

# Max Planck Institute for Chemistry (Otto-Hahn-Institute)



We are looking for three talented junior scientists to work with us on measuring and modelling reactive trace gases and plant ecological processes in forest stands. This work is funded by the EGER project (*Exchange processes in mountainous regions*) from the German Research Society (DFG), and the MPG. The positions will be filled as either stipends in accordance with the funding guidelines of the Max Planck Society or based on German TVöD.

The candidates will be involved in measuring and modelling of water fluxes and bi-directional trace gas exchange of vegetated canopies, as well as interactive coupling of the processes involved. The ability of stands to absorb trace gases, which are biogenically emitted by the plants and/or by the soil below, became known to be an important aspect of atmospheric budgets of trace gases. The amount of absorbed/escaping trace gases is controlled by (a) physiological and/or surface characteristics of vegetation and soils and (b) interaction of turbulent transport with processes of trace gas exchange, and (c) interaction of turbulent transport with atmospheric chemical transformations. The work focuses on a better understanding of de-coupling of in- and above-canopy layers during long-term and campaign-wise field measurements complemented by laboratory studies.

## 1. PhD Position “Soil”

### Background

- Masters Degree (Diploma or equivalent) in soil science, or geocology
- Experience in soil chamber techniques and field work are appreciated
- English language skills and practice in scientific writing is required

### Tasks

- Laboratory measurements of soil fluxes: soil production and consumption rates of NO (and N<sub>2</sub>O) as functions of soil water content, soil temperature and soil nutrient content (NH<sub>4</sub><sup>+</sup>, NO<sub>3</sub><sup>-</sup>). State-of-the-art instrumentation (chemiluminescence (NO)) is available and operational. Biogenic emissions are calculated applying an operational production-consumption-diffusion algorithm
- Field measurements of soil fluxes during intensive observation campaigns (1<sup>st</sup>: mid Aug. to Sept. 2007): Implementation of automated set of dynamic (NO, NO<sub>2</sub>, O<sub>3</sub>, CO<sub>2</sub>, H<sub>2</sub>O) and static (<sup>222</sup>Rn) soil chambers and complementary measurements of soil air profile (NO, N<sub>2</sub>O, CO<sub>2</sub>, CH<sub>4</sub>). Fourier transform infrared spectroscopy (N<sub>2</sub>O, CO<sub>2</sub>, CH<sub>4</sub>), radioactive decay counting (<sup>222</sup>Rn), IR and UV absorption spectroscopy (CO<sub>2</sub>, H<sub>2</sub>O, O<sub>3</sub>), and chemiluminescence (NO, NO<sub>2</sub>) instrumentation will be used.

## **2. PhD Position “Eddy Covariance”**

### Background

- Masters Degree (Diploma or equivalent) in meteorology, or geoecology
- Experience in eddy flux measurement techniques and field work are appreciated
- English language skills and practice in scientific writing is required

### Tasks

- Field measurements of vertical fluxes of reactive trace gases during intensive observation campaigns (1<sup>st</sup>: mid Aug. to Sept. 2007): application of the novel eddy covariance flux measuring system for NO, NO<sub>2</sub> and O<sub>3</sub> (fast dual-channel NO/NO<sub>2</sub>-chemiluminescence analyser ECOPHYSICS 790 TR) in and above canopy
- Data analysis with software packages from other sub-projects of EGER for evaluation and quality check, influence of fast chemical reactions and complex footprints

## **3. PhD Position “Plant Ecology”**

### Background

- Masters Degree (Diploma or equivalent) in biology, or geoecology
- Experience in branch chamber techniques and field work are appreciated
- English language skills and practice in scientific writing is required

### Tasks

- Laboratory and field measurements of bi-directional reactive trace gas exchange at branch level: exchange measurements of NO, NO<sub>2</sub>, HONO, and O<sub>3</sub> applying sensitive gas phase chemiluminescence (NO, NO<sub>2</sub>), UV absorption (O<sub>3</sub>), and absorption spectroscopy (HONO) analyzers for inferring rates of dry deposition and/or emission. Measurements with a highly NO-specific analytical instrument will be performed with enclosure systems (cuvettes) under controlled conditions in the laboratory as well as under changing environmental conditions in the field. Studies of the exchange with intact leaves and branches under different conditions inferring with primary plant physiological processes will contribute to our knowledge on exchange relations at the air/leaf surface and air/mesophyll interface.
- Data analysis to relate branch level conductances of NO, NO<sub>2</sub>, O<sub>3</sub>, HONO (or corresponding emission/formation rates) to simultaneously measured assimilation and transpiration rates as well as to primary physiological processes.

The willingness and physical ability to work on a 40 m meteorological tower is requested.

The positions are for 2 years with the possibility of an extension to 3 years. The application deadline is September 30, 2006. However, the positions will remain open until filled.

Applications must include a Curriculum Vitae, brief motivation as well as a statement of future goals, certified copies of academic certificates, two letters of recommendation. Non-native English speakers are to supply proof of English language ability (TOEFL scores or equivalent).

For position 1 and 2, please send your written application (also per e-mail) as soon as possible to

Prof. Franz X. Meixner or Dr. Eva Falge  
Max Planck Institute for Chemistry (Otto-Hahn-Institute)  
Joh.-Joachim-Becher-Weg 27  
D-55128 Mainz

For further information on the positions:

Email : meixner@mpch-mainz.mpg.de or efalge@mpch-mainz.mpg.de  
Phone : +49 (0) 6131 / 305-493 or 305-578

For position 3, please send your written application (also per e-mail) as soon as possible to

Prof. Jürgen Kesselmeier or Dr. Eva Falge  
Max Planck Institute for Chemistry (Otto-Hahn-Institute)  
Joh.-Joachim-Becher-Weg 27  
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For further information on the positions:

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