Geophysical Research Abstracts, Vol. 9, 01753, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01753

Analysis of debris flow recordings in an instrumented basin

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On August 24 2006, a debris flow event took place in the Moscardo Torrent, a basin of the Eastern Italian Alps instrumented for debris-flow monitoring. The debris flow was monitored by two different seismic networks located in the middle basin and on the alluvial fan, respectively. The event was also recorded by a pair of ultrasonic sensors installed on the fan, close to the lower seismic network. The comparison between the different recordings outlines particular features of the August 2006 debris flow, different from that of events recorded in previous years. According to the data recorded by the seismic sensor placed on the fan the event lasted about 16-17 minutes, while both the ultrasonic sensors and the upper seismic network show the presence of a recession tail that lasts further 15 minutes. Moreover, a typical debris flow wave was observed at the upper seismic network, with a main front abruptly appearing in the torrent, followed by a gradual decrease of flow height. On the contrary, on the alluvial fan the wave displayed an irregular pattern, with the main peak occurring in the rear of the wave both in the seismic recording and in the hydrographs. The change in the shape of the wave can be ascribed to the attenuation of the surge caused by the torrent control works that took place in the lower basin during last years and widened the cross section. This and other aspects revealed by the recordings will be presented and discussed.