



Review of the Sedimentological and Geochemical Approaches for Environmental Assessment of River Sadong, Samarahan-Asajaya District Sarawak, Malaysia

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ABSTRACT

This paper presents an overview of the implication of geomorphology and sedimentology on the chemical characteristics of sediments of River Sadong, Malaysia. There is limited published work on the effect of topography, climate, soil and geology on the sediments lying in the River Sadong. Studies have been undertaken around Kota Samarahan and Asajaya areas whereby some heavy metal constituents and their environmental effects were determined. The study entails the description of the depositional processes alongside with physical and geochemical changes, without neglecting natural and anthropogenic effects.

INTRODUCTION

The River Sadong covers a large area of the Samarahan-Asajaya district in Sarawak, Malaysia (Fig. 1). The river flows largely through the Sadong Basin, its length is about 40km in Samarahan, Southern Sarawak (Bryant 2003). It receives a major input of freshwater from upland (Serian), transports sediments over several metres, then meanders along Satubong, which flows through the floodplain at Gedong and finally makes its way into the ocean in the South China Sea. The environs of river Sadong are characterized by extensive economic and industrial resources such as fishing, mangrove swamps, abandoned coal mining sites, tourism spots and peat swamps. At about 20km up this river, it bifurcates towards the east at Simunja which is characterized by an isolated mountain where coal was mined in the 19th and 20th century (Bryant 2003).

Sediments can be defined as the solid particles that settle on the earth surface either on land or in rivers and oceans. They consist of rock fragments, sand, silt, clay, dissolved organic matter and remains of plants and animals. Rivers are greatly affected by population growth, increased industrialization and urbanization (Babek et al. 2015, Dhivert et al. 2015). River sediments are useful tools in understanding

the environment and their physical and chemical characteristics are dependent on weathering, geology, drainage pattern, transport, deposition, hydrological factors, geochemical influences and human activities (Sundararajan & Natesan 2010, Praveena et al. 2008). A detailed insight into pollution and contamination of a river over a long period of time can be achieved by the analysis of river sediments. Generally, rivers are affected by flows of surface and groundwater from the land and large rivers flow into the sea through estuary. The chemical properties of a river are dependent on the materials dissolved in the water or metals and ions present in the sediments (Arnell et al. 2015, Sundararajan et al. 2009, Nesbitt & Young 1996).

The consequences of human development due to population growth, increased industrial zone, agricultural activities and urbanization have geochemical effects on water bodies, especially rivers (Tatone et al. 2016, Mohiuddin et al. 2010). The most efficient way to understand the sedimentological and chemical features of a river is by a detailed sampling and laboratory analysis of both surface and core sediment samples. The management and protection of the natural environment of the river can be inferred from the useful application of indicators in geochemical