

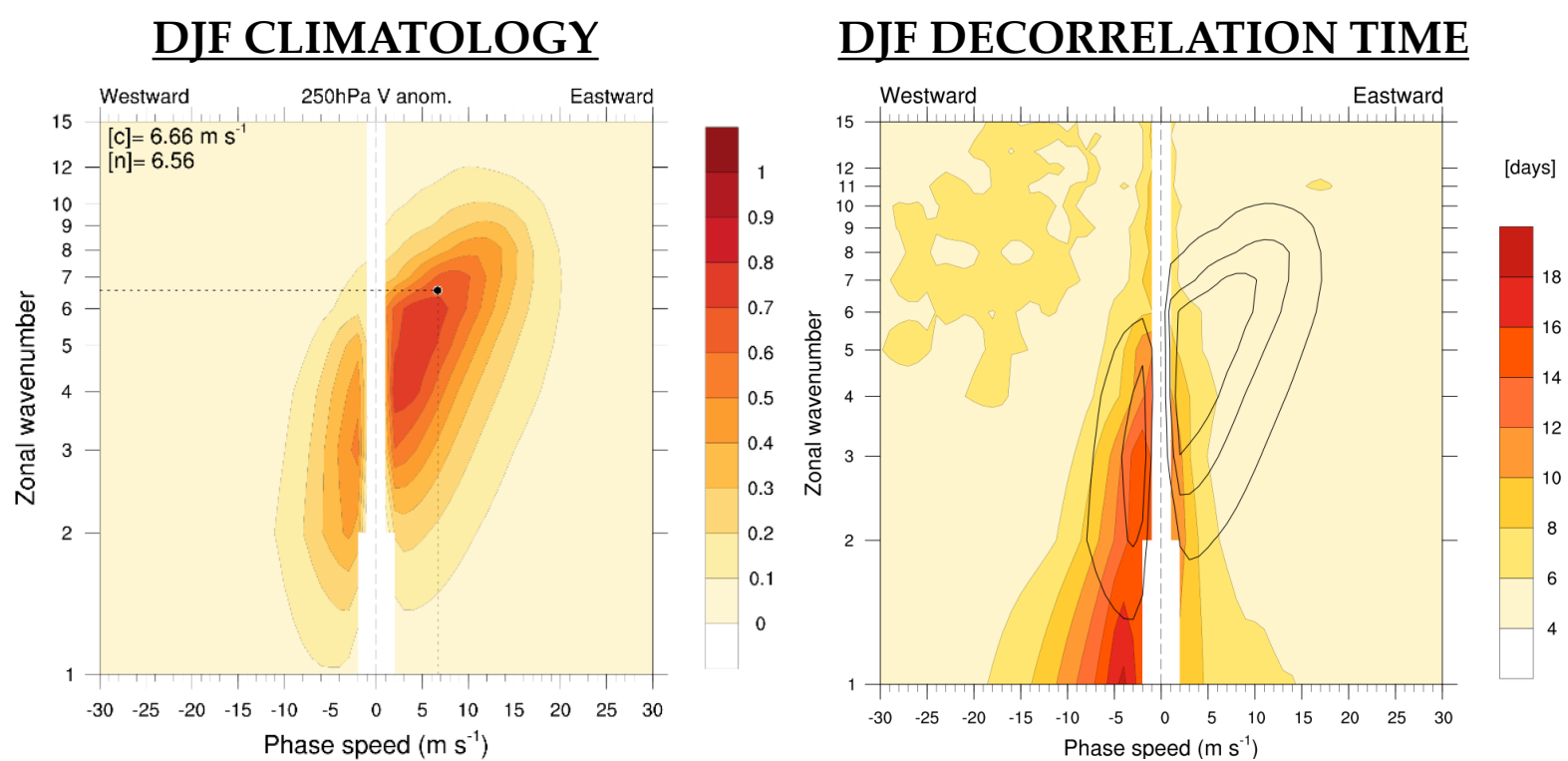
Space/time spectral analysis of atmospheric blocking

Jacopo Riboldi*, Fabio D'Andrea, Gwendal Rivière and François Lott

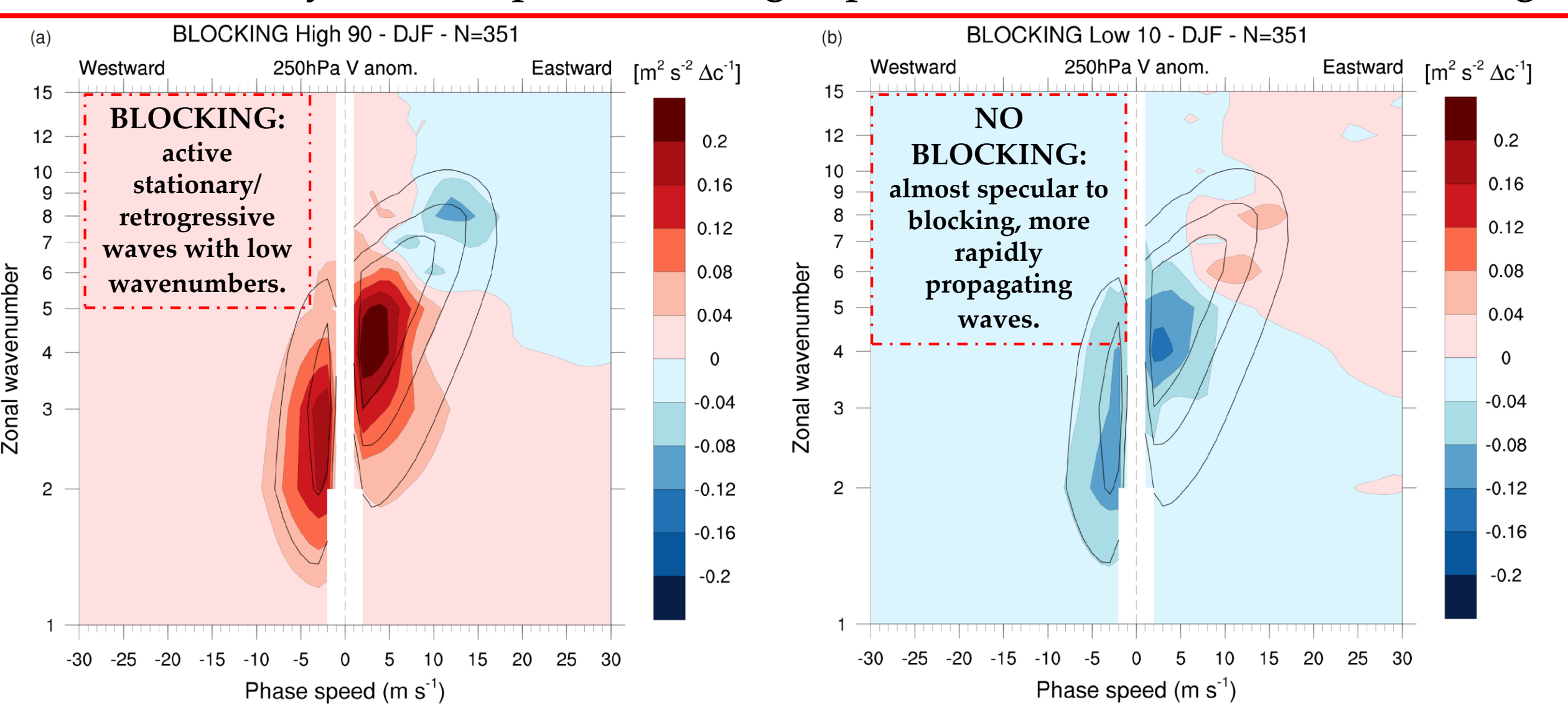
QUESTION: Does blocking exhibit a peculiar spectral signature in Rossby wave activity?

APPROACH: Spectral analysis over consecutive, overlapping 61-days time intervals → “a spectrum a day”. Decomposition of midlatitude flow over a basis of zonally moving waves with different zonal wavenumbers and phase speeds (approach by Randel and Held 1991). Each spectrum is an average of several periodograms from latitudes between 35.25°N and 75°N.

Wavenumber/phase speed harmonics with near-zero or negative phase speed have **high decorrelation time**: once they are excited, it takes on average 10-15 days before they return to average values.
→ **Related to blocking?**



Time series of DJF daily mean blocked area over the Northern Hemisphere between 1979 and 2018: slow-moving PV anomalies (<-1.3PVU), approach by Schwierz et al. (2004). **Anomalies in days of widespread blocking (top 10% of each season) vs “no blocking”**



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Does the spectral signature depend on the chosen blocking diagnostics?
YES, although not substantially!

Does the spectral signature differ for blocking over the Atlantic or the Pacific?
YES, Atlantic blocking has stronger anomalies

[jriboldi.github.io/BW2021](https://github.com/jriboldi/BW2021)
(pw: bw2021)