

Alpine Test Site Guetsch: Meteorological measurements and wind turbine performance analysis

COST 727 Measuring and forecasting atmospheric icing on structures

Météo Suisse, Payerne / *METEOTEST* Bern

Abstract of Status Report 2006

Abstract:

The project "Alpine Test Site Gütsch: meteorological measurements and wind turbine performance analysis" has the goal to expand the knowledge base on atmospheric icing specifically in the Alps. The main topic of the research plan is to carry out a comprehensive experimental study on Gütsch mountain, Switzerland at 2'300 m asl during the winter periods 2005/06, 06/07 and 07/08. The following steps were achieved during 2006:

Meteorology:

The Guetsch test station has been expanded with numerous measurements systems. On one side, the station is fully equipped with standard instruments as defined for the SwissMetNet network. In parallel, a number of new meteorological instruments have been implemented which are installed in order to test their robustness to harsh environment for other meteorological applications.

The installation of the ice detection devices already identified several technical shortcomings of the instruments suitability for harsh conditions. Nevertheless, some devices could be put into operation and tested during winter 2006/07.

All ice detectors are regularly monitored by an automatic camera.

Wind turbine:

Two web cams were mounted at the nacelle of the wind turbine. They allow for the investigation of icing on the rotor blades and the performance of the blade heating. The monitoring of the wind turbine pointed out deficiencies of ice detection as well as blade heating performance.

As the wind turbine is located close to ski slopes, ice throw is an important safety issue. Therefore, the area around the wind turbine was inspected after every icing event for ice fragments that had fallen off the blades. The observation proved that it represents a significant safety risk at this site.

Data handling:

Data from the synoptic station as well as the operational data of the wind turbine is synchronized and stored into a dedicated data base which allows for the analysis and correlation of the meteorological conditions and the wind turbine performances during icing events.

Keywords:

atmospheric icing, sensors, measurements, comparisons, test site, wind turbine performance under icing conditions, in cloud conditions, deposition of super cooled water, recommendations for meteorological guidance, ice sensors and models for wind turbine control