Global Change Ecology (GCE)



Explore this IDIL Master's track in detail, including its academic objectives, curriculum, research opportunities, admission requirements and career prospects.

TRACK OVERVIEW & LEARNING OBJECTIVES

Global Change Ecology (GCE) is an international English-taught track of the IDIL graduate program, focused on analyzing the effects of global changes on biodiversity and ecosystem functioning. It combines global change ecology, conservation biology, disturbance ecology, tropical ecology, palaeoecology, ecosystem dynamics, and environmental modeling.

The track trains students to analyze, manage, and understand the impacts of climate change, land-use changes, and biodiversity erosion. It places a strong emphasis on observation and reconstruction approaches, notably remote sensing, GIS, and palaeoecology, as well as ecological, climatic, and socio-ecological modeling.

The pedagogy combines lectures, seminars based on the critical reading of scientific papers, case studies, practical work, a field excursion, personal projects, and laboratory work. The objective is to prepare students equally for doctoral studies and for careers in environmental expertise and management.

KNOWLEDGE, SKILLS & COMPETENCIES

- Identify and explain the main drivers of global changes and their interactions.
- Analyze the current and future effects of global changes on biodiversity, ecosystem structure, and functioning.
- Utilize remote sensing, geographic information systems (GIS), and spatial data analysis.
- Build, simulate, and interpret simple models applied to climate, ecosystems, and disturbance regimes.
- Use palaeoecological archives and proxies to reconstruct past vegetation, fire, and biodiversity dynamics.
- Analyze disturbance regimes, succession, resilience, feedbacks, thresholds, and regime shifts.
- Critically interpret the results of global dynamic vegetation models and evaluate their limitations.
- Read, discuss, and present recent scientific publications in English.
- Conduct an individual or group scientific project, report results in writing and orally, and work in an interdisciplinary environment.

DETAILED CURRICULUM

Semester 1 (S7) HBB701B Global Change Ecology – Overview — 3 ECTS

- HAG913B Global Change — 3 ECTS
- HAB797B9 Evolution – B2E — 4 ECTS
- HBB712B Statistical Modelling — 2 ECTS
- HAB798B9 Ecology — 2 ECTS
- Non-Core Unit: Introduction to another IDIL program discipline — 2 ECTS
- In-Lab: Advanced GIS and AI for Environment — 2 ECTS
- Personal Project — 10 ECTS
- Transversal Training Unit IDIL — 2 ECTS

Semester 2 (S8)

- Research Internship (30 ECTS)

Semester 3 (S9)

<u>Chose 3 among 5 :</u>

- HBG912B Biological Conservation — 2 ECTS
- HBB906B Disturbance Ecology — 2 ECTS
- HBB907B Biodiversity in the Tropics — 2 ECTS
- HBB908B Mathematical Modeling for Climate and Environment — 2 ECTS
- HBB919B Spatial Data and Analysis — 2 ECTS

- HBB909B Palaeoecology — 2 ECTS
- HBB910B Ecosystem Dynamics — 2 ECTS
- Non-Core Unit: Introduction to another IDIL program discipline — 2 ECTS
- QAM2MUTP Multidisciplinary Team Project — 10 ECTS
- QAM2TTRA Transversal Units 2B IDIL — 4 ECTS

Semester 4 (S10)

- Research Internship (30 ECTS)

Non-Core Teaching Units IDIL:

HA1I01B	Mediterranean Ecosystems
MAM1IDIN	Innovations for personalized medicine
HA1I01H	Defusing quantitative bullshit
HA1I01V	Plant health 2.0: a global war
DAPCNCM1	Why democracy is Hard
PAM1IDCH	Challenges in chemistry for health and environment
HA1I01T	Scientific openness to earth and water issues under global change
HA1I03B	One Health and Eco-Epidemiology
HA1I12E	The Bionic Man
KAPMS790	Sustainable Mangement Basics
SAMIDNC1	IN-MOTION: How the way we move reveals who we are
HA1I22V	Biology by the numbers: Measure, Predict, and Design
PAMCBWCA	The Chemistry of Beer, Wine, and Culinary Arts
HA1I22B	Explore, understand, and learn: an outdoor journey in Sustainability
HA1I23V	Who's afraid of AI?
HA1I03V	Plastic, the invisible menace
HA1I02V	Shaping the Future of Agriculture
EA7EEISD	Economic Insights into Sustainable development

In-Lab

Advanced GIS and AI for Environment : 2 ECTS au S7.

ADMISSION REQUIREMENTS & STUDENT PROFILE

The track is primarily intended for Bachelor's degree students with a solid foundation in ecology, biodiversity, environmental sciences, or related disciplines.

- Strong interest in global change, conservation, and ecosystem management issues.
- Background in data analysis and an aptitude for developing quantitative and spatial skills.
- Ability to read, present, and discuss scientific work in English.
- Autonomy, critical thinking, teamwork skills, and an interest in project-based research.

CAREER OPPORTUNITIES

The track prepares students for doctoral studies in ecology, biodiversity sciences, environmental sciences, palaeoecology, conservation biology, or ecological and climatic modeling.

- Research engineer or project officer in ecology and environment.
- Project manager in biodiversity, climate change, conservation, or adaptation.
- Ecologist, environmental data analyst, or GIS and remote sensing specialist.
- Expert in ecosystem evaluation and management and disturbance-related risks.
- Research careers in universities, research organizations, and environmental observatories.

Potential employers: Research organizations, universities, local authorities, public institutions, consultancy firms, conservation associations and NGOs, natural area managers, and corporate environmental departments.

RESEARCH LABORATORIES & ACADEMIC PARTNERS

The track is part of the IDIL graduate program of the University of Montpellier and shares several courses with the B2E Master's program as well as IDIL transversal units.

The track relies on the scientific environment of Montpellier and on laboratories that can propose projects, host students for internships, and contribute to their supervision, depending on the topics and hosting capacities:

- **CEFE** — Center for Functional and Evolutionary Ecology (*Centre d'Écologie Fonctionnelle et Évolutive*): ecosystem functioning, biodiversity, evolution, conservation, and responses to global changes.
- **ISEM** — Institute of Evolutionary Sciences of Montpellier (*Institut des Sciences de l'Évolution de Montpellier*): ecology, evolution, palaeoecology, biodiversity, and environmental dynamics.
- **MIVEGEC** — Infectious Diseases and Vectors: Ecology, Genetics, Evolution and Control (*Maladies Infectieuses et Vecteurs : Écologie, Génétique, Évolution et Contrôle*): ecology and evolution of host, vector, and infectious agent systems in the context of global changes.
- **CBGP** — Center for Biology and Management of Populations (*Centre de Biologie pour la Gestion des Populations*): ecology, evolution, systematics, population genetics, and biodiversity management.
- **AMAP** — Botany and Modeling of Plant and Vegetation Architecture (*Botanique et Modélisation de l'Architecture des Plantes et des Végétations*): plant diversity, vegetation structure and dynamics, modeling, and remote sensing.
- **MARBEC** — Marine Biodiversity, Exploitation and Conservation: marine biodiversity, aquatic ecosystem functioning, and conservation.

These scientific partnerships foster laboratory immersion, research-based training, and preparation for doctoral studies.