A PRELIMINARY SYSTEM TO PREDICT SNOW INSTABILITY USING ACOUSTIC EMISSIONS

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Abstract. Results from the last four winters' studies on acoustic emissions from snow slopes have shown that periods of higher noise in the frequency band 5 to 125 Hz are associated with periods of instability, but that the phenomenon of acoustic emissions from unstable snow is very weak. Interference with the acoustic emissions from extraneous sources such as chairlifts, trucks, and airplanes causes ambiguities in the data which interfere with the straightforward prediction of instability.

Spectra of the noises were examined, with the idea that filters might improve the signal-to-noise ratio. It was found that the noise generated by unstable snow can occur over a fairly wide range of frequencies and that there is no band of frequencies which is unique to unstable snow. It was found that the noise from the chairlift had a very stable spectrum and that it had a band from 50 to 65 Hz which was pronounced and in which the snow noise was fairly low. The r.m.s. voltage in the band 5 to 125 Hz can therefore be reduced by subtracting a proportion of the r.m.s. output of a narrow-band 55 Hz filter. By adjusting the constant of proportionality, it was possible to eliminate interference from the chairlift almost entirely, and this will be used.

Spectral analyses have also shown that ambiguities are generated by variations in the 60 Hz power-line noise. It is possible to suppress this with the use of filters, but without complex digital data manipulation, it is not possible to eliminate it.

The fact that the snow noise does not transmit over large distances means that events of interest should not occur simultaneously on two, widely spaced geophones. The system will include a geophone in an unstressed region whose r.m.s. voltage will be subtracted from that of the geophone in the stressed region to eliminate signals which are common to both. It is hoped that this technique will eliminate ambiguities caused by extraneous sources such as trucks and airplanes.

PREVENTION OF AVALANCHES IN THE GUNES VALLEY IN T'IEN-SHAN, CHINA

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Abstract. A section of the highway through the Gunes valley can be seriously interrupted by avalanching; in 1966–67 traffic was interrupted for four months. About 86 places are threatened by avalanches, most of which are channelled avalanches that do not reach the highway every year.

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