Contrasting the transport and fate of PCBs and PFASs across the Atlantic Ocean

RAINER LOHMANN *[1], ERIN MARKHAM[1], TATYANA YANISHESKY[1], PAVLÍNA KARÁSKOVÁ[2], JITKA BEČANOVÁ[2], JANA KLANOVA [2]

[1] Graduate School of Oceanography, University of Rhode Island, South Ferry Road, Narragansett, 02882 Rhode Island, USA; (*correspondence: rlohmann@uri.edu)

[2] Research Centre for Toxic Compounds in the Environment (RECETOX), Faculty of Science, Masaryk University, Kamenice 3/126, 625 00 Brno, Czech Republic; (klanova@recetox.muni.cz)

The transport and fate of organic polllutants across the Oceans represents a complex interplay of biogeochemical processes and physico-chemical properties of the chemicals of concern. In this study, we contrasted the presence and fluxes of two global contaminants of concerns – polychlorinated biphenlys (PCBs) and per- and polyfluorinated alkyl substances (PFASs). Samples of PCBs and PFASs were collected during a transect aboard R/V *Knorr* from Montevideo, Uruguay, to Bridgetown, Barbados in 2013. PCBs were measured in air and water, while PFASs were investigated in ~ 100 surface and deep water samples of the Western Atlantic Ocean.

Key PCB congeners were present at concentrations of around 1 pg/L in the surface water, with air concentrations ranging from no detect to several pg/m^3. Air-water exchange calculations suggested net gaseous deposition for most PCBs across the region.

PFAS were found in all surface waters (ΣPFAS 20 – 530 pg/L) and at depths of up to 5526 m, confirming the infiltration of these compounds into our global oceans. Overall, Antarctic Bottom Water had lowest concentrations, in-line with its oldest age, but PFASs were routinely detected in Antarctic Intermediate Water and North Atlantic Deep Water. Overall, this data implies a slow evasion of a small fraction of neutral legacy contaminants, while the ionic PFASs are transported to depth.