



## **Geochemical Study of Lichens in Tatun Volcano Group, North Taiwan**

Ssu-Yu Kuan

Graduate Institute of Applied Geophysics and Environmental Sciences, National Chung Cheng University, Chia-yi County 621, Taiwan (R.O.C.) (deminm1212@gmail.com)

Tatun Volcano Group (TVG) is located in the northwest of Taipei, the capital of Taiwan. Although the last activity was 200000 years ago, it is critical to monitor TVG because it is nearby metropolitan area. This study is part of the monitoring program and attempts to observe the geochemical relationship between lichen and volcanic gas. Lichens have been extensively used for monitoring atmospheric quality. Lichen can live in critical environments and can accumulate metals from atmosphere due to lack of excretion mechanism. Moreover, lichen can live long and growth in a low rate; therefore, lichen geochemistry can represent an average in a long term manner. In TVG, fruticose lichen can be seldom found due to the high concentration of SO<sub>2</sub> in the atmosphere. However, foliose lichen and crustose lichen are not rare in the study area.

In this study, lichens were collected from TVG and Nan-ao Trail which is in non-volcanic area. The cations were measured by ICP-MS. The geochemical results were analyzed by principal components analysis (PCA). It shows that there is no significant difference among non-volcanic lichens and the non-volcanic lichens are located at an end-member of two distinct trends. It is believed that the non-volcanic lichens indicate a geochemical baseline in north Taiwan and two trends may represent the mixing between two different types of volcanic gases in TVG and geochemical baseline. In this study, rare earth elements (REEs) were also measured. The results of non-volcanic and TVG lichens were normalized by North America Shale and TVG andesite, respectively. Both obtain a flat REE pattern, which confirm that TVG lichens receive metals from volcanic origin and non-volcanic lichens give information of background geochemistry in north Taiwan. In addition, a middle REE enrichment and distinct Ce negative anomaly can be observed. According to the previous studies, middle REE enrichment may be achieved by the selected adsorption of middle REEs by organic matter and Ce negative anomaly can result from oxidation reaction during transportation in atmosphere. However, more solid evidences will be needed for confirmation.