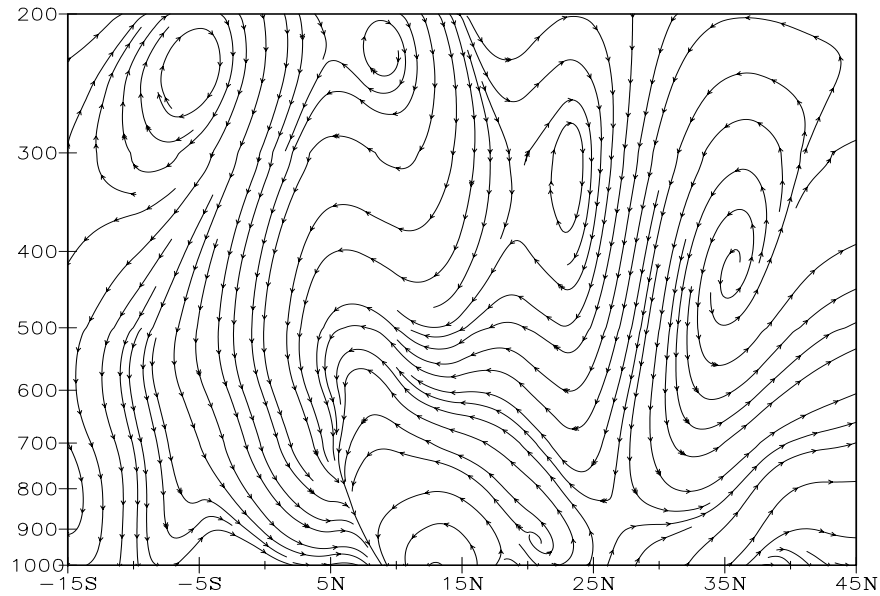
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SP-CCSM4

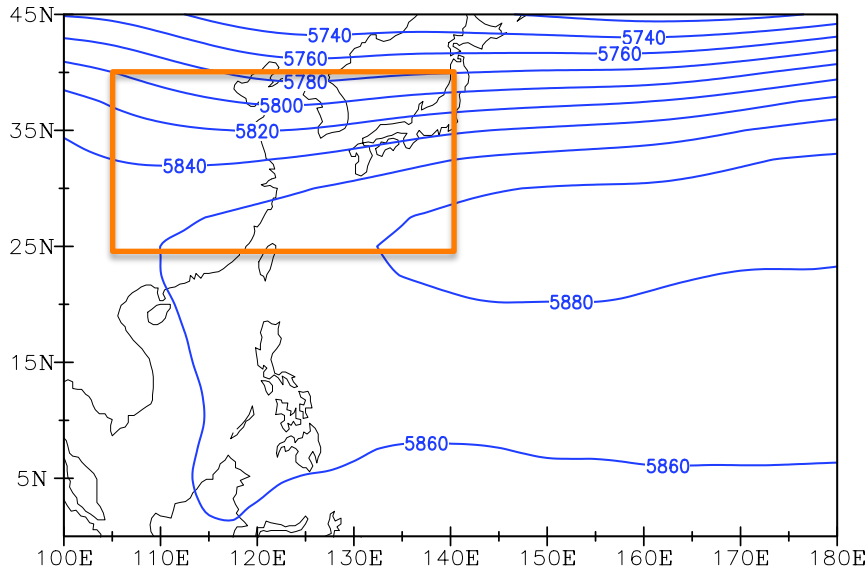


Model-observation

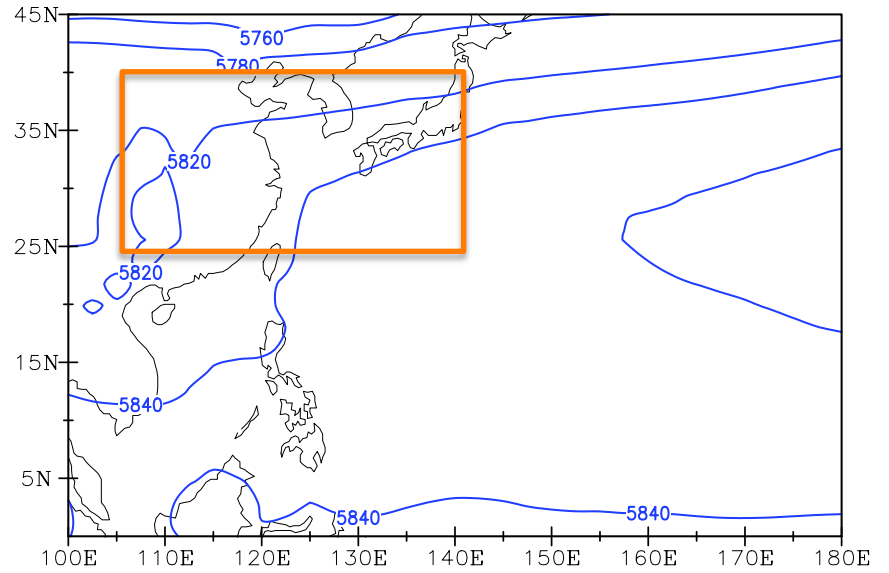


C6: JJA mean 500hPa height field

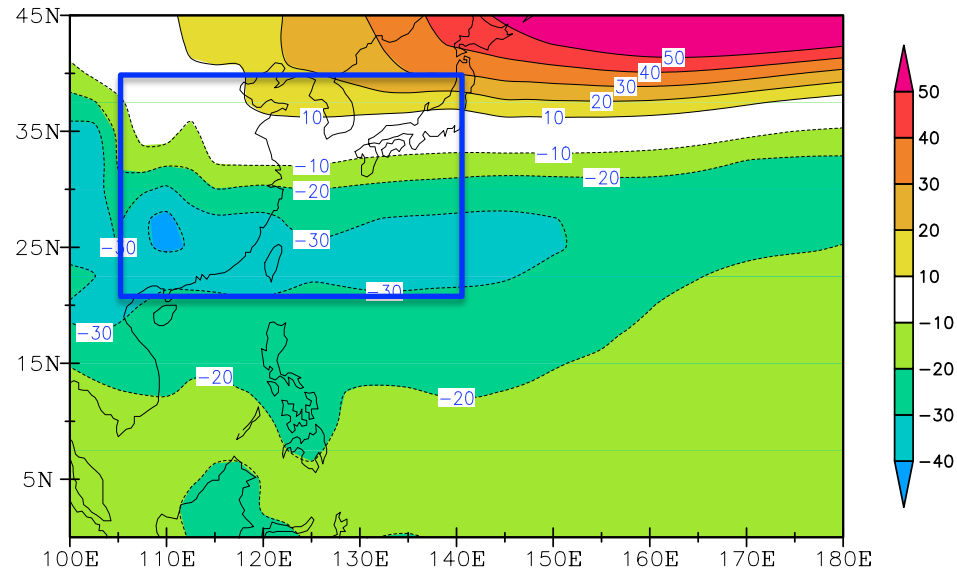
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SP-CCSM4

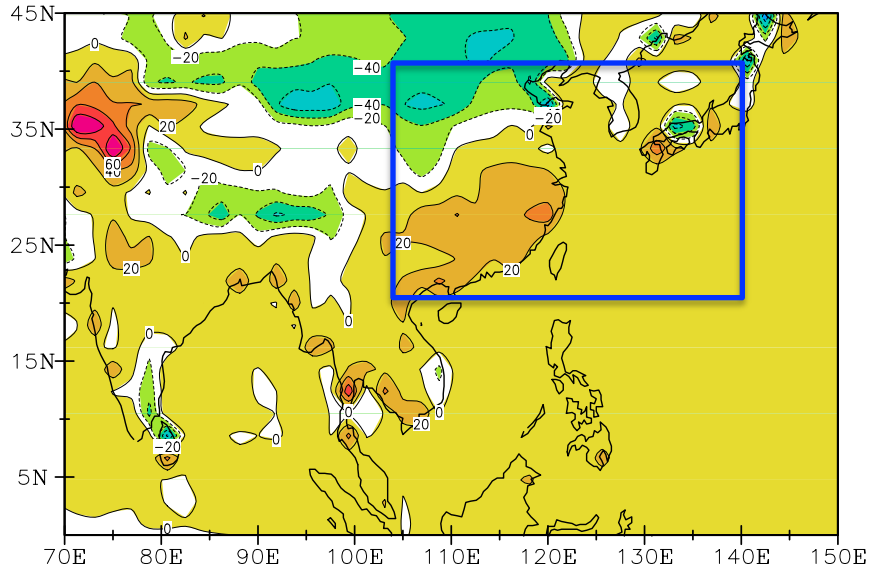


Model-observation

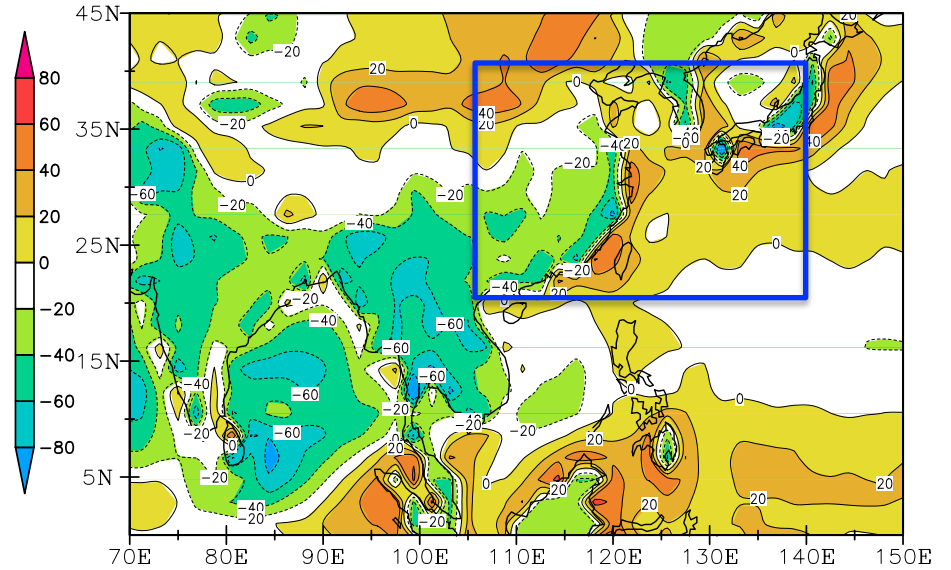


C7: Sensible heat flux and latent heat flux difference (Wm^{-2})

Sensible heat flux
Model-observation

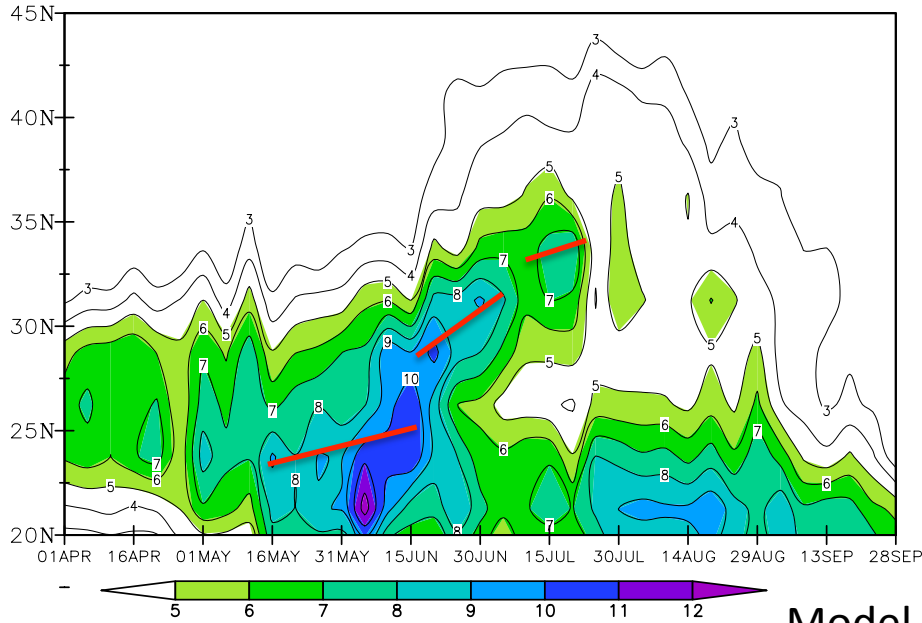


Latent heat flux
Model-observation

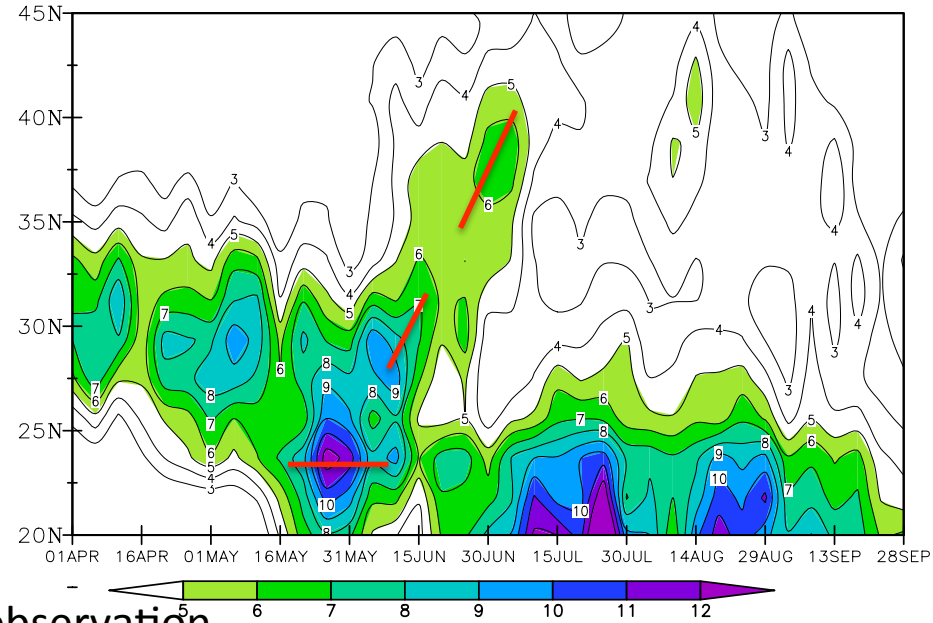


C8: Annual cycle of precipitation rate over eastern China (110 -120 °E)

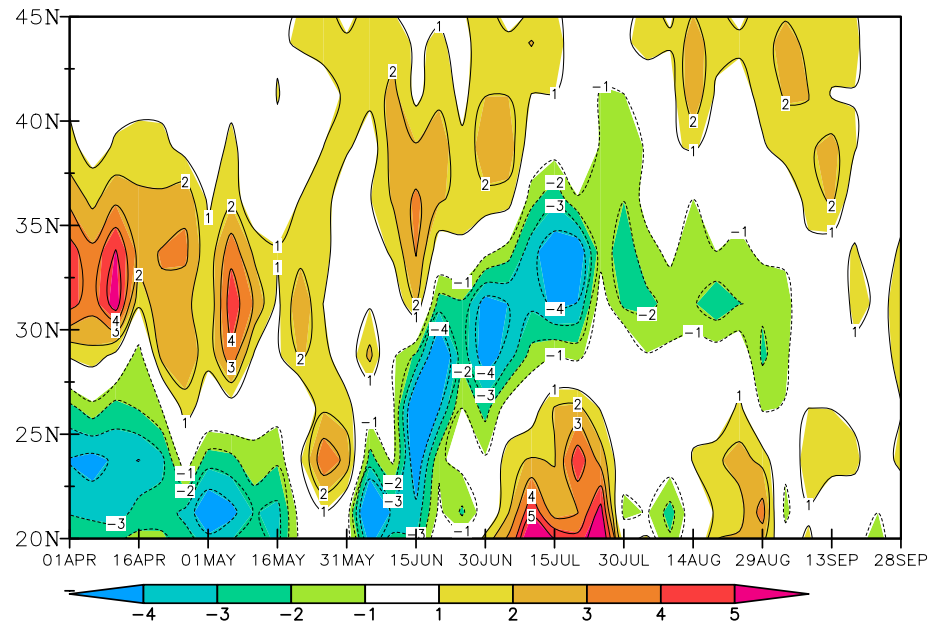
GPCP



SP-CCSM4

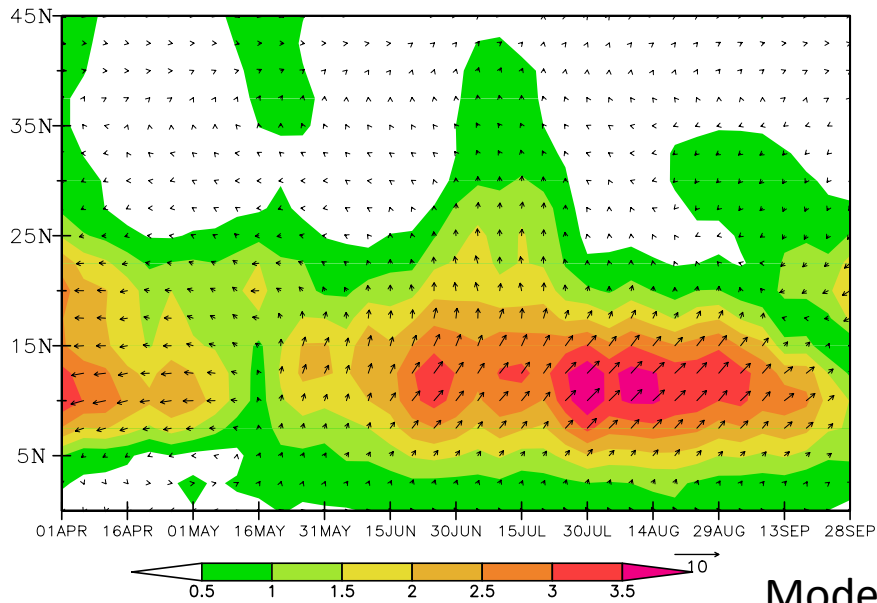


Model-observation

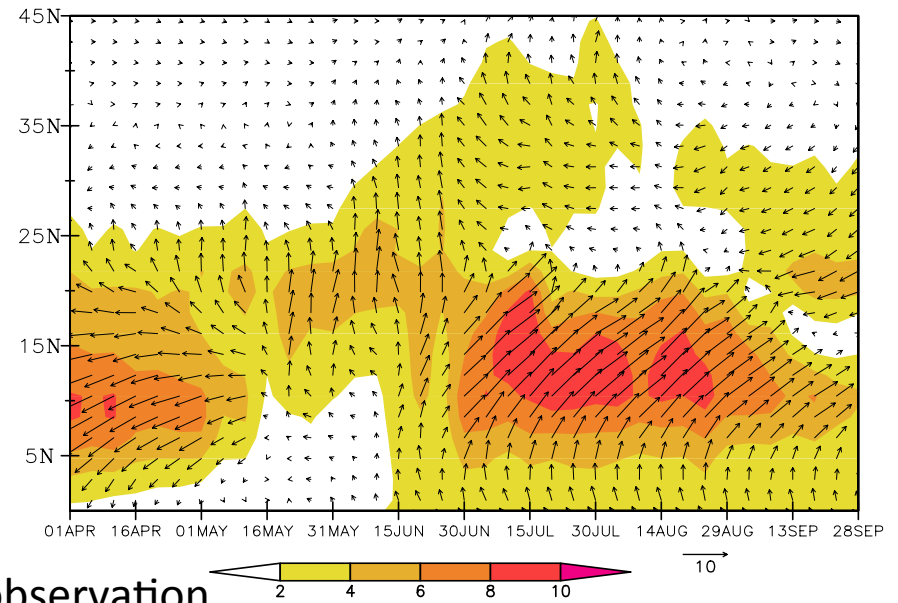


C9: Annual cycle of 850hPa moisture transport over eastern China (110 -120 °E)

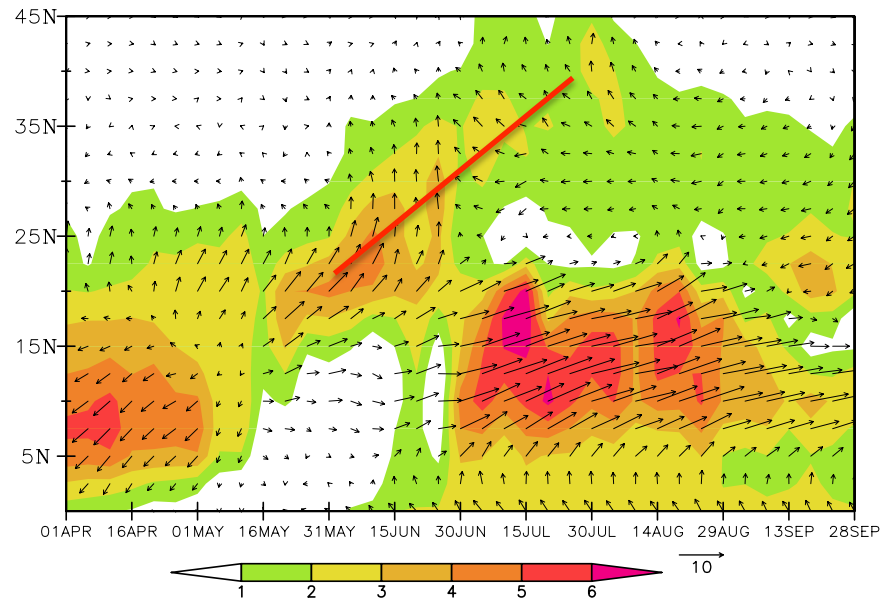
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SP-CCSM4

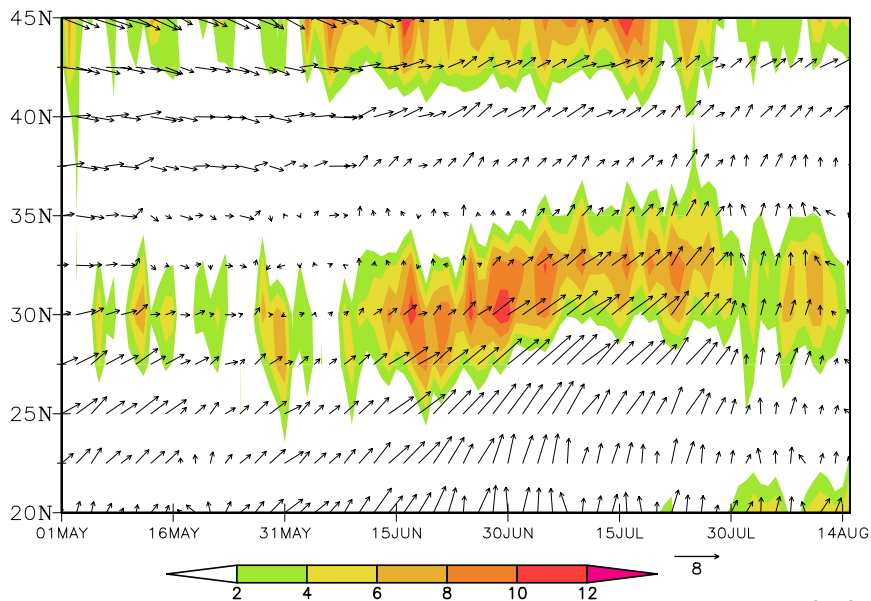


Model-observation

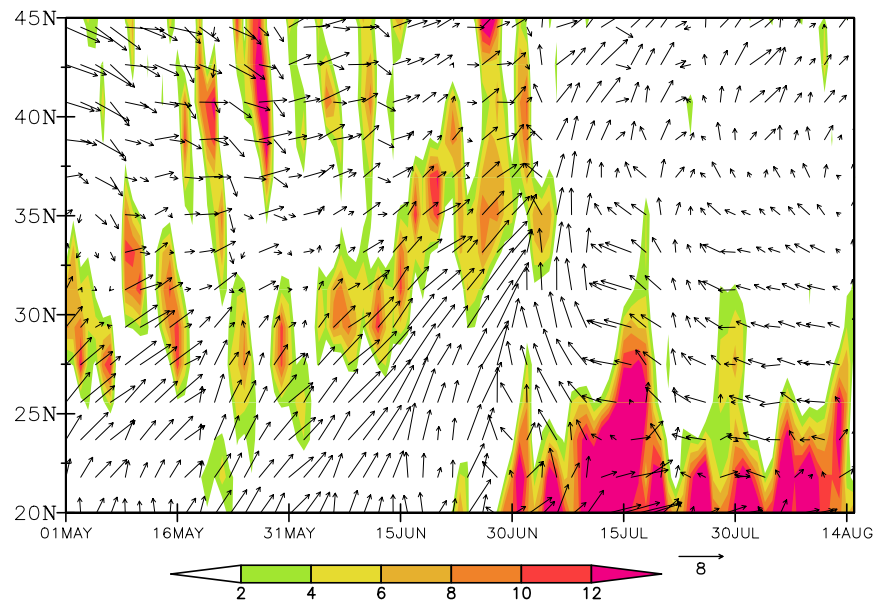


C11: Daily 850hPa wind & vorticity ($10^{-4}s^{-1}$)

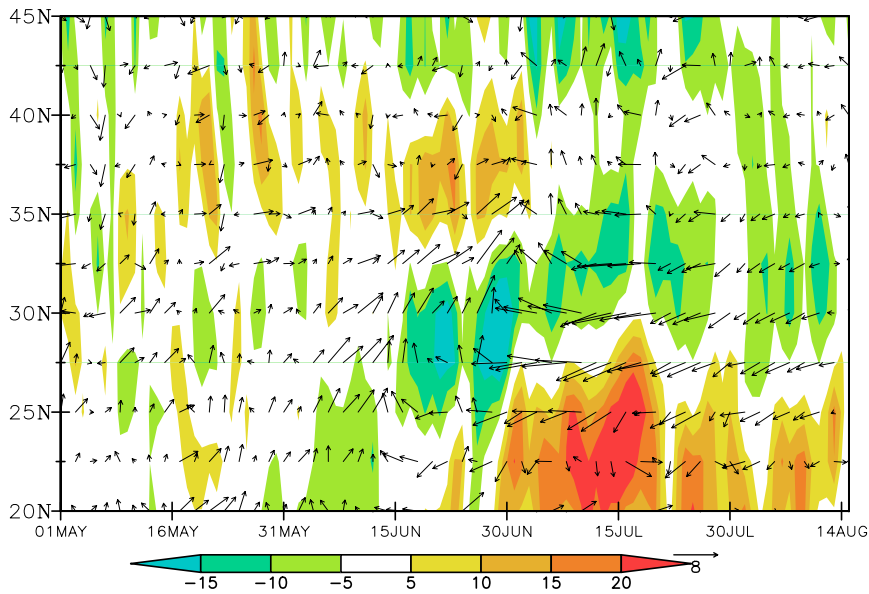
NCEP



SP-CCSM4



Model-observation



D. Conclusions:

1: SP-CCSM simulates EASM well, both JJA mean and monsoon rain belt march over Eastern China.

2: The main difference includes:

- >less precipitation over monsoon region;
- >less moisture transport to the monsoon region;
- >weaker ascending motion in the monsoon region;
- >weakened subtropical high over Western North Pacific;
- >increased sensible heat flux and decreased latent heat flux;
- >shorter Meiyu season over Southeast China and further northward shift of the rain belt.

E. Future work

1. The intraseasonal variability of EASM and its mechanisms.
2. EASM change under the global warming scenario.

Thank you