

## ***Interactive comment on “Atmospheric teleconnections between the Arctic and the Baltic Sea regions” by Liisi Jakobson et al.***

### **Anonymous Referee #3**

Received and published: 16 May 2017

The manuscript addresses the teleconnections between meteorological parameters of the Arctic and Southern Estonia. By means of correlations analyses the authors detected Arctic areas where meteorological parameters show significant correlations with southern Estonia. In winter, these statistical associations are stronger and related to the impact of the Arctic Oscillation (AO).

The Arctic key region and the dynamical linkages between the Arctic and mid- and lower latitudes is a main focus in the current climate research agenda. This study contributes to uncovering statistical relationships between recent Arctic near-surface changes in meteorological parameter and changes in NH mid-latitudes. Though the study does not contribute to the investigation of potential linkage mechanisms between the Arctic and mid- and lower latitudes, it is valuable and could be published in 'Earth System Dynamics' after major revisions addressing the following comments.

C1

#### General comments

1. The background of Arctic-midlatitude linkages and possible physical relationships between Arctic climate change and midlatitude weather and climate and the role of atmospheric teleconnections has to be described more detailed and sound.
2. All analysis are based on linear correlation analysis. To make inferences about correlations, the test of the Nullhypothesis of no correlation has been performed only. I think, this need to be expanded by, at least, including non-parametric approaches not relying on normally distribution, taking into account the reduction of degrees of freedom due to autocorrelation and also by estimating the confidence intervals of the correlation coefficients. Furthermore, Wallace and Gutzler (1981) introduced a stronger criterion than that of statistical significance to make inferences about teleconnections, namely reproducibility, which should be used here, too. Furthermore, the authors have to be careful not to overstate the results of the simple correlation analyses and have to be aware that correlation does not mean causation.
3. Having in mind the position of the centers of action of the teleconnection patterns over the North-Atlantic-Eurasian region, I suggest to include the analysis of statistical relationships with the Scandinavian and East Atlantic/West Russia patterns.
4. The analysis should be extended by including other reanalysis. The authors themselves are experts in evaluating reanalysis data over the Arctic (Jakobson, E., et al, GRL, 2012). The same issue has been studied by Lindsay et al., (JC, 2014). Based on these evaluations I suggest, that at least ERA-Interim should be studied for comparison.

#### Specific comments

- (1) Check the spelling of 'Arctic Amplification' throughout the manuscript.
- (2) Check the spelling of 'indices' throughout the manuscript.
- (3) L57: What is meant by 'cold period'

C2

- (4) L59: 'overall warming. Over which period?
- (5) L62-65: Please, give references for these statements.
- (6) L69: reference Lehmann et al., 2011 is not included in the list of references.
- (7) L107-108: I have some doubts, that detrending changes the correlations only slightly given only an area averaged value. I would like to see the correlation maps instead.
- (8) Throughout the manuscript, do not call a correlation coefficient of 0.5 as strong, it explains only 25% of variance.
- (9) L237: Though I think the results of the study are valuable, they are not very surprising nor spectacular. Please, be more cautious with your formulation.
- (10) Fig.2 to 6: Do not include the shading levels below the 95% significance level.

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Interactive comment on Earth Syst. Dynam. Discuss., doi:10.5194/esd-2017-37, 2017.