Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-340-RC2, 2020

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Baffin Bay sea ice extent and synoptic moisture transport drive water vapor isotope (δ^{18}O, δD, d-*excess*) variability in coastal northwest Greenland" *by* Pete D. Akers et al.

Anonymous Referee #3

Received and published: 29 July 2020

The article presents a 2-year record of water vapor isotopic measurements at a coastal station in Northwestern Greenland. This is part of a larger effort to build a network of water isotopic observations at different Arctic sites. The continuous record allows to analyze the isotopic variability at the diel, synoptic and seasonal time scales. Isotopic variations are interpreted in terms of meteorological factors. Implications for paleoclimate studies are discussed.

The paper reads very well. The rationales are sound. I only have minor comments.

Printer-friendly version

Discussion paper

Minor comments

- section 4 “general overview of isotopic results”: I found it difficult to read because it’s only text and there is no reference to any figure or table. I suggest to add references to figure 2 and/or table 1 and to relate the text to them. Also, this section is very short and does not add much to the paper. Maybe it could be moved into an introductory sub-section of the next section?
- l 255-265: this paragraph does not add much to the paper. This information is re-used in the next sections. This paragraph could be removed and the information could be added when needed in the next sections. The correlation numbers could also be gathered in a table, which would make them easier to read and to refer to in the text.
- l 365: “personal field observations on multiple occasions”: can we see them in Figure 2? It would be more convincing to directly show it in the Figure (or in a zoom of this figure) than to refer to personal observations.
- l 391: Is this effect supported by observations? Or is it too small to be seen? If so, clarify that this effect is expected to be weak?
- section 6 “Annual isotopic cycle”; the title does not represent the content of this section. This section looks at correlations within each month, so it is rather synoptic variability. This section could be renamed “Synoptic-scale isotopic variability”.
- l 429: can we see it in a Figure? If so, refer to it.
- Same l 436.
- l 442: “isotopic variables”: only dxs, isn’t?

- l 444-449: is this paragraph about diel variability? If so, maybe this can be moved to a later section on diel variability?
- l 469: “com”?
- section 7: this section is actually a deeper analysis of the previous paragraph. Therefore, I suggest to move this section into a last sub-section of section 6. It could be renamed ”6.5. Moisture pulse events”. The content can be merged with the last paragraph of section 6.4 to avoid redundancy.
- l 611: Why can’t it just be the effect of boundary layer mixing? At midday, boundary layer mixing is more intense, bringing more depleted and high-dxs water vapor from the free troposphere down to the surface, e.g. the mechanism that you describe in lines 490-493.
- l 661: Start a new paragraph?
- Figure 3: what are the white and magenta lines? Explain in caption
- Figure 5: I really enjoyed this figure.
- Figure 6: what is the time scale for the correlations? 10 minute, 1 hour or daily? Explain in caption.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-340, 2020.

Printer-friendly version

Discussion paper