Deformation characteristics and metamorphic temperature of the high-pressure terrace of the Taiwan orogeny

*Han Chun Lin[1], Yuan Hsi Lee[1], Lucas Mesalles[1], Jian Cheng Lee[2]

1. Department of Earth and Environmental Sciences, National Chung-Cheng University, 2. Institute of Earth Sciences, Academia Sinica, Taiwan

Different mechanisms have been proposed about how the subduction-related high-pressure terrane exhumates to the Earth’ s surface that might come from different tectonic settings. Taiwan orogeny results from arc-continental collision since 6-7Ma and recent studies show that high-pressure Yuli belt is associated with this process. The high-pressure terrane has been buried to ca. 50 km in-depth, and the surrounding terrane is ca. 12-20 km in depth. How the different terrane exhumed to the surface and what kind of structures are developed during the subduction to exhumation process? Here we collect the samples from low to high metamorphic and pressure terrane around the southern Central Range and use the RSCM methods, structural analysis, and zircon fission-track dating to reveal the possible exhumation process.

Three-stage foliations have been observed in eastern Central Range. The S1 is parallel to S0 associated with well-growth mica which is related to the highest metamorphism. The S2 is high-angle dipping foliation with fine-grain mica growth associated with tight to isoclinal folding. The S3 is shallow dipping foliation associated with small to mesoscale recumbent folding. The S3 results from the vertical force, which is strongly related to the recent exhumation process.

The RSCM results show the metamorphic temperature increases from ca. 340°C (low-grade slate) to ca. 500°C (high-pressure belt) in short distances that might infer a high shear zone; however, the zircon fission-track ages are similar in 0.7-1Ma and the eastern Central Range accelerate exhumation since ca. 2Ma simultaneously indicating the different metamorphic terranes have been merged before 2Ma. We suggest that the later stage foliation S2-S3 is related to this rapid exhumation process and the S1 is associated with the highest metamorphism suggesting it could be related to the subduction process.

Keywords: Raman Spectroscopy of Carbonaceous Material, fission track dating, structural analysis, high-pressure Yuli Belt, Taiwan orogeny

