THE VERTICAL GEOCHEMISTRY PROFILE OF HEAVY METAL AND DETERMINATION OF SEDIMENT ACCRETION IN JOHORE WATERS, SOUTH CHINA SEA

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THE VERTICAL GEOCHEMISTRY PROFILE OF HEAVY METAL AND DETERMINATION OF SEDIMENT ACCRETION IN JOHORE WATERS, SOUTH CHINA SEA

By

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ABSTRACT

The study was carried out from the South China Sea off Johore water. Two sediment cores were collected at station JB AD1 (2° 24.965'N; 103° 54.314'E) and JB 9 (2° 23.898'N 104° 21.545'E). The sediment samples were analyzed for sedimentation rate, organic carbon content, and heavy metal concentration. The organic carbon content in JB AD1 sediment varied between 1.11% to 2.63%, while JB 9 range from 0.24% to 1.08%. The mean concentrations of heavy metals for 63μm fraction of JB AD1 sediments were 24.67 μg/g dry weights for Pb, 144.48 μg/g dry weights for Cr, 0.53 μg/g dry weights for Cd, 125.2 μg/g dry weights for Zn, 3.16% for Al and 15.3 μg/g dry weights for Mn. In JB 9, the average concentration for Pb was 24.24 μg/g dry weights, 141.92 μg/g dry weights for Cr, 0.46 μg/g dry weights for Cd, 75.18 μg/g dry weights for Zn, 2.28% for Al and 29.09 μg/g dry weights for Mn. Vertical profile of Al, Pb, Cr, Cd, Zn and Mn show much variation with depth. For core JB AD1, the highest element concentrations are usually found in the middle and the deepest part of the sediment core while the lowest concentrations are found at the upper of the sediment layer. For core JB 9, the lowest concentrations are usually found at the deepest part of the sediment. A 26 cm sediment core was studied by measuring the stable element lead (Pb). Applying the ^{210}Pb method, sedimentation rate of 0.43 cm/yr was obtained. Enrichment factor (EF) was calculated to evaluate the dominant source of the sediments and as indicators of pollution effects. All studied elements are considered as natural sources with EF value less than 10.

ABSTRAK

Kajian ini telah dijalankan di Perairan Johor, Laut China Selatan. Dua sedimen teras telah diambil di stesen JB AD1 (2° 24.965'N; 103° 54.314'E) dan JB 9 (2° 23.898'N 104° 21.545'E). Sampel dianalisis bagi mengetahui kadar sedimentasi, kepekatan logam berat dan kandungan karbon organik. Kandungan karbon organik bagi sedimen JB AD1 berjulat di antara 1.11% hingga 2.63% dan 0.24% hingga 1.08% bagi sedimen JB 9. Kepekatan logam berat pada saiz 63μm mencatat 24.67 μg/g berat kering untuk Pb, 144.48 μg/g berat kering untuk Cr, 0.53 μg/g berat kering untuk Cd, 125.2 μg/g berat kering untuk Zn, 3.16% untuk Al dan 15.3 μg/g berat kering untuk Mn bagi sedimen di Stesen JB AD1. Bagi stesen JB 9, kepekatan Pb ialah 24.24 μg/g berat kering, 141.92 μg/g berat kering untuk Cr, 0.46 μg/g berat kering untuk Cd, 75.18 μg/g berat kering untuk Zn, 2.28% untuk Al dan 29.09 μg/g berat kering untuk Mn. Bagi sedimen teras JB AD1, kepekatan logam yang paling tinggi biasanya ditemui di bahagian tengah dan dalam sedimen teras, sementara kepekatan yang paling rendah didapati di lapisan atas sedimen. Bagi sedimen teras JB 9, kepekatan yang paling rendah didapati di bahagian bawah sedimen. 26 sm sedimen teras telah dikaji dengan mengukur kestabilan Plumbum (Pb). Dengan menggunakan kaedah ^{210}Pb, didapati kadar sedimentasi adalah sebanyak 0.43 cm/thn. Faktor pengkayaan dikira bagi menilai sumber dominan sedimen dan menjadi petunjuk kepada kesan pencemaran. Semua elemen logam yang dikaji menunjukkan ia dari sumber semulajadi dengan nilai faktor pengkayaan kurang daripada 10.