Infrasound monitoring of debris flow

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Processes such as wind, debris flow, avalanches and traffic are sources of sub-audible sounds in the low frequency infrasonic spectrum. Recent studies indicated that debris flow generated noise is of significant amplitude and occupies a relatively noise free band in the low infrasound spectrum (5-15Hz). These low frequency infrasound signals have the ability to propagate long distances through the atmosphere from the debris flow source with a velocity of 344m/s which is about the same as that of audible sound.

This study focuses on naturally occurring infrasound produced by a 3 days debris flow event in July 2007, in the Jiangjia Gully, Yunnan, China. The debris flows had a big variety in terms of the amount of discharge and furthermore they differ from very fluid surges up to more solid surges with a density of 2000kg/m^3. The data was monitored with two different microphones, a custom made Chinese Sensor and a standard infrasound measuring microphone from a German Company. Contemporary video recording and photographing took place for visual validation of the acoustic signals. The aim is to specify the debris flow signal out of interferences to provide a basis for automated signal processing through the use of digital filtering, frequency analysis, and weighted threshold decision-making. As the infrasonic debris flow signals are nonlinear and non-stationary they are analysed by adopting the HHT approach and in comparison the conventional FFT method. The final goal is the development of an automatic passive warning system for debris flows.