Significance of Polycyclic Aromatic Hydrocarbons (PAHs) and Petroleum Biomarker Compounds in Contaminated Passaic River Sediments

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Significance of Polycyclic Aromatic Hydrocarbons (PAHs) and Petroleum Marker Compounds in Contaminated Passaic River Sediments.

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Abstract

The lower Passaic River watershed in northern New Jersey's Passaic River, Newark, New Jersey, 1895

While the presence of hopanes, steranes, tricyclic terpanes, and isoprenoid alkanes has been extensively studied, the role of petroleum source sediments for the Newark surface grab samples resemble the upper Kearny samples, with considerable differences in the distributions of these compounds from sampling sites.

Using the 181 individual compounds

The representative chromatograms show that the distribution of storms at each sampling site cannot be directly compared to the samples.

Principal Components Analysis

The principal components analysis (PCA) shows the difference in the distributions between the samples, indicating that the source of the variance is in the properties of the samples, rather than between sampling areas.

Methods

Sediment cores & grab samples.

Thermodesorption-gas chromatography/mass spectrometry of whole, dry sediment samples

Target organic analytes (OMA):
- Normal and aromatic hydrocarbons
- Phosphates & alcohols
- Aromatic hydrocarbons (F 6 to 8 mg)
- Phosphates

Principal components analysis (181 organic compounds)

Mass chromatograms comparing the Kearny Core sample at 27-20 cm and the Harrison Reach Core B3 sample at 0-30 cm sediment depth.

Detail showing Harrison Reach sampling sites.

OS sites: grab samples only

Sites A3-E1: 120 cm cores and grab samples

Aerial photos of the Passaic River showing the Kearny (above) and Harrison Reach (below) sampling sites.

Photo: Mike Peters