

ARPA
Agenzia Regionale per la Prevenzione e l'Ambiente
dell'Emilia - Romagna

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Atti amministrativi

Determinazione dirigenziale	n. DET-2011-211	del 31/03/2011
Oggetto	Sezione Provinciale di Bologna. Approvazione schema di convenzione tra ARPA-Sezione Provinciale di Bologna e University of Eastern Finland - Kuopio, Finland, relativo al progetto denominato "Supersito: realizzazione di uno studio integrato dell'inquinamento dell'atmosfera nella Regione Emilia-Romagna attraverso misure di parametri chimici, fisici, tossicologici e di valutazioni sanitarie, epidemiologiche e ambientali mediante modelli interpretativi".	
Proposta	n. PDTD-2011-209 del 29/03/2011	
Struttura adottante	Sezione di Bologna	
Dirigente adottante	Corvaglia Maria Adelaide	
Struttura proponente	CTR Aree Urbane	
Dirigente proponente	Poluzzi Vanes	
Responsabile del procedimento	Ferrari Silvia	

Questo giorno 31 (trentuno) marzo 2011 presso la sede di Via F.Rocchi, 19 in Bologna, il Direttore della Sezione di Bologna, Dott.ssa Corvaglia Maria Adelaide, ai sensi del Regolamento Arpa sul Decentramento amministrativo, approvato con D.D.G. n. 65 del 27/09/2010 e dell'art. 4, comma 2 del D.Lgs. 30 marzo 2001, n. 165 determina quanto segue.

Oggetto: Sezione Provinciale di Bologna. Approvazione schema di convenzione tra ARPA-Sezione Provinciale di Bologna e University of Eastern Finland - Kuopio, Finland, relativo al progetto denominato “Supersito: realizzazione di uno studio integrato dell’inquinamento dell’atmosfera nella Regione Emilia-Romagna attraverso misure di parametri chimici, fisici, tossicologici e di valutazioni sanitarie, epidemiologiche e ambientali mediante modelli interpretativi”.

RICHIAMATO:

- l'art. 5, comma 1, della L.R. 44/95 il quale prevede tra le funzioni, attività e compiti di Arpa la realizzazione, anche in collaborazione con altri organismi ed istituti operanti nel settore, di iniziative di ricerca applicata sui fenomeni dell'inquinamento e della meteorologia, sulle condizioni generali dell'ambiente e del rischio per l'ambiente e per i cittadini, sulle forme di tutela degli ecosistemi;

PREMESSO:

- che la missione della University of Eastern Finland, è quella di promuovere il benessere e lo sviluppo attraverso la ricerca, l'educazione e varie forme di collaborazione;
- che i risultati delle suddette attività sono ritenute di interesse da parte di Arpa in relazione agli obiettivi e alle finalità dei propri compiti istituzionali;
- che al buon esito delle suddette attività sono inoltre interessati anche altri soggetti pubblici;
- che per le attività di studio e ricerca in corso presso la University of Eastern Finland, si possono prevedere apposite convenzioni, comprendenti il programma specifico delle attività, i tempi di realizzazione, i costi e le fonti di finanziamento;
- che la University of Eastern Finland ha proposto una serie di attività, riportate in allegato al presente atto, ritenute di interesse per una migliore conoscenza dei processi di valutazione del rischio ambientale e sanitario in aree urbane e rurali;

PREMESSO INOLTRE:

- che ARPA è titolare di un progetto, approvato dalla Regione Emilia-Romagna con Deliberazione di Giunta n. 428 dell'8/2/2010 e con Deliberazione del Direttore Generale di ARPA n. 29 del 15/03/2010, denominato “Progetto Supersito: realizzazione di uno studio integrato dell’inquinamento dell’atmosfera nella Regione Emilia-Romagna attraverso misure di parametri chimici, fisici, tossicologici e di valutazioni sanitarie, epidemiologiche e ambientali mediante modelli interpretativi”;

- che il Progetto denominato “Supersito”, di durata quinquennale, prevede un costo complessivo pari ad Euro 7.256.305,00, di cui Euro 1.581.000,00 per costi di investimento ed Euro 5.675.305,00 per costi di funzionamento, come dettagliato nella citata D.G.R. n. 428/2010 e nella successiva lettera prot. PG.2010.0213783 a firma del Direttore Generale Ambiente e Difesa del Suolo e della Costa della Regione Emilia-Romagna;
- che Arpa ritiene opportuno contribuire alla realizzazione delle attività proposte dalla University of Eastern Finland, riportate in allegato al presente atto, in considerazione della rilevanza dei risultati previsti, coerentemente con le proprie attività istituzionali di prevenzione collettiva e nello specifico con gli obiettivi previsti dal progetto denominato “Supersito”;

RITENUTO:

- di approvare la convenzione, allegata alla presente quale parte integrante e sostanziale, che regola i rapporti tra Arpa e la University of Eastern Finland e per le attività di comune interesse relative alla valutazione del rischio ambientale e sanitario in aree urbane e rurali;
- di approvare l'allegato tecnico alla presente, quale parte integrante e sostanziale della convenzione sottoscritta tra l'Arpa e la University of Eastern Finland;
- di approvare l'erogazione da parte di Arpa di un contributo finanziario complessivo con decorrenza dalla data del 01/04/2011 e fino al 15/07/2015 pari ad Euro 120.000 (escluso dall'applicazione dell'IVA ai sensi dell'art.4 del DPR 633/72 e successive modifiche ed integrazioni), secondo la seguente modalità:
 - il 30% dell'importo complessivo, alla presentazione di una dichiarazione attestante l'intervenuto avvio delle attività previste per la prima annualità;
 - il 50% dell'importo complessivo, alla presentazione di un rapporto che attesti la realizzazione di almeno il 50% delle attività previste per la prima annualità, previa valutazione delle attività stesse;
 - il 20% dell'importo complessivo, alla conclusione delle attività previste per la prima annualità, a seguito di presentazione di relazione finale delle attività svolte e dei risultati raggiunti e di rendicontazione delle spese sostenute, previa valutazione delle attività realizzate;

e così ripartito nelle seguenti annualità:

Annualità 1: Euro	10.000
Annualità 2: Euro	35.000
Annualità 3: Euro	35.000

Annualità 4: Euro 35.000

Annualità 5: Euro 5.000

- di approvare, in particolare, per la prima annualità l'erogazione del contributo finanziario di Euro 10.000, che sarà erogato alla University of Eastern Finland dopo la liquidazione da parte della regione dei corrispondenti contributi ad Arpa, secondo le seguenti modalità:
 - il 30% dell'importo complessivo, pari ad Euro 3.000 alla presentazione di una dichiarazione attestante l'intervenuto avvio delle attività previste per la prima annualità;
 - il 50% dell'importo complessivo, pari ad Euro 5.000 alla presentazione di un rapporto che attesti la realizzazione di almeno il 50% delle attività previste per la prima annualità, previa valutazione delle attività stesse;
 - il 20% dell'importo complessivo, pari ad Euro 2.000 alla conclusione delle attività previste per la prima annualità, a seguito di presentazione di relazione finale delle attività svolte e dei risultati raggiunti e di rendicontazione delle spese sostenute, previa valutazione delle attività realizzate;
- di dare atto che l'erogazione da parte di ARPA-BO degli importi previsti per la 2[^], 3[^], 4[^] e 5[^] annualità di realizzazione delle attività è subordinata all'adozione da parte della R.E.R. degli atti di impegno e liquidazione all'Agenzia dei relativi finanziamenti;
- di dare atto inoltre che le attività svolte saranno rendicontabili dalla data di sottoscrizione della convenzione;

RICHIAMATE:

- la DDG n. 80 del 23/12/2010 - Direzione Amministrativa. Area Bilancio e Controllo Economico. Approvazione del Bilancio pluriennale di previsione per il triennio 2011-2013, del Piano Investimenti 2011-2013, del Bilancio economico preventivo per l'esercizio 2011 e del Budget generale e della programmazione di cassa per l'esercizio 2011;
- la DDG n. 81 del 23/12/2010 - Direzione Amministrativa. Area Bilancio e Controllo Economico. Approvazione delle linee guida e assegnazione ai Centri di Responsabilità dei budget di esercizio e investimenti per l'esercizio 2011;

SU PROPOSTA:

- del Responsabile del Responsabile CTR Aree Urbane, Dr. Vanes Poluzzi, che ha espresso parere favorevole in merito alla regolarità amministrativa del presente atto;

DATO ATTO:

- del parere di regolarità contabile espresso dal responsabile Staff Amministrazione, Nadia Maccaferri, ai sensi del Regolamento Arpa per il Decentramento amministrativo approvato con D.D.G. n. 65 del 27/09/2010;
- che il Responsabile del procedimento, ai sensi della L. 241/90 e della L.R. 32/93, è la D.ssa Silvia Ferrari, Responsabile della Linea Progettuale 1 Del progetto denominato “Supersito”;

DETERMINA

1. di approvare la convenzione tra Arpa Sezione Provinciale di Bologna (ARPA-BO) e la University of Eastern Finland, e l'allegato tecnico, allegati al presente atto quali parti integranti e sostanziali, finalizzata allo svolgimento delle attività relative al progetto denominato “Supersito: realizzazione di uno studio integrato dell'inquinamento dell'atmosfera nella regione Emilia-Romagna attraverso misure di parametri chimici, fisici, tossicologici e di valutazioni sanitarie, epidemiologiche e ambientali mediante modelli interpretativi”;
2. di dare atto che tale convenzione decorre dal 01/04/2011 e termina il 15/07/2015 e che le attività svolte saranno rendicontabili dalla data di sottoscrizione della convenzione stessa;
3. di approvare l'erogazione del contributo complessivo pari ad Euro 120.000 (escluso dall'applicazione dell'IVA ai sensi dell'art.4 del DPR 633/72 e successive modifiche ed integrazioni) da parte di ARPA-BO alla University of Eastern Finland, ripartito nelle diverse annualità come di seguito riportato:

Annualità 1: Euro	10.000
Annualità 2: Euro	35.000
Annualità 3: Euro	35.000
Annualità 4: Euro	35.000
Annualità 5: Euro	5.000
4. di approvare, in particolare, per la prima annualità l'erogazione del contributo finanziario di Euro 10.000, che sarà erogato alla University of Eastern Finland dopo la liquidazione da parte della regione dei corrispondenti contributi ad Arpa, secondo le seguenti modalità, :
 - il 30% dell'importo complessivo, pari ad Euro 3.000 alla presentazione di una dichiarazione attestante l'intervenuto avvio delle attività previste per la prima annualità;

- il 50% dell'importo complessivo, pari ad Euro 5.000 alla presentazione di un rapporto che attesti la realizzazione di almeno il 50% delle attività previste per la prima annualità, previa valutazione delle attività stesse;
 - il 20% dell'importo complessivo, pari ad Euro 2.000 alla conclusione delle attività previste per la prima annualità, a seguito di presentazione di relazione finale delle attività svolte e dei risultati raggiunti e di rendicontazione delle spese sostenute, previa valutazione delle attività realizzate;
5. di dare atto che l'importo di Euro 10.000 avente natura di SERAP-SECOV, relativo al presente provvedimento, è a carico dell'esercizio 2011 per la quota complessiva di Euro 7.500 e dell'esercizio 2012 per la quota complessiva di Euro 2.500 ed è compreso nel budget annuale e nel conto economico annuale e pluriennale 2010-2012 con riferimento al Centro di Responsabilità BOPNC - Progetto Supersito - LP1;
 6. di dare atto inoltre che l'erogazione da parte di ARPA degli importi previsti per le successive annualità di realizzazione delle attività, avverrà con le medesime modalità richiamate al punto 4 e sarà subordinata all'adozione da parte della Regione Emilia-Romagna degli atti di impegno e di liquidazione all'Agenzia dei relativi finanziamenti.

IL DIRETTORE DELLA SEZIONE

(D.ssa M. Adelaide Corvaglia)

AGREEMENT BETWEEN THE BOLOGNA DISTRICT OF THE REGIONAL AGENCY FOR ENVIRONMENTAL PROTECTION IN EMILIA ROMAGNA AND THE UNIVERSITY OF EASTERN FINLAND

BETWEEN

The Bologna District of the Regional Agency for Environmental Protection (hereinafter referred to as ARPA-BO) represented by the Director of the Bologna District, Dr. Maria Adelaide Corvaglia, born on 12/29/1957 in Diso (LE) and domiciled in ARPA-BO main office in Via F. Rocchi, 19, in accordance with the provisions in ARPA's Administrative Decentralization Regulations approved by the General Director Resolution No. 65 of 09/27/2010;

AND

The University of Eastern Finland, Yliopistoranta 1, P.O.Box 1627, FI-70211 Kuopio, Finland, VAT Number FI 22857339, represented by Professor Ari Laaksonen (hereinafter referred to as UEF)

Hereinafter referred as Party and together as Parties.

WHEREAS

- the Regional Law No. 44 of 04/19/1995 established the Regional Agency for Environmental Protection in Emilia-Romagna (hereinafter referred to as ARPA), as an instrumental authority in Emilia-Romagna in charge of the technical functions for collective environmental prevention and control, as well as for providing important health and environmental analytical surveys;
- art. 5, par. 1, lett. a), of the same Regional Law states, that among its other duties, activities and tasks, ARPA will provide, in collaboration with other organizations and institutions working in the same field, applied research initiatives on pollution and weather-climatologic phenomena, on the general conditions of the environment and risks to the environment and its citizens, and on ways to protect the ecosystems;
- art. 5, par. 2, of the same Regional Law states that in order to fulfil its duties, activities and tasks, ARPA may establish agreements or contracts with Companies and Public Entities, engaged in the soil, water, air and environment Sectors, in particular with regard to data collection and to information systems and detection management;
- in accordance with the provisions in ARPA's Administrative Decentralization Regulations approved by the General Director Resolution No. 65 of 09/27/2010, each of the Directors of

ARPA's Local Districts will be responsible for the documents regarding agreements—and protocols relating to activities which interest his/her own District;

FURTHERMORE GRANTING

- that ARPA is the owner of the project approved by the Emilia-Romagna Region with Regional Committee Resolution No. 428 of 02/08/2010 and with ARPA's General Director Resolution No. 29 of 03/15/2010, entitled "Supersite Project: realization of an integrated study of the Emilia-Romagna Region's atmospheric pollution by measuring chemical, physical, and toxicological parameters and by analyzing health, epidemiological and environmental data through interpretative models";
- that the Supersite Project, for the duration of five years, provides a total cost of Euro 7,256,305.00, of which EUR 1,581,000.00 for investment costs and EUR 5,675,305.00 for operating costs, as detailed in the cited Regional Committee Resolution No. 428/2010 and subsequent protocol letter PG.2010.0213783 signed by the General Director of Emilia-Romagna's Regional General Administrative Office for Environmental, Soil and Coast Protection;
- that the Supersite Project realization is articulated in Project Work Packages (Annex A) whose responsibility is entrusted to ARPA, in accordance with the cited General Director Resolution No. 29/2010;

CONTEXTUALLY ASSUMING

- that, as a Public Research Institute, UEF's mission is to promote the well-being and positive development through research, education and various forms of collaboration;
- that the results of the above activities are deemed to be of interest to ARPA in relation to its own institutional aims and objectives;
- that other public organizations are interested in the results of the above activities and that UEF can avail itself of the cooperation of other public or private organizations;
- that for the ongoing activities of study and research at the UEF, appropriate agreements, including specific program activities, implementation scheduling, financial costs and funding sources can be provided;
- that UEF has proposed to ARPA-BO a range of activities, listed in the Technical Annex (Annex B), which are considered to be of interest for the better understanding of the processes of environmental and health risk assessment in urban and rural areas;

- that ARPA-BO, considering the expected results, will contribute to the implementation of the activities, as described in the Technical Annex B, which are consistent with its own institutional activities of collective prevention and more specifically with the objectives of the Supersite Project.

IN VIEW OF THE FOREGOING PREMISES, IT IS HEREBY AGREED AND STIPULATED AS FOLLOWS:

ARTICLE 1

SCOPE OF THE AGREEMENT

The object of this Agreement is the completion of specific activities relating to the implementation of a system for monitoring air pollution and the relative effects it has on the health of the population of Emilia-Romagna, analytically described in the Technical Annex (Annex B), an integral part of this Agreement.

ARTICLE 2

ACTIVITIES PROGRAM

The activities covered by this Agreement, as established between the Parties and as described in the Technical Annex B, will take place during the five years of the Supersite Project, according to the annual intervals described in detail in the Annex B.

While conducting the activities, UEF will consistently report back to ARPA-BO's representatives indicated in the Technical Annex.

For all of the activities in the Technical Annex, ARPA-BO will make available to UEF all necessary and useful material in its possession.

UEF agrees to submit, in a manner to be agreed upon, periodic reports on its activities and on any partial and/or final results obtained, so that ARPA-BO can monitor the performed activity's compliance with the objectives.

ARTICLE 3

DURATION

This Agreement will enter into force on 1st April 2011 and will end on 15th July 2015, according to the annual intervals described in detail in the Technical Annex B.

Pending the signing of this agreement and in view of the preparations necessary for the achievement

of the activities in question, which are carried out by both ARPA-BO and by UEF, the Parties agree that the activities are eligible, under the provisions in the following article 4, from 1st April 2011. ARPA-BO reserves the right to change the overall duration of this Agreement or the previously agreed upon annual intervals, if the Emilia-Romagna Region authorizes, with its own deliberation, to change the project's duration.

ARTICLE 4

COSTS AND PAYMENT METHODS

During the lifetime of the Supersite Project, and for the activities implemented within the present Agreement, ARPA-BO provides an all-inclusive contribution to UEF equal to Euro 120,000.00 (according to the provisions under article 4 of the Presidential Decree 633/72 and subsequent amendments and additions, no VAT will be applied since the activities are considered to be “institutional activities”) distributed in annual payments as follows:

Year 1: Euro 10,000.00
Year 2: Euro 35,000.00
Year 3: Euro 35,000.00
Year 4: Euro 35,000.00
Year 5: Euro 5,000.00

For the implementation of the first year activities, as fully described in the Technical Annex B, ARPA-BO is committed to pay UEF the total amount of Euro 10,000.00 as follows:

- 30% of the total amount, equal to Euro 3,000.00 after the submission of a report stating the commencement of the activities planned for the first year;
- 50% of the total amount, equal to Euro 5,000.00 after the submission of a report demonstrating that at least 50% of the activities planned for the first year have been completed;
- 20% of the total amount equal to Euro 2,000.00 after the conclusion of all activities planned for the first year, and after the submission of a final report, prior to a positive evaluation, with in annex, an expense report.

The disbursement, by ARPA-BO, of the annual payments for subsequent annual activity completion, is subject to the adoption, by the Emilia-Romagna Region, of acts of commitment and of a funding settlement for ARPA.

After the approval, by the Emilia-Romagna Region, of the act of commitment and of the funding

settlement in relation to each year of the Project, ARPA-BO is committed (after written communication) to provide UEF with the respective annual amount, using the same modalities adopted during the first year.

ARTICLE 5

RESULTS PUBLICATION AND ACCESS TO ENVIRONMENTAL DATA

The methods of dissemination or publication of the results related to the object of this Agreement shall be agreed upon, each time, by ARPA-BO and UEF, specifying, in each case, that the activities were realized with the contribution of ARPA and Emilia-Romagna Region.

With reference to the requests for access to environmental data submitted by third parties, the Parties will implement the provisions contained in Legislative Decree No. 195/2005 on the basis of their own regulations.

ARTICLE 6

CONFIDENTIALITY

Parties , except for what is provided for in previous Article 5, shall not disclose or divulge to third parties, without explicit authorization by the other Party , any information, knowledge and documents which were acquired or that have been disclosed in relation to this Agreement.

ARTICLE 7

INSURANCE COVERAGE AND PERSONNEL SECURITY

Each party will provide insurance coverage for their own staff, who, by virtue of the present Agreement, will be asked to attend certain premises for activity implementation. The staff of both parties is required to comply with the disciplinary regulations and safety standards in force at the premises where the related activities are to be performed, in accordance with the local legislation.

ARTICLE 8

PRIVACY

The parties commit themselves to observe the local legislation in regards to the protection of personal data eventually acquired and/or used in carrying out the activities covered by this Agreement. Holders, with regard to the present article, are the Parties identified above.

ARTICLE 9

LIABILITY

The Parties shall be liable towards each other for damage caused by a breach of contract. The liability of either Party shall not extend to any indirect or consequential loss or damage. The liability of either Party shall in all cases be limited to 120.000 euros. The limitation of liability defined herein shall not apply if the damage is caused by a wilful act or gross negligence.

ARTICLE 10

SETTLEMENT OF DISPUTES

The contract shall be governed by the national substantive law of Italy

All disputes arising out of or in connection with this agreement, which cannot be solved amicably, shall be finally brought before the Court of Bologna.

Bologna, on

Realization of a integrated study of atmospheric pollution in Emilia-Romagna Region by chemical, physical and toxicological measures and health, epidemiological and environmental evaluation by interpretative models.

Introduction

The aim of “Supersite” Project is to realize in Emilia-Romagna region a detailed study about some chemicals, physical and toxicological parameters of the atmosphere and to get health, epidemiological and environmental evaluations by interpretative models. The project takes into account international and consolidated experiences of Augsburg (Munich, D) and USA supersites health oriented.

The project main value is the close integration among environmental data and health aspects of fine and ultrafine particulate, in primary and secondary components, and epidemiological information. Many epidemiological studies have already demonstrated the correlation between air particulate and higher morbidity and mortality.

Besides, European Commission, in September 2009, decided not to allow exceptions to Emilia-Romagna Region about the obligation of PM10 limit values observance in air quality. Therefore it's necessary to improve the knowledge about atmospheric aerosol to achieve a better governance of themes related to atmospheric and health protection.

Specific objectives are:

- Chemical mass balance estimated using a detailed fine aerosol speciation data (EC/OC, ions, metals, organic compounds),
- Size distribution of particles with high time resolution,
- Characterization of PBL (Planet Boundary Layer) and SEB (Surface Energy Balance) meteorology during crustal particles transport and particles nucleation events,
- Evaluation of growth and formation events of inorganic and organic secondary aerosol,
- Use of high resolution meteorological modelling (COSMO) and chemistry-transport models (Chimere) to simulate chemical species of epidemiological interest,
- Source apportionment by receptor models using chemical speciation data,
- In compliance to Directive 50/2008 with regard to organic/elemental carbon and ions in PM2.5 in different areas of the region and to Italian Legislative Decree 183/2004 about ozone precursors in air in a rural area,
- Toxicology evaluation of health dangerous substances, elements and compounds or mixture in aerosol,
- Realization of epidemiologic assessments by means of studies of remarkable health events:
 - short term studies, by correlation among informative flows (hospital schedule, pharmaceutical database, etc..) about diseases linked to exposure of pollutants and the values of some aerosol compounds,
 - long term studies, by analysis of informative sources as cancer and mortality registry and values of some aerosol chemical species,
- Risk assessment by elaborations of chemical parameters and toxicological observations and by comparisons with epidemiological analysis of short and long term events,
- Improvement of population exposure evaluation by indoor air quality studies about fine and ultrafine particles.

The sampling sites, shown in Fig. 1, are five: n. 3 in urban areas, Bologna (main site, MS), Parma (US1) and Rimini (US2), n. 1 in rural area, San Pietro Capofiume (RS3) and n. 1 in remote area, Monte Cimone (RS4). The project is organized in 7 workpages (WPs) and its structure is schematically shown below (Fig. 2). Sampling period lasts 3 years (autumn 2011- autumn 2013) in which routine and intensive activities are planned: routine samplings are principal daily and intensive ones have a more detailed speciation. WPs are in detail summarised below.

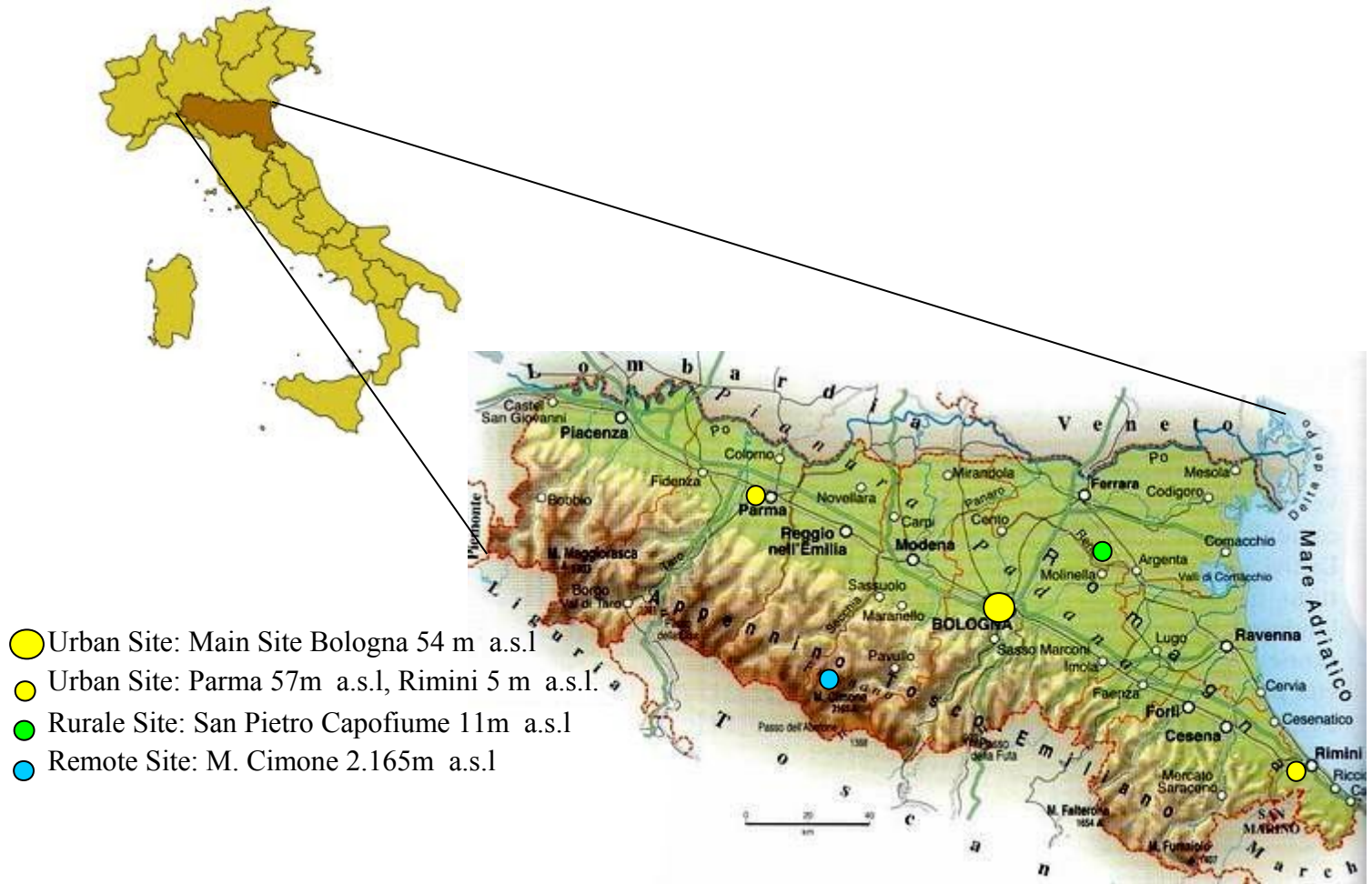


Fig. 1 – Sampling sites: Bologna (main site, MS), Parma (US1), Rimini (US2), San Pietro Capofiume (RS3) and Monte Cimone (RS4).

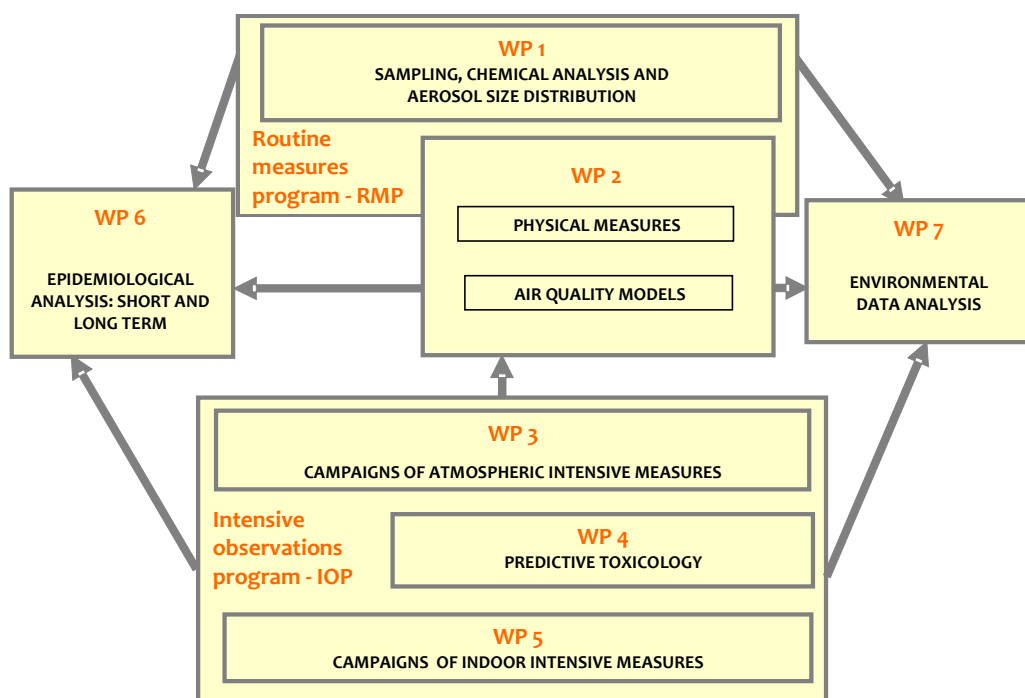


Fig. 2 – Project structure.

WorkPackage 1: Sampling, chemical analysis and aerosol size distribution. Routine measures program.

The main goal is to provide data fluxes about chemical composition of PM_{2.5} in atmosphere on long term (3 years). The planned activities are the management and the execution of aerosol (PM_{2.5}) samplings and chemical-physical analysis in “main site” of Bologna, “satellite sites” of Parma and Rimini and in the rural site of San Pietro Capofiume. Sampling times and methods are different among sites. The analysed parameters are:

- organic and elemental carbon by means of termo-optic analyzer (MS,US1,US2,RS3);
- ions by means of ion chromatography (all sites);
- metals by means of [Inductively Coupled Plasma - Mass Spectrometry](#) (MS,US1,US2,RS3).

Analysis results represent both database for epidemiological evaluation of WP6 and answers to requests of Directive 50/2008.

Furthermore in main and rural site PM₁ and PM_{2.5} hourly data are measured.

In “remote site” of Monte Cimone, atmospheric particulate is sampled with a dichotomy impactor (PM₁ and PM₁₋₁₀): total and hydro-soluble carbon and ions are analysed.

Primary aim also allows to fill the gap of information about chemical composition of both primary atmospheric aerosol, that is directly emitted by sources, and secondary aerosol, that derives from chemical reactions in atmosphere.

Some ozone precursors measures are guaranteed in rural site of San Pietro Capofiume by means of an automatic gas chromatographer with flame ionization (GC-FID) for determining some volatile organic compounds.

About second aim, activities concern the management and the execution of measures of nanometric aerosol size distribution in real time with differential mobility analyzer. Those studies are executed

in main and rural sites: in rural site measures are managed by University of Helsinki, University of Eastern Finland and the Finnish Meteorological Institute. Results give a view of conditions and modality of formation and growth of particles, both in urban and in rural area.

WorkPackage 2: Physical measurements; meteorological and chemistry-transport modeling. Routine measures program.

Main goals of WP2 are the characterization of the planetary boundary layer (PBL) - the lower part of the atmosphere where aerosol dispersion, transport, coagulation and nucleation take place - and of the energy exchange between soil and atmosphere (surface energy balance, SEB), which is the main drivers for turbulence.

Standard measurements collected by the meteorological networks are provided to the other WPs. Special measurements focusing on PBL and SEB are carried out by means of a lidar/ceilometer (mixing height retrieval), a sonic anemometer coupled with a fast infrared gas analyzer (surface turbulent fluxes) and a time domain reflectometer (soil water content and temperature).

These meteorological data provide a powerful information basis in order to perform diagnostics and improvement of the non-hydrostatic meteorological model COSMO and of its post-processing algorithms. Similarly, the chemical data provided by the other WPs are used to perform diagnostics and improvement of NINFA, the implementation of the chemistry-transport model CHIMERE over Northern Italy, and of its post-processing algorithms.

WorkPackage 3: Campaigns of atmospheric intensive measures - Intensive observations program.

The goal is the management, sampling activities in the main (Bologna) and in the rural sites (San Pietro Capofiume) and chemical-physical analysis of aerosol samples about the following parameters:

a) organic substance speciation (polar organic compounds, IPA, Nitro-IPA, Oxi-IPA and linear hydrocarbons) in the PM_{2.5}. The aim is to increase the speciation provided by “routine measurement program”, for specific pollutants in organic carbon compounds.

b) Concentration trend of major aerosol chemical compounds measured with high time resolution (some minutes) by an aerosol mass spectrometer (AMS). AMS measures allow to investigate formation process and aerosol accumulation in terms of meteorological, transport (wind), photochemical parameters and emission impact.

c) Size distribution of aerosol chemical compounds, obtained by multistadium impactor. The chemical species measured in the different size bins (0.05-10 μm) are inorganic ions, total and water-soluble organic carbon (WSOC), proxy secondary organic aerosol. Aerosol size is the most important parameter in order to determine the residential time in atmosphere; so the chemical measures, size segregated, allowed to discriminate the chemical compounds, locally emitted, from ones transported by remote sources.

d) Fine aerosol organic composition characterization obtained by nuclear magnetic resonance spectrometry (NMR) to identify and quantify the source apportionment from biological and combustion sources. NMR spectrometry uses the same AMS approaches, but with a lower time resolution and with higher detailed in the sources, in particular between natural and anthropic sources.

The aim is to provide further information, increasing the aerosol speciation to measures routinely in WP1, to epidemiology evaluations (WP6) and fill the gap about atmospheric aerosol chemical compounds both primary, emitted directly by sources, and secondary, produced by chemical reaction in atmosphere .

WorkPackage 4 – Predictive toxicology-Intensive observations program.

Predictive toxicology is based on developing procedures that are able to predict toxic effects (the output) from chemical and biological information (the input). This offers the opportunity to validate toxicity data by comparing the predictions with realworld measurements. WP4 aims at obtaining several information from biological systems, including mutagenic properties on bacterial and human cells, toxic and transforming effects in established murine models as well as on human cells, ecotoxicology profiles, markers of exposure at a molecular level, starting from real environmental samples of PM 2.5 and PM 1, collected at sites that should be representative of different urban situations and exposures. For reaching this goal, a bunch of new, innovative testing approaches have been chosen, including implemented protocols for Ames test and Comet assay and the prevalidated micronucleus assay, prevalidated in vitro test for cancer prediction, new tools for studying in vitro transformation on human cells, an innovative use of the well-known microtox assay to highlight the ecotoxicological profiles of contaminants. and toxicogenomics approaches, based on high-throughput profiling techniques, aiming at obtaining insight in the fundamental mechanisms of the toxicological response to the exposure to PM 2.5 and PM 1 as well as at identifying biomarkers of exposure that could be used in biomonitoring studies. Knowing the mode or the mechanism of action of the entire environmental complex mixtures could allow a better risk evaluation of the human exposure to environmental toxicants and a better comprehension of the effects of combined exposures. Data from chemical characterization, as obtained in other WPs, together with the biological information are the base for predicting the risk (especially the cancer risk) for human health. All the biological information could support the epidemiological studies, possibly offering a mechanistic interpretation of the epidemiological observations. The use of the microtox assay, a well-known test for assessing aquatic acute toxicity, to highlight the toxicity of airborne samples could lead to the validation of a rapid, sensitive and specific test for monitoring the impact of airborne contaminants on the environment.

WorkPackage 5 – Campaigns of indoor intensive measures - Intensive observations program.

The main goal of the WP5 is to improve the understanding of population exposure to outdoor air pollution within indoor settings. Considering the general objectives of the project, we focus on physicochemical properties of particulate matter.

The data help to address two important issues in epidemiological research and exposure science: 1) how different is the exposure for people living near busy urban streets compared to people living in residential/rural areas (Beelen et al., 2008) and 2) what are the seasonal differences in physicochemical characteristics of indoor particulate matter which could be responsible for the increased health risk found to be associated with particulate matter during the warm season (Nawrot et al., 2007).

Indoor environments are selected with characteristics as similar as possible (e.g. volume, building materials, height from street level) to reduce the influence of the specific features of the indoor environments and to highlight the relative impact of direct emissions from traffic.

Mass concentration and chemical composition measurements are carried out on PM_{2.5} together with size distribution of particulate matter in the range of 5.6÷560 nm.

Concentrations of some gaseous pollutants specifically associated to traffic (e.g., benzene, carbon monoxide, nitrogen dioxide) are measured as well. Outdoor and indoor measurements are simultaneously carried out in two sites.

WorkPackage 6 – Epidemiological analysis: long and short term.

Main objective is to investigate possible associations between exposure to particulate (and its components) and health effects. Epidemiological analyses are made, specifically for short-term and long-term effects.

Studies on short-term effects are related to hourly or daily variations in exposure levels to air pollutants, whereas analyses of long-term effects are mainly focused on spatial heterogeneity of mean concentrations of pollutants, as a proxy of population exposure on a long time period.

Health effects to short-term exposure to particulate and its components are investigated, using environmental data, from main and satellites site of the Supersite Project and fixed monitoring network, as information for exposure assessment. Time-series studies are the main epidemiological study design to investigate possible associations between daily variations of air pollutants and disease occurrences in each day. The analyses control for time-dependent variables, (trends and seasonality) and for meteorological data. Health data are gathered from mortality, morbidity and emergency access registries.

Epidemiological analyses on long-term effects aim to evaluate possible associations between health effects and long-term exposure to particulate and its components. The enrolment of population under investigation follows the statement of cohort studies. The retrospective cohort is clearly defined and involves residents in study areas of the Project. The cohort follow-up is made by means of record-linkage procedures with mortality and morbidity registries. A special issue regards the retrospective exposure assessment of enrolled population. Different geographic approaches (proximity models, land use regression models, dispersion models) is adopted.

A preliminary ongoing activity, to identify the main research needs and define the study protocol, is the state-of-the-art review of these kind of studies, particularly focused on which pollutants (and components) are related to cause-specific mortality and/or to disease onset, and the identification of more susceptible sub-groups of population.

WorkPackage 7: Environmental data analysis.

The main goal is to identify and quantify the contribution of fine PM primary and secondary sources (source apportionment) by receptor models using experimental database of PM_{2.5} chemical composition. WP7 uses as input data chemical composition results, obtained by daily sampling (WP1) in main site (MS) and satellites (US1/2), and by intensive campaigns (WP3) in the main site (MS) and rural site (RS3). Furthermore WP7 uses aerosol size distribution and environmental parameter trends (WP1). Besides WP7 focuses on identification of the aerosol sources, causes of the accumulation of toxic substances (WP4 and WP6) in atmosphere. Outputs are estimations of emission sources, useful comparison with air quality models (WP2) and estimates the exposed population (WP5) and therefore for the risk assessment (WP4).

The temporal series of the particulate chemical composition in the main site and satellites are analyzed to evaluate processes and sources that are responsible of seasonal trends of primary and secondary chemical compounds in different areas of the region. Moreover, events related to long range transport are identified and quantified.

Data collected during the intensive observation program (IOP) are instead used to study variability of chemical compound concentrations in high time resolution, related to trends of sources contribution and to photochemical processes and chemical transformation of particulate.

Particles size distribution is also studied during high pollution episodes, in order to determine sources and processes responsible of the observed trends. Data are supplied in high time resolution, so factors and contributions of sources, responsible for the daily cycles and trends of hourly concentrations, can be investigated.

Furthermore organic composition speciation allows to assess the contribution of the primary and secondary sources of organic fine particulate, with an accuracy that can not be obtained just from temporal series analysis of organic carbon provided by the "Routine measurement program". Sources analysis of organic particulate needs specific methodologies and studies. Methods are receptor models, which have been widely used in analysis of experimental data obtained in "Supersite" projects. Among these methods, "positive matrix factorization" (PMF) is privileged because specifically designed for applications to the studies of the atmospheric particulate. PMF

has also been widely developed to mass spectra analysis of aerosol organic substances measured with aerosol mass spectrometer (AMS), that allowed the quantification of the car exhaust emissions and the secondary sources contribution. A similar statistical analysis of nuclear magnetic resonance (NMR) spectra is integrated for the detailed study of the organic sources due to secondary origins and biofuels combustion. Finally, detailed estimate of the emission contributions to organic substance concentrations can be carried out with receptor models as “Chemical mass balance” (CMB) that uses a input database of organic compounds concentrations as emissions tracers.

Activities manager

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Some activities of WP 1 and 3, which this agreement refers, are planned in collaboration with University of Eastern Finland who can be supported by University of Helsinki and Finnish Meteorological Institute.

These activities are described below for all five years of the project.

About WP1 (sampling, chemical analysis and aerosol size distribution-Routine measures program) one of aims is to study the size distribution of submicron particles to understand the reactions happening and driving particles growth and transformations coming from combustion sources or nucleation processes. These effects can be potentially important sources of aerosol particles affecting climate and human health.

These investigations about size distribution allow to describe the formation of particles in urban areas and their transport in plumes originated by cities or by others polluted areas toward rural zones. Particles of accumulation mode can identify the regional background and can reach the remote sites. The short time life of ultrafine aerosol in atmosphere requires measures with high resolution time, it's so necessary to use right instrumentations, as a differential mobility particle sizer (DMPS) with some minutes resolution time and condensation particle counter (CPC). Furthermore the spatial distribution of aerosol can be heterogeneous also in the same urban area. However the comparison between chemical-physical measures, carried out in parallel in urban and extraurban sites, and meteorological conditions can point out formation events on regional scale, as it happens for some nucleation events. Many measurements, short and long term, has been recorded in different locations both urban and rural sites. It was been pointed out nucleation events occur frequently in atmosphere in both clean and polluted environments, however it is not yet possible to predict which particles are formed and grown and which compounds are involved.

Hence the activities of WP1, consist in measures of aerosol size distribution at urban area of Bologna, at rural area of San Pietro Capofiume where a tDMPS, property of University Eastern Finland, with size range 3-600 nm is operating and is maintained by ISAC-CNR with the current organization.

During first year with regards to activity 7 of WP1, UEF supports Emilia-Romagna Environmental Protection Agency and is involved to activities arrangement, planning and consulting during the definition of the sampling line of DMPS, CPC and AMS located at the main site in urban area of Bologna. ARPA-EMR attends to DMPS management in urban area of Bologna and to collect dataset for 3 years of continuous measures beginning from the end of summer 2011/start of autumn 2011. Besides University Eastern Finland is involved in extraordinary operations, calibrations and major primary instrument repairs.

Similarly at Monte Cimone remote site, formerly station EUSAAR, size distribution measures by a DMPS, property and managed by ISAC-CNR, with size range 10-500 nm and optical measures for Saharan dust by optical particle counter (OPC) are operating since different years.

In the years 2-5, about the activity 8 of WP1 UEF, aided by University of Helsinki, analyses 3 year datasets (both San Pietro Capofiume and Bologna) to understand the nucleation conditions with goal of development parameterizations (chemical and physical) of nucleation, to evaluate events that bring to formation and growth of secondary organic and inorganic aerosol and to quantify of new particles production in the events. Eventually these measures can be compared to Monte Cimone measures, representative of free troposphere.

Regarding concentration trends of major aerosol chemical compounds measured at urban site of Bologna with high time resolution by an aerosol mass spectrometer (AMS), as agreed in activity n. 6 of WP3 (Campaigns of atmospheric intensive measures-Intensive observations program), measures allow to investigate formation process and aerosol accumulation in terms of meteorological, transport (wind), photochemical parameters and emissions impact. UEF will be involved in using a second AMS located at San Pietro Capofiume at least during one campaign per year. UEF will decide when to join according to instrument availability. A tentative aim is to cover three different seasons (autumn, winter, summer). University of Helsinki will participate in campaign data analysis, in which the secondary aerosol composition, obtained by AMS and Berner (water soluble ions, total carbon and water soluble organic carbon) samplings, and the size distribution will be correlated, in order to evaluate the nucleation events and the particle growth with particular reference to meteorological conditions.

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Centro di Responsabilità: Sezione Di Bologna

OGGETTO: Sezione Provinciale di Bologna. Approvazione schema di convenzione tra ARPA-Sezione Provinciale di Bologna e University of Eastern Finland - Kuopio, Finland, relativo al progetto denominato "Supersito: realizzazione di uno studio integrato dell'inquinamento dell'atmosfera nella Regione Emilia-Romagna attraverso misure di parametri chimici, fisici, tossicologici e di valutazioni sanitarie, epidemiologiche e ambientali mediante modelli interpretativi".

PARERE CONTABILE

La sottoscritta Maccaferri Nadia, Responsabile Amministrativo della Sezione di Bologna, esprime parere di regolarità contabile ai sensi del Regolamento Arpa sul Decentramento amministrativo.

Data 31/03/2011

Il Responsabile Amministrativo
