CAMPBELL SCIENTIFIC, INC.

MEASUREMENT & CONTROL SYSTEMS

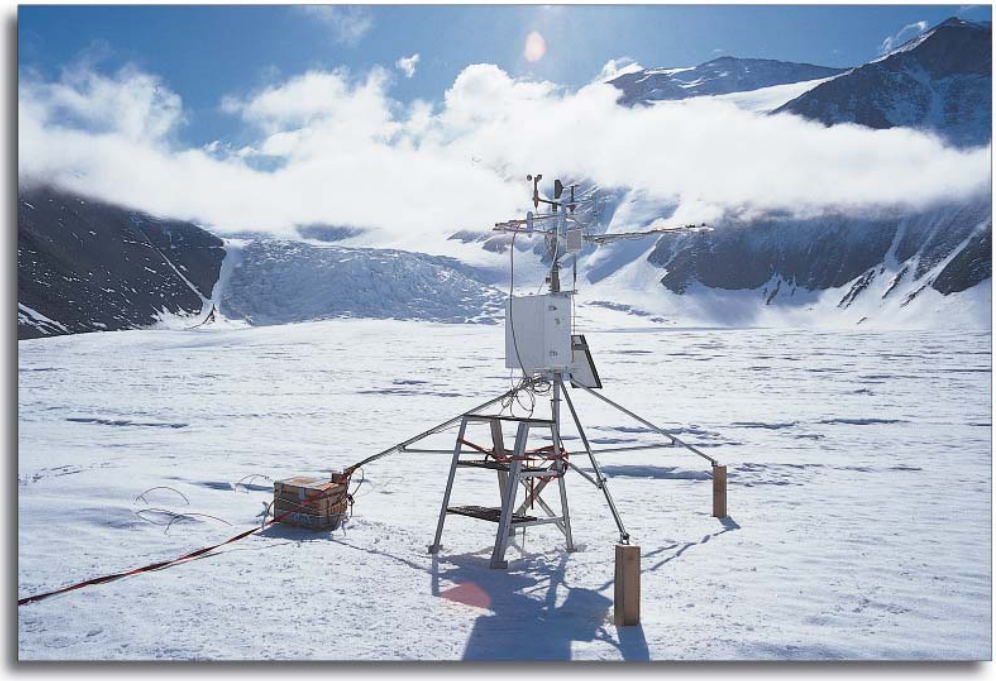
Alpine & Polar

www.campbellsci.com/polar-high-altitude

Benefits of Our Systems

1. Stations are customized by choosing from a variety of dataloggers, sensors, and communications options.
2. Battery/solar power charging system allows long-term, stand-alone operation.
3. Nearly every sensor available can be measured by our dataloggers.
4. Communications options include satellite (Argos, GOES, and others), phone, cellphone, and radio.
5. Dataloggers provide statistical and mathematical processing for on-site data reduction.
6. Stations are expandable: add new sites or add sensors to existing sites.
7. Stations can do double duty—avalanche forecasting, hydrological monitoring, fire weather, and more.
8. Stations can perform unattended control based on time or measured parameters.
9. Stations are research-grade, yet cost-effective.

Extended temperature testing down to -55°C is available for the CR10X.



Our stations are used extensively for remote monitoring in polar environments. This energy flux station provides data for ecological research in the McMurdo Dry Valleys, Antarctica.

From single research stations to large networks, Campbell Scientific monitoring systems have become the world-wide standard for cold weather, high latitude, and high altitude applications. Our stations have measured conditions in both the Arctic and Antarctic, on glaciers, and on mountain peaks around the world. Accurate measurements, durability, low power use, proven reliability, and the ability to customize each station make our equipment ideal for a variety of applications including:

- Avalanche forecasting
- Cold weather effects research
- Cold weather equipment performance
- Electrical power transmission
- Energy balance studies
- Environmental research
- Glaciology
- Ice-flow movement (GPS-based)
- Ice-load/impact monitoring
- Paleoclimatology
- Permafrost research
- Polar & alpine ecology
- Polar oceanography
- Research meteorology
- Road conditions (RWIS)
- Ski conditions reporting
- Structural research
- Surface & groundwater hydrology
- Weather & climate reporting

Long-term, unattended station operation is achieved with low power use, batteries and solar panels, wireless data retrieval, and large onboard data storage capacity. For example, stations installed in the summer have the capability to monitor conditions while "overwintering."

Dataloggers

Our monitoring stations are based around a programmable datalogger (typically a CR10X or CR23X) that measures the sensors, then stores and transmits the data. We designed our dataloggers to provide a high level of station customization. They have programmable execution intervals, operating temperature ranges down to -55°C, on-board instructions for commonly used sensors, and adequate input channels to accommodate many different sensor configurations. If needed, channel capacity can be expanded using multiplexers, including a model designed specifically for thermocouples. Our dataloggers interface directly to most sensors, eliminating external signal conditioning.

Powerful on-board instruction sets allow unattended control decisions based on time or conditional events. For example, peripherals such as heaters or specialized sensors can be actuated based on temperature, wind speed, solar radiation, or some other measured parameter or event. These instruction sets contain programmed algorithms that process measurements and output results in the desired units of measure. Wind vector, wet bulb, histogram, and sample on maxima or minima are all standard to the datalogger instruction sets.

Measurement processing and data storage are programmable, but measurements are typically processed and stored at hourly and daily intervals (e.g., maxima, minima, averages). True averages can be calculated and stored by the dataloggers. Conditional outputs can also be processed and stored. For example, data can be stored at faster intervals based on events such as increased wind speeds or subnormal temperatures.

This station on Nevado Sajama, Bolivia (21,464 ft above sea level) provides data for climatology research.

Software

Our Windows-based software simplifies datalogger programming, data retrieval, and report generation. The datalogger program can be modified at any time to accommodate different sensor configurations or new data processing requirements.

Sensors

Almost any sensor can be measured by our dataloggers, allowing stations to be customized for each site. Typical sensors used with our stations include, but are not limited to: wind speed and direction, solar radiation, temperature (air, water, soil), relative humidity, precipitation, snow depth, barometric pressure, soil moisture, and water quality, as well as strain gages, accelerometers, pressure transducers, GPS receivers, linear potentiometers, and many more.

Data Retrieval

We offer multiple communications options for data retrieval, allowing stations to meet exact needs. Telecommunication options include satellite (Argos, GOES, Inmarsat-C), short-haul, telephone (landline, voice-synthesized, cellular), radio frequency, and multidrop. On-site options include storage module, card storage module, laptop computer, and datalogger keyboard/display. Robust error-checking and low power-use ensure your data arrives uncorrupted and as scheduled. We can even help you post your data to the Internet.

A variety of wireless communications options provides reliable data retrieval—even when the site is inaccessible.

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