

## ***Interactive comment on “Meteorological observations in tall masts for mapping of atmospheric flow in Norwegian fjords” by Birgitte Rugaard Furevik et al.***

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Thank you for your interest and the comments provided. We have copied the four comments here and reply to them one by one. The information will also be included in a revised manuscript.

Comment 1: Line 59, the authors mention that the "dataset provides invaluable data describing the atmospheric forcing, both climatic and short-term, pertaining to the design of large structures in complex terrain." Although I understand the enthusiasm of the authors, one should keep in mind that the potential and limits of the dataset have not yet been assessed in details. It is also unclear to me what the authors mean exactly

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by "atmospheric forcing, both climatic and short-term" with respect to structural design. A more specific reformulation would be welcome.

Reply: We agree that the sentence can be rephrased and we will certainly consider this in the revised version of the manuscript. The message we sought to convey was that the dataset is unique in both the length as well as in the detail of the observed time series at the available sites. The series are long enough so that they can be of use in describing the climatic conditions at the sites, but they are also detailed enough to describe well single weather events of interest and capture some of the complexity in the flow structure on either side of the planned crossings. We do not insist that the mast data can be easily extrapolated to describe the conditions at the middle of the fjord crossings. In fact, the data set of wind, temperature, precipitation etc. presented in this manuscript is an essential part of a larger data set, including Wind Lidars and buoys, which is created in order to collect as much meteorological and oceanographic information from the whole crossing area as is technically and economically feasible. The planned crossings are longer and in more difficult terrain than previously built crossings, and they may require design and solutions not used before. At the start of the project in 2014, it was not clear what atmospheric and oceanic data would be needed and what aspects of the climate/weather had to be accounted for. A lot has been learned since then, but it is correct that we do not know yet how valuable the mast data will be in itself for the design. It is possible that parts of the detailed design calculations may have to be based on other data. However, the wind measurements have proved invaluable in several other aspects, for example to verify numerical models (see e.g. Midtbø et al. (2020) MET report 05-2020 "Finskala modellering av vind i fjorder. Sulafjorden og Vartdalsfjorden 2018" available at <https://tinyurl.com/y4m7xqd8> ). Using numerical models which represent the local wind conditions, we can relate it to the large scale flow (historical, i.e. climatic) which provides wind statistics for design, and this will also help to improve forecasting during a construction phase.

Comment 2: Line 34-35. As the authors already know, there has been a similar cam-

paign in the Bjørnafjord since 2015. Although the data in that fjord are not publicly available, it may be useful to the reader to know that the campaigns in the Sulafjord, Halsafjord and Julsundet are not the only ones.

Reply: We agree that we should include the information here that extensive measurement campaigns related to E39 also exist in other fjords even if those data are not freely available.

Comment 3: Line 98: If no filtering is applied beforehand, downsampling a time series from 20 Hz to 10 Hz will amplify aliasing not reduce it. In general, downsampling increases aliasing. As far as I know, the downsampling procedure was done without filtering, resulting in undesirable aliasing, visible in Figure 15, at frequencies above 4 Hz.

Reply: When the output of the Gill Windmaster Pro is set to 10 Hz, the sampling is done at 20 Hz. Each output value is based on the average of two ultrasonic samples, and this averaging acts as a filter.

Comment 4: It may be informative to the reader to know if the high-frequency sonic temperature is freely available or not. I am aware that some 2-Hz sonic temperature records are usable, but this sampling frequency may be too low to study turbulent fluxes. A sampling frequency of 10 Hz or more is desirable for such purposes.

Reply: The 10 Hz temperature measurement from some of the sonic anemometers was stored. However, it is not a part of the available dataset on thredds and is hence not discussed in the manuscript.

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