



e-Planning Core

- Capacity Building with
- Participatory Science and ICT

2011

Pedro Ferraz de Abreu

ISCSP-UTL



CITIDEP - Research Center on Information Technology and Participatory Democracy

**ENVIRONMENT - HEALTH - CITIZENSHIP
EDUCATION FOR SUSTAINABLE DEVELOPMENT**



EuroLifeNet

Pedro Ferraz de Abreu

MIT, CITIDEP

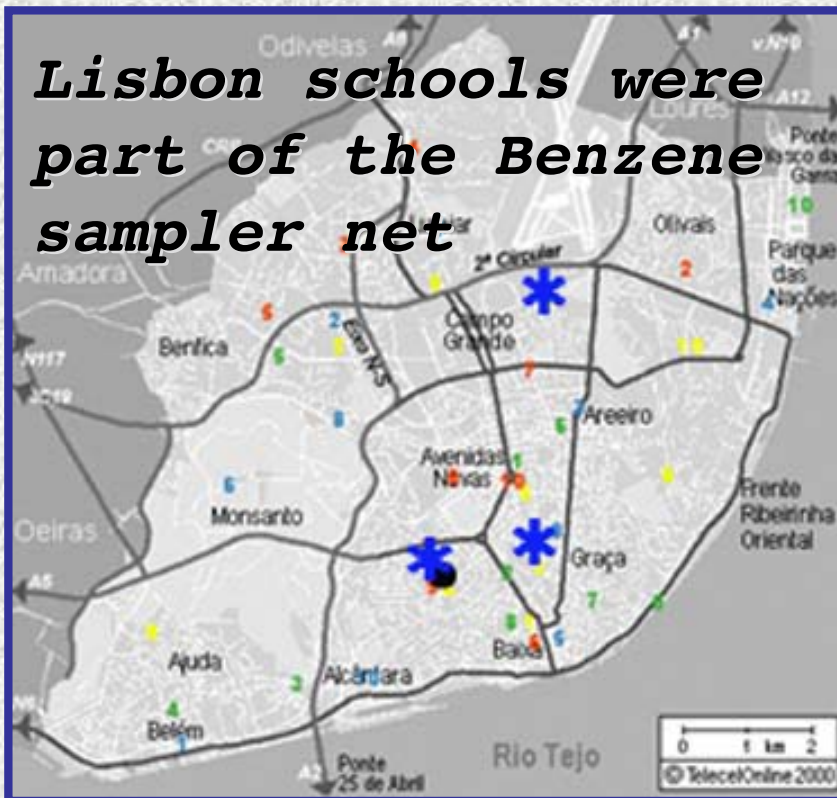
IES - Institute for Environment and Sustainability / JRC - Joint Research Centre - UE

www.citidep.pt • www.eurolifenet.eu • www.citidep.net



CITIDEP promotes networks with scientists, teachers and students

Lisbon schools were part of the Benzene sampler net



- Edinburgh (UK)
- Manchester (UK)
- Nantes (Fr)
- Viana do Castelo (Pt)
- Lisboa (Pt)
- Açores Islands (Pt)



Using Internet (web broadcast) and videoconference to allow access of remote areas and student communities abroad



Highschool students work with Elementary school students 2003 PEOPLE - CITIDEP



Students in Lisbon say goodbye
to students in Viana do Castelo

Activity: “ The air exists,
although we can't see it”

PEOPLE Videoconference
and Internet broadcasting II
with chat for students
from the 2nd and 3rd grade





EURO-LIFE-NET:

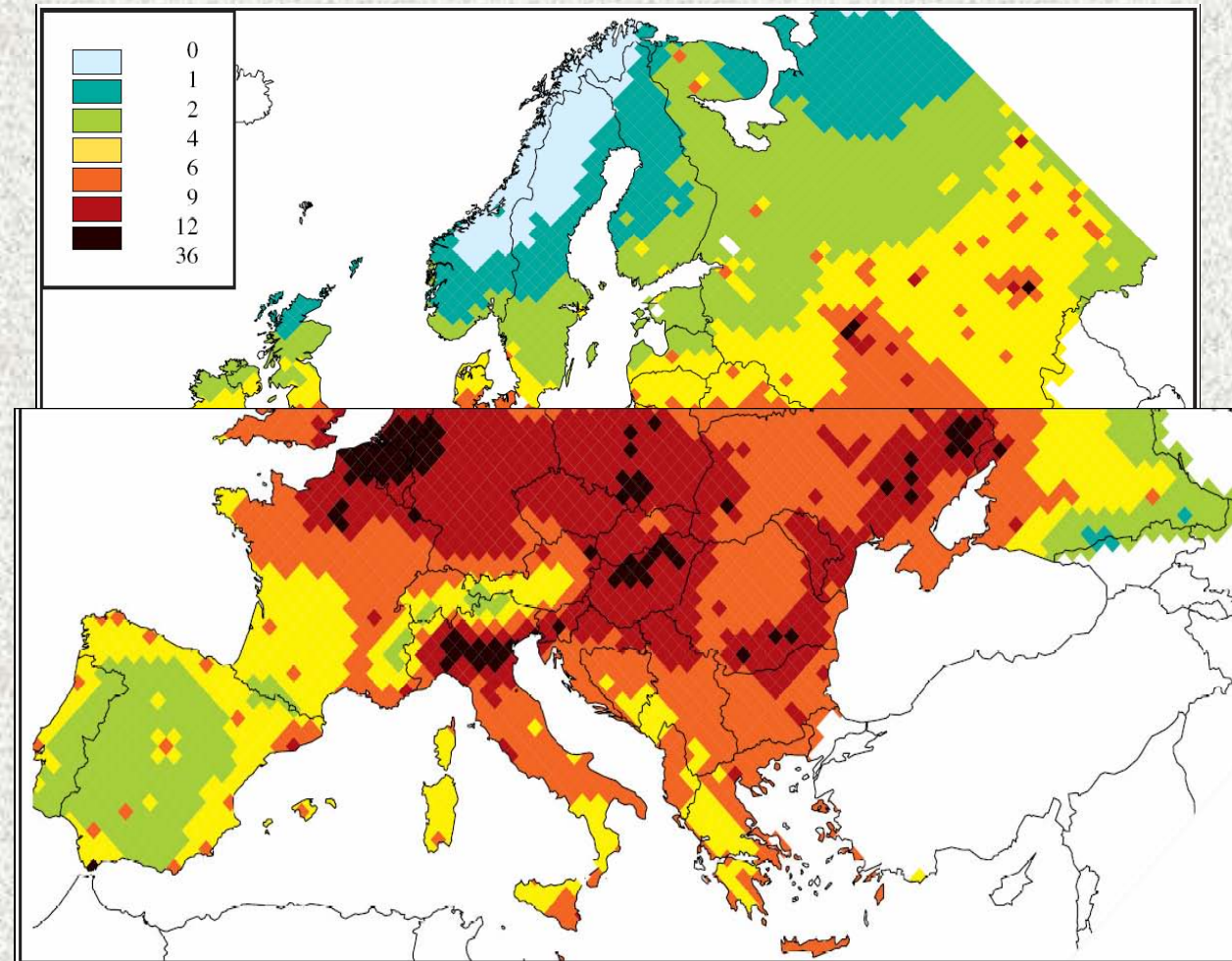
Participatory Science:

Citizens role enabling local indicators for local planning

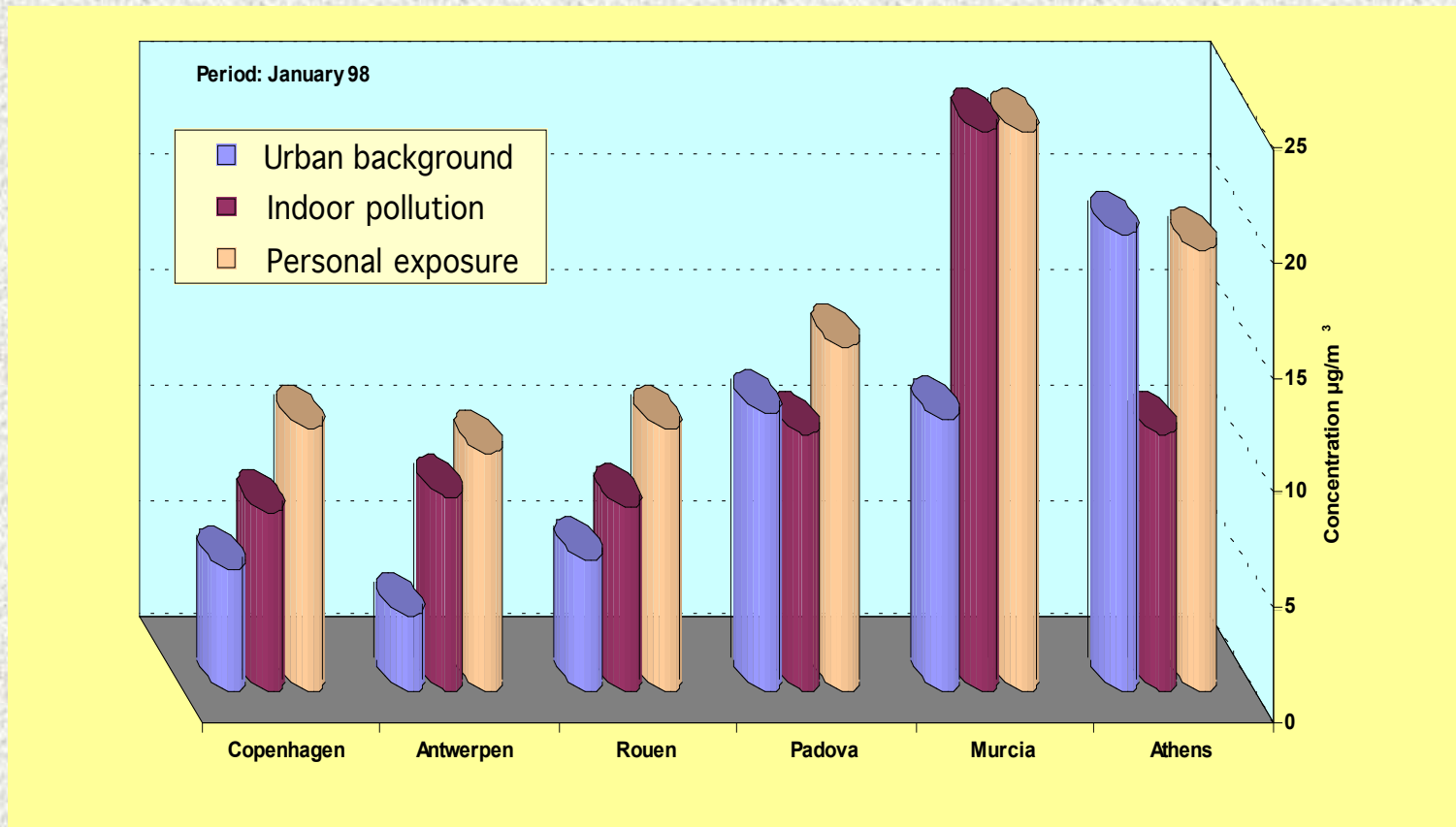
Loss in life expectancy attributable to exposure to fine particulate matter - 2000

Loss in statistical life expectancy (months) that can be attributed to the identified anthropogenic contribution to PM_{2.5}, for the emissions of the year 2000.

Calculation results for the meteorological conditions of 1997.
Source: IIASA



Key aspects for health impact assessment



Personal exposure: up to 2 times urban background levels

Source: LIFE MACBETH project

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CITIDEP - Research Center on Information Technology and Participatory Democracy

ENVIRONMENT - HEALTH - CITIZENSHIP EDUCATION FOR SUSTAINABLE DEVELOPMENT

Needs:

Personal Exposure Data

Raising Awareness

Promoting Citizenship

Teaching Experimental Sciences

Problems:

Expensive, Resource-hungry

Often Superficial, Non-sustained

Political correct does not work

Requires resources & motivation

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EURO-LIFE-NET:

CITIDEP PROGRAM

In each School in the EuroLifeNet, groups of students lead by a teacher will “adopt” each an “**EuroLifeNet Node**”, and keep a regular record of indicators measured on this Node.

Node ID: School, GPS Long/Lat/Z, type

Nodes may be indoor or outdoor

Bio-Physics measures at the Node

Socio-economic measures in a circle (or grid) centered at the Node

Composite data (tracing data around the node, eg. students carrying sensor 24h measuring personal exposure, with diary)



Program timetable: Set-up (2005-06) ; Pilot Project (2006-07) ; Expansion (2007-2014)



EURO-LIFE-NET:

CITIDEP PROGRAM

All “**EuroLifeNet Nodes**” share their data and integrate it at multiple scales, “feeding” different uses and aggregate records. Procedures can be incorporated in curricula.

Adoption of common data protocols

Data validation procedures with institutions

Sets of tool kits for schools and teachers

Use of integrating tools and architectures*

Events inter-schools and public awareness

Scalable + modular, easy procedure to join



* BOINC - Berkeley Open Infrastructure for Network Computing (boinc.berkeley.edu) / GLOBE (www.globe.gov)

© Pedro Ferraz de Abreu

10



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Pilot Project with focus on Particulate Matter (PM 2.5)
Contribute to EU (APHEIS, JRC/IES) Environment-Health Strategy
In sync with UN *“Education for Sustainable Development” Decade*

Scientific Coordination by IES-JRC

10-20 Schools in EU, distributed East-West, North-South, urban and non-urban

Portable PM samplers + local station (right)

Local partnerships with Schools +
Gov/PAd + Environment/Health Institutions
+ NGOs

Funding application to “LIFE+” and other



Pilot project timetable: Set-up (2005-2006) ; School implementation (2006-2007)



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Pilot Project with focus on Particulate Matter (PM10 / PM 2.5)
Contribute to EU (APHEIS, JRC/IES) Environment-Health Strategy
In sync with UN *“Education for Sustainable Development” Decade*

IES-JRC equips* EuroLifeNet schools and coordinate scientific procedures

Students carry portable PM sampler (right), a portable GPS and make a 12 h diary

One student at a time, with different habits and trajectories, will provide a rich map

Other associated projects may benefit from this pilot EuroLifeNet project, and amplify it



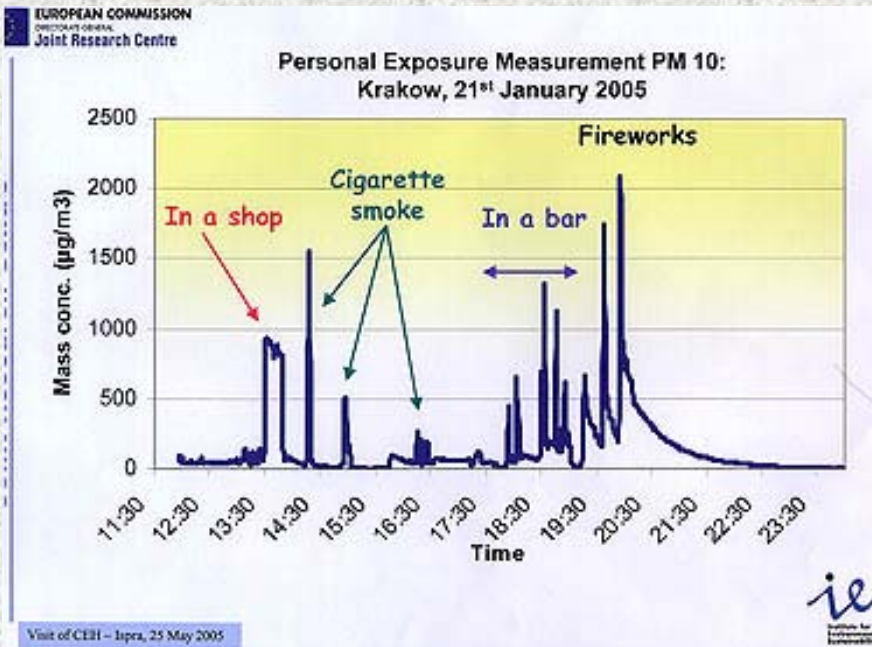
* IES-JRC will lend the PM samplers to designated schools, for the project duration



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

The electronic nature of the portable samplers allows for easy data extraction, network sharing and analysis. Together with a diary and GPS data, this will be a powerful tool both for scientists and teachers.



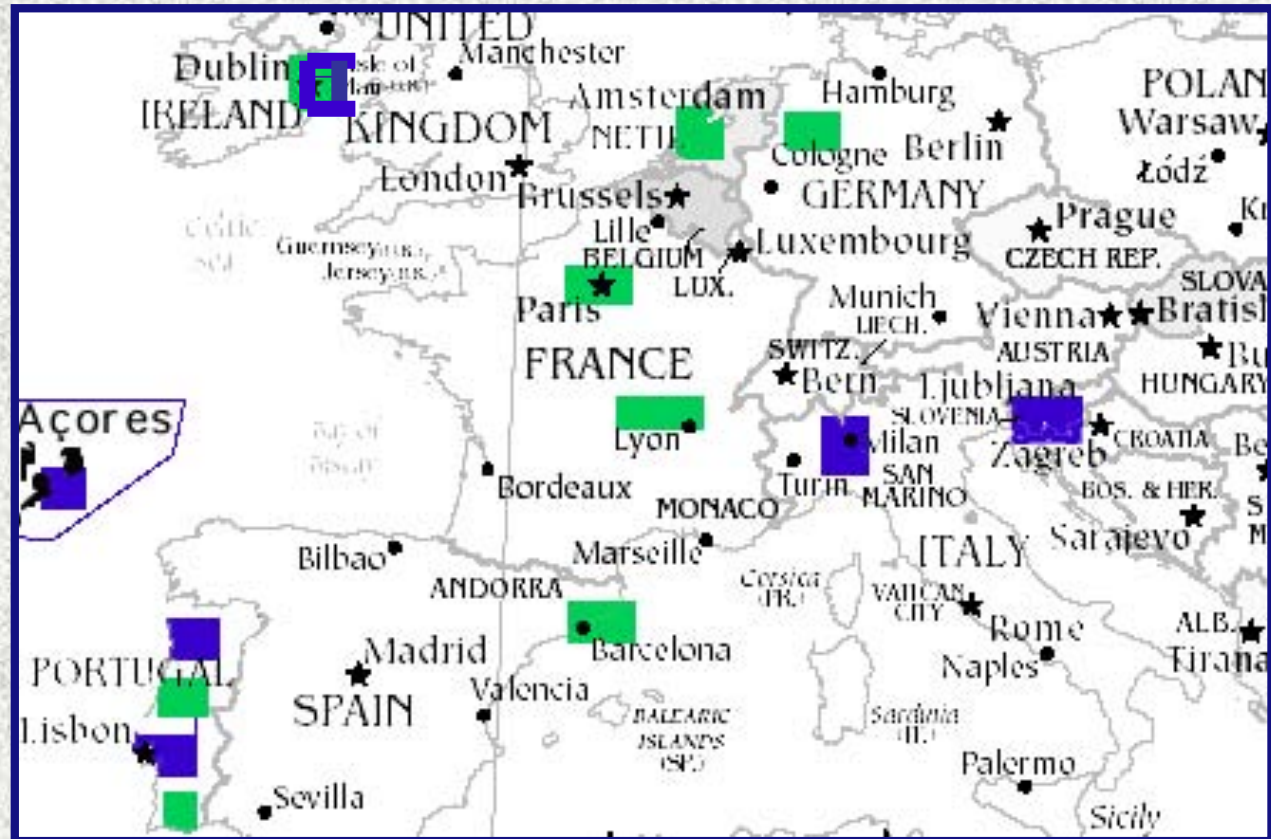


EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Students: 665
 (measuring: 235)
 Teachers: 51
 Researchers: 11
 Experts: 5

HighSchools: 10
 Universities: 4
 Research C.: 5
 NGOs: 3



PROGRAM [2005 - 2014]

PILOT PROJECT [2006 - 2007]

EXPANSION [2008->]



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Experts & scientists

Teachers

Civic action





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Building Partnerships: Experts & scientists Teachers Civic action

JRC - IES

Ministry of Science

Ministry of Environment

Ministry of Education

Schools

Non-Governmental Orgs





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Building Partnerships: Experts & scientists Teachers Civic action

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EURO-LIFE-NET:

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EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

A Joint Agenda:

Experts & scientists

Teachers

Civic action

What to measure

When to measure

How long to measure

How to measure

Network Synchronism

Use of data





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Joint Agenda	Experts & scientists	Teachers	Civic action
What to measure	PM 2.5	No strong preference	PM 10
When to measure	<ul style="list-style-type: none"> • Seasonal • Also weekend/night 	<ul style="list-style-type: none"> • According to curricula • Day only, no w/e 	<ul style="list-style-type: none"> • When pollution is worse
How long to measure	1 month minimum, at least twice a year	1 or 2 weeks, at most twice a year (2/year)	As long as possible
How to measure	Always same person per period / sampler	Many different students per period	As many students as possible, also adults
Network synchronism	Little sync. value; Concentrate all resources one site at a time	High sync. value; All schools in sync, for short periods of time ≤ 2 /year	High sync. value; All in sync, as frequently as possible
Uses of data	<ul style="list-style-type: none"> • Correlate with regular monitoring network data; • Environment/health correlations 	<ul style="list-style-type: none"> • Relate with other course curricula; • Curricula update, exciting participatory science methodology; • Student debate/raising awareness. 	<ul style="list-style-type: none"> • Public raising awareness; • Data as political tool for stronger regulation; • Call for more monitoring and proactive solutions.



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

A Joint Agenda:

Experts & scientists

Teachers

Civic action

What to measure

When to measure

How long to measure

How to measure

Network Synchronism

Use of data





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

TRAINING

Experts

Teachers





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

TRAINING

Experts

Teachers



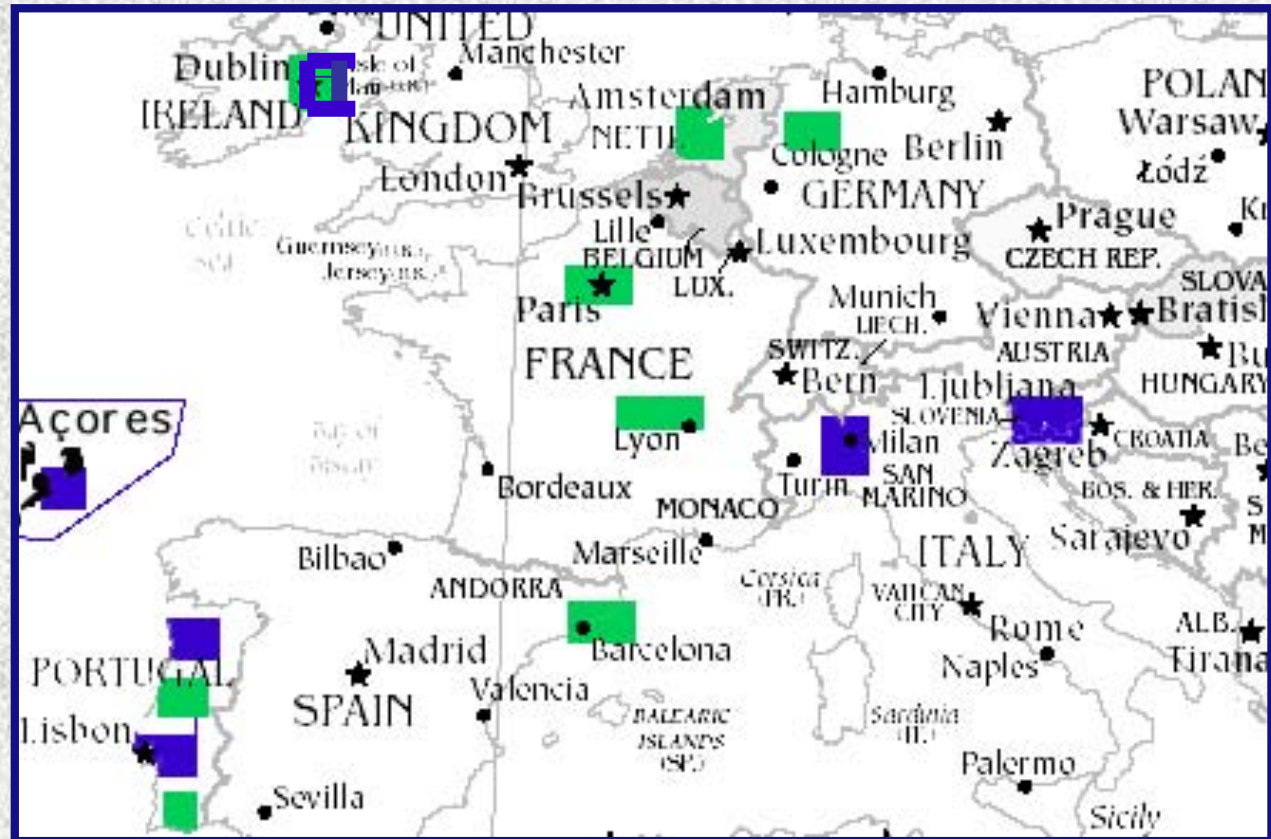


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PROGRAM [2005 - 2014]

PILOT PROJECT [2006 - 2007]

EXPANSION [2008->]



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



LISBOA CLUSTER :

- **CITIDEP Lisboa**
- **Ministry of Environment, Lisbon V.T. Air Quality Division**
- **Universidade Nova Lisboa Dpt Ambiente**
- **Instituto de Ciências Sociais-UL**
- **1 partial post-doc**

- **3 Highschools**
Pedro Nunes, Maria Amalia Anselmo Andrade (Almada)
- **1 Elementary school** (Torel)

Classes: 15 basic + sec. (14-17)

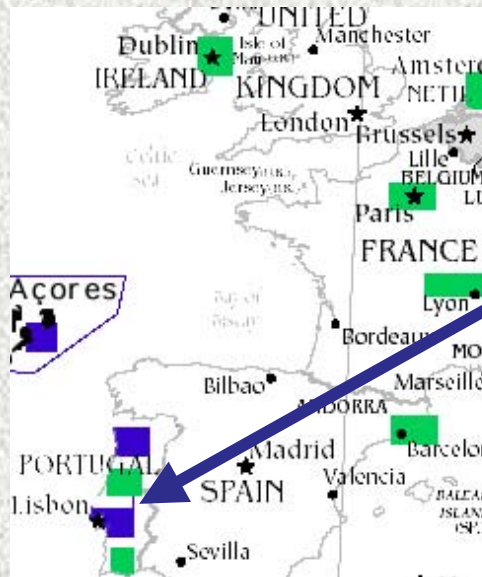
Students: 340 (82 with devices)

Teachers: 18



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



LISBOA CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



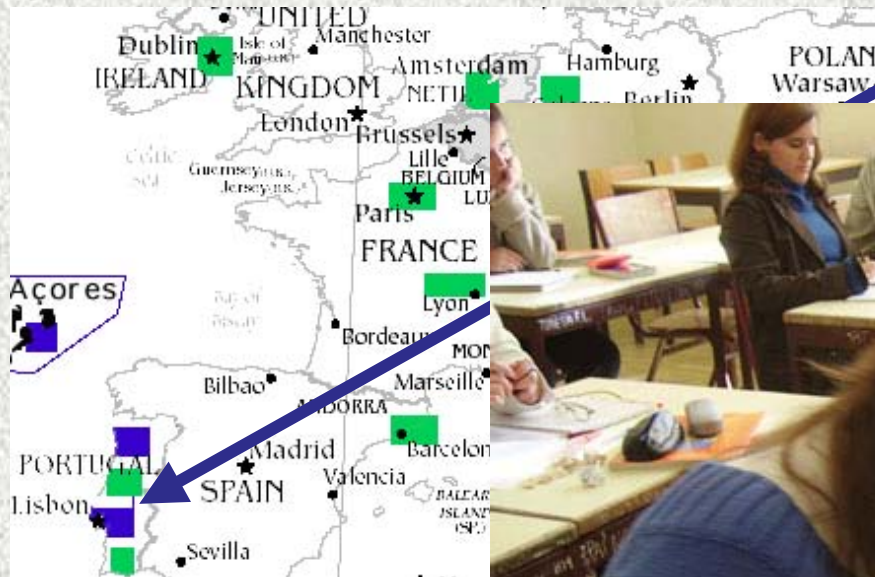
LISBOA CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



LISBOA CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



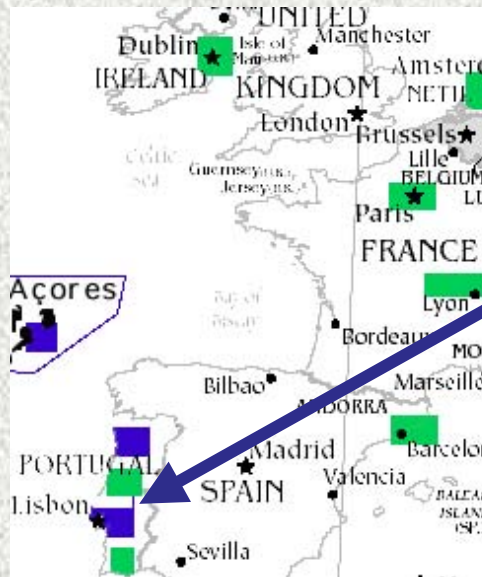
LISBOA CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



LISBOA CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



LISBOA CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



Açores CLUSTER :

- **CITIDEP Açores**
- **1 Highschool**

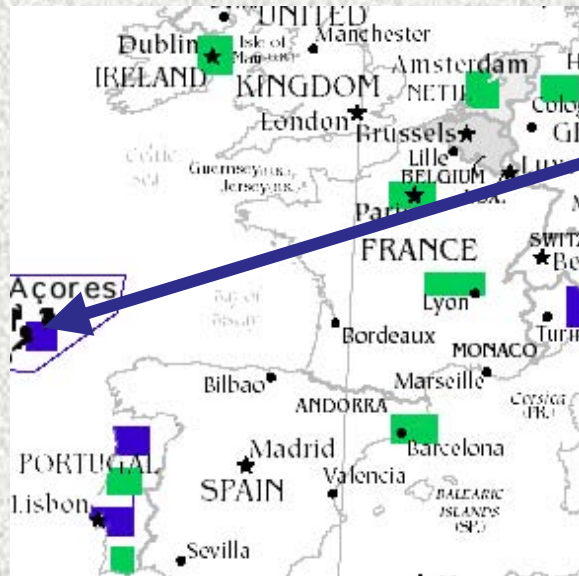
Escola Secundária
Jerónimo de Andrade,
Angra do Heroísmo, Açores

Classes: 4 basic + sec. (12-19)
Students: 80 (24 with devices)
Teachers: 4



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



Açores CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



Açores CLUSTER:





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



VIANA do CASTELO CLUSTER :

- **Escola Superior de Educação-IPVC**
- **Universidade do Minho, Dpt Fisica**
- **1 Master Thesis**
- **CITIDEP Viana do Castelo**
- **2 Highschools**
Ponte de Lima,
Póvoa Varzim

Classes: 2 basic + sec. (14-17)

Students: 45 (39 with devices)

Teachers: 4 + 3 (ESE)



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



VIANA do CASTELO CLUSTER:





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



VIANA do CASTELO CLUSTER :





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



VIANA do CASTELO CLUSTER:





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



MILAN CLUSTER:

- **Mamme Antismog di Milano**
- **Milan Istituto dei Tumori**
- **3 Highschools**
- **CITIDEP Firenze**

Classes: 7 basic + sec. (13-18)

Students: 200 (90 with devices)

Teachers: 12



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



MILAN CLUSTER:

- **Mamme Antismog di Milano**



Classes: 7 basic + sec. (13)
Students: 200 (90 with device)
Teachers: 12



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)



MILAN CLUSTER:

- **Mamme Antismog di Milano**

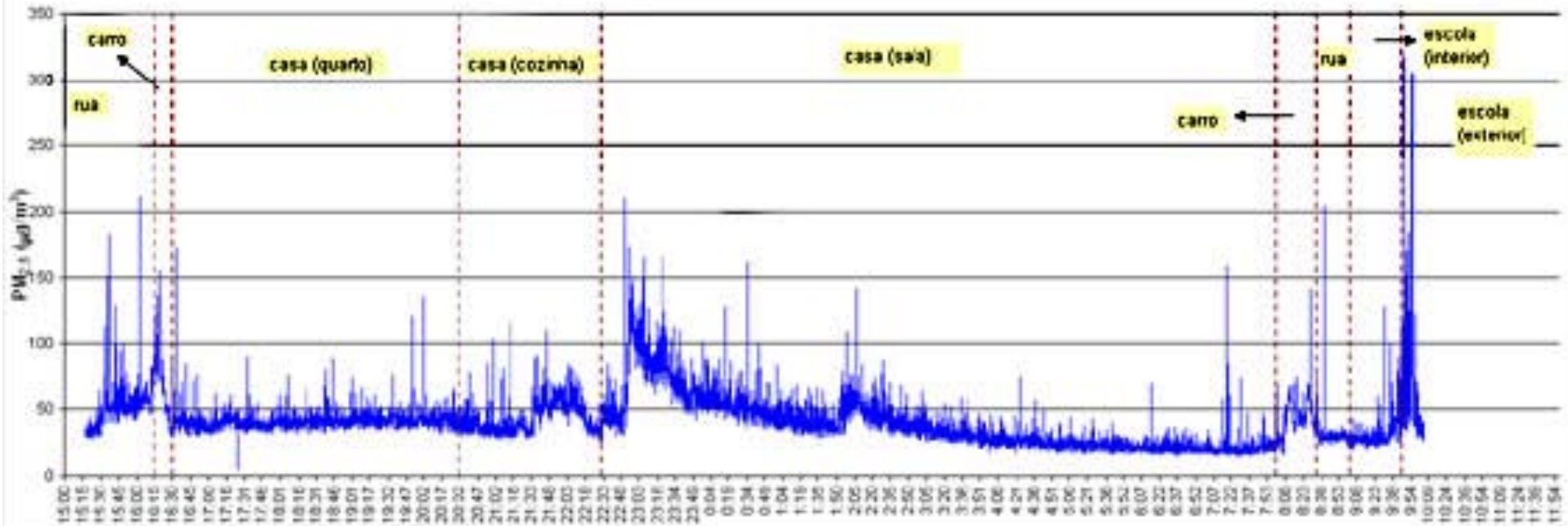


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Example of Student Measure - Lisbon November 2006

- PM 2.5 Graphic (24 h)

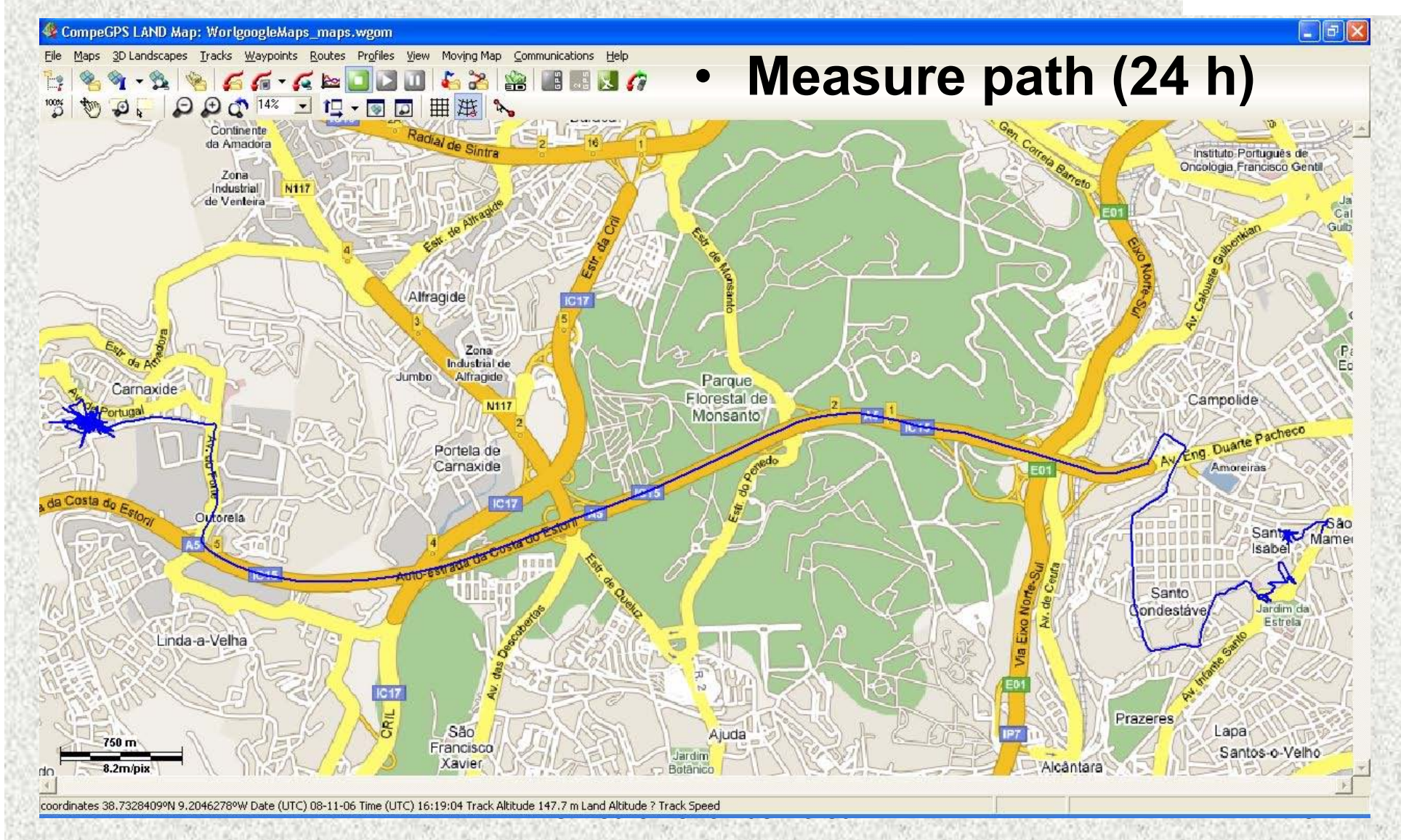




Example of Student Measure - Lisbon November 2006



• Measure path (24 h)



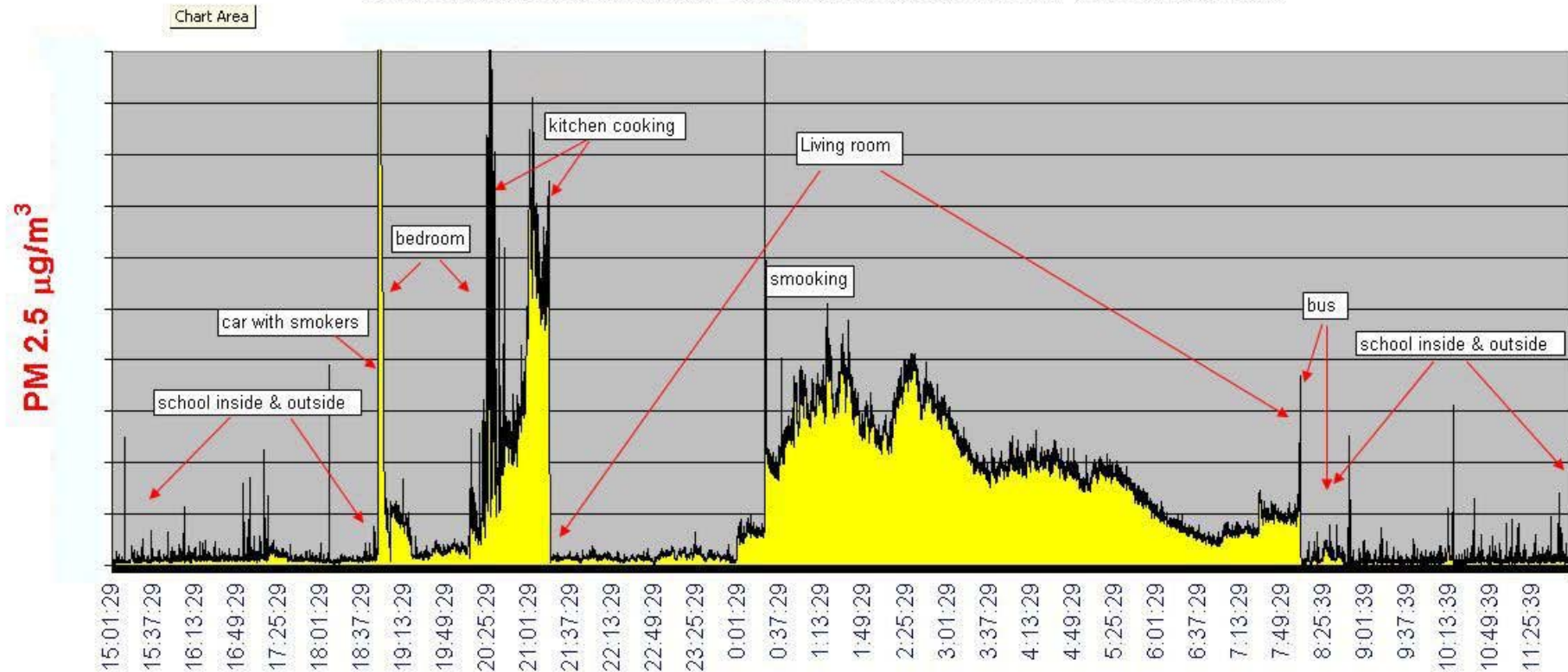


Example of Student Measure - Lisbon November 2006



- PM 2.5 Graphic (24 h)

Anselmo de Andrade School - Measurements from 22 Nov until 23 Nov 2006





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Analysis

Experts

Researchers





EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

Analysis

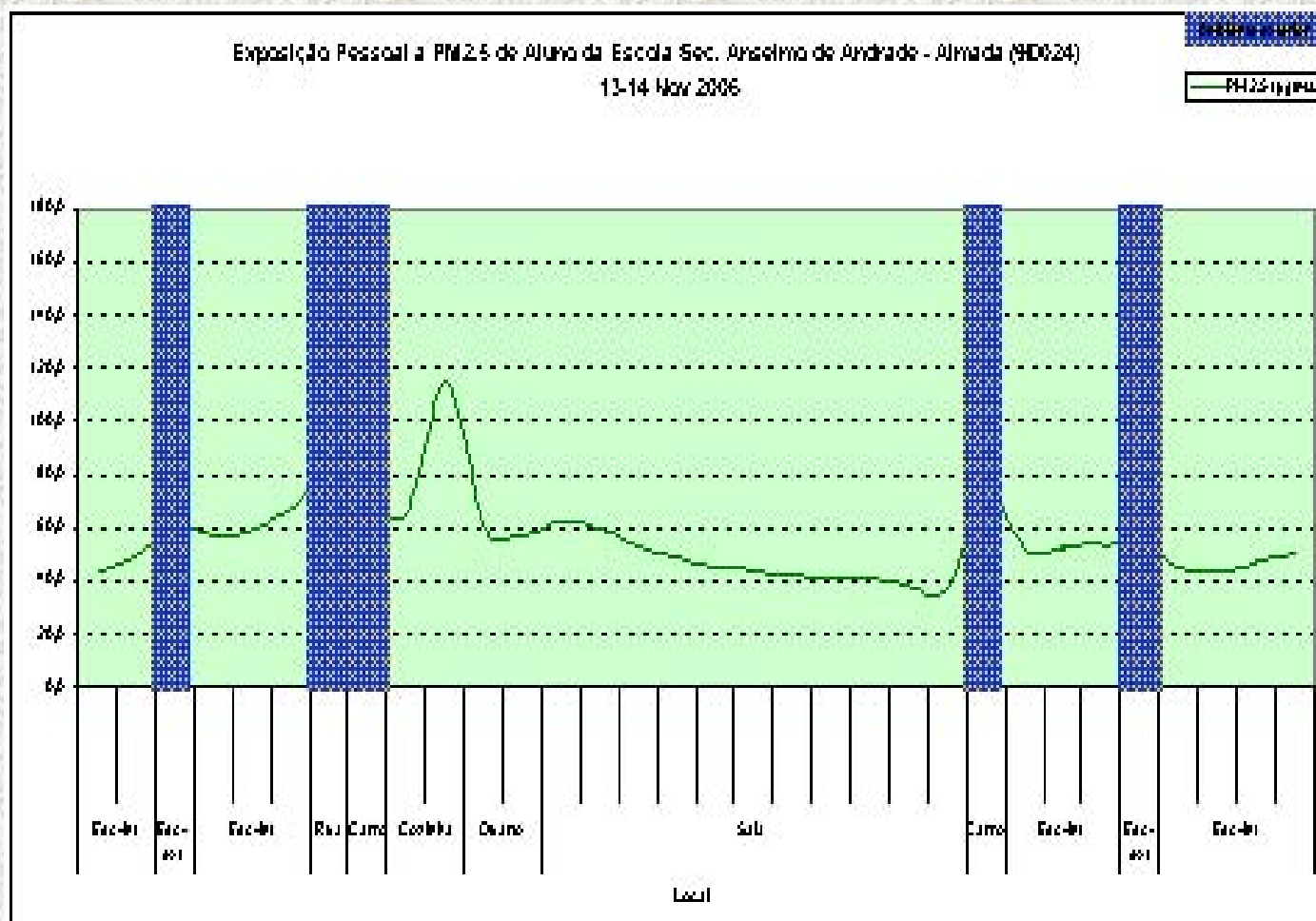
Experts

Researchers





Almada



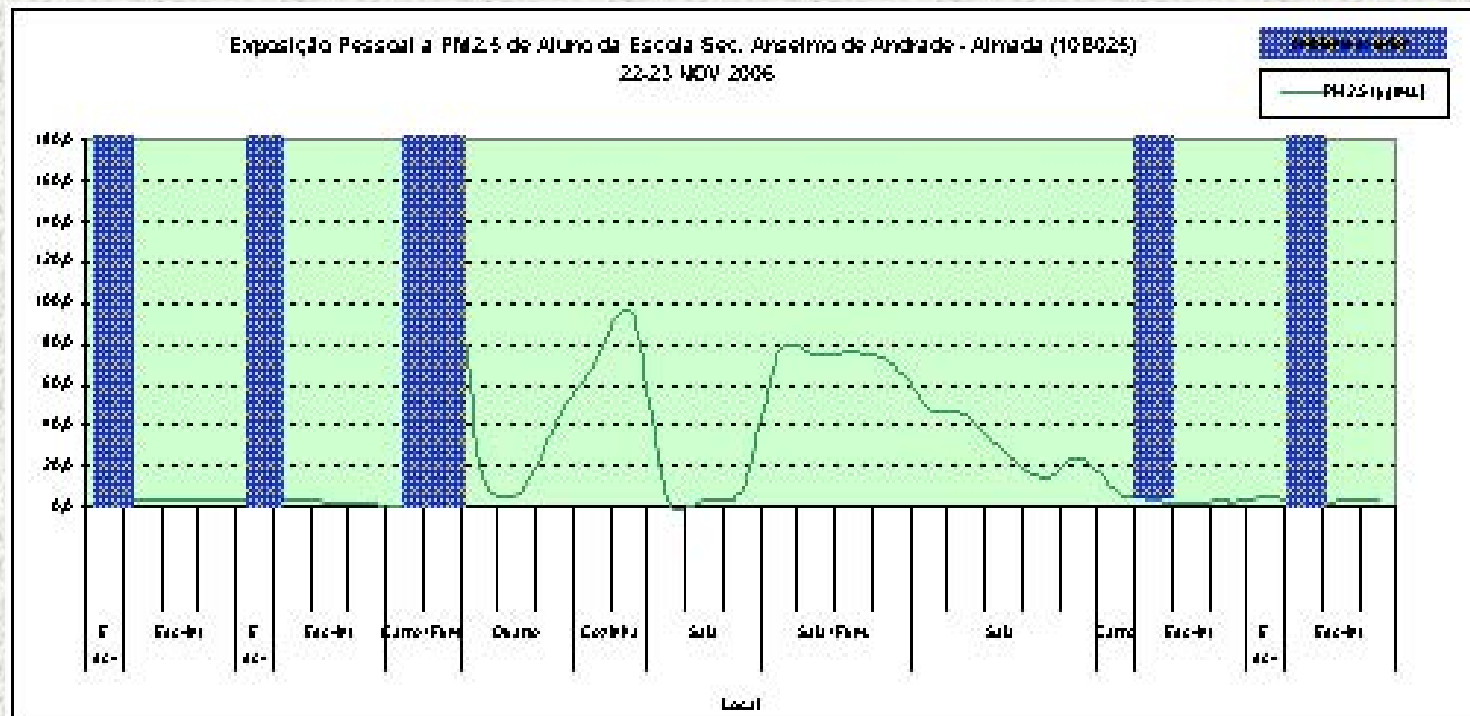
. Aluno não fumador e sem fumadores em casa

. Casa próxima de zona com trânsito

. Modo de transporte: carro



Almada



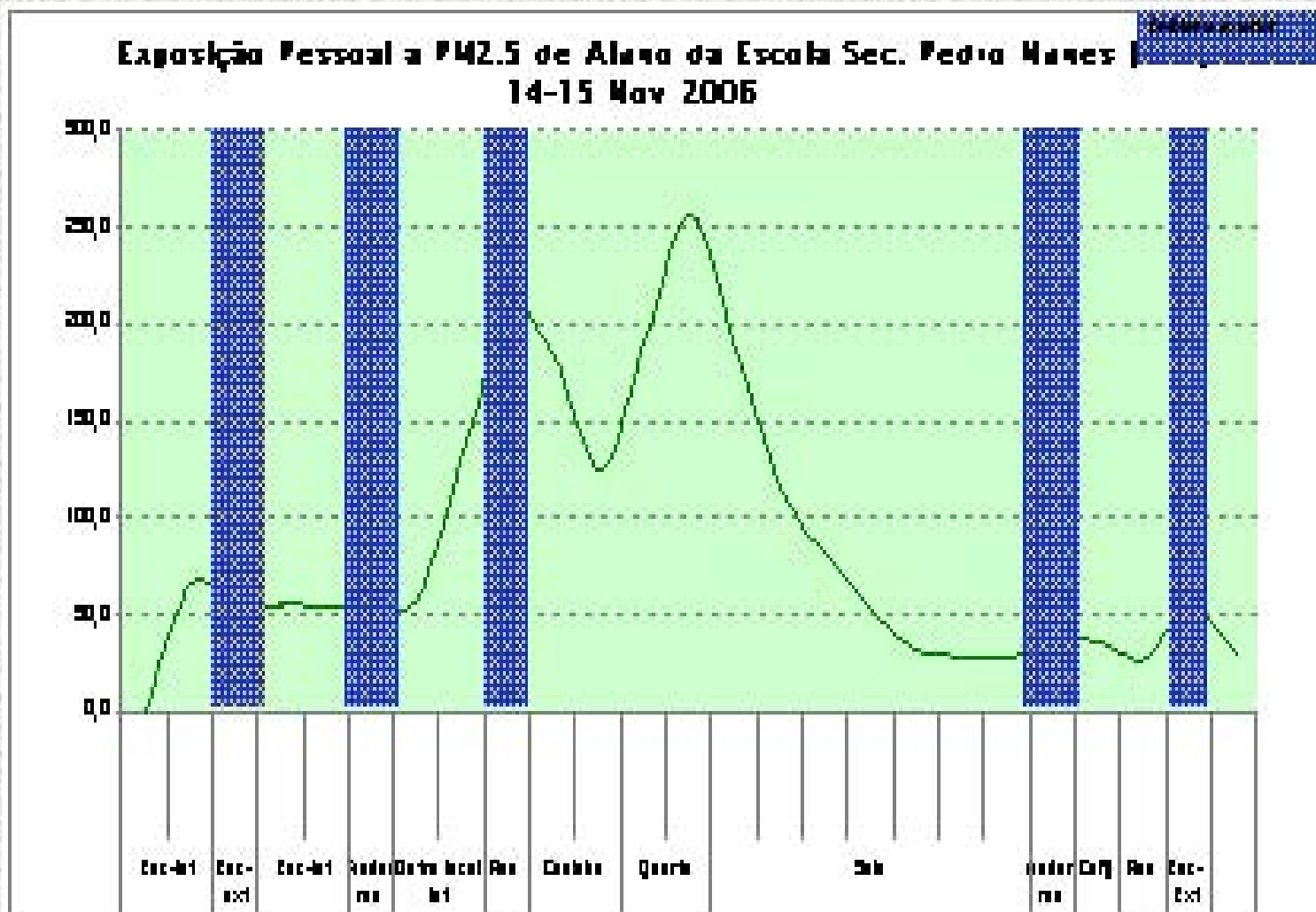
. Aluno com fumadores em casa

. Modo de transporte: carro



Lisboa ES Pedro Nunes

Exposição Pessoal a PM2.5 de Aluno da Escola Sec. Pedro Nunes
14-15 Nov 2006



. Aluno não fumador e sem fumadores em casa

Modo de transporte: a pé



EURO-LIFE-NET:

CITIDEP PROGRAM (with IES-JRC kind support)

II MEETING

1 June 2007





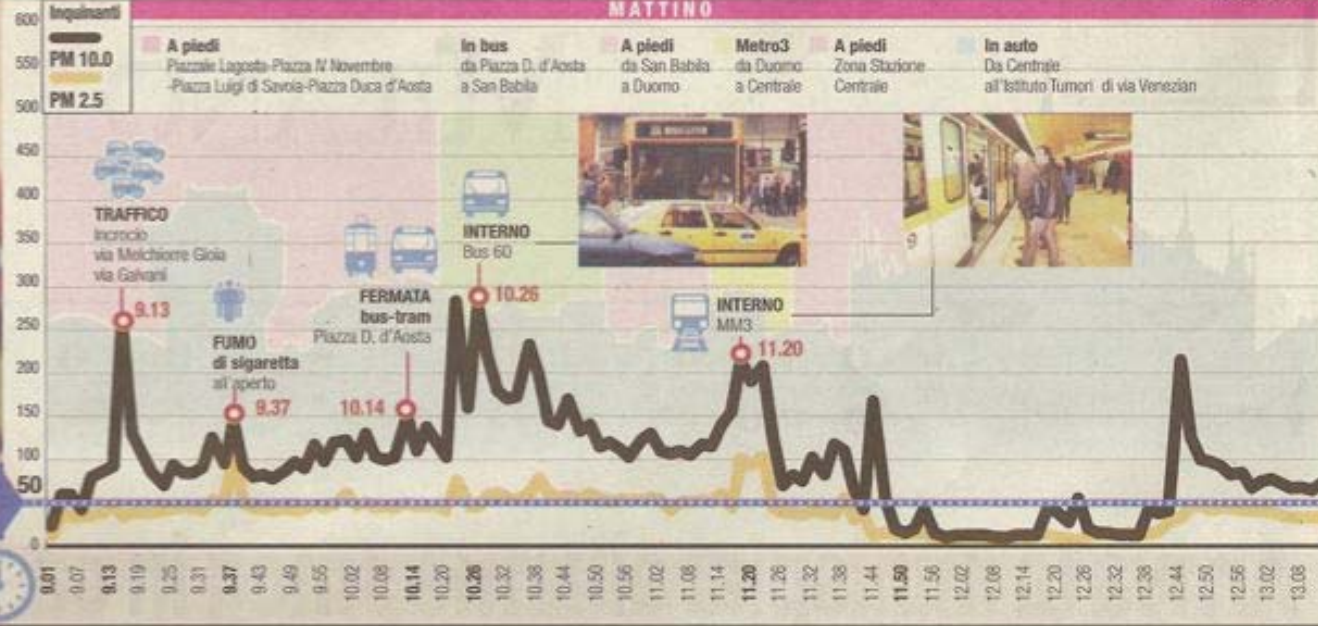
Media

Milano

CORRIERE DELLA SERA ■ LUNEDÌ 25 SETTEMBRE 2006

Snapz P

Viaggio tra i veleni



«Ecco quanto smog si respira a Milano Allarme polveri anche in casa e in metrò»

Per la prima volta misurata l'aria minuto per minuto con una centralina portatile Pm10 oltre i limiti anche al chiuso. In auto il condizionatore acceso riduce i veleni

La legge è categorica e fissa una soglia per l'aria cattiva. Quella che appesantisce i polmoni e tosse alla salute. Passeggiando in città, in

l'aria realmente respirata dai milanesi quando vanno al lavoro, prendono i mezzi pubblici, escono per fare la spesa. Per verificare sul

spese responsabili, secondo l'Asl, di una morte ogni 4-5 giorni solo a Milano) è fissato in 50 microgrammi per metro cubo d'aria. Ve-

di auto, motorini e autobus che si fermano al semaforo e ripartono: il Pm10 schizza sopra i 250 microgrammi per metro cubo, tornando

Alunos Nove escolas portuguesas e uma italiana colaboraram com investigadores para avaliar a qualidade do ar. E ficaram surpreendidos

Os mais novos cientistas do ar

E se o que respiramos está doente?

Textos: **BOA FERRAZ LIMA**
Foto: **ALBERTO PERAZ**

Dentro das salas de aula, os alunos do 1.º ano do ensino primário, em Portugal, estão a fazer um trabalho sobre o ar. Os alunos estão a aprender a ler e a escrever, mas também a aprender a cuidar do ambiente. Os alunos do 1.º ano do ensino primário, em Portugal, estão a fazer um trabalho sobre o ar. Os alunos estão a aprender a ler e a escrever, mas também a aprender a cuidar do ambiente.

OS ALUNOS SABEM DE COR E SALTEADO O QUE SÃO AS PM 2,5, QUE NÃO VÊM NO PROGRAMA

SÃO MICROPARTÍCULAS SUSPENSAS NO AR QUE TODOS RESPIRAMOS E QUE PODEM SER NOCIVAS

Os alunos do 1.º ano do ensino primário, em Portugal, estão a fazer um trabalho sobre o ar. Os alunos estão a aprender a ler e a escrever, mas também a aprender a cuidar do ambiente. Os alunos do 1.º ano do ensino primário, em Portugal, estão a fazer um trabalho sobre o ar. Os alunos estão a aprender a ler e a escrever, mas também a aprender a cuidar do ambiente.



Investigação, na sala de aula do 1.º ano. No topo, em lado da escola

MEÇÃO DE MICROPARTÍCULAS

de uma escola



Com o ar, na escola, a preparar o jantar. No topo, com o ar e o poluente. Tabita Lourenço

ALUNOS

de uma escola



TRÊS PERGUNTAS A

Pedro Ferraz Abreu

Alunos e professores de uma escola de Lisboa, em Portugal, estão a fazer um trabalho sobre o ar. Os alunos estão a aprender a ler e a escrever, mas também a aprender a cuidar do ambiente.

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Sol e vento vão à escola

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Medição realizada no dia 10 de Novembro de 2012





June 12, 2007

Parents and Health Experts Try to Ease Italy's Pollution

By [ELISABETH ROSENTHAL](#)

MILAN — This part of northern [Italy](#) is renowned for fashion, food, Fiat. But now it has another, less welcome claim to fame: the cities here have the worst air pollution in Europe.

By mid-May, Milan had already exceeded [European Union](#) and [World Health Organization](#) limits for particle pollution in the air on 80 days. Last year was bad, too. By the end of March, Milan had 64 such days, Turin had 77, Bologna 51 and Venice 49.

Particulate pollution is tied to heart disease and respiratory ailments like asthma, and poor lung development in children.





JRC NEWS:

“Pedro Ferraz de Abreu, President of the Joint Research Center of the European Commission ...”

NewsBrief
http://emm.newsbrief.eu/NewsBrief/g - Google

Explore our projects: EMM NewsExplorer | MedISys | EMM Labs
Joint Research Centre
Updated every 10 minutes, 24 hours per day.

a qualidade do ar a que estão expostos e concluíram que ambientes interiores são mais perigosos para a saúde do que exteriores, mesmo tendo em conta a poluição dos automóveis.

Esta foi uma das conclusões do programa, inédito a nível europeu, "EuroLifenet - Ambiente/Saúde/Cidadania: Educação para o desenvolvimento sustentável", que foram hoje apresentadas.

Mais de 600 alunos de escolas do ensino básico e secundário de Portugal e Itália levaram a cabo o primeiro estudo em larga escala sobre a exposição pessoal ao poluente atmosférico PM2.5 (as partículas mais pequenas suspensas no ar), um dos que maior impacto tem na saúde humana, nomeadamente na sua relação com as doenças respiratórias.

Pedro Ferraz de Abreu, presidente do Centro Comum de Investigação da Comissão Europeia (CITIDEP), um dos envolvidos no projecto, destacou o facto de esta ser a primeira vez que se faz um estudo de exposição pessoal, o que permite aferir a qualidade do ar dos meios em que as



Media

Googling EuroLifeNet...

[I milanesi diventano «misuratori» di smog](#) - [[Translate this page](#)]

Lo dimostrano i risultati del progetto **EuroLifeNet**, ... STUDENTI ALL'OPERA - La storia di **EuroLifeNet** a Milano prende le mosse nell'autunno 2006: novanta ... fc.retecivica.milano.it/.../Rete%20Cittadini%20Milano/bastasmogmilano/S0789A4DE-0789A54D?WasRead=1 - 22k - [Cached](#) - [Similar pages](#)

[Sem Pénis, Nem Inveja: FUMADORES VERSUS GRELHADOS](#) - [[Translate this page](#)]

Em Portugal foi o CITIDEP - Centro de Investigação de Tecnologias de Informação para uma Democracia Participativa – que promoveu o **EuroLifeNet**. ... sempenisneminveja.weblog.com.pt/arquivo/2007/06/fumadores_versu.html - 13k - [Cached](#) - [Similar pages](#)

[EXPRESSO - Os mais novos cientistas do ar](#) - [[Translate this page](#)]

Chama-se **EuroLifeNet** e pretende contribuir para o estudo do grau de ... Director do programa **EuroLifeNet** e investigador do Massachusetts Institut of ... semanal.expresso.clix.pt/1caderno/pais.asp?edition=1791&articleid=ES247621&action=print - 28k - [Supplemental Result](#) - [Cached](#) - [Similar pages](#)

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Formal Institutional Support:

- Secretary of State for Education, Portugal
- Secretary of State for Environment, Portugal
- IES-Joint Research Centre, European Commission

Funding:

- Ciência Viva – Ministry of Science, Technology and Higher Education - **funding POCI**

www.citidep.pt • www.eurolifenet.eu • www.citidep.net



HighSchools Participating: (Portugal)

- Escola Secundária de **Ponte de Lima**
- Escola Secundária de Rocha Peixoto, **Póvoa do Varzim**
- Escola Secundária Maria Amália Vaz de Carvalho, **Lisboa**
- Escola Secundária Pedro Nunes, **Lisboa**
- Escola Secundária Anselmo de Andrade, **Almada**
- Escola Secundária Jerónimo de Andrade, **Angra do Heroísmo, Açores**



EuroLifeNet / CiênciaViva

Partners:



www.eurolifenet.eu



EURO-LIFE-NET:

Participatory Science:

Citizens role enabling local indicators for local planning

NEXT STEPS:



Portable Sensor units for citizens

Satellite navigation

Mobile phone

Gas sensors



Simple operation!

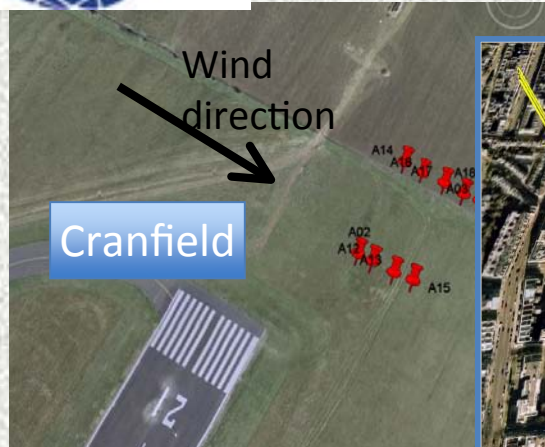


400 gm (incl. batteries)

Rod Jones, Cambridge U. , UK



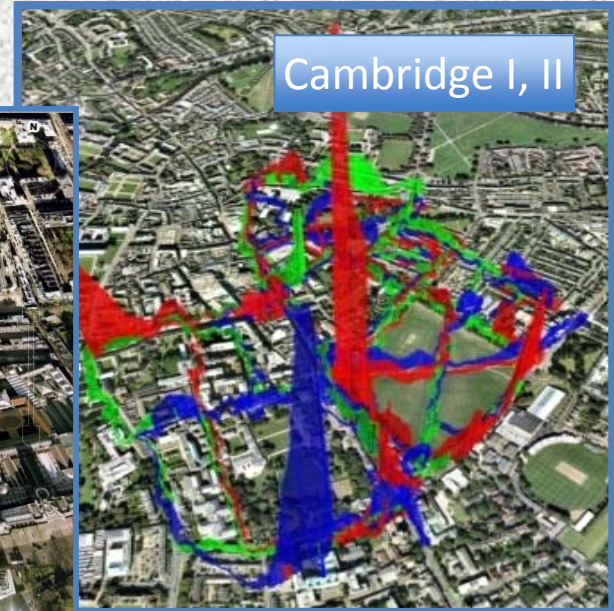
Deployments to date:



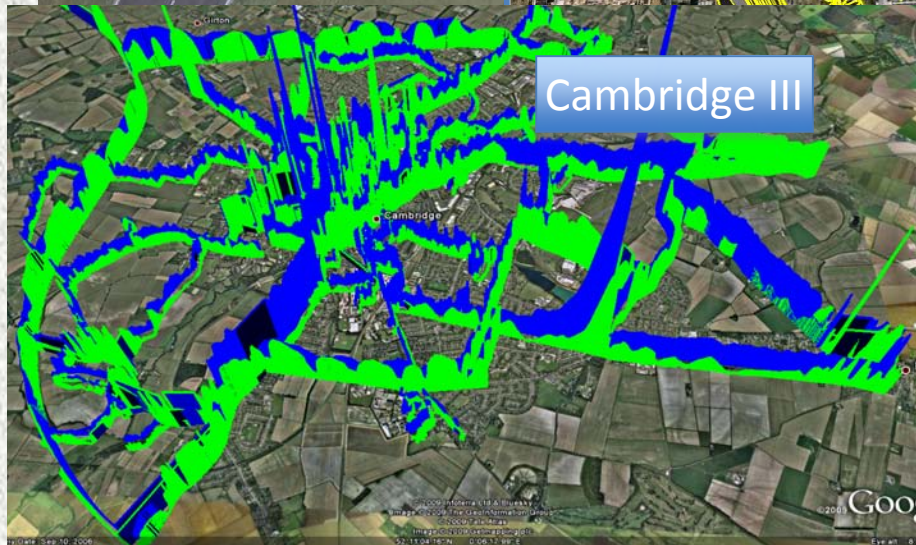
Cranfield



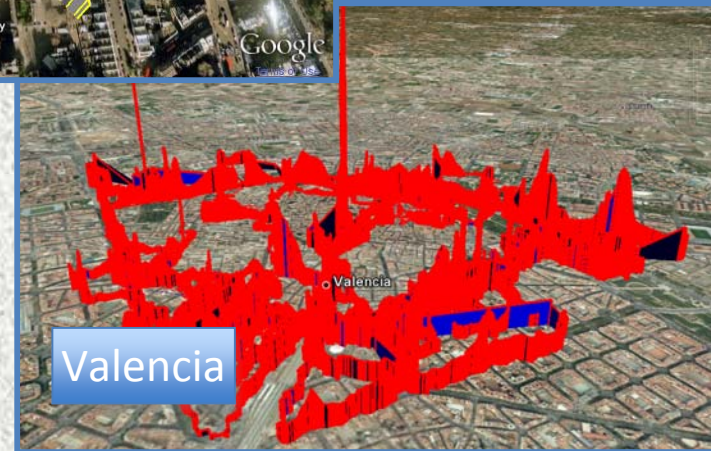
London



Cambridge I, II



Cambridge III



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Multi-species real time mobile measurements of air quality in complex environments

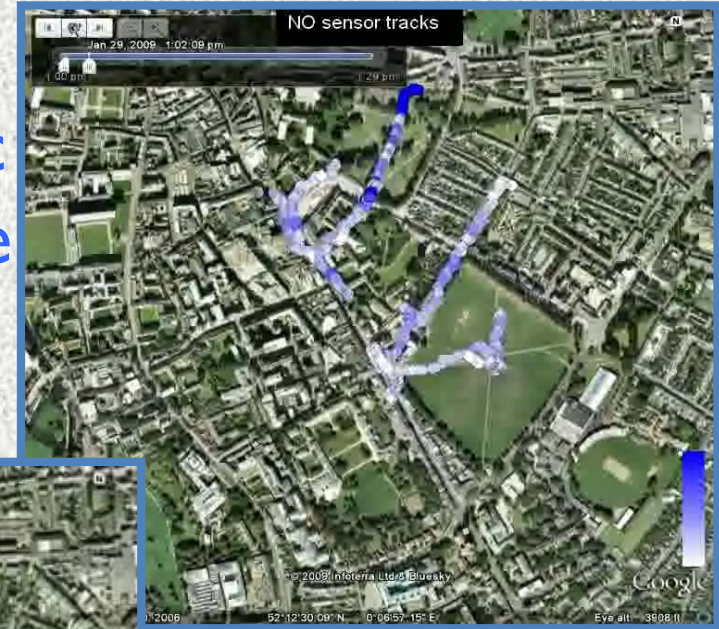


Carbon Monoxide
CO



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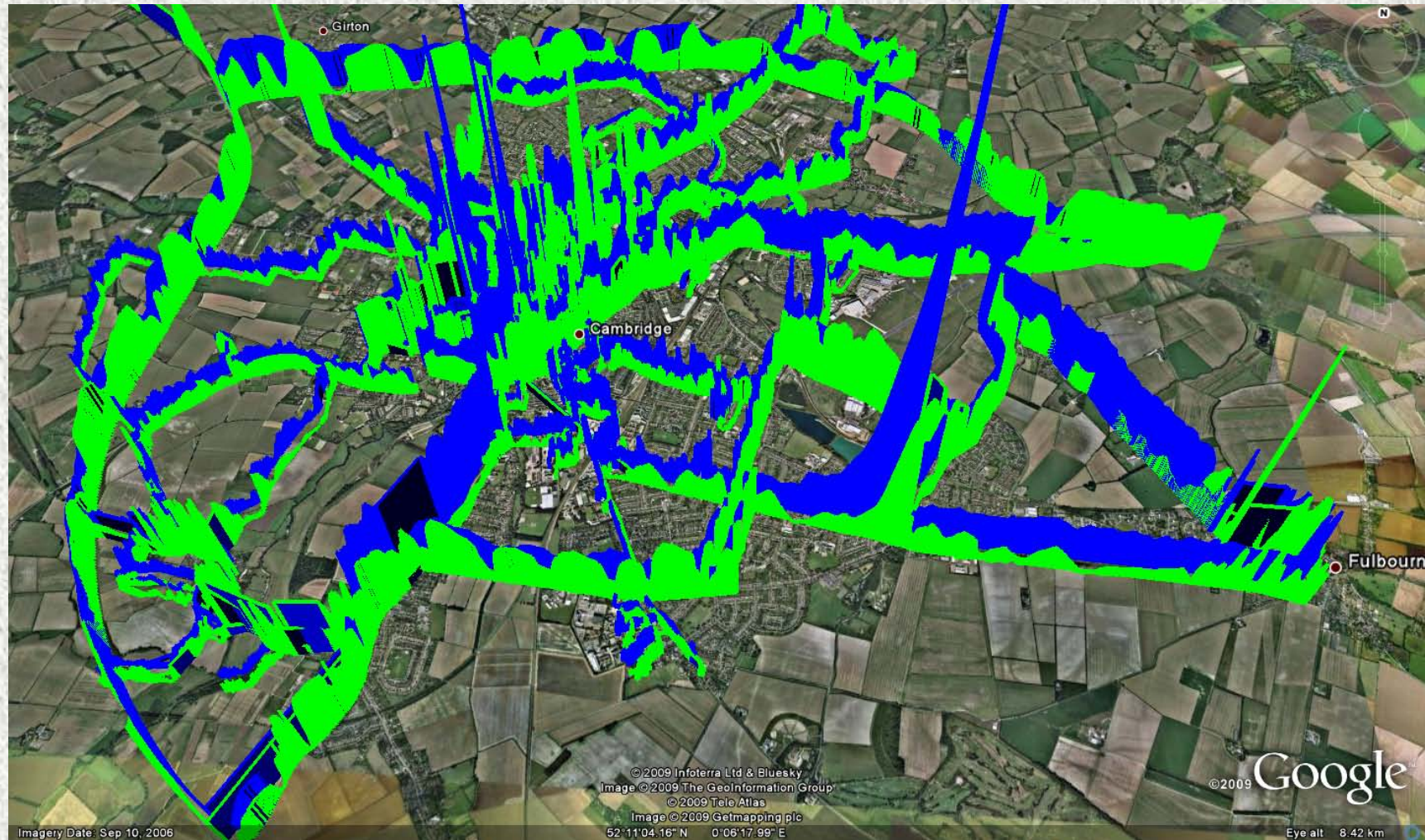
Nitric Oxide
NO



Nitrogen Dioxide
NO₂



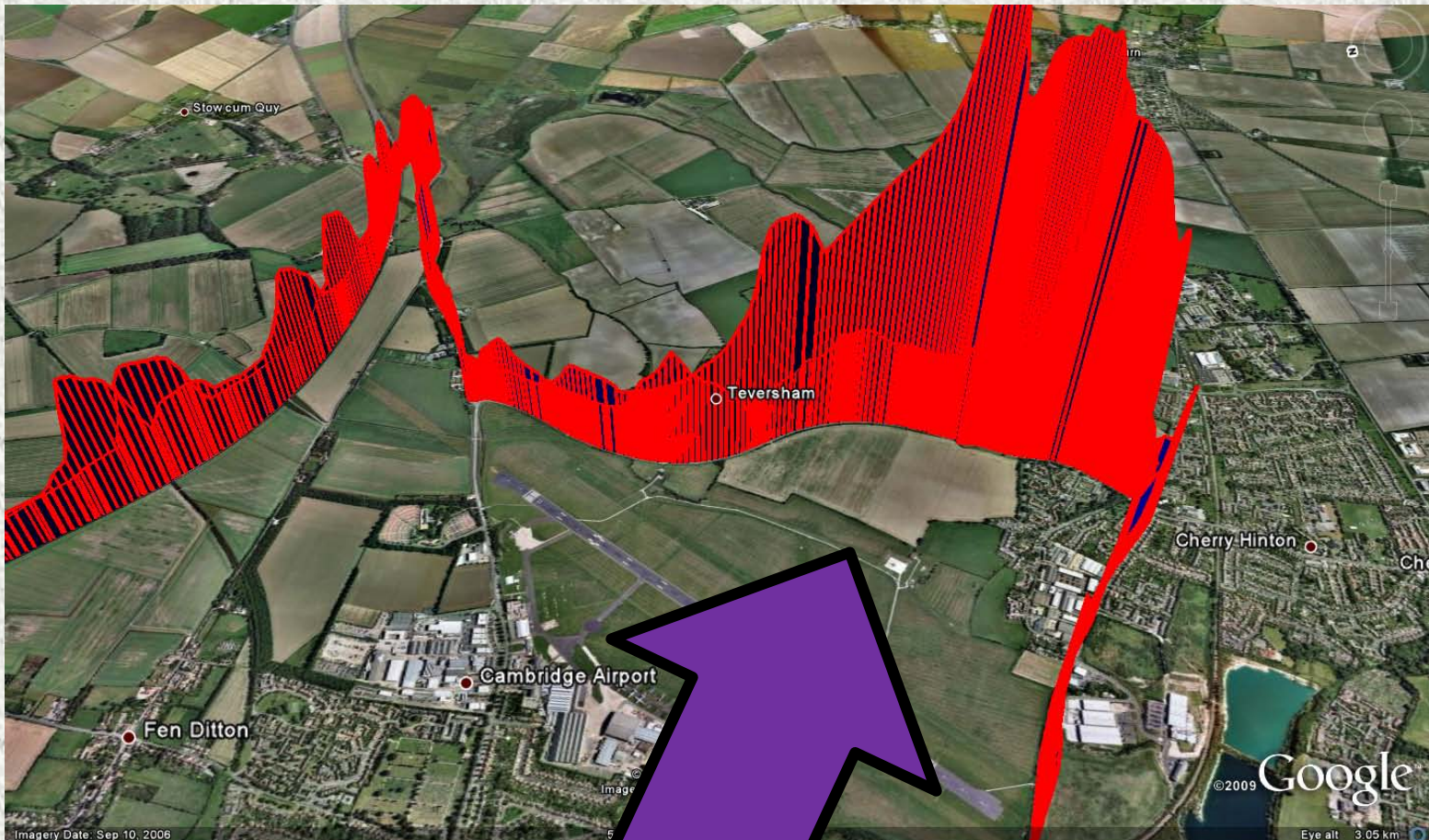
Cambridge deployment September 2009: NO_x



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Pollution events: city CO plume?



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Participatory Science

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Contact nodes:

pfa@mit.edu

Tânia Fonseca

Açores

Timothy Sieber

USA

Luis Rionda

Mexico

Jorge Edison

Brasil

Clelia Guinazu

Argentina

Valérie Aillaud

France

Laura Colini

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Vesna Dolnicar

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Pedro Ferraz de Abreu, PhD

pfa@mit.edu

ISCSP-UTL - Instituto Superior de Ciências Sociais e Políticas, Universidade Técnica de Lisboa

www.labtec-cs.net



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