

## **A test of the Goodrich 0871LH1 ice detector at the Guetsch station**

Cattin René<sup>1</sup>, Heimo Alain, Roulet Yves-Alain, Rast Jacques

<sup>1</sup>Meteotest

Fabrikstrasse 14, 3007 Bern, Switzerland  
+41 31 307 26 26, rene.cattin@meteotest.ch

The Swiss project "Alpine Test Site Gütsch: meteorological measurements and wind turbine performance analysis" has the goal to expand the knowledge on atmospheric icing specifically in the Alps. It is embedded in the European "COST Action 727" and aims at comprehensive testing and improvement of monitoring equipment. One goal of the project is the inter-comparison of existing commercial and newly developed ice detection sensors at the meteorological test station Gütsch operated by the Swiss Federal Office of Meteorology and Climatology MeteoSwiss. One of these sensors is the Goodrich ice detector 0872LH1.

The Goodrich ice detector has a probe that oscillates at 40 kHz. As ice accretes on the probe, the added mass causes the resonant frequency to decrease: the ice load depends linearly on the induced frequency shift. The instrument then initiates a self-de-icing cycle that removes all accumulated ice from the probe. This procedure is repeated until the icing event is over. The output of the instrument is a binary information of type ice (1) or no ice (0) accreted. No information on the ice load (quantity) is delivered.

The sensor was monitored by an automatic camera. The camera images were manually classified on the presence of icing and compared with the readings of the sensor. The analysis showed that in many cases, the instrument performed well, but it also revealed some shortcomings: During strong icing events, ice accretion on the instrument's arm has the tendency to creep upward (or downward or horizontally depending on the installation) and to cover the whole instrument. As long as ice is detected, the heating remains switched on, thus building a hollow ice "igloo" around the sensor. From that moment, the detector does not "see" any ice anymore until the next melting period. The second problem is that under given circumstances not yet characterized, the sensor does not seem to react at all.