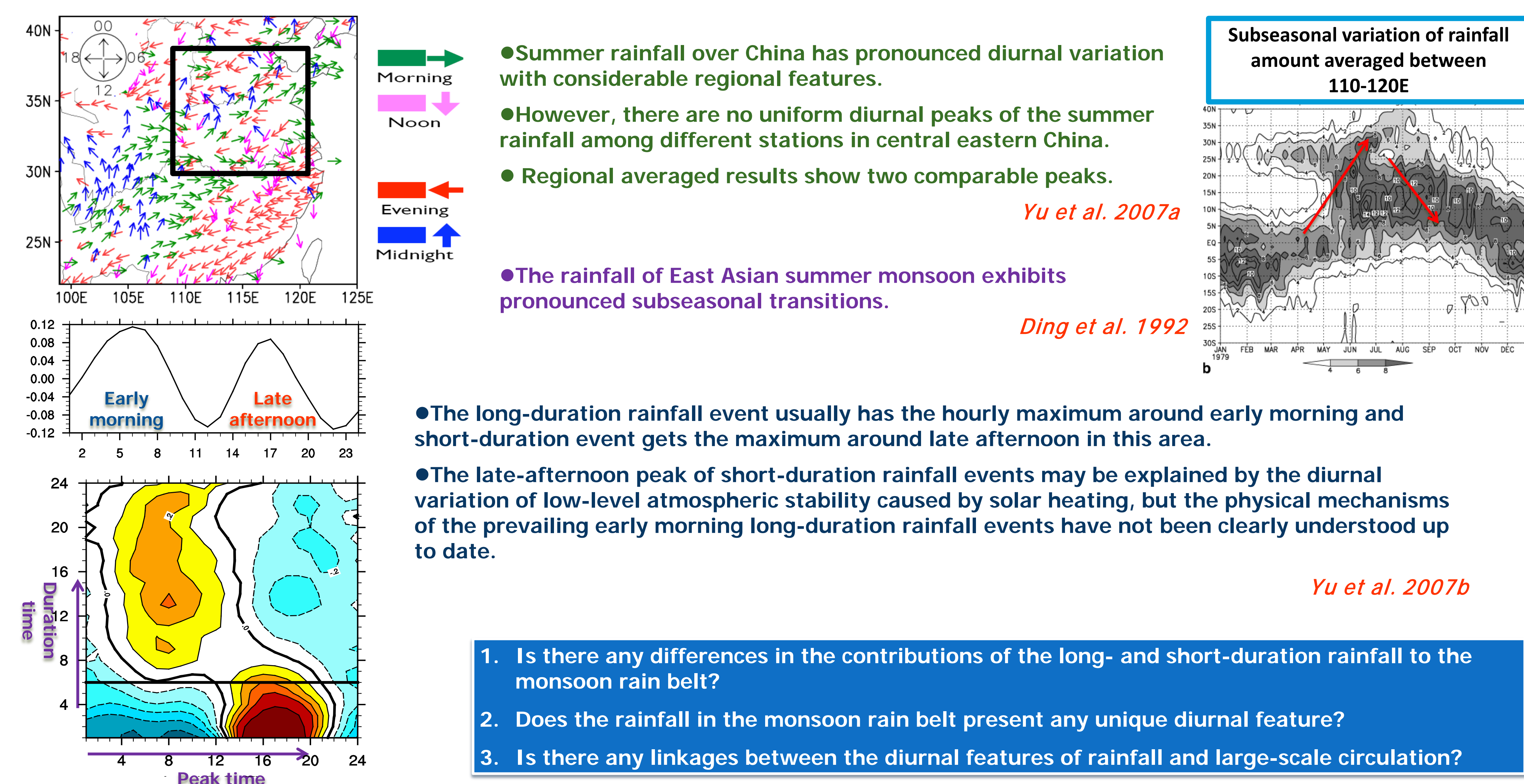


# Subseasonal characteristics of diurnal variation in summer monsoon rainfall over central eastern China

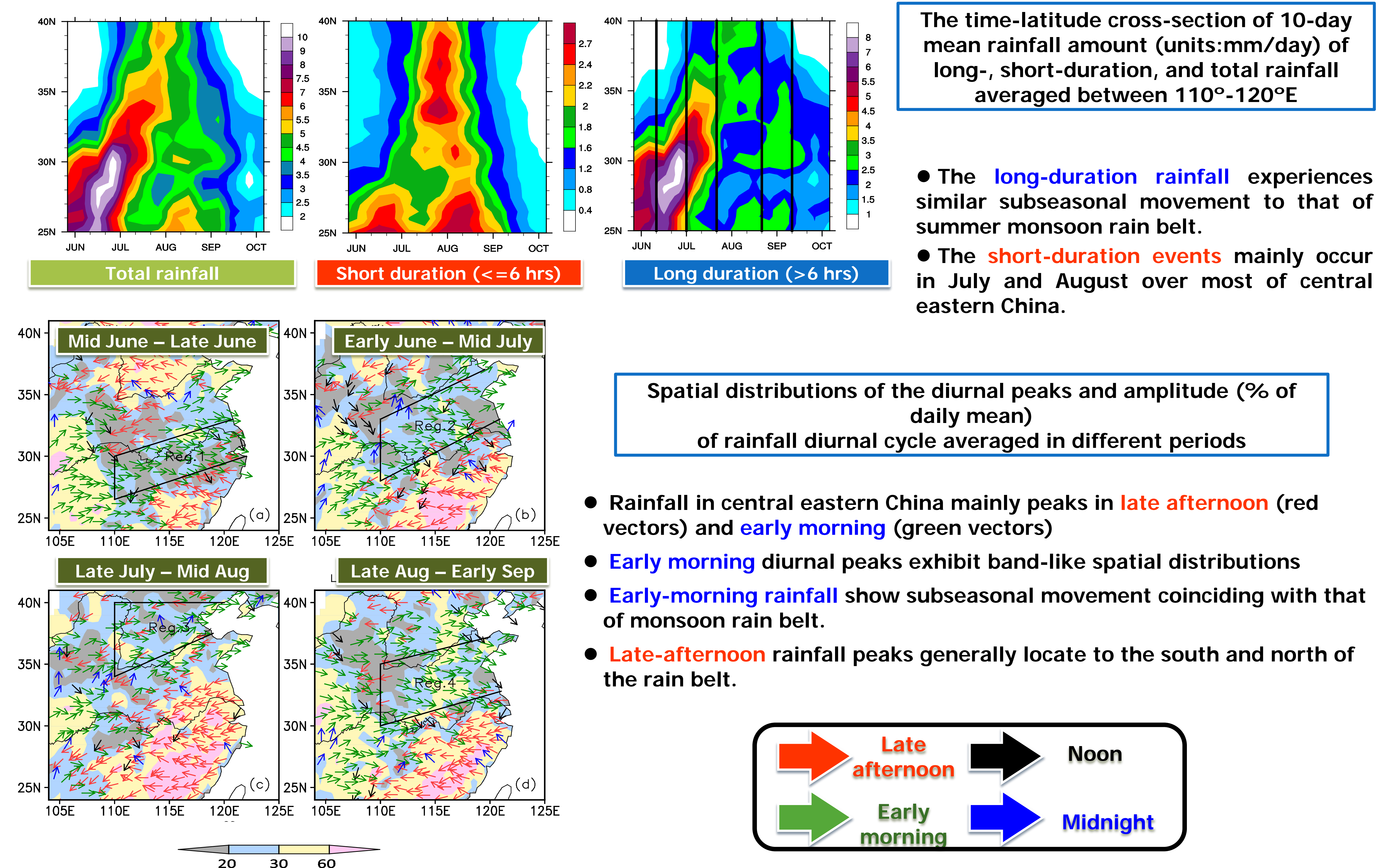
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## Introduction

Diurnal cycle of precipitation is an important aspect of regional climate. The regular occurrence of precipitation at a particular time of the day is connected with both regional and large-scale dynamical and thermal conditions.



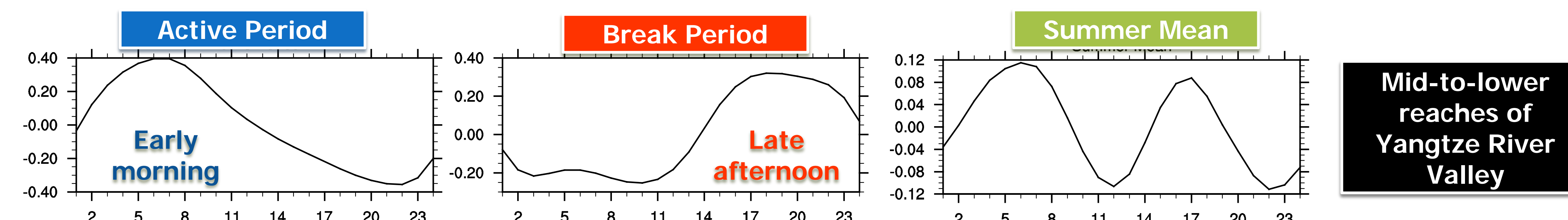
## Linkage of long-duration rainfall and early morning rainfall with monsoon rain belt



## Diurnal features in the active and break monsoon period

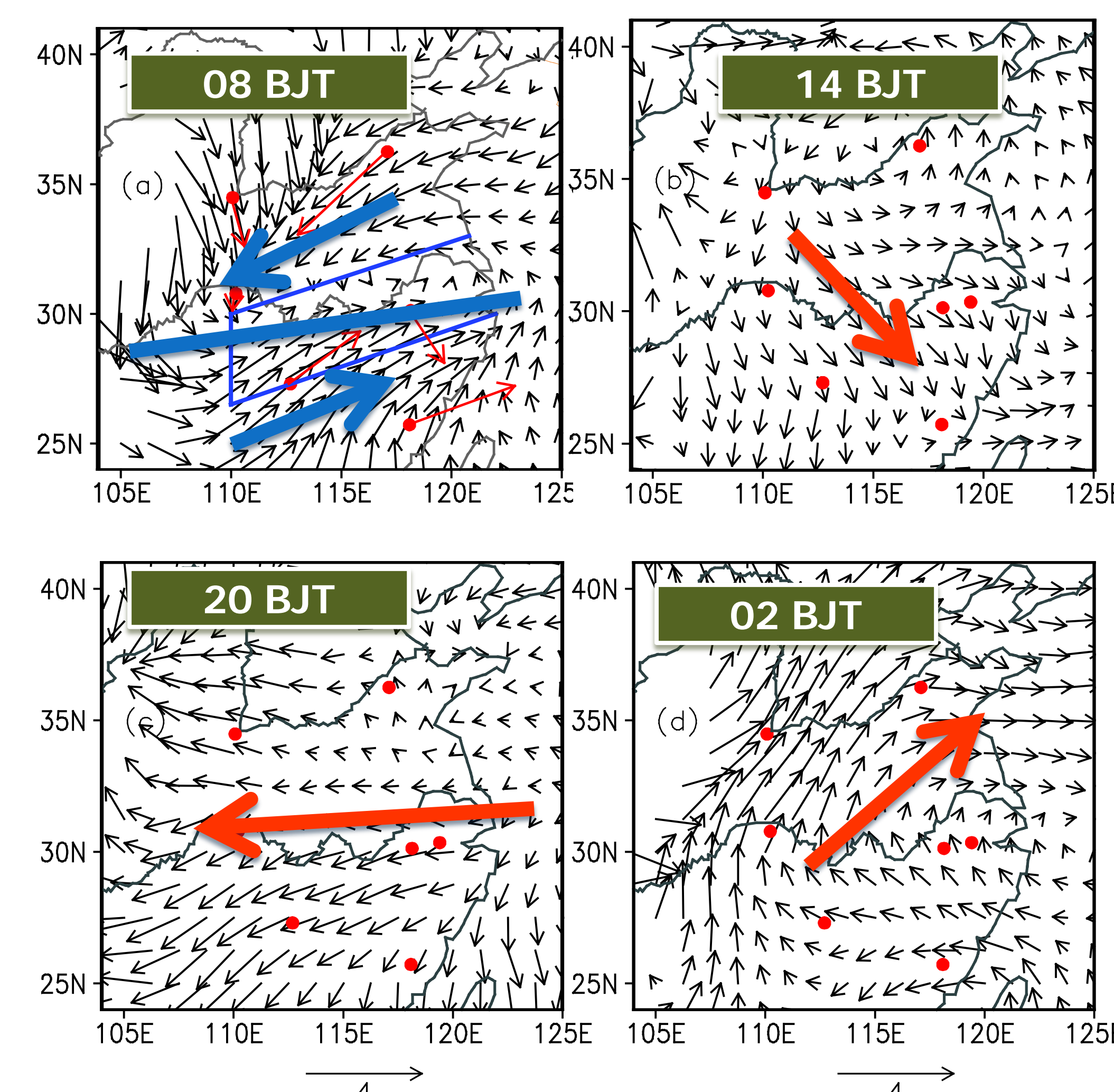
**Active monsoon period:** the time period when the summer monsoon rainfall belt locates in the target region.

**Break monsoon period:** the time period when the monsoon rainfall belt moves out of the target region



- During the **active period**, monsoon rainfall is dominated by the **long-duration** events with **early-morning** diurnal peak.
- During the **break period**, monsoon rainfall is dominated by **shorter duration** events with **late-afternoon** diurnal peak.
- The different diurnal variation of monsoon rainfall between the **active** and **break** monsoon periods can explain the two comparable diurnal peaks averaged in summer central eastern China.

Wind anomaly @850 hPa in **active monsoon period** (minus summer mean) of JRA25 reanalysis



Active period at 08 BJT:

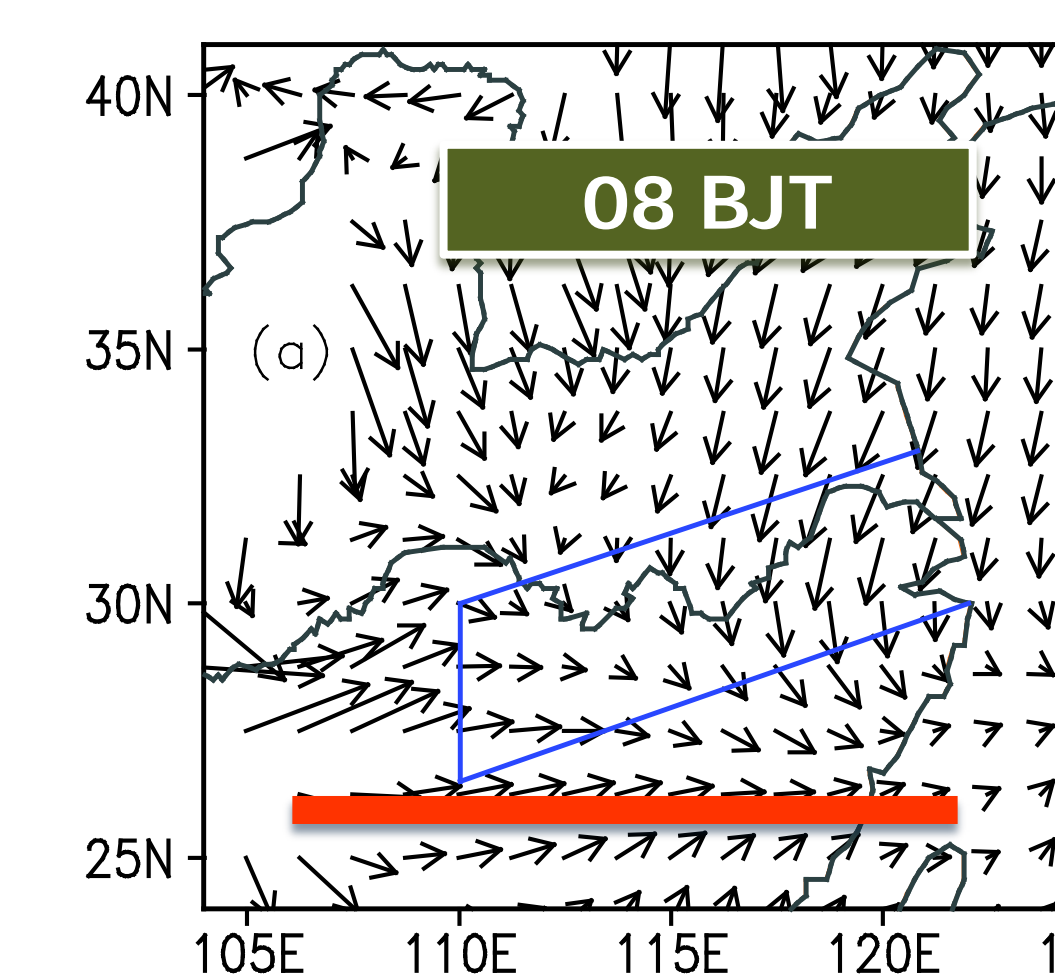
- Southwesterly anomalies over southern China and northeasterly ones over the north of Yangtze River Valley
- The combination of the cyclonic vorticity and enhanced moisture transported by the southwesterly provides a favorable environment for the nocturnal rainfall systems to develop and maximize in the early morning.

Active period at

- 14 BJT: northerly
- 20 BJT: easterly
- 02 BJT: southeasterly

dominant the area of monsoon rain belt

Wind anomaly of **break monsoon period** 08 BJT



Break period at 08 BJT:

- The convergence locate at the south to the monsoon rain belt.

## Summary

1. The **long-duration rainfall** experiences similar subseasonal movement to that of summer monsoon rain belt. The **short-duration events** mainly occur in July and August over most of central eastern China.
2. The **early-morning rainfall** shows subseasonal movement coinciding with that of monsoon rain belt. The **late-afternoon** rainfall peaks generally locate to the south and north of the rain belt.
3. Rainfall at different latitudes of central eastern China exhibits similar diurnal features when partitioned into **active** and **break** periods. During the **active** period, monsoon rainfall is dominated by the **long-duration** events with **early-morning** diurnal peak. During the **break** period, monsoon rainfall is dominated by **shorter duration** events with **late-afternoon** diurnal peak.
4. The different diurnal variation of monsoon rainfall between the **active** and **break** monsoon periods can explain the two comparable diurnal peaks averaged in summer central eastern China.

Yuan, W., R. Yu, H. Chen, J. Li, and M. Zhang, 2010: Subseasonal Characteristics of Diurnal Variation in Summer Monsoon Rainfall over Central Eastern China. *Journal of Climate*, 23, 6684-6695.

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