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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***

Water



Air

Characteristics of water and air in Cieszyn and in Pavia

Students from Cieszyn:

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Nugara Giulia

Ratto Melissa

Tombola Marco

Vignati Jacopo

Collaboration of:

ARPA Pavia

Travaco' Siccomario City Council

Legambiente Pavia

WATER

Characteristics of water and air in Cieszyn and in Pavia

Ticino



Water

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

Water

Ticino

Map



Characteristics of water and air in Cieszyn and in Pavia

Po



Water

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*

Water

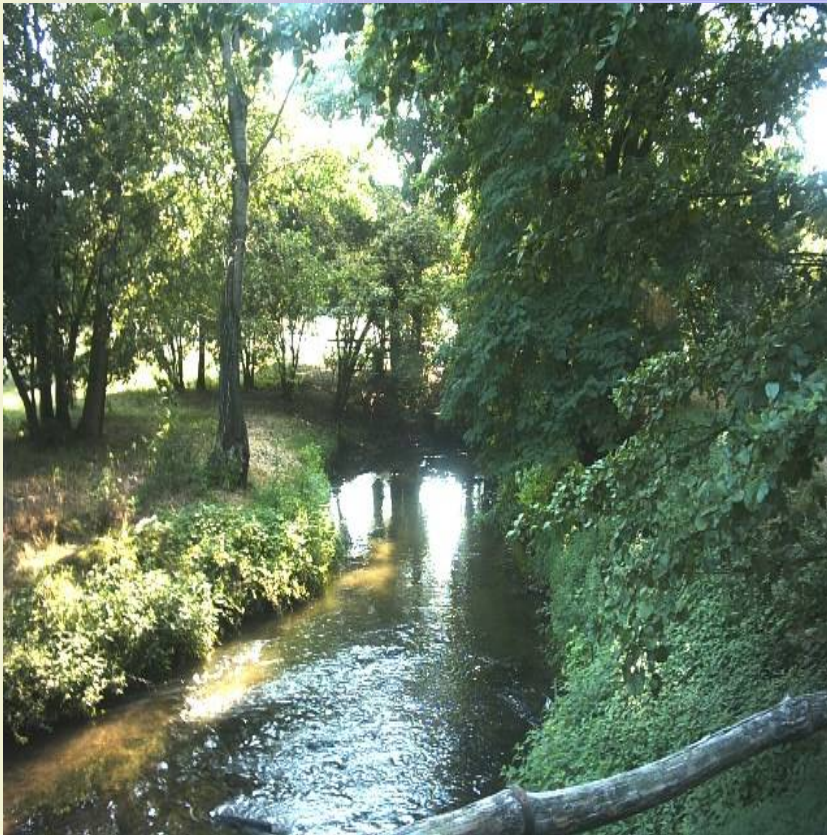
River Basin Area

Po



Characteristics of water and air in Cieszyn and in Pavia

Vernavola



Water

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

Characteristics of water and air in Cieszyn and in Pavia

Water

Drawings

Po

Where	When
Travacò siccomario	1 IV 2006



Ticino

Where	When
Bereguardo	30 III 2006



Vernavola

Where	When
The Park Vernavola	31 III 2006



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

Water

Vernavola



Results

The river Vernavola

Biological indicators of clean water

Organisms:

Ephemeroptera: Beatis

Caenis

Trichoptera: Hydropsychidae

Hydroptilidae

Diptera: Chironomidae

Crustacea: Gammaridae

Asellidae

Gastropoda: Bythinidae

Irudinea: Erpobdella

Batracobdella

Oligochaeta: Tubificidae

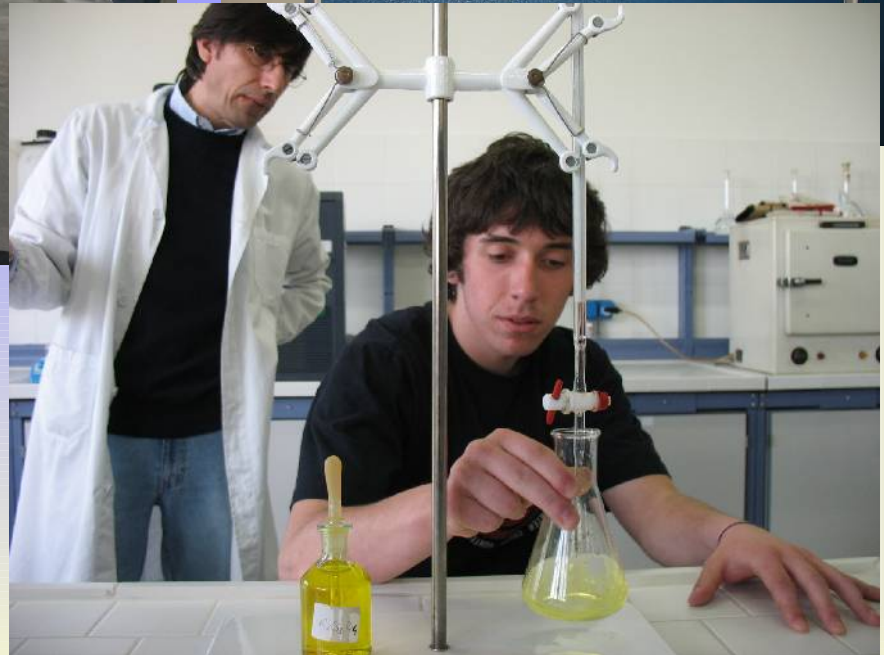
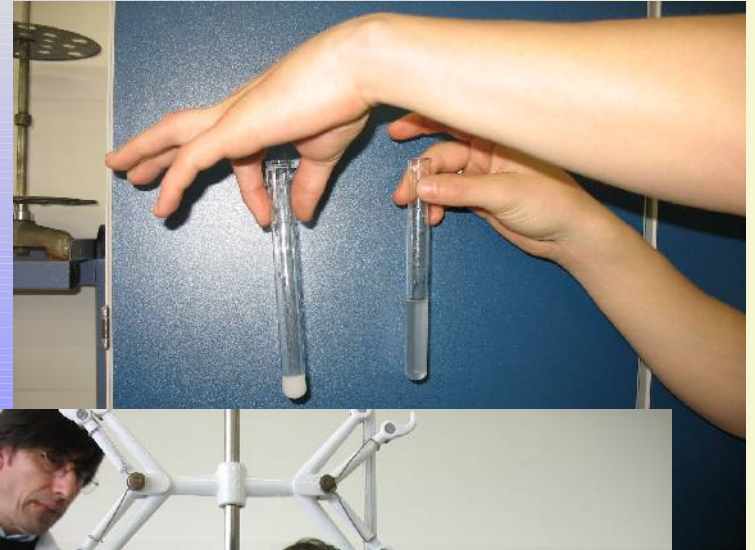
Lumbriculidae

Naididae

Characteristics of water and air in Cieszyn and in Pavia

Water

Po



Results

The river Po

Electric conductivity	χ = 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 m/L
Sulphates (Qualitative)	= < 50 mg/L
Iron (Fe^{3+})(Qualitative)	= < 5 mg/L

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

Water

Ticino



Results

The river Ticino

Level of pollution expressed by macrodescriber parameters

	Level1	Level 2	Level 3	Level 4	Level 5	area CUS 30-3-2006
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	≤ 1,25	> 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	
Level of polution	480 - 560	240 – 475	120 - 235	60 – 115	< 60	Total score 280

Results

The river Ticino

Level of pollution expressed by macrodescriber parameters

	Level1	Level 2	Level 3	Level 4	Level 5	area CUS 1-3-2006
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	≤ 1,25	> 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	400
Score	80	40	20	10	5	
Level of polution	480 - 560	240 – 475	120 - 235	60 – 115	< 60	Total score 340

Final Considerations

1. Pollution of water in the Ticino river expressed by macrodescriber parameters (O_2 , BOD_5 , COD, NH_4 , NO_3 , Total Phosphorus, *Escheric. coli*) is on the Level 2 which means that its water is clean.
2. Low level of electric conductivity, chlorides, sulphates, iron and deposit show that water in the river Po is chemically clean for our analysis.
3. Hardness: the river Po water is medium because of the presence of Ca^{2+} , Mg^{2+} in water and pH is 7.88

AIR

What did we do to analyse the air in Pavia?



Students at work: lichens observations



The lichens are air indicators



The air in the countryside around Pavia



What do lichens analysis tell us?

- 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 Pavia we can not find lichens at all

Thank you for your hospitality

