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Infrasound monitoring of snow avalanches in the Italian Alps

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Risk assessment of snow avalanches is mostly related to weather conditions and snow cover. However a robust risk validation requires to identify all avalanches occurring, in order to compare predictions to real effects. For this purpose on December 2009 we installed a temporary 4-element, small aperture (100 m), infrasound array in the Alps. The array has been deployed south of Mt. Rosa, at an elevation of 2000 m a.s.l. in the valley of Gressoney, where natural avalanches are expected and triggered ones are regularly programmed. The array consists into 4 absolute pressure transducers with a sensitivity of 0.01 Pa in the 0.1-50 Hz frequency band and a 7 channel Guralp CMG-DM24 A/D converter, sampling at 100 Hz. Timing is achieved with a GPS receiver. The array is completely buried in snow. Gel cell batteries and 200 W solar panels provide the array power requirements ($\sim$3 W) and should allow a continuous operation during the winter season. A multi-channel semblance is carried out on the continuous data set as a function of slowness, back-azimuth and frequency of recorded infrasound in order to detect all avalanches occurring from the back-ground signal, strongly affected by microbarom and mountain induced gravity waves. This pilot experiment in Italy will allow to verify the efficiency of the system, and might represent an important validation to modeled avalanches activity during this winter season.