

Elemental distributions in a high biodiversity forested catchment in Singapore

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Weekly hydro-geomorphic field surveys were conducted for three months (from 31 Aug 2017 to 14 Nov 2017) at Dermawan forested catchment, Singapore, a high biodiversity, but considerably disturbed and landslide prone site, to uncover its elemental concentrations and possible sources. Although the study site resides in a busy historical industrial zone in Bukit Gombak, with high concentrations of surface soil Cr, Cu, Ca, Mg, Sr and Mn compared to nearby natural forested catchments and international threshold criteria, geological assessment results suggested soil elements are most likely naturally occurred. Stream hydrochemistry contained notably high Cd and Sb, which could be harmful to aquatic environment. However, other elements were in their natural/normal concentration ranges. Hydrological survey indicated low stream discharge at the catchment outlet, averaged at only 0.0053 m³/s, with alkaline and alkaline earth elements (Ca, Mg and Na) dominating the total elemental load of 3.67 tonnes/year. Although sources of harmful element Cd, Cr and Sb in soil (for Cd and Cr) and stream water (for Cd and Sb) remain unknown at this stage, the two most possible anthropogenic candidates are historical industrial and current military exercises. The study not only provided new geochemical data for a forested catchment located at Gombak Norite geological unit in Singapore but also piloted catchment conservation plans in terms of hydro-geomorphology.

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