

ESF Exploratory Workshop on
**Towards A Global Synthesis Of Methane
Fluxes From Land Ecosystems**

Hamburg (Germany), 10-12 April 2012

Convened by:
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The European Science Foundation (ESF) is an association of 72 Member Organisations devoted to scientific research in 30 European countries. The Mission of ESF is to provide a common platform for its Member Organisations in order to advance European research and to explore new directions for research at the European level. Through its activities, the ESF serves the needs of the European research community in a global context.

The main objectives of ESF for the years 2006-2010 (extended to 2011 and 2012) as defined by its *Strategic Plan* are to promote Science Strategy and Science Synergy, paving the way for initiatives across disciplinary and geographic boundaries in the European Research Area (ERA).

The Exploratory Workshops scheme is one of the key instruments of the Science Strategy “pillar”. Each year, ESF supports approximately 50 Exploratory Workshops across all scientific domains. The focus of the scheme is on workshops aiming to explore an emerging and/or innovative field of research or research infrastructure, also of interdisciplinary character. Workshops are expected to open up new directions in research or new domains. It is expected that a workshop shall conclude with plans for follow-up research activities and/or collaborative actions or other specific outputs at international level.

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Main Objectives of the Workshop:

Methane (CH₄) fluxes from terrestrial ecosystems are perceived as an important feed-back to climate change. Since the 1980s, many CH₄ flux studies have been conducted. However, other than the CO₂ flux observations, no comprehensive global synthesis of CH₄ flux observations has been achieved so far. This workshop aims at bringing together scientists experienced in measuring CH₄ fluxes at different ecosystems and scientists that synthesize observations of land-atmosphere fluxes using remotely sensed information and models to generate a global picture of CH₄ flux dynamics. Global constraints of this kind are needed for adequately incorporating CH₄ dynamics into global carbon-cycle models.

Expected deliverables of the workshop:

- The first deliverable is an international CH₄-FLUXNET initiative which builds on and connects previous synthesis and networking activities.
- The second deliverable is a strategy for the implementation of a functional and consistent database collecting CH₄ flux measurements from the global land ecosystems applying different approaches, e.g. chamber and eddy covariance methods.
- The third deliverable will be a set of papers on recommendations on best practices in chamber and eddy covariance applications for CH₄ flux measurements and standardized protocols for data processing and quality control.

- The fourth deliverable is the initialization of a series of synthesis papers on different aspects of CH₄ flux processes, for instance on the temperature sensitivity of CH₄ where we correct it for confounding factors.
- Finally, the CH₄ synthesis initiative shall lead to the generation of scaled up CH₄ fields, a “quasi-observational” space-time explicit picture, at least for the northern temperate to arctic latitudes.

Report publication and dissemination

The Workshop Report will be published on the workshop webpage.

PRELIMINARY PROGRAMME

The workshop will be composed of eight plenary sessions (six scientific sessions, two summarising discussion sessions) and of three time slots for break-out sessions which will focus on advancing the specific deliverables of this workshop. Each scientific plenary session will consist of three talks (each 20 min) and ample time for general discussion (45 min). Titles of presentations are preliminary so far and will be updated before the workshop.

Tuesday, 10 April 2012

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|--------------------|--|
| 10.00-13.00 | <i>Arrival, Reception</i> |
| 13.00-14.30 | <i>Lunch</i> |
| 14.30-16:30 | A. Plenary session: The need for a FLUXNET-CH₄; state of the art of land-atmosphere CH₄ flux research
(Chair E.-M. Pfeiffer ; Rapporteur E.-S. Tuittila)

Welcome; Rationale, Goals and Outline of the Workshop
L. Kutzbach

Presentation of the European Science Foundation (ESF)
Giuseppe Scarascia-Mugnozza (Standing Committee for Life, Earth and Environmental Sciences (LESC))

Update on the global CH₄ budget - top-down approaches
M. Heimann

Update on process understanding from field CH₄ cycle research
V. Gauci

Discussion |
| 16.30-17:00 | <i>Coffee Break</i> |
| 17.00-18.45 | B. Plenary session: CH₄ flux data availability from different land ecosystems
(Chair A. Knohl ; Rapporteur A.-K. Köhler)

Overview of CH₄ flux studies from boreal land ecosystems
J. Rinne

Overview of CH₄ flux studies from arctic land ecosystems
W. Oechel, D. Zona

CH₄ emissions in SE Asia's tropical peatlands
A. Schrier

Discussion |
| 19.00-21.00 | <i>Dinner</i> |

Wednesday, 11 April 2012

- 08.30-10.15** **C. Plenary session: Towards standardized methodologies for CH₄ flux studies**
(Chair **T. Vesala**; Rapporteur **D. Zona**)
- Conclusions from the CH₄ chamber calibration campaign**
J. Riis Christiansen
- State of the art of eddy covariance CH₄ flux measurements**
W. Eugster
- Quality assurance and gap-filling of CH₄ flux measurements**
S. Dengel
- Discussion**
- 10.15-10.45 *Coffee Break*
- 10.45-12:30** **D. Plenary session: Setting up a FLUXNET-CH₄ initiative**
(Chair **M. Mahecha**; Rapporteur **P. Serrano Ortiz**)
- Experiences from FLUXNET**
D. Papale
- Experiences and ideas from MethaneNet**
V. Gauci
- CH₄ research in PERGAMON, DEFROST and PAGE21**
T. Christensen
- Discussion**
- 12.30-13.45 *Lunch*
- 13.45-15:30** **E. Break-out sessions**
- a) **Next steps for the initiation of a FLUXNET-CH₄ initiative**
(Chair **D. Zona**, Rapporteur **L. Kutzbach**)
- b) **Towards a global synthesis on temperature sensitivities of CH₄ processes**
(Chair **M. Mahecha**, Rapporteur **A. Bloom**)
- c) **Joint efforts on best practices for closed chamber CH₄ flux studies**
(Chair **J. Riis Christiansen**, Rapporteur **S. Petersen**)
- d) **Joint efforts on best practices for eddy covariance CH₄ flux studies**
(Chair **W. Eugster**, Rapporteur **J. Rinne**)
- 15.30-16.00 *Coffee Break*
- 16.00-17:45** **F. Break-out sessions - Continuation**
- 18.00-19.15 *Light evening meal*
- 19.30-21.15** **G. Plenary session: Representation of CH₄ processes in climate-carbon cycle models**
(Chair **E. Matthews**; Rapporteur: **Ph. Bousquet**)
- CH₄ processes in the Walter-Heimann CH₄-hydrology model**
M. Heimann

CH₄ processes in the PEATLAND-VU model

K. v. Huissteden

Introducing wetlands and CH₄ dynamics in global climate-carbon cycle models

T. Vesala

Discussion

Thursday, 12 April 2012

- 08.30-10.15** **H. Plenary session: Global-scale analyses/synthesis of CH₄ processes and fluxes**
(Chair **D. Papale**; Rapporteur: **N. Shurpali**)
- What are wetlands and where are they?**
E. Matthews
- New empirical, data-adaptive methods for detecting temperature sensitivities of biogeochemical processes**
M. Mahecha, A. Bloom
- Three decades of methane sources and sinks: budgets and variations**
Ph. Bousquet
- Discussion**
- 10.15-10.45 *Coffee Break*
- 10.45-11.45** **I. Break-out sessions – Continuation from previous day**
- 11.45-13.00 *Lunch*
- 13.00-14.30** **J. Plenary session: Summary and general discussion of break-out sessions**
(Chair **T. Christensen**; Rapporteur: **M. Mahecha**)
- 14.30-15.00 *Coffee Break*
- 15.00-17.00** **K. Plenary session: General discussion on next steps to achieve the workshop deliverables, follow-up research activities and/or collaborative actions or other specific outputs**
(Chair **L. Kutzbach**; Rapporteur: **R. Gebert**)
- 17:00 *End of the workshop and departure*

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Objectives of the ESF Standing Committee for Life, Earth and Environmental Sciences (LESC)

The main objectives of the **ESF Standing Committee for Life, Earth and Environmental Sciences (LESC)** are:

1. to identify and promote emerging scientific topics and high quality science deserving special attention in Europe;
2. to manage a wide ranging portfolio of activities of the European Science Foundation;
3. to examine and report on issues of strategic scientific importance within its fields of competence.

This committee's sphere of activities comprises the broad field of life, earth and environmental sciences:

- Biology
- Biotechnology
- Agriculture
- Earth sciences
- Climate research
- Glaciology
- Oceanography
- Environmental sciences, etc.

ESF Standing Committees support a limited number of **Exploratory Workshops** each year. These workshops allow leading European scientists to explore novel ideas at the European level with the challenging aim to "*spearhead*" new and preferably interdisciplinary areas of research. Further details are available on the internet at <http://www.esf.org/workshops>.

One desirable outcome of an ESF Exploratory Workshop may be that participants submit **high quality proposals for further ESF activities** (such as "à la carte Programmes" or a EUROCORES initiative), or **research funding applications** for submission to the EU 7th Framework Programme or to other European or international funding organisations.

In the case of **ESF Programmes** ("*à la carte*" or [EUROCORES](#)), which are financed by, and coordinated through, the European Science Foundation, a draft proposal should be submitted to the LESC Secretariat for advice, to then subsequently undergo further external refereeing. If successful in obtaining LESC's scientific recommendation, the proposal will be submitted to ESF Member Organisations for funding on a voluntary basis. More details are available at <http://www.esf.org/research-areas/life-earth-and-environmental-sciences.html>.

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