

Snow Web: The Next Generation of Antarctic Meteorological Monitoring Systems.

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Adequate in-situ observation of the Antarctic lower atmosphere has proved problematic, due to a combination of the inhospitable nature and extent of the continent. Traditional weather stations are expensive, subject to very extreme weather for long periods and are often isolated, and as such are prone to failure and logistically difficult to repair.

We have developed the first generation of an extended system of atmospheric sensors, each costing a fraction of the price of a traditional weather station. The system is capable of performing all of the monitoring tasks of a traditional station, but has built-in redundancy over the traditional approach in the fact that many units can be deployed in a relatively small area for similar expenditure as one large weather station. Furthermore, each unit is equipped with wireless networking capabilities and so is able to share information with those units in its direct vicinity. This allows for the possibility of intelligent data gathering, and the ferrying of collected information to a manned observation station and hence the ability to monitor data in real-time. The distributed nature of the data collected can then be used as a stand-alone product to investigate small-scale weather and climate phenomena or integrated into larger studies and be used to monitor wide regions. GPS hardware installed on each unit also allows for high-resolution glacier or ice-shelf tracking.

As a proof of concept study, in January 2011 ten such weather stations were deployed in Windless Bight, Ross Island, Antarctica for a short period. This presentation reports on findings from this field study, and discusses possibilities for the future.