

Abundances of selected heavy metals in rock and sediment samples from the Mekong River basin, Cambodia

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Abstract

This paper presents the abundances of heavy metals in rock and sediment collected along the Mekong River Basin in Cambodia. The main purpose of this study is to examine the influenced of rock weathering process, on the distribution and concentration of heavy metals namely As, Co, Cr and Pb in the sediment around the river basin. The field observation shows the appearances of volcanic rock and contact metamorphic rock on the hilly area, road cuts and construction sites. The alluvium quaternary which is distributed widely in the study area mostly situated on the flood plain and lowland area. The agricultural activities such as cultivation of vegetables, fruit, maize and paddy were planted on the alluvium. The rock samples were collected for the mineralogical study and observed using polarizing microscope. The sediment samples were air dried and ground into fine grain before identified the mineralogical content using X-Ray Diffraction (XRD). The analysis of heavy metals was carried out using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES). The result of petrographic analysis shows that the rock samples were classified as basalt-andesite rocks whereas the metamorphic rock shows the medium – high grade of metamorphism. The result obtain from geochemical analysis of rock shows the varies range of heavy metals concentration where As was bdl – 16 mg/kg, Co was bdl - 38 mg/kg, Cr was bdl - 87 mg/kg and Pb was 13 - 58 mg/kg. The heavy metals in sediment sample also shows the same patterns, where the high concentration is controlled by pH, organic matter, and percentage of clay. The X-ray Diffraction (XRD) analysis indicate that the main mineralogical content in sediment were iron oxide minerals; kaolinite and quartz. As a conclusion the high concentration of heavy metals in sediment were contributed partly by the chemical weathering of parent rock.