



Važnost meteorologije u praćenju onečišćenja zraka

The role of meteorology in air pollution monitoring

Ana Alebić-Juretić

Nastavni Zavod za javno zdravstvo

Teaching Institute of Public Health

Rijeka

- Povijesni pregled
- Stara klasična/kemijska mreža
- Automatska mreža
- Važnost meteorologije u praćenju kvalitete zraka

- *Historical view*
- *Old classic/chemical network*
- *Automatic network*
- *The role of meteorology in air pollution monitoring*

1. Povijesni pregled

- 1973 – Rijeka: SO_2 , crni dim, UTT
- Krajem 70' - proširenje na Bakarski zaljev
- 1980 – NO_2 , NH_3 , H_2S , TSP, PAHs
- Sredinom 80' – analiza oborina
- 1986: proširenje na Krk i Cres
- 1995: Gorski kotar

1. *Historical view*

- 1973- Rijeka: SO_2 , *black smoke, dustfall*
- *Late 70' -extension to Bakar bay*
- 1980 – NO_2 , NH_3 , H_2S , TSP, PAHs
- *Mid 80' - analyses of precipitation*
- *extension to the islands of Krk and Cres*
- 1995: *Gorski kotar area*

2. Klasična /kemijska mreža

Classic/Chemical network



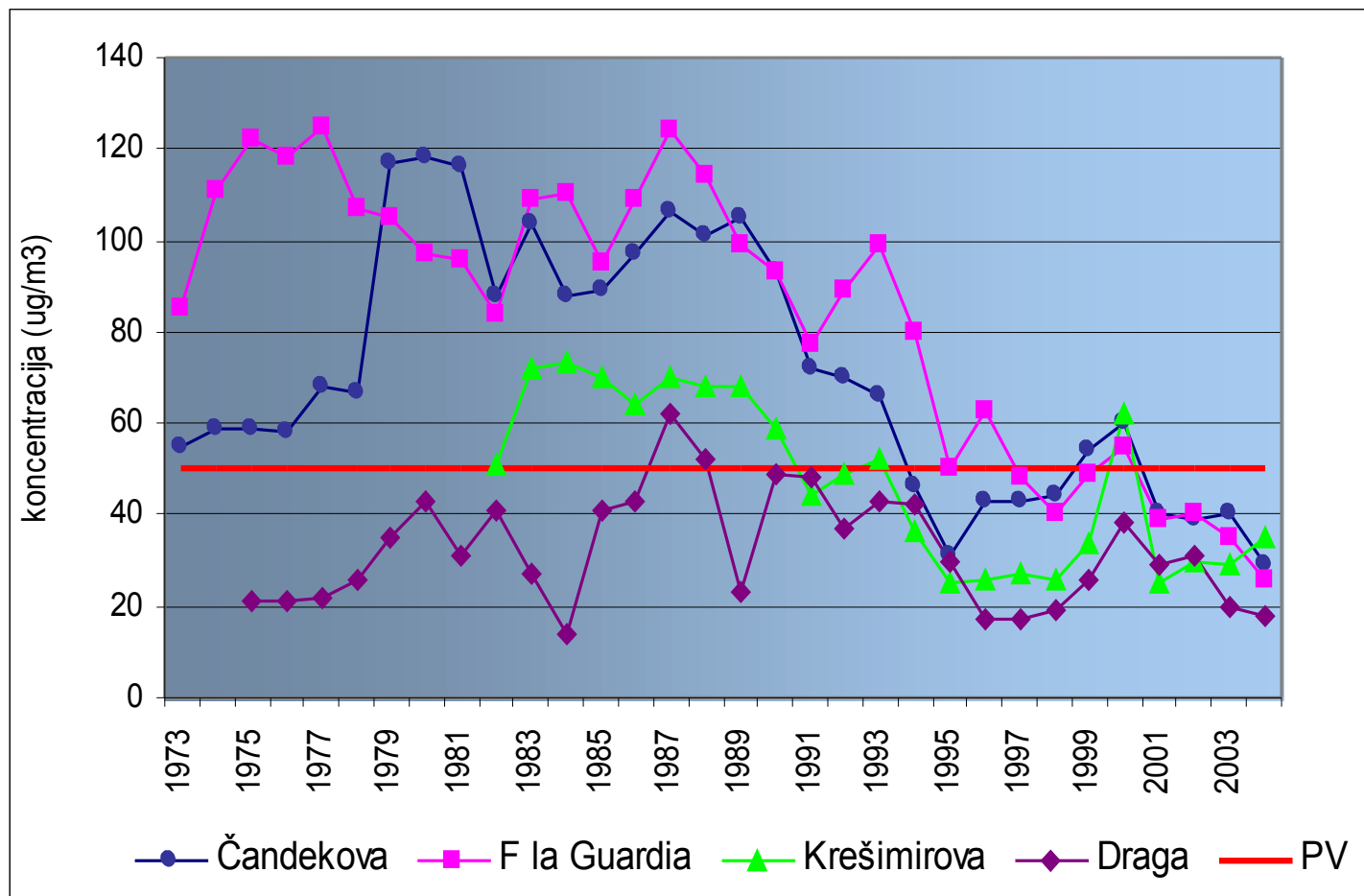
Analiza sakupljenih uzoraka

Chemical analyses of the collected samples



Trend SO₂

Long term trends - SO₂



Prosječne dnevne koncentracije pogodne za:

- Trendove
- Prostorno planiranje
- Retrospektivne studije izloženosti populacije

ali **ne** za:

- Identifikaciju zagađivača
- Pravovremeno djelovanje na izvor

Daily mean concentrations suitable for:

- Trends
- Spatial planning*
- Retrospective studies on human exposure*

*but **not** for:*

- Source identification*
- Prompt action on pollution source*

3. Automatska mreža

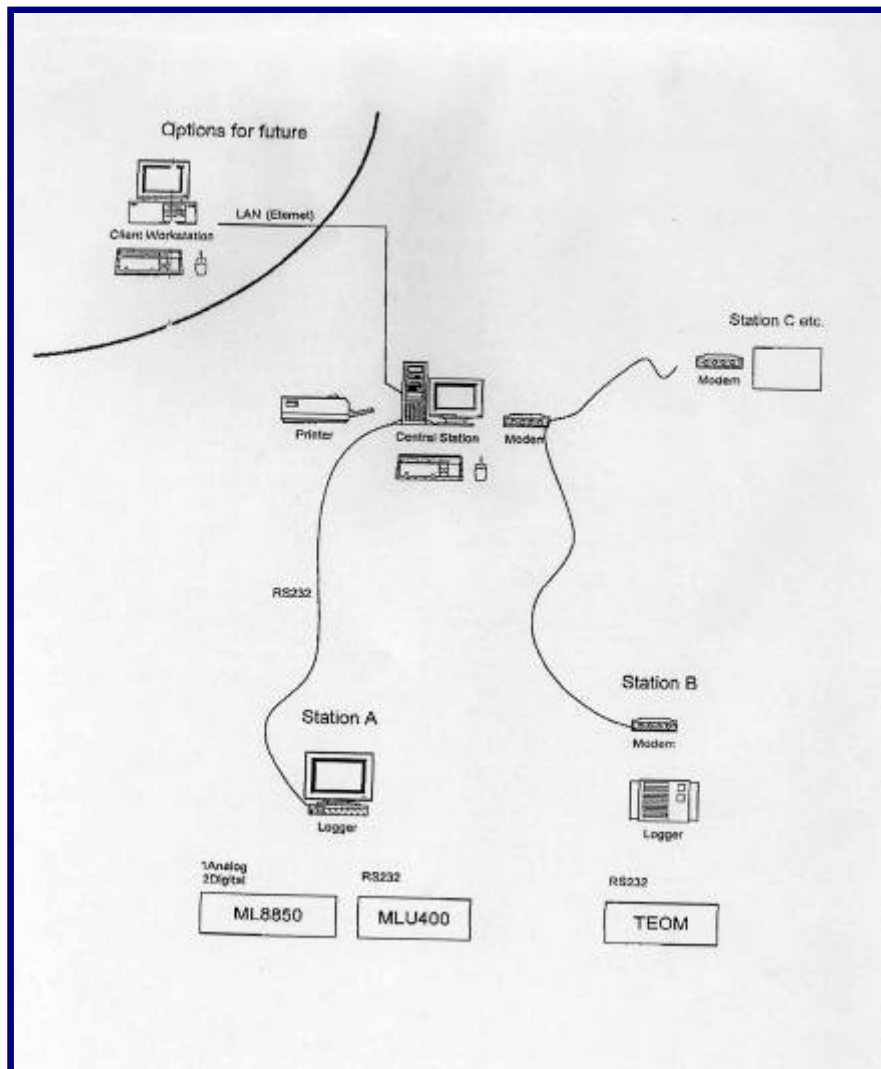
Automatic network

1989: SO₂



1998: O₃





2000: Prva automat-
ska mreža za praće-
nje kvelitete zraka

*2000: The very first air
monitoring network in
Croatia*

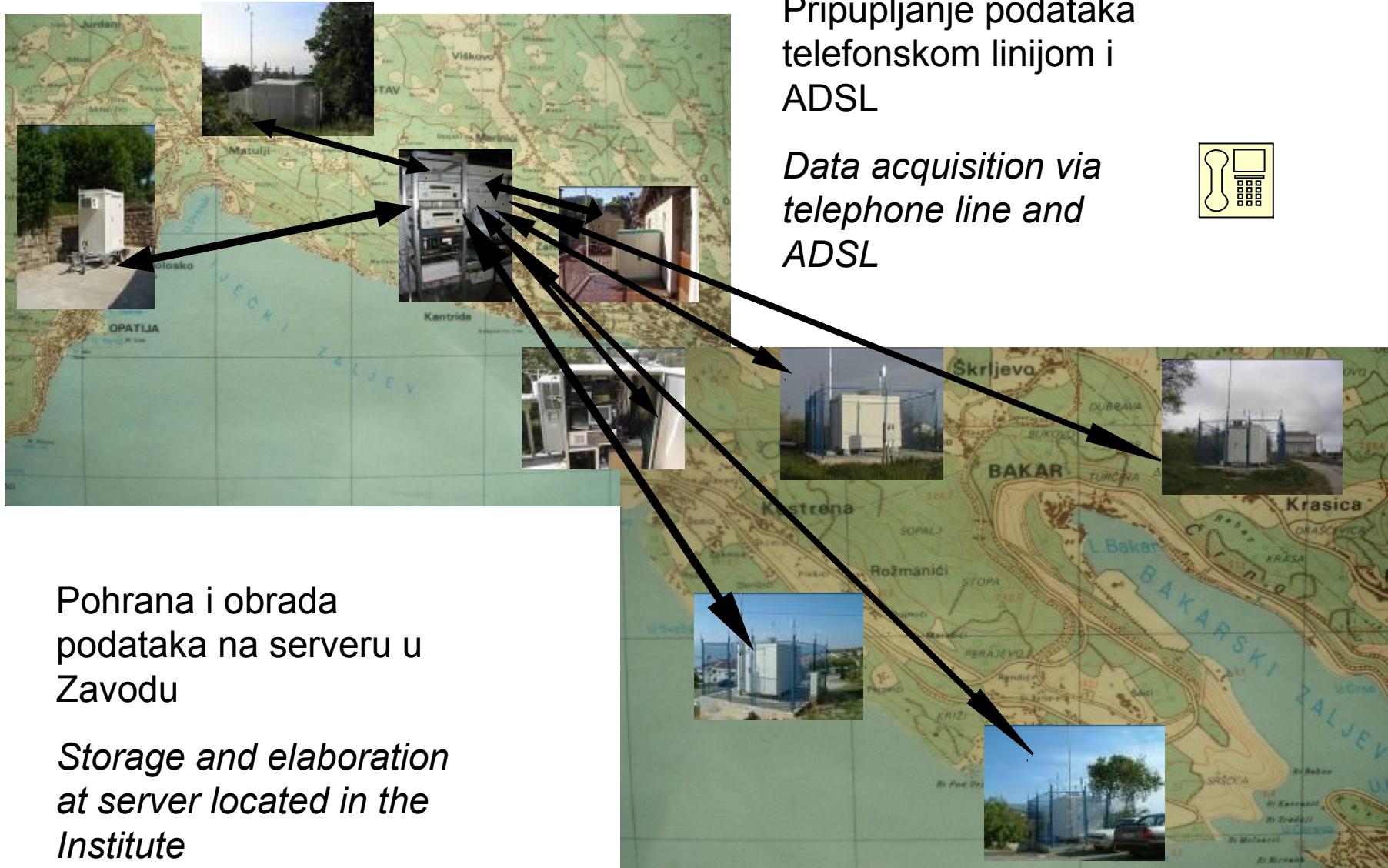
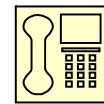


Proširenje mreže 2003:

Extension of the network in 2003

Pripupljanje podataka telefonskom linijom i ADSL

Data acquisition via telephone line and ADSL



Pohrana i obrada podataka na serveru u Zavodu

Storage and elaboration at server located in the Institute

Site Bulider: web : www.zzjzpgz.hr, prvi prikaz u Hrvatskoj / *the very first in Croatia*

Monitoring kakvoće zraka na području Primorsko goranske županije - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address: <http://www.zzjzpgz.hr/zrak/index.php> Go Links

NASTAVNI ZAVOD ZA JAVNO ZDRAVSTVO PRIMORSKO-GORANSKE ŽUPANIJE RIJEKA

Monitoring kakvoće zraka

Mjerenja polutanata Meteorološki podaci Granice i preporučene vrijednosti HOME

POSLEDNJE SATNE VRIJEDNOSTI PO POSTAJAMA

	RIJEKA - KREŠIMIROVA 52 a	SO ₂	NO ₂	O ₃
		2.1	25.2	27.2

	RIJEKA - KREŠIMIROVA 38	PM 10
		7.1

	OPATIJA - GOROVO	O ₃

	KOSTRENA - MARTINŠĆICA	TSP
		22.5

	KOSTRENA - VRH MARTINŠĆICE	SO ₂	NO ₂	O ₃	TSP
		1.7	3.3	71.6	27.0

	KOSTRENA - URINJ	SO ₂	NO ₂	O ₃	TSP
		1.3	6.1	64.6	19.0

	PAVEKI	SO ₂	NO ₂	O ₃	TSP
		9.4	1.0	98.5	8.0

POSLEDNJE UCITAVANJE VRIJEDNOSTI

datum : 08.06.2005. sat : 09:00

GRANIČNE VRIJEDNOSTI (GV) I PREPORUČENE VRIJEDNOSTI (PV)

SO ₂	NO ₂	O ₃	H ₂ S	TSP	PM 10
350	200	180	10	300	200

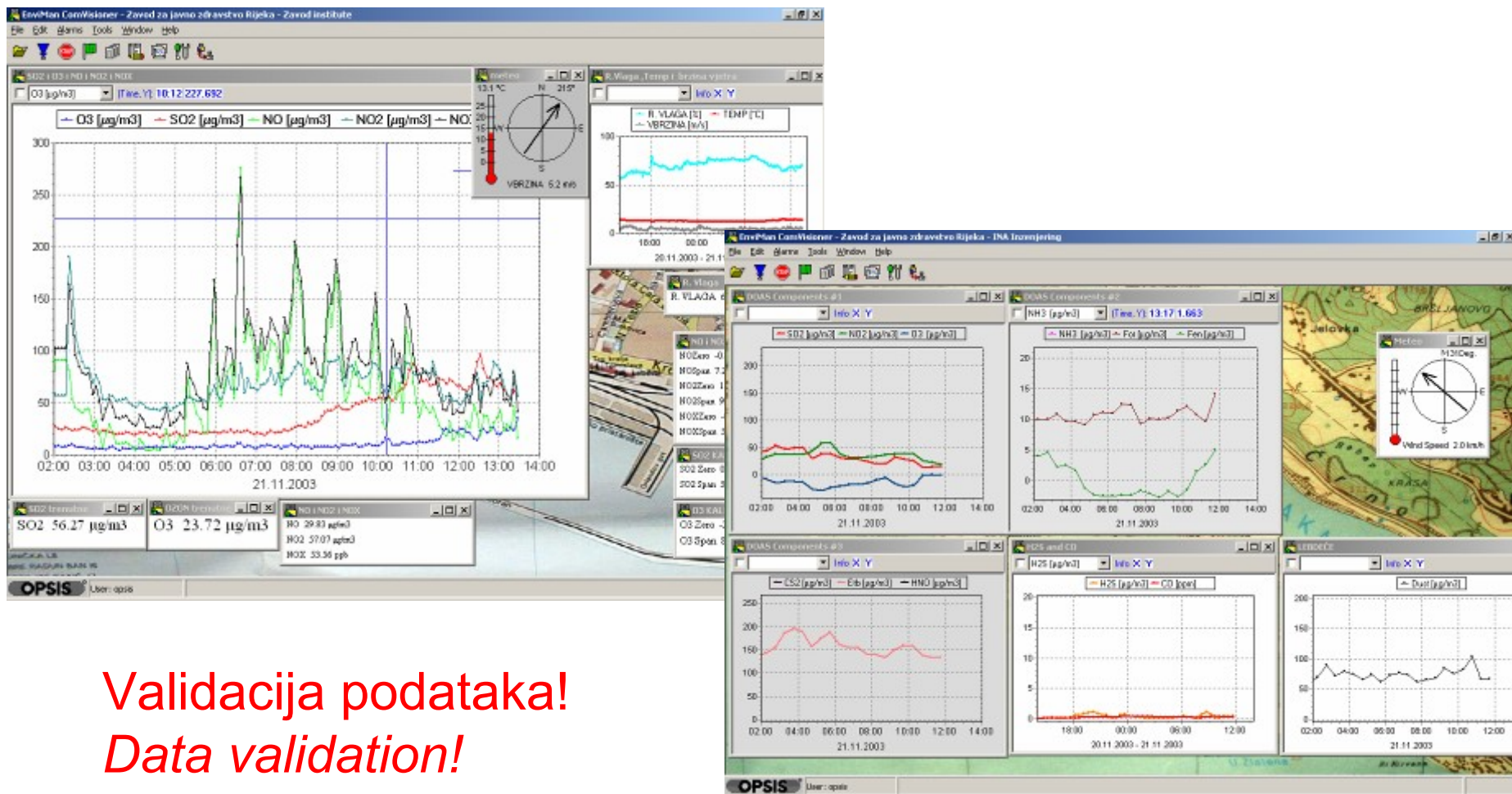
■ ISPOD GV I PV ■ IZNAD GV I PV ■ NEMA PODATKA

MAPA MJERNIH POSTAJA

Com Visioner:

- prikaz sirovih podataka

-Display of raw data

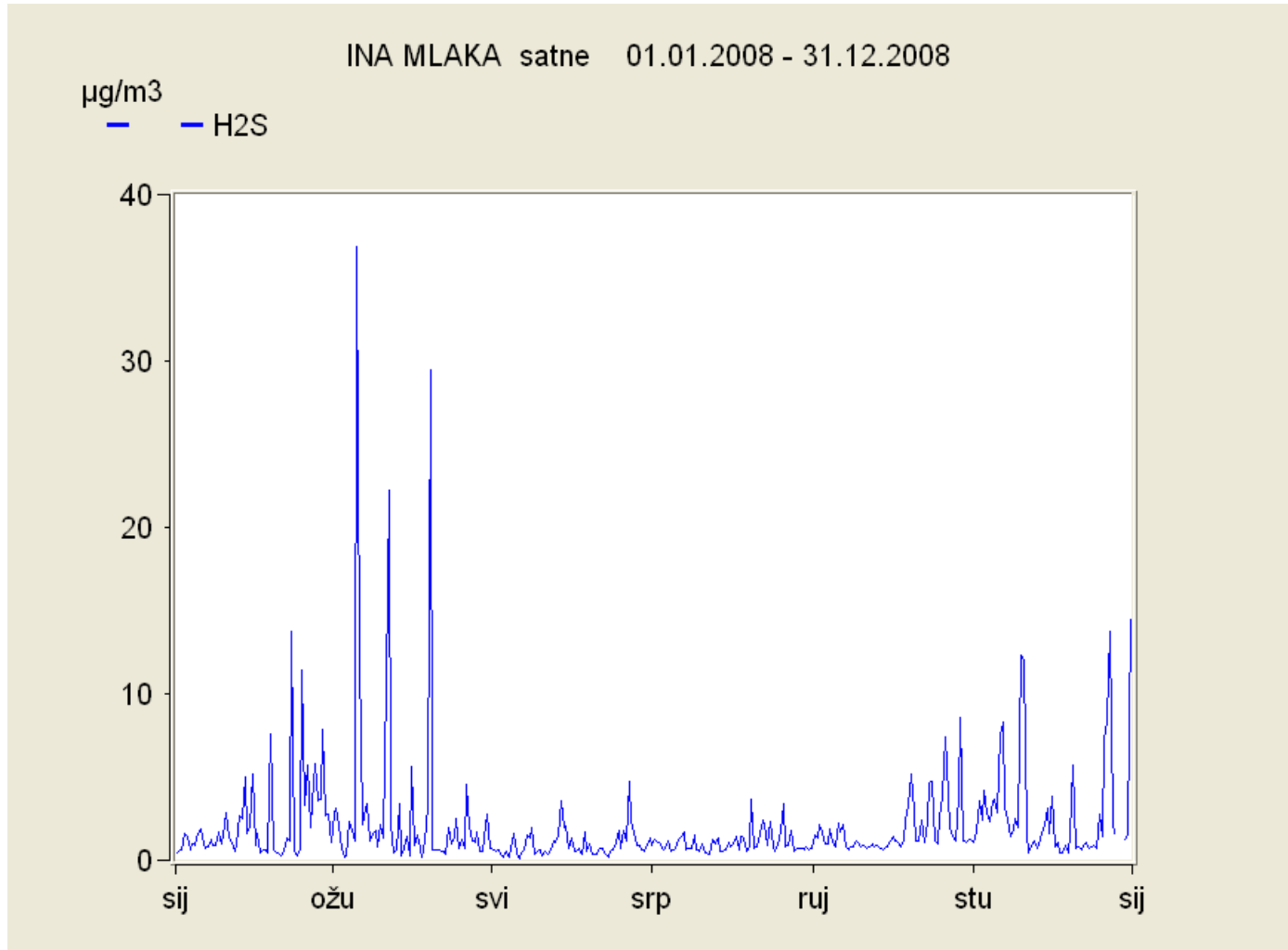


Validacija podataka!
Data validation!

Reporter:

- obrada podataka

- *data elaboration*

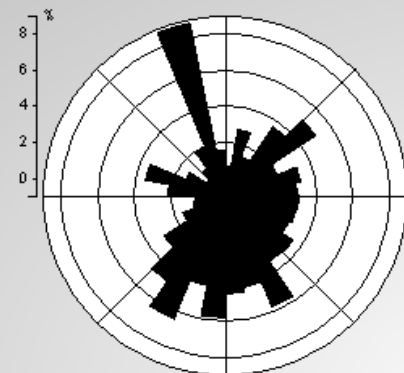


Koncentracijske ruže – identifikacija izvora

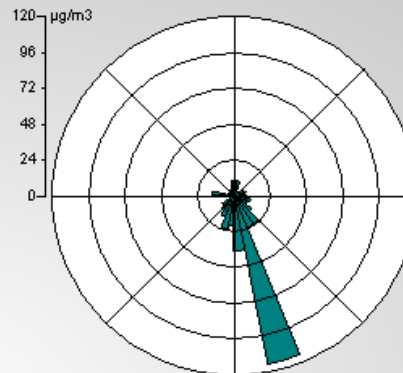
Concentration roses – source identification

Mjerna postaja: Mlaka 01.01.2008 - 31.03.2008

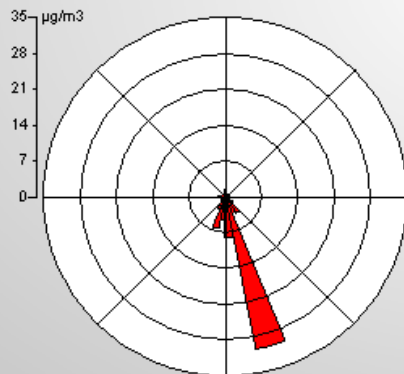
■ Freq. of smjer vjetra



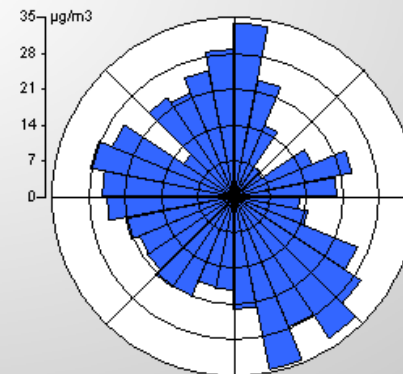
■ Mean of SO₂



■ Mean of H₂S

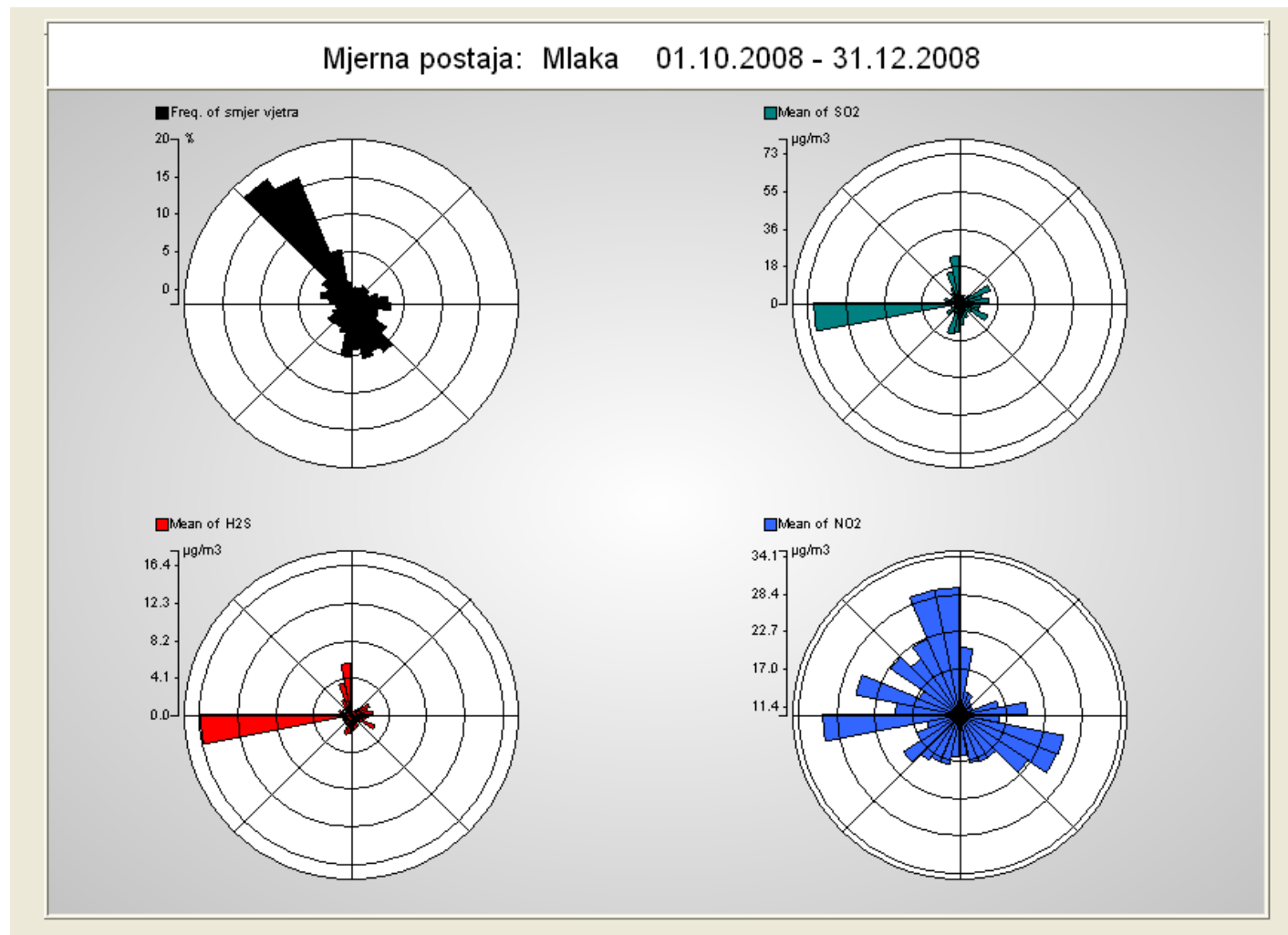


■ Mean of NO₂



Identifikacija izvora:
različit od prijašnjeg!

Source identification:
different from the previous!



Je li to dovoljno?

- Možemo identificirati glavni smjer donosa-izvor
- Imamo trenutne vrijednosti za poduzimanje mjera

ali...

- Postoje situacije koje ova oprema ne može riješiti

Is that enough?

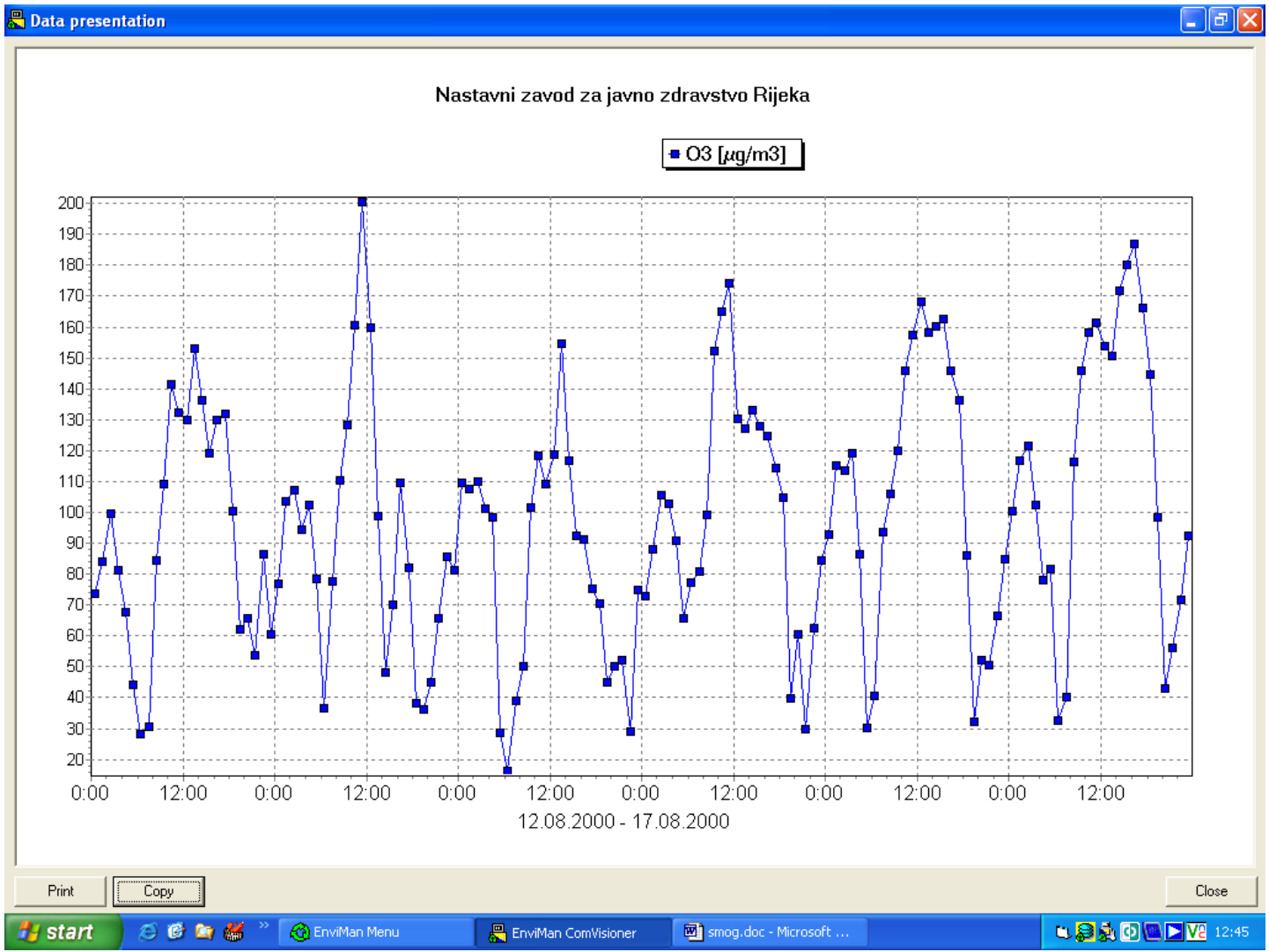
- *Pollution source can be identified*
- *Real time concentrations are available to enforce pollution abbatment*

but..

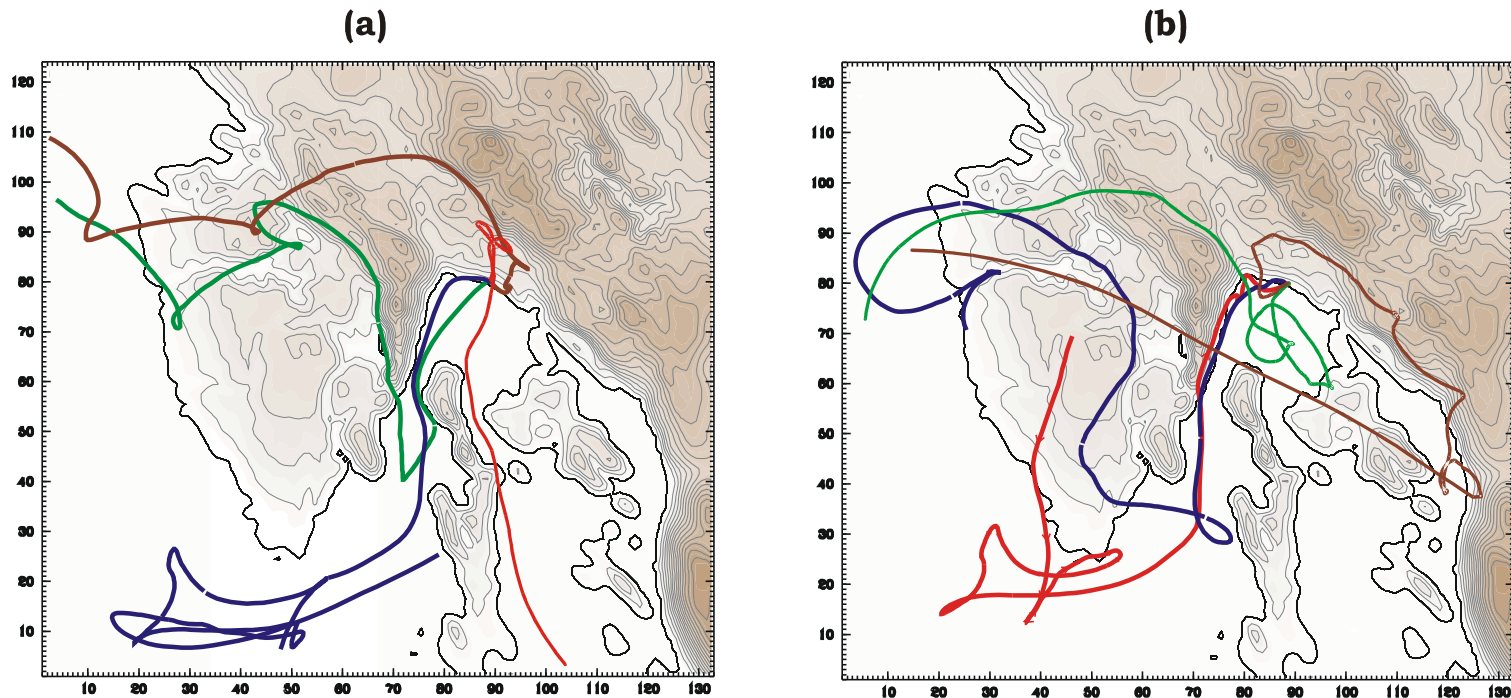
- *There are conditions that cannot be solved with this equipment.*

Tu dolazi meteorologija! *Here the meteorology comes!*

1. Povišene konc. O₃ 1. *Elevated O₃ conc.*



2. Daljinski transport utječe i na lokalno onečišćenje. *Long range transport affect the local pollution.*



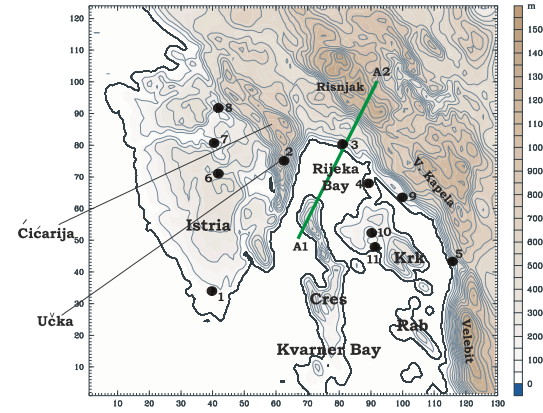
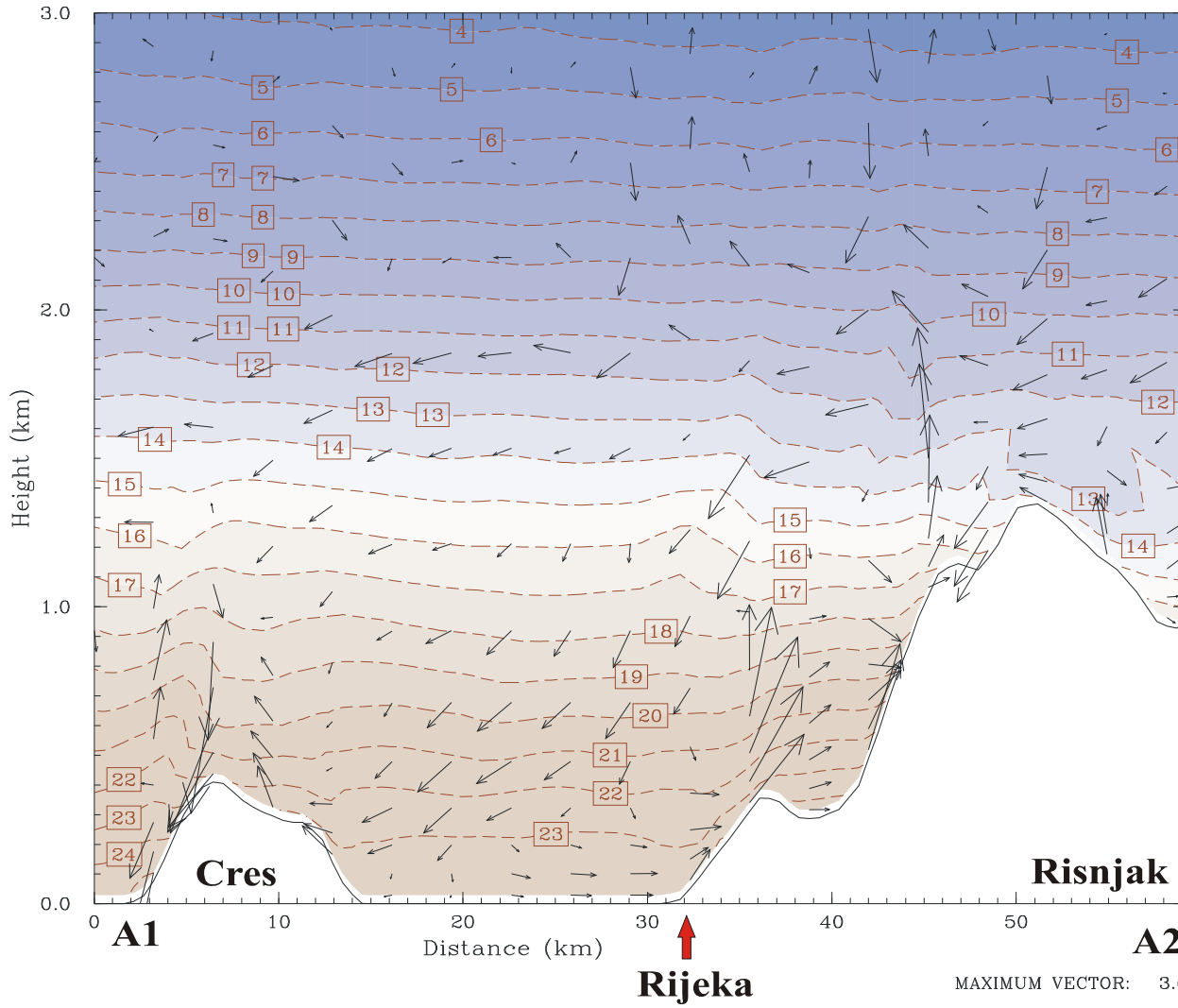
2-day backward 1000 hPa trajectories arriving at Rijeka every six hours (02 LST (red), 08 LST (brown), 14 LST (green) and 20 LST (blue) starting from (a) 18 August 2000 and continue on (b) 19 August 2000.

3. Bolje poznavanje lokalne meteorologije (PGS) *Better knowledge of local meteorology (PBL)*





Weather research and forecasting (WRF) model

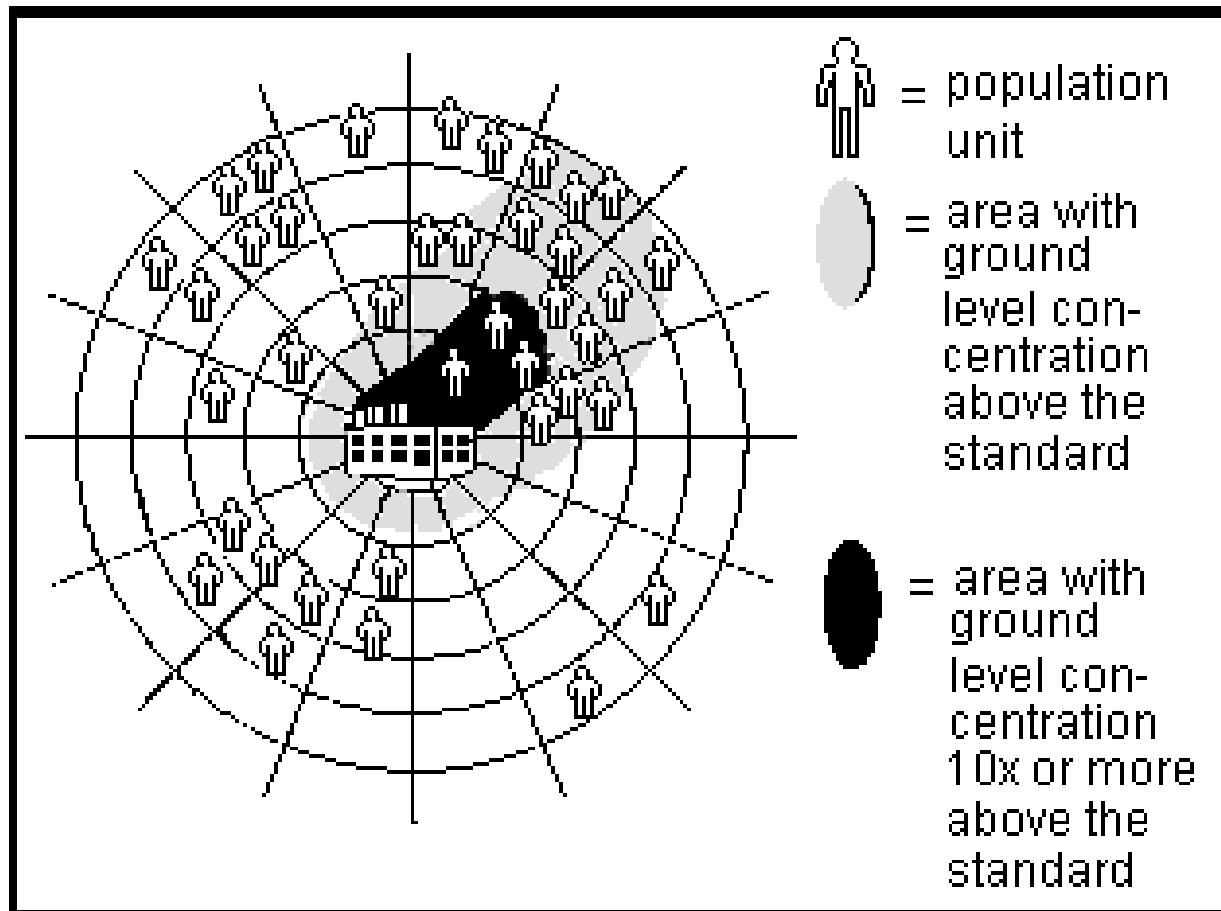


28.-30.06.2004.

By courtesy of
 Dr. Maja
 Telišman
 Prtenjak

3. Procjenu širenja polutanata u slučaju icidenata

Evaluation of pollution spreading in the case of accidents



http://www.epa.gov/ttn/atw/3_90_023.html

