

Observations of Vertical Temperature Profiles over the Ross Ice Shelf from the Alexander Tall Tower AWS

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The Antarctic boundary layer is dominated by a semi-permanent temperature inversion, which is forced by the year-round radiational cooling of the ice covered continent. Observations of the near-surface vertical temperature structure are limited to a very small number of manned sites across the continent. The installation of a 30 m automatic weather station (AWS) tower on the Ross Ice Shelf (Alexander Tall Tower AWS; -79.044°S, 170.651°E) in February 2011 provides an opportunity to analyze the vertical temperature profiles from a previously unobserved location. The tower was installed with six levels of instrumentation to observe vertical profiles of temperature, wind speed and wind direction in the near-surface boundary layer.

This study presents an initial review of the temperature observations from the Alexander Tall Tower AWS to better understand the near-surface vertical temperature structure over the Ross Ice Shelf, Antarctica. Time series of the vertical temperature gradient over the height of the AWS will be presented. The structure of the temperature profile will be investigated using the method of self-organizing maps to identify the range of vertical temperature profiles that occur in this region of the Ross Ice Shelf.