

Response to the comments from Anonymous Referee 1 for the submitted ACP paper: “Bresson, H. et al. 2021: Case study of a moisture intrusion over the Arctic with the ICON model: resolution dependence of its representation. ”

We thank the ACP handling editor, Farahnaz Khosrawi, as well as the Anonymous Referee #1 for this review. Please find below our response to the comments (in italics) from the Anonymous Referee #1.

Comments from Anonymous Referee #1:

The paper gives an analysis of the representation of an atmospheric-river case study in the area of Ny-Ålesund (Svalbard) with the ICON model using different spatial resolutions. It gives both a detailed analysis of the model performance and an overview on the changes of atmospheric conditions associated with the event.

The paper is very well written and structured, I've enjoyed reading it. I recommend to accept it, after taking some minor points into account:

Response: We thank the Anonymous Referee #1 very much for these kind and motivating comments. We are very pleased that the Anonymous Referee #1 enjoyed the scientific content of the manuscript, as well as its form. We hope that the corrected manuscript will also appeal to other readers and motivate further studies on the representation and understanding of moisture intrusions over the polar regions.

line 119: Absorption coefficients for in the microwave frequency range relevant atmospheric gases

--> Absorption coefficients for atmospheric gases relevant in the microwave frequency range, in particular water vapour

Response: The sentence has been amended.

line 129: covers a period from 1979 and onward.

--> covers a period from 1979 onward.

Response: The correction has been done.

line 187: a known issue by the DWD service

--> an issue known by the DWD service

Response: The sentence has been corrected.

line 319: the IWV values are relatively similar both at Shojna and Ny-Ålesund stations.

--> the IWV values are relatively similar at the Shojna and Ny-Ålesund station.

Response: The sentence has been corrected.

line 395: I don not fully understand what you mean by "negative latent heat fluxes (evaporation) dominate in association with the low pressure system over the Northern North Atlantic Ocean (Fig. 1) and the region with precipitation > 5 mm per hour." Especially the relation to precipitation is not clear to me, since it is a relatively small and scattered area in the figure (I am also not 100% sure what is inside and what outside the 5 mm/h contour line). Since precipitation is not mentioned anywhere else in the paper, nor analysed in detail, maybe just skip it. I think it is not that relevant here.

Response: The sentence was meant to show that negative latent heat fluxes dominate over the Northern Atlantic Ocean, at the same location as the one of the low pressure system. That location also show some precipitation (> 5 mm). However, we do agree that the precipitation is not a focus of this paper. Hence we follow the advice and remove the precipitation lines from the Fig.12 and in the according text.

line 404: Although this study only here modestly explore

--> Although this study only modestly explores

Response: The sentence has been changed.

Please check brackets of references in brackets at lines 35,114,115,116,144,154

Response: The syntax of the references at line 35, 114, 115, 116, 144 and 154 have been changed.