

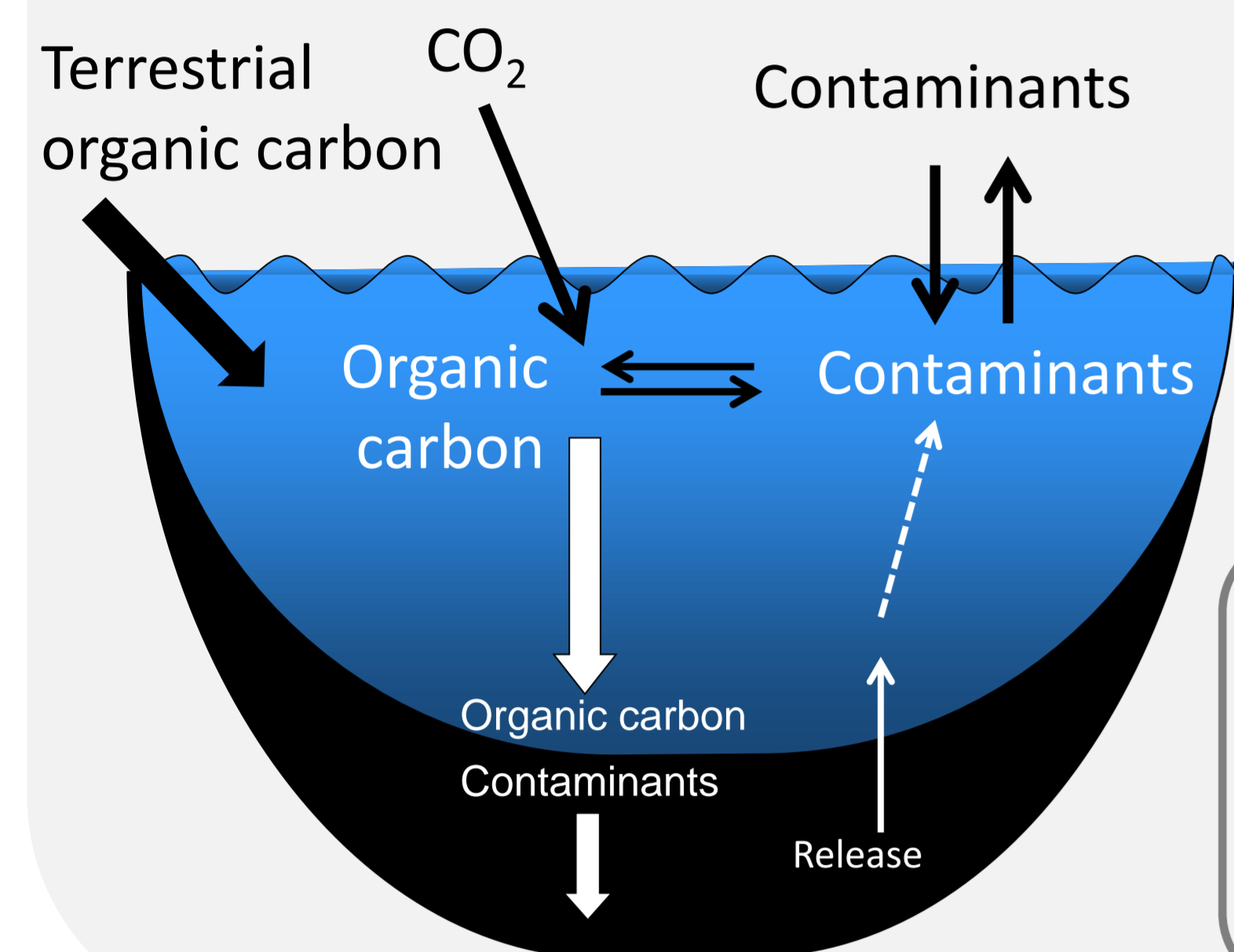
Influence of organic carbon cycling on the fate of organic contaminants in the Baltic Sea

Anna Sobek*, Gisela Horlitz, Inna Nybom

Department of Environmental Science, Stockholm University, Sweden

*anna.sobek@aces.su.se

The biological pump pulls contaminants into the aquatic system



1. Organic carbon characteristics are important for contaminant transport
2. Marine organic carbon can carry more organic contaminants than terrestrial organic carbon

HYPOTHESIS:

A higher proportion of terrestrial organic matter reduces contaminant flux from air to water and sediment, and storage capacity of the sediment

EXPERIMENTAL AREA

Gulf of Finland (Tvärminne), May to September 2018

Target compounds:
Polychlorinated biphenyls (PCBs)
Polycyclic aromatic hydrocarbons (PAHs)

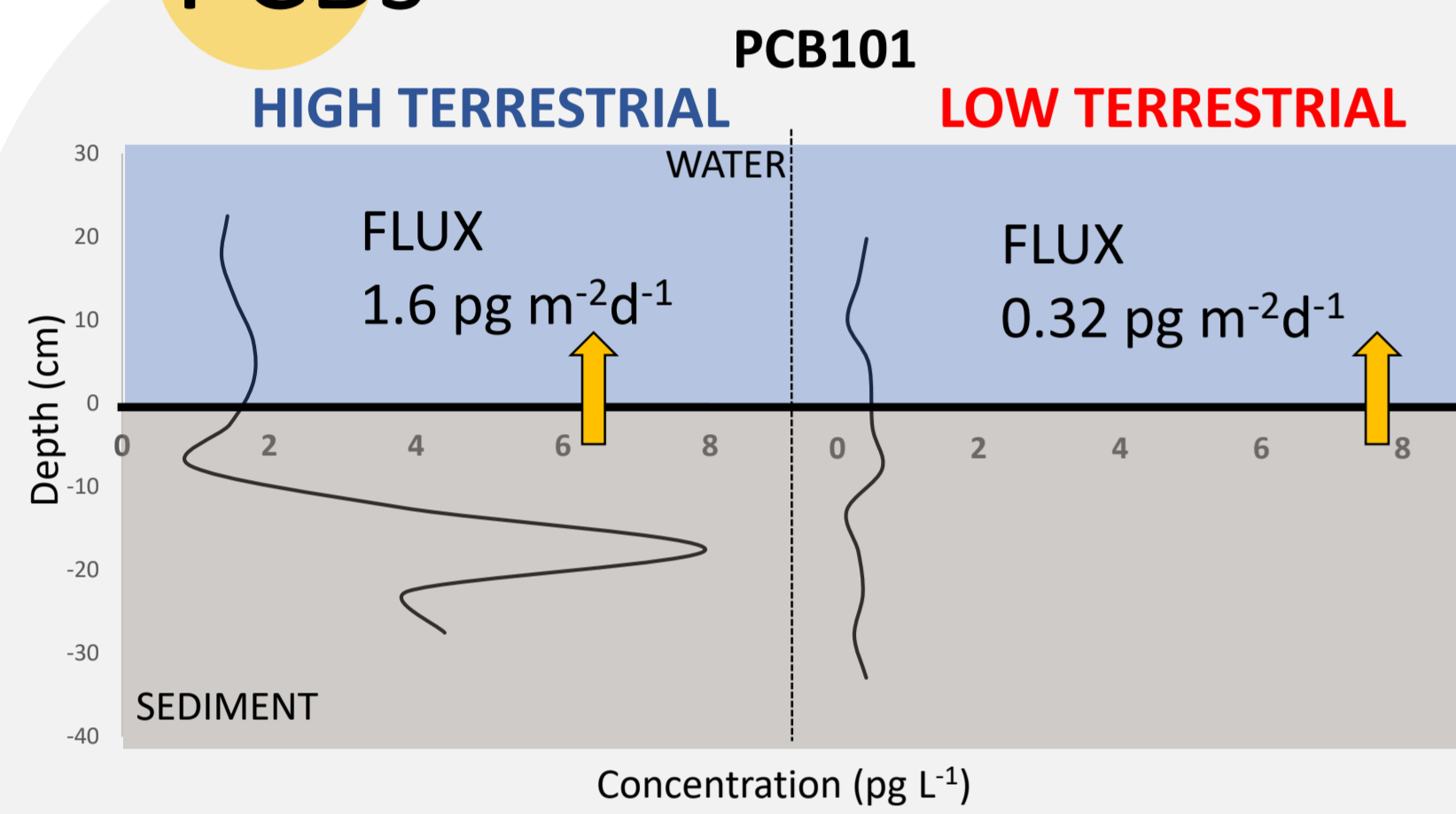
High terrestrial influence $\delta^{13}\text{C} -24.4$

TWO SITES

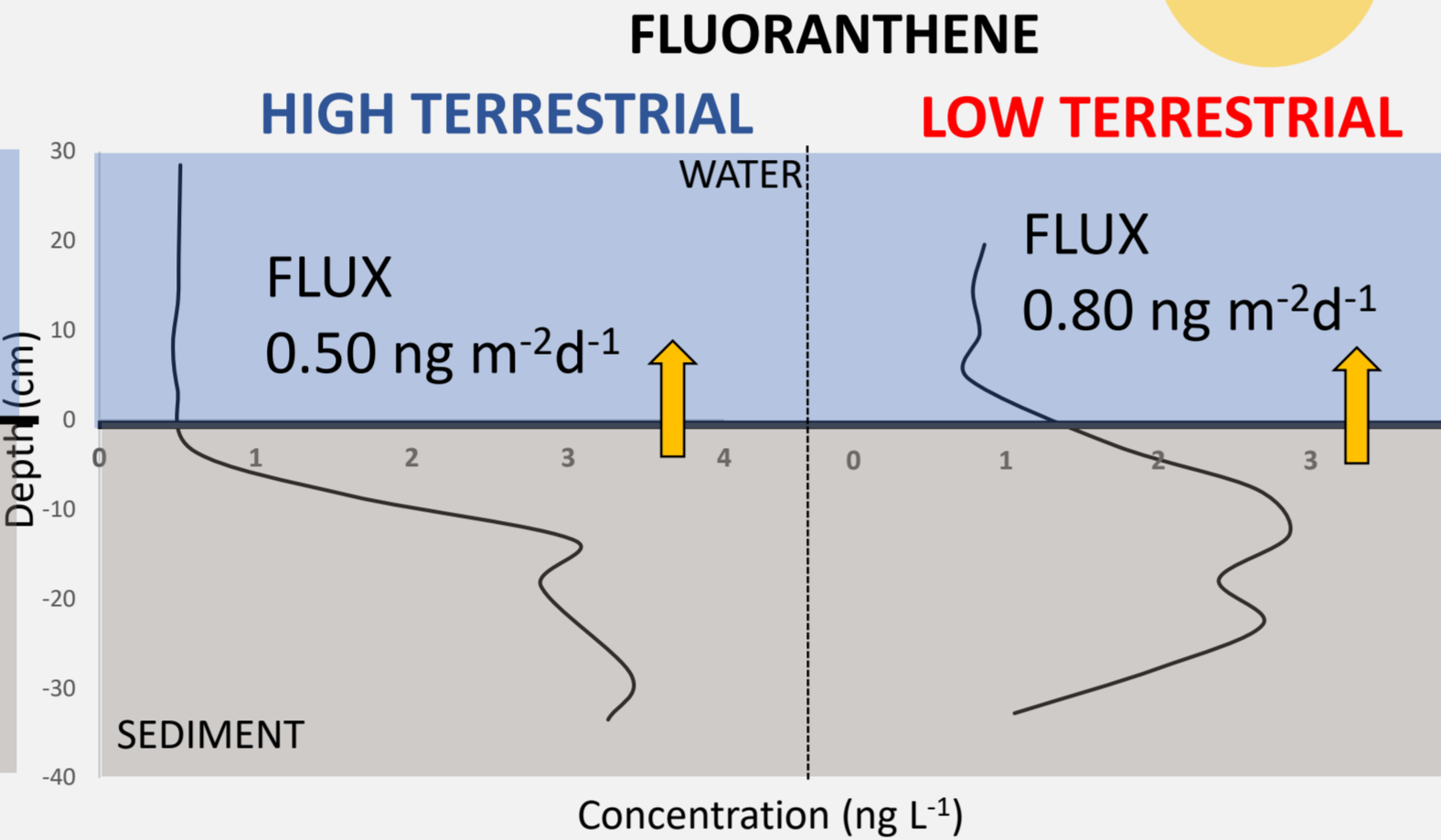
Low terrestrial influence $\delta^{13}\text{C} -22.7$



PCBs



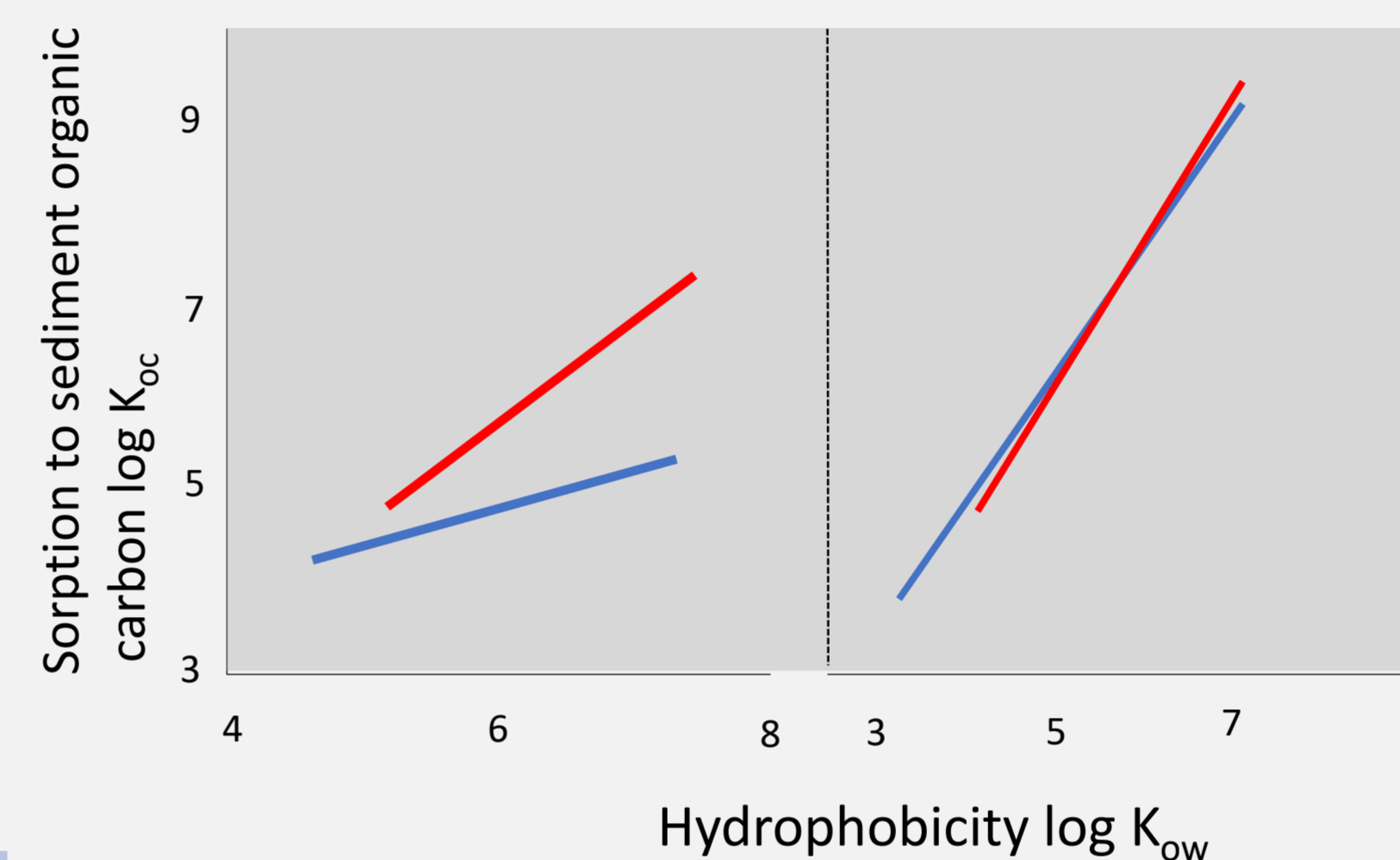
PAHs



PCBs

LOW TERRESTRIAL
HIGH TERRESTRIAL

PAHs



K_{oc} = Partition coefficient between organic carbon and water

K_{ow} = Partition coefficient between octanol and water

- **Flux** of PAHs and PCBs from sediment to water at both sites
- **PAHs:** the flux from sediment to water is similar at high and low terrestrial site
- **PCBs:** the flux from sediment to water is higher in low terrestrial site

PCBs: Sorption ($=\log K_{oc}$) to sediment organic carbon is stronger at low terrestrial site

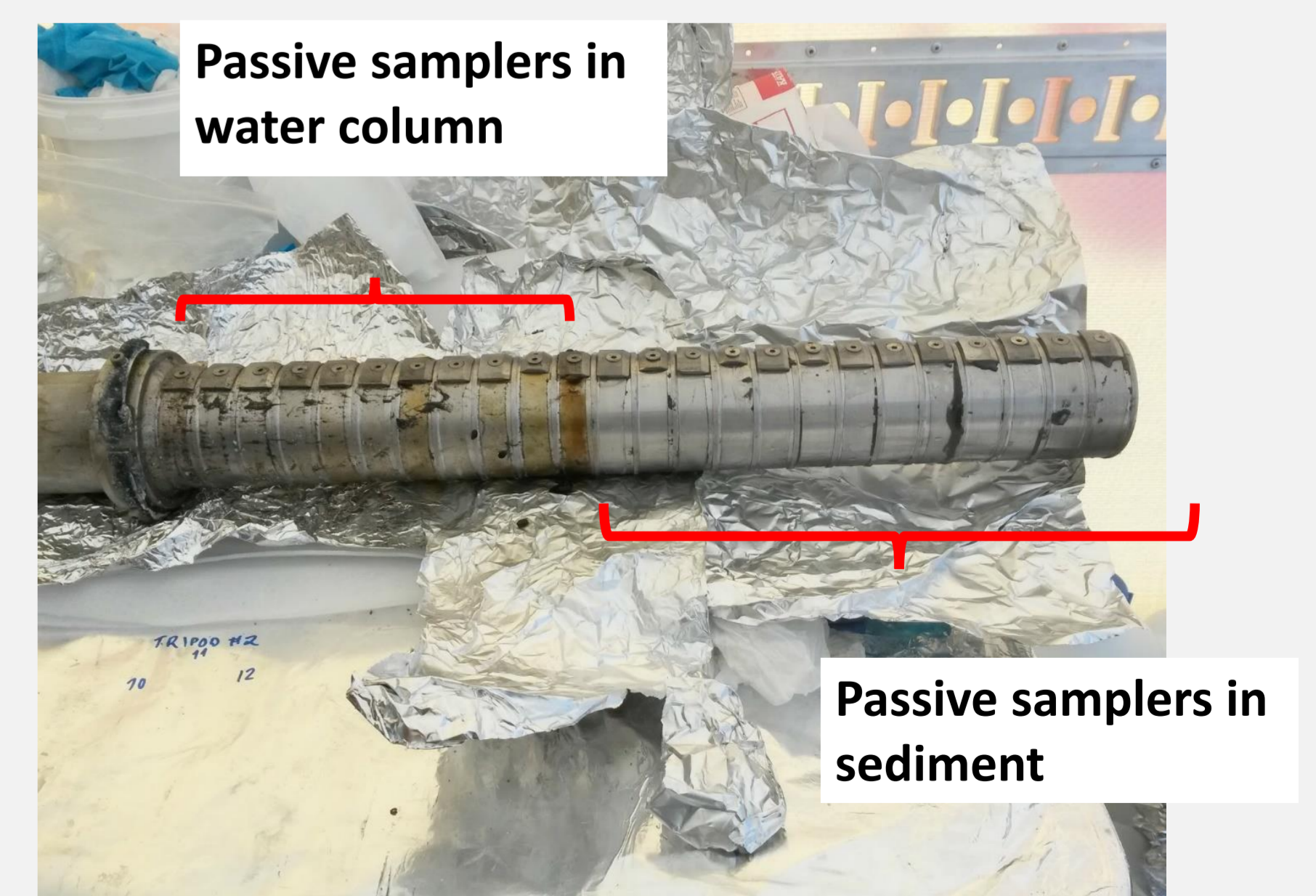
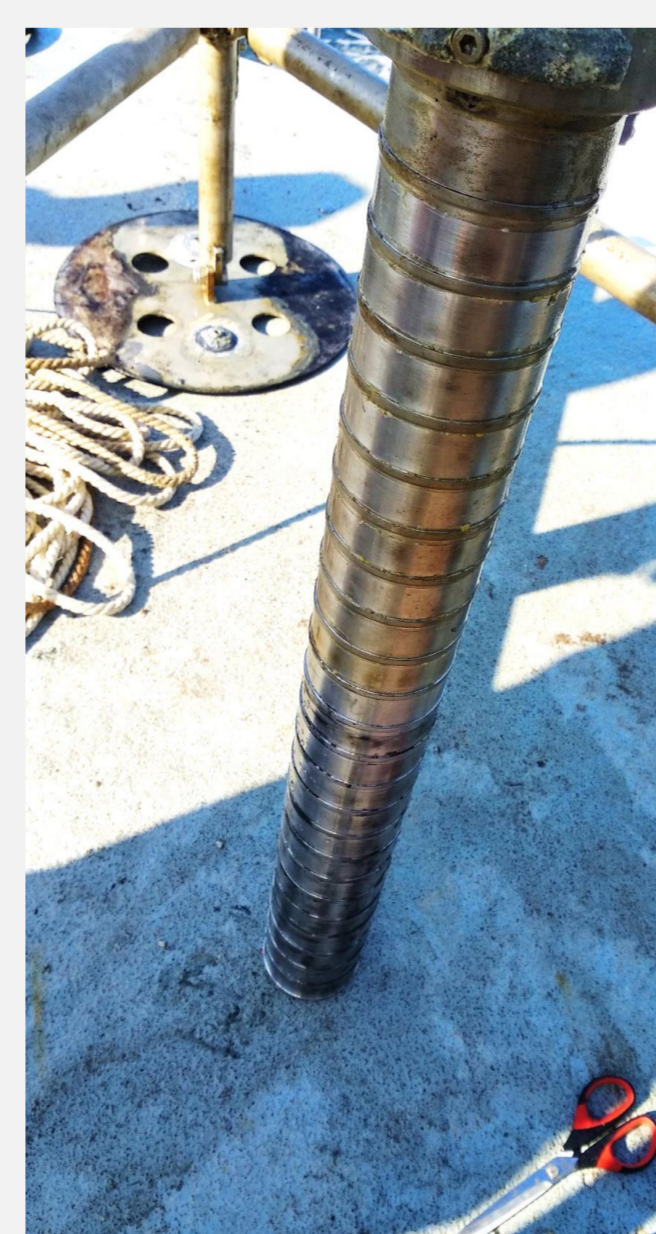
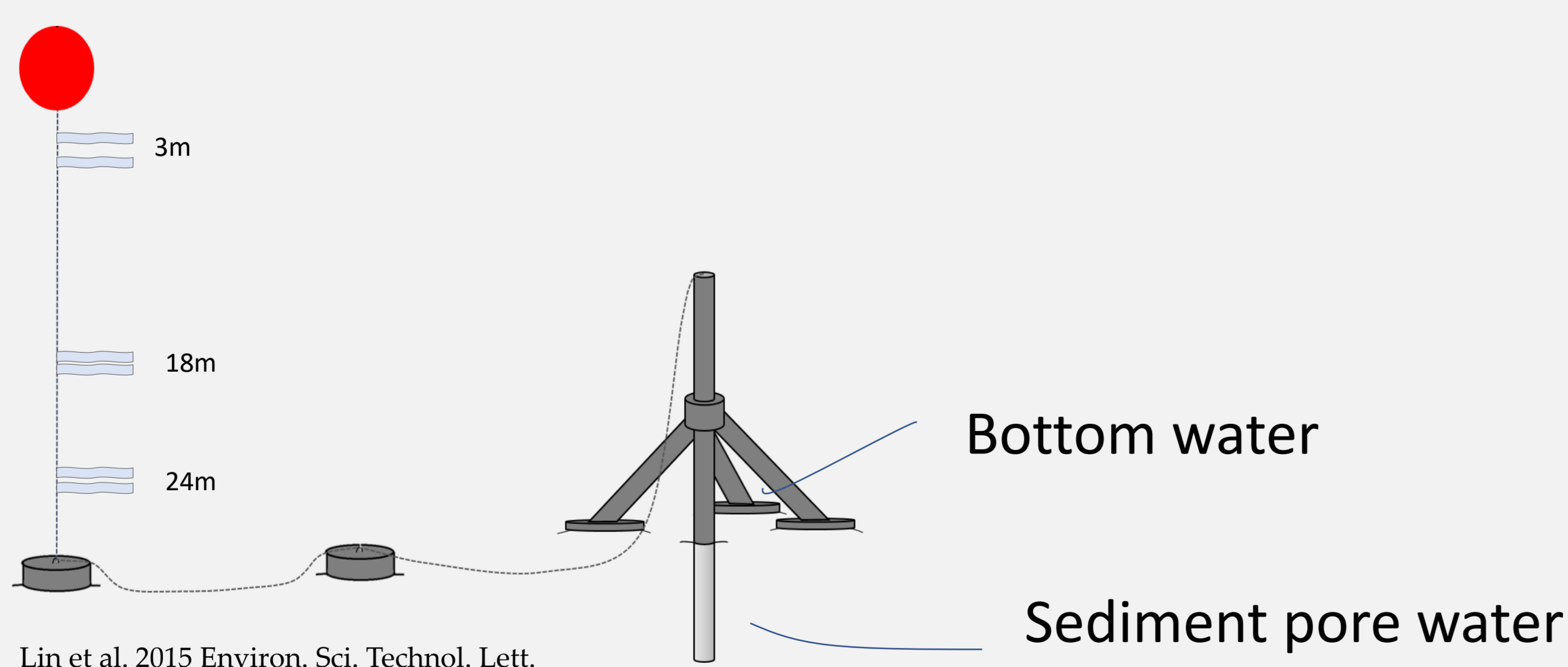
→ In agreement with hypothesis and differential flux at the two sites

PAHs: Sorption strength to sediment organic carbon is the same at low and high terrestrial site

→ explains similar flux from sediment to water at high and low terrestrial site
→ due to sorption to black carbon, known to be significant for PAHs?

More data on PCBs and PAHs in air, water and at other sites coming soon.

SAMPLING of sediment-water interphase



Photos by Inna Nybom