

Polycyclic aromatic hydrocarbon distributions and associations with organic matter in Kenting coastal waters

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Abstract

Partitioning of PAHs between particulate and dissolved phases control their environmental fate and transport in aquatic systems. Highly variable physical and biological processes complicate the analysis of PAH cycling in the coastal waters. As an initial effort to characterize inventories and distributions of PAHs in the Kenting coastal waters, the field cruises were contracted seasonally to collect the water samples through the water column. The chemical characteristics and PAH concentrations of the particles were determined in order to relate PAH partitioning and transport in the Kenting coastal waters.

Water samples were seasonally collected from surface (1 m) and bottom water (15 m) at Kenting coastal area in 2006 to examine spatial and temporal variability in particulate and dissolved polycyclic aromatic hydrocarbon (PAH) concentrations and their interactions with suspended particles including plankton. Samples were separated into particulate (C_p) and dissolved (C_d) phases using 1 μ m glass fiber filters. Each phase was analyzed for 40 polycyclic aromatic hydrocarbons (PAHs). Distribution coefficient (K_d) of each PAH was measured by the particulate PAH divided by its dissolved concentration. Concentration profiles of PAHs in the Kenting coastal waters indicate that compositional differences in PAH particle-water distributions were a function of seasonal variation across the year. Although the portion of this study was based on a limited number of samples, the preliminary mass balance calculations indicated that in 2006 on an annual scale, fluvial contributions of PAHs to the Kenting coastal waters was relatively negligible and that atmospheric deposition and coastal erosion may have been the most significant source of PAHs into the waters. Since the Kenting area is not the industrial spots, we conclude that the origins of atmospheric PAHs to the waters may be dominated by traffic and that variation of distributions may be dependent on the local wind direction.