



WISe

Snow Liquid Water Content Sensor

- Small and lightweight device
- Designed for field measurement
- Accurate and reliable output

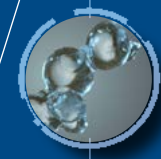
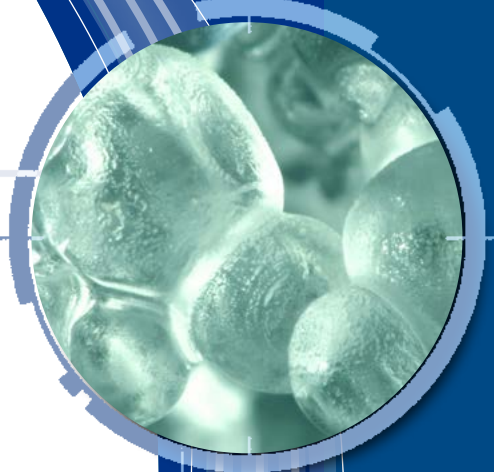
Applications

- Snowmelt onset detection
- Snow avalanche forecasting
- Snow making quality assessment
- Radiative transfer calculations
- Remote sensing validation

Technology developed in collaboration with Météo-France

A2 Photonic Sensors

c/o Grenoble INP-MINATEC
3, Parvis Louis Néel - CS 50257
38016 Grenoble cedex 1, FRANCE
Tel: +33 4 56 52 95 43
contact@a2photonicsensors.com
www.A2PhotonicSensors.com





Liquid water content

Liquid water content

The presence of liquid water in the snowpack has a dramatic impact on its physical and mechanical behaviors. The measurement of this quantity provides very valuable information for many purposes, including avalanche forecasting, analysis of machine-made snow, and scientific studies related to snow metamorphism.



Technical specifications

Technical specifications

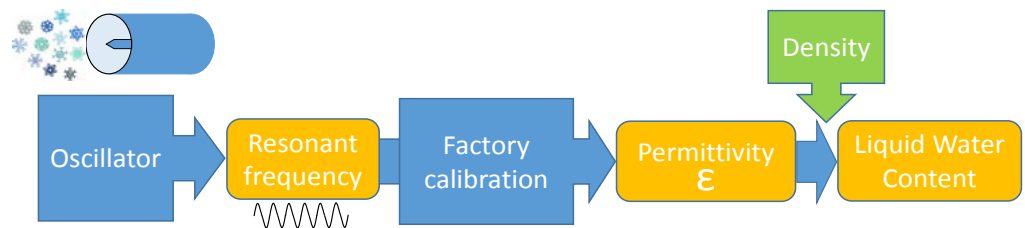
- Liquid water content measurement range: 0-20 vol. %
- Typical measurement uncertainty: 1 vol. %
- Acquisition time: <1s
- High accuracy thanks to a well-defined measurement volume
- Robust stainless steel sampler, IP65 processing unit
- Battery life: 12 days of normal operation (1200 mAh battery)
- Weight: approx. 1 kg for the complete system
- Size (cm): sampler 26 x Ø 8, processing unit 25 x 13 x 6



Working principle

Working principle

The working principle of WIS_{ϵ} relies on the relation between the liquid water content, the density and the permittivity of snow in the MHz range.



The measurement takes place in a sampler acting as a capacitor, where the electrodes are a metal cylinder and a central rod. Thanks to an internal resonator, WIS_{ϵ} measures the resonant frequency of the system. This value is then converted into permittivity thanks to a conversion function determined at manufacturing time. In a second step, the permittivity is combined with the density of the snow (measured separately) in order to compute the liquid water content.

The technique was validated against the well-established calorimetry method.