



FED-tWIN



**Programme de coopération durable sur le plan de la recherche  
entre les établissements scientifiques fédéraux et les universités**

**In the framework of the FED-tWIN program, the Royal Belgian Institute for Space Aeronomy (BIRA-IASB) and the Université de Liège (ULiège) are looking for a**

## **POSTDOC RESEARCHER (M/F/X)**

**to join their teams to support the activities of the FED-tWIN research profile Prf-2021-034\_BERTRAC#2 – Investigation of bidirectional surface/atmosphere exchange of reactive trace compounds in terrestrial ecosystems through measurements and modelling.**

### ***The two institutions***

The **Royal Belgian Institute for Space Aeronomy (BIRA-IASB)** is a Belgian Federal Scientific Institute (FSI) conducting research and providing services in the domain of the physics and chemistry of the atmosphere of the Earth and other planets, and outer space. The Institute has a long lasting experience with atmospheric trace gas measurements, which are an essential pillar in atmospheric research and crucial for atmospheric model evaluation. The BIRA-IASB team involved in this research profile is the Mass Spectrometry team, which focusses on *in situ* online reactive trace gas detection using mass spectrometric and other instrumentation. More information about the Institute, its activities and the projects in which it is involved can be found on [www.aeronomie.be](http://www.aeronomie.be).

The University of Liège (ULiège, <http://www.uliege.be>) is the only complete public university in French-speaking Belgium. Its TERRA Teaching and Research Center ([www.terra.uliege.be](http://www.terra.uliege.be)) of the Gembloux Agro-Biotech Faculty is one of its research units developing research in biological engineering applied to agronomy, biotechnology and the environment. Within this structure, the successful candidate will be more specifically affiliated to the BioDynE research axis, whose research is focusing on gas and energy exchanges between temperate ecosystems and the atmosphere.

The teams involved in this research profile have been collaborating for more than 10 years on biosphere/atmosphere exchange by merging their expertises in atmospheric trace gas detection (BIRA-IASB) and micrometeorological flux techniques (ULiège).

## ***Description of the research profile***

The BERTRAC research profile will focus on important aspects of the surface/atmosphere exchange of non-methane biogenic volatile organic compounds (BVOCs), ozone (O<sub>3</sub>) and reactive nitrogen (mainly NO<sub>x</sub>), a triad of (families) of reactive trace compounds which are closely linked in tropospheric chemistry. Whereas emissions of BVOCs by terrestrial ecosystems strongly affect air quality and climate, deposition of O<sub>3</sub> and NO<sub>x</sub> is known to influence ecosystem functioning with implications on ecosystem services.

Accurate knowledge on trace gas exchange drivers and processes is required for integration in chemistry and transport models in order to better predict future air quality and climate, and to allow policy makers to take the right decisions. Although the eddy covariance ecosystem-scale technique provides the most representative and reliable trace gas exchange measurements, the resulting above-canopy fluxes are not always easy to interpret as they are the net result of several concomitant exchange processes in which different ecosystem components are involved (vegetation, soil, litter, ...), and of potential photochemical trace gas loss and/or production and physical transport processes. This proposal will contribute to an improved identification and characterization of those exchange processes, especially for those compounds for which information is still scarce and for which knowledge gaps have been detected in previous joint research between the FSI and the University. This will be done by means of heavily instrumented campaigns at three well-characterized Belgian ICOS ecosystem sites (a mixed forest, a crop site, and a managed grassland), in which eddy covariance flux measurements, dynamic soil/litter and leaf/branch enclosure flux measurements and concentration profile measurements of the relevant reactive trace gases will be performed alternately using state-of-the-art instrumentation. In addition, a generic 1D surface/atmosphere exchange model, including all latest information on exchange processes, will be developed and applied as a supporting tool for field data interpretation. Furthermore, as disentanglement of co-varying trace gas exchange drivers in natural conditions is often very hard, field measurements will be complemented by experiments under controlled conditions in a growth chamber at the FSI and in the highly sophisticated and brand new ECOTRON infrastructure at the University.

## ***Job description***

The FED-tWIN researcher will participate in the activities of both teams.

She/He will:

- contribute to the development of new protocols for deriving high quality ecosystem-scale eddy covariance flux measurements of an extended set of reactive trace gases obtained with state-of-the-art chemical analyzers (e.g. PTR-TOF-MS for volatile organic compound flux measurements), in line with the most recent standard operating procedures.

- contribute to a better characterization of the (bidirectional) biosphere/atmosphere trace gas exchange processes through optimal use of the existing European Research Infrastructures (ICOS, ACTRIS, AnaEE) in which the teams are involved.
- help designing optimal measurement strategies for maximal information retrieval (e.g. combinations of eddy covariance, vertical profiles, use of enclosures, etc... in dedicated campaigns).
- be responsible for expanding the hitherto predominantly experimental joint research efforts between the two teams with a modelling component to support interpretation of (bidirectional) site-specific above-canopy eddy covariance trace gas fluxes and allow improved quantification of reactive trace gas budgets along the soil-canopy-atmosphere continuum.
- publish results in peer-reviewed journals of the domain
- integrate the themes of reactive gases and air quality into existing master degree courses at the University
- apply for research projects in the domain of interest.

## ***Job profile***

### Diploma and experience

You hold a PhD in Sciences, Applied Sciences or Agronomical Sciences/Bio-Engineering and have a postdoc experience in the targeted scientific domain. The PhD should have been obtained at the earliest 12 years prior to the submission date of the job application. The 12-year period is extended by one year for each maternity, parental and adoption leave of the candidate and for each long-term sick leave of the candidate or his/her immediate family.

### Specific expertise/skills

You should have been active in the field of environmental sciences (physics or chemistry), atmospheric sciences, biogeochemistry or related sciences and have experience with and extensive knowledge in at least one of the following subject areas:

- Air pollutant emissions (e.g. volatile organic compounds, ozone, nitrogen oxides) linked to terrestrial ecosystems and their related atmospheric chemistry
- Micrometeorology
- Ecophysiological processes and soil sciences
- Modelling of gas exchange between surfaces and the atmosphere

You have demonstrable experience with at least one of the following technical skills:

- field measurements / field work
- analytical instrument handling
- eddy covariance or less direct trace gas exchange measurement techniques
- system development, including logger programming

### Further specific qualifications

- You must have documented experience in handling and processing of large data sets using state-of-the art coding languages and in writing and publishing scientific articles.

- You are highly motivated, well organized and dynamic, with a high level of independence and creative thinking.
- You are eager to learn new techniques and you show a keen interest and curiosity driven approach to scientific questions
- You are a team player with excellent oral and written English communication skills, a good knowledge of French or Dutch is an asset.
- You have a very good knowledge of widely used data analysis tools in environmental sciences (Python, Matlab, ...)

### ***We offer***

- A contractual position of indeterminate duration, with simultaneous 50% appointment at ULiège and 50% appointment at BIRA-IASB.
- The starting date is negotiable, but the candidate should be available on 30/11/2022 at the latest.
- Access to state-of-the-art infrastructure at BIRA-IASB and ULiège.
- A stimulating and dynamic working environment where quality, professionalism and team spirit are encouraged.
- Extra-legal benefits are offered at BIRA-IASB.
- Flexible schedule and possibility to work occasionally from home.
- Refund of commuting expenses when using public transportation or bicycle.
- Access to special advantages arranged for employees of the federal scientific institutions (e.g. possibility to follow trainings, childcare in July/August).
- At BIRA-IASB, the salary will follow federal regulations for the scientific career in the SW2 scale, with possibility to acquire a bilingualism bonus.
- At ULiège, the salary will follow the regulations for a postdoctoral researcher.
- At BIRA-IASB all relevant work experience (public + private sector) will be considered when determining seniority.

### ***Procedure***

After evaluating the submitted applications, the selected candidates will be invited for an interview. Candidates whose diploma is not awarded in Belgium must submit a NARIC certificate of equivalence. If the equivalence certificate has not yet been obtained, the application must at least have been initiated at the time of the application. More information about the equivalence certificate can be found on the website: [www.enic-naric.net/index.aspx?c=Belgium](http://www.enic-naric.net/index.aspx?c=Belgium)

Both BIRA-IASB and ULiège seek to foster an environment where all talents can flourish, regardless of gender, age, cultural background, nationality or impairments. If you have any questions relating to accessibility, support or financial aspects, please contact us at [hr-ae@aeronomie.be](mailto:hr-ae@aeronomie.be) and/or at [linda.agro@uliege.be](mailto:linda.agro@uliege.be)

## *Interested?*

Please send to Prof. Bernard Heinesch ([Bernard.Heinesch@uliege.be](mailto:Bernard.Heinesch@uliege.be)) and Dr. Crist Amelynck ([Crist.Amelynck@aeronomie.be](mailto:Crist.Amelynck@aeronomie.be))

- A detailed CV, including a list of your scientific publications
- An elaborate cover letter describing your motivation
- Contact information of 2 referees

With the following reference: “D22\_FED-tWIN\_BIODYNE”.

**Deadline for applications: 30/04/2022**