Geophysical Research Abstracts
Vol. 20, EGU2018-3200, 2018
EGU General Assembly 2018

Soil chemistry of a high conservation tropical forest in Singapore

Canh Tien Trinh Nguyen (1), Dong Eon Kim (1), Jiandong Liu (1), Jiang Ze (1), Mengjie Liew (1), Yabin Sun (1), Yixiong Cai (2), and Liong Shie-Yui (1)

(1) Tropical Marine Science Institute, National University of Singapore, Singapore, (2) National Biodiversity Centre, National Parks Board, Singapore

This study provided the first insight data of the soil chemistry in Jungle Fall and Fern Valley forested catchments in the renowned Bukit Timah Nature Reserve, Singapore. Nineteen elements including macro (Al, Fe, Ti) and potentially toxic elements (As, Ba, Ca, Cd, Co, Cr, Mg, Mn, Mo, Ni, Pb, Sb, Sn, Sr, V and Zn) in forest surface soils were studied to understand their concentrations, distributions and potential sources. The study uncovered low concentrations of almost elements in granite-derived soils within these catchments compared to other local Singapore soils as well as international environmental quality guidelines (e.g. USEPA, CCME and Eco-SSL). Multivariate data analysis including Principal Component Analysis, Hierarchical Clustering analysis and Correlation coefficient analysis revealed Co, Sb and particularly high Cd concentrations in soil were most likely derived from anthropogenic activities on the two nearby granite quarries in the 1970s to 1990s. The other elements were likely naturally sourced given their associations with different soil components. It is possible that Mn and its oxides controlled Mn, Ca, Zn, Mg, Ba, Pb, Ni, Sr; Alkali and/or alkali-earth metal oxides governed Na; and Fe, Al, Ti and their oxides were main factors for As, Mo, Fe, V, Al, Cr, Sn and Ti. Although the soils in the two catchments are not highly contaminated, the high concentration of Cd might warrant management attention given the sensitive nature and high biodiversity values of the substantial inland primary forest inside the Bukit Timah Nature Reserve.