

PFAS in Water by Expert Laboratory

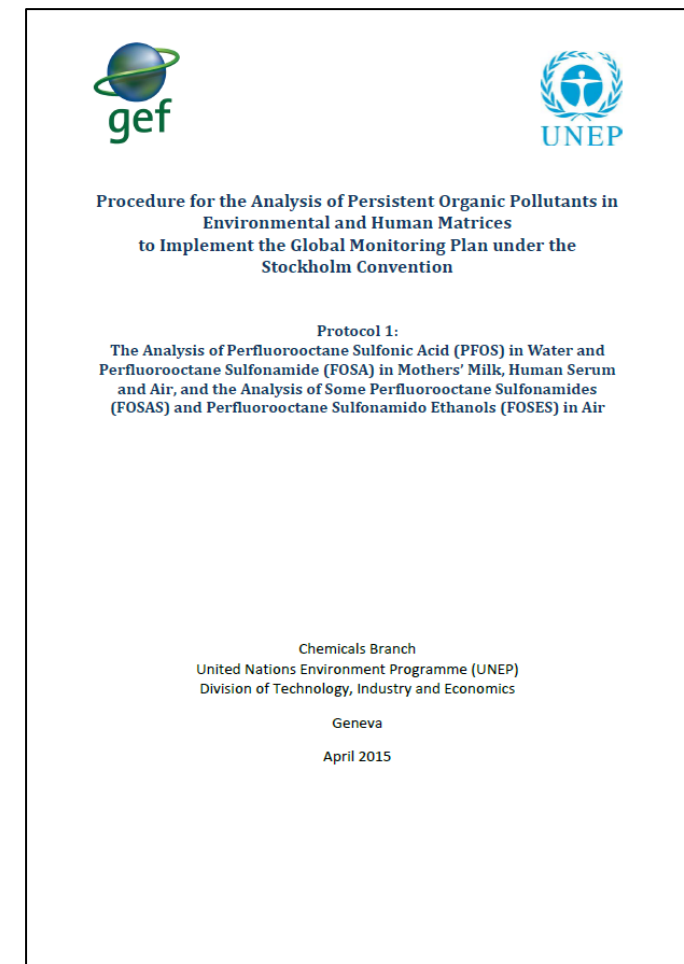
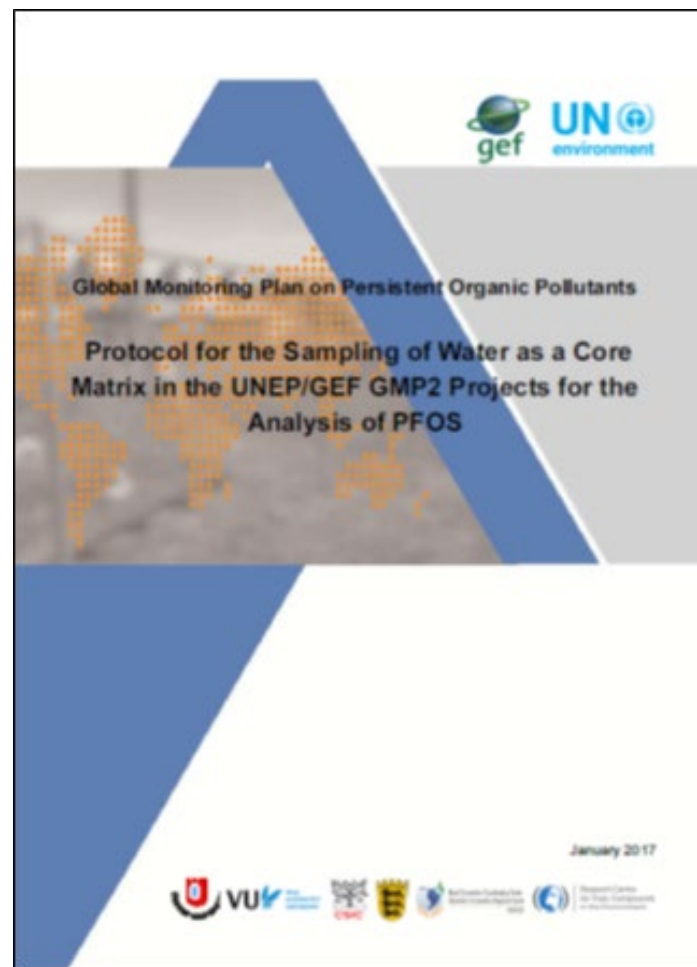
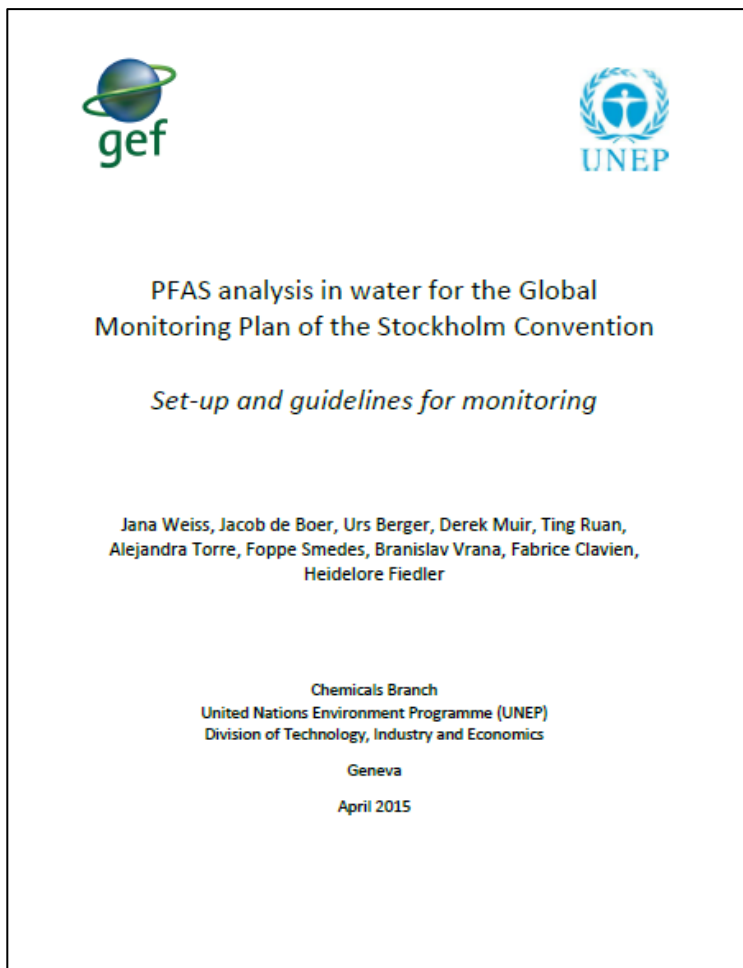


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Core matrix “water” – for PFAS only

- Water is a new core matrix and was not included in UNEP/GEF GMP1 projects;
- The guideline states: active sampling, 4-times per year, at mouth of river or estuaries;
- Analytes: PFOS; amended by PFOA (through listing at COP-9 in 2019) and PFHxS (through recommendation by POPRC in 2019);
- PFOS separated into linear and branched isomers (L-PFOS and br-PFOS); to follow EPA methods 533 and 537.1

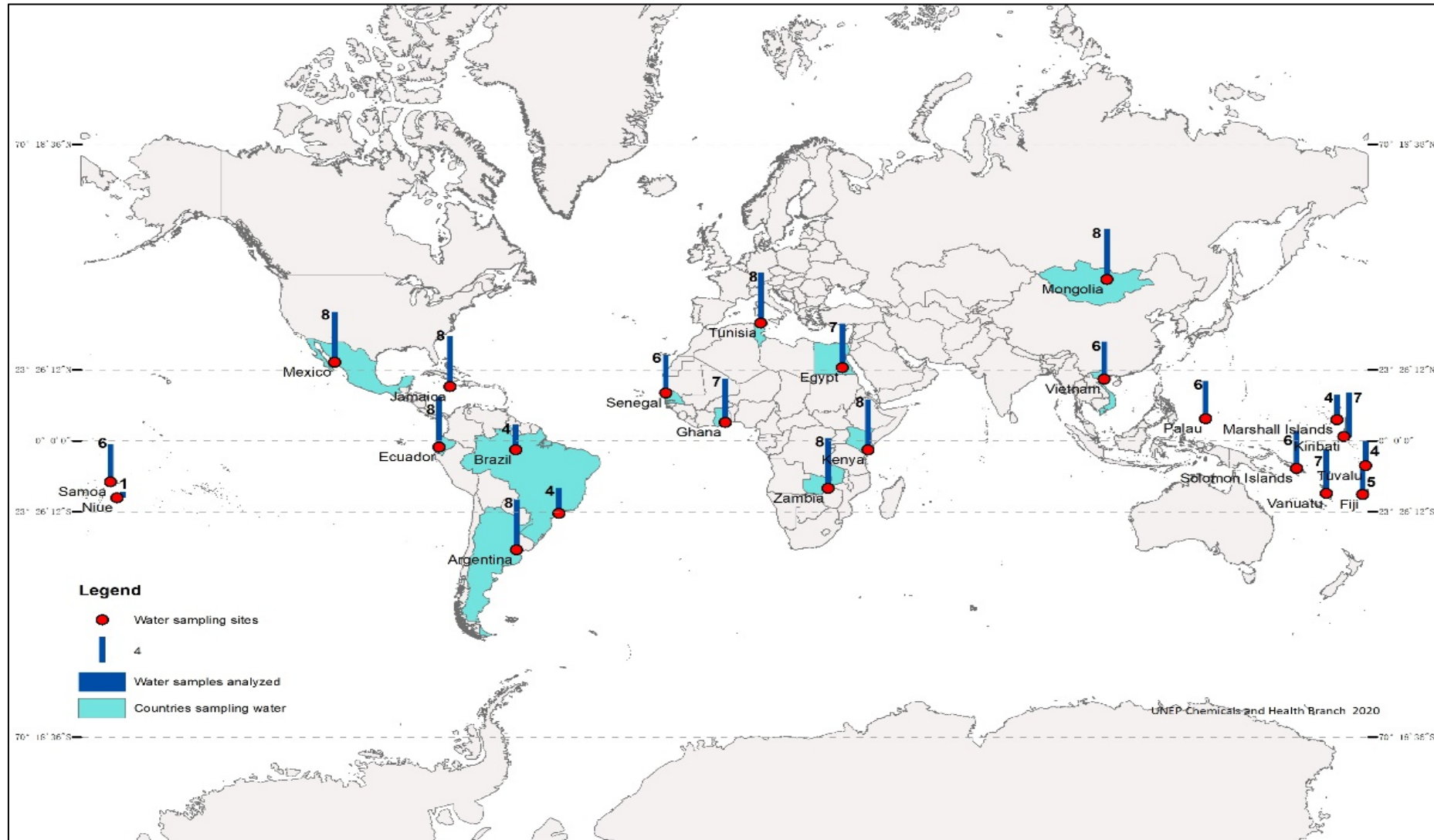
UNEP guidance documents



Results for PFAS in water

1. Across all projects

Number of water samples analyzed for PFASs



Summary (n=144)

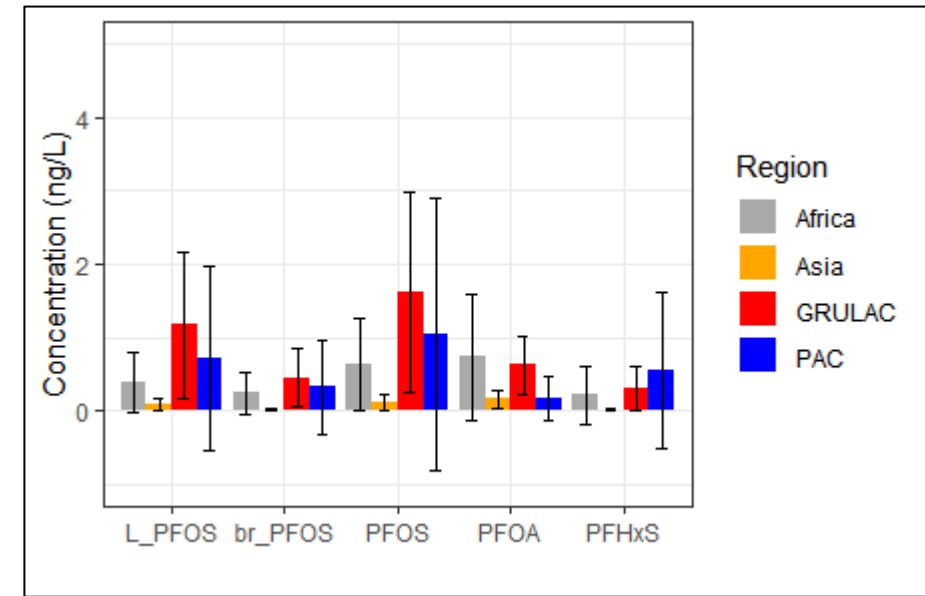
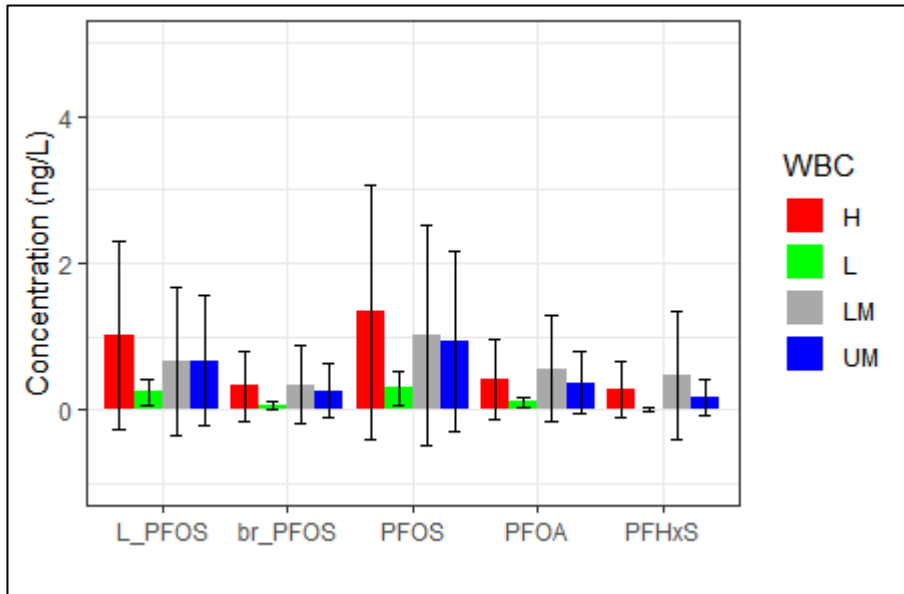
Distribution of sample origin and characteristics of the countries submitting water samples
Concentrations in ng/L

	Africa (N=44)	Asia (N=14)	GRULAC (N=40)	PAC (N=46)	Overall (N=144)
PFOS					
Mean (SD)	0.637 (0.637)	0.107 (0.111)	1.61 (1.35)	1.04 (1.85)	0.985 (1.39)
Median [Min, Max]	0.446 [0, 2.64]	0.0688 [0, 0.441]	1.35 [0.0443, 5.32]	0.0688 [0, 6.23]	0.370 [0, 6.23]
PFOA					
Mean (SD)	0.732 (0.854)	0.166 (0.118)	0.621 (0.396)	0.161 (0.302)	0.464 (0.599)
Median [Min, Max]	0.377 [0.0521, 4.02]	0.132 [0, 0.459]	0.551 [0.0506, 1.44]	0.0526 [0, 1.51]	0.225 [0, 4.02]
PFHxS					
Mean (SD)	0.217 (0.403)	0.0132 (0.0189)	0.305 (0.295)	0.552 (1.05)	0.329 (0.670)
Median [Min, Max]	0.0570 [0, 1.63]	0 [0, 0.0474]	0.166 [0, 0.952]	0.0129 [0, 3.51]	0.0550 [0, 3.51]

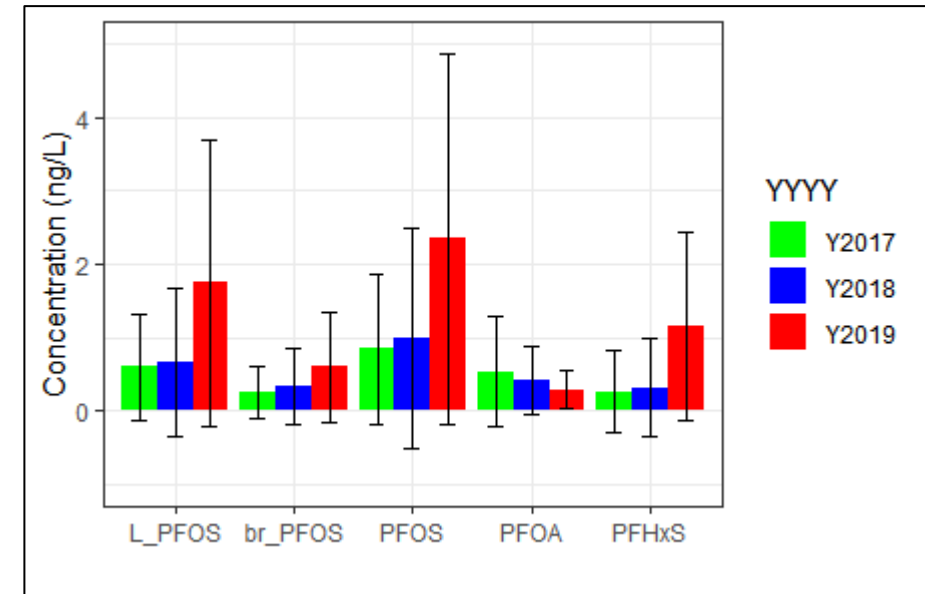
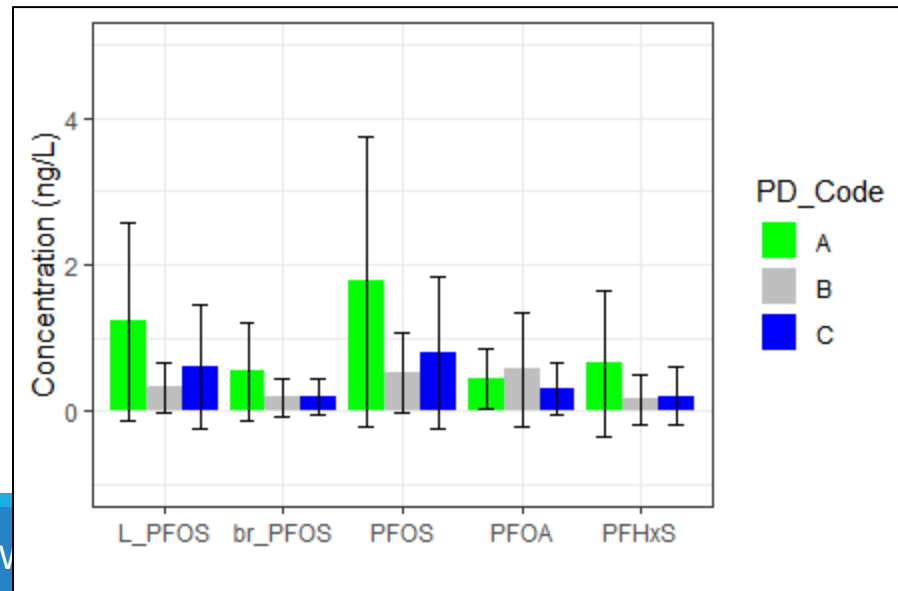
	Africa (N=44)	Asia (N=14)	GRULAC (N=40)	PAC (N=46)	Overall (N=144)
Region					
Africa	44 (100%)	0 (0%)	0 (0%)	0 (0%)	44 (30.6%)
Asia	0 (0%)	14 (100%)	0 (0%)	0 (0%)	14 (9.7%)
GRULAC	0 (0%)	0 (0%)	40 (100%)	0 (0%)	40 (27.8%)
PAC	0 (0%)	0 (0%)	0 (0%)	46 (100%)	46 (31.9%)
Year					
Y2017	24 (54.5%)	6 (42.9%)	20 (50.0%)	14 (30.4%)	64 (44.4%)
Y2018	20 (45.5%)	7 (50.0%)	20 (50.0%)	27 (58.7%)	74 (51.4%)
Y2019	0 (0%)	1 (7.1%)	0 (0%)	5 (10.9%)	6 (4.2%)
WBC					
L	4 (9.1%)	0 (0%)	0 (0%)	0 (0%)	4 (2.8%)
LM	40 (90.9%)	14 (100%)	0 (0%)	20 (43.5%)	74 (51.4%)
UM	0 (0%)	0 (0%)	36 (90.0%)	20 (43.5%)	56 (38.9%)
H	0 (0%)	0 (0%)	4 (10.0%)	6 (13.0%)	10 (6.9%)
PD_Code					
A	8 (18.2%)	8 (57.1%)	16 (40.0%)	14 (30.4%)	46 (31.9%)
B	29 (65.9%)	0 (0%)	16 (40.0%)	17 (37.0%)	62 (43.1%)
C	7 (15.9%)	6 (42.9%)	8 (20.0%)	15 (32.6%)	36 (25.0%)

Statistical summary of results for PFOS, PFOA and PFHxS according to project region

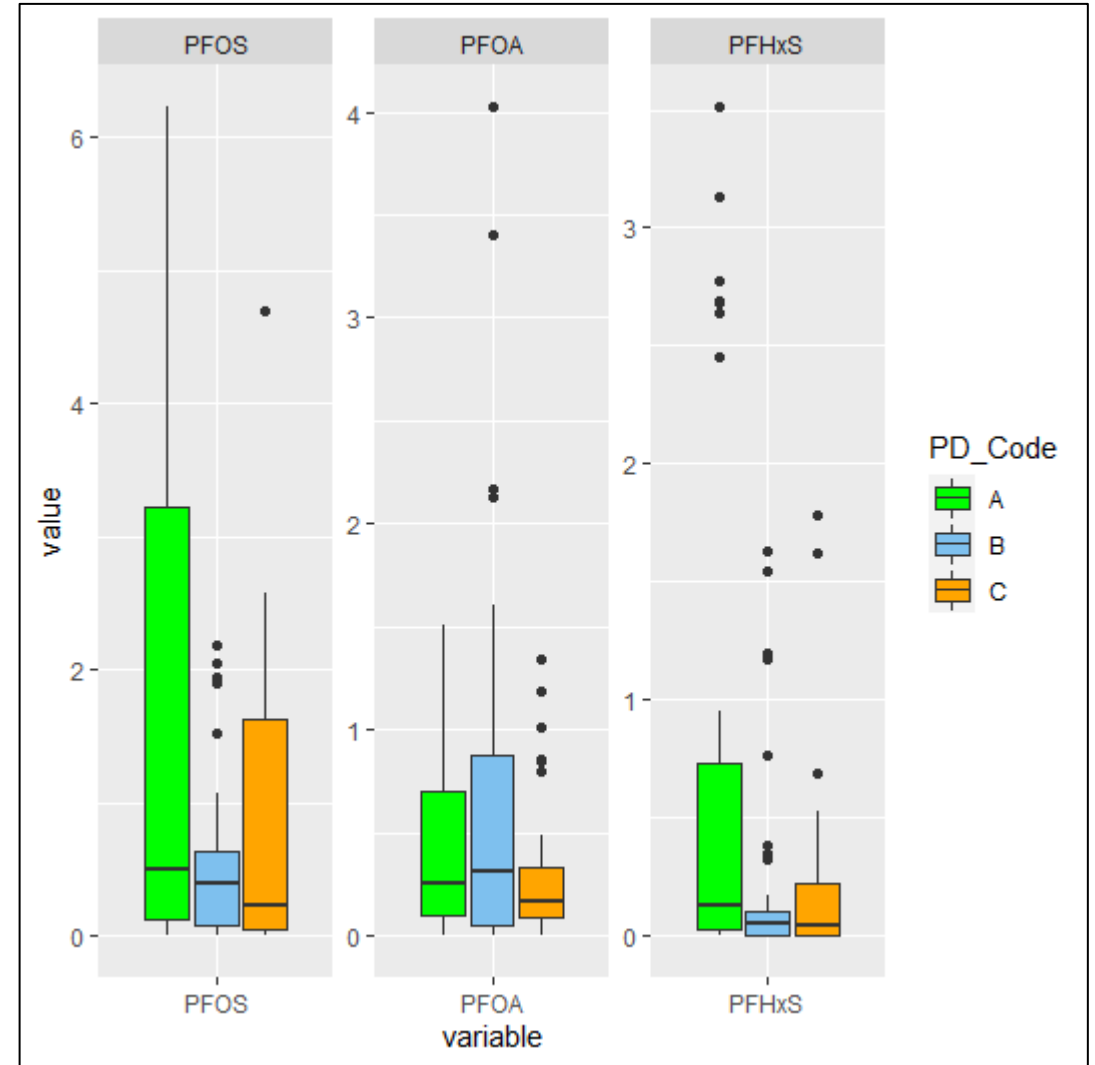
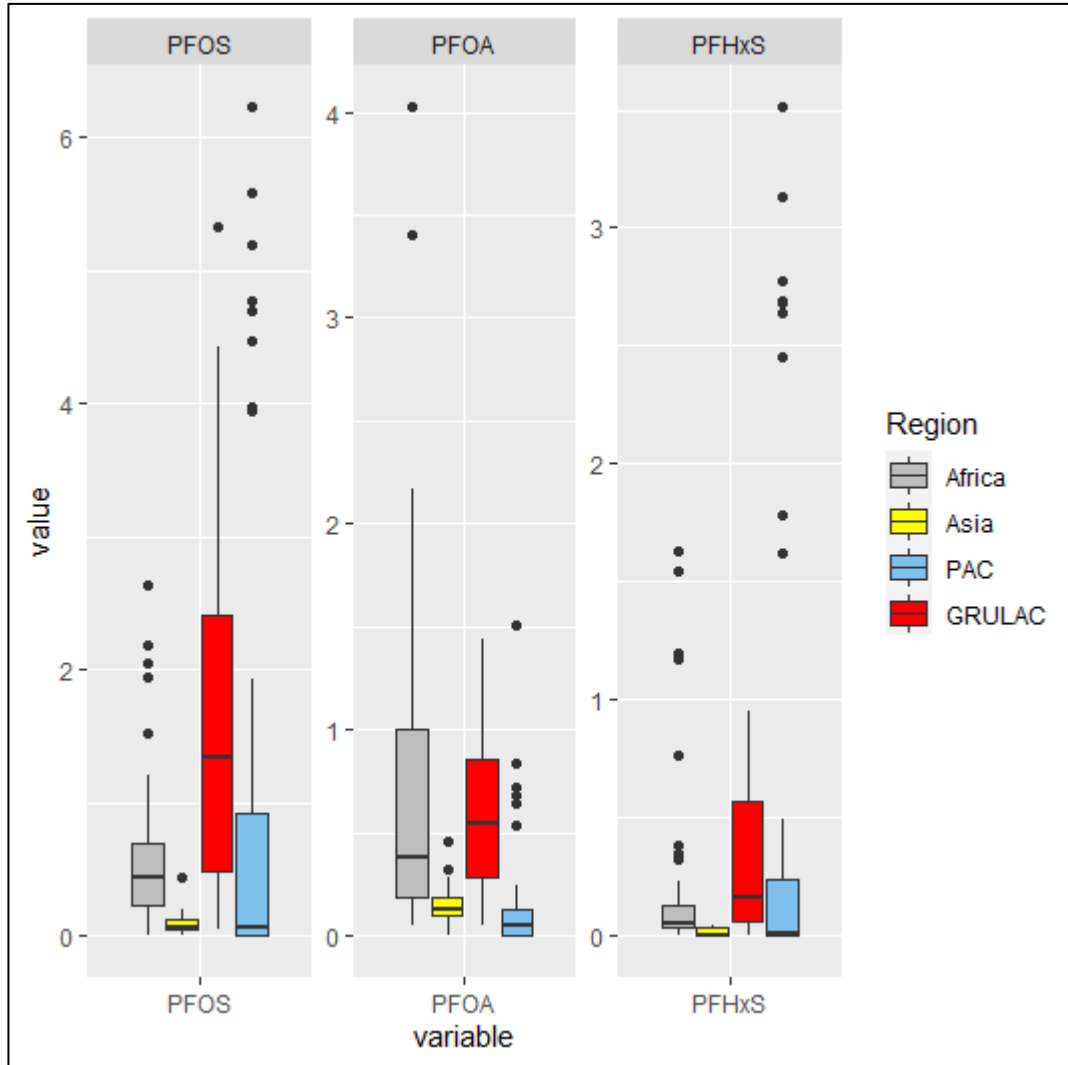
Mean values and SD (n=144)



PD_Code: Population density code using World Bank indicator;
WBC = World Bank classification of income

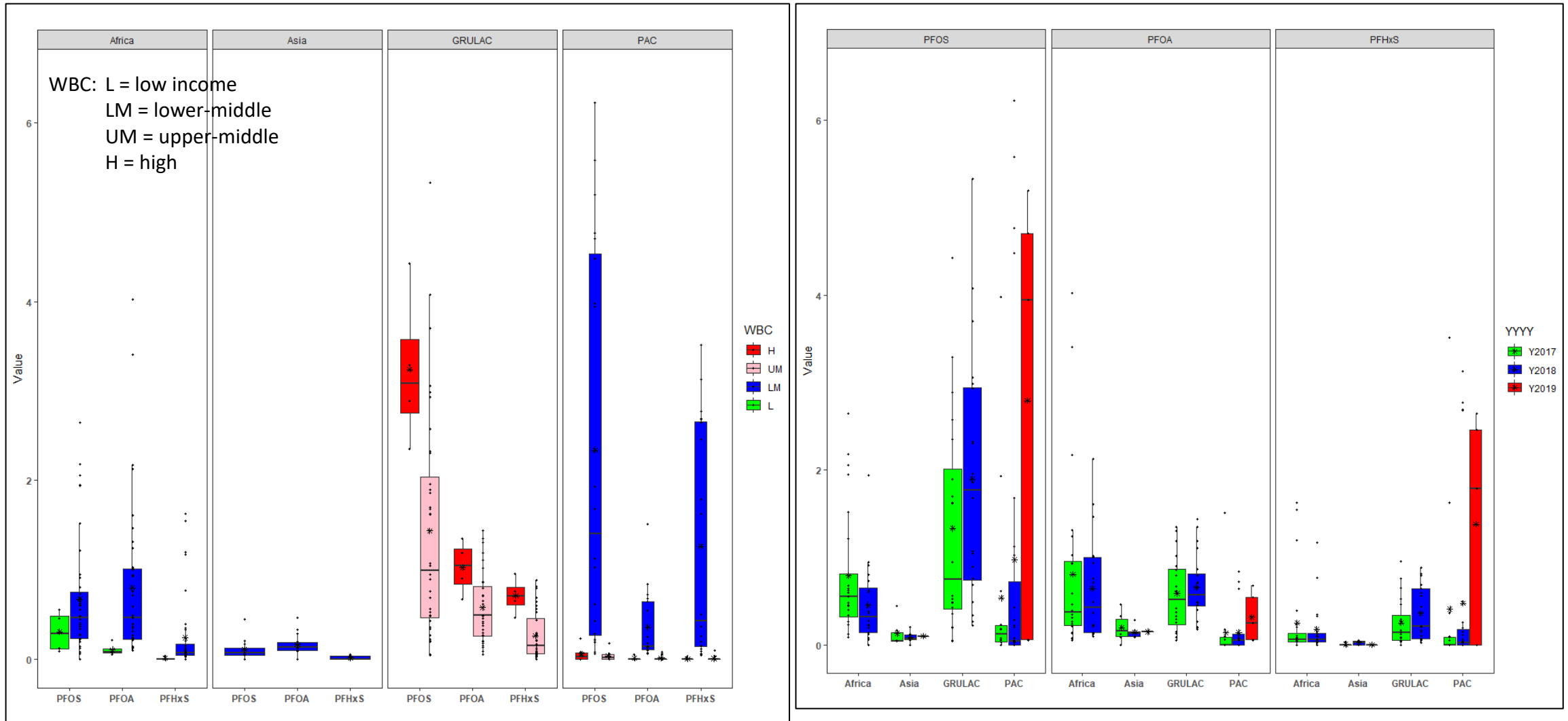


Overview PFAS per Region and PopDensity

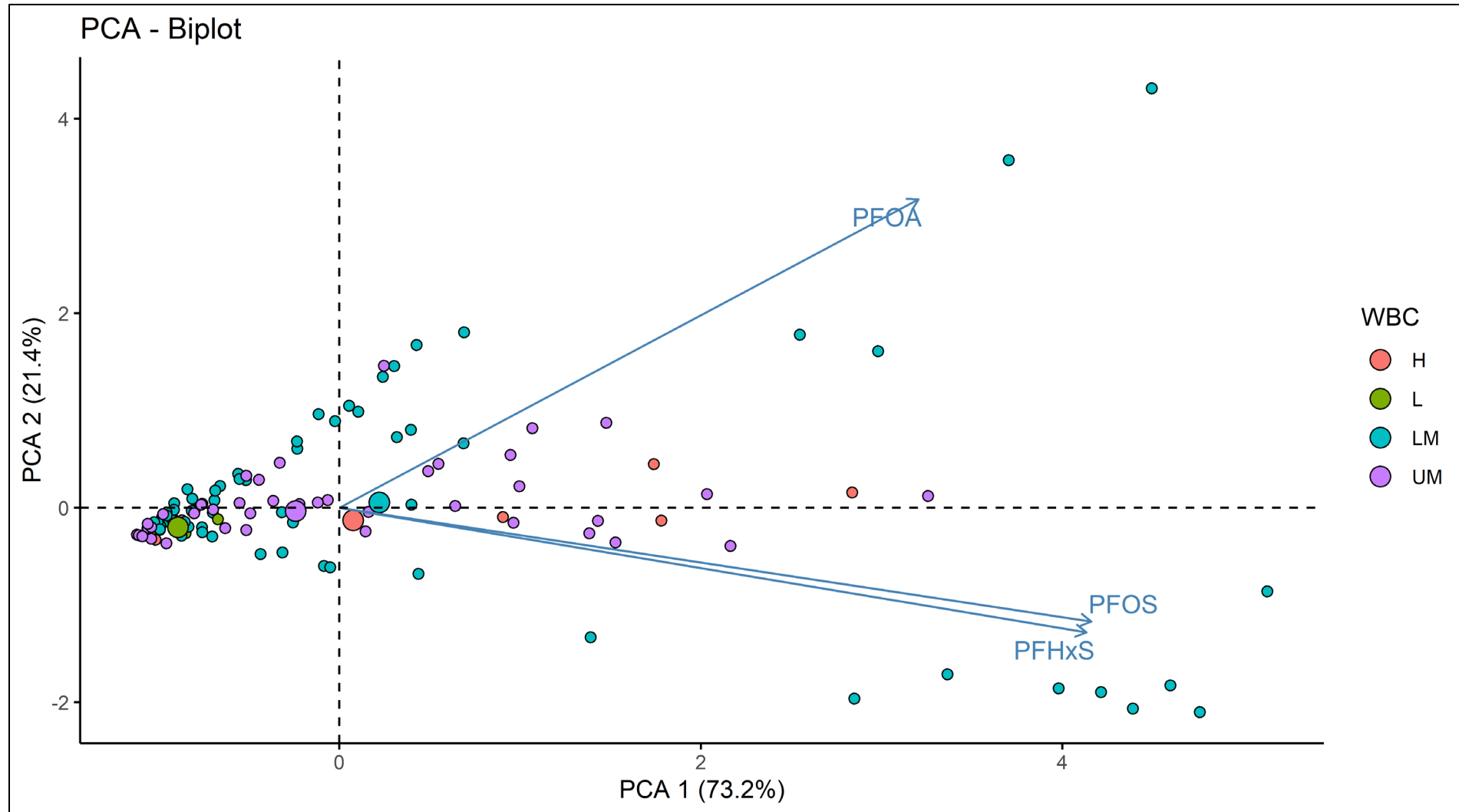


Values in ng/L

Overview according to income and year



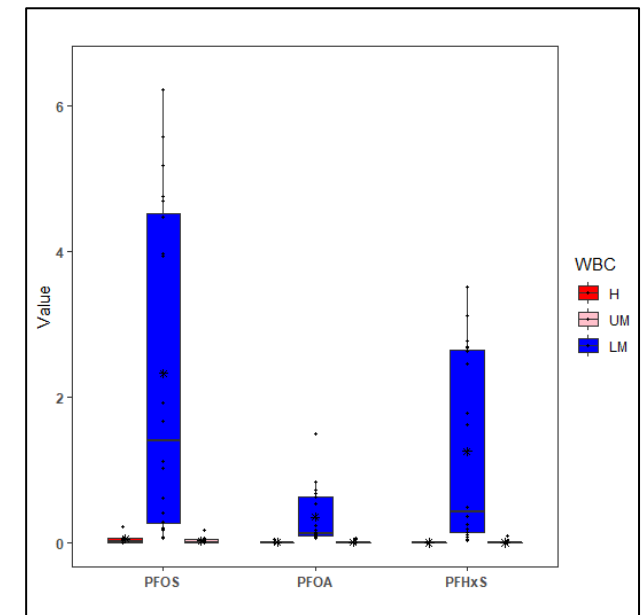
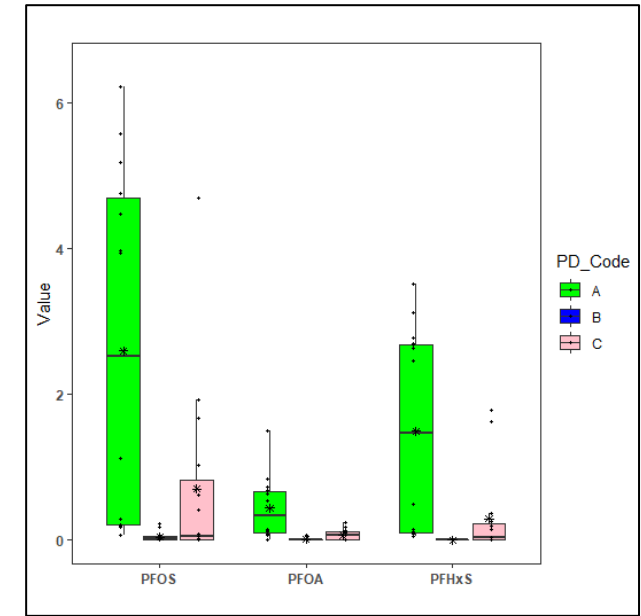
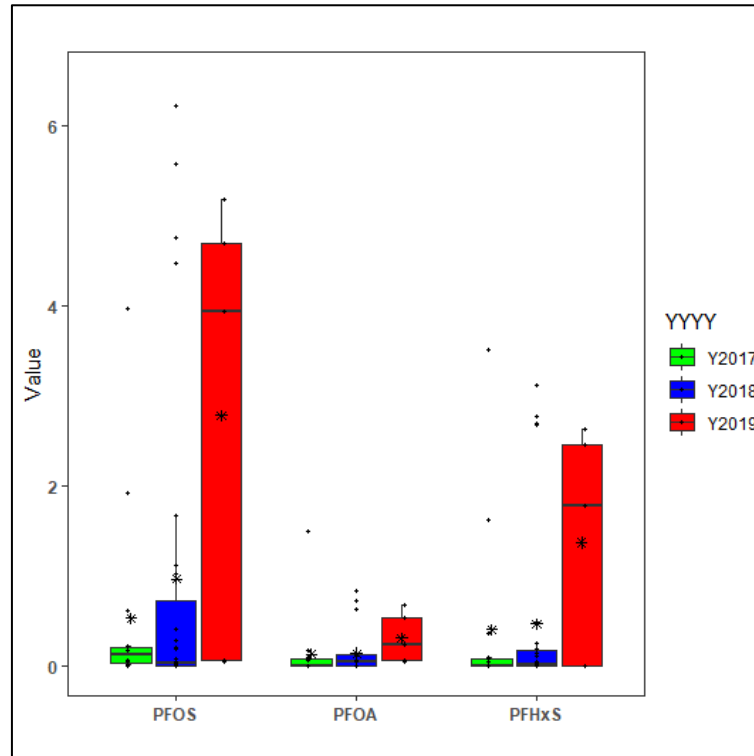
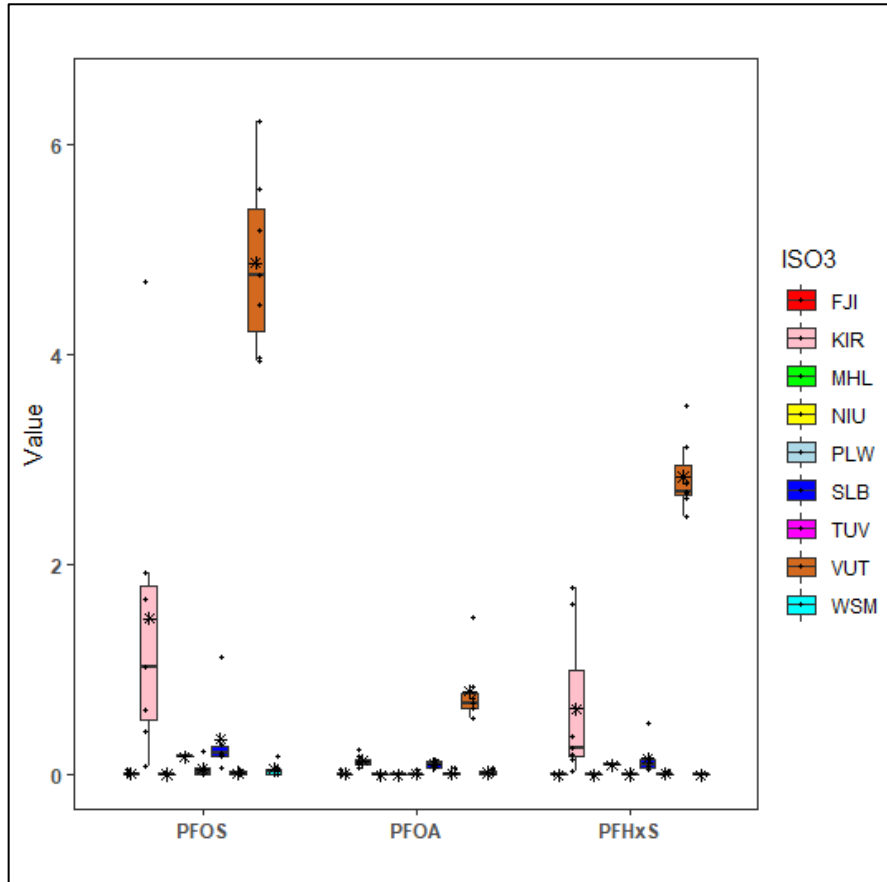
According to income



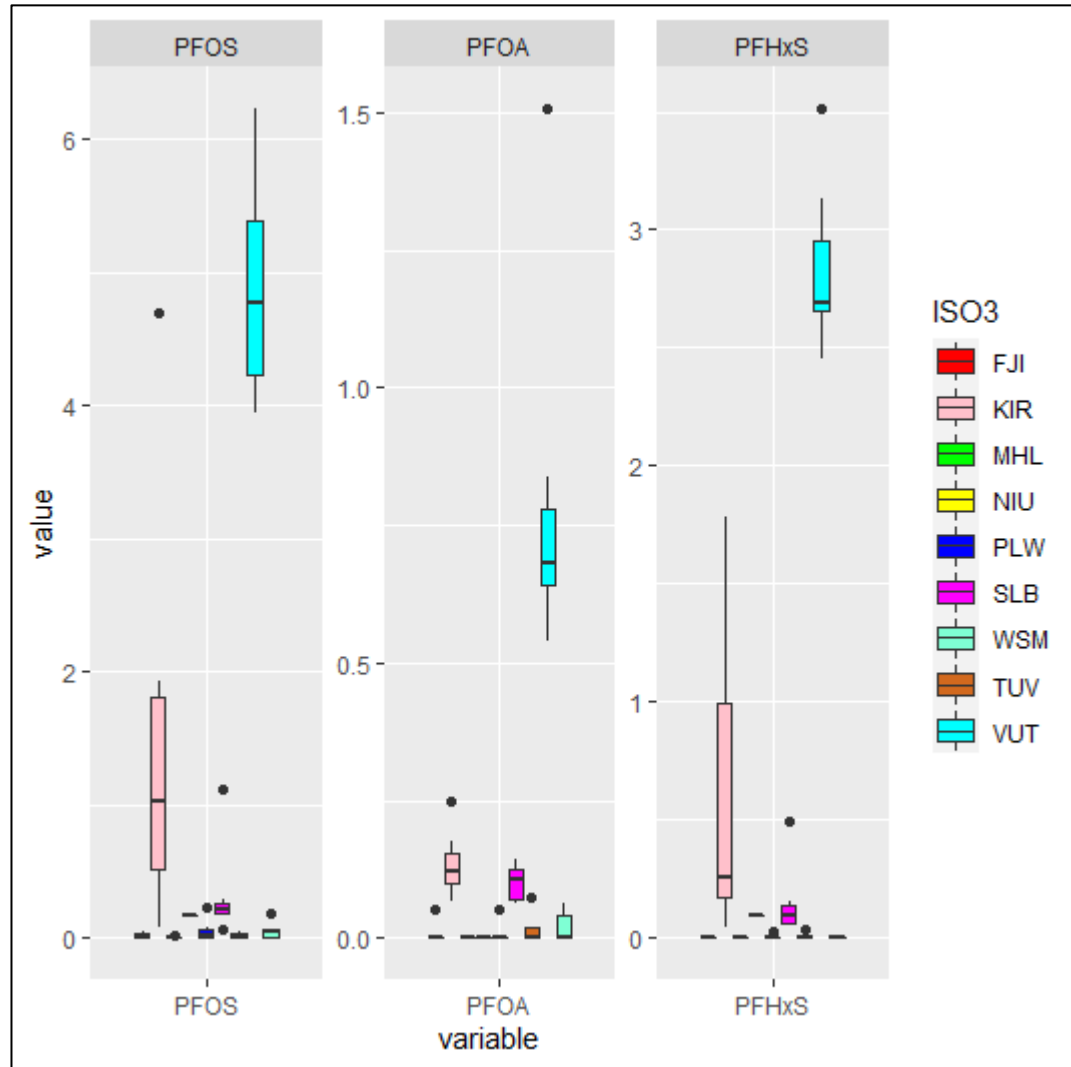
Results PFAS water

4. Pacific Islands

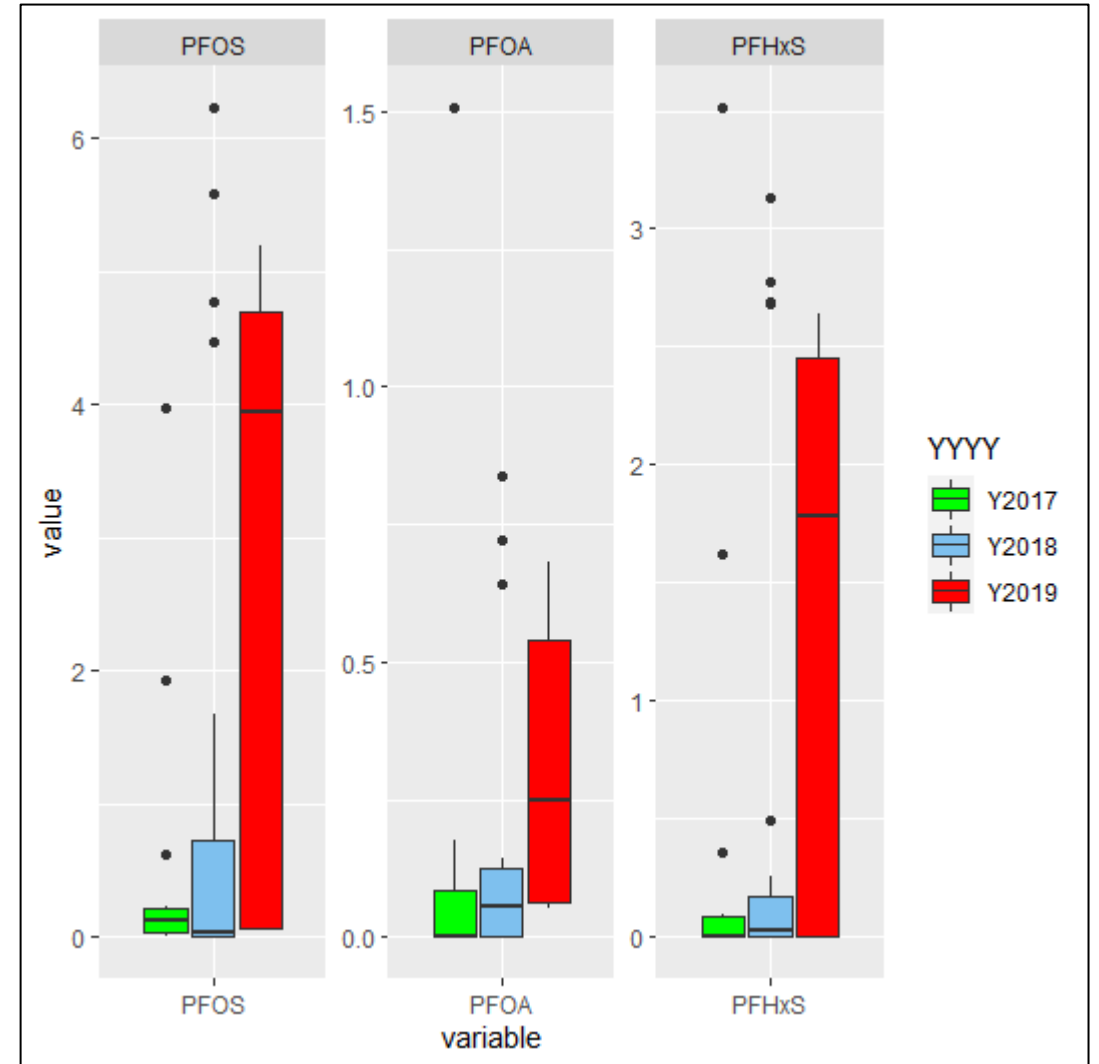
PFAS in water –PAC (ng/L)



By country

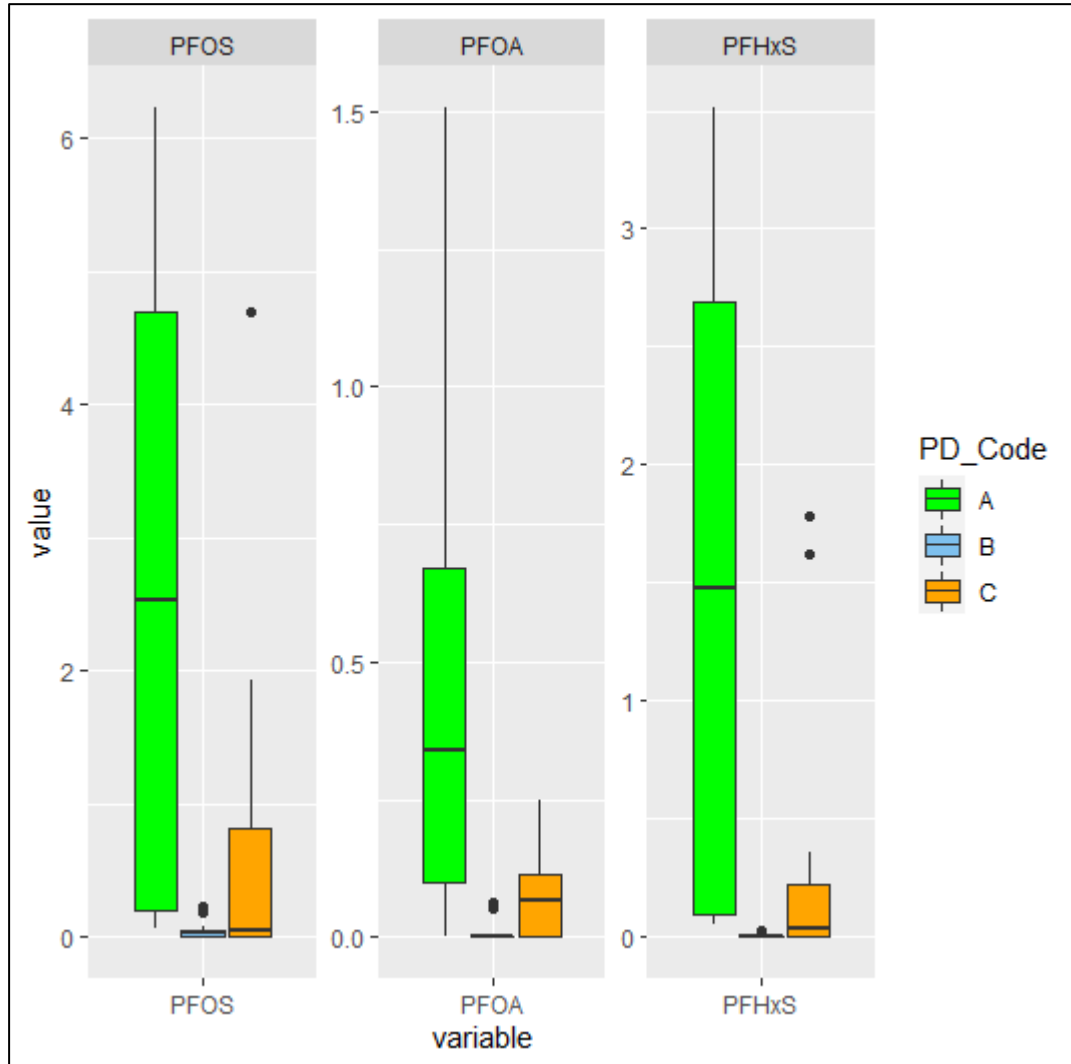


By year

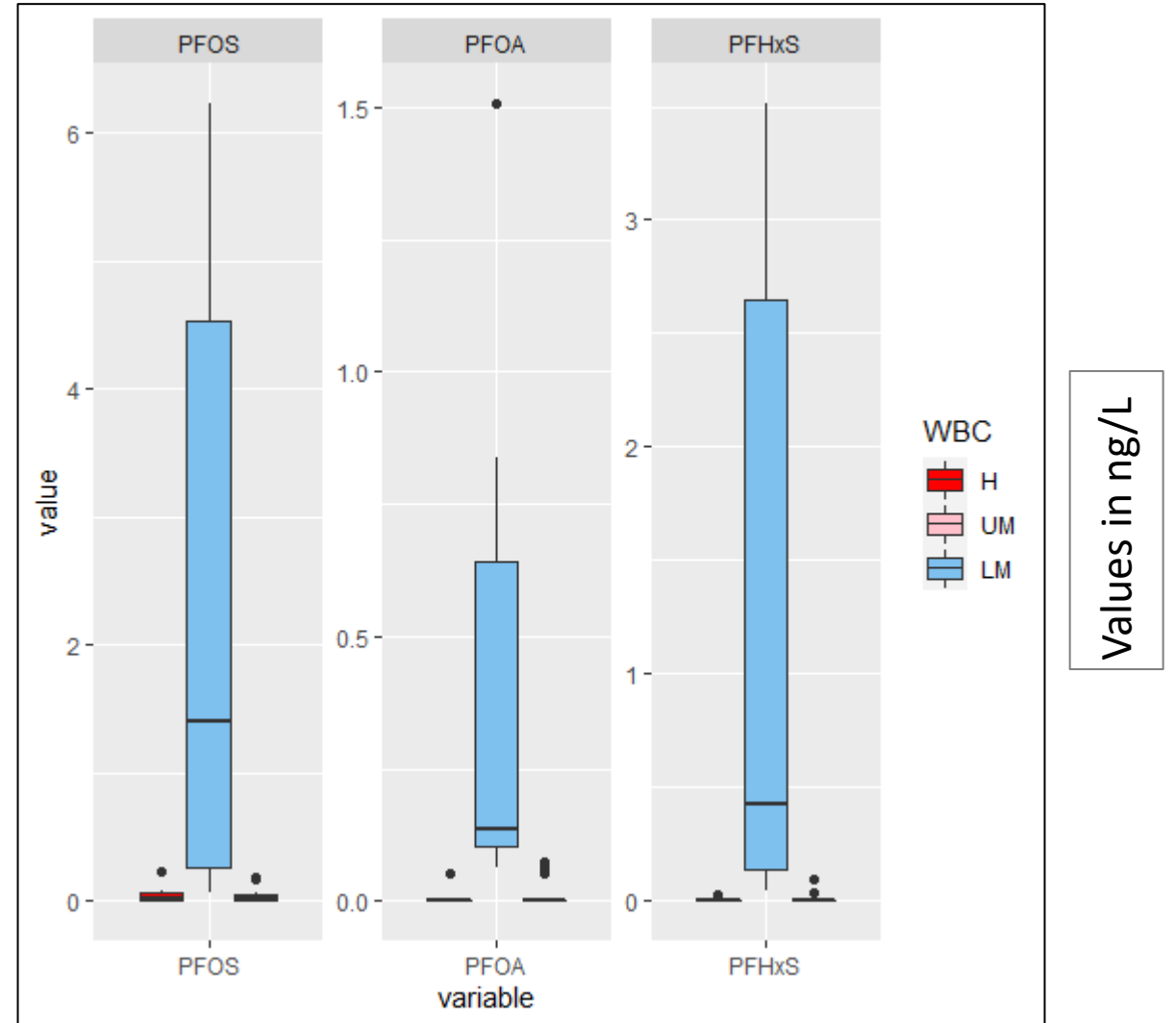


Values in ng/L

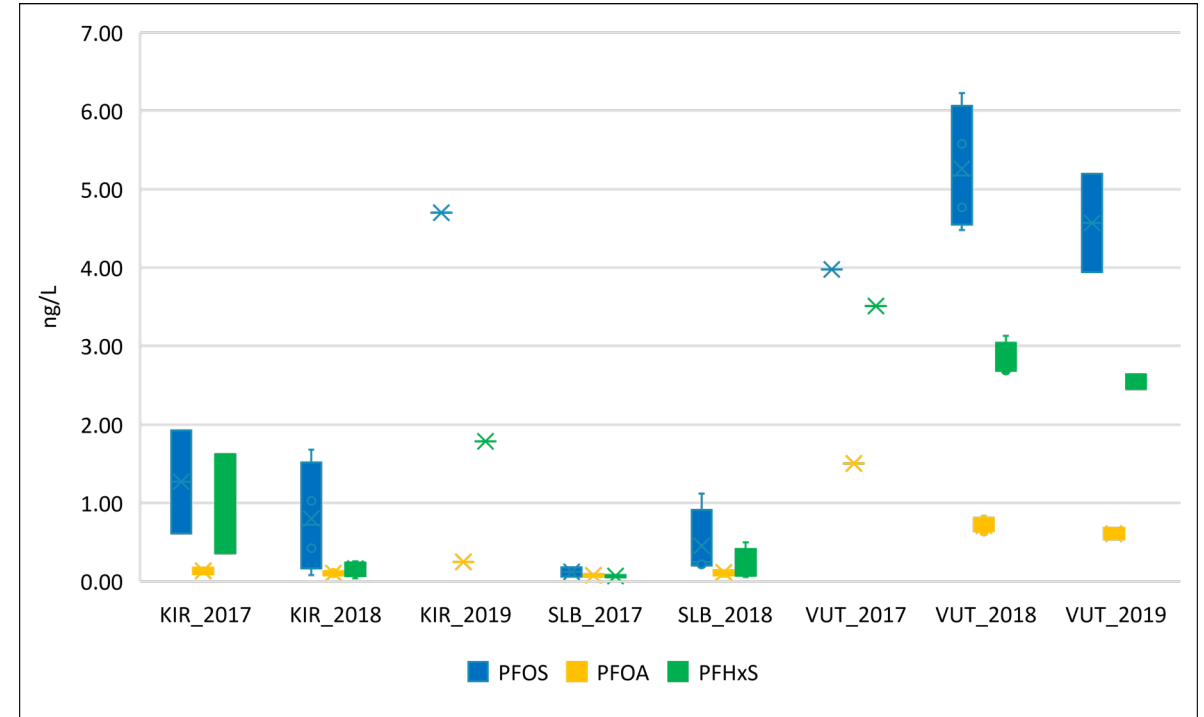
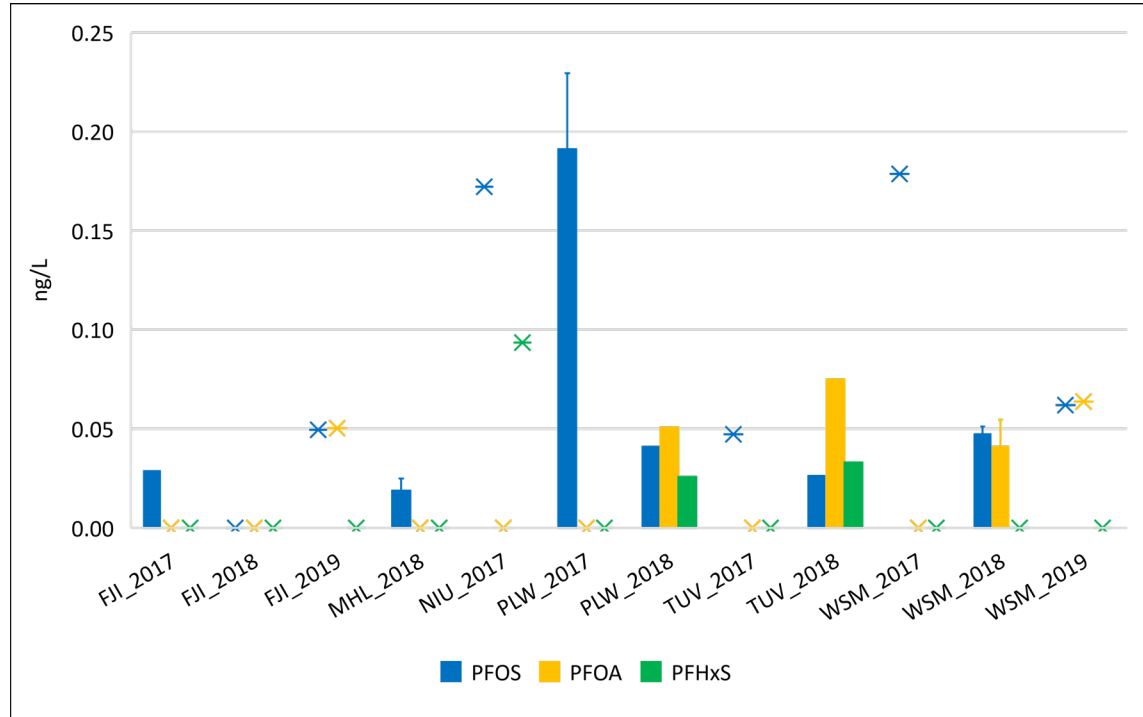
By population density



By income



Boxplots per country and year for PFASs in water



Acknowledgment:

- This work was funded through a grant from UN Environment (funds from the Global Environment Facility – GEF) “Supporting implementation of the Global Monitoring Plan on POPs” to Örebro University;
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- Thanks to all national teams for providing the samples.

Thank you !