Geophysical Research Abstracts
Vol. 12, EGU2010-3692, 2010
EGU General Assembly 2010


# The new geophysical observatory in Northern Caucasus (Elbrus volcanic area) and results of studies of ULF magnetic variations preceding strong geodynamic events

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The new geophysical observatory for fundamental scientific studies of geophysical processes in the Elbrus volcanic area (Northern Caucasus) has been organized recently as a result of merging of five geophysical laboratories positioned round the Elbrus volcano and equipped with modern geophysical instruments including broadband triaxial seismometers, quartz tilt-meters, magnetic variometers, geo-acoustic sensors, hi-precision distributed thermal sensors, gravimeters, and network-enabled data acquisition systems with precise GPS-timing and integrated monitoring of auxiliary parameters (variations on ambient humidity, atmospheric pressure etc). Two laboratories are located in the horizontal 4.3 km deep tunnel drilled under the mount Andyrchi, about 20 km from the Elbrus volcano.

Analysis of multi-parameter streams of experimental data allows one to study the structure of geophysical wave fields induced by earthquakes and regional catastrophic events (including snow avalanches).

On the basis of continuous observations carried out since 2007 there have been determined anomalous wave forms in ULF geomagnetic variations preceding strong seismic events with magnitude 7 or more. Mentioned wave forms may be natively related to processes of evolution of dilatational structures in a domain of forthcoming seismic event. Specific patterns in anomalous ULF wave forms are distinguished for undersea earthquakes and for earthquakes responsible for triggering tsunami events. Thus, it is possible to consider development of a future technology to suggest the possible area and the time frame of such class of catastrophic events with additional reference to forecast information (including acoustic, hydro-acoustic and geo-acoustic) being concurrently analyzed.