

## Halogenated hydrocarbons in Austrian running waters – first results of a new water quality monitoring system

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### *Introduction*

Together with the Federal Act on Water Law, the Federal Act on Hydrography was also amended in 1990. The latter provides a legal, administrative, and financial basis for a new countrywide water quality monitoring system for running waters. The functioning of the whole system (incl. field sampling operations, laboratory analysis, data transfer and management, reporting) is based on a close cooperation between the Dept. for Federal Water Management Register of the Federal Ministry of Agriculture and Forestry, the Federal Environmental Agency and the provincial authorities; costs were met by federal (2/3) and provincial (1/3) authorities. Full details are to be found in /1/, /2/, /3/, /4/, /5/. Measures for quality assurance and quality control are important parts of the monitoring program; the Federal Environmental Agency and the Dept. for Federal Water Management Register are leading institutions in promoting quality assurance procedures in water analysis methods in Austria.

Data collection, processing, and interpretation should be a major element of water quality management: statements on the status quo and the identification of long-term trends provide important information for decision-makers, planning groups, and the general public, and form the basis for planning preventive and restaurative measures and their efficiency control.

### *Design of the monitoring network*

The survey of the first investigation period (Dec. 1991–Dec. 1992) included measurements of about 50 physical/chemical water parameters which, generally, are measured six times per year at about 150 sampling sites; the sample collection at several locations is laid down in international agreements; therefore these sampling sites are monitored more frequently. The extension of the network to 250 sampling sites will be completed by summer 1993.

The present paper deals with the contamination of Austrian running waters by halogenated hydrocarbons: Pentachlorophenol, Sum of Hexachlorocyclohexanes, AOX – Adsorbable Organic Halogen (information on the environmental properties of those compounds in /6/). The 15 catchment areas as laid down in the Federal Law on Hydrography

# PCB

(Fig.1) determined by the large rivers in Austria are the aggregation basis for the presentation of the current site data. Further detailed evaluations will concentrate on the situation of each sampling site. At present, Austria's water management lacks obligatory surface water quality limits; only a draft of an ordinance for running water pollution exists. This divides the rivers into salmonid (mountain) and cyprinid (lowland) regions respectively, with different corresponding limit values for several parameters.

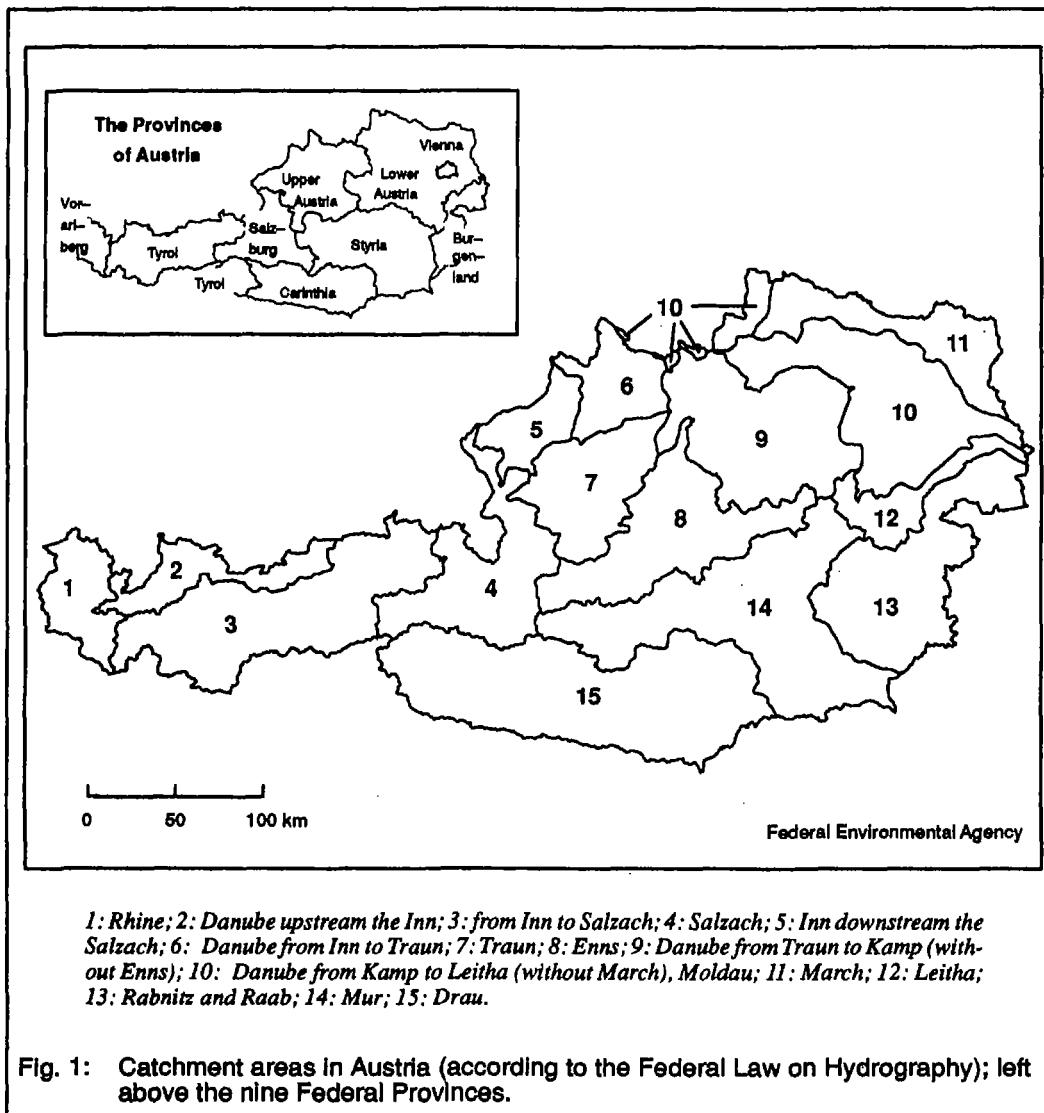


Fig. 1: Catchment areas in Austria (according to the Federal Law on Hydrography); left above the nine Federal Provinces.

**Results****Pentachlorophenol, Sum of Hexachlorocyclohexanes**

catchment area	Pentachlorophenol		Sum of Hexachlorocyclohexanes	
	sampling sites	values	sampling sites	values
01	0	0	0	0
02	1	1	1	1
03	14	61	14	61
04	14	88	14	88
05	2	5	2	5
06	2	21	2	21
07	17	85	17	85
08	11	44	11	44
09	6	37	6	37
10	4	44	4	44
11	5	28	5	28
12	6	30	6	29
13	8	51	8	51
14	13	42	13	42
15	34	164	34	164
total	137	701	137	700

Tab.1: Number of sampling sites in each catchment area and number of data collected during the investigation period for the parameters Pentachlorophenol and Sum of Hexachlorocyclohexanes.

**Pentachlorophenol:** Only 2 single values out of 701 values (one in catchment area 4 – 0.20 µg/l – and one in catchment area 15 – 0.27 µg/l) lay beyond the detection limits which varied between 0.01 and 0.2 µg/l (because of different analyzing institutions).

**Sum of Hexachlorocyclohexanes:** 21 values (total number of data collected 700) were above the detection limits that varied between 0.01 and 0.1 µg/l. Peak values (up to 0.19 µg/l) were found in the catchment area of the River Mur (Nr. 14) in Styria.

**AOX**

catchment area	sampling sites	values	0*			
			>0-25	>25-50	>50	
01	12	72	90.3	8.3	1.4	0.0
02	0	0	—	—	—	—
03	13	55	69.1	29.1	1.8	0.0
04	14	59	67.8	30.5	1.7	0.0
05	2	2	0.0	100.0	0.0	0.0
06	2	4	25.0	25.0	50.0	0.0
07	17	85	15.3	74.1	9.4	1.2
08	11	44	75.0	20.5	2.3	2.3
09	6	20	25.0	50.0	20.0	5.0
10	4	9	11.1	22.2	55.6	11.1
11	1	2	0.0	50.0	50.0	0.0
12	6	23	30.4	56.5	13.0	0.0
13	6	31	54.8	35.5	9.7	0.0
14	13	43	27.9	20.9	2.3	48.8
15	34	164	26.2	68.3	5.5	0.0
total	141	613				

Tab.2: Number of sampling sites in each catchment area, number of data collected during the investigation period, frequency distribution of the AOX data in percent (classification ranges in µg/l, limiting value of the ordinance draft: 50 µg/l).

\*: 0 or < detection limit (varying between 0.1 and 10 µg/l because of different analyzing institutions)

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The number of high AOX concentrations is especially apparent in the catchment area of the River Mur (Nr.14) in Styria. This region is highly influenced by the effluents of pulp and paper plants. Peak concentrations were found in the small River Pöls deriving from a pulp mill using chlorine or chlorine derivatives for bleaching. This effluent also influences the River Mur. The impacts of other pulp and paper mills in Austria on aquatic ecosystems could be reduced in the last years: some plants apply effective waste water treatment processes, other sites were closed.

## **References**

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