

Mandalakis, M., Gustafsson, O, Reddy, C.M., and Xu, L., *Radiocarbon apportionment of fossil versus biofuel combustion sources of polycyclic aromatic hydrocarbons in the Stockholm metropolitan area*, Env. Sci. and Technol., 2004; v38, 5344-5349

Source-diagnostic markers and the isotopic compn. of polycyclic arom. hydrocarbons (PAHs) were examd. in surface sediments from the greater Stockholm, Sweden, waterways to deduce the contribution from biomass sources to the environmental PAH load. The summed concn. of 20 PAHs ranged from 0.8 to 45.1 mg/g (dry wt.) and exhibited a steep decline with increasing distance from the city center, evidencing that sources within the metropolitan area of Stockholm dominate its PAH burden. Several diagnostic PAH ratios indicated an overwhelming predominance of pyrogenic sources over the petrogenic ones, while retene and 1,7-dimethylphenanthrene were unable to correctly evaluate the contribution from biomass combustion. The stable carbon isotope compn. ( $\delta^{13}\text{C}$ ) of individual PAHs ranged from -24.8 to -27.0 permill. but also was proved inefficient to discriminate between different types of fuels due to the overlapping signals in various sources. The  $\delta^{14}\text{C}$  values of PAHs ranged between -550.4 and -934.1 permill., indicating a clear predominance of fossil fuel sources. By using an isotopic mass balance approach, we estd. that on av.  $17 \pm 9\%$  of PAHs were derived from biomass combustion. This radiocarbon apportionment, in conjunction with detailed energy statistics for the Stockholm region, revealed that the ambient PAH burden is roughly similar, per unit energy produced, from fossil fuels and biofuels. Societies' shifting energy policies toward a larger reliance on biofuels may thus not lead to further deterioration of air quality and respiratory ailments for the urban population.