Interactive comment on "Merits of novel high-resolution estimates and existing long-term estimates of humidity and incident radiation in a complex domain" *by* Helene Birkelund Erlandsen et al.

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This paper summarizes a new dataset, HySN, of three variables (humidity, short- and long-wave radiation), which are very useful for a variety of modelling applications, but are historically not as well defined as eg temperature and precipitation. The paper provides a description of the production of the data, and carries out a thorough evaluation against observations and other modelled products of the same variables.

In general, the paper is well-structured and clearly written. It demonstrates the benefit

of the new dataset compared to existing modelled gridded products, especially due to the increase in resolution. My overall impression is very positive but I have some minor concerns/suggestions.

1   Minor corrections:

Abstract: Somewhere you should mention the full temporal extent of the dataset. From the paper it sounds like you have only produced data for 1982-2000, but looking at the Zenodo link, the data are available from 1979-2017.

P1 L13: Td has not yet been defined, either define it here or just write dew-point temperature.

P2 L18-19: "In recent time a gridded, observation-based data set of near surface wind speed has also been developed." Please provide a reference for this.

P6 L23: "The data is currently compiled for the time period 1982-2000..." This is confusing, as the Zenodo archive seems to contain data for 1979-2017. If you are only choosing to analyse the years 1982-2000 for this paper, please explain why (due to availability of observations?). But don't do yourself a disservice by not advertising the whole dataset!

P8 Fig 1: The description of the markers is a little confusing – it sounds like there are multiple purple markers rather than that the purple marker is a site for which both $SW_\downarrow$ and $LW_\downarrow$ are available. Could you rephrase this? Also, the blue-red colour bar for the difference plot has the numbers overlapping the units, please adjust this.

P9 L9-10: This sounds like you are referring to Table 2 in Grini (2015), you should make it clear that this is referring to Table 2 in this paper.

P12 L17: Why does the trend analysis only start in 1985, when the rest of the analysis

uses 1982 onwards?

P13 L13: Why is this not shown? Maybe add something to the supplementary information to support this statement.

P15 Figure 7: In the caption you refer to "upper", "middle" and "lower" plots. Please change this to left, middle and right as they are arranged.

P21 L10: Why are you now only using the data up to 1999? Please explain.

P21 L26: You refer to Table 8 before Table 7, please check the numbering. Also, you never refer to Table 9 in the text, please do so.

P28 L28: Why 36 years?

2 Typographic errors:

Throughout: "Era-Interim" should be capitalised: "ERA-Interim".

Throughout: You sometimes write "T2" and sometimes "T_2", please be consistent through the manuscript. Similarly, please choose between "Td" and "T_d".

P3 L29: Should read "based on reanalysis data".

P6 L6: Lussana et al should be within the parentheses.

P10 L5: I think "Table S.2" should be "Table A3".

P10 L20: "staring point" should be "starting point".

P11 L12: You are losing some of the equation off the side of the page.

P11 L14: "$\mu_{station,station,observed}$" should be "$\mu_{season,station,observed}$"

P12 L20: "$SW_\downarrow$" should just be "SW" in this case (south-west, not short-wave).

C3

P28 L8-14: Please format lists properly (indented, with bullets).

P28 L30: "entail" should be "entails".

P36 Table 1: The hyphens/minus signs at the start of each sentence in the "Processing methods" and "input data" columbs are quite confusing. If these are supposed to be points in lists, please format the lists appropriately with bullet points.

P37-39: The tables are not consistently formatted, they should really have horizontal lines at top, bottom and between header and content. Also, what does it mean that some numbers are bold in Tables 3-5?