

臺灣脊梁山脈南段磁感率異向性東西向變化之研究

Study of Anisotropy of Magnetic Susceptibility across the Southern Portion of the Backbone Range, Taiwan

Supervisor:

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Project description:

Taiwan orogen is related to the on-going arc-continent collision between the Eurasian and Philippine Sea Plates. The Backbone Range in Taiwan has been recognized as the oldest geological unit of Taiwan, and mainly composed by slate (Lushan formation) and schist (Tananao complex). Previous studies divided the Tananao complex into Taroko belt and Yuli belt. These two belts contact to each other by the Shoufeng shear zone. Generally, Shoufeng shear zone was recognized as former subduction interface before the beginning of collision stage.

In order to understand the characteristics and tectonic meaning of the Shoufeng shear zone, evaluating the changes of finite strain, which underwent through several deformed events cross the Backbone Range, is essential information. By doing this study, we expect to observe the magnitude variation of finite strain across the Shoufeng shear zone compare with the wall rocks. To analyze the finite strain, anisotropy of magnetic susceptibility (AMS) is an efficient, convenient, fast tool to characterize petrofabric and structure. AMS measurement can afford the shape and three principal directions of finite strains.

We will conduct the field work and collect oriented samples along the Southern Cross-Island Highway, which is across the Backbone Range at the southern Taiwan. In the lab, principal directions and values of magnetic susceptibility ellipsoid will be measured. According to these basic parameters above, the magnetic foliation and lineation which should be consistent with the petrofabric foliation and lineation of mesostructure could be inferred from AMS. Furthermore, the magnitudes of magnetic susceptibility ellipsoids will be used to illustrate the mean magnetic susceptibility and the degree of anisotropy, ellipsoid type and strain pattern, and also explore the relationships among these parameters. Besides, various experiments and methods, such as magnetic susceptibility, hysteresis loop, and isothermal remnant magnetism can be used to evaluate the magnetic source carrier(s) of AMS.

We will evaluate degrees of deformation across the Tananao complex and the Shoufeng shear zone based on the magnitudes and shape of finite strain ellipsoids, and expect to unravel a piece of puzzle about Taiwan orogeny.

Project Schedule:

Week 1-2: paper readings and field trip

Week 3: sample preparation

Week 4: conducting AMS measurements

Week 5: magnetic mineral determination

Week 6-7: Report and Discussion

Week 8: synthetic interpretation and complete the presentation / report.

Preferred background:

Student with field work experience is highly welcomed.

Knowledge of Excel and stereonet plotting is required.

Paleomagnetic knowledge and ArcGIS skills are not necessary.