EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

EUROCORES Programme
European Collaborative Research

Integrated Studies of Processes and Composition in a complex changing Troposphere (EuroTROP)

DRAFT Call for Outline Proposals

What is EUROCORES?

The ESF European Collaborative Research (EUROCORES) Programmes offer a flexible framework for researchers in Europe to work on questions which are best addressed in large-scale collaborative research programmes.

The EUROCORES Programmes allow excellent researchers in the various participating countries to collaborate in research projects 'at the bench'. They also allow, when appropriate, colleagues in non-European countries, for example the US, to participate. The Programmes encourage and anticipate networking and collaboration between researchers in order to achieve synthesis of scientific results across the programme, to connect with related programmes, and to disseminate findings.

The EUROCORES Programmes allow national research funding organisations in Europe and beyond to support top-class research in and across all scientific areas, by matching their strategic priorities with the needs articulated by the scientific community.

Final funding decisions on the projects and the research funding remain with the national funding organisations, based on a single international peer review process operated by ESF. Financed by the participating national Funding Organisations, ESF also provides support for networking between the researchers and for the scientific synthesis of research results and their dissemination. In this way, the EUROCORES Scheme complements the EC Framework Programme and other collaborative funding schemes at European level.

For further information see:
http://www.esf.org/eurocores

Integrated Studies of Processes and Composition in a complex changing Troposphere (EuroTROP)

Following agreement with XX funding organisations in *Country A, Country B, Country C, Country D, Country E, Country F, Country G, Country H, Country I, Country J, Country K, Country L, Country M, Country N, Country O and Country P* the European Science Foundation is launching a Call for Outline Proposals for Collaborative Research Projects (CRPs) to be undertaken within the EUROCORES Programme EuroTROP. The Programme aims to support high quality multidisciplinary collaborative research in Europe, with involvement of leading scientists from outside Europe, when appropriate.

The research phase of EuroTROP will run for three years [1] and includes national research funding as well as support for networking and dissemination activities. The research grants are provided directly to the eligible and successful Principal Investigators by their respective national funding organisations. The networking and dissemination support, also financed by the national organisations, is centrally managed by the ESF.

Outline Proposals are to be submitted by xth February 2011. It is expected that Full Proposals will be invited by xth March 2011 with xx May 2011 as expected deadline for submission.

A Programme-specific website can be consulted for the latest updates at **http://www.esf.org/eurotrop**

Background and objectives

Climate and global change as well as environmental pollution and connected health effects are among the most pressing scientific issues in the recent years. Quantification of tropospheric processes and their impacts on the air quality and climate is an important component of Earth system science which requires deeper investigation. In turn, tropospheric processes are also influenced by climate change and socio-environmental parameters such as changing land use patterns. Air pollution is a widespread problem in Europe which affects large regions throughout the entire continent, irrespective of national boundaries. Long-range transport of emitted gases and particles may impact regions remote from their sources.

It is evident, by now, that sustainable societal development cannot remain solely wealth-oriented, but must embrace an environmentally conscious agenda. Such an approach is possible if scientifically sound knowledge in all environmental areas becomes available to our societies and policy makers.

[1] The formal duration of EUROCORES programmes is three years; however, individual researchers will apply to the national or other funding organisations under their respective rules, which may allow for more than three years' funding. No networking and coordination support will be available outside the formal duration of the programme.

Understanding the chemistry and physics of the atmosphere, a very complex medium including a large variety of processes with many feedbacks, requires a joint action and interdisciplinary approach between various European groups and research areas. This approach will also facilitate the dissemination among a non-experts audience of the obtained results, something which is increasingly important in our information-based society.

EuroTROP aims to study the troposphere in comprehensive manner, providing a framework where synergies and interdisciplinary approach are made possible.
Based on the experience gained in the ESF Research Networking Programme INTROP, EuroTROP will:

- Coordinate investigations and theoretical studies of tropospheric processes in the laboratory and in the field.
- Interpret the results using the most up-to-date models.
- Disseminate the results of the research to foster common awareness.

EuroTROP will focus on a deeper understanding of the multiphase system troposphere and the complex interaction process of gases, particles and clouds addressing the following broad objectives, intimately linked to European key societal questions:

- Clarification of understanding sinks and sources of the main oxidants in the troposphere
- Development of process schemes for the oxidation and degradation of the most important Volatile Organic Compounds (VOCs) in the troposphere including multiphase steps in the course of oxidation
- Development of a framework with the chemical and physical description of the subsystems based on process-oriented laboratory and field investigations, considering the main different aerosol types
- Development of adequate physico-chemical models for aerosols and clouds including reduced versions for the implementation of aerosol and cloud processes in higher scale models, i.e. upscale from regional models
- Prediction ability for the fate of novel chemicals
- Identification of remaining areas of uncertainty in tropospheric research
- Ensuring the state-of-the-science process descriptions inform larger scale models in all research areas.

The research in the framework of EuroTROP, exploited in a closed interaction manner among the experts participating to this Programme, is expected to have a variety of impacts in climate research, global change research, a better understanding of environmental pollution and of health effects,

Scientific goals

The main scientific goal of the EuroTROP Programme is to improve the current understanding of composition and quantification of processes in the troposphere.

EuroTROP covers tropospheric research on multiple levels and scales from the laboratory towards complex field measurements utilising state of the art techniques and modelling.
Therefore, it is an explicit objective of EuroTROP to foster the collaboration of chemists, physicists, meteorologists and other scientists to improve the understanding of the composition and processes occurring in the troposphere and the linkages to climate change and environmental pollution with its associated health effects.
In this framework, approaches to bridge the scales from detailed process-oriented modelling to local pollution to regional and global modelling with reduced complexity should be developed.

Understanding the multiphase chemical transformations of trace species in the troposphere requires a multidisciplinary approach that must involve groups of researchers with highly complementary skills.
None of the European countries has at its own disposal the full range of scientific excellence, experimental expertise, and research infrastructure like, e.g., large environmental chambers for the study of complex kinetic systems under simulated atmospheric conditions, laboratories for studying elementary reactions, aerosol chemistry and physics as well as the most advanced modelling tools.
Therefore, building a framework capable of meeting new challenges in the field of elementary chemical processes in the atmosphere requires collaboration between the best research teams that can be found throughout Europe.
EuroTROP aims also to develop close collaborations with non-European experts from USA, Canada and, possibly, other non-European Countries.

The results will be disseminated through high level publications but also by a number of events to promote awareness of the work being

performed in EuroTROP. As the members of the atmospheric research community are strongly interlinked with the neighbouring disciplines covering climate change, environmental pollution and health effects and Earth System Science, EuroTROP results will have substantial impacts on these fields.

Research topics

EuroTROP will operate through "integrated" research in order to combine technically advanced laboratory and field studies with interpretation by state-of-the-art models: multiple components of atmospheric research should be found in a given Collaborative Research Project (CRP) and each CRP should structure its research in a fully integrated manner with the other CRPs.
Using this approach, large synergies among experts in different research fields are expected, resulting in a clear advancement of science.

For the EuroTROP CRPs the following research topics are defined:

1. **Aerosol formation and transformation**

Detailed mechanistic quantification of the processes leading to aerosol formation and transformation focussing on, but not limited to, secondary organic components will form the basis of this topic area. Scientist should develop projects:

• To identify new Secondary Organic Aerosol (SOA) sources and formation processes

• To quantify anthropogenic and biogenic contributions to SOA

• To measure optical properties of aerosols in field and laboratory studies for a better characterization of their climatic and visibility effects

• To better describe SOA formation from low molecular weight compounds including aqueous phase formation pathways

• To investigate and describe non-equilibrium processes

• To investigate SOA formation from a combination of biogenic and anthropogenic precursors

• To better describe functionalisation of SOA components using different approaches

2. **Radical and reactive trace gas sources, sinks and budgets**

This topic will focus on the contributions of daytime and night-time radicals to the tropospheric oxidising capacity. Scientist should develop projects:

• To better characterise and understand by appropriate process models the diurnal cycles of OH and HO2 including particle interaction

• To better understand ozone sinks and sources including novel pathways

• To understand the formation and fate of NO3 and its height profile

• To understand tropospheric halogens and halogen radical formation

• To better describe the role of small carbonyl compounds as radical sources

• To develop improved measurement techniques for small radicals of tropospheric interest

3. **Surface – atmosphere interactions**

This topic is concerned with the interactions of tropospheric trace components with surfaces, particularly with respect to reactive and photosensitised processes. Scientist should develop projects:

• To understand surface processing for engineered and natural (biological) materials

• To better characterise the deposition velocity for organic compounds

• To better describe the oceans as a source of gaseous and particulate tropospheric constituents

• To better describe the oceans as a sink of oxidants, trace gases and particles and the consequences of its input

4. **Aerosols, clouds and their interactions**

Processes responsible for complex aerosol-cloud interactions form the focus for this research topic with a need to quantify impacts of composition on warm droplet activation and growth, organic component cloud processing, the nature and properties of ice nuclei and the impact of composition on liquid droplet freezing; deriving physically-based parameterisation of all processes for the advancement of aerosol-cloud models. Scientist should develop projects:

• To better understand aerosol-cloud interactions (ACI) by appropriate laboratory and field

experiments including development of numerical descriptions and parameterisations

• To better understand the factors governing the CCN and IN activity of particles
• To develop better descriptions of aerosol chemistry for both organic and aqueous particles by laboratory studies, field experiments and modelling

• To develop better descriptions of cloud chemistry for both organic and inorganic compounds by laboratory studies, field experiments and modelling

• To better understand the role of the ice phase in mixed phase clouds

5. Particle sources and effects

Research focusing on quantitative health effects of different aerosol types, ideally performed in close collaboration with scientists possessing medical expertise, is therefore needed, and will be central to this topic. Scientist should develop projects:

• To develop more accurate characterisation techniques and protocols for the physical and chemical properties of ambient tropospheric aerosols

• To develop improved and new methods for the source apportionment of particles and particle Compounds

• To investigate health effects of different aerosol types

• To suggest relevant alternatives to PMx as indicators for health effects

6. Cross-cutting activities: Process-oriented model development / Combination of analytical techniques / Technology development

Multidisciplinary approaches will be encouraged throughout EuroTROP, using process-oriented modelling to connect laboratory studies and fieldwork towards a better systematic and quantitative understanding of the troposphere. Scientist should develop projects:

• To develop and apply process-oriented models for the description of aerosols and clouds

• To reduce complexity of process description for application in higher scale models.

• To combine advanced analytical techniques for a better field characterisation of oxidants, radicals, trace gases, aerosols and clouds.

• To develop new technologies and instrumental methods for the application in the real troposphere

• To develop new technologies and instrumental methods for the application in quantifying tropospheric processes in the laboratory

Guidelines for applications

(Outline and Full Proposals)

This Call for Proposals is for Outline Proposals for Collaborative Research Projects (CRP). Proposers should be individual scientists (or research groups represented by individual scientists) who are eligible for funding from a national funding organisation participating in the EUROCORES Programme EuroTROP.

Scientists or groups not applying for or not eligible to apply for funding from such an organisation can be associated to a proposal when their scientific added value can be demonstrated. Participation of Associate Partners in a project must be fully self-supporting and will not be financially sponsored by the participating funding organisations.

Proposals are only eligible if they fulfil all of the following **criteria**:

- Proposals must involve, as a minimum, three eligible Principle Investigators (PIs) from **three different countries.**
- A maximum of 50% of the total number of Individual Projects (IPs) in a Collaborative Research Project (CRP) can come from one country.
- Proposals must involve more PIs than Associated Partners (APs).

Applications should envisage three years of research. Taking into account the two-stage proposal selection and approval process (described below), the successful projects are expected to begin their research phase activities during **March** - **June 2012**.

Online submission of applications

Outline and Full Proposals will be submitted online. Applicants should follow the proposal structure as indicated in the application template for Outline Proposals available on the Programme website at: **http://www.esf.org/eurotrop**.

Links to information on national funding eligibility and requirements as well as to a EUROCORES Glossary and Frequently Asked Questions (FAQs) are available on the Programme website.

Prior to submitting Outline Proposals, all applicants must contact their national funding organisations in order to verify eligibility and to ensure compliance with their national grant requirements and regulations. The list of participating organisations and their nominated contact persons is included on the last page of this document.

At the time of the online submission of the Outline Proposal, the Project Leader will be asked to confirm on behalf of the consortium that all the Principal Investigators in the CRP have consulted their national funding organisations and are eligible for funding from these organisations.

Outline Proposals

Outline Proposals are invited by xth February 2011.

Outline Proposals will be examined by the participating funding organisations for formal eligibility. Therefore, it is crucial that all applicants requesting funding contact their national funding organisation prior to submitting their proposals.
In compliance with the rules and regulations of the participating national funding organisations, the requested funds under the EUROCORES Programme EuroTROP may include salaries for scientific and technical staff, equipment, travel costs and consumables within the project. The amounts requested from each funding organisation participating in the call must be clearly specified. National policies may also require the proposal to contain specific additional information. Applicants should be aware that the participating funding organisations can make adjustments to the requested funds in order to bring these in line with their normal grant regulations and standards.

As described below, applications will be reviewed according to specific assessment criteria in a two-stage procedure. The goal is to select scientifically excellent proposals which fit well within the scope of the programme and have significant potential to add value to its achievements.

At the outline stage, the Review Panel will select proposals based on the following criteria:

- Relevance to the Call for Proposals
- Novelty and originality
- European added value (scientific)
- Qualifications of the applicants

An Outline Proposal must comprise:

- A short description of the CRP (max. 1200 words, including objectives, milestones, methodologies (e.g. experiments and fieldwork);
  - Short description of how (and why) the partners contributing to the CRP will work together and how their contributions will be integrated;
- Short CVs of Project Leader (PL), all PIs and Associate Partners, including five most relevant publications (max. one page each);
- Estimated budget (consistent with the rules of relevant national funding organisation), tabulated according to a provided template.

Associated Partners (APs) are also considered part of a CRP and will be assessed as such at both the Outline and Full Proposal stage.

It will be assumed that arrangements for the handling of Intellectual Property Rights (IPR) will be in place within projects, following the applicable national legislation and national funding organisation's regulations. Applicants are strongly urged to have such arrangements in place, covering all research groups (including any associated groups) before the start of the projects. It is expected that the results obtained by the projects supported under this EUROCORES Programme will be placed in the public domain, through standard scientific dissemination activities.
It is also expected that compliance with all other relevant national or international regulations on research (for example ethics) will have been affirmed before funding is granted. It is the responsibility of applicants to clarify any such matters (if applicable) with their national contact points.

Full Proposals

Full Proposals will be invited following the recommendations of the Review Panel. The deadline for Full Proposals will be announced later, but is expected to be around xxth May, 2011.

Please note that only applicants who have submitted an Outline Proposal can submit a Full Proposal.

For the Full Collaborative Research Project (CRP) Proposals, the most important selection criterion is "scientific quality". Other criteria include interdisciplinarity (according to the scope of the call), qualifications of the applicants, level of integration and collaboration, feasibility and appropriateness of methodologies, European added value, relation to other projects (complementarities versus risk of overlaps and double-funding) and suitability of the requested budget.

The Full Proposals will be assessed by at least three independent external expert referees selected by the ESF. The expert referees are selected from a pool of scientists suggested by the participating funding organisations, the Review Panel and the ESF office. The names of all referees used in the international peer review of EUROCORES programmes, together with the names of those who have contributed to the peer review process in other ESF instruments, will be published on the ESF website once in a given year.
The referee reports will be made available (anonymously) to the applicants for their information and if necessary for their comments and clarifications. The Review Panel will rank all Full Proposals based on the assessment of the Full Proposal, the anonymous referee reports and the applicant's responses to these.
The Review Panel will create a rank-ordered list of the strongest Full Proposals and will subsequently make recommendations to the Management Committee for the funding of these proposals. The Management Committee assigned to each programme comprises representatives of all the participating funding organisations.

The actual granting of the funds to the Individual Projects will be based on the Review Panel's ranked list. The funding cut-off will be determined based on the total amount of funds available in each participating Funding Organisation and how the Individual Projects figure on the list. The use of funds in a project will be subject to the national requirements and regulations of each participating Funding Organisation.

Full proposals must include sound and well-argued scientific cases both at the level of the consortium's collective objectives and in terms of the expected contributions of each of the Individual Projects in the consortium. Full Proposals must also include a list of all participants and their contact information and shorts CVs, detailed tabulated budgets for the whole CRP and for each project within it. Full Proposals could include other necessary

supporting information. A coherent and common scientific case must be made throughout the proposal to demonstrate a collective and collaborative aim and for scientific synergy and integration of multinational expertise. In addition, the amount requested from each national funding organisation has to be clearly and separately specified. Detailed instructions on requirements and how to complete the application forms will be made available when inviting Full Proposals.

The **Project Leader** (PL) will be the main point of contact between the ESF and the CRP for the whole duration of the project. He/she will be responsible for the flow of information and communication between the ESF and all the participants in the CRP. The PL will represent the Collaborative Research Project in relation to its participation in programme activities and for the fulfilment of reporting requirements for the CRP as a whole and for the contributions of the individual Principal Investigators in the CRP.

In addition to their normal scientific and collaborative activities within the CRP, all **Principal Investigators** will be responsible for dealing with the requirements concerning the contributions of their national funding organisation, and for supporting the Project Leader in the overall progress of the CRP, including organising and participating in networking activities and in the fulfilment of reporting requirements.

Programme Structure and Management

Programme Structure

The overall responsibility for the governance of each individual EUROCORES programme lies with a *Management Committee*, whose members include one representative from each participating funding organisation in the programme (usually a senior science manager), together with an ESF representative.

Proposal assessment and selection are the responsibility of an international, independent *Review Panel*. The members of this panel are leading scientists, appointed by the ESF following suggestions from participating Funding Organisations. The membership of the Review Panel will be available on the Programme website for information. The Review Panel is also expected to monitor the overall scientific progress of the programme.

The Scientific Committee is formed by the Project Leaders of all funded CRPs and will be responsible for the overall scientific progress of the programme, including for the preparation of a work plan for the overall programme activities, including networking and dissemination. The Scientific Committee will also advise and support the EUROCORES Programme Coordinator in the coordination of the programme.

Programme Networking

Networking activities are designed to strengthen the scientific objectives of the EUROCORES Programme by promoting coherence and synergy in the activities of the scientific community involved. This will help to produce the European added value which is a main objective of all EUROCORES Programmes.

Networking and collaboration within EUROCORES Programmes take place at two levels:

1. Between the various Individual Projects within each Collaborative Research Project (CRP) (intra-CRP activities), and;
2. Between the funded CRPs in the programme (cross-CRP activities).

The intra-CRP activities must be supported through the individual research grants the participants receive from the national funding organisations in the given CRP.

The cross-CRP activities are centrally funded by the ESF through contributions from the participating organisations to the EUROCORES Programme.

The intra-CRP collaboration is motivated by the nature of the CRP's research objectives, i.e. by the scope and the complexity of the questions it deals with. In a CRP, the participating groups have the opportunity to gather the required critical mass to successfully address the objectives and challenges of their project.

The cross-CRP networking and collaboration is inspired by the aims and the nature of the EUROCORES Programme as a whole. The themes of EUROCORES Programmes are selected because they demonstrate a clear need for collaboration in the proposed field. The funded CRPs will collectively establish and streamline this new collaboration. To this end, the CRPs will

engage the programme participants and, when of clear benefit, colleagues from outside the programme in joint activities such as:

- Programme-wide meetings or conferences;
- Working group meetings for the exchange of information and results across the CRPs;
- Joint scientific meetings or summer schools;
- Short term visits;
- Development and delivery of joint training programmes;
- Seminars, workshops, symposia, invited sessions either stand-alone or as part of other larger events;
- Common web-facilities and publications.

Through active participation of scientists in the above mentioned activities, not only can existing collaborations be enhanced, but new and strategic partnership opportunities may also be identified.

Furthermore, these activities may provide opportunities to explore aspects of the programme which are not covered by the funded research projects.

The integrating activities between the CRPs should help to strengthen the field by building coherence within the existing and emerging research communities and will serve as platforms for the dissemination and outreach of the research conducted in the programme.

Project members are expected to participate annually in at least one cross-CRP activity.

When submitting your proposal, please note that the costs for networking within your CRP should be included in your proposal as part of the costs of meetings, travel and subsistence. Funds for networking between the CRPs will be centrally managed by the ESF through contributions from the participating funding organisations.

Programme evaluation

A mid-term evaluation involving the Review Panel will assess the overall progress of the Programme. The Review Panel may also comment on the CRPs' work plan in relation to the objectives of the overall Programme. A final evaluation at the end of the Programme will assess the overall achievements of the whole EUROCORES Programme.

Contacts in the participating organisations

As it is currently not known which Funding Organisations will support this programme, please contact your National Funding Organisation or Research Council to inquire about this programme.

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[1] The European Science Foundation (ESF) provides a platform for its Member Organisations to advance European research and explore new directions for research at the European level.
Established in 1974 as an independent non-governmental organisation, the ESF currently serves 79 Member Organisations across 30 countries.