

METEOROLOGY

Caucasus Mountains Get Early Lightning Detection System

Determined to limit loss of life and property in the Russian Federation's most active thunderstorm zone, Russia introduces Vaisala's thunderstorm detection system across the Northern Caucasus.



Russian High-Mountain Geophysical Institute chooses Vaisala

The High-Mountain Geophysical Institute (VGI), part of Roshydromet (the Russian Federal Service for Hydrometeorology and Environmental Monitoring), is tasked with monitoring weather conditions in the Northern Caucasus Mountains. Annually, the region records the most thunderstorm days in the Russian Federation. This is due to its rugged terrain and unique geographical position sandwiched between the Black and Caspian Seas. With its stated objective of reducing damage and losses from weather and climatic events, the VGI opted

for the Vaisala Lightning Detection System for accurate, early detection of thunderstorm activity.

New State-of-the-Art System

VGI had been utilizing an older meteorological system for recording thunderstorms. This existing system had significant technical limitations that prevented the Institute from taking a proactive role in weather monitoring and warning. To address their future needs, Vaisala offered a modern automated system that allowed for precise real-time location and time data on lightning strokes in 3-D rendering.

Challenge:

- Limit the risk to human life and economic damage from adverse thunderstorm events in the Northern Caucasus
- 3-D rendering of stable and precise real-time location and time data for lightning strokes

Solution:

- Vaisala Lightning Detection System including four LS8000 sensors and CP8000 central processors
- Upgrades with Vaisala Thunderstorm Electric Field Mill EFM550

Benefits:

- A high quality, readily upscalable system allowing for comprehensive coverage of mesoscale meteorology
- Reliable technical and maintenance support in remote mountain areas
- CAPEX was quickly offset by savings from reduced annual material losses in the region

Close Cooperation with VGI

The project began in October 2007 with initial site surveys and final selection determined by experts from VGI. The sites were selected based on their proximity to existing government facilities in order to ensure land ownership, ease of site supervision and an existing technical infrastructure. After site selection, Vaisala worked closely with VGI experts to install the sensors, calibrate the antennas, and set up network connections. The system was fully completed and relaying data to the High-Mountain Geophysical Institute in Nalchik by August 2008.

More Accurate and Effective Warnings

At each of the four sites, Vaisala installed a CP8000 central processor and an LS8000 modular lightning detector equipped with a low frequency (LF) and a very high frequency (VHF) sensor. This sensor array gives the Institute detailed data on individual lightning strokes. Researchers can now determine the potential severity and direction of the storm based on stroke classification, frequency, intensity, position, polarity, current steepness, and signal peak values. This real-time data rendering means thunderstorm warnings can be issued more effectively and accurately.

Expanding on Success

The failure-free operation of the Vaisala Lightning Detection System, along with the responsive Vaisala technical support, has generated very positive feedback from VGI associates. Vaisala is currently upgrading the Caucasian network with Vaisala Thunderstorm Electric Field Mill EFM 550 to provide more detailed analysis. Roshydromet seems quite confident in the quality of the system as they are now looking to expand the system to the Moscow region.



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