



The role of black carbon in sediment sorption of organic pollutants

Gerard Cornelissen and **Örjan Gustafsson**

Stockholm University, Dept. of Applied Environmental Science (ITM), 10691 Stockholm, Sweden. (orjan.gustafsson@itm.su.se)

Environmental Black Carbon (BC) includes soot and charcoal formed during incomplete combustion of fossil fuels and biomass. In most sediments, the total Organic Carbon (OC) consists of 1-20% BC. In this research we tested the role of BC in environmental PAH sorption for seven sediments, with BC ranging from almost entirely fossil to biomass in character. We determined phenanthrene sorption isotherms for original sediment with both BC, OC and native PAHs as well as for combusted sediment with only BC. We found that at environmentally relevant concentrations of 1 ng/L, the contribution of BC to total sorption was 50-85%, so in many cases BC was more important to sorption than all the other OC. The relative importance of BC to sorption diminished with increasing PAH concentration.

Additionally, we measured environmental BC sorption for planar and nonplanar aromatic compounds. Planar compounds yielded BC sorption coefficients that were 10-100 times higher than nonplanar ones with the same K_{ow} . The results demonstrated that both steric and dispersive interactions between aromatic sorbates and BC sorbent are important in the mechanism of strong BC sorption