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Technical design of AURORA BOREALIS - icebreaker, drilling platform and multi-purpose research vessel

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In spite of its critical role in climate evolution, the Arctic Ocean is the only basin of the world ocean that has essentially not been sampled by the drilling vessels of the Deep-Sea Drilling Project (DSDP) or the Ocean Drilling Program (ODP), and its long-term environmental history and tectonic structure is therefore poorly known. Exceptions are the ODP Leg 151 and the more recent successful ACEX-expedition of the Integrated Ocean Drilling Program (IODP). However, the dominant lack of data remains and represents one of the largest gaps of information in modern Earth Science. Therefore, AURORA BOREALIS is currently projected as a new research icebreaker with drilling facilities to fulfil the needs of the IODP or its eventual successor as a Mission-Specific Platform, to drill in deep, permanently ice-covered ocean basins. This icebreaker will be designed to maintain position against drifting sea-ice and shall thus be equipped with a powerful, dynamic positioning system. This new icebreaker is planned as an optimized science platform from keel up and will allow to conduct long international, interdisciplinary expeditions into the central Arctic Ocean during all seasons of the year. In a long-term perspective, AURORA BOREALIS will also be used to address Antarctic research targets, both in its mode as a regular research vessel as well as a polar drilling ship. The construction of AURORA BOREALIS requires several new technical design efforts, such as advanced dynamic positioning and deep-sea drilling within closed sea-ice cover and two moon pools (7 x 7 m each), and will provide extended technical potential and knowledge for marine technology.

The current scientific and technical status of this European project will be presented.