Magnetic Fabrics Analysis across the Central Region of the Chimei Fault in the Coastal Range of Eastern Taiwan

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Taiwan is an ongoing orogen located in the conjunction of two subduction-arc systems with opposite vergences between the Philippine Sea and Eurasian plates. The Coastal Range along the eastern Taiwan is the accreted terrain composited of Luzon arcs and surrounding basins onto the Eurasian crust. The Chimei fault, a typical lithology-contrast fault thrusted the Miocene volcanic Tuluanshan Formation over the Pleistocene sedimentary Paliwan Formation, is the only major reverse fault across the entire Coastal Range. To investigate the deformation pattern and strain history across the Chimei fault, we analyzed oriented samples in the footwall of mudstone and in the hanging wall of volcanic rocks along the Hsiukuluan River via anisotropy of magnetic susceptibility (AMS).
Results of AMS across the central part of the Chimei fault show that the direction of k_{MAX} changed from N-S orientation to sub-vertical and the orientation of k_{MIN} switched from 270/70 to N-S orientation when samples of the footwall were approaching to the fault zone. At the same time, anisotropy was increasing and susceptibility ellipsoid changed from oblate in the fractured zone through prolate in the folded zone to oblate in the faulted zone. Based on identification experiments of magnetic minerals, the major magnetic carrier is magnetite with pseudo-single domain, suggesting paramagnetic minerals control the AMS. With increasing deformation, oblate ellipsoids with strong anisotropy developed within the fault zone highlighted the strain history of the central part of the Chimei fault. As a result, it strongly speculated that stress altered from sub-vertical sedimentary loading to horizontally NW-SE compression during collision stage and current N-S compression orientation could be resulted from 30 degree clockwise rotation during accretion stage.
This study demonstrates that AMS pattern across the Chimei fault is the consequence of finite deformation. Our results of magnetic fabrics evolution across the Chimei fault can provide insights into understanding the tectonic history of Chimei fault.

Keywords: Anisotropy of Magnetic Susceptibility, Chimei Fault, Coastal Range, Taiwan

