

Internationally acclaimed actor, the Laboratoire de Glaciologie (GLACIOL) of the Department of Geosciences, Environment, Society of the Faculty of Sciences of the Université Libre de Bruxelles (ULB) is a research unit focused on the study of the cryosphere (glaciers, ice sheets and sea ice) and its relation within the climate system. This specialised expertise has enabled it to contribute to IPCC reports and to advance knowledge in an area of great societal concern.

With two full-time academics, half a dozen post-doctoral researchers and about fifteen doctoral students, GLACIOL publishes about twenty articles per year in leading and high-profile journals such as *Nature* and *Science*. Two lines of research guide the work led by Prof. F. Pattyn and Prof. F. Fripiat. First, ice analysis performed on samples collected in Antarctica and Greenland to reconstruct the paleoclimate (over the last 800,000 years), and to study the interactions between the cryosphere, the ocean and the atmosphere. The second area is the modelling of glaciers and ice caps in Antarctica to reconstruct the dynamics of the ice in interaction with the atmosphere and ocean and to improve projections of sea level rise.



© GLACIOL - Prof. Frank Pattyn, co-director of the GLACIOL laboratory

GLACIOL also carries out field work: geophysical methods (radar) enable it to determine the structure of the ice and the amount of snow received by an ice cap over several decades, as well as studying the flow of the ice. Moreover, the laboratory is involved in ocean, sea-ice and sediment sampling as well as in deep drilling in Antarctica and Greenland: besides unravelling past climate history this should help to better understand the sequestration of CO₂ in the ocean during interglacial and glacial periods, as well as the roles of the polar oceans on global biogeochemical cycles.

Current research projects

GLACIOL is currently involved in several projects supported by BELSPO and FNRS-FWO (EoS project) as well as three European projects (H2020). **PROTECT** ([Projecting sea-level rise: from ice sheets to local implications](#)) aims to improve projections of future sea levels through its various components: melting ice sheets, glaciers... Within this framework, the laboratory is modelling the Antarctic ice sheet to understand its variations in the geological past and is studying its interactions with the ocean in order

to improve the probability level of current estimates, which fluctuate between 50 cm and multi-metre sea level rise by the end of this century.

For its part, **BE-OI** ([Beyond EPICA – Oldest Ice](#)) aims to go back 1.5 million years into the past by drilling 3000 m deep into the oldest ice, close to the bedrock. This project should provide a better understanding of glacial cycles and variations in greenhouse gas concentration. It is complemented by **DEEPICE** ([MSCA Innovative Training Network](#)), the preparatory phase of the analyses that will be carried out on the oldest ice.

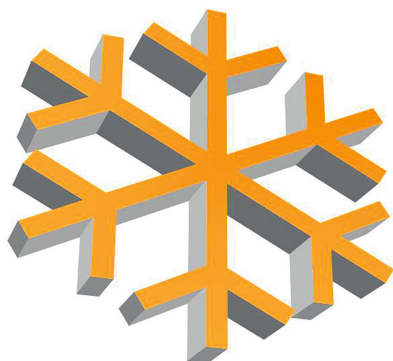
The challenge of understanding climate change



© GLACIOL

A true sentinel of the environment, ice records climatic variations while also being a victim of them. The challenge for GLACIOL and the international scientific community is to better understand the mechanisms behind these changes and to improve modelling techniques in order to obtain a better estimate of sea level by the end of the century. The laboratory has already made significant contributions to successive IPCC reports since 2013, including its 2019 “Special Report on the Ocean and Cryosphere in a Changing Climate”.

It remains to be determined how much of the observed changes in the cryosphere and ocean are due to human activities and how much to natural variability. There is no doubt that glaciologists still have their work cut out for them!



Laboratoire de Glaciologie - GLACIOL

Université Libre de Bruxelles (ULB)

ULB CP 160/03

50 Avenue F.D. Roosevelt

1050 Bruxelles

Tel.: +32 (0)2 650 22 27

Email: glaciol@ulb.be

<https://glaciologie.ulb.be/>