

Interactive comment on “Spatial variability and potential maximum intensity of winter storms over Europe” by Michael A. Walz and Gregor C. Leckebusch

Anonymous Referee #1

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In this paper an attempt is made to identify windstorms affecting certain regions of central and northern Europe with the aid of ECMWF operational seasonal forecast system 4, consisting of 51 members of retrospective forecasts each resemble an artificial reality until November 2017. The paper presents some scientific interest, considering previous related work. More specifically I have some major scientific queries:

1. I cannot understand the advantage of employing ECMWF operational climatic predictions (system 4) to study the windstorms on a climatological basis and not reanalysis datasets, such as the ERA-20C at a similar resolution? Recognizing the merit of the great data amount, how the authors are confident about the reliability of these

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datasets? 2. Following the same comment, I cannot understand statement in page 3 “That way the ensemble serves as a unique data archive which can be used to assess the statistical uncertainty more precisely compared to exploiting observational reanalysis data for this kind of estimation”. The authors should clarify and verify this point, since determines the novelty of the paper as compared to previous related studies. In any case, this statement is not discussed or verified in section 4. 3. Similarly, the authors should clarify the statement in page 2: “Clearly none of the windstorms found in these forecasts ever happened, however each of them represents one possible physical consistent realisation of a potential reality” 4. In section 2: “31 years of data, is equivalent to 1581 “virtual” years”. Please clarify. 5. The spectral resolution of the data is T255. Is this the same with reanalysis data ERA-interim or ERA-20C? 6. In section 2: “. . .This is implemented by only taking into account windstorms that affect a country at least once in their lifetime, i.e. by defining a radius around a country/an area through which a windstorm or a cyclone has to pass”. Please clarify. How this radius is defined? Is it defined a priori? 7. Section 2: As the cyclones identified by the Murray and Simmonds algorithm are not necessarily extreme in terms of impact, the minimal core pressure and the maximum curvature of an identified track both have to be within the lowest respectively highest 5% of all tracks at least once within the defined radius” I think this percentile is somewhat arbitrary. Is it based on statistical analysis? Or in previous studies? 8. What do you mean by “local maximum” or local 98th percentile” in practice? At every grid point? 9. In section 3: apart from central pressure and curvature as measures of the cyclone intensity, the local pressure drop is an important measure that determines intense and mainly explosive cyclones that are responsible for wind storms. 10. Section 4: From Table 1, I assume that the 3 clusters are identical for all 4 regions. Is this true? For this reason the clusters are displayed for the two regions ?

Other comments 1. Abstract: Main findings are missing. A large part is devoted to explain the advantages of using seasonal forecasts. This is not the scope of the abstract. 2. Section 1: why the ETCs responsible for windstorms in Europe have their

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origin over the NW Europe? A reference is required. 3. Section 1: “..they usually follow an eastward trajectory”. Similar comment 4. Section 1 is not structured in paragraphs. 5. Section 2 is not structured in paragraphs. For instance, in page 3, line 13 a new paragraph could start with the statement “Two different types. . .” 6. Since section 2 is entitled “Data” , the authors should focus only on the data used. The remaining part refers to methodology that is described in section 3. Therefore, section 2 and 3 should be reformulated 7. Section 2, page 4, line 4: “Due to the constraint for the tracked cyclones.” What do the authors mean? 8. Section 5 is not structured in paragraphs. For instance, in page 12 at lines 14, 24 and page 13 at lines 7, 23 9. Legend of Figure 1: Replace “Km2” by upper case “Km2”

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