



Estimation of sediment discharge by the acoustic sensor

Y. Itakura (1), H. Suwa (2), and T. Sawada (3)

1. Shiga University, Hiratsu 2-5-1, Otsu, Japan (itakura@sue.shiga-u.ac.jp / phone +81-77-537-7727)
2. DPRI Uji, Kyoto University, Uji, Kyoto, Japan (suwa@slope.dpri.kyoto-u.ac.jp / phone +81-774-38-4101)
3. DPRI Hotaka, Kyoto University, Kamitakara, Gifu, Japan (sawad@yc5.so-net.ne.jp / phone +81-578-9-2154)

Estimation of sediment discharge is important to prevent and mitigate the hazards carried by debris-flow events or flood events. An acoustic sensor, one of sensors for this purpose, has been tested at some observation sites of Japanese torrents, Nojiri-torrent, Kagoshima, Kamikamihori-torrent, Nagano, and Ashiarai-torrent, Gifu. The acoustic sensor consists of the microphone installed underground at a depth of around 1m inside a pipe and the signal amplifier unit. The microphone detects sounds generated by the collision of moving particles with each other or with the channel bed and propagated through underground. It is, therefore, supposed that the output signal level of the acoustic sensor depends on the discharge amount in the torrent.

Some big events occurred at Nojiri-torrent and Kamikamihori-torrent as debris-flow events and at Ashiarai-torrent as flood events. The acoustic sensor was set under the bank near the torrents and recorded the output signal. The results of our observation are shown the correlation between the output signal level and the discharge amount. The observation site of Nojiri-torrent has two kinds of channel bed, natural one and artificial one; on the other hand, the site of Kamikamihori-torrent is only natural bed and the one of Ashiarai-torrent is only artificial one. The correlation coefficient between the output signal and the discharge amount is about 70% in any torrents and is slightly higher in natural bed than in artificial bed.

The acoustic sensor is useful for sediment-discharge estimation as well as the other ground vibration sensors.