

# Speciation of Airborne and Deposited PM in the Netherlands



## Content

- Heavy metals
- Bulk components (Secondary Inorganic Aerosols)
- Wet deposition vs. airborne particles
- Black smoke
- PM10 & sea salt
- Source apportionment study

## Heavy metals

- Sampling method developed in 70's
- Cut off on particle diameter is flat compared to modern samplers (approximately 6 µm)
- Analysis by ICP-MS

## Heavy metals in particles (location)

Jaargemiddelde concentratie zware metalen in 2006 (ng/m<sup>3</sup>)

Location	Arsen (*10)	Cadmium (*100)	Lood	Zink
Biest Houtakker	~10	~30	~10	~40
Vlaardingen	~8	~25	~8	~30
Bilthoven	~5	~15	~5	~25
Kollumerwaard	~4	~12	~4	~20

In general: Levels in south > levels in north

## Heavy metals in particles (trend)

Year	Cd*100 (ng/m³)	Pb (ng/m³)	Zn (ng/m³)
1990	~50	~30	~15
1992	~45	~25	~12
1994	~40	~20	~10
1996	~35	~18	~8
1998	~30	~15	~7
2000	~25	~12	~6
2002	~22	~10	~5
2004	~20	~8	~4
2006	~18	~7	~3

## Precipitation

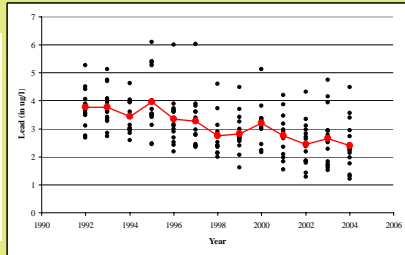
Two identical wet only samplers for bulk components and for heavy metals.

15 locations operated 1992 - 2004

Chemical analysis similar to airborne particles

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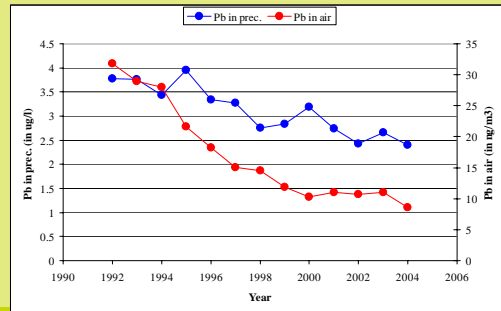
## Lead in precipitation



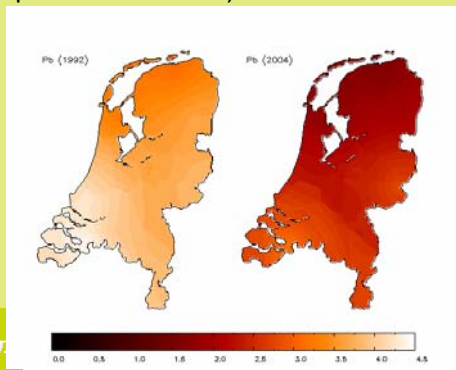
Instrument and sampling strategy unchanged 1992-2004  
After 2004: new samplers and less locations



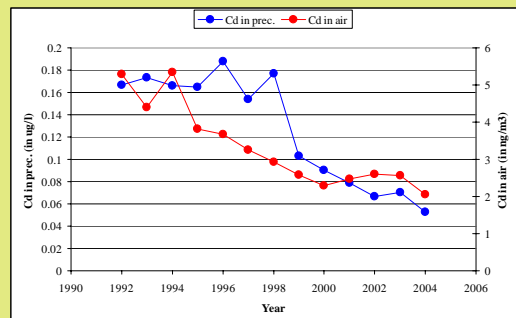
## Lead



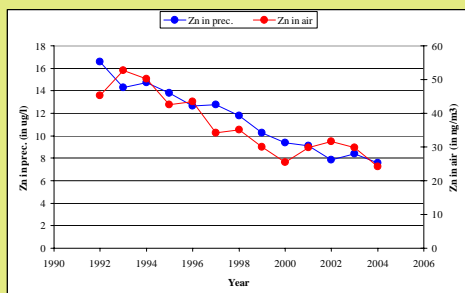
## Lead concentrations (in µg/l) in precipitation in the Netherlands (interpolation of measurements)



## Cadmium



## Zinc



## Bulk components in air (Secondary inorganic aerosols)

- Sampling method developed in 70's (compared to heavy metals smaller amount of air)
- Cut off on particle diameter flat compared to modern samplers (approximately 3-4 µm)
- Analysis by ion chromatography and CFA







