Selection and Ranking
screening data

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Use of data from screening studies

examples from Swedish screening studies

- Screening database
- Prioritization for long tem air monitoring
- Estimation of pathways and sources
  - chemicals related to usage
  - unintentionally produced organic substances

Screening of chemicals

A way of dimensioning the problem

Objectives

To investigate the occurrence and concentration levels of selected chemicals in a variety of environmental media

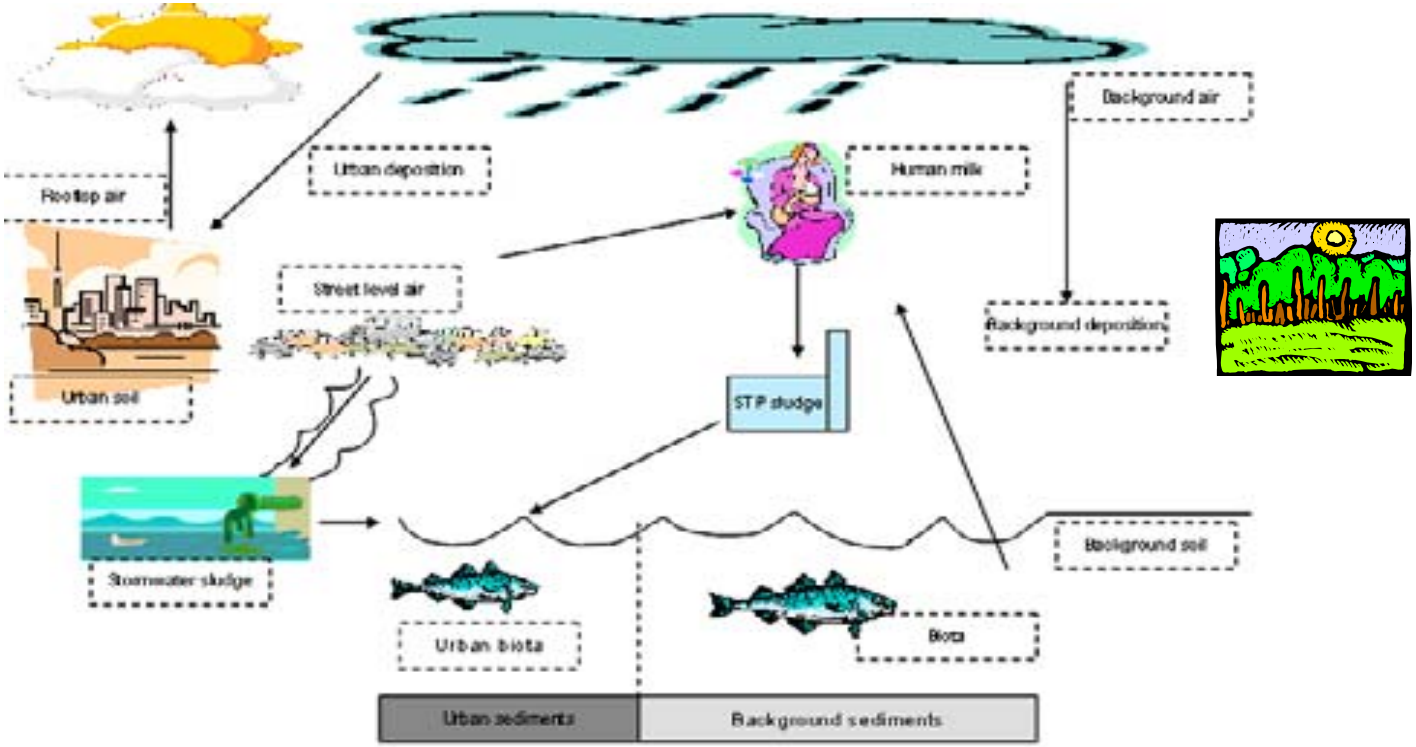
Limitation

Measurements of a chemical in several media at several sites but only a few samples at each site

A "snap shot" of the situation

Screening study

Measurements of a chemical in ca 50 samples divided in different matrices



The sampling strategy depends on the chemical

Result of a screening

Identification of "new" substances in the environment

Occurrence and concentrations ranges in different media
Transport pathways in the environment
Possible emission pathways
Include substances for long-term monitoring

Screening a first step in procedures for

Risk estimates
Environmental quality standards
Emission control – measures

Screening database

The database contain both national and regional data

(http://www3.ivl.se/miljo/db/IVL_screening_registersida.htm)

- approximately 600 substances or substance groups
- 90 000 samples in the database
- 16 matrixes

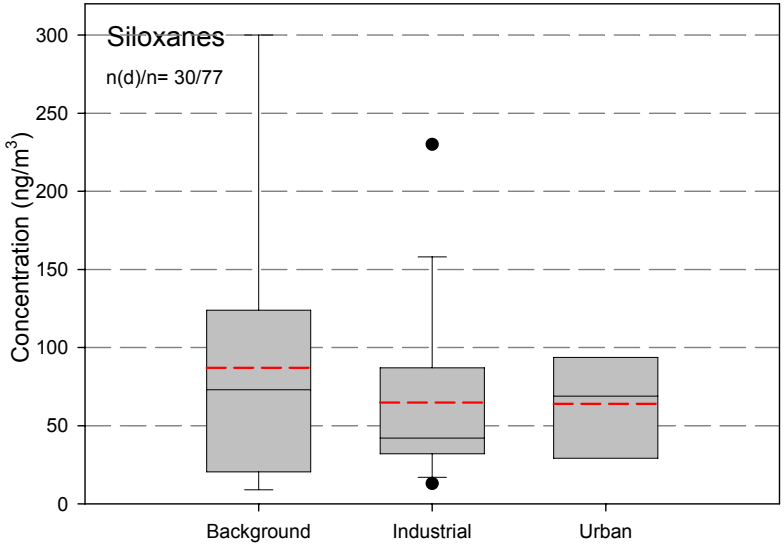
Prioritizing organic chemicals for long-term air monitoring background - using screening data

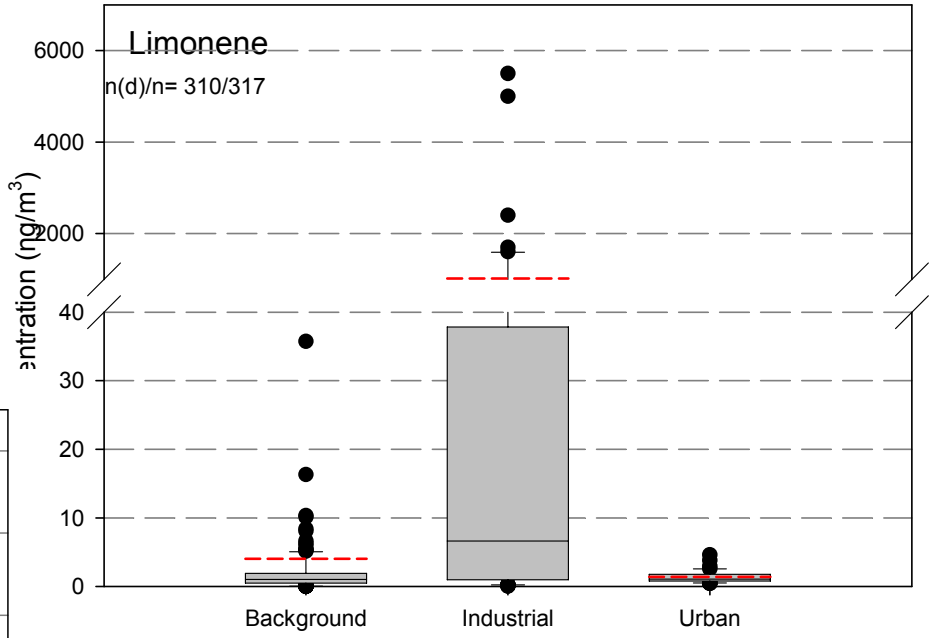
- For which chemicals are air an important transport medium
- Is atmospheric deposition important for the occurrence of the chemical in the ecosystem
- Source identification: Concentrations in background, urban sites and at point sources
- Assessment of LRT potential

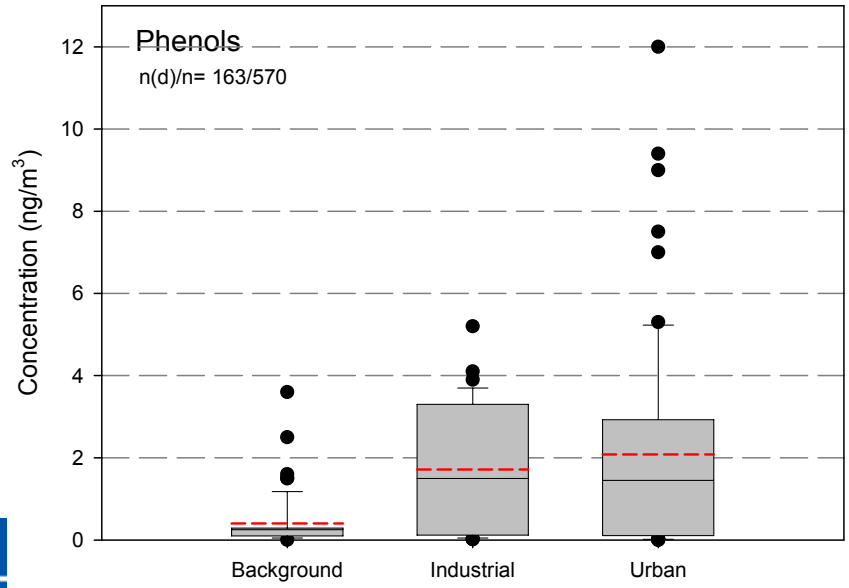
Prioritizing organic chemicals for long-term air monitoring

Overview

Concentrations in air at different sites

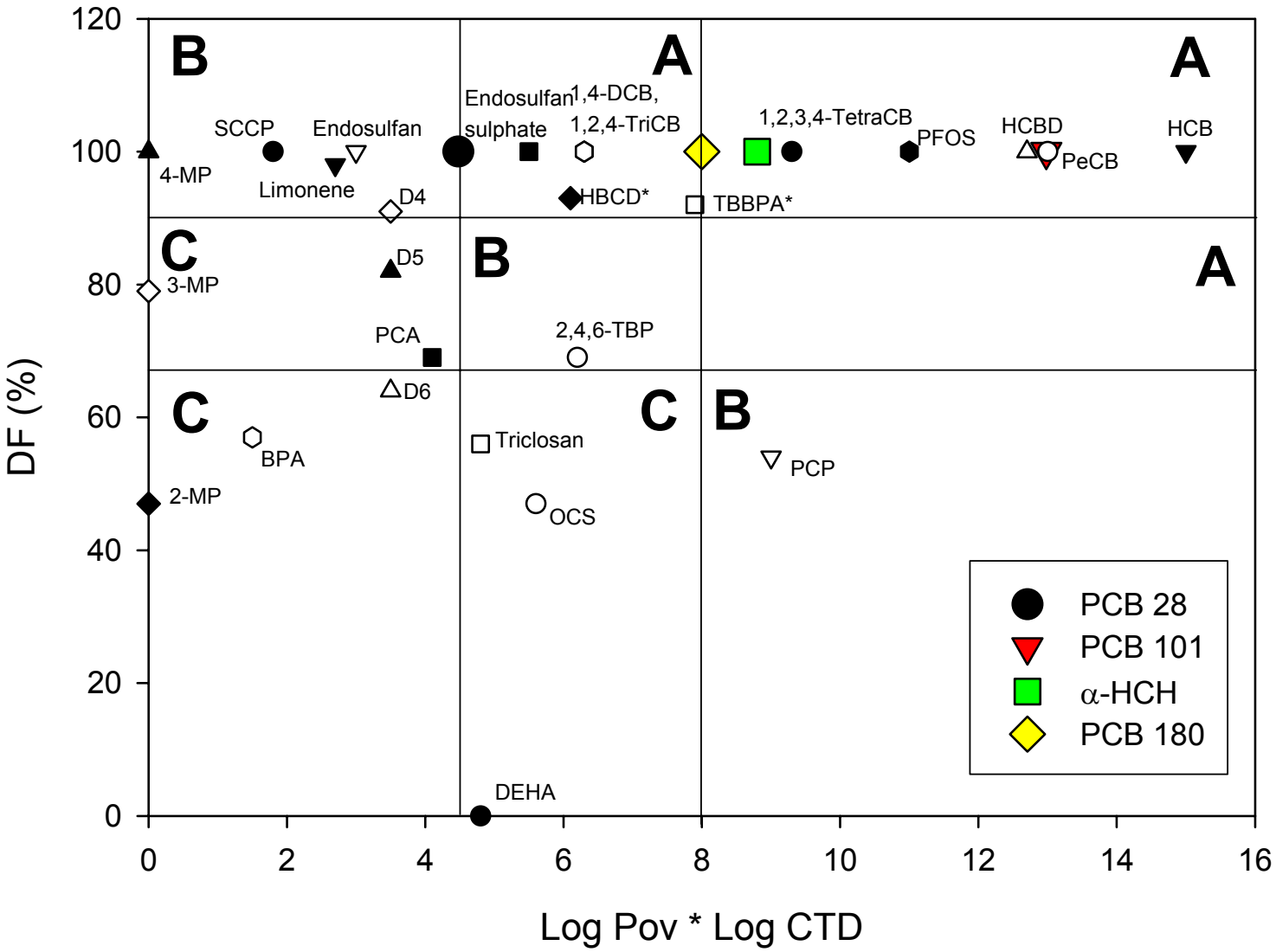






Data from screening data-base

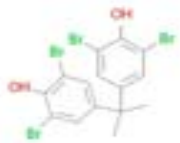
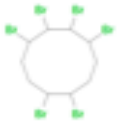
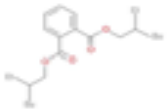
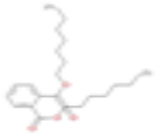
Prioritizing organic chemicals for long-term air monitoring in background – a step-by-step method



A method for prioritizing organic chemicals for long-term air monitoring – application to Swedish data
Palm Cousins et al in prep

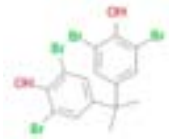
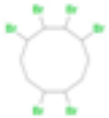
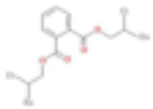
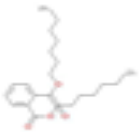
Overview

Emerging substances – widespread occurrence

Detection frequency in different matrixes		AIR	SEDIM	BIOTA	SLUDGE
Perfluorooctane sulfonate (PFOS)		100%	100%	100%	100%
Tetrabromobiphenol-A (TBBPA)		92%	50%	100%	100%
Dicyclohexylamine (DCHA)		100%	100%		100%
1,2,5,6,9,10-hexabromocyclododecane (HBCDD)		92%	76%	100%	50%
Bis(2-ethylhexyl)phthalate (DEHP)		100%	69%	31%	100%
Di-isononyl phtalate (DINP)		83%	62%	0%	100%

Examples from IVLs screening studies

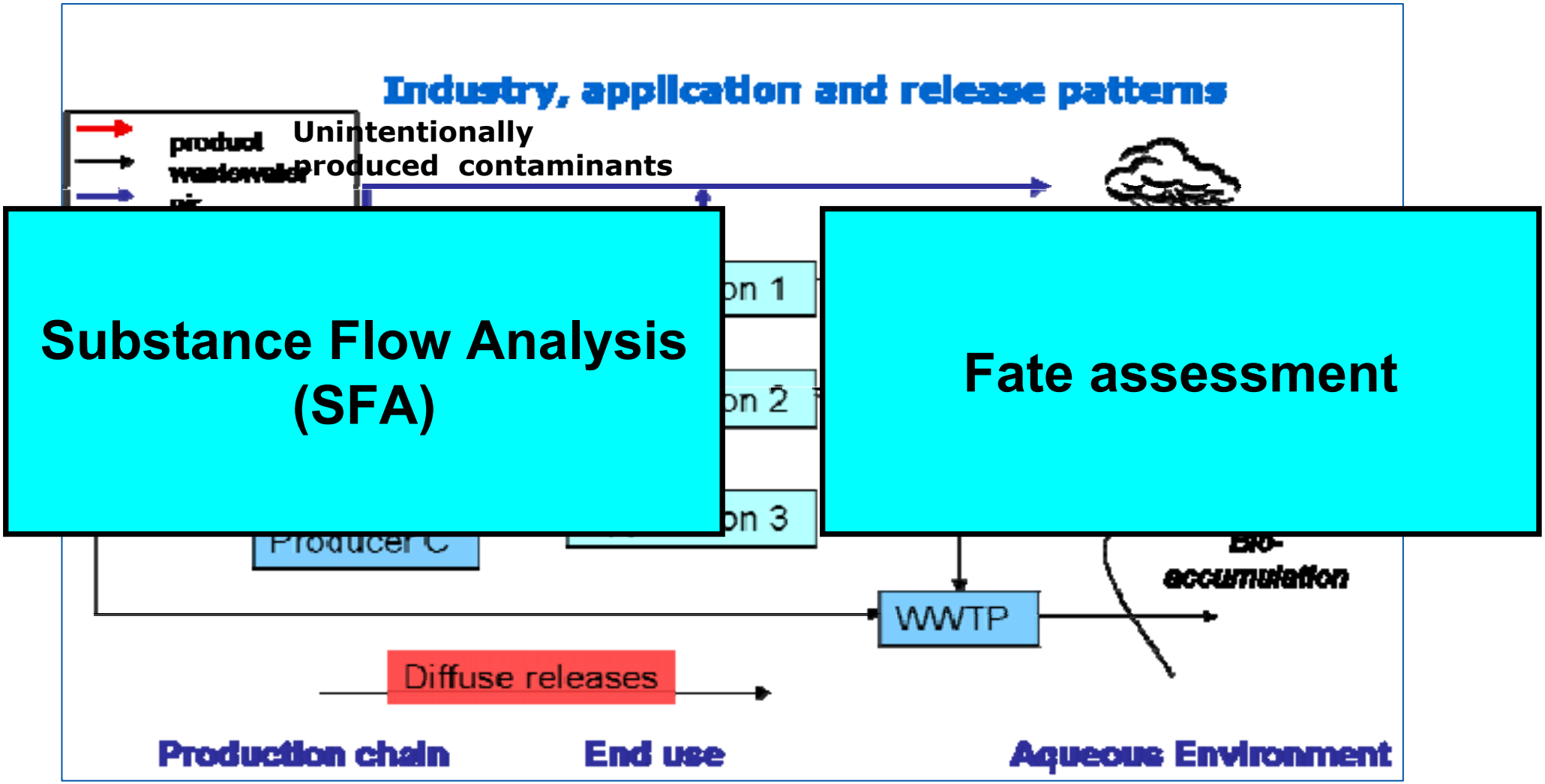
Emerging substances with widespread occurrence

Perfluorooctane sulfonate (PFOS)	
Tetrabromobiphenol-A (TBBPA)	
Dicyclohexylamine (DCHA)	
1,2,5,6,9,10-hexabromocyclododecane (HBCDD)	
Bis(2-ethylhexyl)phthalate (DEHP)	
Di-isononyl phtalate (DINP)	

Chemicals spread mainly spread via diffusive emissions usages

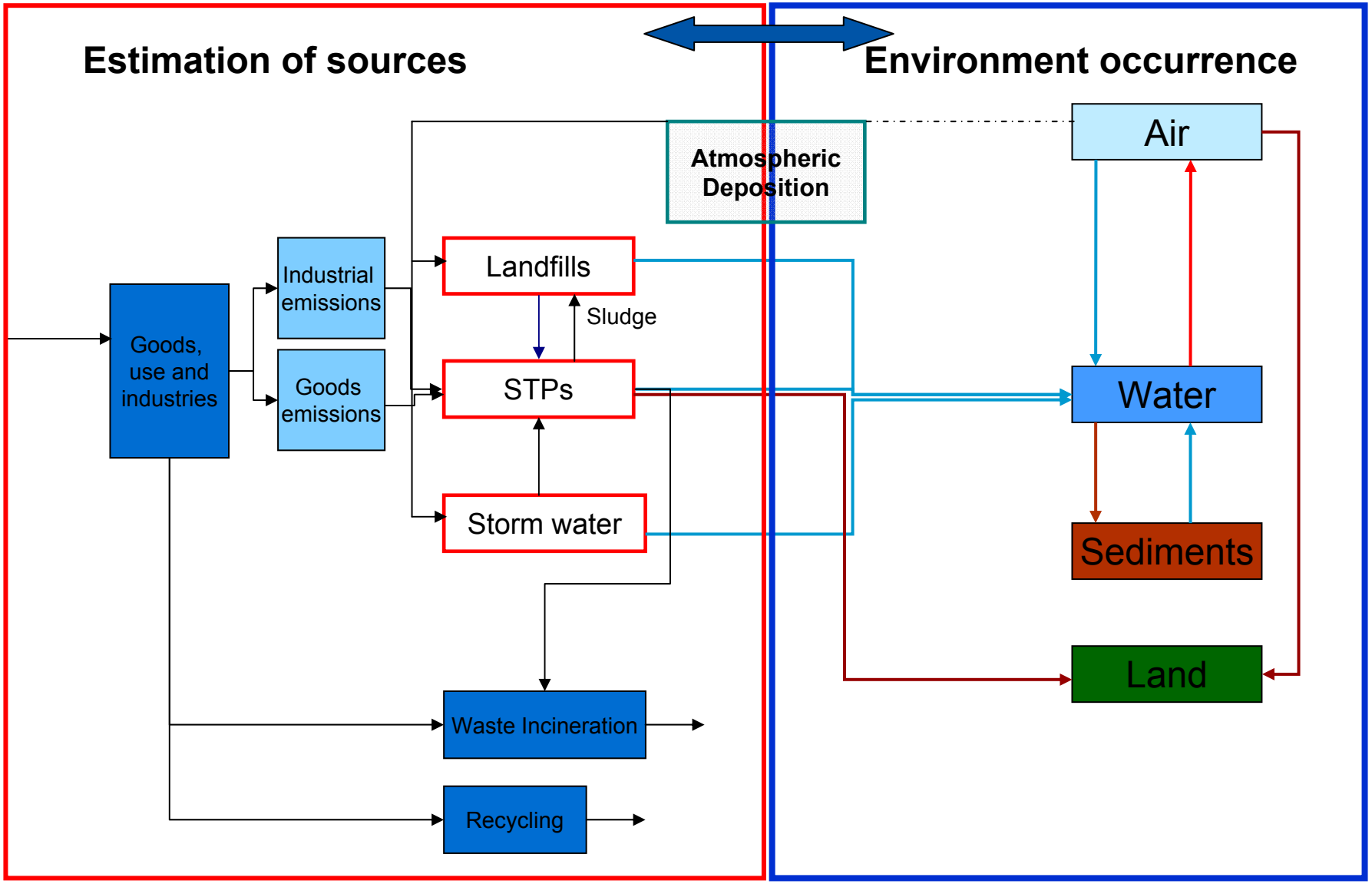
Occurrence in different articles and products

Screening data and estimation of sources and pathways



Screening data and estimation of pathways and sources

Substance flow analyses, SFA



ChEmiTecs

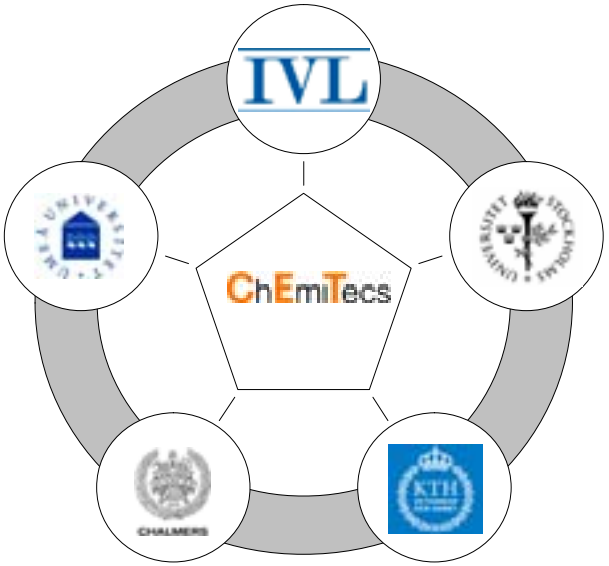
Organic chemicals emitted from technosphere articles

what is the magnitude of the problem (& what can be done about it)

Research programme Chemitecs

Swedish EPA 2008-2012

www.chemitecs.se



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Overall aim of ChEmiTecs
to increase the scientific understanding of the magnitude of the problem regarding emissions from articles: an integrated approach

Use of screeningdata

Selection of case studies

#2 Integrated identification of chemical/article/use combinations of concern

#4 Quantification of emissions

#5 Relative importance of emissions

Relative importance of emissions

To estimate the magnitude of the emissions of selected organic substances/groups of substances from articles in relation to other emission categories and pathways.

The occurrence of the selected chemicals in the environment gives important information on the dimension of the problem

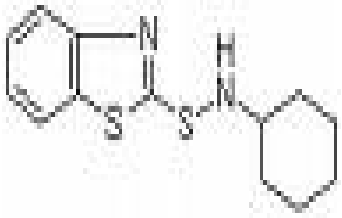
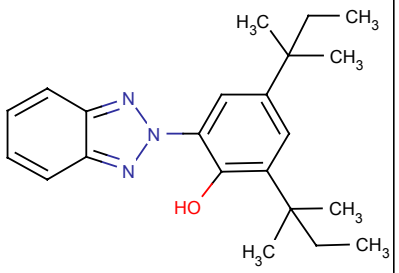
The results from screening studies are important data sources

If no data are available for substances that have been identified as important in this project a screening will be performed for these substances

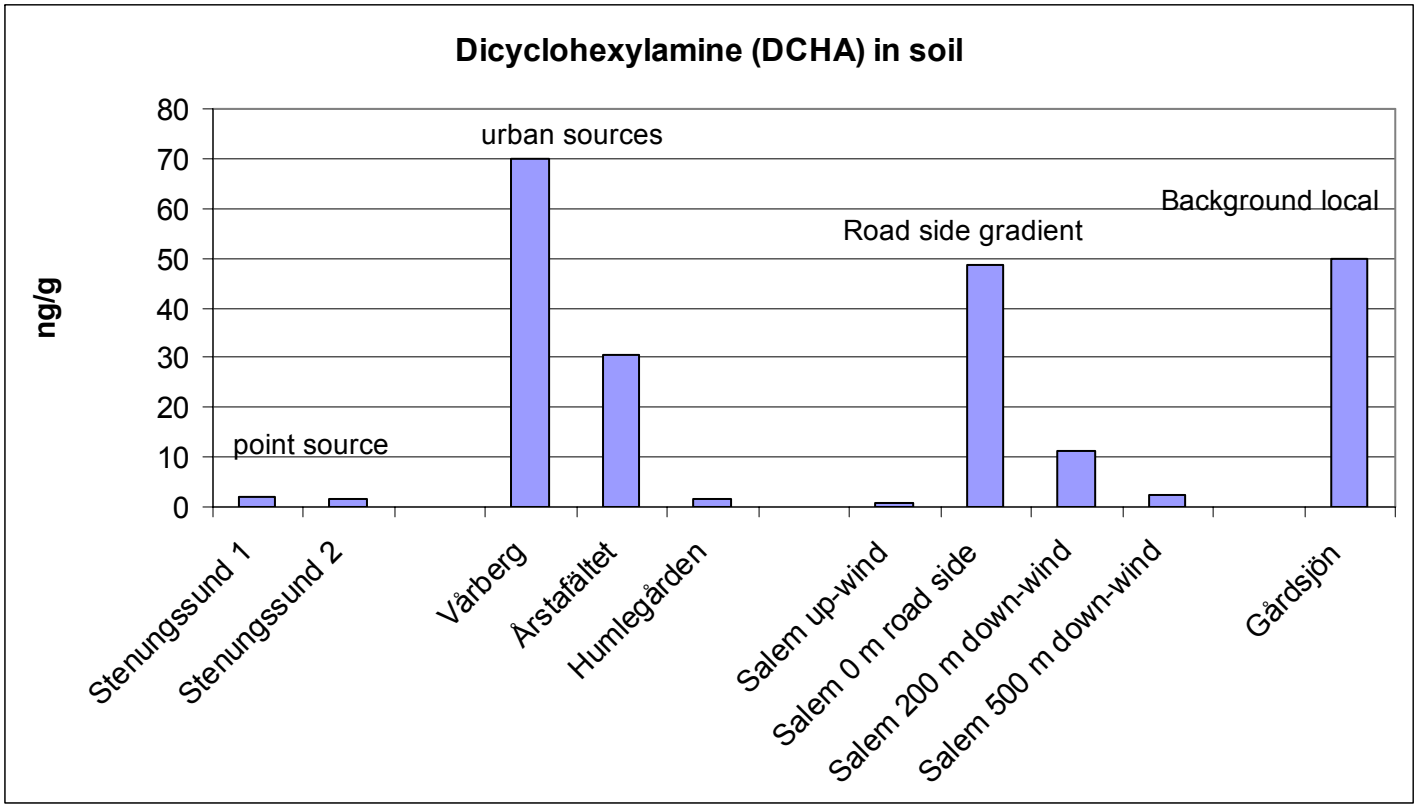
Case studies

Product	Substances and substance groups	Environmental data
PVC-flooring	Ftatalate / DINP	Screening
Accelerators in car tyres	Benzothiazols and Benzenediamines	No
Surface-treated textiles car seat	Fluorinated compound PFCs	Yes
UV-stabilizer in a coated textile	Benzotriazoles	No
Computor	Organophosphates	Screening

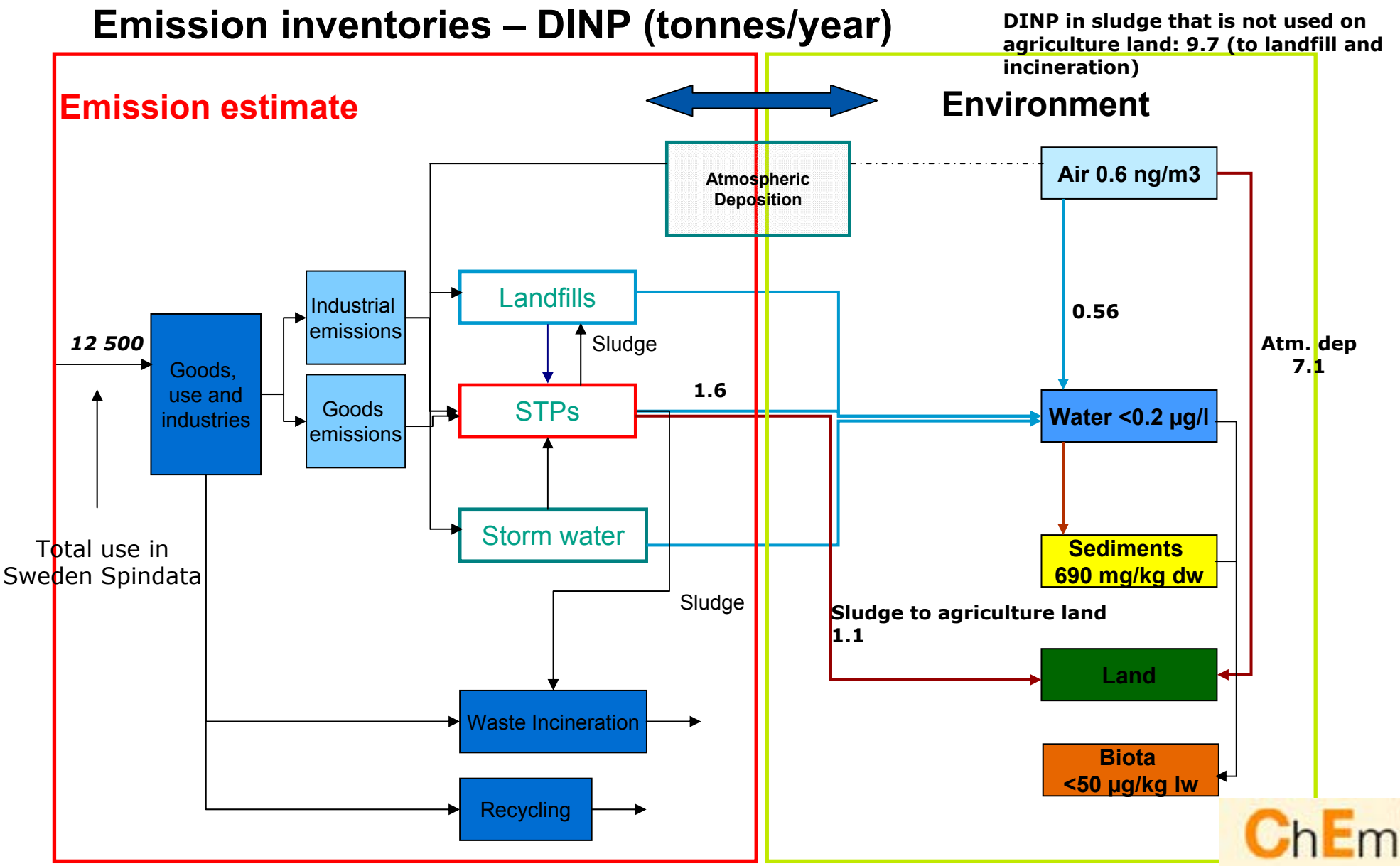
Case studies

Product	Substances and substance groups	Environmental data
Accelerators in car tyres 	Benzothiazols and Benzenediamines DCHA transformation product	Selected for screening 7 substances
UV-stabil textile 	Benzotriazoles	Selected for screening 5 substances

Screening of DCHA

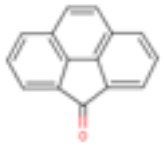
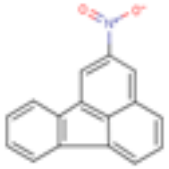
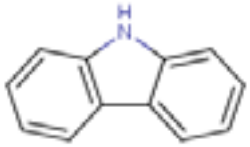


Emission inventories – DINP (tonnes/year)

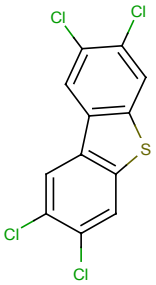


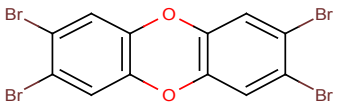
Screening of unintentionally produced organic contaminants

- **PAHs and related substances**

- **Brominated and chlorinated aromatic substances**





Screening of unintentionally produced organic contaminants
IVL-rappport B1944
IVL, UmU, NILU

Unintentionally produces organic substances

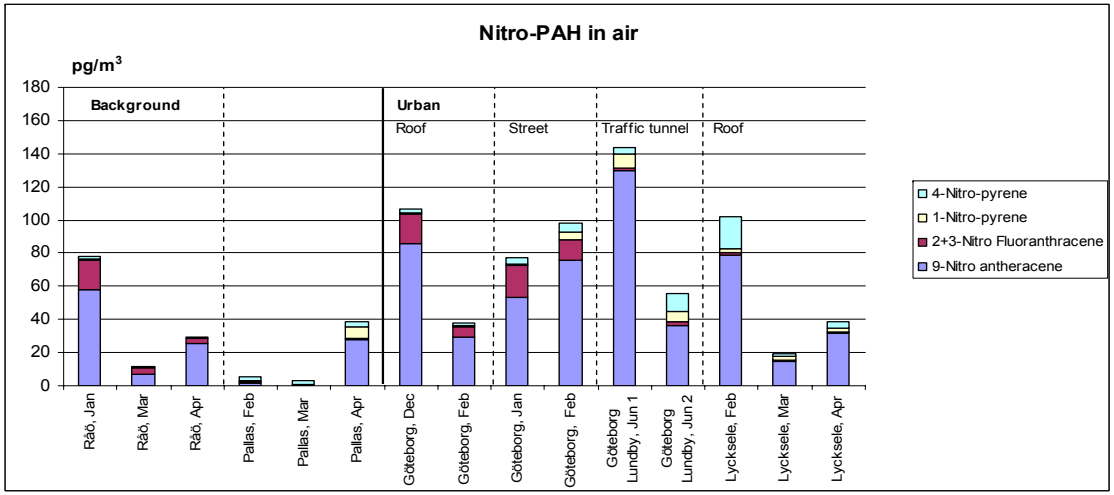
Overview Detection frequency

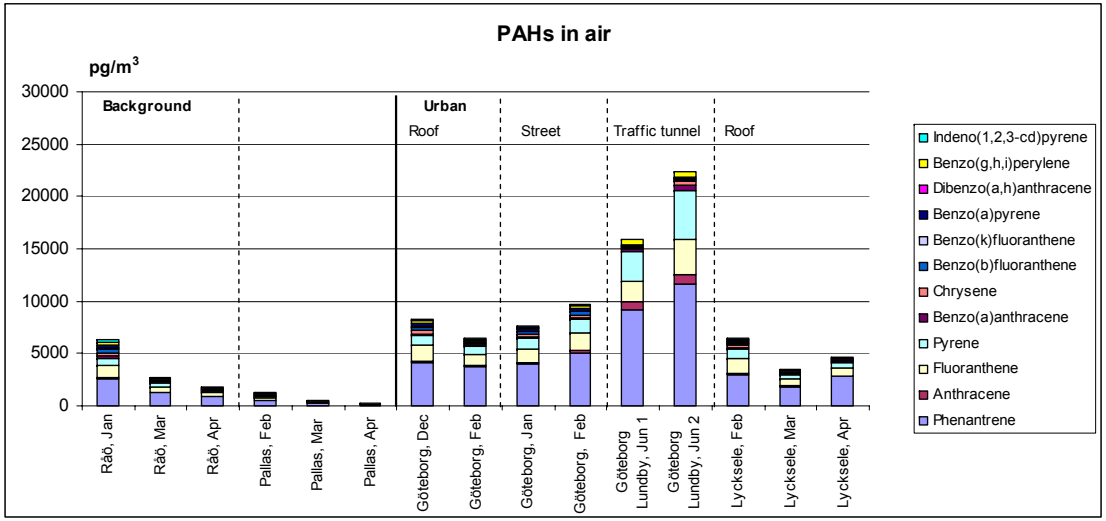
Matrix *Number of samples*	Air *15* %	Atm. Dep *5* %	Sedim. *5* %	Soil *4* %	Biota *6* %	Storm water sludge *3* %	STP sludge *2* %
PAHs ref substances	100	100	100	100	100	100	100
N-Heterocycles	100	100	100	100	33	100	100
S-Heterocycles	100	100	60	75	0	100	100
O-Heterocycles	100	100	100	100	0	100	100
Oxy-PAH	100	100	100	100	100	100	100
Nitro-PAH	100	100	100	100	50	100	100
PBDFs	100	100	100	100	100	100	100
PBDDs	27	0	100	75	33	67	100
PCDTs	67	100	100	75	17	100	100
PCDTAs	13	0	0	50	0	0	0

Polybrominated dibenzofurans (PBDF)
Polybrominated dibenzodioxins (PBDD)
Polychlorinated dibenzothiophenes (PCDT)
Polychlorinated dibenzothianthrenes (PCDTA)

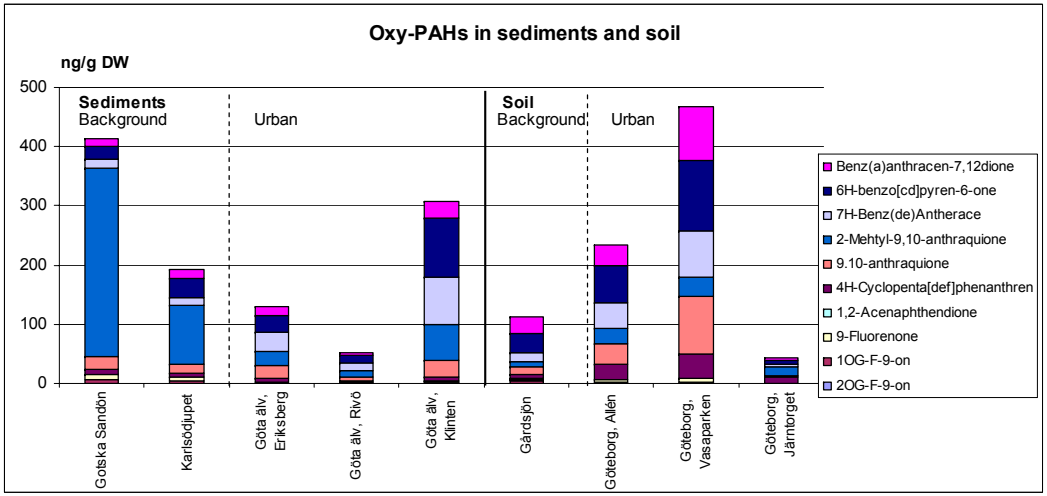
IVLs, screening studies

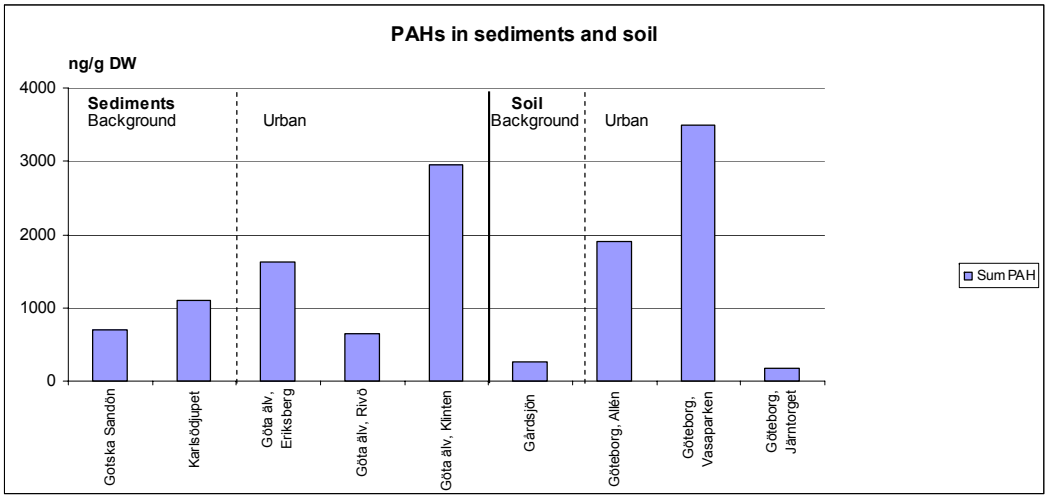
Concentrations of nitro-PAHs and PAHs in air





Concentrations of oxy-PAHs in sediments and soil





Summary

Screening studies are important to "find" new chemicals in the environment

Screening studies are important for including of substances for long term-monitoring

Data from screening studies could be used to identify sources and pathways: as first step

Combination of measured data and use of models is essential

Summary

Results from screening can be important input to research project

but

Results from, both previous research projects and monitoring programs give important information to a screening

Can research help reducing the costs or increasing the efficiency of environmental screening studies?

Yes