CLIMCOR

Paleo CLIMatic CORing: High Resolution and Innovations

The French coring/drilling has been acknowledged among the leaders in this field for the last 20 years or so, especially in ice and marine domains. However technological developments are pursued at different levels and the present CLIMCOR project, funded by the French Government new program for excellence in Infrastructures, intends to provide the French scientific community with top-notched technological support and a new generation of drilling/coring tools. CLIMCOR project concerns ice, continental and marine coring activities.

Here we present the first workpackage aiming, to provide equipment dedicated to produce or study ice cores . ***ANR-11-EQPX-0009-CLIMCOR***

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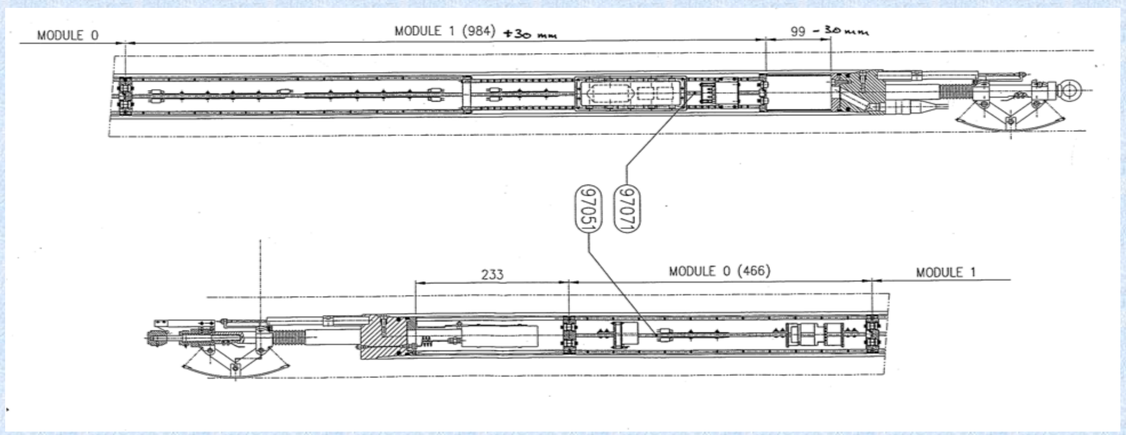
During the last decades, C2FN ICE (hosted by Laboratoire de Glaciologie et Géophysique de l'Environnement- LGGE – Grenoble), has developed a large range of drilling and logging tools, successfully used in polar and non polar regions. Priorities for their use by the ice core community are decided by a dedicated French Ice Core Science Group.

CLIMCOR – ICE 2012-2019

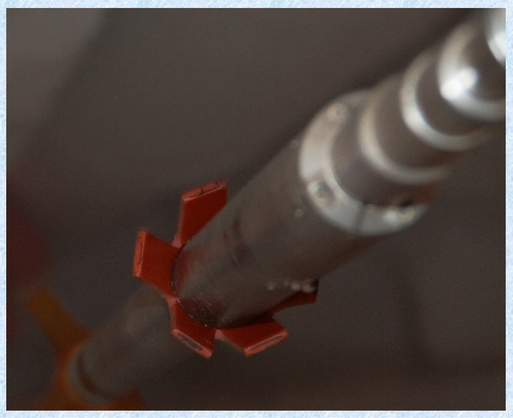
Thanks to CLIMCOR C2FN-ICE will enlarge the range of tools available for this community.

Borehole logging tools

A new borehole logger providing precise measurements of : pressure, temperature, inclination and orientation of a borehole



A new sonic borehole logger for crystal fabric studies. An existing commercial system will be adapted for use at high pressure.



Picture of the sonic logger from the University of Alaska (Fairbanks) implemented into the Dome C borehole in 2011.

Instruments for optimal work on a traverse

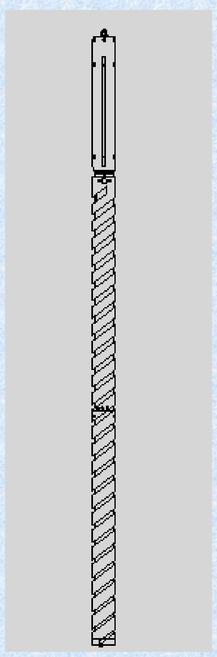
This part will include :

- a dedicated caravan able to embed a small drill and its motion (thanks to traps in the roof and floor) and equipped with clean benches for core treatment
- basic scientific equipment for primary measurements on snow cores.

Picture of the FELICS drill in the Italian ITASE caravan (left) and of the IPEV scientific traverse (right). © M. Frezzotti, ENEA; J. Chappellaz, CNRS/LGGE/IPEV

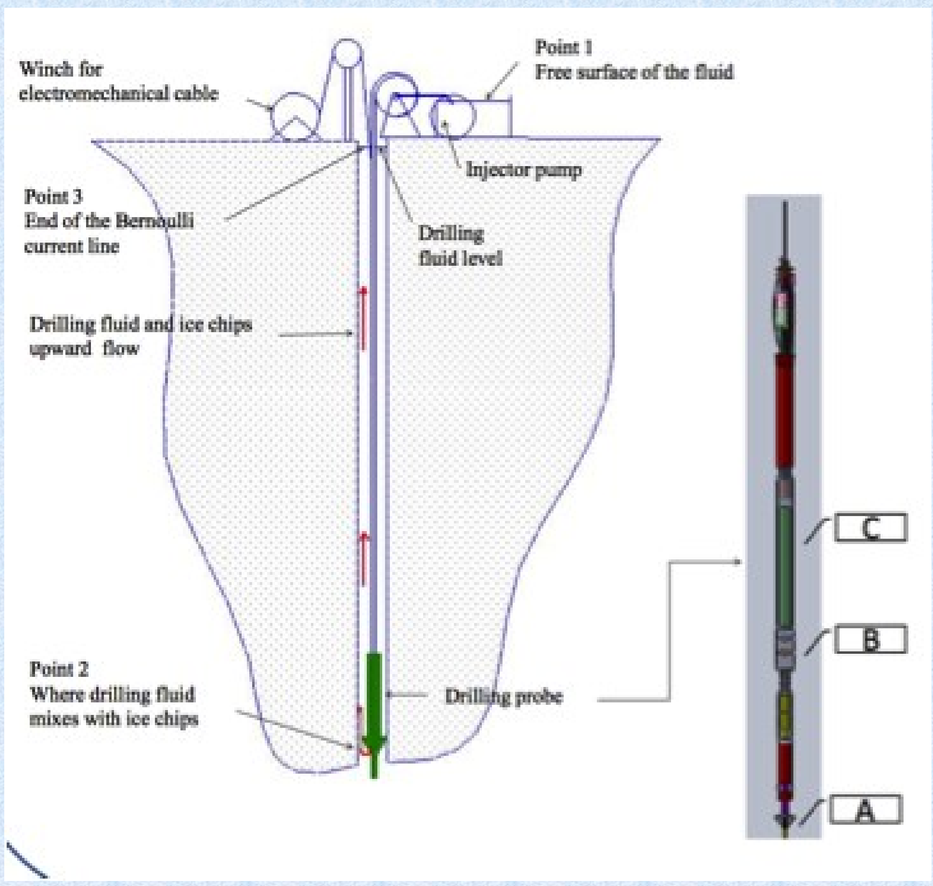
Improvement of existing technology

Lightweight electromechanical and thermal drills :



- This equipment with both an electromecanical and a thermal drill head and core barrel will allow to collect ice cores in extreme conditions (high altitude and carried by hand) and in "warm" ice (with the thermal head)
- R&D budget will be dedicated to reduce contamination of ice cores with organic compounds released by standard drilling systems, in order to obtain optimal measurements of organics in the ice.

Improvement of the Subglacior drilling probe



Subglacior is a new generation of drilling probe currently under development by C2FN-ICE(funded by the ERC Ice&Lasers and the ANR Subglacior projects). This revolutionary probe embedding a spectrometer will allow to measure CH4 concentration and H2O isotopes while drilling. CLIMCOR will support the integration of additional instruments in the probe, for measuring e.g. dust and conductivity.

A: drill head, B: gas/fluid splitting line, C: embedded laser spectrometer.

http://www.iceandlasers-subglacior.org

http://climcor-equipex.dt.insu.cnrs.fr