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# Electromagnetic emission prior to landslides, avalanches and earthquakes.

**V. Morgounov**, A. Zdorov

Institute of Physics of the Earth Russian Academy of Sciences, Moscow, Russia (vam@ifz.ru / Fax: +07 495-2556040)

Snow avalanche and landslide hazard is reasonably considered as one of the vital problem in different countries. Serious economical losses, victims among population and snow resort visitors because of these natural calamities indicate that the problem is far from a reliable solution. The main attention is paid to the question of forecast of the general dangerous time periods according to meteorology conditions, and the conditions of strain accumulation in the zone of frontogenesis. Nevertheless up to now the most important element of the avalanche and landslide: short term prediction of the moment of avalanching remained unsolved. The usage of the electromagnetic methods in practice of landslide risk monitoring gives a new potential for the study of landslide nucleation. The results of electromagnetic emission measurements during the final phase of landslide nucleation in the mountains of the North Caucasus are submitted. The recorded anomalous effects are explained in terms of microfracturing mechanism in the zones of steeply rising strain. Similar electromagnetic emission (EME) effects are recorded during and after operating of knock-boring machine nearby and after impact action of different origin like industrial blasting. The character of the arising EM effects is of the same origin as electromagnetic emission recorded prior to earthquakes. Thus, electromagnetic effects preceding landslide, aftereffect of the mechanical impact (blasting or other reason) and during earthquakes nucleation are the evidence of the generation of the emission in the subsurface layers of the Earth crust. In contrast to the rocks, the ice and snow massif demonstrates good dielectric properties. During the process of microfracturing of the ice matrix, the volume under stress eliminate acoustic and electromagnetic emission due to the excitation of mechano-electric transformers through the mechanisms of relaxation of mosaic electric charge, originated on the sides of the opening cracks and other dislocation mechanism. The

phenomena of generation of the EME in rocks (ice and snow) during plastic destruction enables to use it for prediction of natural hazards like landslides, tectonic motions, snow avalanches, earthquakes. Modern technology enables to develop a compact computer warning system for monitoring of the dangerous time periods in the vicinity of residential areas and particular objects.

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