

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-609

Anonymous Referee #2

Referee comment on "Atmospheric rivers and associated precipitation patterns during the ALOUD and PASCAL campaigns near Svalbard (May–June 2017): case studies using observations, reanalyses, and a regional climate model" by Carolina Viceto et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-609-RC2>, 2021

General comments:

This paper explores the differences of atmospheric rivers' characteristics and meteorology in reanalyses and the regional climate model HIRHAM5 in Svalbard. Using field campaign identification of water vapor transport events in May and June 2017, 3 independent atmospheric river events were detected at a research station over an 11-day period. This paper analyzes how using integrated vapor transport versus integrated water vapor affects atmospheric river detection. Additionally, the differences between reanalyses, the regional climate model, and observations demonstrate the importance of using a high spatial and temporal resolution model for AR identification. This paper was a thorough study in how applications of AR detection schemes vary in the Arctic, where lower atmospheric moisture content must be considered. Additionally, the synoptic and precipitation analyses were very interesting, particularly how the results varied amongst the reanalyses. There were some points that needed clarification, but overall, the manuscript was scientifically interesting, novel, and important work. For these reasons, I am recommending this manuscript for acceptance to ACP with minor revisions.

Specific comments:

Section 3.2: Some added clarification on which datasets the algorithms were applied to would be helpful. The final two sentences (L208-210) specifically state that the Guan2018 algorithm was only applied to MERRA-2, but I was confused until getting into the results about which datasets Gorodetskaya2020 was applied to. It is not stated until L230-231.

L 228-230: Why were these specific datasets chosen to display in Figure 2, when you also applied Gorodetskaya2020 to JRA55 and CFSv2?

L 242-244: While it is later elaborated on in L272-277, it might be helpful to mention, after stating that the geometrical criteria was applied, that the current geometrical applications of the algorithm prevent the June 6 case from being identified as an AR (and is instead a pAR).

Figure 3: Yellow color is difficult to see - could this be changed to a darker yellow?

L 383-384, Figure S7: Should this also be the beginning of the second event? You are referencing the band of high IVT, which appears nearest to Ny-Ålesund at 12 UTC on June 6.

Figure 7: These figures could probably be made wider by cutting whitespace on the edges to make the timestamps more clear.

Technical comments:

L 301: Should be "Figure 4" not "Figure 3"

L 317: "Siberia" not "Siberian"

L 539: "These were associated" not "These was associated"