

## Antarctic Extremes: Support for the Next Generation Polar Weather and Climate Station

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Antarctica has an extreme environment where intense weather events occur, such as extreme long duration cold periods and rapid changes in relative humidity, to name a few. To have observations year-round around the continent, automated weather stations (AWS) were set up to provide the most coverage with limited human resources. The AWS observations have been helpful to study the climate and weather of Antarctica. The AWS themselves must last long periods of time in these extreme conditions. A new AWS system is currently being built in order to create one that can withstand the environment, the most extreme events that the stations would experience need to be found using observations from the current AWS network. Rapid changes and long durations of temperature, relative humidity, and wind speed were analyzed from 18 Antarctic AWS using observations from 2001-2016. Initial findings show AWS sites can experience a rapid change of 11.4°C in 10 minutes for temperature and 44.9% in 10 minutes for relative humidity. A rapid change in wind speed was investigated, but is now being explored for other unlikely situations that may have escaped traditional quality control. A long duration of -40°C and colder temperatures can last for about 266 days, a relative humidity of 70% and higher for 127 days, and a wind speed of 20 m/s and higher for over 6.5 days. Each of these extremes and long duration events are currently being examined more closely to verify the meteorology behind them. More work needs to be done, including looking through more years and stations to verify these are the record extremes and long duration events for the current AWS network and to provide these findings to the team of meteorologists and engineers working to construct the new AWS system.