Electronic Supplementary Information

Levels of per- and polyfluoroalkyl substances (PFAS) in ski wax products on the market in 2019 indicate no changes in formulation

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Table S1. Detailed information about ski wax products analyzed in the present study

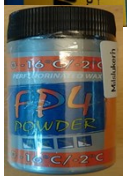
Product name/ Product number	Product picture	Product name/ Product number	Product picture
SWIX FC10X CERA F/ 7045951824131		VAUHTI FC LDR/ 6419696087204	
SWIX FC7X CERA F/ 7045951824117		GALLIUM GIGA SPEED MAXFLUOR / 4948575107853	
SKIGO C22 GUL/ 7393753630048		SWIX HF MARATHON/ 7045951580778	
TOKO JETSTREAM POWDER BLUE/ 7613186169350		SKIGO HF UNIVERSAL / 7393753630208	
BRIKO MAPLUS FP4/ 8028383990079		TOKO HF HOTWAX/ 4250423601612	
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Table S2. List of PFASs monitored and the optimized UPLC-MS/MS parameters

Target compounds	Parent Ion (*m/z*)	Product Ion (*m/z*)	Cone voltage (V)	Collision voltage (V)	Internal standard
Perfluoroalkyl carboxylic acid (PFCAs)					
Perfluorobutanoic acid (PFBA, C4)	213	169	20	10	$^{13}C_4$-PFBA
Perfluoropetanoic acid (PFPeA, C5)	263	219	20	10	$^{13}C_3$-PFPeA
Perfluorohexanoic acid (PFHxA, C6)	313	269	20	10	$^{13}C_2$-PFHxA
Perfluoroheptanoic acid (PFHpA, C7)	363	319	21	11	$^{13}C_4$-PFHpA
Perfluorooctanoic acid (PFOA, C8)	413	369	22	11	$^{13}C_4$-PFOA
Perfluorononanoic acid (PFNA, C9)	463	419,	24	11	$^{13}C_5$-PFNA
Perfluorodecanoic acid (PFDA, C10)	513	469	26	11	$^{13}C_2$-PFDA
Perfluoroundecanoic acid (PFUnDA, C11)	563	519	28	11	$^{13}C_2$-PFUnDA
Perfluorododecanoic acid (PFDoDA, C12)	613	569	30	12	$^{13}C_2$-PFDoDA
Perfluorotridecanoic acid (PFTrDA, C13)	663	619	32	12	$^{13}C_2$-PFDoDA
Perfluorotetradecanoic acid (PFTeDA, C14)	713	669	35	12	$^{13}C_2$-PFDoDA
Perfluoropentadecanoic acid (PFPeDA, C15)	763	719	38	13	$^{13}C_2$-PFDoDA
Perfluorohexadecanoic acid (PFHxDA, C16)	813	769	39	14	$^{13}C_2$-PFDoDA
Perfluoroheptadecanoic acid (PFHpDA, C17)	863	819	40	15	$^{13}C_2$-PFDoDA
Perfluorooctadecanoic acid (PFODA, C18)	913	869	41	16	$^{13}C_2$-PFDoDA
Perfluorononadecanoic acid (C19)	963	919	42	17	$^{13}C_2$-PFDoDA
Perfluoroeicosanoic acid (C20)	1013	969	43	18	$^{13}C_2$-PFDoDA
Perfluoroheneicosanoic acid (C21)	1063	1019	44	19	$^{13}C_2$-PFDoDA
Perfluorodocosanoic acid (C22)	1113	1069	45	20	$^{13}C_2$-PFDoDA
Perfluorotetracosanoic acid (C23)	1163	1119	46	21	$^{13}C_2$-PFDoDA
Perfluorotricosanoic acid (C24)	1213	1169	47	22	$^{13}C_2$-PFDoDA
Perfluoropentacosanoic acid (C25)	1263	1219	48	23	$^{13}C_2$-PFDoDA
Perfluoroalkyl sulfonic acids (PFSAs)					
Perfluorobutane sulfonate acid (PFBS)	299	80	45	30	$^{18}O_2$-PFHxS
Perfluorohexane sulfonate acid (PFHxS)	399	80	55	36	$^{18}O_2$-PFHxS
Perfluorooctane sulfonate acid (PFOS)	499	80	65	42	$^{13}C_4$-PFOS
Perfluorodecane sulfonic acid (PFDS)	599	80	80	46	$^{13}C_4$-PFOS
Internal Standards					
$^{13}C_4$-Perfluorobutanoic acid ($^{13}C_4$-PFBA)	217	172	20	10	
$^{13}C_3$- Perfluoropentanoic acid ($^{13}C_3$-PFPeA)	266	222	20	10	
$^{13}C_2$- Perfluorohexanoic acid ($^{13}C_2$-PFHxA)	315	270	20	10	
$^{13}C_4$- Perfluoroheptanoic acid ($^{13}C_4$-PFHpA)	367	322	21	11	
$^{13}C_4$-Perfluorooctanoic acid ($^{13}C_4$-PFOA)	417	372	22	11	
$^{13}C_5$-Perfluorononanoic acid ($^{13}C_5$-PFNA)	468	423	24	11	
$^{13}C_2$-Perfluorodecanoic acid ($^{13}C_2$-PFDA)	515	470	26	11	
$^{13}C_2$-Perfluoroundecanoic acid ($^{13}C_2$-PFUnDA)	565	520	28	11	
$^{13}C_2$-Perfluorododecanoic acid ($^{13}C_2$-PFDoDA)	615	570	30	12	
$^{18}O_2$-Perfluorohexane sulfonic acid ($^{18}O_2$-PFHxS)	403	84	55	36	
$^{13}C_4$-Perfluorooctane sulfonic acid ($^{13}C_4$-PFOS)	503	80	65	42	

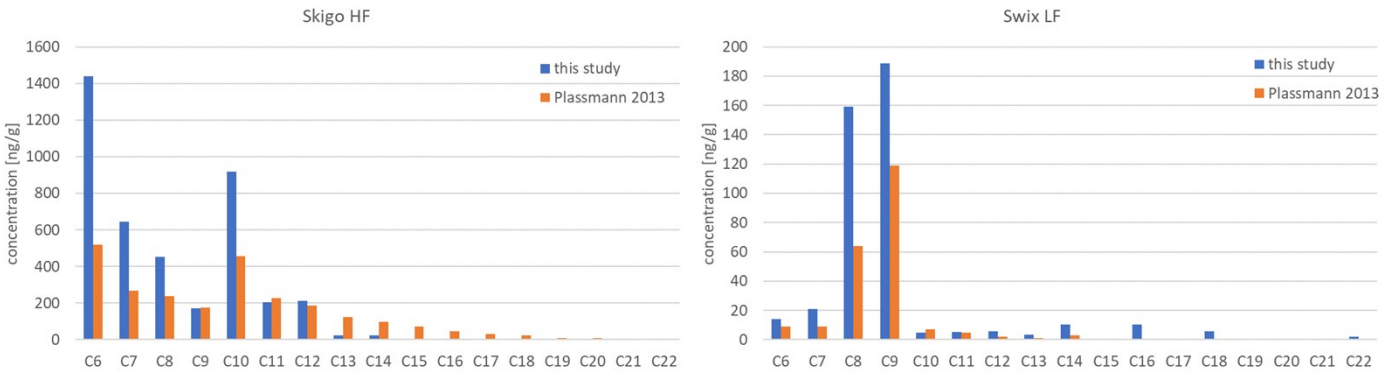
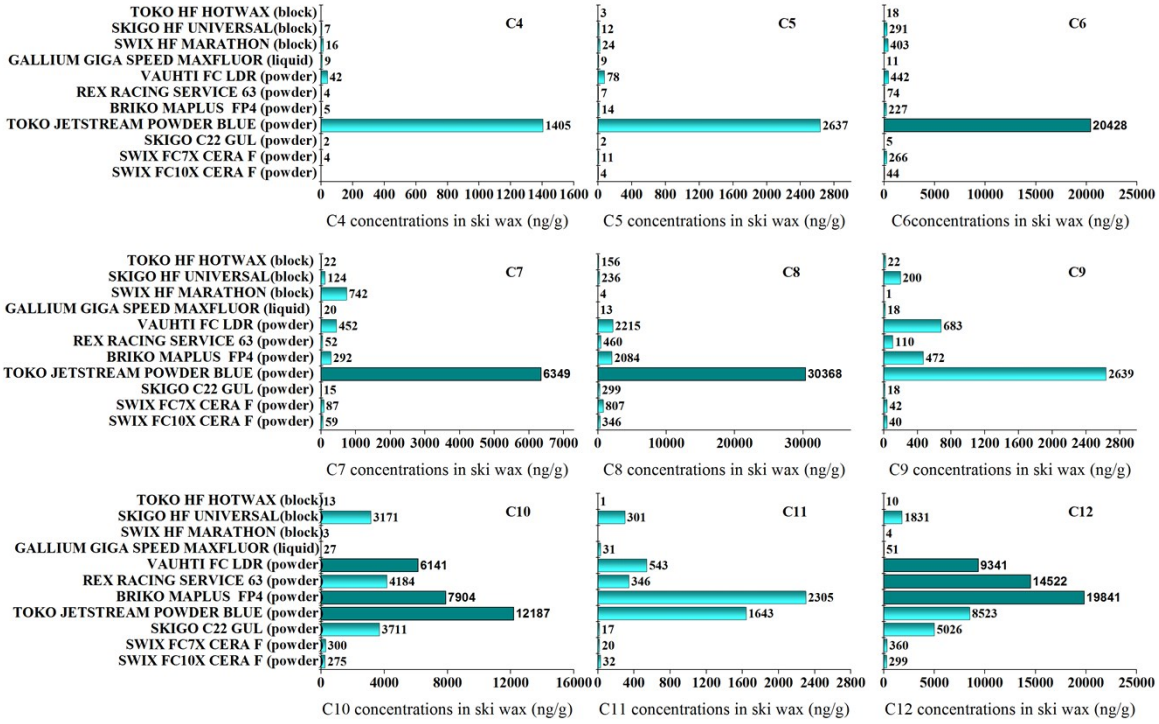


Figure S1: Comparison of two ski waxes analysed in this study and previously in the same laboratory in 2013, reported in Plassmann et al. [1]



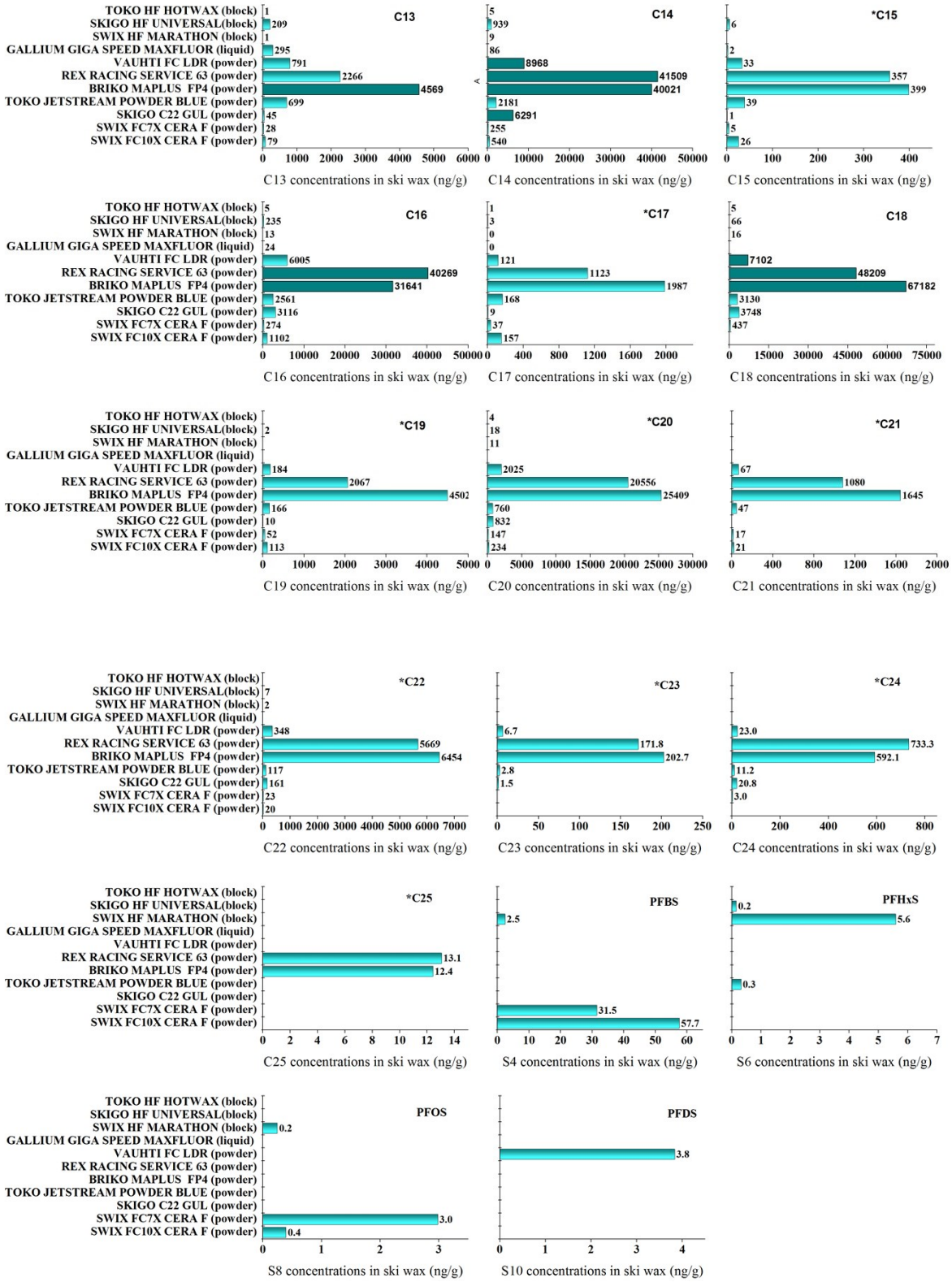


Figure S2. Concentrations (ng/g) of the 26 individual PFAS analytes in the eleven commercial ski wax products purchased from a Norwegian retailer in 2019. Concentrations marked in darker color are semiquantitative due to the peak areas exceeding the standard calibration curve, and concentrations reported for compounds marked with an asterisk are semiquantitative due to lack of standards.

References

1. Plassmann, M.M. and U. Berger, *Perfluoroalkyl carboxylic acids with up to 22 carbon atoms in snow and soil samples from a ski area.* Chemosphere, 2013. **91**(6): p. 832-837.