

# ClimACT – Acting for the transition to a low carbon economy in schools – development of support tools

## Kick-off Meeting

### Introduction of the IST team

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7<sup>th</sup> September 2016  
Campus Tecnológico e Nuclear



Logos of partner organizations and funding sources:

- TÉCNICO LISBOA
- ISQ
- ABAE ASSOCIAÇÃO BANDEIRA AZUL DA EUROPA
- EDIGREEN
- Ciemat Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas
- UNIVERSIDAD DE SEVILLA
- UNIVERSITÉ VILLE DE LA ROCHELLE
- UNIVERSITY OF GIBRALTAR
- Interreg Sudoe
- EUROPEAN UNION

O Programa Interreg Sudoe está cofinanciado pelo Fundo Europeu de Desenvolvimento Regional (FEDER)

1. IST – Instituto Superior Técnico
2. C<sup>2</sup>TN – Centro de Ciências e Tecnologias Nucleares
3. Team of the project
4. Previous work

**IST** is the largest school of Architecture, Engineering, Science and Technology in Portugal

**Facts and figures**

**1911**

IST was founded in 1911 by Alfredo Bensaúde

**11.611**

Number of students

**853**

professors and researchers

**42%**

of students get a job before graduation

**86%**

of graduates get a job within 6 months after graduation

**20**

research centers and institutes

**46**

spin-off companies created at IST since 2009

**2.174**

scientific publications in ISI Web of Science

**3**

IST has 3 campus

**C2TN** performs R&D, Advanced Training & Education, Consulting and Services  
in **Nuclear Sciences and Technologies**.

**Facts and figures**

**72**

researchers

**35**

PhD students

**150**

papers per year

**3**

Thematic areas:  
Environment,  
Materials and  
Radiopharmaceutical  
/Health physics

**Excelent**

C<sup>2</sup>TN was  
recognised as  
Excellent by the  
national funding  
agency FCT

# Team of the project

	<b>Marta Almeida</b>	<b>Marina Almeida-Silva</b>	<b>Nuno Canha</b>	<b>Catarina Galinha</b>
				
<b>BK</b>	BSc-Environmental Engineering PhD-Environmental Sciences	BSc-Environmental and Health PhD-Environmental Sciences	BSc-Chemistry MSc- Chemistry PhD-Environmental Sciences	BSc: Biochemistry MSC: Biochemistry PhD: Food/Agriculture
<b>Role</b>	<b>Project Coordinator</b>	<b>Communication +Web Portal+Transportation</b>	<b>ClimACT Academy</b>	<b>Decision Support Tool</b>
<b>Email</b>	smarta@ctn.tecnico.ulisboa.pt	marina@ctn.tecnico.ulisboa.pt	nunocanha@ctn.tecnico.ulisboa.pt	Catarina.galinha@ctn.tecnico.ulisboa.pt
	<b>Tiago Faria</b>	<b>Joana Lage</b>	<b>Vítor Manteigas</b>	<b>Isabel Dionísio</b>
				
<b>BK</b>	BSc-Environmental and Health MSc-Environmental Engineering	BSc-Environmental and Health MSc-Environmental Engineering PhD-Environmental Sciences	BSc- Environmental and Health MSc-Public Health	Laboratory technician
<b>Role</b>	ClimACT PhD student Audits – Air + Waste	Audits – Green Spaces + Green Procurement + Water	ClimACT PhD student Databases + Audits + Social	Technical support
<b>Email</b>	tiagofaria@ctn.tecnico.ulisboa.pt	joanalage@ctn.tecnico.ulisboa.pt	Vitor.manteigas@estesl.ipl.pt	dionisio@ctn.tecnico.ulisboa.pt

Administrative staff:

For financial doubts use these emails

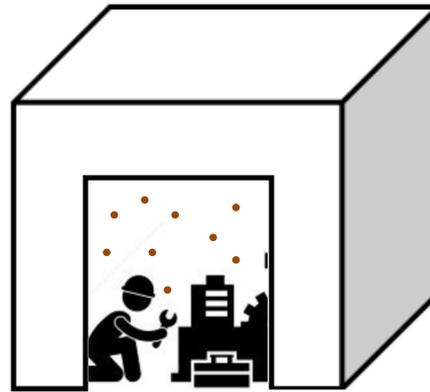
Olga Ribeiro	olga.ribeiro@tecnico.ulisboa.pt
Filipa Martins	Filipa.martins@ist.utl.pt

### Research:

1. Identification of sources of air pollutants and processes associated with their formation;
2. Assessment of local, regional and long-range transport of air pollutants;
3. Assessment of daily exposure and inhaled dose of air pollutants;
4. Identification of mitigation options to improve air quality and protect human health

# Previous projects





**Occupational exposure to chemical agents**

# Previous projects - Occupational exposure

**QUESTION 1:** At which level are the **workers exposed** to particles during their working day?

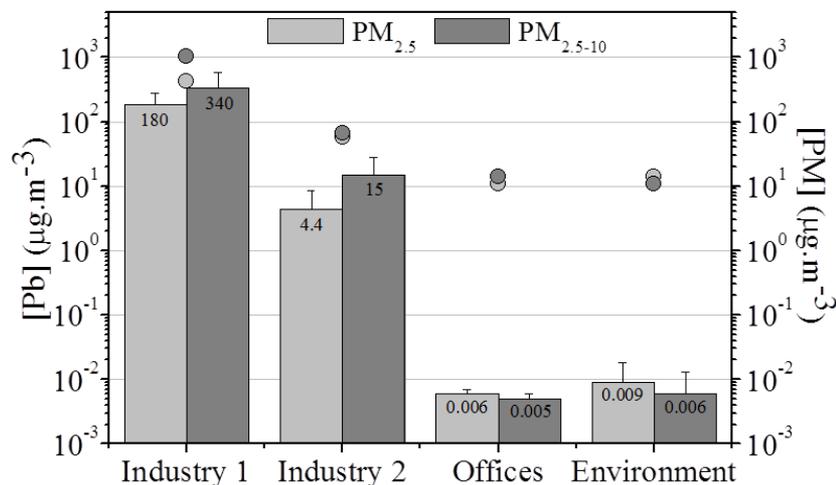
**QUESTION 2:** Is it possible to develop a new **human bioindicator** to evaluate professional exposure?

**QUESTION 3:** Is the **exhaled breath condensate** a tool for noninvasive evaluation of pollutant exposure?



# Previous projects - Occupational exposure – “EBC Project”

## Concentration of PM and Pb in particles



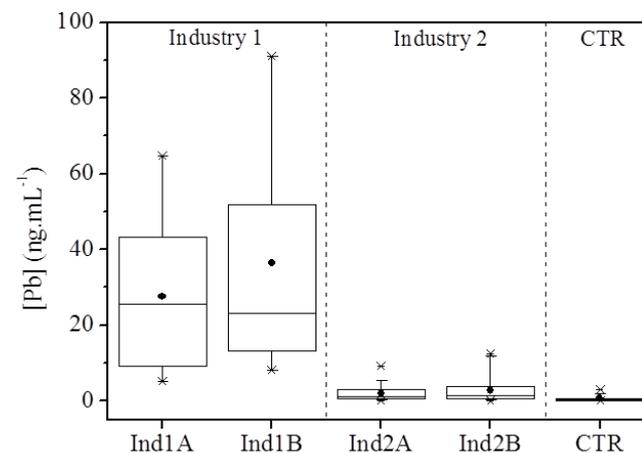
- PM10 concentration is 10-10<sup>2</sup> times higher than in offices and environment;
- Pb exposure in the industry is 10<sup>3</sup>-10<sup>4</sup> times higher than in offices and environment.

P.M. Félix, S.M. Almeida, T. Pinheiro, J. Sousa, C. Franco, H.Th. Wolterbeek (2013) Assessment of exposure to metals in lead processing industries, International Journal of Hygiene and Environmental Health 216 (1), 17-24.

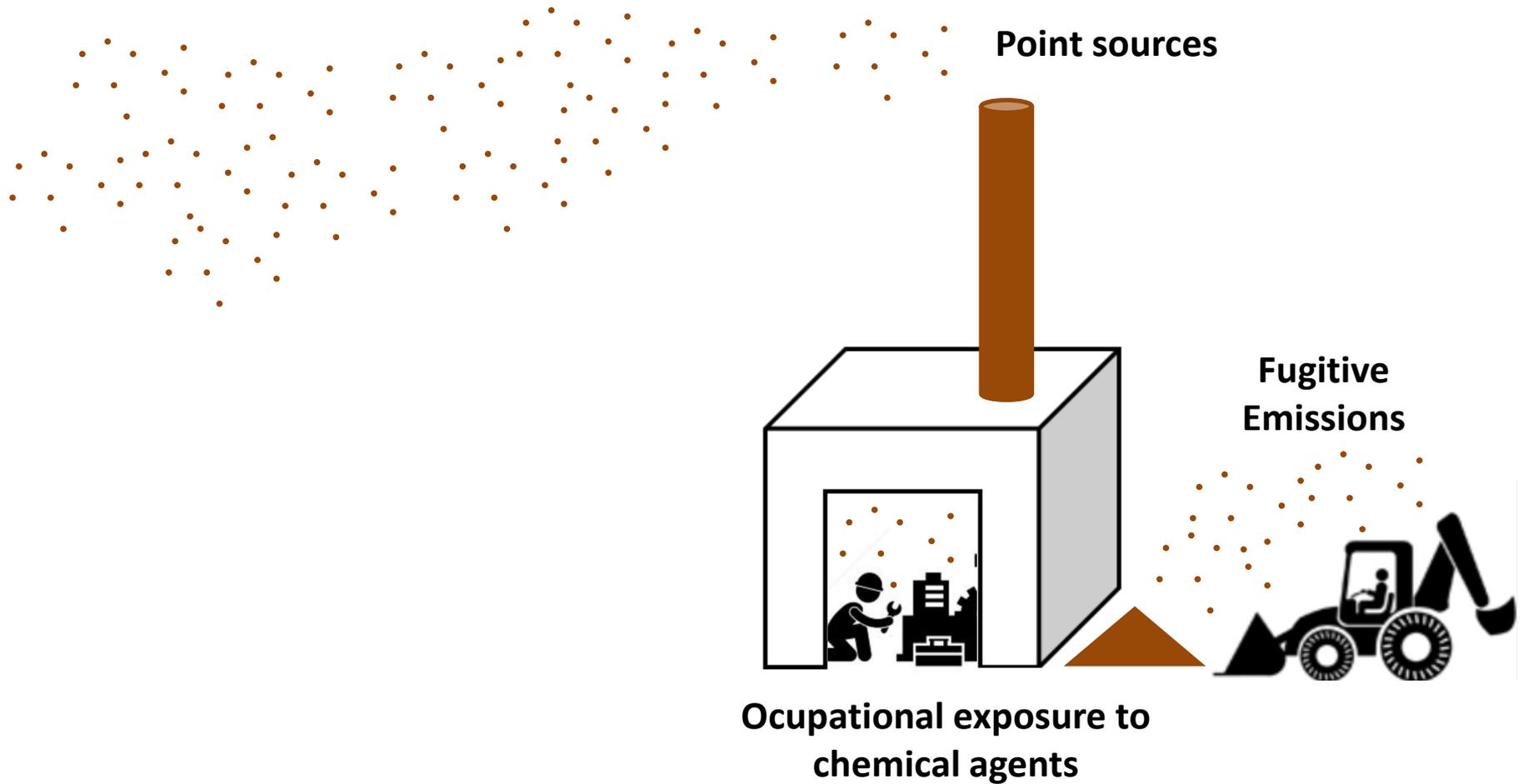
- Ability of EBC to assess different levels of exposure;
- Minor influence of confounders, such as gender, age, smoking habits and working years;
- non-invasive characteristics;
- analytically undemanding processes, resulting in expedite analysis and little sample manipulation.

P.M. Félix, S.M. Almeida, C. Franco, A.B. Almeida, C. Lopes, M.I. Claro, E. Frago, C. Teles, H.Th. Wolterbeek, T. Pinheiro (2014) The suitability of EBC-Pb as a new biomarker to assess occupational exposure to lead, International Journal of Environmental Health Research.

## Concentration of Pb in EBC



# Previous projects - Industrial emissions



# Previous projects - Industrial emissions

**QUESTION 1:** What is the best **methodology to characterize fugitive emissions**?

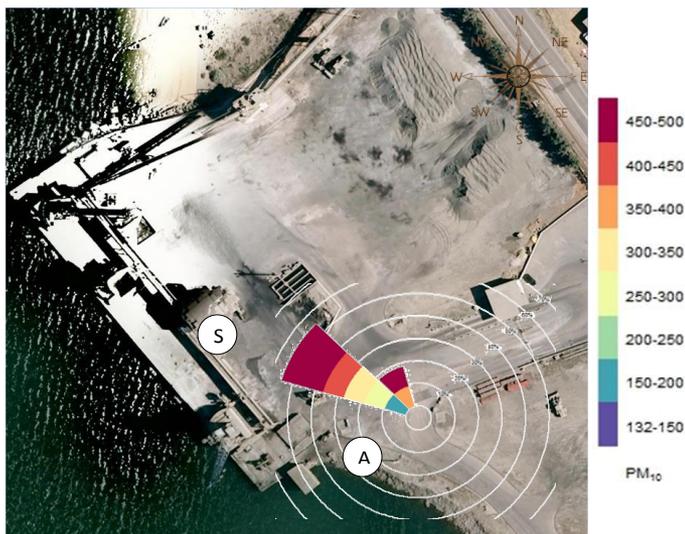
**QUESTION 2:** What are the **chemical, morphological and mineralogical characteristics** of the fugitive emissions?

**QUESTION 3:** What is **the impact of fugitive emissions** on environment?

**QUESTION 4:** What sort of **actions** should be taken?



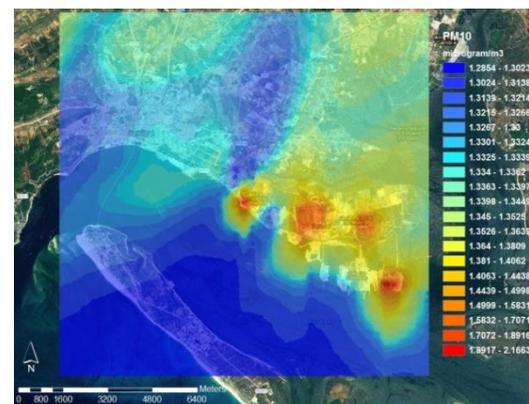
# Previous projects - Industrial emissions – “PM<sub>fugitive</sub> Project”



Development of the methodology:

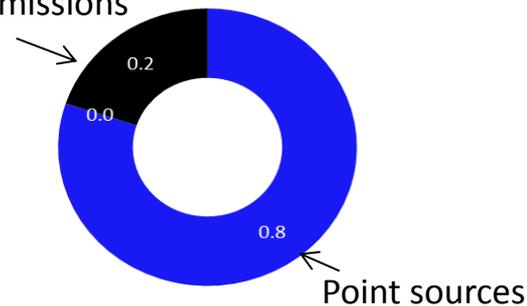
- Upwind and downwind measurements
- Control of wind direction and wind speed

**Contribution of point sources and fugitive emission to the total PM concentration**



- Fugitive emissions depend on the type of operation, operator, meteorological conditions and type of handled material;
- Fugitive emissions can contribute for 20% of the PM concentrations.

Fugitive emissions



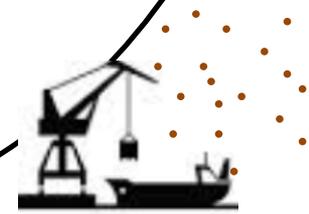
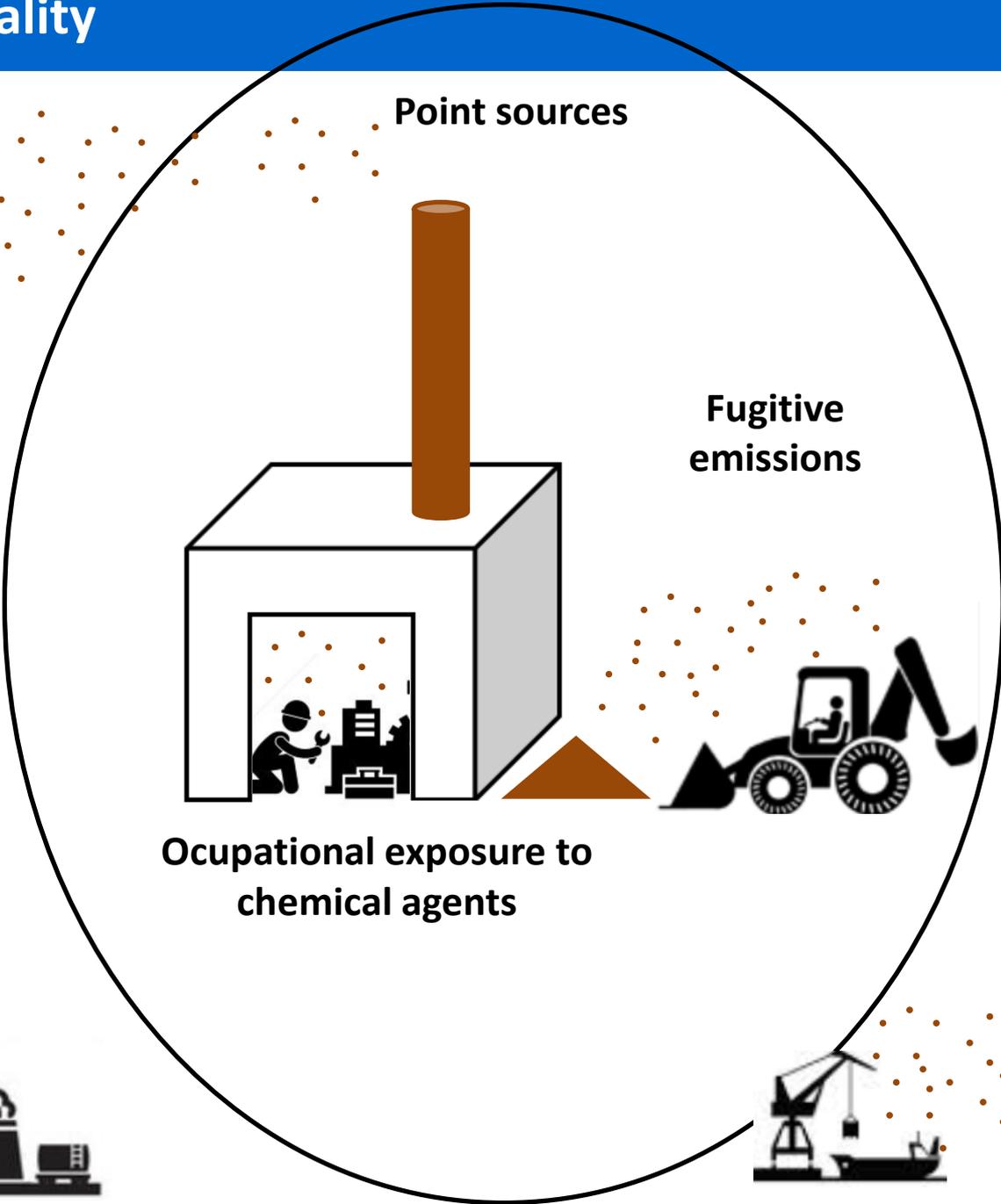
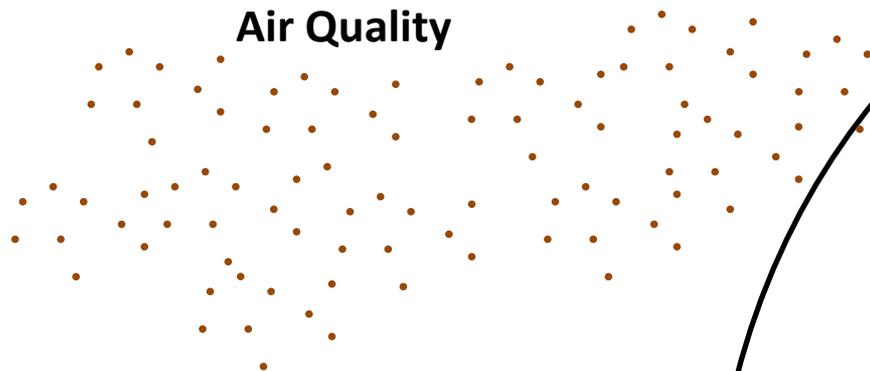
# Previous projects – Air Quality

Air Quality

Point sources

Fugitive emissions

Occupational exposure to chemical agents

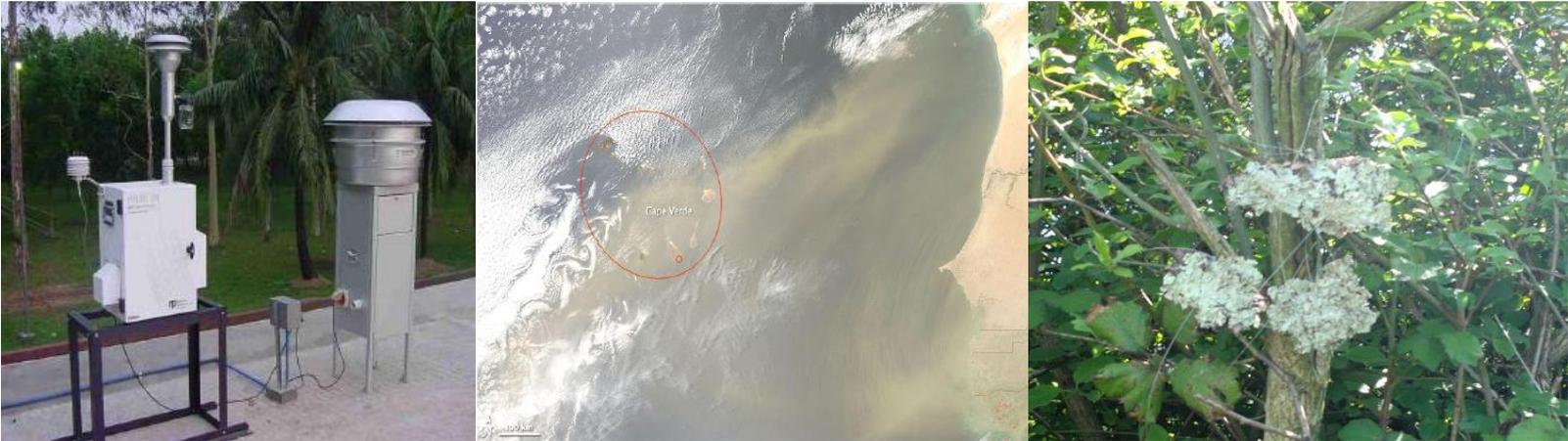


# Previous projects – Air Quality

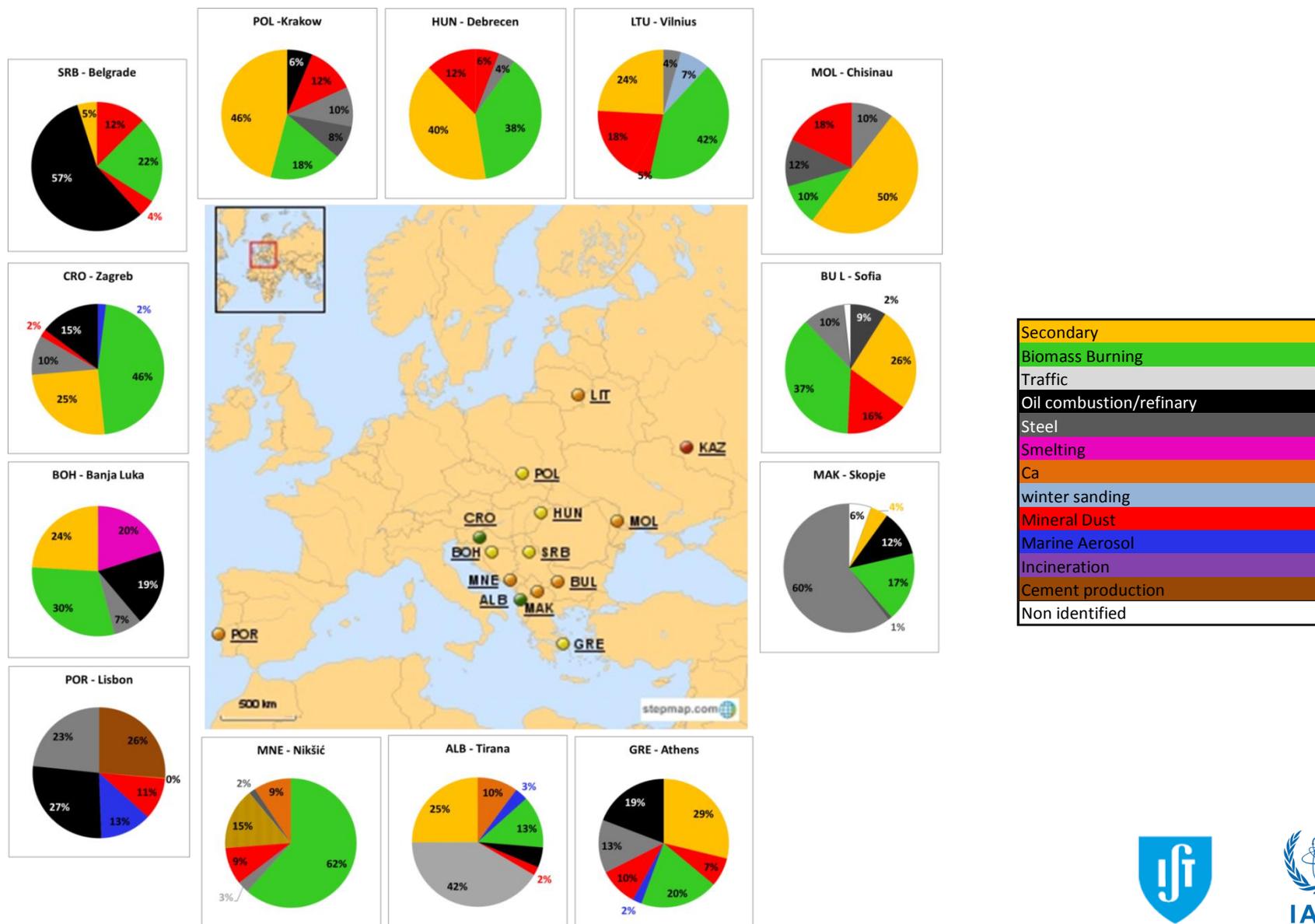
**QUESTION 1:** What is the **contribution of the different sources** of PM?

**QUESTION 2:** What is the role of **long-range transport** of particles?

**QUESTION 3:** What are the **actions** that can be taken to decrease PM concentrations?

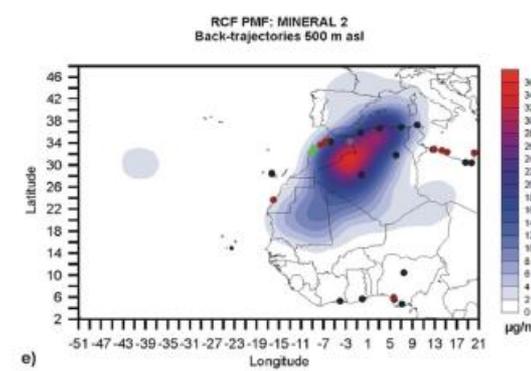
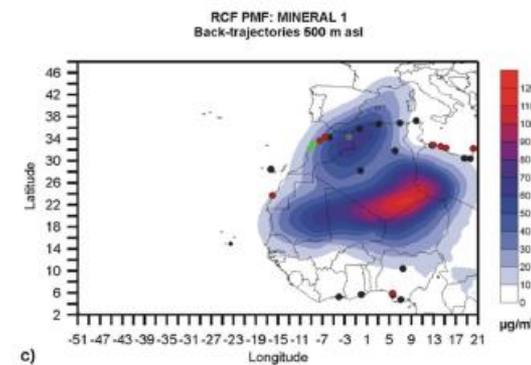
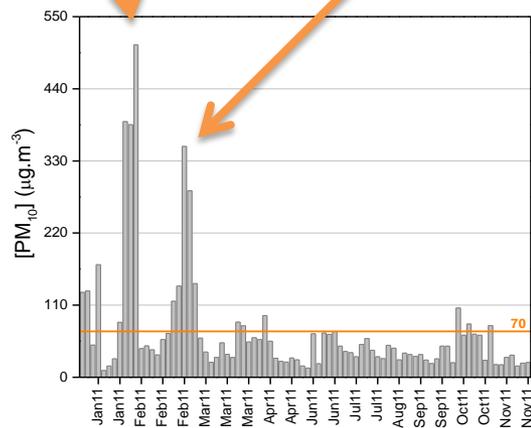
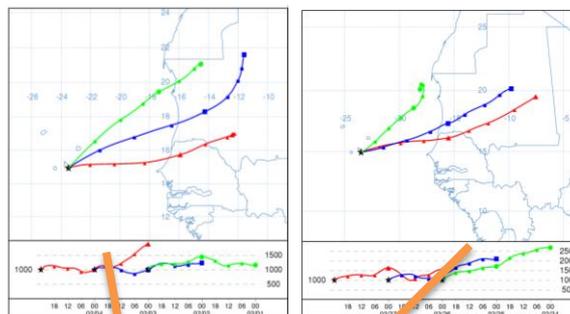
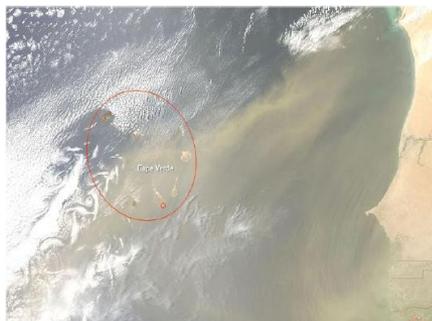


## Identification of emission sources in 13 European cities



# Previous projects – Air Quality – “CVDust project”

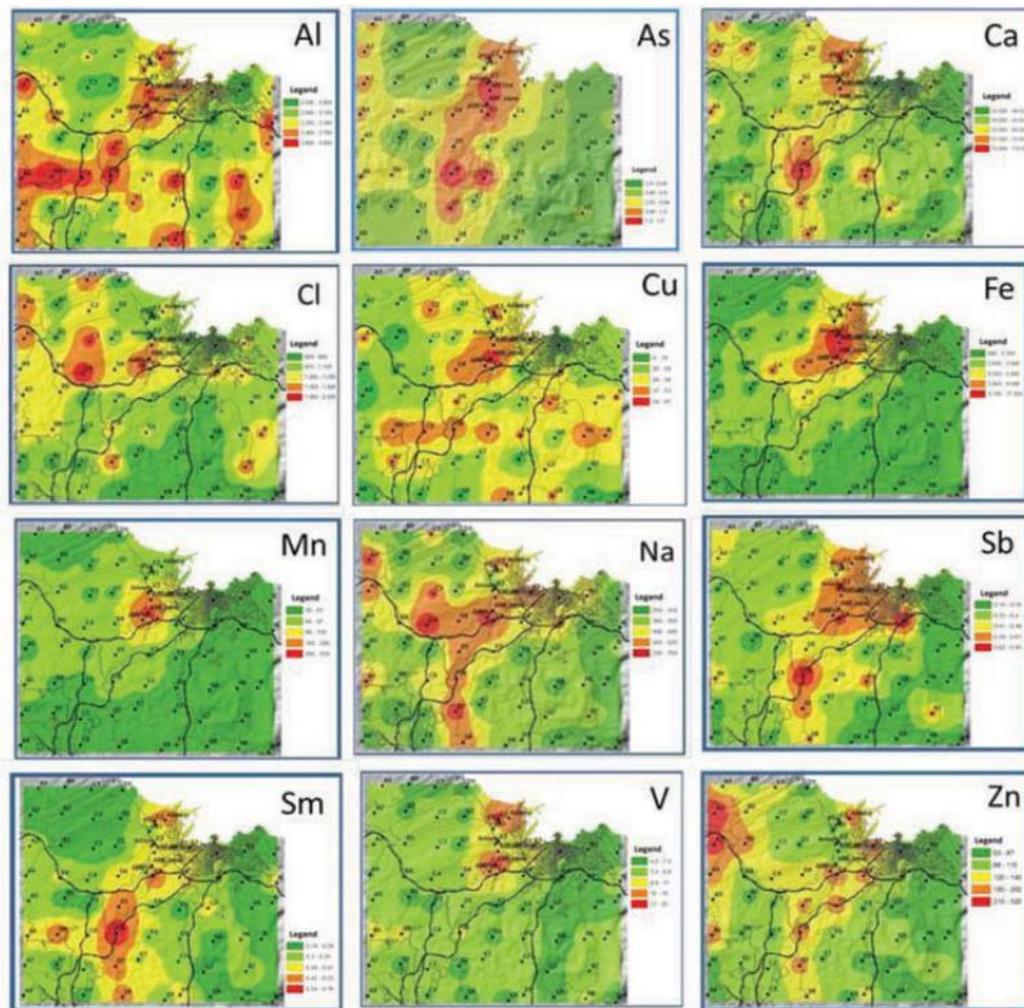
## Assessment of the impact of long range transport of dust from Sahara desert



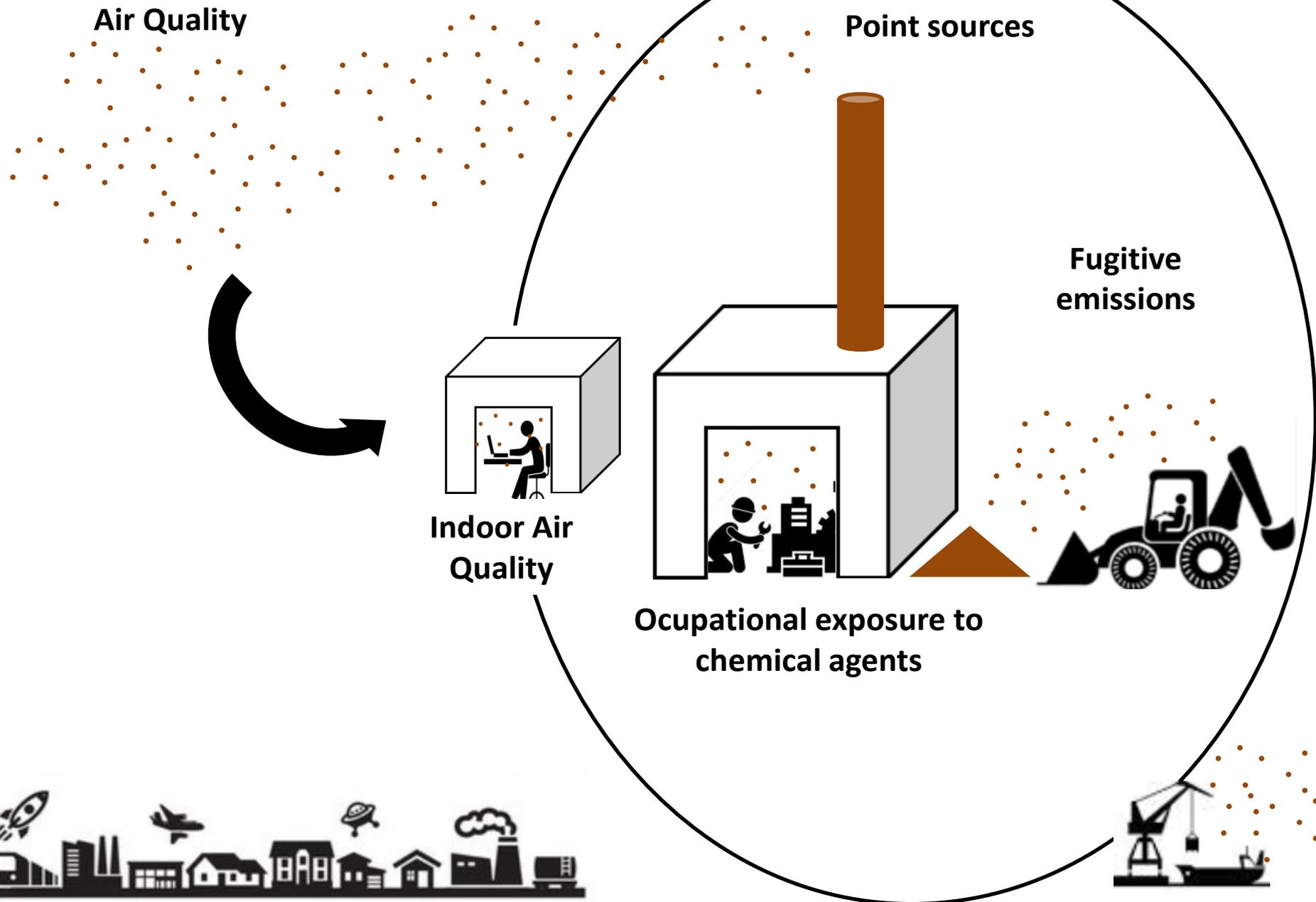
## Assessment of the impact of industrial activities



“Assessment of Emissions and Impact of Steel Production Processes”



# Previous projects – Indoor Air Quality



# Previous projects – Indoor Air Quality

## Assessment of the exposure of susceptible population to atmospheric pollutants: children, elderly, athletes, hospitalized patients

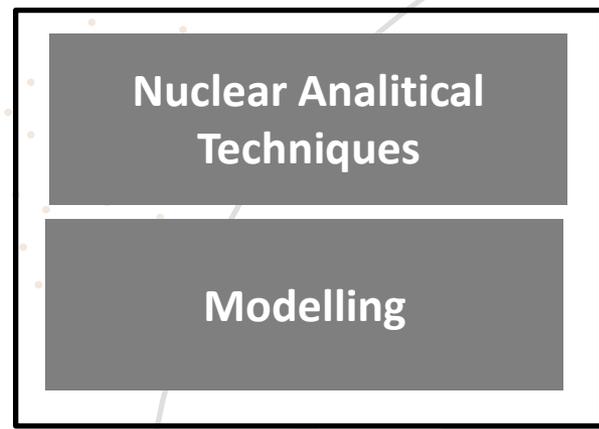


**QUESTION 1:** At which level are we **exposed** to such dangerous particles during our daily activities?

**QUESTION 2:** What and where are the major **sources** of pollutants that affect daily exposure and how can we **eradicate** them?

**QUESTION 3:** How can we all work together with our governments and environmental protection agencies to **IDENTIFY**, **TRACK**, and **CONTROL** emissions of pollutants in our cities to improve Air Quality and subsequently Quality of Life?

# Previous projects



Emissões pontuais

Emissões fugitivas

Qualidade do Ar

ocupacional  
agentes químicos

Health

Efficiency

Ecosystems

Heritage

Tourism

Economy

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End

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