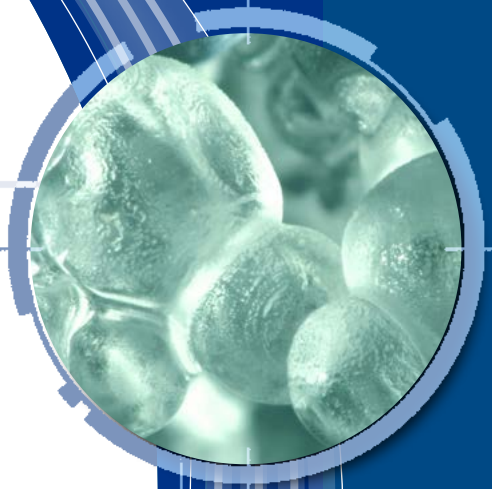
A2 Photonic Sensors

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 with the support of LabEX OSUG@2020

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

METEO FRANCE

Liquid water content

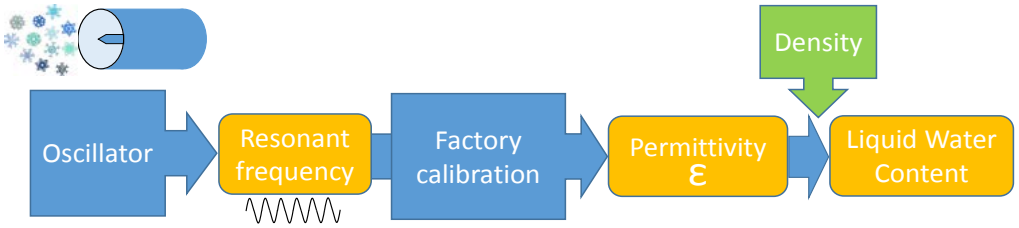
The presence of liquid water in the snowpack has a dramatic impact on its physical and mechanical behaviors. The measurement of this quantity provides very valuable information for many purposes, including avalanche forecasting, analysis of machine-made snow, and scientific studies related to snow metamorphism.

Technical specifications

- 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

The working principle of WISe 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, WISe 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.

Photos courtesy of A2 Photonic Sensors & CEN/Météo France