

# ***Interactive comment on “Synoptic-scale conditions and convection-permitting hindcast experiments of a cold-season derecho on 3 January 2014 in Western Europe” by Luca Mathias et al.***

## **Anonymous Referee #2**

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This paper presents a series of high-resolution simulations of a high-impact winter severe weather event in Europe. This event was poorly represented in the operational FC and the paper addresses the question of why this was the case. The results very nicely shows that very high temporal resolution boundary condition input is required to capture the event with high resolution simulations. The main findings are clearly communicated and well documented and I have only minor questions and requests for changes.

L22 endure last L23 for a broader readership consider to define the term derecho L24

might may L29 Please define straight-line wind damage L33/34 under suspicion of being produced by were likely affected by tornados L43 It is unclear what is meant by “these specific characteristics” L46 Please define strongly forced L51 with regard to for L101 the statement “which in the end leads to two additional distinct input data sets” is unclear L133 What do you mean by the statement “while the ECAN boundary conditions remain unchanged? L144 discontinuity of what? L153 I am more familiar with the term anticyclonically tilted L162ff Why was the event not recognized by the forecasters if all the ingredients were so clearly present? L185 The high shear values are of course related to the fact that Kyrill was one of the strongest storms in this area in the last decades, maybe add a comment. L194ff: Could you in addition to the surface wind signature briefly comment on how the env. Conditions for convection (shear, stability etc.) were represented in the fc? L209 Do you know why the trough was missing in the simulations? Were dry or moist dynamics responsible for this fc failure? L225 Related to the previous point, how exactly did the trough form? L240 Please define low-end CAPE L252 Could you add the observations to figure 13, going back and forth to figure 1 makes the comparison quite cumbersome. L265 Please define linear upscale growth L267 Can you really call a trough a boundary?

Figures: The line labels are in most figures difficult to read and I recommend increasing their size Figure 1: can you highlight the location of the Larkhill sounding more prominently? Figure 4f: Do you have in indication if the upward motion is mainly in response to diabatic heating or due to qg forcing? Figure 7: I am not familiar with this graphical representation of the MU cape. Are the unit values really around 1 J/kg? How do the values add up to 202 J/kg?

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