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UNIVERSITÉ
SAVOIE
MONT BLANC



UMR0042

Alpine Centre for Research on Lake Ecosystems and Aquatic Food Webs (CARRETEL)

Mission and objectives

The UMR (INRAE – USMB, Université Savoie Mont Blanc) conducts research on lake ecosystems to produce knowledge on the ecological functioning and the dynamics of lakes and their biodiversity, from the past to the future, and to develop bio-indicators of lake ecological status. This research is carried out in the context of global change, in particular climate change and local anthropogenic pressures affecting lakes, and is designed to serve both fundamental and applied perspectives and to support policy and decision-making for lake management.

Management

Jean-Philippe Jenny, Director
Serena Rasconi, Deputy Director
Jean-Christophe Clément,
Deputy Director

Research topics

- Biodiversity & Biotic interactions
- Lacustrine biogeochemistry
- Ecological assessment

Key figures

- 15 researchers and lecturer-researchers
- 25 engineers and technicians
- 8 senior researchers
- 10 PhD and post-docs

Keywords

- Limnology
- Paleolimnology
- Biodiversity
- Multidisciplinary approach



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The main objectives are to:

understand how local and global pressures affect lake resources and ecological functions. Various disciplines and approaches (experimentation, limnology, paleolimnology) are used to understand and model ecological changes in lakes.

The specific objectives are to (i) understand the role of biodiversity, food webs and biogeochemical processes in lake functioning; (ii) evaluate the impacts of climate change, in relation to other anthropic pressures, on the organisms and lake functional characteristics (iii) evaluate the functional relationships between the atmospheric, terrestrial and aquatic compartments in order to identify and quantify the processes and flows operating in the lacustrine meta-ecosystem.

The unit's work mainly involves:

CARRETEL's expertise in (i) characterizing biological assemblages, their interactions and their organization into food webs, (ii) identifying the mechanisms that regulate biogeochemical processes, lake productivity, and the dynamics of biological communities (from plankton to fish) (iii) evaluating the impact of global and local stressors on lacustrine systems and responses to stress factors at different levels of observation, from species to communities and ecological functioning of the whole lacustrine ecosystem.



Centre
Lyon-Grenoble Auvergne-Rhône-Alpes



75 bis avenue de Corzent
74200 Thonon les bains
Tel.: + 33 (0)4 50 26 78 00

<https://carrel.lyon-grenoble.hub.inrae.fr>



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CARTEL UMR teams

- BIOTIC team: "Biodiversity & biotic interactions"
- MyCYCLE team: "Lake biogeochemistry"
- DiagnosE team: "Ecological assessment"

Glossary

- CCLA: Communauté de Communes du Lac d'Aiguebelette
- CISALB: Comité intersyndical pour l'assainissement du lac du Bourget
- CIPEL: International Commission for the protection of the waters of Lake Geneva
- ECLA: Pôle écosystèmes lacustres de l'OFB
- GLEON: Global Lake Ecological Observatory Network
- OFB: French Biodiversity Agency
- SILA: Syndicat Mixte du Lac d'Annecy

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Research

The main disciplines are ecology and limnology.

Questions relating to lacustrine functional ecology are dealt with at different spatial and temporal scales, and by considering different levels of biological organization (from genetics to ecological webs).

The research is being carried out in the context of global change, with issues involving many different disciplines (microbiology, trophic ecology, ichthyology, stress ecology, biochemistry, chemistry, molecular ecology, modelling, etc.) in order to obtain as complete a view as possible of how lakes function and how they are changing.

The issues include (i) conservation of lake biodiversity and quality, (ii) understanding the mechanisms underlying the ecological functions and the fate of carbon in lakes, (iii) developments in ecological assessment by including new generation of tools (high throughput measurements and observational methods).

Part of the research is at the science-management interface, close collaboration being established with lake managers.

Collaboration and expertise

OFB: As part of the R&D Division ECLA (Lake Ecosystems), CARTEL is jointly developing applied research projects with the French Biodiversity Agency.

OSUG: Since 2022, CARTEL is a member of the Grenoble Observatory for Sciences of the Universe (OSUG).

Network "Lacs Sentinelles" : CARTEL is part of this network, contributing to knowledge and management of high-altitude lakes.

Lake managers: CARTEL works closely with the managers of the major large peri-alpine lakes (CIPEL, CISALB, SILA, CCLA), carrying out ecological monitoring of these socio-economically important ecosystems.

International: CARTEL contributes to the international networks GLEON (Global Lake Ecological Observatory) and PAGES (Past Global Changes). The UMR runs the PARAQUA COST Action (CA20125) and is involved in various European projects (INTERREG, Twinning programs, CSA HORIZON-MISS-2022-OCEAN-01-09).

Scientific facilities

CARTEL runs the OLA infrastructure (long-term Observatory and experimentation on LAKes). This facility provides field and experimental analytical capacity in limnology to analyse and understand changes in, and functioning of, lakes exposed to local and global anthropic pressure.

This facility forms part of the Open Science system (open information system for historical lake-related data) and of the national facility ANAEE-France (Analysis and Experimentation for Ecosystems).

Teaching

CARTEL's lecturer-researchers are heavily involved in university teaching at USMB. The CARTEL UMR also contributes to specific training (limnology, WFD fisheries, specialized courses in plankton taxonomy, sclerochronology, new-generation biomonitoring using environmental DNA) as well as to organizing and hosting international limnology summer schools.



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