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Volcanoes geological mapping and structural geology with UAS High Resolution Digital Terrain Model : the Kuei-Shan Tao case example (Eastern Taiwan).

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Volcanic areas in the World are often difficult to map especially in a structural point of view as (1) fault planes are generally covered and filled by more recent lava flows and (2) volcanic rocks have very few tectonic striations. Kuei-Shan Tao (11km from Ilan Plain – NE Taiwan) is a volcanic island, located at the southwestern tip of the South Okinawa trough (SWOT). Two incompatible geological maps had been already published both lacking faults and structural features (Hsu, 1963 and Chiu et al., 2010). We propose herein not only to up-date the Kuei-Shan Tao geological map with our high resolution dataset, but also to create the Kuei-Shan Tao structural scheme in order to better understand its geological and tectonic history.

Consequently, we first acquired aerial photographs from our UAS survey and get our new UAS high resolution DTM (HR UAS-DTM hereafter) with a ground resolution <10cm processed through classical photogrammetric methods. Taking into account common sense geomorphic and structural interpretation and reasoning deduced from our HR UAS-DTM, and the outcropping lithologies situated all along the shoreline, we have up-dated the Kuei-Shan Tao geological mapping and its major structures. To conclude, the lithologies (andesitic lava flows and pyroclastic falls) and the new structural scheme lead us to propose a scenario for both the construction as well as the dismantling of Kuei-Shan Tao which are keys for both geology and geodynamics of the SWOT.