

Ocean Sci. Discuss., referee comment RC1
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Comment on os-2022-17

Anonymous Referee #1

Referee comment on "Import of Atlantic Water and sea ice controls the ocean environment in the northern Barents Sea" by Øyvind Lundesgaard et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2022-17-RC1>, 2022

Using the 3-year data from the moorings together with atmospheric data, the authors carried out a comprehensive study that reports the variations of hydrographic properties and currents in the vicinity of Kvitøya Trough, discusses the potential effects of atmospheric forcing and ice, and finally presents the schematic circulation of Atlantic Water. I found this paper to be a compelling study that well described their data in details. It was straight forward and easy to understand, and surely made valuable contributions to the literature. The writing is clear and well organized. However the paper focuses on the description of the data, but barely provide reasons which I would expect to see. For example, the near-surface water is fresher in 2019 when the open-water period is shorter, why is that? Why was the freshening of the water column at M1 in winter 2020 less pronounced at M2? I understand that the authors would like to get into the mechanisms in the future studies, but think more analysis on the described data would emphasize the importance of this paper.

I am confused about the dynamical link of the meridional air pressure gradient and the AW inflow. The meridional air pressure gradient results in the zonal winds which eventually force on the currents. Why not directly compare the wind with the currents? In addition, the currents do not have to be associated with the zonal winds. To find out the best fit of wind direction, a correlation analysis of the current with each wind component can be applied. The currents in M1 and M2 may be associated with different wind components (directions).

Some specific comments.

Lines 326-328. The good correlations of velocities in vertical do not mean the current was vertically uniform. Testing the baroclinicity can help quantify that.

Why did the authors present in-situ T in Figs.3 and 4 but conservative T in Fig.6?

Is the linear interpolation of salinity appropriate as the present of halocline? If this is an issue, how meaningful is the freshwater content calculation?