Supplementary Material

1. Supplementary text

Instrumental analysis and quantification

The samples were analyzed for syn- and anti-DP, Dec-601, Dec-602, Dece-603 and Dec-604 using an Agilent 7890 gas chromatograph (GC) coupled to an Agilent 7200 high resolution quadruple time-of-flight mass spectrometer (HRqToFMS). 1 µL of the concentrated extract was injected into a Gerstel programmed temperature vaporization (PTV) injector operated in solvent vent mode. Two 15 m 0.25mmx0.25µm Agilent HP5 UI columns connected in series were used for separation, with Helium at 1.4 mL/min constant flow as carrier gas. The temperature program was 55°C, 2 min, 70°C/min to 200°C, 1 min, 10°C/min to 310°C, 0 min, 70 min°C/min to 325 min, 10 min. The MS was operated in electron capture negative ionization (ECNI) mode using methane as moderating gas and with an ion source at 120°C. The quantification was performed using MassHunter Quant version B.09.00, and integrated areas of targeted analytes and internal standards were used to quantify the concentration of Dechloranes (i.e. internal standard method).

2. Supplementary Figures and Tables

2.1. Tables

Table S1: Information on Mirex, Dechlorane Plus (Syn- and Anti-isomers) and Dechlorane Related Compounds Dechlorane-601, -602, -603, and -604. Information is collected from PubChem (Kim, 2021). *Where several abbreviations are available, the one used in this study is outlined in **bold**.

CAS#	Common name(s)*	Abbr.(s)*	Chemical formula	IUPAC	MW (g/mol)	Log K_{OA}
2385-85-5	**Mirex**, Dechlorane	MIREX	$C_{10Cl}12$	1,2,3,4,5,5,6,7,8,9,10,10-dodecachloropentacyclo[5.3.0.0^{2,6}.0^{3,9}.0^{4,8}]decane	545.5	11.3 *
13560-89-9	**Dechlorane Plus**, Dechlorane-605	**DP**, Dec-605, DDC-CO	$C_{18}H_{12}Cl_{12}$	1,6,7,8,9,14,15,16,17,17,18,18-dodecachloropentacyclo[12.2.1.1^{6,9}.0^{2,13}.0^{5,10}]octadeca-7,15-diene	653.7	14.8*
135821-03-3	*Syn*-Dechlorane Plus	**Syn-DP**, Syn-DDC-CO	DP isomer	-	-	-
135821-74-8	*Anti*-Dechlorane Plus	**Anti-DP**, Anti-DDC-CO	DP isomer	-	-	-
13560-90-2	Dechlorane-601	**Dec-601**, DDC-ID	$C_{20}H_{12}Cl_{12}$	4,5,6,7,13,14,15,16,19,19,20,20-dodecachloroheptacyclo[9.6.1.14,7.113,16.02,10.03,8.012,17]icosa-5,14-diene	677.7	16.7 **
31107-44-5	Dechlorane-602	**Dec-602**, DDC-DBF	$C_{14}H_4Cl_{12}O$	1,4,5,6,7,11,12,13,14,14,15,15-dodecachloro-9-oxapentacyclo[9.2.1.1^{4,7}.0^{2,10}.0^{3,8}]pentadeca-5,12-diene	613.6	15.0*
13560-92-4	Dechlorane-603	**Dec-603**, DDC-Ant	$C_{17}H_8Cl_{12}$	3,4,5,6,10,11,12,13,16,16,17,17-dodecachlorohexacyclo[6.6.1.1^{3,6}.1^{10,13}.0^{2,7}.0^{9,14}]heptadeca-4,11-diene	637.7	15.2*
34571-16-9	Dechlorane-604	**Dec-604**, HCTBPH	$C_{13}H_4Br_4Cl_6$	1,2,3,4,7,7-hexachloro-5-(2,3,5,6-tetrabromophenyl)bicyclo[2.2.1]hept-2-ene	692.5	14.9*

*EPI Suite estimations collected from Zhang et al. (2016).

**EAS-E Suite (Ver.0.96 - BETA, release Nov., 2022). www.eas-e-suite.com. Accessed 28.11.2022. Developed by ARC Arnot Research and Consulting Inc., Toronto, ON, Canada

Table S2: Chemical structures of Mirex, Dechlorane Plus and Dechlorane Related Compounds Dechlorane-601, -602, -603, and -604. Collected from https://pubchem.ncbi.nlm.nih.gov/ (Kim, 2021).

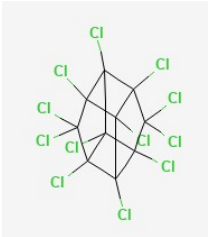
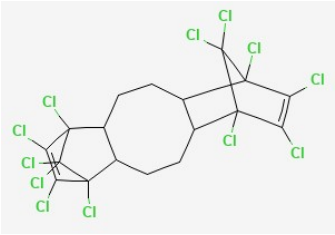
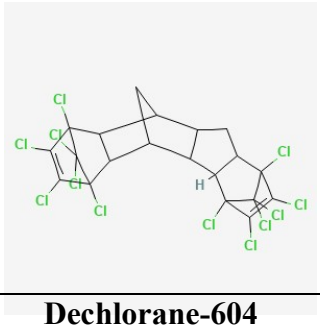
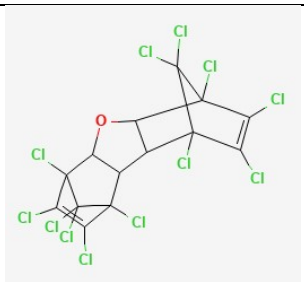
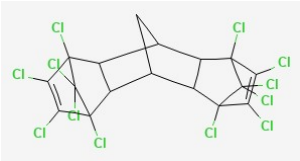
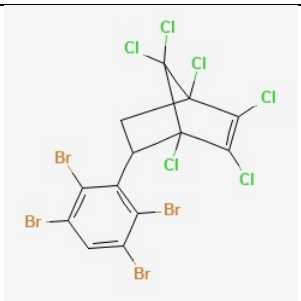
Mirex	**Dechlorane Plus**	**Dechlorane-601**
		
Dechlorane-602	**Dechlorane-603**	**Dechlorane-604**
		

Table S3: Station name, country, geographic coordinates, sampling periods, temperature, wind speed, orography, exposure time, applied sample volume (estimated from a sampling rate of 2.26 m^3/day and the exposure time).

Station	Country	Lat. (°N)	Long. (°E)	T[1] (°C)	Wind speed[1] (m/s)	Altitude[1] (m.a.s.l.)	Sampling start	Sampling end	Exp. time (days)	Vol. (m^3)
ARM/Amberd*	Armenia	40.4	44.3	18	2.39	2080	24.06.2016	23.09.2016	91	206
AUT/Illmitz	Austria	47.8	16.8	20.5	2.94	117	22.06.2016	27.09.2016	97	219
AUT/Vorhegg	Austria	46.7	13.0	14.9	2.02	1020	13.07.2016	05.10.2016	84	190
BEL/Houtem	Belgium	51.0	2.6	18.3	4.2	10	01.07.2016	30.09.2016	91	206
BEL/Koksijde	Belgium	51.1	2.7	18.3	4.2	4	01.07.2016	30.09.2016	91	206
CHE/Jungfraujoch	Switzerland	46.5	8.0	-0.7	1.54	3578	13.07.2016	06.10.2016	85	192
CHE/Payerne	Switzerland	46.8	6.9	15.7	2.09	489	06.07.2016	12.10.2016	98	221
CYP/Ayia Marina	Cyprus	35.0	33.1	29	3.18	520	23.06.2016	15.09.2016	84	190
CZE/Kosetice*	Czech Republic	49.6	15.0	18.3	2.87	535	24.06.2016	26.09.2016	94	212
CZE/Svratouch	Czech Republic	49.7	16.0	18.7	3.04	737	22.06.2016	23.09.2016	93	210
DEU/Hohenpeissenberg	Germany	47.8	11.0	16.7	2.17	985	28.06.2016	28.09.2016	92	208
DEU/Melpitz	Germany	51.5	12.9	19.6	3.06	86	20.06.2016	19.09.2016	91	206
DEU/Neuglobsow	Germany	53.2	13.0	18.1	3.39	62	01.07.2016	04.10.2016	95	215
DEU/Schaulnsland	Germany	47.9	7.9	14.1	2.1	1205	01.07.2016	30.09.2016	91	206
DEU/Schmücke	Germany	50.7	10.8	17.6	2.86	937	01.07.2016	30.09.2016	91	206
DEU/Waldhof*	Germany	52.8	10.8	18.2	3.5	74	01.07.2016	30.09.2016	91	206
DEU/Westerland*	Germany	54.9	8.3	16.9	5.9	12	01.07.2016	05.10.2016	96	217
DEU/Zingst	Germany	54.4	12.7	17.6	6.16	1	01.07.2016	30.09.2016	91	206
DNK/Anholdt	Denmark	56.7	11.5	16.8	6.61	40	01.07.2016	01.10.2016	92	208
DNK/Keldsnor	Denmark	54.7	10.7	17.5	5.36	10	27.06.2016	16.09.2016	81	183
DNK/Tange	Denmark	56.4	9.6	16	4.48	13	30.06.2016	29.09.2016	91	206
ESP/Barcarrota	Spain	38.5	-6.9	23.5	2.37	393	28.07.2016	28.10.2016	92	208
ESP/Els Torms	Spain	41.4	0.7	19.8	2.03	470	05.08.2016	07.11.2016	94	212
ESP/Mahon	Spain	39.9	-4.3	21.6	2.36	78	02.08.2016	02.11.2016	92	208
ESP/Niembro	Spain	43.4	-4.9	17.2	4.23	134	09.08.2016	09.11.2016	92	208
ESP/San Pablo de los Montes	Spain	39.5	-4.4	18.1	2.47	917	02.08.2016	02.11.2016	92	208

ESP/Viznar*	Spain	37.2	-3.5	15.1	2.66	1265	27.07.2016	04.11.2016	100	226
FIN/Hailuoto	Finland	65.0	24.7	13.9	5.08	4	04.07.2016	04.10.2016	92	208
FIN/Hyytiälä	Finland	61.9	24.3	13.6	3.1	181	04.07.2016	03.10.2016	91	206
FIN/Oulanka	Finland	66.3	29.4	12.4	2.78	310	01.07.2016	30.09.2016	91	206
FIN/Pallas*	Finland	68.0	24.1	11.4	2.9	340	30.06.2016	04.10.2016	96	217
FIN/Utö	Finland	59.8	21.4	15.9	6.37	7	01.07.2016	02.10.2016	93	210
FIN/Virolahti	Finland	60.5	27.7	15.7	5.24	4	01.07.2016	30.09.2016	91	206
FIN/Ähtäri	Finland	62.6	24.2	13.7	3.05	162	30.06.2016	30.09.2016	92	208
FRA/Donon	France	48.5	7.1	18.6	2.36	775	05.07.2016	04.10.2016	91	206
FRA/La Tardiére	France	46.7	-0.8	19.6	3.16	133	28.06.2016	27.09.2016	91	206
FRA/Le Casset	France	45.0	6.5	15.1	1.58	1750	28.06.2016	27.09.2016	91	206
FRA/Peyrusse V	France	43.6	0.2	20	2.03	200	28.06.2016	27.09.2016	91	206
FRA/Porspoder	France	48.5	-4.8	16.8	5.89	50	02.07.2016	05.10.2016	95	215
FRA/Revin	France	49.9	4.6	17.9	3.24	390	28.06.2016	27.09.2016	91	206
FRA/St.Nazaire	France	44.6	5.3	17.8	2.82	605	05.07.2016	11.10.2016	98	221
GBR/Auchencorth Moss	United Kingdom	55.8	-3.2	14.5	4.61	260	01.07.2016	28.09.2016	89	201
GBR/Chilbolton	United Kingdom	51.1	-1.4	17.2	4.28	78	29.06.2016	27.09.2016	90	203
GBR/High Muffles	United Kingdom	54.3	-0.8	15.4	5.62	267	29.06.2016	28.09.2016	91	206
GBR/Lough Navar	United Kingdom	54.4	-7.9	14.1	5.01	126	01.07.2016	03.10.2016	94	212
GBR/Strathvaich Dam	United Kingdom	57.7	-4.8	12.8	5.08	270	01.07.2016	03.10.2016	94	212
GBR/Yarner Wood*	United Kingdom	50.7	-3.7	16.1	5.98	119	05.07.2016	11.10.2016	98	221
GEO/Abastumani	Georgia	41.8	42.8	19.2	1.99	1650	21.06.2016	14.09.2016	85	192
GLN/Nord	Greenland	81.6	-16.7	-12.8	5.48	20	01.09.2016	04.12.2016	94	212
GRC/Aliartos	Greece	38.4	23.1	24.1	2.88	110	07.07.2016	07.10.2016	92	208
GRC/Finokalia	Greece	35.3	25.7	25.2	7.1	250	28.06.2016	04.10.2016	98	221
GRL/Norðuri á Fossum	Faroe Islands	62.2	-7.2	10.9	7.26	300	01.07.2016	01.10.2016	92	208

HRV/Zavizan	Croatia	44.8	15.0	12.5	3.37	1594	30.06.2016	29.09.2016	91	206
IRL/Carnsore Park	Ireland	52.2	-6.4	15.4	6.65	9	13.07.2016	12.10.2016	91	206
IRL/Mace Head	Ireland	53.3	-9.9	14.6	7.49	5	13.07.2016	11.10.2016	90	203
IRL/Malin Head	Ireland	55.4	-7.3	14.3	6.75	20	01.06.2016	29.09.2016	120	271
ITA/Capo Granitola	Italy	37.6	12.7	24.7	4.37	5	17.06.2016	21.09.2016	96	217
ITA/Ispra**	Italy	45.3	8.6	19.8	1.95	209	01.07.2016	30.09.2016	91	206
ITA/Longobucco	Italy	39.4	16.6	23.2	2.56	1379	04.07.2016	17.10.2016	105	237
ITA/Monte Curcio	Italy	39.3	16.4	13.3	2.56	1796	04.07.2016	17.10.2016	105	237
ITA/Montelibretti**	Italy	42.1	12.6	23.6	2.04	48	30.06.2016	29.09.2016	91	206
LTU/Preila	Lithuania	55.4	21.0	17.1	5.01	5	01.07.2016	01.10.2016	92	208
LTU/Rugsteliskis	Lithuania	55.4	26.1	13.6	3.62	120	19.07.2016	19.10.2016	92	208
LVA/Rucava	Latvia	56.2	21.2	15.3	5.75	18	01.07.2016	21.10.2016	112	253
LVA/Zoseni*	Latvia	57.1	25.9	13.2	3.8	188	05.07.2016	24.10.2016	111	251
MDA/Leova	Moldova	46.5	28.3	21.4	3.13	156	04.07.2016	04.10.2016	92	208
MLT/Giordan Lighthouse**	Malta	36.1	14.2	25.5	4.41	167	01.07.2016	30.09.2016	91	206
NLD/De Zilk**	Netherlands	52.3	4.5	17.2	5.68	4	14.07.2016	19.10.2016	97	219
NLD/Kollumerwaard	Netherlands	53.3	6.3	16.9	6.14	1	13.07.2016	19.10.2016	98	221
NLD/Vredepeel**	Netherlands	51.5	5.9	17.2	3.38	28	12.07.2016	18.10.2016	98	221
NOR/Andøya	Norway	69.3	16.0	11	5.23	338	27.06.2016	05.10.2016	100	226
NOR/Birkenes*	Norway	58.4	8.3	14.2	3.76	199	11.07.2016	10.10.2016	91	206
NOR/Hurdal	Norway	60.4	11.1	12.8	2.55	280	14.07.2016	12.10.2016	90	203
NOR/Karasjok	Norway	69.5	25.5	11.1	3.04	308	23.06.2016	23.09.2016	92	208
NOR/Kårvatn	Norway	62.8	8.9	12	2.79	208	06.07.2016	02.10.2016	88	199
NOR/Tustervatn	Norway	65.8	13.9	10.8	2.71	475	30.06.2016	29.09.2016	91	206
NOR/Zeppelin	Norway	78.9	11.9	4.3	3.76	474	07.07.2016	28.09.2016	83	188
POL/Diabla Gora	Poland	54.1	22.0	16.6	3.27	157	01.07.2016	01.10.2016	92	208
PRT/Alfragide**	Portugal	38.7	-9.2	21.5	5.22	109	08.07.2016	10.10.2016	94	212
PRT/Monte Velho	Portugal	38.1	-8.8	21.3	5.44	43	07.07.2016	07.10.2016	92	208
RUS/Astrakhan	Russia	45.8	47.9	23.1	4.16	-25	13.07.2016	10.10.2016	89	201
RUS/Caucasus	Russia	43.7	40.2	21.1	2.77	400	09.07.2016	12.10.2016	95	215

RUS/Danki	Russia	54.9	37.8	17	3.65	150	01.07.2016	01.10.2016	92	208
RUS/Lesnoy	Russia	56.4	32.9	14.6	3.88	340	12.07.2016	10.10.2016	90	203
RUS/Pinega	Russia	64.6	43.2	14.9	3.1	28	01.07.2016	30.09.2016	91	206
RUS/Voronezh	Russia	51.9	39.6	17.8	3.55	145	12.07.2016	12.10.2016	92	208
SVK/Chopok	Slovakia	49.0	19.6	7.3	2.36	2008	01.07.2016	04.10.2016	95	215
SVK/Starina	Slovakia	49.0	22.3	17.7	2.55	345	01.07.2016	03.10.2016	94	212
SVN/Iskrba	Slovenia	45.6	14.9	19.7	2.48	520	01.07.2016	30.09.2016	91	206
SWE/Abisko	Sweden	68.4	18.8	10.2	2.53	385	23.06.2016	26.09.2016	95	215
SWE/Aspvreten	Sweden	58.8	17.4	16	3.77	20	07.07.2016	03.10.2016	88	199
SWE/Bredkälen	Sweden	63.8	15.3	10.9	2.85	404	05.07.2016	11.10.2016	98	221
SWE/Esrange	Sweden	67.9	21.1	9.1	2.81	475	21.06.2016	24.10.2016	125	283
SWE/Råö*/**	Sweden	57.4	11.9	15.8	4.5	5	27.06.2016	03.10.2016	98	221
SWE/Vavihill	Sweden	56.0	13.1	16.4	4.31	175	13.06.2016	30.09.2016	109	246
SWE/Vindeln	Sweden	64.2	19.8	12.6	3.16	225	30.06.2016	10.10.2016	102	231
UKR/Zmeiny Island*	Ukraine	45.3	30.2	22.8	4.51	-	01.07.2016	30.09.2016	91	206

*PAS locations supplied with two parallel PAS for evaluation of method reproducibility

**Identified as “suburban” sites

[1]Lunder Halvorsen (SUBMITTED)

Table S4: Recoveries of the isotope-labelled internal standard in laboratory blanks, field blanks and exposed samples, given as the range, average ± standard deviation, and median of recoveries in %.

	Range (%)	**Average ± St.Dev (%)**	**Median (%)**
Laboratory blanks (n=14)	81.2 – 173.8	108.2 ± 23.8	105.6
Field blanks (n=3)	84.9 – 145.5	110.9 ± 25.5	102.4
Exposed samples (n=115)	22.8 – 187.5	80.0 ± 26.3	80.5

Table S5: Relative standard deviation (RSD) (%) calculated from the concentration (pg/sample) of syn-DP, anti-DP and Dec-602 in two parallel PAS deployed at each station (n=11). Stations where the compounds were below MDL in one or both samples, thus prohibiting the calculation of the RSD, are indicated with "-".

Station	**Country**	**Syn-DP RSD (%)**	**Anti-DP RSD (%)**	**Dec-602 RSD (%)**
ARM/Amberd	Armenia	-	-	-
CZE/Kosetice	Czech Republic.	85	5	-
DEU/Waldhof	Germany	33	40	-
DEU/Westerland	Germany	15	3	-
ESP/Viznar	Spain	9	17	-
FIN/Pallas	Finland	-	-	-
GBR/Yarner Wood	Great Britain	13	8	-
LVA/Zoseni	Latvia	8	7	-
NOR/Birkenes	Norway	-	-	-
SWE/Råö	Sweden	37	52	-
UKR/Zmeiny Island	Ukraine	-	-	4

Table S6: Concentrations of Syn-DP, Anti-DP, ΣDP (Syn-DP + Anti-DP), and Dec-602 given in pg/sample and pg/m^3 (in brackets), in addition to the region of the sample location (based on the EuroVoc system), and the Anti-DP fraction f_{anti} where both DP isomers were detected above MDL.

Station	**EuroVoc**	**Syn-DP** pg/sample (pg/m^3)	**Anti-DP** pg/sample (pg/m^3)	**ΣDP** pg/sample (pg/m^3)	**Dec-602** pg/sample (pg/m^3)	f_{anti}
ARM/Amberd I	CEE	<MDL (<MDL)	<MDL (<MDL)	<MDL (<MDL)	6.1 (0.03)	-
AUT/Illmitz	WE	115.9 (0.53)	530.6 (2.42)	646.5 (2.95)	18.7 (<MDL)	0.82
AUT/Vorhegg	WE	207.6 (1.09)	2043.8 (10.77)	2251.4 (11.86)	<MDL (0.09)	0.91
BEL/Houtem	WE	53.4 (0.26)	144.8 (0.7)	198.2 (0.96)	20.9 (<MDL)	0.73
BEL/Koksijde	WE	<MDL (<MDL)	<MDL (<MDL)	<MDL (<MDL)	9.2 (0.1)	-
CHE/Jungfraujoch	WE	39.5 (0.21)	<MDL (<MDL)	39.5 (0.21)	9.3 (0.04)	-
CHE/Payerne	WE	62 (0.28)	209.4 (0.95)	271.5 (1.23)	<MDL (0.05)	0.77
CYP/Ayia Marina	SE	216.9 (1.14)	1218.7 (6.42)	1435.6 (7.56)	<MDL (<MDL)	0.85
CZE/Kosetice I	CEE	188.3 (0.89)	126.9 (0.6)	315.1 (1.48)	<MDL (<MDL)	0.4
CZE/Svratouch	CEE	42.7 (0.2)	217.5 (1.04)	260.2 (1.24)	<MDL (<MDL)	0.84
DEU/Hohenpeissenberg	WE	53.1 (0.26)	317.3 (1.53)	370.5 (1.78)	11.2 (<MDL)	0.86
DEU/Melpitz	WE	42.3 (0.21)	235.7 (1.15)	278 (1.35)	<MDL (<MDL)	0.85
DEU/Schaulnsland	WE	95.8 (0.47)	832.1 (4.05)	928 (4.51)	<MDL (<MDL)	0.9
DEU/Schmücke	WE	31.4 (0.15)	125.7 (0.61)	157 (0.76)	<MDL (<MDL)	0.8
DEU/Waldhof I	WE	391.5 (1.9)	1534.1 (7.46)	1925.6 (9.36)	<MDL (<MDL)	0.8
DEU/Westerland I	WE	44.5 (0.21)	102.5 (0.47)	147.1 (0.68)	4.3 (<MDL)	0.7
DNK/Tange	NE	<MDL (<MDL)	80 (0.39)	80 (0.39)	<MDL (<MDL)	-
ESP/Barcarrota	SE	137.5 (0.66)	648.1 (3.12)	785.6 (3.78)	<MDL (<MDL)	0.82
ESP/Els Torms	SE	59.1 (0.28)	269.5 (1.27)	328.6 (1.55)	<MDL (<MDL)	0.82
ESP/Niembro	SE	43.9 (0.21)	95 (0.46)	139 (0.67)	<MDL (<MDL)	0.68
ESP/Viznar I	SE	73.7 (0.33)	153.4 (0.68)	227.1 (1)	2.8 (<MDL)	0.68
FIN/Hailuoto	NE	42.1 (0.2)	<MDL (<MDL)	42.1 (0.2)	<MDL (<MDL)	-
FIN/Hyytiälä	NE	80.2 (0.39)	<MDL (<MDL)	80.2 (0.39)	<MDL (<MDL)	-
FRA/Donon	WE	346.1 (1.68)	2309.6 (11.23)	2655.7 (12.91)	<MDL (<MDL)	0.87
FRA/Le Casset	WE	31 (0.15)	130.1 (0.63)	161 (0.78)	<MDL (<MDL)	0.81

GBR/Auchencorth Moss	WE	68.3 (0.34)	147.2 (0.73)	215.5 (1.07)	<MDL (<MDL)	0.68
GBR/Chilbolton	WE	34.9 (0.17)	<MDL (<MDL)	34.9 (0.17)	<MDL (<MDL)	-
GBR/Strathvaich Dam	WE	25.4 (0.12)	<MDL (<MDL)	25.4 (0.12)	<MDL (<MDL)	-
GBR/Yarner Wood I	WE	26.4 (0.12)	<MDL (<MDL)	26.4 (0.12)	<MDL (<MDL)	-
GEO/Abastumani	CEE	202.4 (1.05)	292.6 (1.52)	495 (2.58)	7.5 (<MDL)	0.59
GRL/Nord	NE	49.1 (0.23)	222.6 (1.05)	271.7 (1.28)	<MDL (<MDL)	0.82
GRC/Aliartos	SE	34 (0.16)	<MDL (0.3)	34 (0.47)	11.6 (<MDL)	-
GRC/Finokalia	SE	100.3 (0.45)	<MDL (<MDL)	100.3 (0.45)	17.4 (<MDL)	-
HRV/Zavizan	CEE	30.2 (0.15)	161.1 (0.78)	191.3 (0.93)	15.3 (<MDL)	0.84
IRL/Carnsore Park	WE	31.2 (0.15)	<MDL (<MDL)	31.2 (0.15)	7.2 (<MDL)	-
IRL/Mace Head	WE	27.1 (0.13)	<MDL (<MDL)	27.1 (0.13)	8.9 (0.04)	-
IRL/Malin Head	WE	31.2 (0.11)	<MDL (<MDL)	31.2 (0.11)	4.4 (<MDL)	-
ITA/Capo Granitola	SE	<MDL (<MDL)	148.4 (0.68)	148.4 (0.68)	19.4 (0.02)	-
ITA/Ispra	SE	59.6 (0.29)	452.9 (2.2)	512.5 (2.49)	9.1 (0.06)	0.88
ITA/Montelibretti	SE	26.2 (0.13)	67 (0.33)	93.3 (0.45)	<MDL (0.07)	0.72
LTU/Preila	NE	28.7 (0.14)	136.5 (0.66)	165.2 (0.79)	11.4 (0.01)	0.83
MLT/Giordan Lighthouse	SE	70.5 (0.34)	97 (0.47)	167.5 (0.81)	27.2 (0.04)	0.58
NLD/De Zilk	WE	65.9 (0.3)	363.8 (1.66)	429.7 (1.96)	24.3 (<MDL)	0.85
NLD/Kollumerwaard	WE	164.3 (0.74)	946.5 (4.27)	1110.8 (5.02)	74 (<MDL)	0.85
NLD/Vredepeel	WE	247 (1.12)	1681.8 (7.59)	1928.9 (8.71)	23 (<MDL)	0.87
NOR/Andøya	NE	41.2 (0.18)	69.7 (0.31)	110.9 (0.49)	<MDL (0.06)	0.63
NOR/Karasjok	NE	66.3 (0.32)	152.5 (0.73)	218.8 (1.05)	<MDL (<MDL)	0.7
NOR/Zeppelin	NE	115.5 (0.62)	269.1 (1.43)	384.6 (2.05)	<MDL (0.13)	0.7
POL/Diabla Gora	CEE	<MDL (<MDL)	66.9 (0.32)	66.9 (0.32)	3.7 (0.11)	-
PRT/Alfragide	SE	61.1 (0.29)	222.7 (1.05)	283.8 (1.34)	<MDL (0.33)	0.78
SVK/Chopok	CEE	185.8 (0.87)	861.6 (4.01)	1047.4 (4.88)	18.8 (<MDL)	0.82
SVK/Starina	CEE	33.1 (0.16)	139.8 (0.66)	172.9 (0.81)	<MDL (<MDL)	0.81
SVN/Iskrba	CEE	<MDL (0.11)	89.1 (0.43)	89.1 (0.54)	<MDL (0.02)	-
SWE/Råö I	NE	<MDL (<MDL)	166.3 (0.75)	166.3 (0.75)	3.4 (<MDL)	-
UKR/Zmeiny Island I	CEE	<MDL (<MDL)	<MDL (<MDL)	<MDL (<MDL)	6.3 (<MDL)	-

Table S7: Concentrations of Syn- and Anti-DP measured at stations identical between this study (Skogeng, sampled in 2016) and Schuster et al. (2021) (sampled in 2005/6).

		Schuster et al. (2021)			Diff. Schuster-Skogeng			
Station	**Country**	**Syn-DP (pg/m^3)**	**Anti-DP (pg/m^3)**	**ΣDP (pg/m^3)**	**Syn-DP (pg/m^3)**	**Anti-DP (pg/m^3)**	**ΣDP (pg/m^3)**	**Ratio (pg/m^3) (Schuster/Skogeng)**
CZE/Kosetice	Czech Republic	0.11	0.13	0.24	-0.77	-0.47	-1.24	0.16
FIN/Pallas	Finland	0.09	0.14	0.23	-0.01	-0.17	-0.18	0.56
IRL/Malin Head	Ireland	0.03	0.07	0.1	-0.08	-0.24	-0.32	0.23
NOR/Zeppelin	Norway	1.25	3.08	4.32	0.63	1.64	2.27	2.11
RUS/Danki	Russia	0.01	0.07	0.1	-0.09	-0.24	-0.31	0.24

Table S8: Studies reporting atmospheric concentrations of Dechlorane Plus and Dechlorane Related Compounds, given in pg/m^3 and pg/sample (in brackets). BG: Background

Country/ region	**Type**	**Sampling**	**Anti-DP pg/m^3 (pg)**	**Syn-DP pg/m^3 (pg)**	**ΣDP pg/m^3 (pg)**	**Dec-601 pg/m^3 (pg)**	**Dec-602 pg/m^3 (pg)**	**Dec-603 pg/m^3 (pg)**	**Dec-604 pg/m^3 (pg)**	**Ref.**
Europe	BG	PAS	<MDL – 11.2 (<MDL - 2310)	<MDL – 1.9 (<MDL – 392)	0.1 – 12.9 (25 - 2655)	<MDL (<MDL)	<MDL – 0.3 (<MDL - 74)	<MDL (<MDL)	<MDL (<MDL)	This study
Great Lakes	(not found)	AAS			<MDL - 490					(Hoh et al., 2006)
Great Lakes	(not found)	AAS			0.26 – 0.43					(Liu et al., 2016)
Greenland	BG	AAS	<MDL - 33.14	<MDL - 8.99						(Vorkamp et al., 2015)
Arctic-Antarctica	Marine	AAS	0.01 - 1.22	0.01 - 1.34						(Moller et al., 2010)

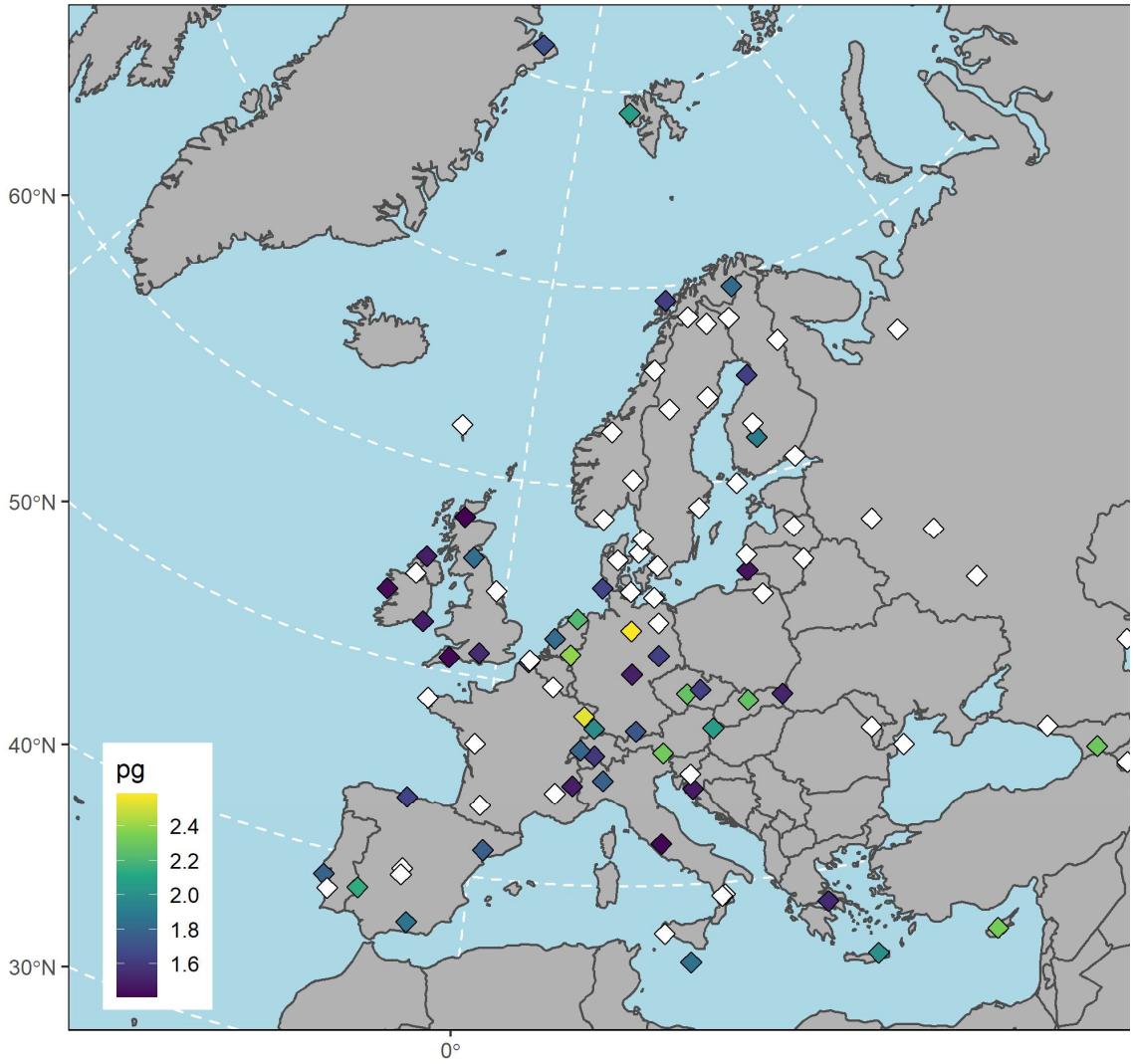
Asia-Arctic	Marine	AAS	0.01 - 0.88	0.01 - 2.39	0.01 - 1.4		<MDL - 0.2	<MDL - 0.44	<MDL - 0.05	(Moller et al., 2011)
Asia-Antarctica	Marine	AAS	<MDL - 5.6	<MDL - 5.8				<MDL - 0.39		(Moller et al., 2012)
China	Industry	AAS			13.1 - 1794					
China	Background	AAS			0.47 - 35.7					(Chen et al., 2011)
China	Urban	AAS	<MDL - 190	<MDL - 52	<MDL - 240					(Li et al., 2016)
China	Urban	PAS			(<MDL - 13296.6)					
China	Rural	PAS	5.8	1.9	(<MDL - 3854.3)					(Ren et al., 2008)
Norway	Industry	AAS	4.2 - 14.7	2.5 - 14.9	6.8 - 29					
Norway	Industry	AAS	648.9 - 1243.5	555.9 - 742.8	1204.9 - 1986.3					
Norway	Industry	AAS	9.1 - 24.6	5.6 - 19	14.7 - 43.6					
Norway	Industry	PAS	<MDL - 3.2	<MDL - 3.7	<MDL - 6.9					
Norway	Industry	PAS	1.8 - 39.2	1 - 28.5	2.8 - 67.6					
Norway	Industry	PAS	0.5 - 4.2	0.6 - 2.1	1 - 6.3					(Morin et al., 2017)
Norway	BG	PAS								
Canada	BG	AAS	0 - 2.8	<MDL - 0.67						(Vorkamp et al., 2019)
Canada	(not found)	PAS	0.01 - 1.04	0 - 0.72			0 - 0.06		0.02 - 0.12	(Yu et al., 2015)
Great Lakes	Urban, rural, BG	AAS			<MDL - 4.42					(Olukunle et al., 2018)
Svalbard	Urban	AAS	0.15 - 4.2	0.05 - 0.91	0.05 - 5.03					(Salamova et al., 2014)

Tanzania	Rural	PAS	<MDL - 1 (90 - 100)							(Nipen et al., 2021)
Tanzania	Suburban	PAS	<MDL - 2 (90 - 300)	<MDL - 0.8 (60 - 100)						
Tanzania	Urban	PAS	<MDL - 16 (90 - 2000)	<MDL - 4 (60 - 500)			<MDL - 0.2 (1 - 30)	<MDL - 0.2 (1 - 30)		
Tanzania	Industry	PAS	<MDL - 7 (90 - 1000)	<MDL - 2 (60 - 300)			<MDL - 0.2 (1 - 30)	<MDL - 0.04 (1 - 6)		
China	Industry	AAS			7723 - 26734		4.1 - 5.14	<MDL	<MDL	(Wang et al., 2010)
Europe	Urban	PAS	<MDL - 1.79	<MDL - 0.92	0.15 - 2.23					(Schuster et al., 2021)
Europe	Rural	PAS	<MDL - 0.68	<MDL - 0.22	0.04 - 0.9					
Europe	BG	PAS	<MDL - 6.42	<MDL - 2.49	0.03 - 8.54					
Svalbard	BG	AAS	<MDL - 1.04	<MDL - 0.32						(Bohlin-Nizzetto, 2020)
Norway	BG	AAS	<MDL - 0.27	<MDL - 0.18						
Canada	BG	AAS	0.12 - 1.9	0.07 - 0.28						(Xiao et al., 2012)

2.2. Figures

Figure S1: Maps of the spatial distribution of the Dechlorane Plus (DP) isomers Syn-DP (A), Anti-DP (B). The amounts in pg/sample are log transformed to allow for a better visual comparison between the sample locations. Note the differences in scales between the maps.

A) Syn-DP



B) Anti -DP

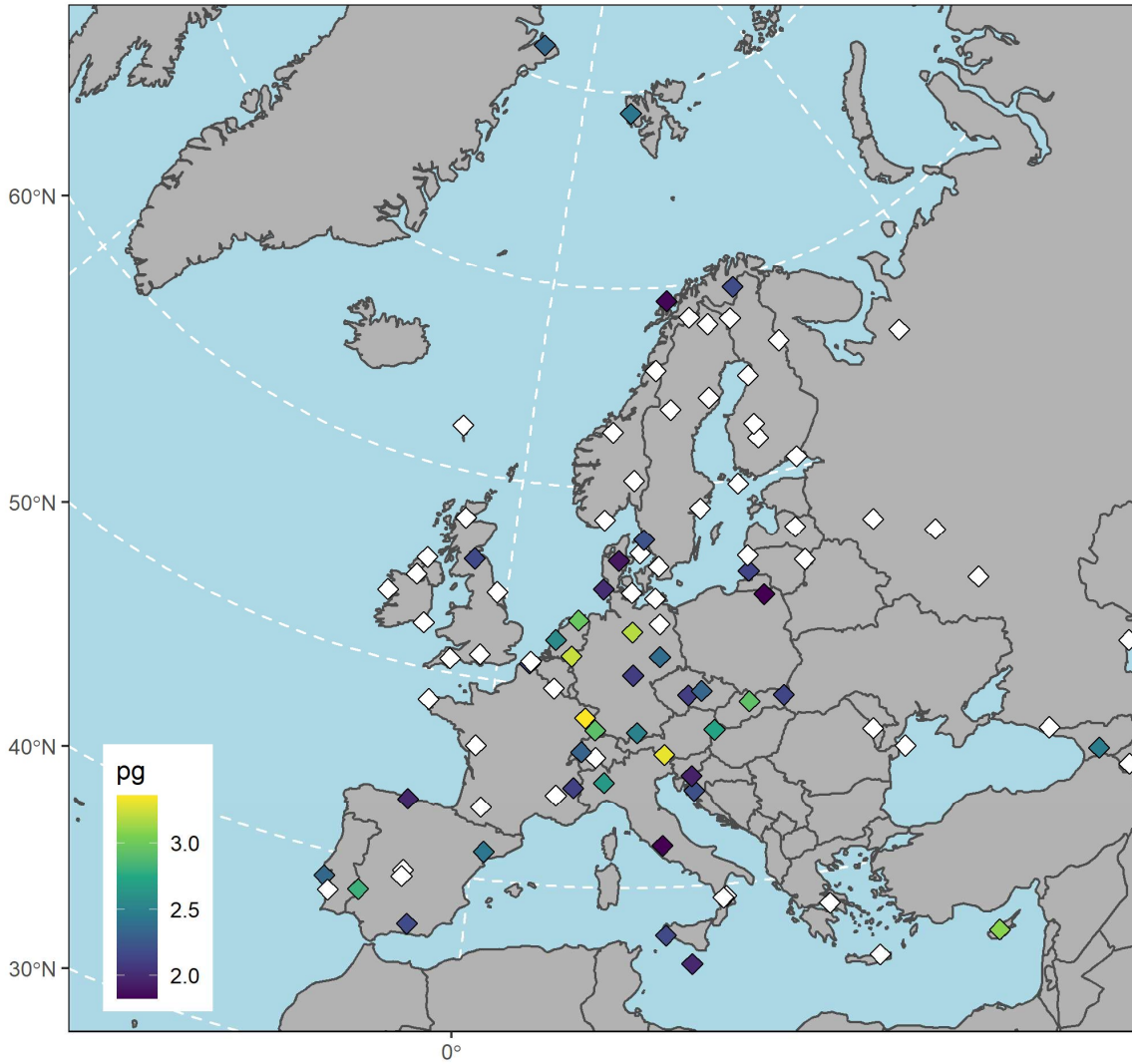


Figure S2: The spatial coverage of sampling sites using PAS in this study. The background colors represent the regions included in the study area (EuroVoc, 2021).

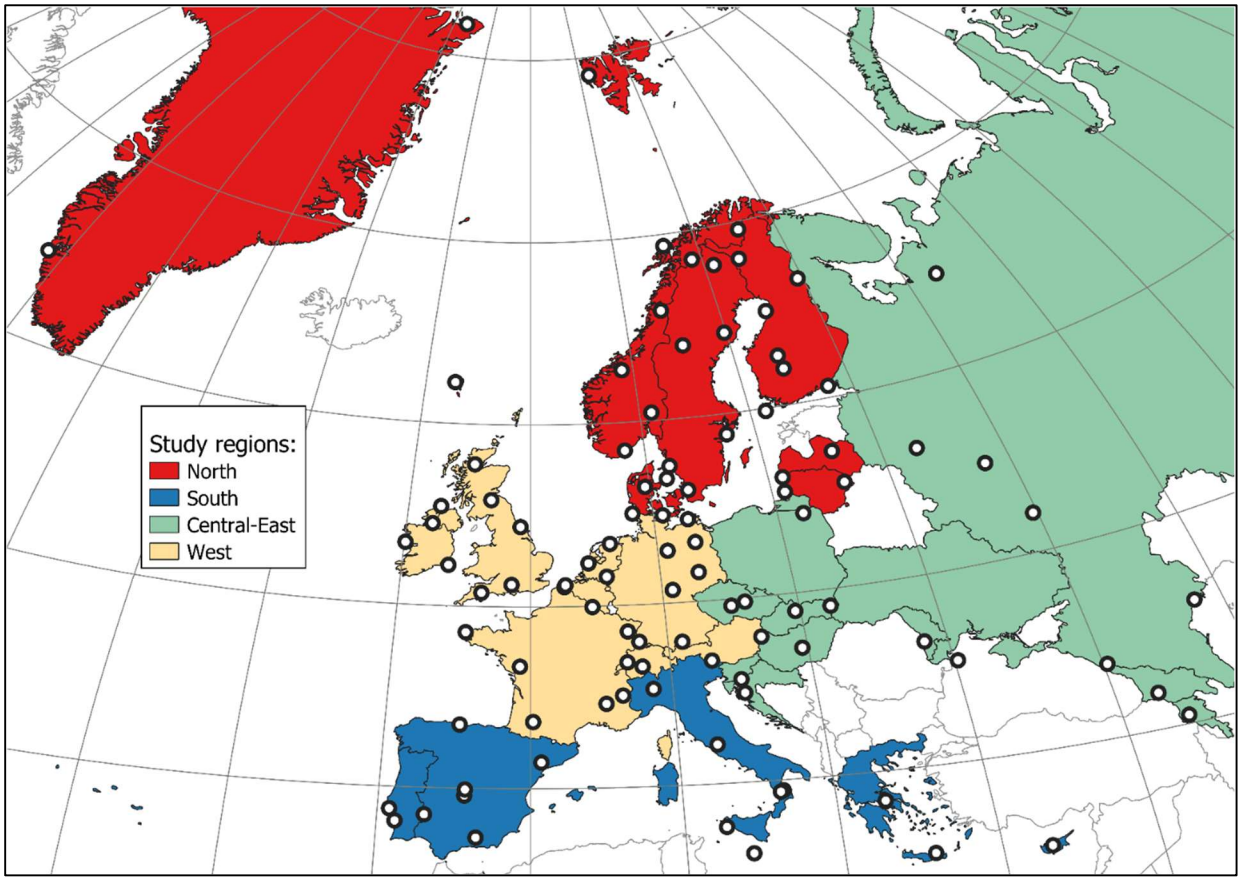
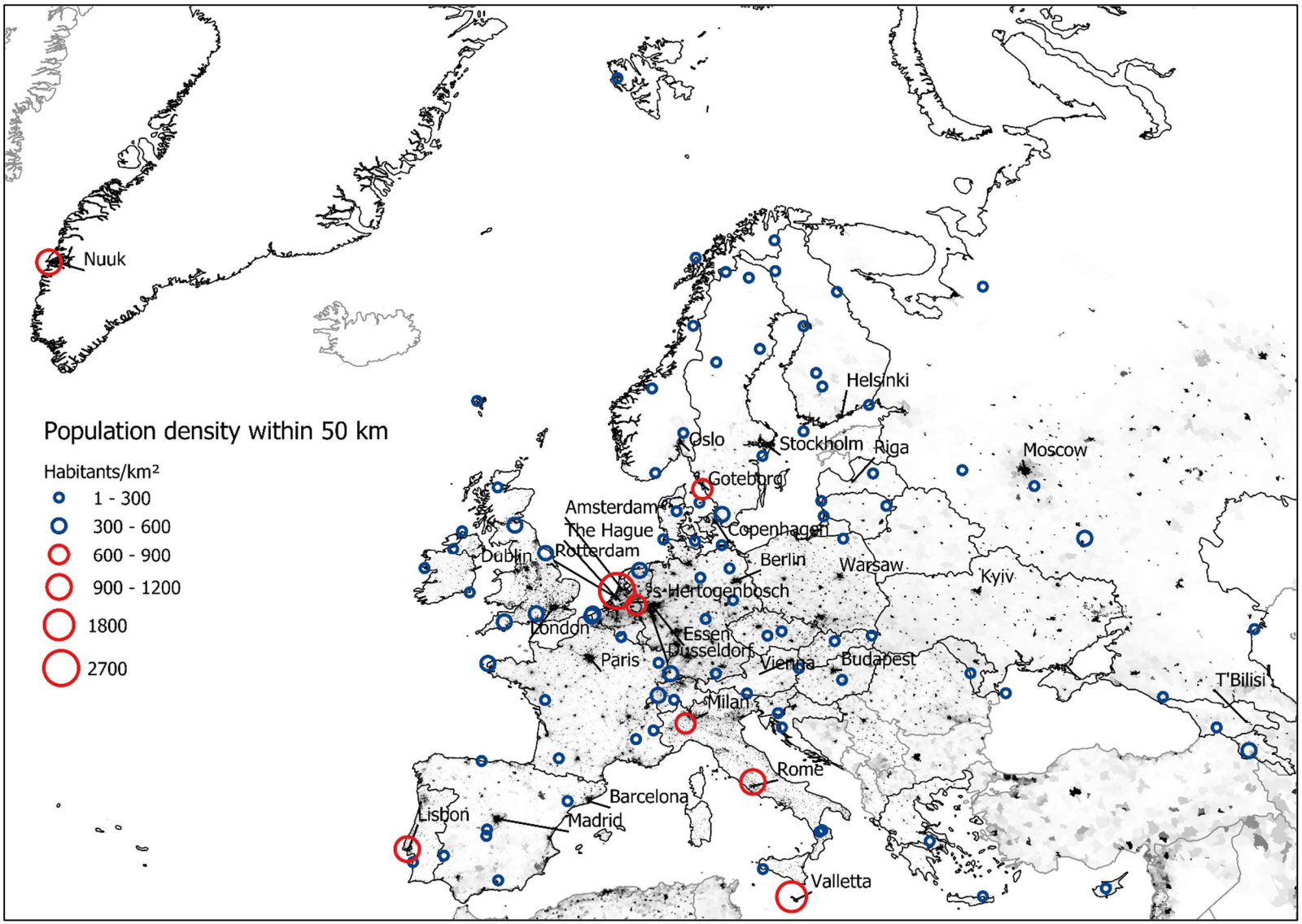


Figure S3: The spatial distribution of the estimated population density within 50 km of each site, with the gridded population density across Europe in the background (CIESIN, 2016, Lunder Halvorsen et al. (SUBMITTED)).



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