Geophysical Research Abstracts
Vol. 20, EGU2018-3194, 2018
EGU General Assembly 2018
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Bed-load monitoring via Japanese pipe-hydrophone- case study in Kaohsiung, Taiwan

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Sediment transport is highly relative to water conservation and management in the mountain area. Especially the case on bed load monitoring which plays an important role on riverbed changes. In the past, government usually uses direct methods to monitor, however it has some disadvantages like high cost and high risk in high flow. Therefore, indirect methods like acoustic method for the continuous monitor will become more important in the future. There are several kinds of methodologies on indirect bed load monitoring. This paper will focus on the theory of hydrophone and how it will be applied on site to identify the feasibility in Taiwan. Due to the topographic conditions most of rivers in Taiwan are short and steep. The stormy weather and turbulent river also make it more difficult to evaluate the sediment transport during typhoon seasons. Higher discharge also transports bigger and larger sediment like stones that over 50cm. The study area of this paper is located in Yokaung River, a mountain torrent in Kaohsiung city, Jiasian District. The 3 mm thickness pipe had been installed in 2016 and it had recorded two torrential rainfall events and two typhoon events. After the second typhoon event, the pipe was broken and replaced by thicker pipe which was 7.5mm. The data of two kinds of pipe are recorded and compared. As we know, the thicker pipe is less sensitive than thinner pipe so the ranges of the discharge for detecting are also different. According to the result, detecting rate of thicker pipe is low but it can tolerate in high discharge. It means that thicker pipe is probably more suitable for the situation of Taiwan's torrent.