

***Interactive comment on “A 20-year record (1998–2017) of permafrost, active layer, and meteorological conditions at a High Arctic permafrost research site (Bayelva, Spitsbergen): an opportunity to validate remote sensing data and land surface, snow, and permafrost models” by Julia Boike et al.***

**Anonymous Referee #1**

Received and published: 28 November 2017

I have read this manuscript with great interest. Climate change is of critical societal concern and is currently a central theme for a number of scientific disciplines. Observations and models suggest most rapid warming at high latitudes and the presence of permafrost makes these amongst the most sensitive global environments. The 20-year record of permafrost, active layer, and meteorological conditions presented by Boike

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et al. from Bayelva near Ny-Ålesund is a unique high-quality dataset that will be very useful for many scientists and projects in the future. This is a clearly written paper and the overall structure of the article is well structured. The main sources of errors and uncertainty are given and discussed. The data set is made easy accessible. The manuscript should be accepted and needs only some minor revisions:

Title: Consider a shorter title; only use e.g the first part: A 20-year record (1998-2017) of permafrost, active layer, and meteorological conditions at a High Arctic permafrost research site (Bayelva, Spitsbergen)

In the abstract (L36) and other parts of the manuscript (e.g. L104, L520) the term “climate warming” and “warming of air temperatures” are used. Better use “global warming”, “atmospheric temperature rise” or so instead of “climate warming”/“warming climate”. The term “climate” is defined as a statistical average of meteorological conditions and as such cannot “warm” (the expression is popular but not really scientifically correct).

L63: After IPY new updates on changes in permafrost temperature have been published and presented in recent peer-reviewed assessments, like SWIPA2017. In addition to Romanovsky et al. (2010) I therefore suggest to add e.g. Romanovsky et al. (2017). Romanovsky V, Isaksen K, Drozdov D, Anisimov O, Instanes A, Leibman M, McGuire AD, Shiklomanov N, Smith S, Walker D, 2017. Changing permafrost and its impacts. In: Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2017. pp. 65-102. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway.

L208: Replace “1989” with “1898”. Consider also to include that a meteorological station was established in Ny-Ålesund already in 1969.

L470: Replace “thermometer chain” with “thermistor chain” or “thermistor string”

L 479-481: Please explain more in detail why you think there is an air exchange within the casing in the uppermost 1.5 m. There are several other boreholes with similar

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setup and such information is important.

Figure 1: Please include exact coordinates of the Bayelva site in e.g. the figure caption.

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2017-100>, 2017.

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