



AURORA BOREALIS - a new research icebreaker and drilling vessel

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Future scientific breakthroughs in marine polar research critically depend on our ability to perform field expeditions with state-of-the-art technologies and modern infrastructures. This will require major investments, both in terms of generating new, as well as maintaining and renovating existing infrastructure. Diverse novel tools are presently projected, also within the context of scientific needs after the IPY has ended. We here report on the planning of a new European research icebreaker, the AURORA BOREALIS, with an all-season capability of endurance in permanently ice-covered waters and with the possibility to carry out deep-sea drilling in ice-covered deep-sea basins. AURORA BOREALIS will be the most advanced polar research vessel in the world with a multi-functional role of drilling in deep ocean basins and supporting climate and environmental research and decision support for stakeholder governments within the next 35-40 years. The vessel will be a powerful research icebreaker with more than 45,000 tons displacement and an estimated length of 180 m, with about 55 Megawatt propulsion power. New technological features to be implemented include a novel hull design and specialized dynamic positioning systems for operations under closed sea-ice cover conditions with up to 2.5 m ice thickness, combined with advanced satellite navigation and ice-forecasting support. Two moon-pools (7x7 m each) will allow routine deployment and operation of Remotely Operated Vehicles (ROV) and Autonomous Underwater Vehicles (AUV) in ice conditions. A dedicated deep-sea drilling rig with full weather protection will enable sampling of the ocean

floor in water depths down to 5000 m with 1000 m penetration under polar conditions. The modular arrangement of science space with hangars, the possibility to flexibly equip the ship with laboratory or supply containers and with helicopters, addresses the needs of diverse disciplines in marine research. We report on the current status of the technical design, the scientific outline and the framework of the Preparatory Phase recently started within the context of a European collaborative project, the European Research Icebreaker Consortium - AURORA BOREALIS.