

Beyond EPICA - Oldest Ice Core: The European effort to obtain a 1.5 Myr greenhouse gas –climate feedback record from an ice core in East Antarctica

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Beyond EPICA - Oldest Ice Core is an European driven research project funded within the frame of the Horizon2020 programme, aiming to retrieve an ice core from East Antarctica which dates back to the enigmatic Mid Pleistocene Transition (MPT), a period of time between 1.2 Myr to 900 kyr ago when the dominant 40 kyr glacial/interglacial cyclicity gave way to the current 100 kyr periodicity. The cause and effect relationship that led to the enigmatic MPT change in the climate system is not understood yet, as important information on global changes in the climate system are still missing. Most of this information, including the phasing of these changes in the Earth System can only be derived from a continuous ice core from Antarctica covering the last 1.5 Myr. Only ice cores contain direct and quantitative information about past climate forcing and atmospheric responses. However, the longest (EPICA) ice core record available to date covers only the last 800 kyr and therefore the International Partnerships for Ice Core Sciences (IPICS) has listed this “Oldest ice” challenge as one of the most important objectives in ice core science for the years to come.

The European ice core community took this challenge and it consists of renowned experts from Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, and the U.K. The European team’s reconnaissance phase was carried out using airborne and ground-based high-resolution radar surveys over the last three years. These studies of the Dome C and Dome F regions have identified a drilling site (called Little Dome C, LDC) at about 40 km southwest from Concordia Station and the former EPICA drill site, in East Antarctica. Over the next six years, the Beyond EPICA team will carry out an ice core drilling project at the LDC site starting during the Antarctic season 2019-20. As ice older than 800 kyr can only be found in the bottom 300 m of the core, the ice expected to cover the MPT will be available in 2024.