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# IAN REPORT 148

# SedAlp WP 5 Part 1

## Conception, installation and first operation of a bedload monitoring station at Suggadinbach

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# Report 148 SedAlp WP5 Part 1:

# Conception, installation and first operation of a bedload monitoring station at Suggadinbach


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# Bedload transport monitoring station at Suggadinbach

A new bedload transport monitoring station has been designed by the Institute of Mountain Risk engineering at the Suggadinbach in Vorarlberg. In cooperation with the Austrian Service for Torrent and Avalanche Control the station has been installed in June 2013 in a check dam. The dam is structured into a low water section in order to have concentrated flow and sediment transport for most time of the year. The check dam during construction is shown in Figure 1.

Figure 1: Structured check dam prepared for installation of the measuring system.

Two different types of measuring systems are installed: 13 Swiss type geophone sensors record the vibrations of the transported sediment. Details of the geophone plate are shown in Figure 2 and Figure 3. Additionally 3 modified Japanese pipe hydrophones are mounted under steel plates in order to record the acoustic signal produced by the sediment transport. The hydrophone measuring system is shown in Figure 4 and Figure 5 Both systems can be compared directly because they are arranged consecutively in flow direction. Therefore the advantages of both systems can be combined. . An overview of the measuring station and a detail of the equipped check dam can be seen in Figure 6 and Figure 7.

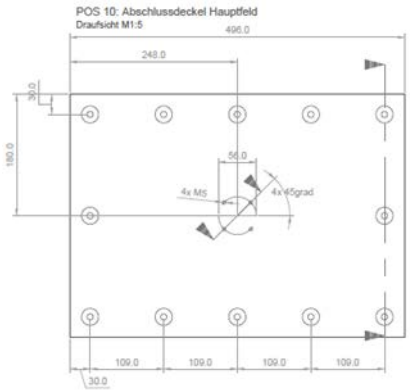


Figure 2:.Details of the geophone plate.

Figure 3: Geophone plate with sensor.

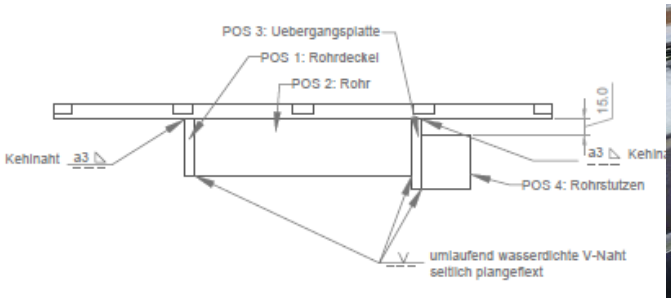


Figure 4: Details of modified pipe hydrophone.

Figure 5: Modified pipe hydrophone.

Figure 6: Overview of the measuring system.

Figure 7: Detail of the equipped check dam (during installation in June 2013).

The measuring frequency amounts to 9.6 kHz and the signal is evaluated for 1 minute intervals. The maximum amplitude, the number of impulses over a certain threshold and the quadratic sum of the energy is stored for all 16 channels. An example of recorded data is shown in Figure 8 for a geophone and a hydrophone. For situations where more information is required the full 9.6 kHz signal can be stored. Additionally the water stage and surface velocity is measured upstream of the station to record the discharge and flow conditions in the Suggadinbach torrent. The flow data and a picture of a webcam for visual control are sent every hour. The daily generated files of the measuring station are transferred via FTP. Additionally an uninterrupted power supply unit is installed to guarantee continuous measurement during short electric power outlage.

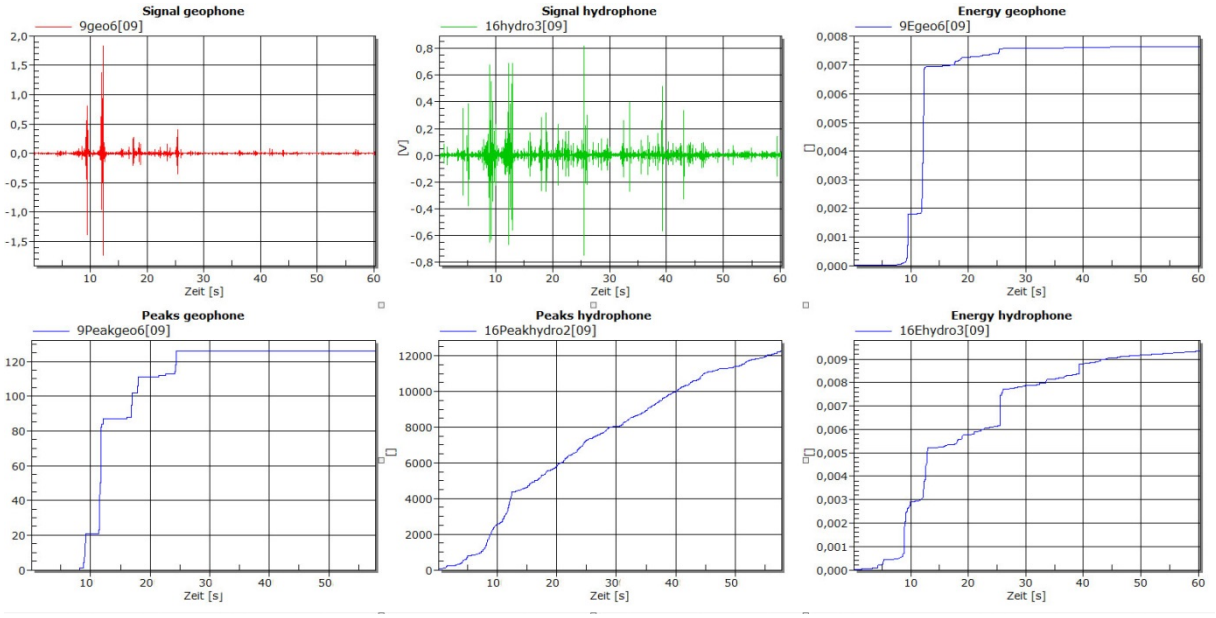


Figure 8: Example for recorded and evaluated date of a hydrophone and a geophone.