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Comment on wcd-2021-59

Nili Harnik (Editor)

Editor comment on "Circumglobal Rossby wave patterns during boreal winter highlighted by space–time spectral analysis" by Jacopo Riboldi et al., Weather Clim. Dynam. Discuss., https://doi.org/10.5194/wcd-2021-59-EC1, 2021

I would like to add another comment to those raised by the reviewers:

The authors discuss in their introduction, among other things the Circumglobal Teleconnection Patterns (CTP) of Branstator (2002), as well as quasi resonant modes, both of which are stationary circumglobal wave trains. In the context of extreme events the stationarity is often a major factor in increasing the impact on a given location. In addition, the CTPs are diagnosed using monthly mean wind anomalies (Branstator et al, 2002), but it has been shown that on daily time scales they are comprised of localized wave packets with a near-zero phase speed but non zero group speed so that when averaging over a whole month they yield a stationary circumbglobal wave anomaly (c.f. Harnik et al, 2016 and some references therien).

On the other hand, the analysis (by construction) finds non-stationary waves with slow, but non zero phase speeds. While the phase speeds found are slow, on the order of 5m/sec. this means a propagation of around 3000 km in a week, which is much more than is found for the CTPs (see Harnik et al, 2016). Given this, is it possible that the main patterns found are not the CTPs defined by Branstator nor the waves studies in the quasi-resonance papers, but rather they are slow eastward propagating, zonally elongated wave trains?

Harnik, N., G. Messori, R. Caballero, and S. B. Feldstein (2016), The Circumglobal North American wave pattern and its relation to cold events in eastern North America, Geophys. Res. Lett., 43, 11,015–11,023, doi:10.1002/2016GL070760.