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Interactive comment on "Surface Radiation during the Total Solar Eclipse over Ny-Ålesund, Svalbard, on 20 March 2015" *by* M. Maturilli and C. Ritter

Anonymous Referee #1

Received and published: 20 February 2016

In "Surface Radiation during the Total Solar Eclipse over Ny-Ålesund Svalbard, on 20 March 2015," Maturilli and Ritter present a dataset including observations of surface radiation components and air temperature, humidity and pressure (and cloud base height) collected during a total solar eclipse at the Arctic station. While these are routine observations, the fact that they were made during such a rare event makes them unique and worthy of being highlighted here.

The data are of high quality, being collected as part of well-known international networks (primarily BSRN). The published datasets are complete and can be easily used by others. There is no general discussion of uncertainties either with the dataset or in the manuscript, except for a couple of points which were important to the manuscript. However, since the data are collected with standard, widely used sensors and are distributed through international networks, it is not difficult to find additional details re-

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garding uncertainties (also in previous publications). I therefore do not suggest adding additional discussion of the uncertainties here. The accompanying manuscript gives a good overview of the data and their potential uses, without being too long or detailed. I suggest the manuscript and dataset be published after consideration of the minor comments below.

Manuscript:

1. I would suggest combining Figures 1 and 4 into one full-page figure with the same x-axis and ticks on both. This would make it much clearer at a quick glance the link between the two and the explanation for the non-eclipse decreases in global radiation. It is well explained in the text and captions, but isn't immediately clear from the figures since they are separated.

2. Around line 8 on page 4, it is pointed out that cold air advection is another possible explanation for the cooling seen at the time of the eclipse. While this is certainly possible, I wonder about the timing. I would expect the advection of cold air by katabatic winds to first cool the near surface air, which would then cool the surface, but in this case, the air temperature decreases after the surface temperature (LWup) decreases. Is that indicative of radiative cooling?

3. The terms 'solar radiation' and 'shortwave radiation' are used interchangeably throughout the manuscript. While I think it is fine to use either one, I would suggest consistently using one through the manuscript, to avoid suggesting they are referring to two different things.

page 2 line 31: I would reverse the word order to 'near surface wind'. p. 3 l. 3: Consider changing 'predominated' to something like 'often interrupted'. p. 3 l. 6: I think 'associated' would be better than 'according' here (also p. 5 l.9). p. 4 l. 5: I would change 'tardily' to 'delayed'.

Datasets:

4. While they don't show any significant change in the inversion structure, it might be useful to also include the (full) radiosonde profiles from the time of the eclipse, and perhaps a few days before and after. These could be useful for other things, for example radiative transfer modelling.

5. It would be useful to rename the two March 2015 datasets to indicate which contains the radiation and T/P/RH data and which contains the cloud data. Currently they both show up with the same name: Expanded measurements from station Ny-Ålesund (2015-03).

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