Accessory publication

Distribution of perfluoroalkyl compounds and mercury in fish liver from high-mountain lakes in France originating from atmospheric deposition

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Quality assurance

The standard fish length represents the arithmetic mean fish length over all fish samples. Fish length varied between samples collected from each lake. In particular the Lake trouts (n = 4) and Lake trout/Arctic char (n = 1) from the Lac de Crop and the Brown trout (n = 1) from Lac de la Sagne had a higher fish length than in the other samples. Positive relationships were found between fish length and Hg[1–4] and PFC levels, respectively.[5,6] However, data for PFCs are limited and, for example, Shi et al. found no relationship between fish characteristics and PFC levels.[7] In this study, the fish length-adjusted concentrations were determined by a regression of individual fish mercury/PFC concentration on fish lengths, and then solving the regression equation for the predicted mercury/PFC concentration associated with the length of the standard-sized fish. In subsequent analyses for comparing data between the lakes, the predicted mercury/PFC concentrations were natural log-transformed.

Table A1. Method detection limits (MDLs), method quantification limits (MQLs) and blank concentrations (*n* = 6) for fish liver samples in nanograms per gram (wet weight)

MDL and MQL (ng L^{-1}) at 3 and 10 times of the signal to noise in natural samples (*n* = 6) respectively. n.d., not detected

Analyte	MDL	MQL	blanks
Perfluorooctane sulfonate (PFOS)	0.14	0.46	n.d.
Perfluorononanoic acid (PFNA)	0.05	0.17	n.d.
Perfluorodecanoic acid (PFDA)	0.11	0.37	n.d.
Perfluoroundecanoic acid (PFUnDA)	0.09	0.30	n.d.
Perfluorododecanoic acid (PFDoDA)	0.06	0.20	n.d.
Perfluorotridecanoic acid (PFTriDA)	0.08	0.28	n.d.
Perfluorotetradecanoic acid (PFTeDA)	0.13	0.43	n.d.
Perfluorotridecanoic acid (PFPeDA)	0.07	0.23	n.d.

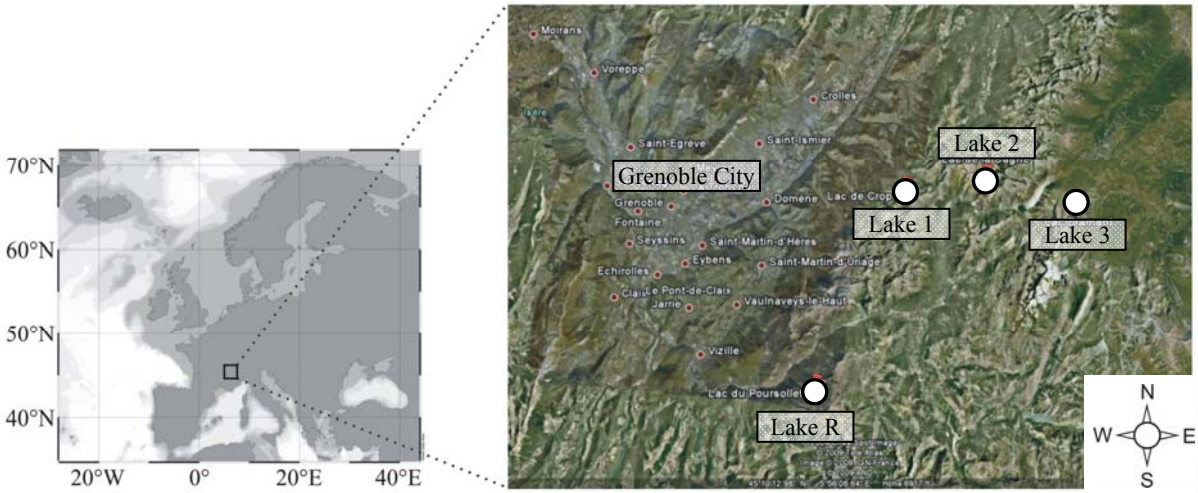
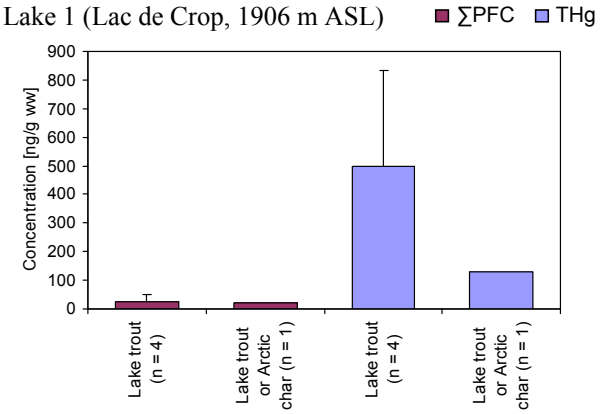


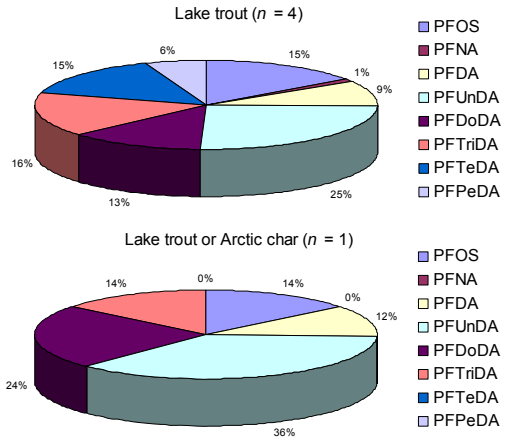
Fig. A1. Map showing the sampling locations at the lake 1 (Lac de Crop, 45°12′28 N, 5°59′16 E), lake 2 (Lac de la Sagne, 45°13′15 N, 6°04′33 E) lake 3 (Lac Bramant, 45°12′00 N, 6°10′35 E) and lake R (Lac du Poursollet, 45°03′08 N, 5°54′00 E) close to Grenoble City (45°11′37N, 5°43′50 E), France. Note: The prevailing wind direction in this region is the west.

PFC and THg concentration

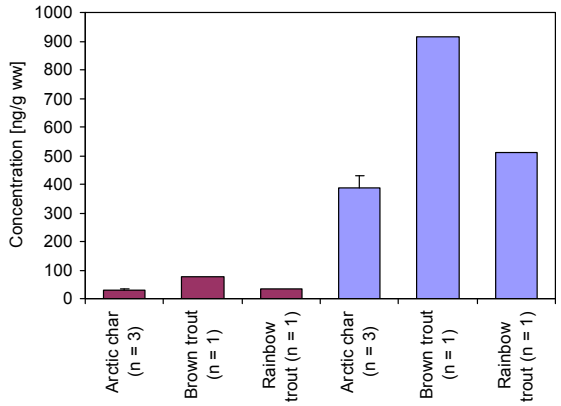
PFC pattern

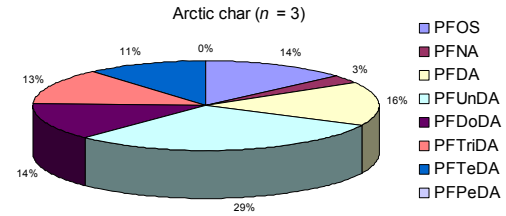
Lake 1 (Lac de Crop, 1906 m ASL)

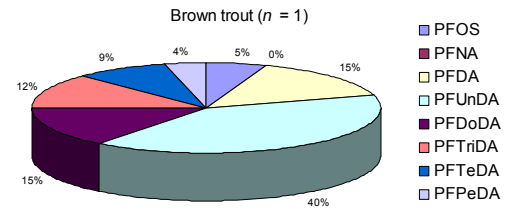


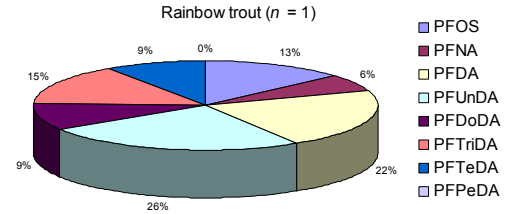


Lake 2 (Lac de la Sagne, 2067 m ASL)









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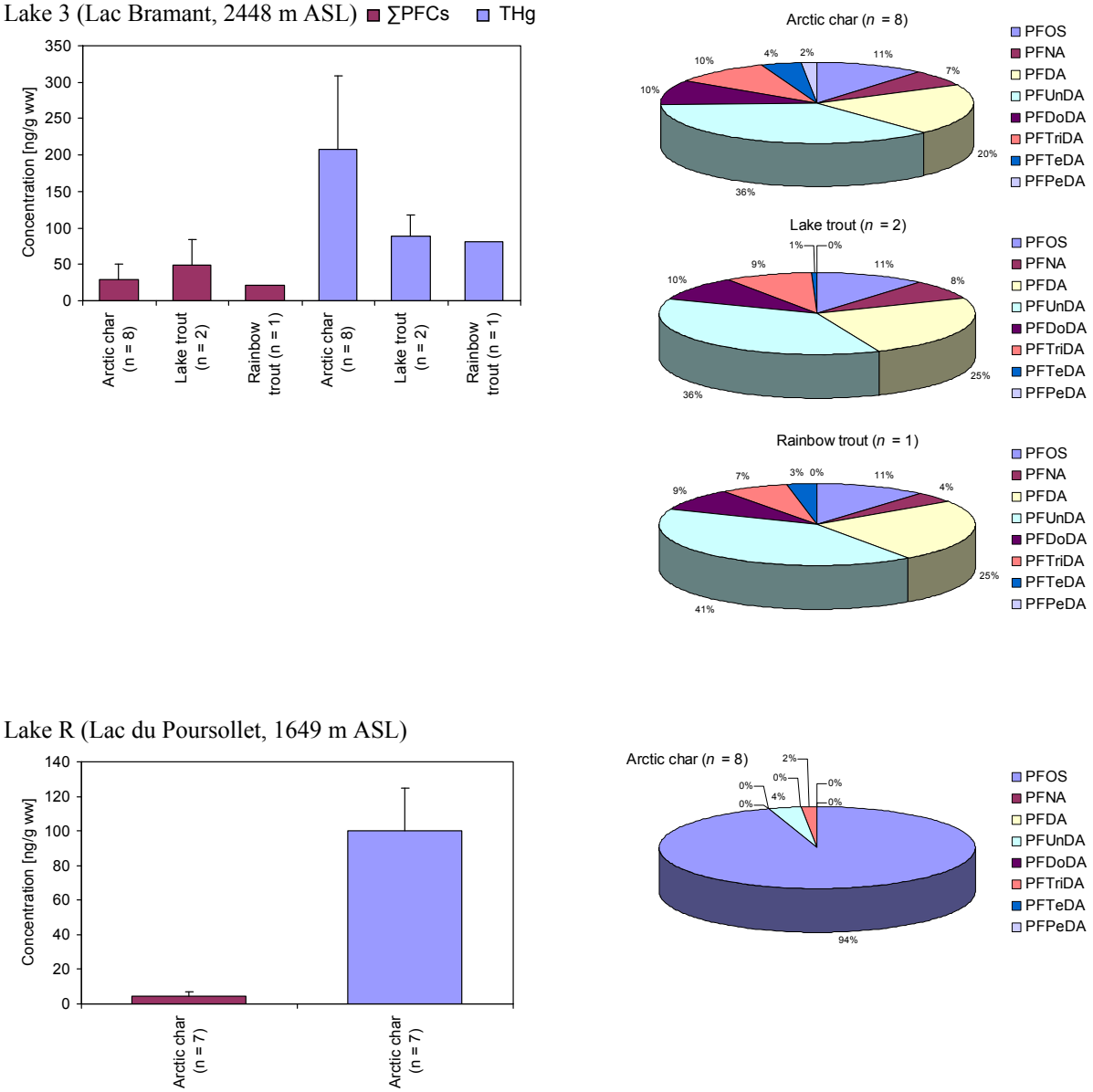
PFC and THg concentration PFC pattern



Lake R (Lac du Poursollet, 1649 m ASL)

Fig. A2. Comparison of the mean concentration and pattern of ∑PFC and THg in the different fish species in the lakes Lac de Crop, Lac de la Sagne, Lac Bramant and Lac du Poursollet.

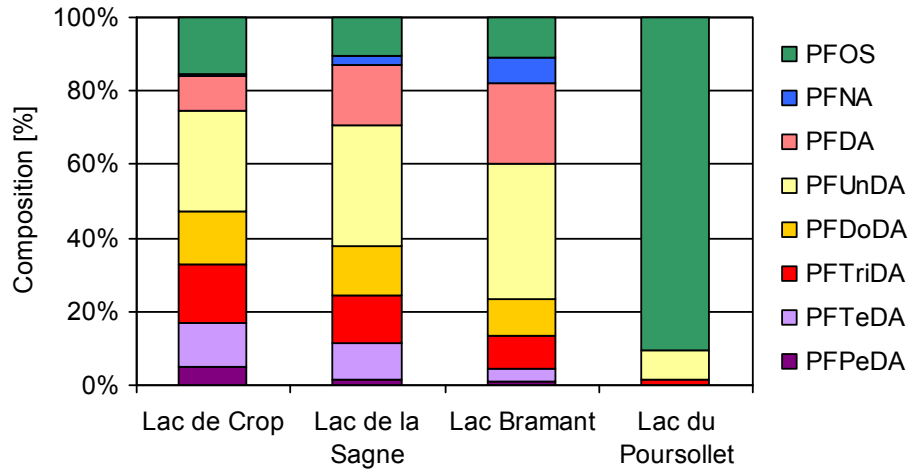


Fig. A3. Composition profile of individual PFCs in fish liver from the lakes Lac de Crop, Lac de la Sagne, Lac Bramant and Lac du Poursollet.

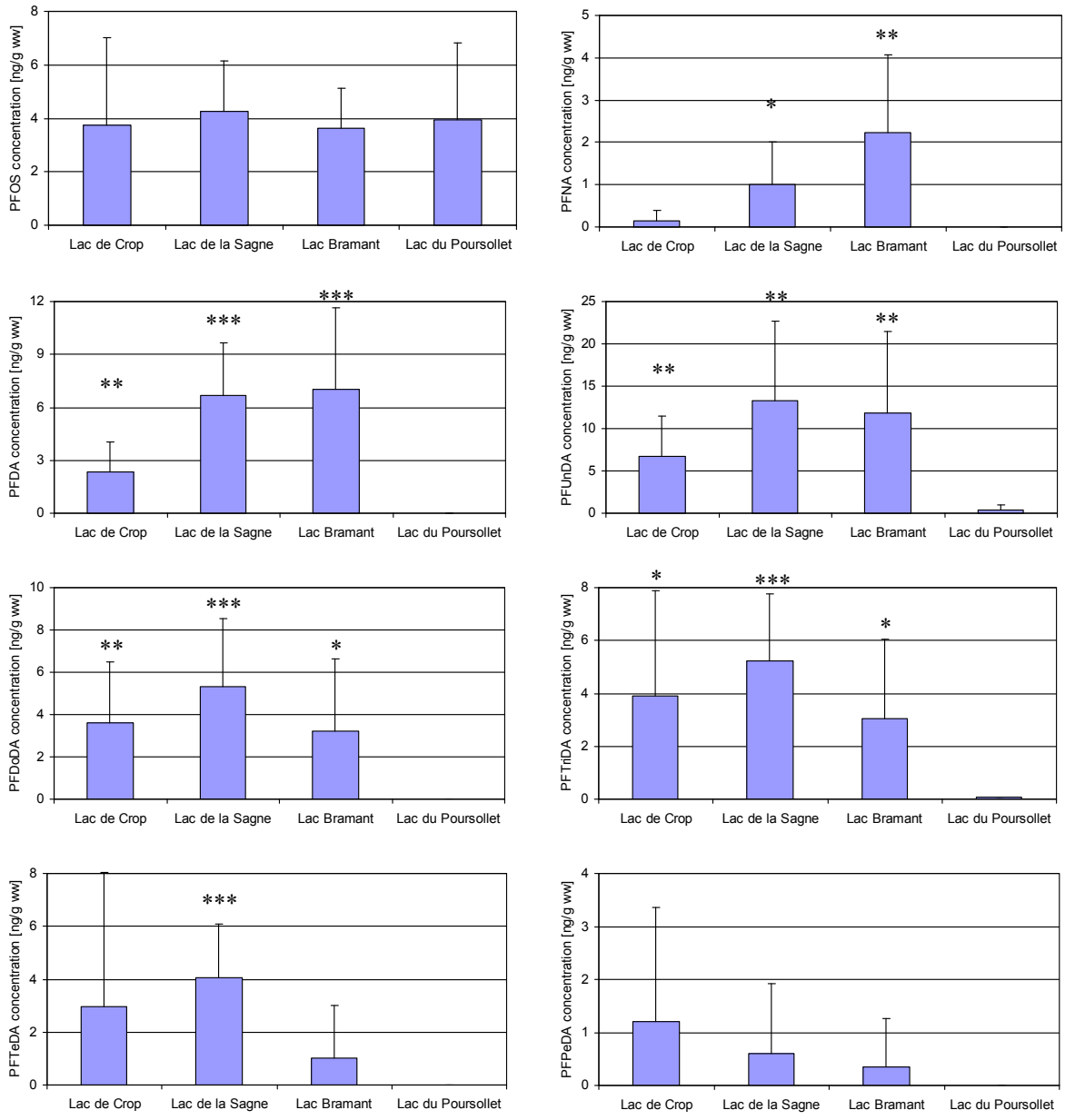


Fig. A4. Spatial distribution of geometric mean concentrations of individual PFCs in fish liver in the lakes Lac de Crop, Lac de la Sagne, Lac Bramant and Lac du Poursollet. Asterisks indicates significant difference from the lake Lac du Poursollet at $P < 0.05$ (*); $P < 0.01$ (**); and $P < 0.001$ (***) respectively.

References

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