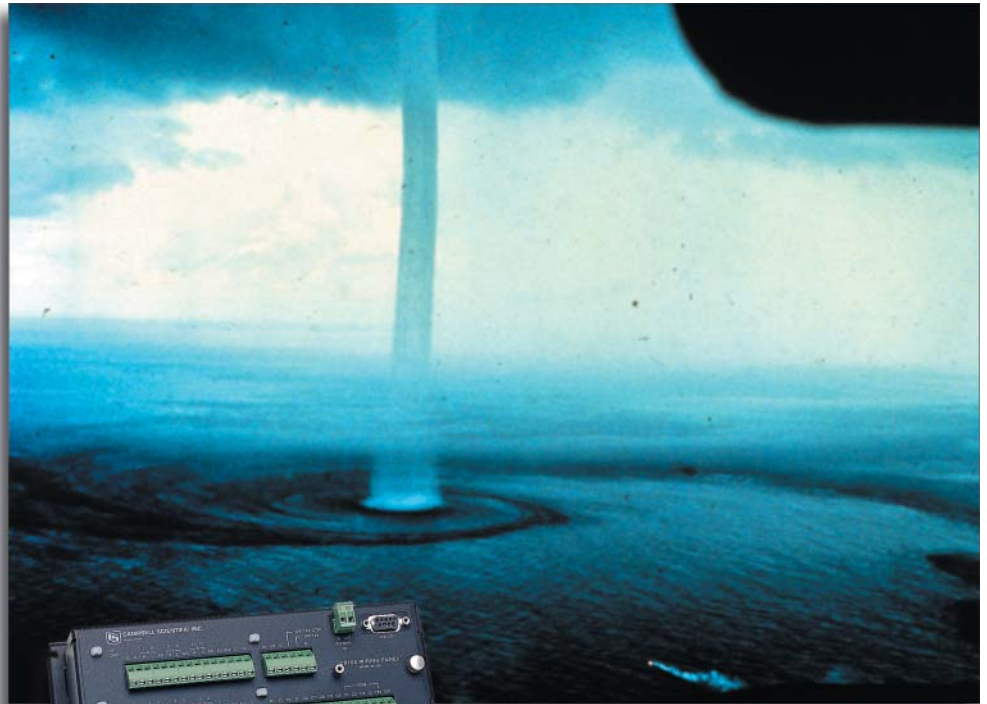


# Oceanography

[www.campbellsci.com/oceanography](http://www.campbellsci.com/oceanography)

## Benefits of Our Stations

1. Measurement stations are customized to meet exact needs.
2. Stations can measure most commercially available sensors without external signal conditioning.
3. Communications options include satellite (Argos, OrbCom, QualComm, Inmarsat C, GOES), radio, phone, and cellphone.
4. Stations operate reliably in harsh environments.
5. Dataloggers provide on-site statistical and mathematical capabilities.
6. Batteries and solar panels allow long-term, remote operation.
7. Stations are easily expandable—add new sites or add sensors to existing sites.
8. Powerful software supports programming, data retrieval, and data display.



*From coastal weather stations to buoys to shipboard stations, our measurement systems are well-suited for all types of oceanographic monitoring.*

Campbell Scientific measurement and control systems provide remote unattended monitoring for a variety of oceanographic applications. Accurate measurements, proven reliability, and the ability to customize each station are a few of the features our systems are known for. Common oceanographic applications include:

- Coastal erosion and sedimentation
- Ecosystem research
- Ice-flow movement (GPS)
- Ice-load/impact monitoring
- Oceanographic currents
- Salinity and water quality studies
- Ship-board monitoring
- Structural monitoring
- Temperature profiles
- Tidal monitoring
- Wave height and power
- Weather and climate monitoring

## Dataloggers

Our monitoring systems are based around programmable dataloggers that measure the sensors, then process, store, and transmit the data. The compact size, rugged design, low power use, and versatility of our dataloggers allow them to be used in many applications—including integration into submerged systems. Our dataloggers have programmable execution intervals, wide operating temperature ranges, and ample input channels for commonly used sensors. Most sensors interface directly to our dataloggers, eliminating external signal conditioning. Onboard



instruction sets contain built-in processing routines that range from simple statistics (e.g., average, maximum, minimum, standard deviation) to more complex routines (e.g., saturation vapor pressure, histogram, FFT).

Data are typically viewed and stored in the units of your choice (e.g., wind speed in mph,  $m\ s^{-1}$ , knots). Measurement rates and data recording intervals are independently programmable, allowing calculation of 15-minute, hourly, and daily data values from 1-minute or 1-second measurements, for example. Conditional outputs, such as wind gusts, can also be recorded. The program can be modified at any time to accommodate different sensor configurations or new data processing requirements. If needed, channel capacity can be expanded using multiplexers. All of these features allow you to meet your data requirements, be it storing hourly averages of meteorological data or compensating a depth sensor for depth and wave period to produce wave power spectra.

### Sensors

Almost any sensor can be measured by our dataloggers, allowing systems to be customized for each site. Typical sensors used include, but are not limited to: wind speed and direction, solar radiation, temperature (air, water), relative humidity, precipitation, barometric pressure, pressure/depth (strain gage or quartz crystal), as well as flow transducers, potentiometers, load cells, accelerometers, radiometers, thermocouples, thermistors, and RTDs.

### Data Retrieval

We offer multiple communication options for data retrieval which can be mixed within the same network. Telecommunications options include satellite (Argos, OrbCom, QualComm, Inmarsat C, GOES), telephone (landline, cellular, voice-synthesized), radio, short-haul, multidrop, and ethernet. On-site options include storage module and laptop.

### Software

Our PC-based support software simplifies the entire monitoring process, from programming and 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.



*A weather station provides data for marine ecology research in the Bahamas.*



*The goal of a research project in the Estuary of Auckland, New Zealand is to model the effects of cooling water discharges.*