Seasonality in Arsenic Biogeochemistry: Pak Panang Bay, Southern Thailand

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The Pak Panang Bay is located in southern Thailand where its catchment comprises of a tin mining area. Inputs of As are derived from the spoil tips in the mined area and may be transported into the Bay, which is a center for aquaculture and fisheries. Water, sediments and biological samples were collected from the Bay, its major fluvial input, the Pak Panang, and three other rivers in the dry season during 2001 and 2002 and the wet season in 2002. Arsenic in the water was mainly in inorganic form, especially in the wet period, when concentration of dissolved arsenic in the Bay was in the range 1-4 $\mu g\ L^{-1}$ whereas in the dry season it was 4-12 $\mu g\ L^{-1}$. Particles contaminated with As had only limited penetration into the Bay during the dry season and particles stored in the upper reaches on the rivers (i.e. sediments with As concentrations as high as 400 $\mu g\ g^{-1}$) were advected seaward in the wet season. However, in the Bay As concentrations were generally less than 20 $\mu g\ g^{-1}$, with a steep concentration gradient outwards from the river mouth, indicating dilution during transport. Particulate arsenic species in sediments were determined by selective extraction and As(V) comprised 85% of total As, with smaller quantities of As(III), DMA and MMA. In fish and crustacea from the Bay the methylated species AsB, DMA and MMA were found along with inorganic arsenic.