Dataset containing concentrations of stormwater-driven substances in urban streams under dry and wet weather conditions and in bottom sediments in Sweden

This dataset presents the concentrations of a wide range of substances in urban streams in Sweden. Data set involves concentrations in stream water collected under dry and wet weather conditions on several occasions as well as a one-time collection of bottom sediment. The collected data included 34 targeted PFAS, 13 phthalates, 10 organotin compounds (OTCs), 16 polycyclic aromatic hydrocarbons (PAHs), and 9 phenols (i.e., nonylphenols, octylphenols and -ethoxylates) in water phase. Bottom sediment data included analysis results for 35 targeted PFAS as well as 30 PFAS precursors (by using TOP assay), 13 phthalates, 10 OTCs, 16 PAHs, and 8 phenols (excluding BPA).

Contaminant concentrations in the water phase were measured during both dry and wet weather conditions in three Swedish urban streams: Fyrisån in Uppsala (Upp), Ljurabäck in Norrköping (Nrk), and Storån in Söderköping (Sdk). Sediment samples were also collected from these three streams, along with an additional stream: Kättstabäcken, a stream near Stockholm Arlanda Airport that receives stormwater discharges through a pond system, here after abbreviated as Arn. Both water and sediment samples were collected from multiple sites along each stream, distributed as follows:

- Reference sites (ArnA, NrkA, SdkA, and UppA) were located upstream of urban areas to represent baseline conditions.
- Downstream sites (ArnB, NrkB, NrkC, SdkB, and UppB1) were located immediately downstream of urban areas to assess the impacts of urbanization and stormwater runoff.
- Further downstream sites (SdkC, and UppC) were positioned to evaluate potential dilution effects.
- Uppsala, the only city with a WWTP discharging into its stream, included an additional site, UppB2, located 100 m downstream of the WWTP and 200 m downstream of UppB1.

See Figure 1 for the sampling sites and Table 1 for the coordinates where water and sediment sampling took place. Table 2 provides detailed information about the sampling occasions for both dry and wet weather events.

The file:

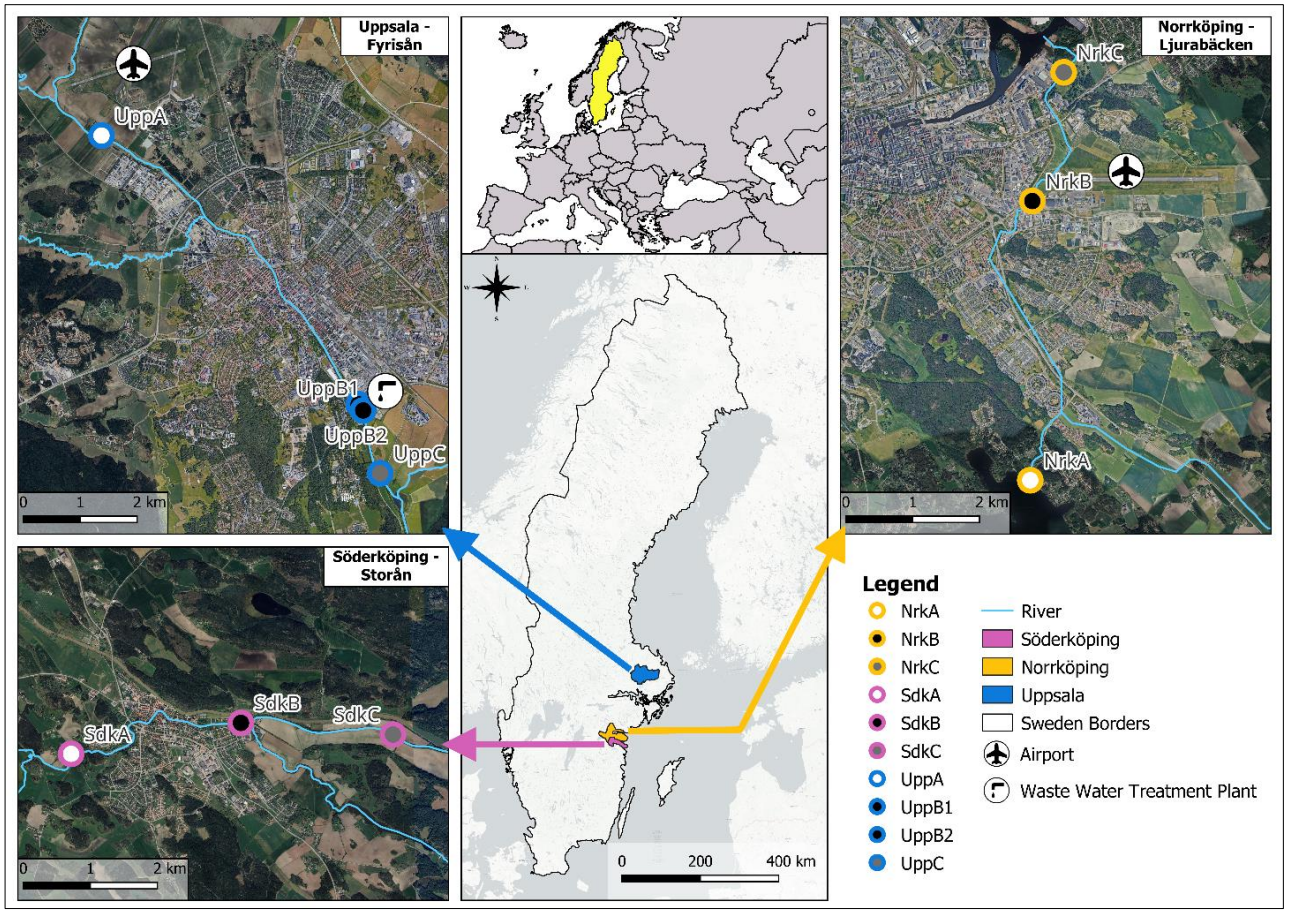
- **"PFAS_in_water_34_targeted_PFAS.xlsx"** contains PFAS concentrations measured in urban streams under dry and wet weather conditions, with details provided in Table 2.
- **"PFAS_in_sediment_35_targeted_PFAS.xlsx"** contains PFAS concentrations in the bottom sediment collected from the sampling sites, with site coordinates listed in Table 1.
- **"PFAS_in_sediment_30PFAS_TOP_Assay.xlsx"** includes concentrations of 30 precursor compounds in bottom sediment, analyzed using the TOP Assay method.

- **“Organic_contaminants_in_water.xlsx”** contains abovementioned organic contaminants concentrations in urban streams under dry and wet weather conditions, with details provided in Table 2.
- **“Organic_contaminants_in_bottom_sediment.xlsx”** contains abovementioned organic contaminants concentrations in the bottom sediment collected from the sampling sites, with site coordinates listed in Table 1.

All files are also available in CSV format with the same filenames.

In dataset Excel files includes:

- Event No: A unique identifier for each sampling event. For example, "1" represents the first event, and "2" represents the second event.
- Date: The date when the sample was collected.
- Sample_Site: The specific location where the sample was taken. For example, "UppA" refers to the upstream reference site in Uppsala.
- Event_Type: The type of event during water sampling:
    - Dry Weather: Reflects concentrations of compounds without direct input from stormwater runoff.
    - Wet Weather: Reflects concentrations in the stream during runoff events such as rain or snowmelt.
- Event_Code: A code combining the event number and type for easier reference:
    - BF: Dry weather sampling
    - RE: Wet weather sampling
    - SM: Snowmelt sampling
    - SD: Sediment sampling
- City: The urban area associated with the stream where the sample was taken. For example, "Uppsala" indicates the samples were collected from the Fyrisån stream in Uppsala.
- Sample_Label: A unique identifier for each sample, combining the sample site, event number, and event type. For example, "UppA_01BF" represents a sample collected at UppA during the first dry weather event.
- Other columns in data set show the substance concentration analyzed for each sample. See Table 3 for substance name and abbreviations listed in the excel files. Substances with concentrations below the reporting limits are indicated as “<” followed by the corresponding reporting limit.



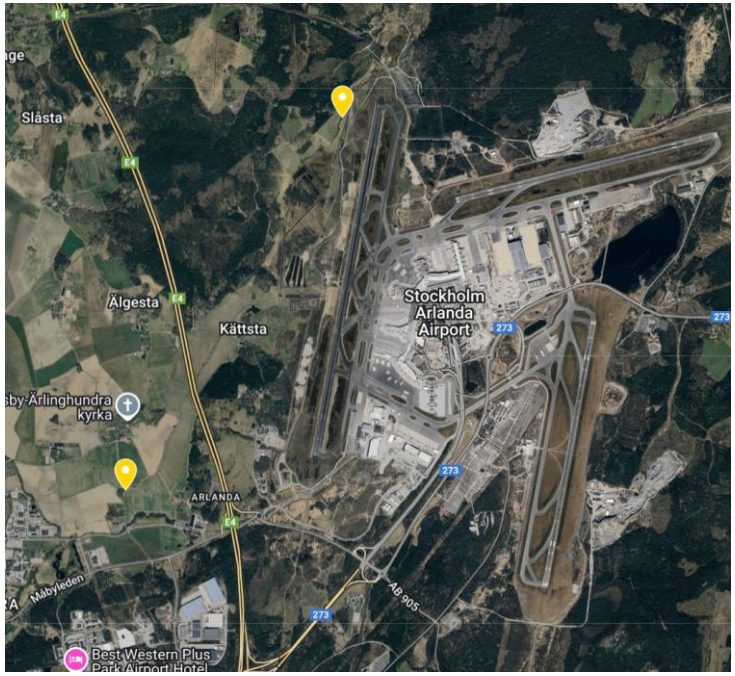


Figure 1. A map showing the locations of the study areas in Sweden: Uppsala (marked in blue), Norrköping (yellow), and Söderköping (pink). Middle insets provide information on location of Sweden in Europe and location of study areas withing Sweden. Outer insets provide details on the sampling sites along the Fyrisån (upper left), Storån (lower left), and Ljurabäcken (lower right), showing the locations of airports and the wastewater treatment plant. Screenshot next to the map shows the sediment sampling location along Kättstabäcken 8marked in yellow) in Arlanda.

Table 1. Coordinates of sampling sites for water and sediment samples

Sampling Sites	Water Sampling Coordinates		Sediment Sampling Coordinates	
	Longitude	Latitude	Longitude	Latitude
UppA	17.578139	59.886588	17.5771011	59.8868957
UppB1	17.655366	59.84268	17.6554222	59.8426312
UppB2	17.656716	59.841679	17.6563436	59.8417083
UppC	17.661265	59.831679	17.6613627	59.8316038
NrkA	16.219937	58.545871	16.3061581	58.4765624
NrkB	16.2217748	58.5833263	16.340546	58.479974
NrkC	16.230462	58.600521	16.3812429	58.4780303
SdkA	16.298764	58.47634	16.2227602	58.5505957
SdkB	16.342321	58.480029	16.2217748	58.5833263
SdkC	16.381126	58.478058	16.229965	58.600161
ArnA	NA	NA	17.91738	59.66536
ArnB	NA	NA	17.88186	59.63441

Table 2. Information on sampling events. *Indicates events where samples were partially or entirely absent due to equipment failure at one of the sampling points (A, B, or C)

Uppsala	Date	Precipitation depth (mm)	Duration (hr)	Antecedent dry days
Dry Weather 1*	2022-07-06	0	24	2
Dry Weather 2	2022-08-17	0	24	11
Wet Weather 1	2022-08-28	39.6	17	6
Wet Weather 2	2022-09-13	27.2	9	10
Wet Weather 3*	2022-10-17	6.1	5	6
Dry Weather 3	2023-04-20	0	24	15
Dry Weather 4	2023-06-15	0	24	31
Wet Weather 5	2023-08-15	11.3	4	2
Wet Weather 6	2023-08-28	5.2	4	2
Wet Weather 7	2023-09-20	7.2	4	17

Norrköping	Date	Precipitation depth (mm)	Duration (hr)	Antecedent dry days
Dry Weather 1	2022-10-05	1	24	2
Wet Weather 2	2022-10-17	3.3	4	1
Snowmelt	2022-11-23	-	96	0
Dry Weather 2	2023-04-19	0	24	16
Dry Weather 3	2023-06-01	0	24	18
Wet Weather 3	2023-06-18	11.4	14	30
Wet Weather 4	2023-09-19	3.2	3	17
Wet Weather 5	2023-10-03	21.3	10	1

Wet Weather 6*	2023-10-21	10.1	12	0
Wet Weather 7	2023-10-29	9.2	12.5	1

Söderköping	Date	Precipitation depth (mm)	Duration (hr)	Antecedent dry days
Wet Weather 1	2022-09-13	4.4	6.5	1
Dry Weather 1	2022-10-05	0.7	24	2
Wet Weather 2	2022-10-17	4.6	4.5	8
Snowmelt	2022-11-23	-	96	0
Dry Weather 2*	2023-04-19	0	24	14
Wet Weather 3*	2023-05-17	3.2	6	12
Dry Weather 3	2023-06-01	0	24	15
Wet Weather 4	2023-06-18	10.8	14	30
Wet Weather 5*	2023-10-04	16.0	9	2
Wet Weather 6	2023-10-21	13.6	10	0
Wet Weather 7	2023-10-29	8.6	11.5	4

Table 3. Compound names and abbreviations in the excel files

Family	Compound Name	Abbreviation	Units for water	Units for sediment
PFAS	Perfluorobutanoic acid	PFBA	ng/L	µg /kg dw
PFAS	Perfluoropentanoic acid	PFPeA	ng/L	µg /kg dw
PFAS	Perfluorohexanoic acid	PFHxA	ng/L	µg /kg dw
PFAS	7H-perfluoroheptanoic acid	HPFHpA	ng/L	µg /kg dw
PFAS	Perfluoroheptanoic acid	PFHpA	ng/L	µg /kg dw
PFAS	Perfluorooctanoic acid	PFOA	ng/L	µg /kg dw
PFAS	Perfluorononanoic acid	PFNA	ng/L	µg /kg dw
PFAS	Perfluorodecanoic acid	PFDA	ng/L	µg /kg dw
PFAS	Perfluoro-3.7-dimethyloctanoic acid	PF37DMOA	ng/L	µg /kg dw
PFAS	Perfluoroundecanoic acid	PFUnDA	ng/L	µg /kg dw
PFAS	Perfluorododecanoic acid	PFDoDA	ng/L	µg /kg dw
PFAS	Perfluorotridecanoic acid	PFTrDA	ng/L	µg /kg dw
PFAS	Perfluorotetradecanoic acid	PFTeDA	ng/L	µg /kg dw
PFAS	Perfluorohexadecanoic acid	PFHxDA	ng/L	µg /kg dw
PFAS	Perfluorobutanesulfonic acid	PFBS	ng/L	µg /kg dw
PFAS	Perfluoropentane sulfonic acid	PFPeS	ng/L	µg /kg dw
PFAS	Perfluorohexanesulfonic acid	PFHxS	ng/L	µg /kg dw
PFAS	Perfluoroheptanesulfonic acid	PFHpS	ng/L	µg /kg dw
PFAS	Perfluorooctanesulfonic acid	PFOS	ng/L	µg /kg dw
PFAS	Perfluorononanesulfonic acid	PFNS	ng/L	µg /kg dw
PFAS	Perfluorodecanesulfonic acid	PFDS	ng/L	µg /kg dw
PFAS	Perfluoroundecanesulfonic acid	PFUnDS	ng/L	µg /kg dw
PFAS	Perfluorododecanesulfonic acid	PFDoDS	ng/L	µg /kg dw
PFAS	Perfluorotridesulfonic acid	PFTrDS	ng/L	µg /kg dw
PFAS	4:2 Fluorotelomer sulfonic acid	4:2 FTS	ng/L	µg /kg dw
PFAS	6:2 Fluorotelomer sulfonic acid	6:2 FTS	ng/L	µg /kg dw
PFAS	8:2 Fluorotelomer sulfonic acid	8:2 FTS	ng/L	µg /kg dw
PFAS	Perfluorooctane sulfonamide	FOSA	ng/L	µg /kg dw
PFAS	N-Methyl perfluorooctane sulfonamide	MeFOSA	ng/L	µg /kg dw

PFAS	N-Ethyl perfluorooctane sulfonamide	EtFOSA	ng/L	µg /kg dw
PFAS	Perfluorooctane sulfonamidoacetic acid	FOSAA	ng/L	µg /kg dw
PFAS	N-Methyl perfluorooctane sulfonamidoacetic acid	MeFOSAA	ng/L	µg /kg dw
PFAS	N-Ethyl perfluorooctane sulfonamidoacetic acid	EtFOSAA	ng/L	µg /kg dw
PFAS	N-Ethyl perfluorooctane sulfonamidoethanol	EtFOSE	ng/L	µg /kg dw
PFAS	N-Methyl perfluorooctane sulfonamidoethanol	MeFOSE	ng/L	µg /kg dw
OTCs	Monobutyltin	MBT	ng/L	µg /kg dw
OTCs	Dibutyltin	DBT	ng/L	µg /kg dw
OTCs	Monooctyltin	MOT	ng/L	µg /kg dw
OTCs	Tributyltin	TBT	ng/L	µg /kg dw
OTCs	Dioctyltin	DOT	ng/L	µg /kg dw
OTCs	Monophenyltin	MPhT	ng/L	µg /kg dw
OTCs	Triphenyltin	TPhT	ng/L	µg /kg dw
OTCs	Tetrabutyltin	TTBT	ng/L	µg /kg dw
OTCs	Tricyclohexyltin	TCyT	ng/L	µg /kg dw
OTCs	Diphenyltin	DPhT	ng/L	µg /kg dw
PAHs	Naphthalene	Nap	µg /L	mg / kg dw
PAHs	Acenaphthylene	Acy	µg /L	mg / kg dw
PAHs	Acenaphthene	Ace	µg /L	mg / kg dw
PAHs	Fluorene	Fl	µg /L	mg / kg dw
PAHs	Phenanthrene	Phe	µg /L	mg / kg dw
PAHs	Anthracene	Ant	µg /L	mg / kg dw
PAHs	Fluoranthene	Flua	µg /L	mg / kg dw
PAHs	Pyrene	Pyr	µg /L	mg / kg dw
PAHs	Benz[a]anthracene	BaA	µg /L	mg / kg dw
PAHs	Chrysene	Chr	µg /L	mg / kg dw
PAHs	Benzo[b]fluoranthene	BbF	µg /L	mg / kg dw
PAHs	Benzo[k]fluoranthene	BkF	µg /L	mg / kg dw
PAHs	Benzo[a]pyrene	BaP	µg /L	mg / kg dw
PAHs	Dibenz[a,h]anthracene	DahA	µg /L	mg / kg dw
PAHs	Benzo[ghi]perylene	BPer	µg /L	mg / kg dw
PAHs	Indeno[1,2,3-c,d]pyrene	IP	µg /L	mg / kg dw

Phenols	4-tert-octylphenol	4-t-OP	µg /L	mg / kg dw
Phenols	4-nonylphenol	4-NP	µg /L	mg / kg dw
Phenols	4-nonylphenol diethoxylate	4-NP2EO	µg /L	mg / kg dw
Phenols	4-tert-octylphenol monoethoxylate	4-t-OP1EO	µg /L	mg / kg dw
Phenols	4-tert-octylphenol diethoxylate	4-t-OP2EO	µg /L	mg / kg dw
Phenols	4-tert-octylphenol triethoxylate	4-t-OP3EO	µg /L	mg / kg dw
Phenols	4-nonylphenol monoethoxylate	4-NP1EO	µg /L	mg / kg dw
Phenols	4-nonylphenol triethoxylate	4-NP3EO	µg /L	mg / kg dw
Phthaletes	Di-(2-ethylhexyl)phthalate	DEHP	µg /L	mg / kg dw
Phthaletes	Diisononyl phthalate	DINP	µg /L	mg / kg dw
Phthaletes	Di-n-butylphthalate	DBP	µg /L	mg / kg dw
Phthaletes	Di-n-octylphthalate	DNOP	µg /L	mg / kg dw
Phthaletes	Diisodecyl phthalate	DIDP	µg /L	mg / kg dw
Phthaletes	Dimethylphthalate	DMP	µg /L	mg / kg dw
Phthaletes	Diethylphthalate	DEP	µg /L	mg / kg dw
Phthaletes	Di-n-propylphthalate	DPP	µg /L	mg / kg dw
Phthaletes	Diisobutyl phthalate	DIBP	µg /L	mg / kg dw
Phthaletes	Di-n-pentylphthalate	DNPP	µg /L	mg / kg dw
Phthaletes	Butylbenzylphthalate	BBP	µg /L	mg / kg dw
Phthaletes	Dicyclohexylphthalate	DCP	µg /L	mg / kg dw
Phthaletes	Di-n-hexylphthalate	DNHP	µg /L	mg / kg dw