

Antarctica

The quest for the oldest ice on Earth

EU funds three-year project to decipher climate history with 2.2 million Euros

[14. November 2016] In Antarctica internationally leading ice and climate scientists of 14 institutions from ten European countries are looking for the oldest ice on Earth. Goal is to find the place, where in Antarctica the ice core can be drilled which goes furthest back in Earth's history. Such a core would allow to deciphering past processes in the climate system to improve prognoses for the future. The European Commission funds the project "Beyond EPICA - Oldest Ice" (BE-OI) with 2.2 million Euros, which is coordinated by the German Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI).

To find 1.5 million year old ice is the goal of "Beyond EPICA - Oldest Ice" (BE-OI). For comparison: currently, the oldest ice core goes back 800,000 years in time. Such cores contain the air from past times. With laboratory analyses the past composition of the atmosphere can be revealed. "We do not know, why there was a change in the glacial-interglacial periodicity 900,000 to 1,200,000 years ago", explains BE-OI project coordinator Prof Olaf Eisen, glaciologist at the Alfred Wegener Institute.



Field work (Photo: Alfred-Wegener-Institut / Thomas Steuer)

Before this so-called mid-Pleistocene transition glacial and interglacial periods took turns every about 40,000 years. Since then this period last about 100,000 years. This knowledge originates for example from sediment cores, but these lack the atmospheric gases. "We cannot dedicatedly investigate the role of the greenhouse gases, because we do not have suitable samples", says Prof Frank Wilhelms, AWI glaciologist and subproject leader.

BE-OI is supposed to change that: The project includes geophysical measurements, rapid drilling technologies and age determination of ice on site. In addition, required drilling technologies will be developed further and tested. The first hands-on work will be starting shortly: In Antarctica AWI glaciologists together with European BE-OI partners will investigate the ice sheets' thickness, its physical properties and the topography of the underlying bedrock at two different sites from an airplane as well as on ground. Ice thickness is just a first indicator of past ice, as different snow accumulation and ice flow behaviour determine, how thick the ice sheet is today.

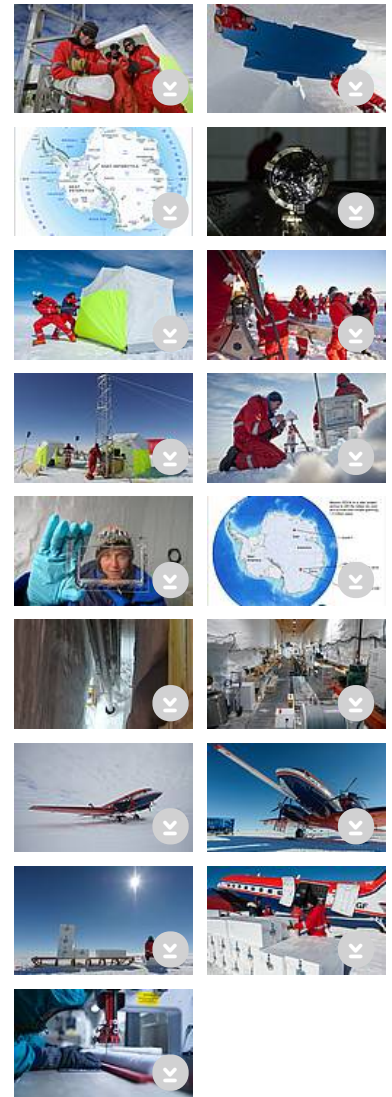
During the ground programme in a field camp the scientists will concurrently measure snow accumulation and will use new technologies, to drill boreholes and determine temperatures. "During previous studies we determined key regions, where we expect the oldest continuous ice record on Earth" says Olaf Eisen. "Now we have to prove this and it is important that we learn as much as possible about deposition processes and the composition of the ice", explains the glaciologist.

Besides such scientific questions, the project also has the task to assemble technical and personnel expertise for such a deep-drilling project, to set up a science and management plan and to establish the budget and funding. In order to generate a maximum scientific knowledge gain, the wider paleoclimate community and the modelling community are included as well.

Background:




The Beyond EPICA - Oldest Ice (BE-OI) consortium and its international partners unite a globally unique concentration of scientific expertise and infrastructure for ice-core investigations. BE-OI is an EU Coordination and Support Action (CSA). It delivers the technical, scientific and financial basis for a comprehensive plan to retrieve an ice core up to 1.5 million years old in a future project during the




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Beyond EPICA - Drilling Phase. This would be an important contribution for the future exploration of Antarctica and promises unique insights about climate and the global carbon fluxes. This knowledge will improve future prognoses of climate development with solid quantitative data and will allow establishing more targeted strategies, to cope with the societal challenges of global change.

BE-OI is the European contribution for the global search for a suitable site for a ice-core deep drilling. The consortium takes care of the pre-site surveys for site selection around Dome C and Dome Fuji, both potentially appropriate regions in East Antarctica. Other science consortia will investigate other regions under the umbrella of the International Partnerships in Ice Core Sciences.

Members of the consortium:

- Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI, Germany), Coordination
- Institut Polaire Français Paul Émile Victor (IPEV, France)
- Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA, Italy)
- Centre National de la Recherche Scientifique (CNRS, France)
- Natural Environment Research Council - British Antarctic Survey (NERC-BAS, Great Britain)
- Universiteit Utrecht - Institute for Marine and Atmospheric Research (UU-IMAU, Netherlands)
- Norwegian Polar Institute (NPI, Norway)
- Stockholms Universitet (SU, Sweden)
- Universität Bern (UBERN, Switzerland)
- Università di Bologna (UNIBO, Italy)
- University of Cambridge (UCAM, Great Britain)
- Kobenhavns Universitet (UCPH, Denmark)
- Université Libre de Bruxelles (ULB, Belgium)
- Lunds Universitet (ULUND, Sweden)

"Beyond EPICA - Oldest Ice"

In Antarctica internationally leading ice and climate scientists are looking for the oldest ice-core record on Earth. They want to find the place, where in Antarctica the ice core can be drilled which goes furthest back in Earth's history, up to 1.5 million years. Such a core would allow to deciphering past processes in the climate system to improve prognoses for the future. "Beyond EPICA - Oldest Ice" has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730258 with. The project runs from October 2016 to September 2019 and brings together experts of 14 institutions from ten European countries, coordinated by the German Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research.

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Additional information can be found on the project website: <http://www.beyondepica.eu/>

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