Geophysical Research Abstracts
Vol. 12, EGU2010-5680, 2010
EGU General Assembly 2010

Flood-Induced Riverbed Changes and Sediment Yields Revealed by Twice LiDAR Surveys

Yu-chung Hsieh (1,3), Yu-Chang Chan (2), Jyr-Ching Hu (1), and Chao-Chung Lin (3)

(1) National Taiwan University, Geoscience, Taiwan (spencer1121@gmail.com), (2) Institute of Earth Sciences, Academia Sinica,Taiwan(yuchang@earth.sinica.edu.tw), (3) Central Geological Survey, MOEA , Taiwan(hsiehyc@moeacgs.gov.tw)

Riverbed changes and sediment yields from watersheds greatly influence the conservation of water and soil, the planning of hydraulic engineering, and the river habitat, etc. At present, sediment yield calculation often used empirical or theoretical formula as well as data collected at hydrological stations, and rarely had the actual measured value through high-resolution topography. The Lanyang River is one of main rivers in Taiwan and often suffers the influence of typhoon during summer. Most of sediments generated from slump and soil erosion into river were transported from the upstream watershed and resulted in the riverbed changes during the typhoon season. In 2008, there are four significant typhoon events influencing this area, including the Kalmaegi, Fung-wong, Sinlaku, and Jangmi typhoons. This topographic research funded by the Taiwan Central Geological Survey, surveyed the terrain of the Lanyang River before and after the typhoon season using Airborne LiDAR technique, and computed the terrain variations. The variations of the terrain on the riverbed may be regarded as the sediment yield of the bed load transported during the typhoon season. This research used high-resolution terrain models to compute sediment yield of the bed load, and further discussed volumes of sediment yield in watershed during the typhoon season. In the Lanyang River we discovered that the upstream and midstream channel still had the characteristics of erosion and transportation during the typhoon season. The sediment on the river bed reduced approximately 2.3 million cubic meters; and the erosion rate of the bed load sediments were estimated about 3.4 mm during the 2008 typhoon season. The results imply significant sediment yield and transportation from the upstream watershed of the Lanyang River during only single typhoon season in which cumulated rain falls are high. The leading factors of the riverbed erosion include the riverbed slope, channel curvature, channel width, lithology on both sides of riverbank and the sediment yield of its tributaries. Further analysis of collected data in the Lanyang River are needed to further understand the typhoon influence and apply the results to flash flooding hazard prevention.