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Interactive comment on "Temperature data acquired from the DOI/GTN-P Deep Borehole Array on the Arctic Slope of Alaska, 1973–2013" *by* G. D. Clow

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I have thoroughly read through the manuscript "Temperature data acquired from the DOI/GTN-P Deep Borehole Array on the Arctic Slope of Alaska, 1973-2013" submitted by Gary Clow of the US Geological Survey. The array of temperature measurements for 23 drill holes that have been monitored from 1973 to 2013 (4 of these wells were plugged and abandoned early due toe coastal erosion) and reported in this publication represent a valuable data set for Arctic Alaska. This data provides not only the opportunity to observe temperature changes within the permafrost to sub-permafrost regimes on Alaska's North Slope over a 40 year period, but also provides a window

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into temperature anomalies of warmer and cooler heat flow (and water upwelling) from basement rocks across the region. The description of the temperature measurement methodology (section 2), from instrumentation (section 2.1 and Figure 5) to data and conversion processes (section 2.2), deconvolution (section 2.2.4), and denoising (section 2.2.3) provided me with a better familiarity of the necessary procedures involved. The temperature-depth profiles (section 3), presented in figures 8 through 30, appear to be accurate graphic presentations of the data (more discussion of this will follow). The profiles are color coded for the field study campaigns into teal (1977-1984), magenta (1989), orange-red (2003-2004), blue (2007-2008), and red (2012-2013). This color-coding scheme presents the data well in figures 8-30 with this exception, one cannot differentiate within the teal color the 1977, 1978, 1979, 1980, and 1981 temperature profiles (see for example Figure 8, page 32). One could assume that since each later year represents temperature measurements further from the time of drilling, the temperatures along the profile would be higher. If there is a way to symbolize each year within the teal color code it would improve the figures. The discussion of drilling disturbance (section 3.2) is an important discussion, is relevant to the paper and is obvious in the temperature profiles in each figure. The discussion of temperature gradients (section 3.4) is perhaps the most important discussion within the article, especially for those interested in locating thermal anomalies across the Arctic Slope of Alaska. The article discusses that this data represents variations in the thermal conductivity of the rocks with depth. The discussion of the lack of major change in temperature gradient at the base of the permafrost in a number of wells is important and the citation is accurate. The discussion of climate change effects (section 3.6) could (and should be) be expanded once the temperature log data is corrected for time since last mud circulation (drilling disturbance) as the author correctly points out. No doubt this data will be utilized likely in the near term for this additional research. The summary (section 4, page 19) gives a good summary of the paper's discussion of the data, the value of the data and suggests further uses for this data in permafrost and climate impact studies. Tables 1 and 2, and the location Figure 1 for the boreholes pro-

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vide the overall background for the paper. Importantly, the paper states at the end of the summary that "The fully processed borehole temperature data are available online from the ACADIS repository at doi:10.5065/D6N014HK". I suggest putting the actual website, https://www.aoncadis.org/dataset/USGS_DOI_GTN-P.html at the end of the summary. I was able to locate this website by Googling "doi:10.5065/D6N014HK", however this was the sixth and final Google "hit", the others referring back to this article. The manuscript should be published, with minor edits, and represents important data acquisition and research in northern Alaska that is unequaled in the Arctic, particularly for such a long period of time. Hopefully, the remaining 19 available wells can continue to be monitored for another 40 years into the future and provide even longer term measurement of thermal profile data in an arctic environment.

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