

PESAt at the heart of your projects

Our academic research projects leverages innovation for the regional very small and medium-sized enterprises (SMEs). To achieve this, SMEs have to be involved in PIVOTS, notably through co-funding calls at territorial, national and European scales and with the support of the DREAM competitiveness cluster dedicated to water and natural environments. The terms of collaboration are as follows:

- Collaborative projects under regional, national or Europeans financing,
- Service provisions at various levels of the value chain,
- Training/demonstration support.

The Institute of Earth Sciences in Orléans (ISTO: Institut des Sciences de la Terre d'Orléans) conducts research in the areas of the geosciences, ranging from the internal dynamics of the Earth on up to the surface environments. ISTO is particularly involved in the reactive transport processes in natural porous environments and in the functioning and evolution of biogeosystems.

The Observatory of Sciences of the Universe in Centre-Val de Loire region (OSUC: Observatoire des Sciences de l'Univers en region Centre) federates a number of laboratories and staff members of the Orléans campus involved in PIVOTS (ISTO, LPC2E, ICARE, UR Sols) and federates the research conducted on the subsurface/ground/atmosphere continuum associated with global change. L'OSUC is responsible for the French Peatland Observatory (Service National d'Observation (SNO) Tourbières) labelled by CNRS. The SNO is a network of 4 instrumented sites in France, including the La Guette peatland.

Tourbières www.sno-tourbieres.cnrs.fr

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PIVOTS

www.plateformes-pivots.eu

PIVOTS is a coordinated set of experimental and analytical platforms dedicated to the development of environmental engineering and metrology for activities with a high consumption of natural resources.

Along the entire value chain, it brings together public and private-sector actors in monitoring the quality of the environment and the sustainable management of natural resources (soil, subsurface, surface water, groundwater, sediment, air).



With the support of:



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PIVOTS

PESAt

Platform on «Soil-Atmosphere» Exchanges in peatlands

An innovative metrology for the long-term observation and modelling of greenhouse gas emissions (GHG, CO₂ and CH₄) between peat soils and atmosphere.



Institut des Sciences de la Terre d'Orléans
ISTO



Measurement tools for estimating carbon budget at various spatial and temporal scales of the ecosystem and to reduce uncertainties in climate prediction models!



Static chambers for measuring the soil respiration and the net ecosystem exchange (NEE).
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Applications of PESAt

- Water, carbon and energy balance at the ecosystem scale,
- Outcome and transfers of dissolved organic carbon in wetlands and adjacent streams,
- Interoperable databases for greenhouse gas fluxes and modelling of these fluxes,
- Improvement of global climate prediction models,
- Implementation and validation of GHG and CO₂ measurement tools at various spatiotemporal scales,
- Effect of biodiversity change on CO₂ production (and GHG fluxes).



«SPIRIT» Infrared absorption spectrometer used to measure CH₄ and N₂O emissions. SPIRIT was developed by the LPC2E laboratory (CNRS – University of Orléans, international patent n° WO 2007/017570 A1), one of the OSUC laboratories involved with ISTO in PESAt.
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PESAt implements measurement tools that enable, over time and space, high-frequency acquisitions of spatio-temporal variabilities of GHG and Dissolve Organic Carbon (DOC) fluxes and of water balance and energy. This allows in particular to establish long-term carbon balance and to estimate the functioning as carbon sink or carbon source of peatlands; ecosystems that contain one-third of the global soil carbon stock. PESAt's instrumental devices are spread out across the site (La Guette peatland, Cher) and the experimental means (mesocosmes) and analytic tools are grouped at ISTO, Orléans. The main devices of PESAt are (i) a **eddy covariance flux tower** equipped with CO₂ and CH₄ analyzers, water-vapor measurement analyzers and a 3D anemometer, (ii) development of **automatic chambers** for measurement of spatial and temporal variability of CO₂ fluxes in peatlands (iii) development of **sensors for measurement of *in situ* CO₂ production and soil respiration** and (iv) sensors for measurements of environmental parameters and soil physics.



Weather station.
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Available means of study

- Flux tower equipped with CO₂, de CH₄ and H₂O analyzers and with a 3D anemometer for measuring by eddy covariance high frequency [20 Hz] of GHG fluxes,
- Sensors for soil temperature, soil water content and water level for characterization of soil physics,
- Sensors of heat flux in the ground and of net radiation for estimating the energy balance,
- A weather station,
- Automatic chambers deployed on-site to measure the spatial variability of the GHG fluxes,
- Mobile automatic chambers deployed for laboratory experimentation and on other sites,
- An environment for the analyses of solid and dissolved organic matter and of the chemical quality of waters.