Quality evaluation of UAV associated digital terrain model by means of ground control points

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In recent years, Unmanned Aerial Vehicle (UAV) become a popular technology, and is very useful for natural disaster assessment and hazard mitigation study. With good UAV equipment and resources, this study is thus focus on the feasibility and adaptability analysis of the UAV techniques and its' applications. Digital terrain model (DTM) is the one of the most essential data set for hazard analysis. In this study we try to find what the data and the quality that UAV-associated equipment may produce, and the relationship related with the ground control points (GCPs), and what is the most efficient way to improve the quality, and how to achieve this goals. There are two kinds of UAVs, the fixed wing and the rotor wings, depending on different role of classification. In this study, we compare the quality evaluation of DTM from these two kinds of UAV. Different factors are also evaluated in this study, including different kinds of digital cameras, different UAVs, and different sets of GCP groups, by comparing the DTM quality that applying in the same area. The result indicates that the quality of images affects the DTM, and the quality of image relates with, and only with the mission fly high. However, different UAV platform is not important for data resolution. In this study, we analyzed how does GCP affects DTM, compared with the airborne LiDAR data, and with ground leveling. Even caused of the field situations, time costs. . . etc. we could not set GCP homogeneously and ideally. The result finds the distribution and the amount of the ground control points are the dominant factors affecting DTM quality. The current result shows that the precision of the DTM could be better than 20cm, compared with airborne LiDAR data. Based on the objective of this study, some suggests and results related with different platforms and equipment selection, and the mission planning is thus discussed.