Seasonal variation of the errors in an objective analysis over Vietnam area

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ALERA dataset

(AFES-LETKF experimental ensemble reanalysis dataset)

- generated by analysis cycles using a system composed of 40-memer ensemble forecast with AGCM for the Earth Simulator (AFES, *Ofuchi et al. 2004*) at T159/L48 resolution.
- Observational data excluding satellite radiances are assimilated using the local ensemble transform Kalman filter (LETKF, *Miyoshi and Yamane, 2007*).
- provides analysis value (ensemble mean) and error value (ensemble spread) at each grid point.

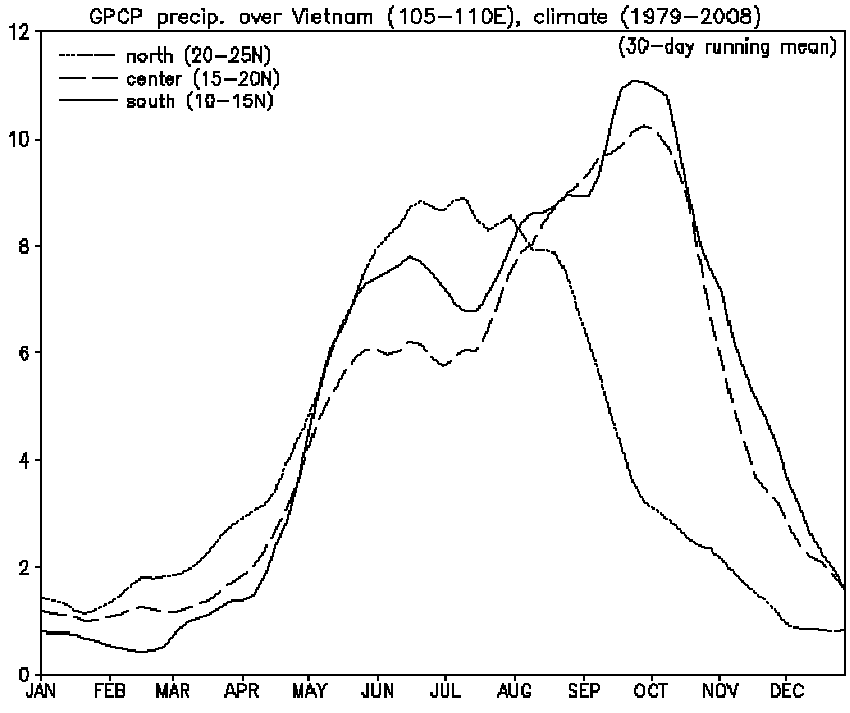
ALERA dataset

(AFES-LETKF experimental ensemble reanalysis dataset)

- Variables: Winds (u, v m/s), temperature (T K), dew point depression (T-Td K), geopotential height (z m) and sea-level pressure (slp hPa)
- Levels: 1000, 925, 850, 700, 600, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10 (17 levels)
- Horizontal resolution: 1.25° ×1.25° (288×145 points)
- From 1 May 2005 to 10 Jan 2007
- Original 6 hourly snapshots and daily-, pentad- and monthly-means

(http://www.jamstec.go.jp/esc/afes/)

Vietnam

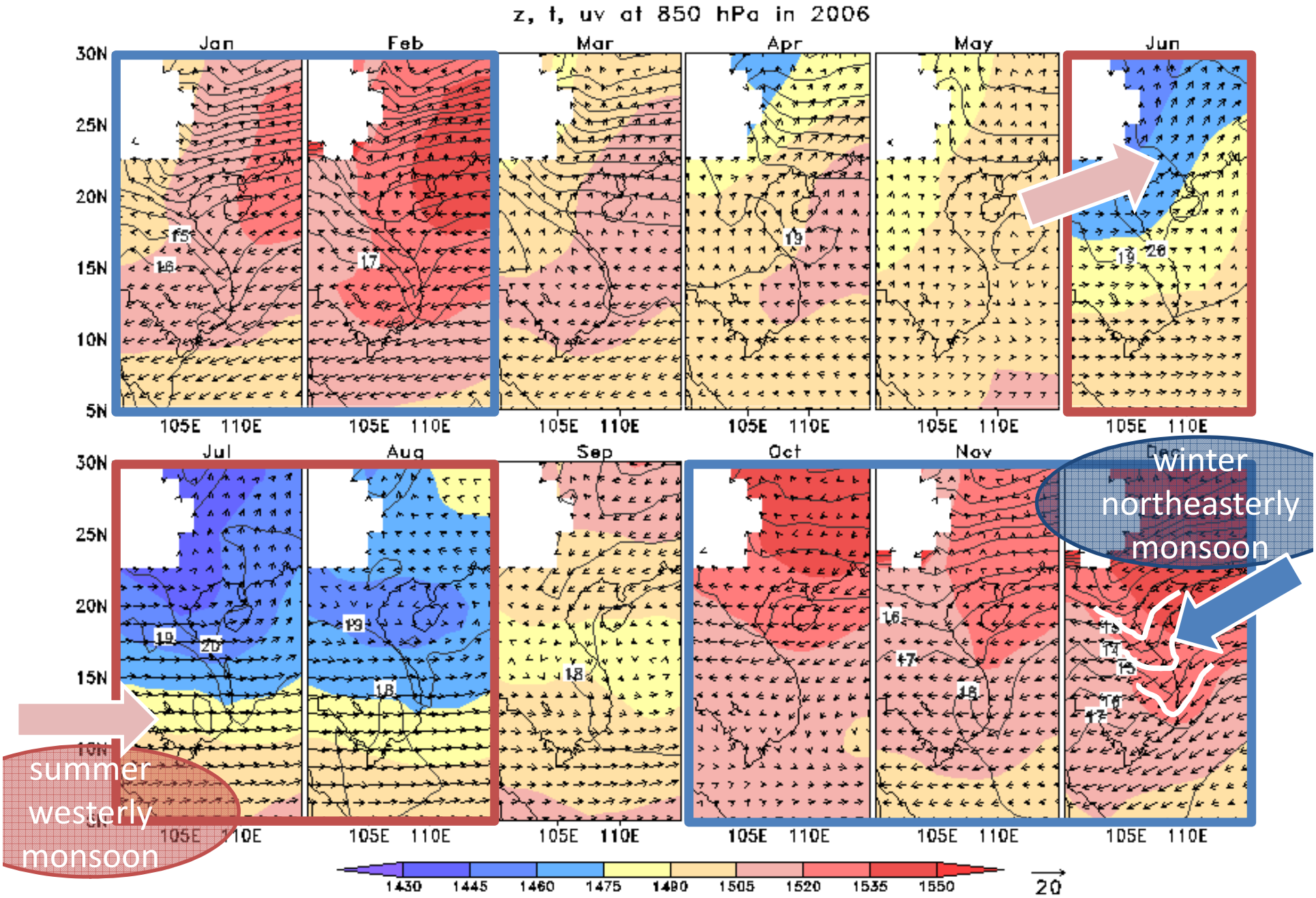


- Main rainy season is Sep.-Oct. in the east coastal area
- Precipitation maximum also appear in summer in the inland areas
- Vietnam area strongly dominated by both the summer westerly monsoon and the winter northeasterly monsoon

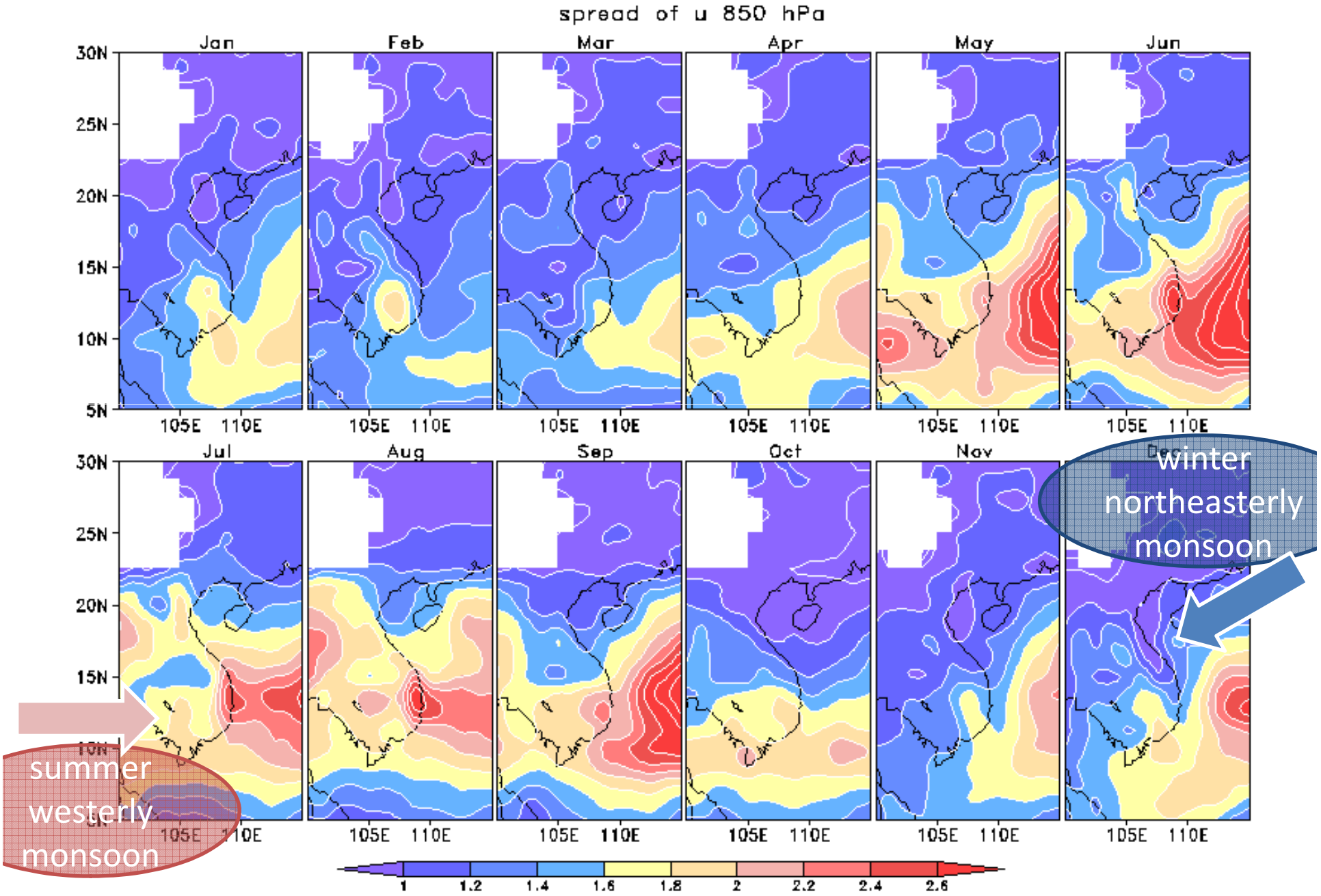
Objective

- seasonal variation of the errors in an objective analysis (ALERA dataset) over Vietnam area.
- The variation of analysis error related to the summer and winter monsoon flows and precipitation over Vietnam area.

Seasonal variation of the synoptic atmospheric field

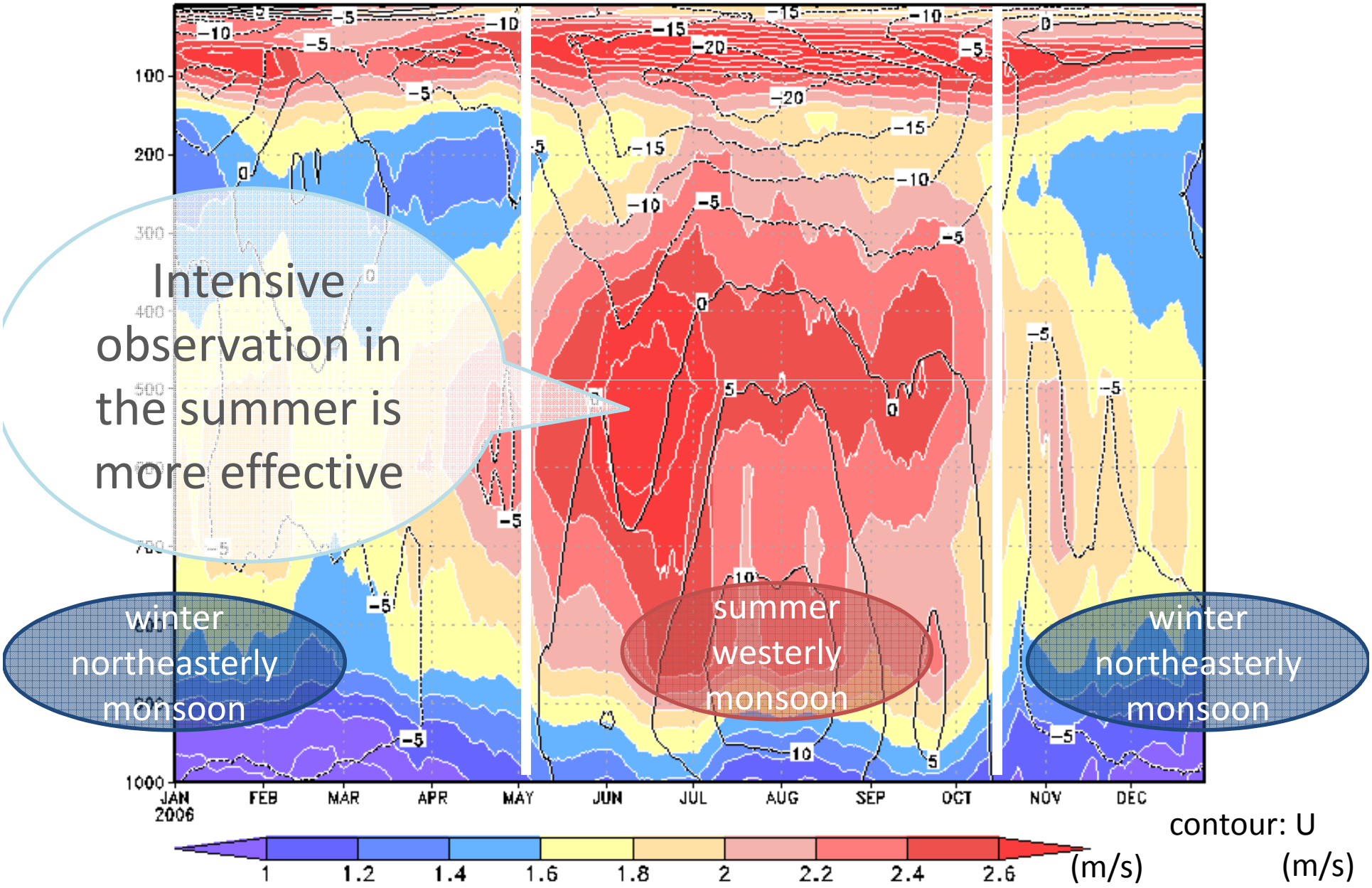


Seasonal variation of the analysis error of zonal wind speed

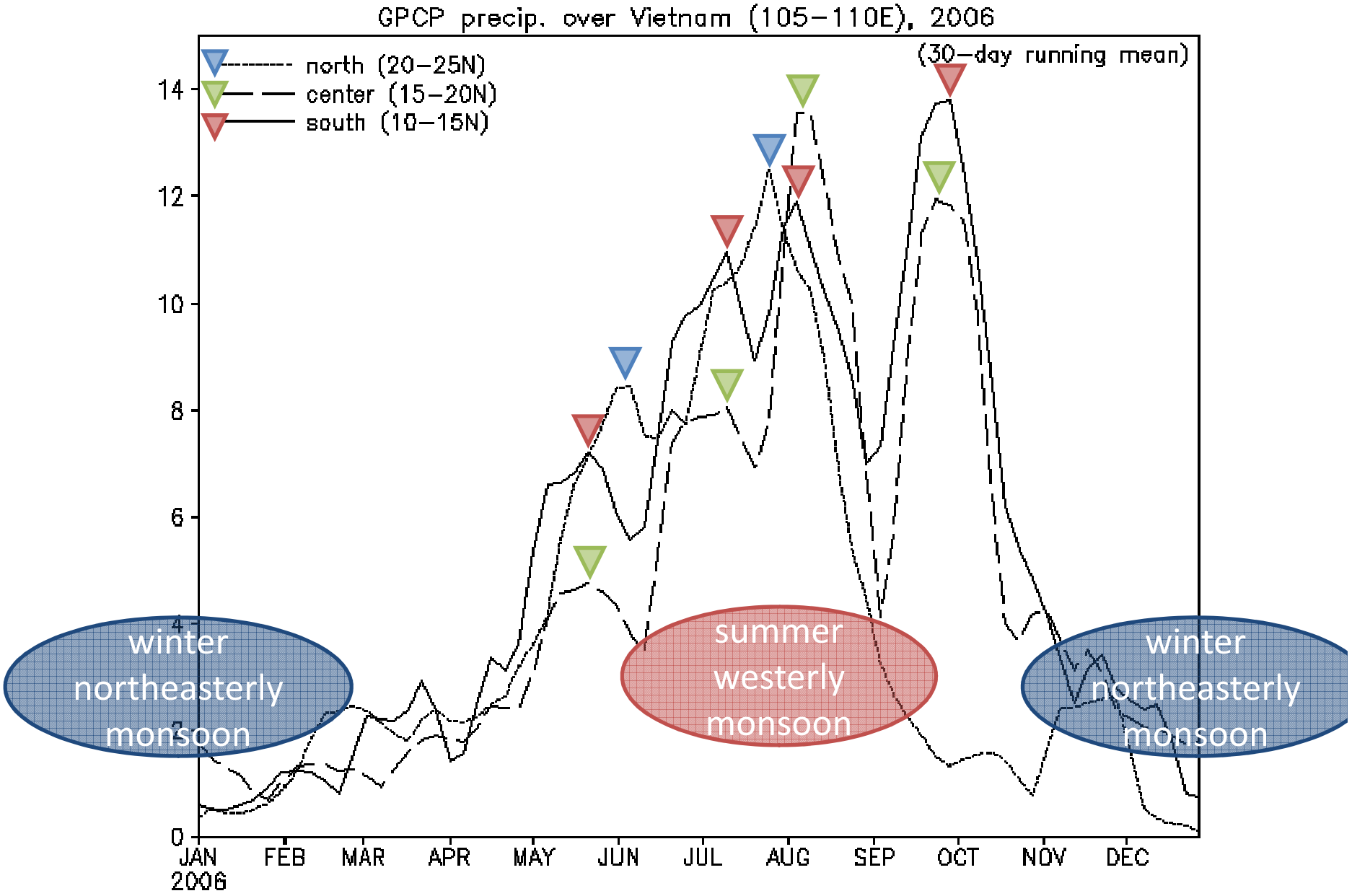


Seasonal variation of the analysis error of zonal wind speed

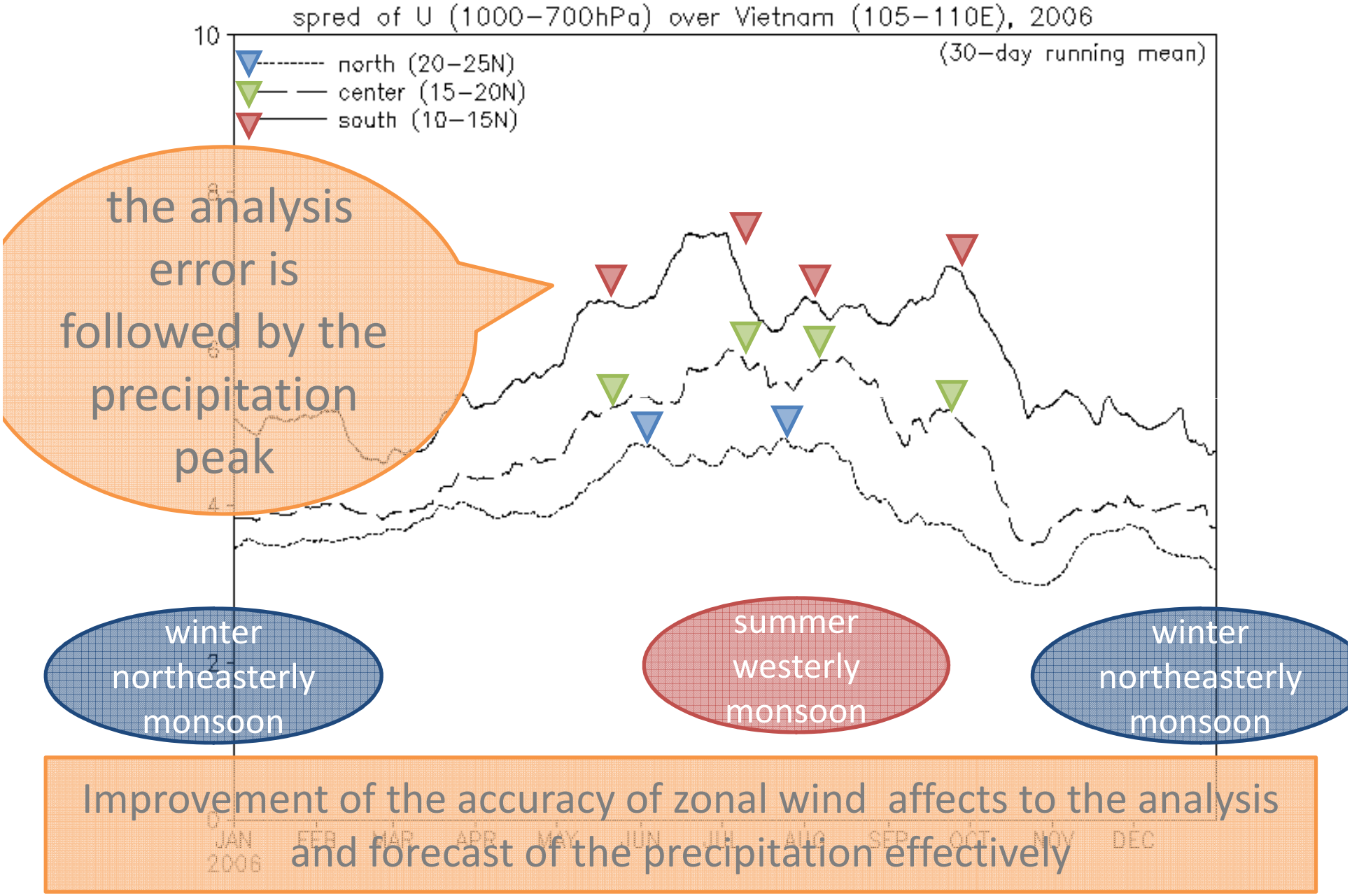
30-day running mean in the southern Vietnam (10-15°N, 107.5-110°E)



Seasonal variation of the precipitation in 2006



Seasonal variation of the analysis error of zonal wind speed



Summary

- Through the year, the accuracy of the objective analysis over the northern Vietnam is significantly higher than that over the southern Vietnam.
- The error of the summer westerly monsoon is larger than that of the winter northeasterly monsoon.

The analysis (forecast) of the summer westerly monsoon in subtropics is more difficult than that of the winter northeasterly monsoon originating from the mid-latitudes

- The analysis error in the southern Vietnam (south of 15N) increases especially in June and September in 2006.

Summary

- Accordingly, it is suggested that adding observations in the **middle and lower layers** in **boreal summer** over the **southern Vietnam** are more effective in the consideration of the future operational observation strategy.

Precipitation at the observational Station