臺灣脊樑山脈低傾角夾皺劈理之特性研究
Characteristics Study of Shallow-Dipping Crenulation Cleavages at the Backbone Range, Taiwan

Supervisor:

En-Chao Yeh, Department of Earth Sciences, NTNU

Project description:

Taiwan is a classical mountain belt located at the conjunction of on-going oblique convergence between the Eurasian and Philippine Sea Plates. The history of the Yuli belt in the eastern Backbone Range of Taiwan recently is re-discovered as deposition around 15Ma, subduction into 50km depth and exhumation back to the surface. The findings of shallow-dipping crenulation cleavage have been proposed as evidence of rapid exhumation for the Yuli belt. Before evaluating the role of shallow-dipping crenulation cleavages all over the Backbone Range in the content of evolution of Taiwan Mountain Belt, the characteristics of shallow-dipping crenulation cleavages should be investigated. This project will aim to train students study the shallow-dipping crenulation cleavages with different methods to examine various aspects and synthesize results.

In details, we will conduct field work and collect oriented samples at the Backbone Range. In the lab, the shortening of folds associated with the crenulation cleavage as axial plane will be calculated. The anisotropy of magnetic susceptibility (AMS) experiments will be conducted to explore the final strain ellipsoid of oriented samples. Microstructure will be examined under oriented thin sections. The amount of dissolution associated the development of crenulation cleavage under pressure solution will be estimated via geochemical calculation of XRF results. The maximum temperature which crenulation cleavages had been experienced will be estimated via the results of Raman Spectroscopy of Carbonaceous Material (RSCM).

To synthesize the results, we will integrate the strain data on multi-scales from outcrops, AMS, microstructures and dissolution amount. The maximum temperature of shallowing-dipping crenulation cleavages hg

We expect that this work can afford basic characteristic information of the shallow-dipping crenulation cleavages and shed the lights on evaluating of its role during the exhumation processes of Backbone Range, Taiwan.

We will conduct field work and collect oriented samples in the Backbone Range. In the lab, principal directions and values of magnetic susceptibility ellipsoid will be measured. The relationship between magnetic foliation/lineation, which resulted from

the principal directions of magnetic susceptibility ellipsoids inferred from AMS, and petrofabric foliation/lineation of mesostructure will be inspected. And the magnitude parameters of magnetic susceptibility ellipsoids will be used to illustrate the mean magnetic susceptibility and the degree of anisotropy, foliation, lineation, 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.

Project Schedule:
Week 1: paper readings and field trip
Week 2: sample preparation
Week 3: AMS measurements & XRF experiment
Week 4: Thin section examination
Week 5: RSCM experiment
Week 6: Data Analysis
Week 7: synthetic interpretation
Week 8: complete the presentation / report.

Preferred background:
Student with field work experience and ArcGIS skills is highly welcomed.
Knowledge of Excel and stereonet plotting is required.