Geophysical Research Abstracts
Vol. 19, EGU2017-6240, 2017
EGU General Assembly 2017

Improving the process of geological mapping in sedimentary terrain by using high-resolution topography in 3D environments

Yu-Chang Chan (1), Nai-Cih Shih (2), Chia-Hung Chiu (2), and Yu-Chung Hsieh (3)

(1) Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan (yuchang@earth.sinica.edu.tw), (2) Department of Geoscience, National Taiwan University, Taipei, Taiwan, (3) Central Geological Survey, Ministry of Economic Affairs, Taipei, Taiwan

Traditional geologic maps were basically produced by field geologists through direct field investigations and interpretations from 2D topographic maps. However, the quality of traditional geologic maps was knowingly compromised by field conditions, particularly, when the mapping area is largely inaccessible or covered by heavy forest canopies. Recent advancement in airborne LiDAR technology can virtually remove trees or buildings, thus, providing a useful high-resolution topographic data set for the bare ground surface. The high-resolution topography still needs to be interpreted in terms of geology, and fundamental questions regarding how to apply the high-resolution topography remain to be answered for improving the process and quality of geological mapping. In this study, we aim to test the quality and reliability of high-resolution geologic maps produced by recently developed methods by an example from the fold-and-thrust belt in northern Taiwan. We performed the geological mapping by applying the LiDAR-derived DEM, self-developed Python program tools and many layers of relevant information at interactive 3D environments on a computer. Our mapping results indicate that the proposed mapping methods will significantly raise the quality and consistency of the geologic maps. Our study also shows that in order to gain consistent mapping results, future high-resolution geologic maps should be produced in 3D environments based on existing geologic maps and a few field checks for verification.