FinappSWE

CRNS SWE probe
Water Content in Snow

CRNS probes for measuring SWE - water content in snow - in real time, and non invasively.

Overview

The FinappSWE measures the water equivalent of snow (SWE) by passively detecting the variation of natural neutrons coming from the cosmos after their passage through the snowpack.

Measuring the amount of water in snow can be not easy. Monitoring sites are located in difficult locations and seasonal dynamics have often continuous and sudden changes. Furthermore, one centimeter of rain can produce from two centimeters of sleet to 50 or more centimeters of snow, depending on the air temperature and different snowpacks that can contain different amounts of water. In general, snow depth does not directly translate into the amount of water retained in the snow. Because of this variability, SWE is the best information to know how much water is retained in the snow.

A pair of Finapp probes are installed:

The first is placed above the snow pack. This probe is used to measure incoming neutrons from space before they interact with the snow.

The second is placed at ground level, burying it slightly, when the ground is free of snow. The snow cover will completely cover the probe, which will then count neutrons that have already interacted with the snow pack.

The difference in neutron counts between the two probes gives an accurate measure of how much water is present in the snow pack.

The measurement area is 20 m in radius, and is the ideal sensor to replace weighing systems, snow pillows, or manual measurements.

Benefit & features

- Real time measurement
- Non-invasive
- Wide range of use, over 10,000mm SWE
- Insensitivity to bridging phenomena
- Very low power consumption
- Remote IoT telemetry options
- Ideal replacement for traditional snow-pillow sensors
- Does not cause the melt of light snow
- Site visits reduced
- No site preparation
- Fast set-up
- Performance not affected by rainfall or snowfall
- Not affected by type of snow or ice
- Will not cause snow drifting
- No antifreeze chemicals used (i.e., glycol)
- Large maintenance cycle
- Easy to integrate into existing stations
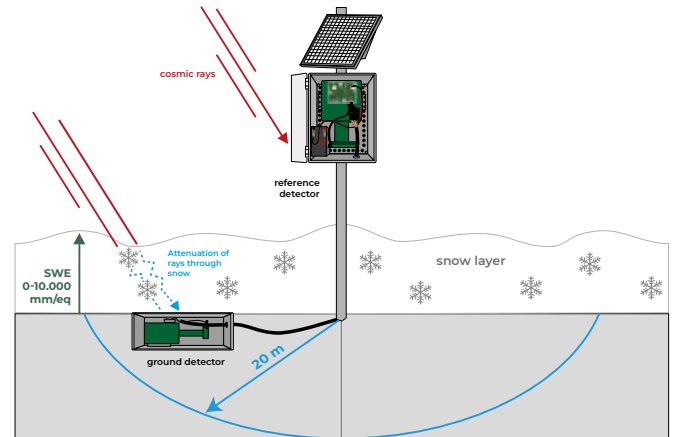
Application

- Water resources management
- Water Content in Snow Monitoring
- Hydroelectric power forecasting
- Seasonal run-off management
- Flood forecasting and risk management
- Dam Maintenance planning

Specification

Main output	Snow Water Equivalent (SWE)
Range	0 - 10,000
Measuring units	mm (of water equivalent)
Footprint	over an area of radius about 20m
Neutrons counting	900 neutrons/h*
Muons counting for real time on site validation	4'000 muons/h*
Barometrics pressure	900- 1100 mBar; included
Electrical consumption	1,0 Wh / 80mA @ 12V
Case	Probe 1: Aluminum, IP68, 40x30x17cm Probe 2: ABS Plastic, IP67, 50x40x21cm
Power supply	Autonomous: Battery & Solar Panel 17,1-30V / max 35W External: 11,5-15V External: 9,6-15V by SDI12 interface USBC: 5V
Temperature of use	-40°C / +65°C
Web interface	2G/3G/4G (SIM included)
Data access	1. Web Interface 2. API 3. MicroSD 4. USB / RS232 5. SDI12 6. Ethernet
Location identification	GPS (on demand)
Optional interfaces**	RS-232; RS-485; SDI-12; Ethernet
Optional parameters	External Temperature & Humidity;

Optional accessories

Model	Features
FR010	Pole
FR011	Tripod
FR003	40W solar Panel
FR030	30 A/h battery
FM007	Sdi-12 Output

Ordering Information

Model	Features
–	Brackets for anchoring to 40-50mm pole (default 48mm)
–	Cable with connector for connection to external power supply
FM002	20W Solar Panel
FM017	18A/h Battery included
–	Instruction Manual

* at sea level under standard conditions soil moisture ~5% at 5Gev cut-off Rigidity

** to choose between two available slots