

Source Investigation of Aliphatic and Polycyclic Aromatic Hydrocarbons in Coastal Sediments of Brunei Bay, East Malaysia

S.Y. PANG¹, S. SURATMAN¹, AND N. MOHD TAHIR^{1,2*}

¹INOS, Universiti Malaysia Terengganu, 21030 K.T., Terengganu, Malaysia (p.sweeyun@gmail.com; miman@umt.edu.my)

²PPSMS, Universiti Malaysia Terengganu, 21030 K.T., Terengganu, Malaysia (*correspondence: hayati@umt.edu.my)

Brunei bay is an area with a vast array of biological diversity and productive ecosystems, regional hydrological systems and water resources, a natural barrier against strong tides, carbon storage, and habitat for wildlife. On the other hand, the bay is also important as transshipment and maritime activities to the area. This investigation represents the first study to understand about the current status, source and distribution of the aliphatic and polycyclic aromatic hydrocarbons (PAHs), in coastal surface sediments of Brunei Bay. Thirteen surface sediments collected, freeze-dried and then ultrasonic extracted. Identification and quantification were carried out using gas chromatography mass spectrometry after samples derivatisation. Total n-alkanes, unresolved complex mixtures (UCMs) and total PAHs and its alkylated homologues ranged between 0.61-9.88 μgg^{-1} , 2.92-16.15 μgg^{-1} and 0.02-2.19 μgg^{-1} , respectively. The low organic carbons in sediments showed weak correlation with total n-alkanes, total PAHs, and UCM. The carbon preference index (CPI) ranged 1.42-2.77 and other biomarkers ratios such as terrestrially derived alkanes, terrigenous over aquatic (TAR), isoprenoid hydrocarbons and UCM have indicated a mixed contribution of terrigenous and also anthropogenic fossil fuel inputs. The PAH profiles showed a predominance of petrogenic sources contamination over the area, with lesser contributions from pyrolytic PAHs and also natural sources. The naturally derived PAHs, i.e, perylene, comprises only of 2.61-39.39% of total PAHs. The elevated petrogenic PAHs are probably due to surface runoff from surrounding town or direct discharges of fossil fuel from maritime related activities such as boating and fishing. The values of n-alkane, PAHs and related biomarkers suggest that there was a moderate to high pollution in the area of study.