

# Satellite Impact on the Analysis of Southern Hemisphere Blocking Climatology and Variability



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## Purpose

In this study, we aim to

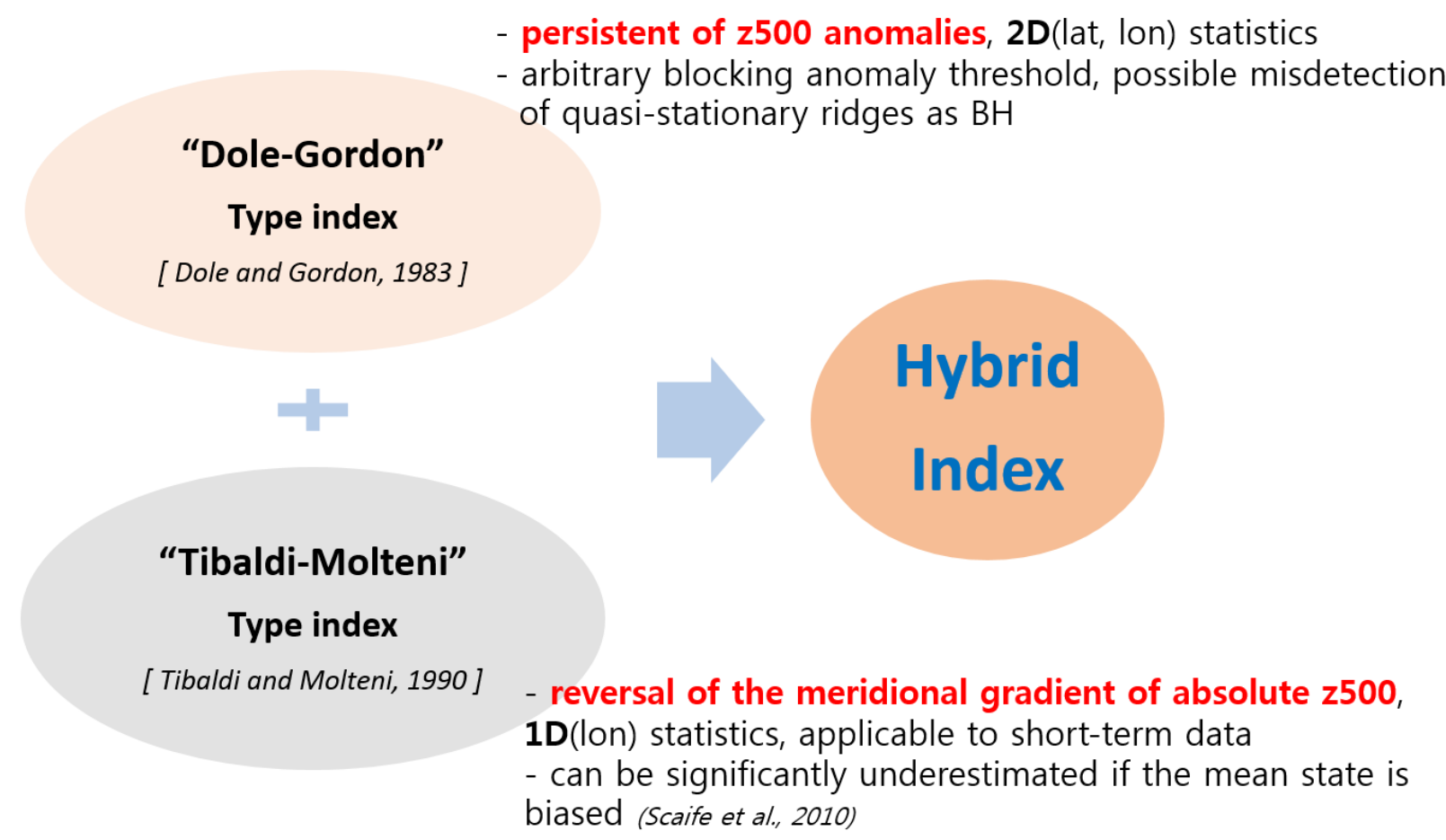
- examine the main characteristics of 32-year climatology of SH blocking frequency derived from four different modern reanalysis data sets.
- evaluate the influence of satellite data assimilation on the analysis of SH blocking frequency statistics by comparing with blocking statistics from JRA 55C reanalysis.

## Data and Methods

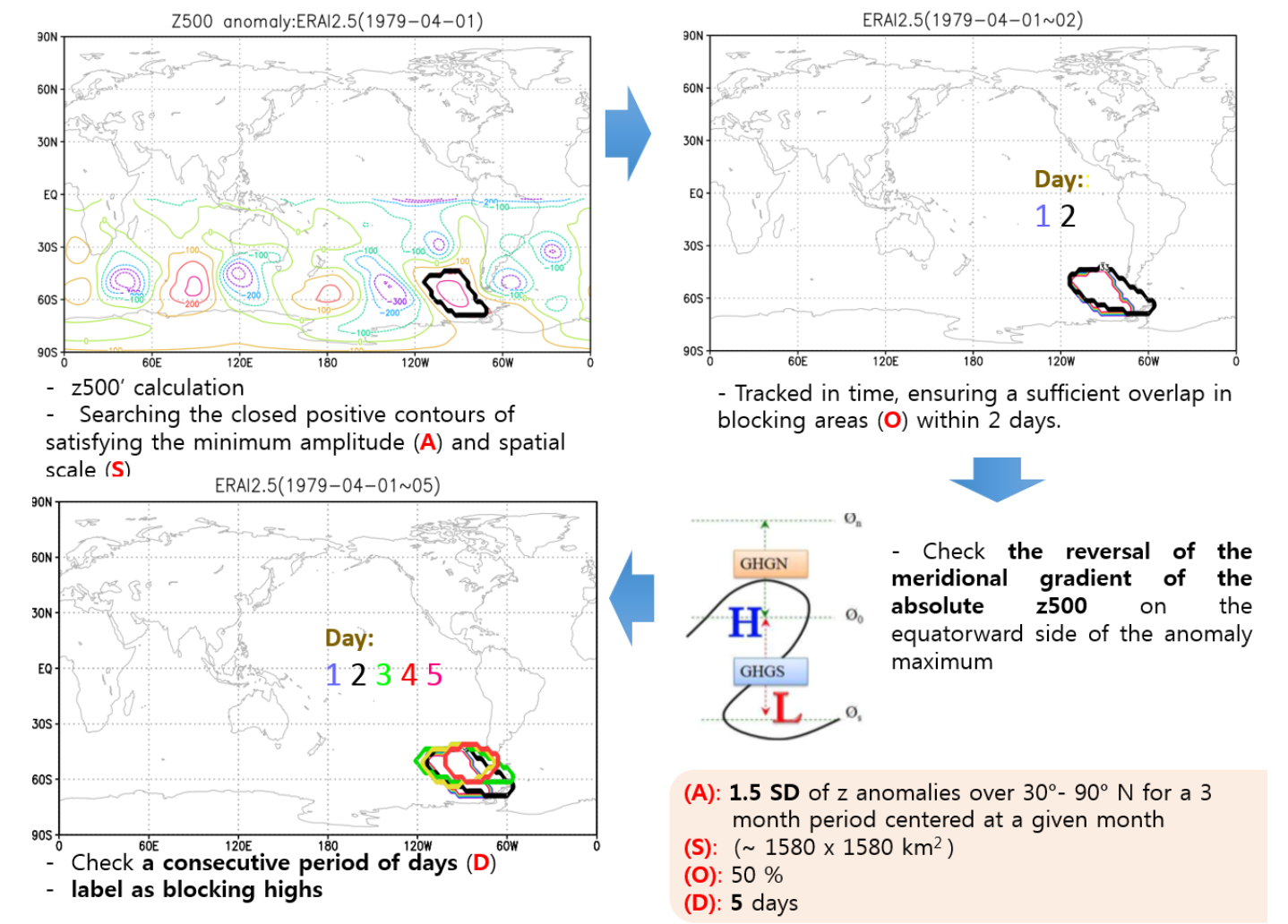
### Used data

- Period: 1979 ~ 2010 (32 years)
- Data: geopotential height (500hPa), daily mean, resolution: 2.5 x 2.5
  - NCEP/NCAR Reanalysis data
  - ERA-Interim data
  - MERRA (Modern-Era Retrospective Analysis for Research and Applications) data
  - CFSR (The Climate Forecast System Reanalysis) data
  - JRA-55 (Japanese 55-year Reanalysis) data

### Used blocking index: Hybrid index



### Blocking detection process



## RESULTS

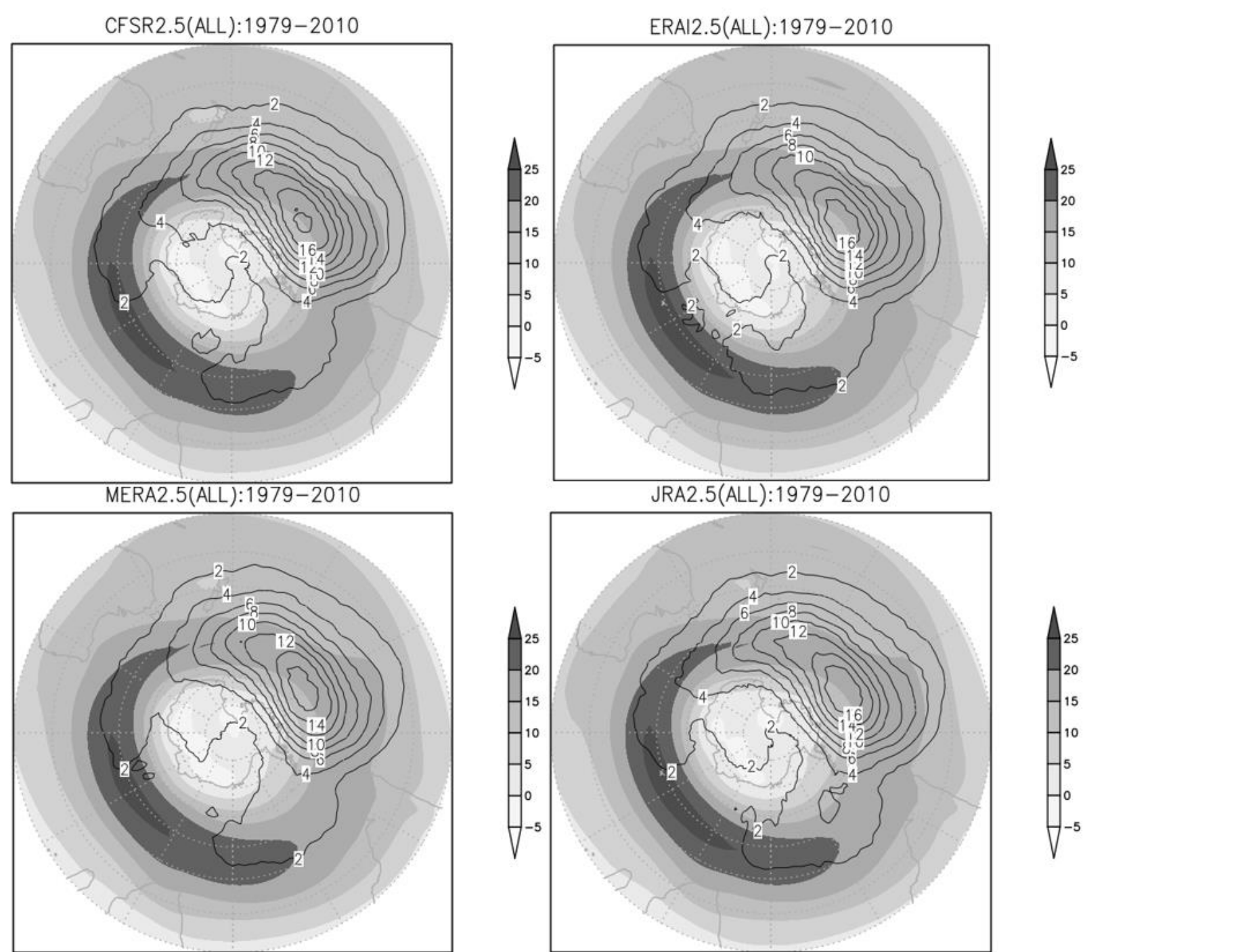


Figure 1. Climatology of annual mean blocking frequency in Southern Hemisphere for CFSR, ERA-Interim, MERRA, JRA-55 reanalysis data. Units for blocking frequency is number of blocked days per year.

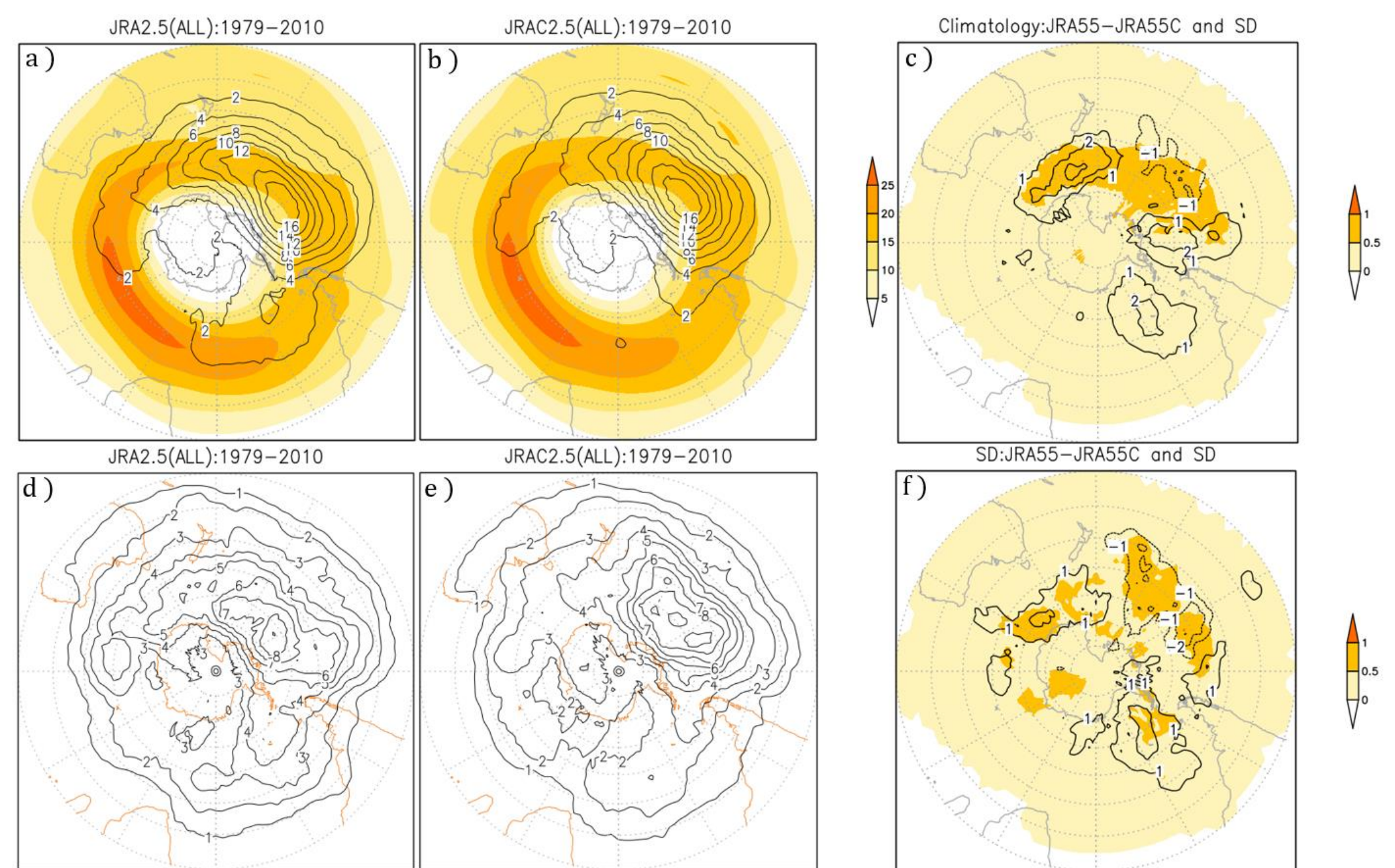


Figure 2. Climatology (top, a and b) and standard deviation (bottom, d and e) of annual mean blocking frequency in Southern Hemisphere for JRA-55 and JRA-55C data and its difference between them over the period of 1979-2010. Contour in c) and f) denote difference between a) and b) and d) and e), respectively. Shaded area in c) and f) are standard deviation of annual mean blocking frequency and standard deviation among four different modern reanalysis data (CFSR, ERA-Interim, MERRA, JRA-55). Units for blocking frequency is number of blocked days per year.

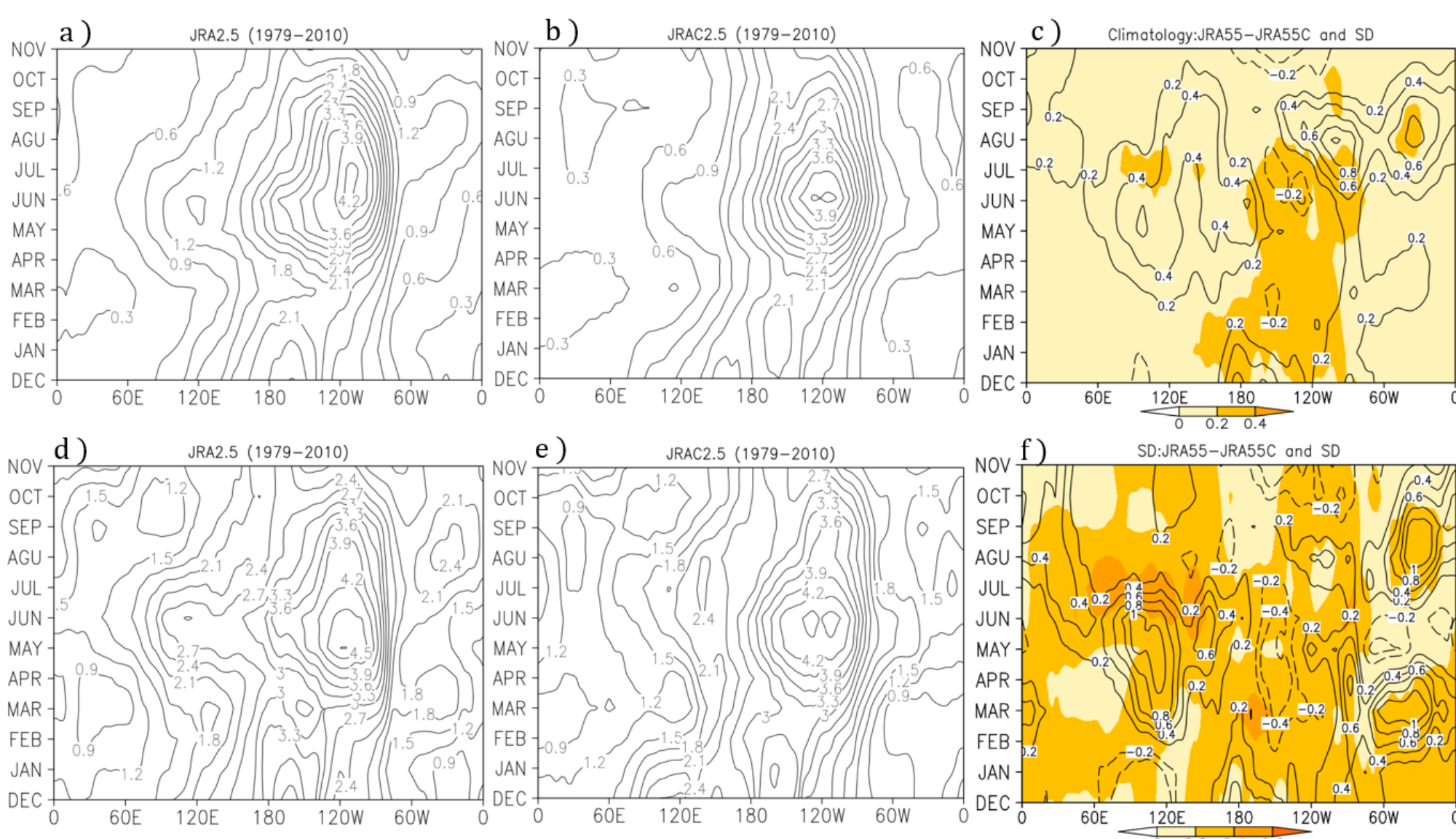


Figure 3. Seasonal cycles of blocking frequency (a and b, Units are number of blocked days per month) and standard deviation (d and e) as a function of longitude in Southern Hemisphere for JRA-55 and JRA-55C data and its difference (c and f) between them over the period of 1979-2010.

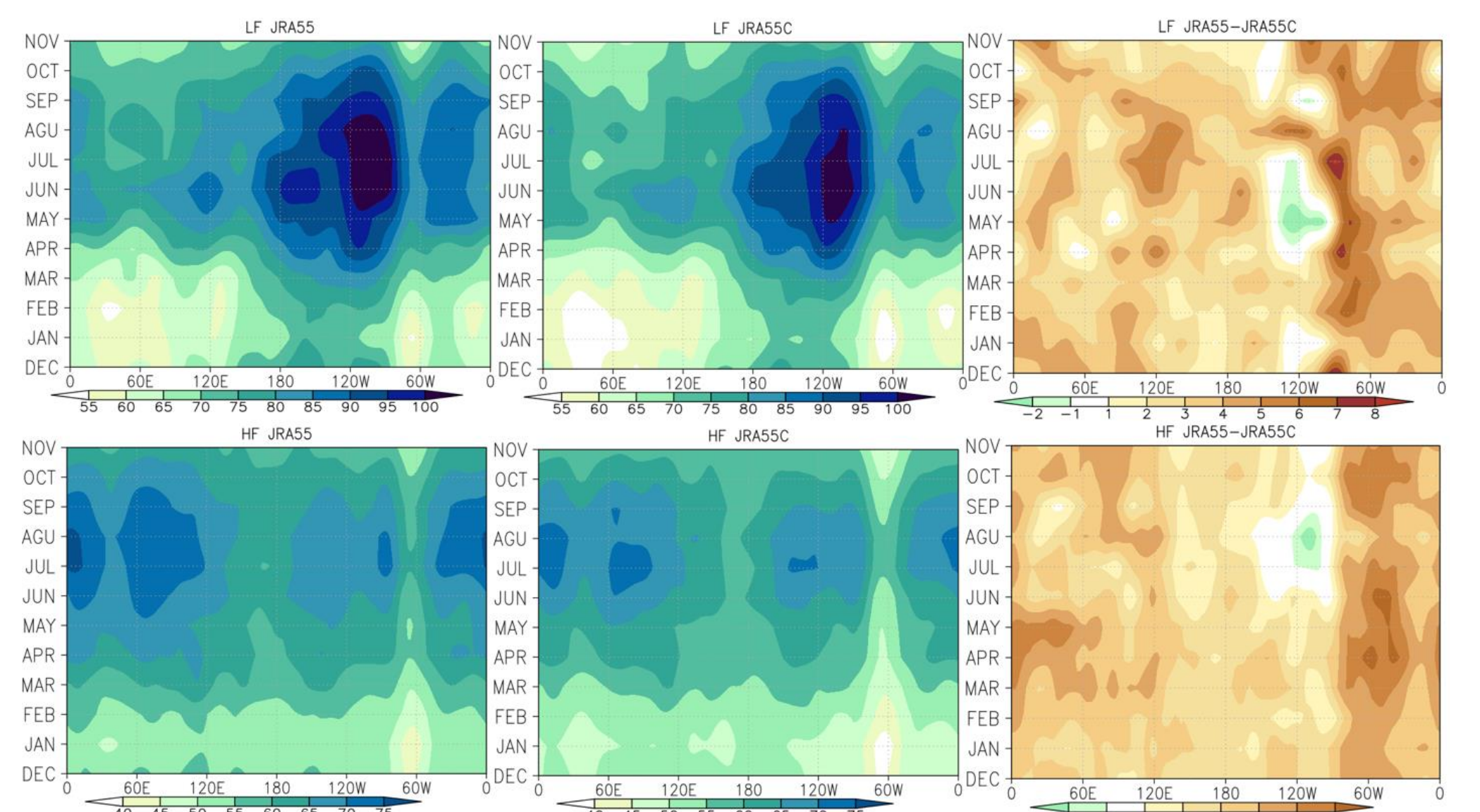


Figure 4. Seasonal cycle of low-frequency (LF: 10-90) and high frequency (HF: less than 10 days) eddies for JRA55, JRA55C and their difference