



## **Input of UAV, DTM photo-interpretation and SAR interferometry on active tectonics applied on the Southern Coastal Range (SE Taiwan)**

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Taiwan is an excellent geomorphic laboratory where both extreme climatic events and high active tectonics compete. Moreover many Earth Sciences and Environmental data bases exist nowadays that help to better constrain both structural geology and active deformations. The latter unfortunately is still poorly known in the Coastal Range of E.Taiwan in terms of geology due to access difficulties, high relief, paucity of roads, tropical vegetation and high climatic events (typhoons and heavy rainfall) and so on.

Indirect methods such as photogrammetric survey using UAV's helps a lot to get high resolution topographic DEM and DTM, better than 10cm in planimetry, that helps a lot to get through careful photo-interpretation, a bird's eye view of the geology. Therefore we were able to much update the famous pre-existing geological maps (Wang and Chen, 1993).

Moreover, by combining our high resolution topographic results with those of SAR interferometry (database of Champenois et al, EPSL, 2012), we were able to identify, characterise and quantify the differential active features toward the LOS of the Coastal Range (eastern Taiwan). In order to synthetise and to model the deformation of that famous place, we herein constructed more than 500 parallel projected profiles in order to locate, characterize and quantify the active tectonic features and compare them to the topography and the updated photo-interpreted geology (this work). We then were able to reconstruct the structural geometry of the Coastal Range and the Longitudinal Valley in SE Taiwan.

Among our results, we reveal and prove : 1. the whole 2cm differential surrection of the Coastal Range ; 2. the differential displacement between both Central and Coastal Ranges ; 3. we explain the location of the Pinantashi river situated within the Lichi melange that correspond to the maximum surrection of the Coastal Range ; 4. we reveal the different units and their relative displacement within the Coastal Range itself ; 5. we prove the injection of the Lichi melange within the maximum deformation area especially within the southern Longitudinal Valley Fault and the Pinantahsi river.

To conclude, we now have the data (quality, quantity) in order to reconstruct correctly the geology of the surface of Taiwan which will help to better constrain the deepest structures of the island as well as seismic hazards.

References :

Champenois, J., Fruneau, B., Pathier, E., Deffontaines, B., Lin, K.C. & Hu, J.C., 2012. Monitoring of active tectonic deformations in the Longitudinal Valley (Eastern Taiwan) using Persistent Scatterer InSAR method with ALOS PALSAR data, *Earth and Planetary Science Letters*, 337-338, 144-155.

Wang, Y., & Chen, W. S., 1993. Geological map of eastern Coastal Range, Central Geological Survey, scale 1:100,000.