CLIMCORE - continent

« Science »

Une lecture commentée à tête reposée de la réponse à l'AAP equipex 2011

On the continents, various environments are drilled and cored to provide also reliable records of past climate: lakes, peatbogs, and loess deposits. These records nicely complement those from marine and ice-cores, yielding important datasets related to continental hydrology, the carbon, nitrogen and dust cycles, or, glaciers and ice sheets.

very high quality data and high-resolution records **that could extend their temporal coverage further back in time, in more contrasted climate conditions than the** last two millenniums or the Last Glacial Maximum

The currently **available drilling/coring equipments do not allow such important jump in the quality of the data**, and therefore in the knowledge of past climate variations at extremely high resolution.

Description du Programme

Scientific issues

Understanding past environmental and climate changes is a key issue to better investigate the recent and future ones

calibrate the Earth System models used for future predictions

Scientific issues / climcore - continent

Whereas polar and marine archives are able to record global climatic and environmental changes, continental ones (lake sediment, speleothem, peat bog, loess…) have long been considered as records of only local interest. The new boundaries of paleosciences tend to modify this point of view. Indeed emergent scientific questions regarding past environmental changes point the importance of a better knowledge of local impacts of global changes. In particular human-climate-environment interplays are under the scope in order to better define future environmental policies (Costanza et al., 2007, Ambio).

The field of "environmental changes" is including climatic change, but goes far beyond. The main identified issues being, in decreasing order: Biodiversity, nutrient (N and P) cycles and climatic change. Moreover, very few are known about emerging contaminants or on atmospheric aerosol loading (Rockstrom et al., 2009). Regarding the particular case of climate change, continental records are requested to perform "extensive networks of proxy data [which] would help measure how the proxies responded to the rapid global warming observed in the last 20 years" and (Jansen et al., 2007, Climate Change 2007: the physical science basis).

Diagnostic / communauté carottage continental

this community is distributed over more than 15 institutions and laboratories all over French territory

own low cost and limited coring equipment

Moreover the disparity of techniques and protocols used precludes the onset of an organized, efficient scientific community

La "solution" CLIMCORE-continent

a wide range of equipment, as well as several sets of tools, is required to remain competitive internationally

rapidity of deployment and robustness are the main required qualities of continental coring/drilling equipment, allowing to be projected on various fieldworks worldwide

Etat de l'art et investissements récents

C2FN-CONTINENT is equipped with a diverse range of equipments

They are located in more than a dozen of laboratories. The main ones are EDYTEM, LSCE, CEREGE, OSUR and LGP.

A new 250-90 drilling machine (150 k€; 2009) able to drill down to 250m and a truck with a trailer (220k€; 2010)

Connection between the different types of coring

The CLIMCOR proposal is dedicated to ice and sediment coring for paleoclimate investigations

The development of new technologies, such as with the recently granted EQUIPEX Aster-CEREGE, to investigate paleoproxies, which permit analyzing ice or sediment cores at extremely high resolution, bears a major prerequisite : the necessity to obtain sufficiently good quality cores

pooling the technological expertise of these different archives guarantees that exchange of know-how and experience will benefit to each of them

CLIMCOR EQUIPEX support and development will benefit to all relevant paleoclimatic investigations or infrastructure in France and more generally in Europe, whatever the timescale, the region or the nature of the record to be investigated.

Originalité et caractère novateur du projet d'équipement

range of very performing tools to overpass the technological challenges and open new scientific perspectives

The down hole hydraulic hammer

The Re-Entry large barge

The sand drill equipment

…

Networking activity benefit

C2FN has been designed as a national central service

It gathers the coring facilities corresponding to the different scientific fields, ice, marine, and continental domains, under the umbrella of the CNRS-INSU technical division (DT INSU).

The main laboratories are LSCE, EDYTEM, CEREGE, ISEM, LGP, Chrono-environnement, GEODE, etc. Dr. Fabien Arnaud represents this community

C2FN has a scientific leader, Dr. Denis-Didier Rousseau

The technical responsible is Michel Calzas

An important point to be noticed is that the different cells of CLIMCOR proposal are meeting regularly to discuss the present achievements in their respective fields. Exchanges of expertise and advices are constant and regular favoring a very strong and efficient activity for the benefit of the whole scientific community.

Environnement technique

All the equipment and prototypes founded by this EQUIPEX will be under the responsibility of CLIMCOR-CONTINENT and will be stored in the large garage onsite in La Seyne sur Mer

Associated laboratories and institutions (EDYTEM, LSCE, CEREGE, OSUR and LGP) have their own infrastructure and their own drilling equipment. Each laboratory will continue to manage their equipment and part of the equipment founded by this EQUIPEX under a MoU with INSU

In all cases the equipment will remain under the responsibility and the label of CLIMCOR.

Strategy of access to the equipment

CLIMCOR-CONTINENT is a central cell supporting more than 15 laboratories sprayed all over France on a technical level. It brings its expertise and gathers the expertise from very active laboratories and which have their own drilling / coring equipments and experience.

With CLIMCORE –CONTINENT all drilling and coring equipment means are put together.

Every laboratory will have access to the drilling equipment either from the central cell or from the equiped laboratories through an excellence-base call for proposal.

Upon request, any French or foreign laboratory can benefit from the CLIMCOR-CONTINENT expertise and advices. Under a financial participation (covering operating expenses) any laboratory can have access to the equipment under CLIMCORE-CONTINENT responsibility with a technical support.

Data dissemination (l'exemple des "marins")

The archiving of other material (biological, sediments) and its distribution is not the responsibility of the fleet. The policy for distributing this material is defined before head in the application file, and usually describes International program policy such as IMAGES.

Management du projet