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Interactive comment on "AntAir: satellite-derived 1 km daily Antarctic air temperatures since 2003" *by* Hanna Meyer et al.

Anonymous Referee #1

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This manuscript reported a dataset of daily and monthly averaged Antarctic air temperature at the resolution of 1km for the 2003-2017 period. This dataset is constructed using MODIS LST and automatic weather station (AWS) air temperature observations by means of machine learning algorithms, which are proved to be effective for reconstructing Antarctic air temperature in the authors' early work published in 2016. The uncertainty of the dataset is also estimated based on a cross validation method. This dataset is an important supplement for the remote sensing based on global dataset of air temperature by Hooker et al. (2018), also useful for estimating Antarctic climate change, and validating the simulation of regional climate models.

Generally, this manuscript is well organized and written, and figures are appropriate. It deserve publication in ESSD. However, before publication, the manuscript still requires

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Discussion paper

some following revisions.

Page 3 10-15: What about the quality of AWS observations? Can the data be trusted and is the quality the same at all of the observational stations? What kind of quality control is made for these observations? The availability of observed data is greatly inconsistent in time between weather stations. How large can the errors in reconstructed air temperature be due to this inconsistence?

Page 3 20-30: Also please add the description of the quality of MODIS LST. It is also necessary to discuss the suitability of MODIS LST for Antarctic air temperature estimate. See Wang et al. (2013) reported robust correlation between MODIS LST and air temperature over the Lambert glacier drain.

Page 5 5-10 I think that the authors should use the DEMs with higher accuracy, such as DEMs from Bamber et al. (2009) or Slater et al. (2018), rather than RAMP DEM

In my opinion, spatial distribution of errors of reconstructed air temperature at each AWS location should be shown.

To further estimate the accuracy, the constructed dataset should be compared with the previous temperature reconstruction for their overlapping period by Steig et al. (2009), O'Donnell et al. (2011), and Nicolas and Bromwich (2014).

References:

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