



Avalanche, Ski, Alpine, and Polar

Instruments for Cold Region Monitoring and Research



Campbell Scientific provides rugged, low-power measurement systems for many applications in snowy climates. Our systems measure snow depth, snow-water equivalent, air temperature, relative humidity, and wind speed and direction. This data is useful for displaying

current weather conditions, identifying snow-making conditions, forecasting spring runoff and summer water availability, and modeling avalanche conditions.

MAJOR SYSTEMS

MetPRO | Research-Grade
Meteorological Station
Reliable Weather Monitoring



Measurements	Datalogger	Power	Communications
wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation, soil water content	CR6	BP12 12 Vdc, 12 Ah battery recharged with 20 W solar panel	Wi-Fi, radio

Custom Systems

Most of the systems we sell are customized. Tell us what you need and we'll help you configure a system that meets your exact needs.

Dataloggers

Campbell Scientific monitoring stations are based around a programmable datalogger that measures the sensors, then processes, stores, and transmits the data. They interface directly to most sensors, eliminating external signal conditioning. Our low-power dataloggers have wide operating temperature ranges (down to -55°C), programmable execution intervals, onboard instructions, and ample input channels for commonly used sensors.

Data are typically displayed and stored in the units of your choice (e.g., wind speed in mph, m/s, knots). 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 our 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.

Sensors

Almost any sensor can be measured by our dataloggers, allowing monitoring systems to be customized for each site. Campbell Scientific offers sensors that measure snow water equivalent, snow depth, wind speed and direction, temperature (air, water, and soil), precipitation, presence of icing conditions, relative humidity, solar radiation, barometric pressure, and soil moisture. Our stations can monitor strain gages, accelerometers, pressure transducers, GPS receivers, linear potentiometers, and many more types of sensors.

The 05108-45 Wind Monitor is designed specifically for harsh alpine conditions. To discourage ice buildup, the sensor's housing is black and covered with an ice-resistant coating. It also features oversized ceramic bearings, oversized propeller shaft, high pitch propeller, and locking propeller nut.



More info: 435.227.9120

campbellsci.com/avalanche-ski-alpine-polar



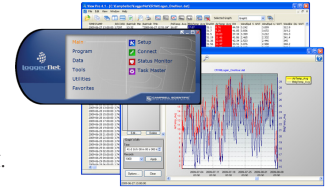
Communications

We offer multiple communications options for data retrieval, which can be mixed within the same network. Telecommunications options include short-haul, telephone (land line, voice-synthesized, cellular), radio frequency, multidrop, and satellite. On-site options include storage module and laptop computer.



Software

Our PC-based support software simplifies the entire data acquisition process, from programming to data retrieval to data display and analysis. Our software automatically manages data retrieval from networks or single stations. Robust error-checking ensures data integrity. We can even help you post your data to the Internet.



Alpine and Polar Applications

- › 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 and alpine ecology
- › Polar oceanography
- › Research meteorology
- › Road conditions (RWIS)
- › Ski conditions reporting
- › Surface and groundwater hydrology
- › Structural research
- › Weather and climate reporting

Alpine and Polar Case Studies

Our systems have helped a variety of organizations reach their goals. The following are just a few of these:

Campbell Scientific weather station provided important avalanche forecasting data for the Ten Mile Canyon area in Colorado. The weather station, located near the summit of Ten Mile Peak, reported weather conditions via radio telemetry. Knowledge of the weather conditions allowed avalanche forecasters to coordinate work activities that avoided dangerous areas.

www.campbellsci.com/ten-mile-canyon

The Long-Term Ecological Research (LTER) program, sponsored by the National Science Foundation, used Campbell Scientific gear to monitor ecological phenomena in McMurdo Dry Valleys, Antarctica—one of the most extreme deserts on Earth. Harsh weather conditions in the dry valleys offered unique challenges for data collection. Six stations are located on lake shores, and four are mounted on wooden stilts on local glaciers, including an eddy correlation station that aids in energy balance studies.

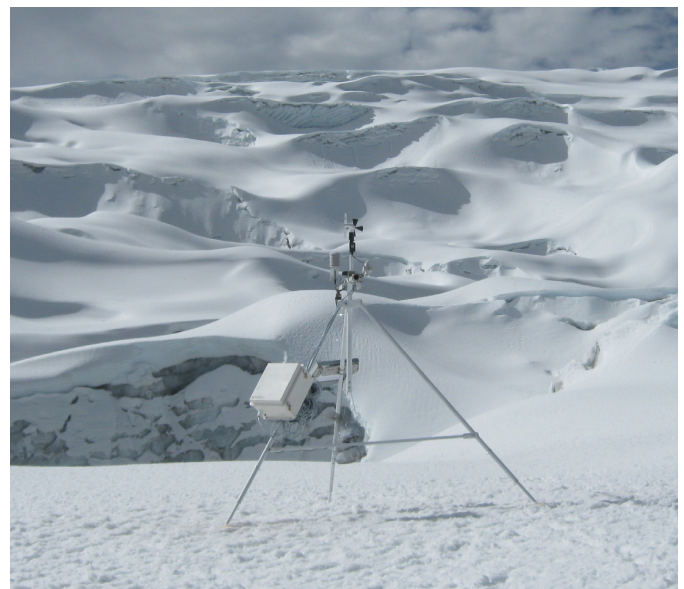
www.campbellsci.com/antarctica-ecology

A new Research and Test Facility (RTF) at the University of Alaska, Fairbanks was built on an area with underlying permafrost at various depths. The RTF was instrumented with sensors under the building, in the foundations, in flooring systems, and throughout the wall and roof areas. A nearby weather and geotechnical station also provided additional information about permafrost, foundations, and thermal control of the subsurface building envelope.

www.campbellsci.com/alaska-construction

A network of eight Campbell Scientific weather stations, all at elevations greater than 4,000 m (13,100 ft), monitor glaciers in the high Andes in Bolivia, Colombia, Ecuador, and Peru. The water supplied by these glaciers is critical to many towns and cities in that region. These stations provide glacial retreat and high mountain hydrology data that allow better water resource management.

www.campbellsci.com/peru-glacier



This station was installed on a glacier in the snow-capped Quisquipina mountains, near Ausangate peak, part of the Vilcanota mountain range near Cuzco, Peru.

