

# ENVIRONMENTAL LEVELS - POSTERS

## THE REGIONAL BACKGROUND MONITORING OF POPs (PAHs, PCBs, OCPs) IN THE CZECH REPUBLIC

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### Introduction

The first information concerning to ambient air levels of PBTs compounds in former Czechoslovakia were published as results of Project TOCOEN<sup>1</sup>.

In many cases, emissions to the atmosphere represent the main way the compounds are released into environment. To assess the effect of the steps taken to reduce the POPs emission, monitoring of their concentration levels is required. Aiming at the study of long range transport and deposition, measurements of PBTs compounds atmospheric concentrations were being carried out in Czech Republic and data obtained were related to air concentrations of other pollutants and to meteorological parameters<sup>2</sup>.

Czech Ministry of the Environment and RECETOX Brno have performed in CR The System of Monitoring of Organic Compounds in the Ambient Air (SYMOS), a preliminary monitoring system of PBT compounds in ambient air in CR. During SYMOS pilot study in 1994-1995, PAHs, PCBs, chlorinated pesticides and PCDDs/Fs were monitored in the area of Kosetice observatory (professional observatory of Czech Hydrometeorological Institute located in south Bohemia). Observatory Kosetice was established as a regional background station of international monitoring (EMEP, GAW, GEMS) and national monitoring programmes (monitoring of Czech MOE, Project TOCOEN, GEOMON)<sup>3</sup>.

### Methods

In the pilot study of the SYMOS Project, samples were taken in area of Kosetice observatory from July to December 1995. The 24-hours samples were collected weekly, starting on Wednesdays, 8 a.m., PCDDs/Fs were sampled in four-weeks intervals. The pollutants were collected by using of a high volume sampler equipped with quartz filter and polyurethane foam adsorbents.

From 1996, the regular monitoring of semi-volatile PBTs was continued at the Kosetice observatory, under a co-operation scheme between Czech Hydrometeorological Institute Praha and RECETOX-TOCOEN & Associates, Brno. The Kosetice Observatory is included among regional background stations under both international (GAW, EMEP) and national (TOCOEN) programmes. In present time, the TOCOEN monitoring programme of PBTs at Kosetice observatory has been carried out on a regular basis for already 12 years – a unique achievement globally. The sampling procedure (one samples per week for determination of PAHs, PCBs and OCPs) and analytical determination is based on conclusions of EMEP coordinating meeting took place in Norway in November 1997. Pollutants mentioned above are monitored in the gaseous state as well as in atmospheric particulates.

### Results and Discussion

The results from the period 1996-1999 are shown in Tables 1 and 2. The PAHs concentrations (Table 5) identified follow characteristic course prompted by the higher occurrence of these compounds in winter when they are produced by various combustion processes (Figure 1). The high New Year 1997 value was probably the result of episodic input from local heating systems. PCBs and OCPs concentrations (Table 1) display a totally different profile in which

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no such "seasonality" has been identified. These compounds are present in the atmosphere today due to their volatilisation from soil and sediments, i.e. as secondary inputs from old deposits, and also due to a long-range atmospheric transport from regions in which they are still used. These results reflect the global trends. PCBs occurrence remains at the level of the European background. The decreasing tendency in PCB levels in ambient air is shown in Figure 2. Predominance of degradation metabolites of DDT (DDE and DDD) was observed (the same trend exists in all environmental samples from this observatory). This predominance reflected old loads – input from old usage and environmental accumulation of DDT rather than long-range transport from regions where the compound is still in use.

Table 1: Observed concentration of PAHs, Kojetice observatory, 1996-1999

1996 – 1999	Gas phase + aerosol				
	PAHs	Minimum	Maximum	Arithmetic mean	Geometric mean
Naphthalene	0.0025	56.6900	2.5409	0.5111	0.3820
Acenaphthylene	0.0025	38.1700	0.8339	0.1114	0.1230
Acenaphthene	0.0025	6.9300	0.3323	0.1164	0.1215
Fluorene	0.0025	56.0600	4.0805	1.7470	1.9610
Phenanthrene	0.0025	117.5000	8.2358	4.4350	4.8635
Anthracene	0.0025	8.9200	0.3202	0.1329	0.1385
Fluoranthene	0.0025	77.3300	2.8638	1.3362	1.6785
Pyrene	0.0025	54.7300	1.8350	0.7902	1.0750
Benz(a)anthracene	0.0050	23.7800	0.5172	0.1056	0.1200
Chrysene	0.0050	32.3700	0.8841	0.2599	0.2730
Benzo(b)fluoranthene	0.0050	34.4500	0.7704	0.1889	0.1920
Benzo(k)fluoranthene	0.0050	9.7100	0.4295	0.1160	0.1325
Benzo(a)pyrene	0.0050	13.7700	0.3864	0.0773	0.0750
Indeno(123-cd)pyrene	0.0050	20.4200	0.5682	0.1221	0.1500
Dibenz(ah)anthracene	0.0050	2.8400	0.0668	0.0000	0.0095
Benzo(ghi)perylene	0.0050	14.0000	0.4145	0.1012	0.1235
Sum of PAHs	0.06	567.67	25.08	11.65	13.17

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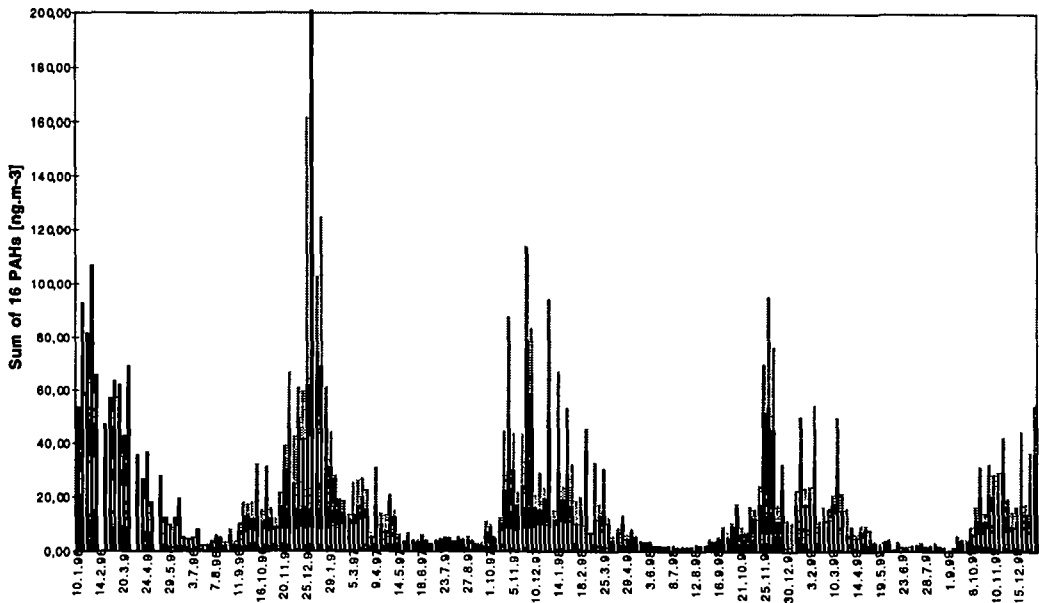
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Table 2: Observed concentration of PCBs and OCPs, Ko etice observatory, 1996-1999

1996 – 1999	Gas phase + aerosol				
	OCPs	Minimum	Maximum	Arithmetic mean	Geometric mean
PCB 28	0.0007	0.1640	0.0201	0.0000	0.0150
PCB 52	0.0010	0.1070	0.0190	0.0000	0.0170
PCB 101	0.0007	0.0790	0.0156	0.0000	0.0130
PCB 118	0.0006	0.0130	0.0027	0.0000	0.0030
PCB 153	0.0006	0.1620	0.0268	0.0000	0.0180
PCB 138	0.0005	0.1120	0.0183	0.0000	0.0130
PCB 180	0.0004	0.1170	0.0132	0.0000	0.0090
Σ PCBs	0.0045	0.4670	0.1155	0.0600	0.0965
α-HCH	0.0006	0.2130	0.0315	0.0000	0.0270
β-HCH	0.0005	0.0740	0.0059	0.0000	0.0005
γ-HCH	0.0008	0.6990	0.0561	0.0000	0.0170
δ-HCH	0.0005	0.0100	0.0006	0.0000	0.0005
Σ-HCHs	0.0020	0.8410	0.0935	0.0000	0.0510
p,p'-DDE	0.0005	0.2130	0.0306	0.0000	0.0250
p,p'-DDD	0.0012	0.0220	0.0025	0.0000	0.0012
p,p'-DDT	0.0030	0.0780	0.0056	0.0000	0.0033
Σ DDTs	0.0010	0.2130	0.0363	0.0000	0.0280
HCB	0.0004	0.8350	0.1036	0.0000	0.0870

Figure 1: Sum of PAHs, observatory Ko etice, 1997-1999 (grey line = aerosols, black line = gas phase)



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Figure 2: Sum of 7 indicator congeners of PCBs, observatory Ko\_etice, 1997-1999  
(grey line = aerosols, black line = gas phase)

