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Tecnologico "G. Cardano"
Pavia*



*Zespół Szkół Ponadgimnazjalnych nr 1
im. W. Szybińskiego
Cieszyn*



Agenzia Nazionale Socrates Italia

***Comenius 1.2 Project
Cieszyn - Pavia***

Characteristics of water and air in Cieszyn and in Pavia

Pavia, 26.3 – 9.4 2006

Characteristics of water and air in Cieszyn and in Pavia

***From this point you can follow two different
ways: the air pollution or the water
pollution. Click left button of the mouse on
the wished picture and... enjoy yourself!***

Air



Water



Credits...

Water

Characteristics of water and air in Cieszyn and in Pavia



Po



Ticino

Rivers results...

Po

Ticino

Vernavola



Vernavola

*Follow the way. Click left
button of the mouse on the
wished picture if you want
know more about it.*

***Characteristics of water and air
in Cieszyn and in Pavia***

PO's photos

Water



Characteristics of water and air in Cieszyn and in Pavia

PO

These are the characteristics of Po River. If you click left button of the mouse on the picture you can found another photos to this river. Otherwise you can return to the switch menu.



Length:	652 km
Water flow:	1540 m ³ /s
River basin:	71.000 km ²
Source:	Mount Monviso, Alps, Italy
Terminate:	Adriatic Sea
Crossed countries	Italy

Characteristics of water and air in Cieszyn and in Pavia

Po Basin Area

*This is the Po
Basin Area,
from Mount
Monviso to
Adriatic Sea.*



Characteristics of water and air in Cieszyn and in Pavia

TICINO

These are the characteristics of Ticino River. If you click left button of the mouse on the picture you can found another photos to this river. Otherwise you can return to the switch menu.



Length:	248 km
Water flow:	350 m ³ /s
River basin:	7.228 km ²
Source:	San Gottardo Massif Switzerland
Terminate:	In Po River, near Pavia
Crossed countries	Switzerland and Italy

Characteristics of water and air in Cieszyn and in Pavia

TICINO's photos

Ticino river before Pavia



Ticino river across Pavia

Characteristics of water and air in Cieszyn and in Pavia

Ticino Basin Area

***This is the
Ticino Basin
Area.***



Characteristics of water and air in Cieszyn and in Pavia

VERNAVOLA

These are the characteristics of Vernavola torrent. If you click left button of the mouse on the picture you can found another photos to this river. Otherwise you can return to the switch menu.



Length:	15 km
Water flow:	m ³ /s
River basin:	0,35 km ²
Source:	San Genesio (PV)
Terminate:	Ticino river, near Pavia
Crossed countries	Italy

VERNAVOLA's photos



**Characteristics of water and air
in Cieszyn and in Pavia**

Water

Po results

Electric conductivity	$\chi = 217 \mu\text{S} / \text{cm}$
Hydrogen power	pH = 7.88
Alkalinity	$(\text{HCO}_3^-) = 204 \text{ mg/L}$
Chlorides	$(\text{Cl}^-) = 27 \text{ mg/L}$
Hardness	$^{\circ}\text{F} = 20.5$
Imhoff cone deposit	$= < 1 \text{ m/L}$
Sulphates (Qualitative)	$= < 50 \text{ mg/L}$
Iron (Fe^{3+})(Qualitative)	$= < 5 \text{ mg/L}$

Level of pollution expressed by macrodescriber parameters

	Level 1	Level 2	Level 3	Level 4	Level 5	area CUS 1-3-2006
100- OD (% sat)	≤ 10	≤ 20	≤ 30	≤ 50	> 50	96
BOD ₅ (O ₂ mg/L)	≤ 2,5	≤ 4	≤ 8	≤ 15	> 15	2,6
COD (O ₂ mg/L)	< 5	≤ 10	≤ 15	≤ 25	> 25	9,2
NH ₄ (N mg/L)	< 0,03	≤ 0,10	≤ 0,50	≤ 1,50	> 1,50	0,09
NO ₃ (N mg/L)	< 0,3	≤ 1,5	≤ 5,0	≤ 10,0	> 10,0	1,8
Total Phosphorus (P mg/L)	< 0,07	≤ 0,15	≤ 0,30	≤ 0,60	> 0,60	0,15
<i>Escheric. coli</i> (colonies/100 mL)	< 100	≤ 1.000	≤ 5.000	≤ 20.000	> 20.000	1500
Score	80	40	20	10	5	Total score 280
LEVEL OF POLLUTION	480 – 560	240 – 475	120 – 235	60 – 115	< 60	

Level 2

These results were developed
by a chemistry class of this
school together with a group of
Polish students

Ticino results Water

Level of pollution expressed by macrodescriber parameters

	Level 1	Level 2	Level 3	Level 4	Level 5	area CUS 30-3-2006
100- OD (% sat)	≤ 10	≤ 20	≤ 30	≤ 50	> 50	92
BOD ₅ (O ₂ mg/L)	≤ 2,5	≤ 4	≤ 8	≤ 15	> 15	2,0
COD (O ₂ mg/L)	< 5	≤ 10	≤ 15	≤ 25	> 25	9,0
NH ₄ (N mg/L)	< 0,03	≤ 0,10	≤ 0,50	≤ 1,50	> 1,50	0,06
NO ₃ (N mg/L)	< 0,3	≤ 1,5	≤ 5,0	≤ 10,0	> 10,0	1,9
Total Phosphorus (P mg/L)	< 0,07	≤ 0,15	≤ 0,30	≤ 0,60	> 0,60	0,08
<i>Escheric. coli</i> (colonies/100 mL)	< 100	≤ 1.000	≤ 5.000	≤ 20.000	> 20.000	800
Score	80	40	20	10	5	
LEVEL OF POLLUTION	480 – 560	240 – 475	120 – 235	60 – 115	< 60	Total score 340

Level 2

Characteristics of water and air in Cieszyn and in Pavia

Vernavola results

ORGANISM	TYPES	found	not found
PLECOTTERI			X
EFEMEROTTERI	Baetis	X	
	Caenis	X	
TRICOTTERI	Hydropsychidae	X	
	Hydroptilidae	X	
COLEOTTERI			X
ODONATI			X
DITTERI	Chironomidae	X	
ETEROTTERI			X
CROSTACEI	Gammaridae	X	
	Asellidae	X	
GASTEROPODI	Bythiniidae	X	
BIVALVI			X
TRICLADI			X
IRUDINEI	Erpobdella	X	
	Batracobdella	X	
OLIGOCHETI	Tubificidae	X	
	Lumbriculidae	X	
	Naididae	X	
ALTRI			X

This is a summary table that shows the experimental results of the analysis of samples taken at Torrente Vernavola PV.

Air pollution

What is ARPA...

ARPA is the abbreviation for "Regional Agency for Environment protection"

It was founded by regional law n° 16 on 14 august 1999

How is ARPA structured?

Head Office

v.le Restelli, 1/3 20124
Milano

Tel. 02696661

Public relation Office: tel.
02.69666706

Web site:

www.arpalombardia.it

E-mail:

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Local Office of PAVIA

Via n. Bixio, 13

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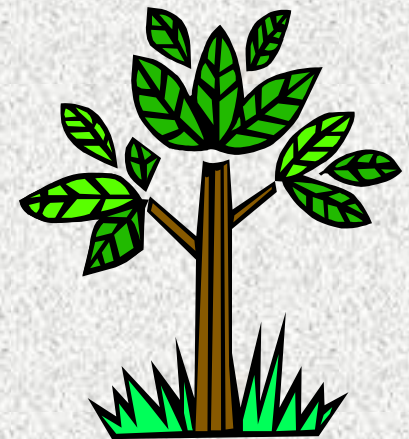
What do ARPA do

art. 3 regional law 14 August 1999, n.16

ARPA monitors the environment and tests:

- **air pollution**
- **pollution from radiation**
- **Acoustic pollution**
- **Water pollution**
- **Ground pollution**
- **garbage**

and reports to the authorities every action against the law



**How does ARPA
monitor the air
quality?**

This is the mobile laboratory to examine the air

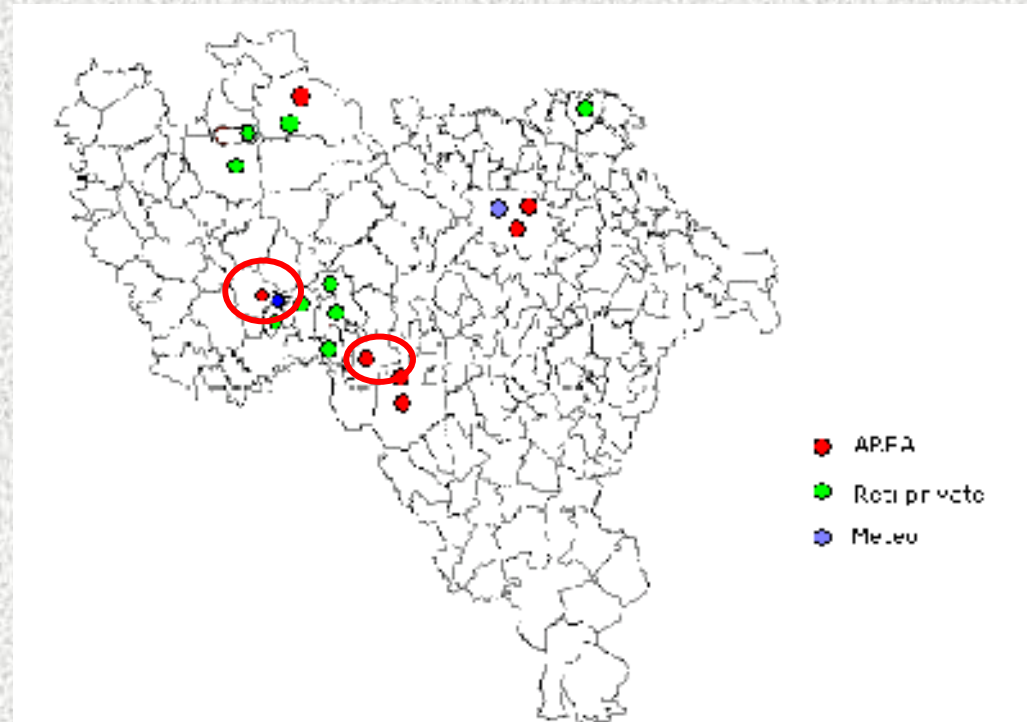


This is the fixed laboratory to examine the air



This is the map of places in the Pavia province where ARPA has made tests for

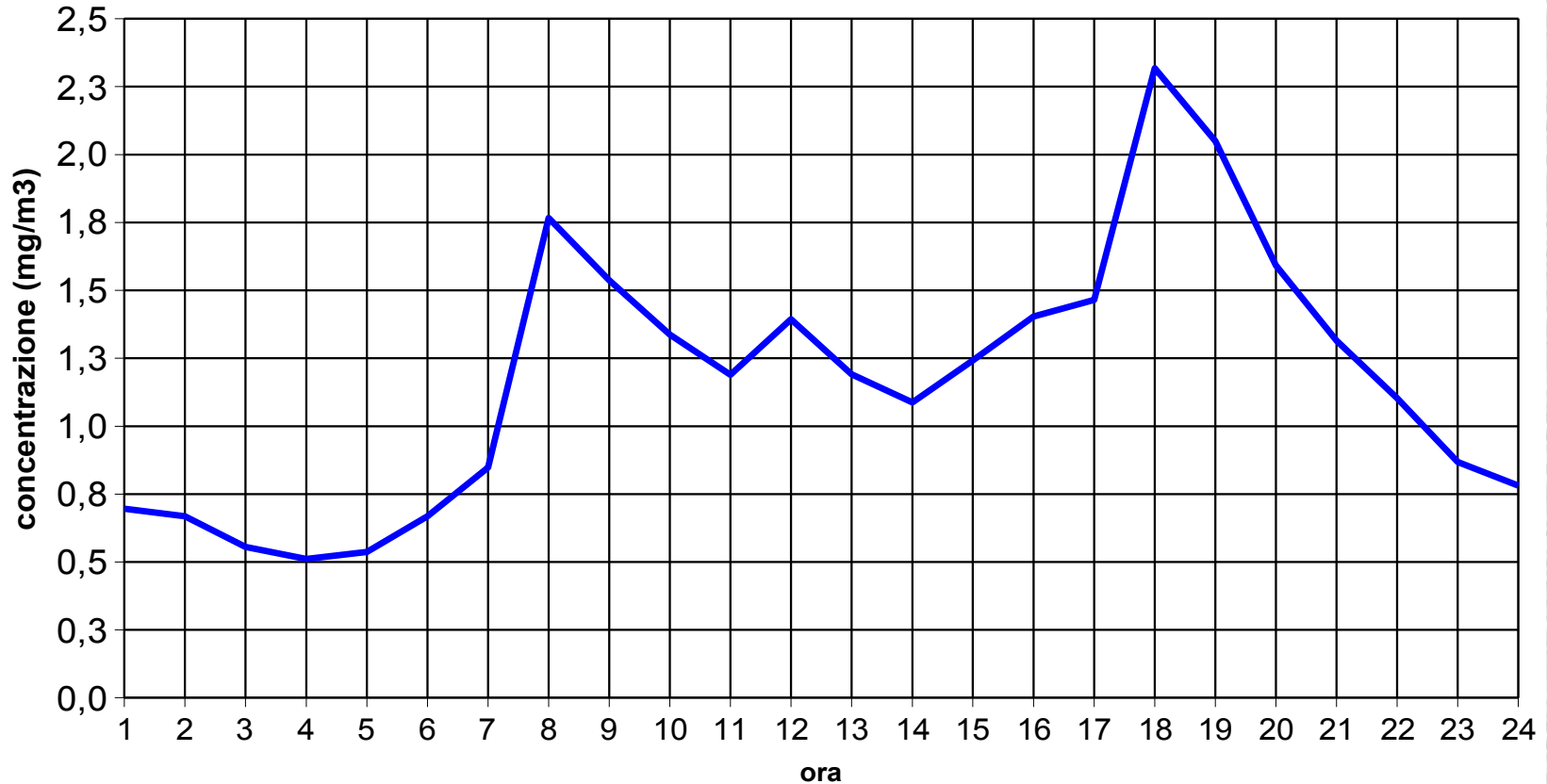
- SO₂
- CO
- NO_x
- O₃
- PTS
- PM₁₀
- PM_{2.5}
- BTX



**What is in the
air?**

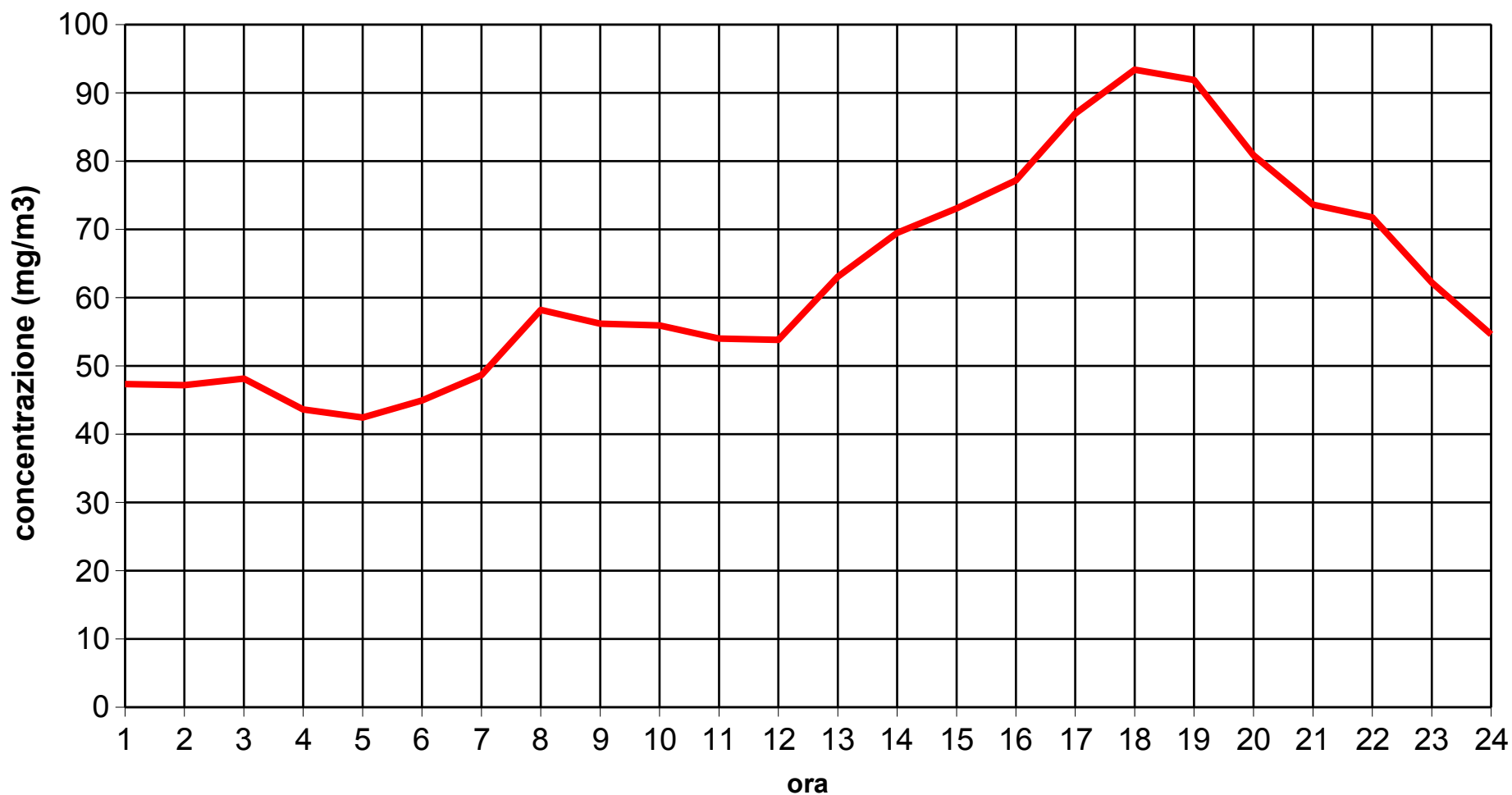
This chart shows air pollution of CO on a working day in Pavia. You can see that pollution is higher at 7.00 AM (when people go to work and students go to schools) and at 6.00

Giorno tipo CO - Via Marconi



As the previous chart but referred to NO₂

Giorno tipo NO2 - Via Marconi



As the previous chart but referred to O₃

Giorno tipo O₃ - Via Marconi



**Limit fixed by law for particulates (PM10)
for the safety of human health
D.M. 60/2002**

Annual limit

(annual average)

40 $\mu\text{g}/\text{m}^3$

DURING THE YEAR

2010 THE LIMIT WILL BE 20 $\mu\text{g}/\text{m}^3$

**The indicator that
we use in Pavia
are lichens**

Bioindicator of air: lichens



Students looking for the lichens



Lichens in Pavia



Final considerations

- How is the air in Pavia?
- The presence of lichens in some places tells us that air is not bad at all.
- The lichens we found shows that the air pollution is between 100 and 150 $\mu\text{g SO}_2/\text{m}_3$
- In the center of town Pavia we can not find lichens at all

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Collaboration of:

ARPA Pavia

Travaco' Siccomario City Council

Legambiente Pavia

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