

PLANNED INTERDISCIPLINARY-GEOSCIENTIFIC PROCESS-STUDIES ON A TYPICAL EAST ANTARCTIC CONTINENTAL MARGIN SETTING AT THE EKSTRÖM ICE SHELF (DRONNING MAUD LAND): FROM GONDWANA DECAY TO RECENT DEGLACIATION

Gerhard Kuhn¹, Christoph Gaedicke²,

¹Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Am Handelshafen 26, 27570 Bremerhaven, Deutschland, email: gerhard.kuhn@awi.de

²Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Hannover, Deutschland

Recent findings of outcrops of the so-called "Explora Wedge" and overlying younger sediments below the Ekström Ice Shelf initiated discussion about discovering this area in more detail.

The Ekström Ice Shelf is a characteristic ice shelf and one out of numerous small to medium scale ice shelves around East Antarctica. It is bordered by ice rises and ridges, has only a small catchment area and a slow flowing central ice stream. Nevertheless, this region is of critical importance to water-mass preconditioning in the Weddell Sea, and like other ice shelves in that area particularly susceptible to future environmental changes.

We have learned about sub-ice-shelf melting and freezing processes as well as the formation of supercool water and ice platelets mostly through modelling. Observations from land-fast sea ice are still very rare. Ikaite and related inorganic carbonate precipitation, processes probably observed in the ANDRILL sediment cores, may be associated with freezing processes and brine formation in this type of environment. Hardly any measurements exist regarding oceanographic and glaciological seasonal cycles and associated processes below an ice shelf, close to its calving, or at the grounding zones. Observations and detailed spatial mapping of seafloor morphology and composition are difficult and can only be done with the aid of AUVs or ROVs diving below the ice shelf. "Deep SCINI", a ROV that can be lowered through an ice hole, discovered a school of fish hidden under 740 m of ice and 850 km away from the coast and light, living at the grounding zone of the Ross Ice Shelf (WISSARD project). It also discovered a community of sea anemones (*Edwardsiella andrillae*), a new species, which lives in high densities upside down on the underside of the ice shelf and is part of an unknown system of biogeochemical processes. These are two more examples for living at the edge on Planet Earth.

Evidence of these biological, oceanographic and glaciological processes could have been archived in sedimentary deposits. With detailed seafloor mapping and high-resolution reflection seismic we hope to find postglacial and Holocene sediments. A sequence of more than 1000 m thick sediments has been detected lying on top of the "Explora Wedge" in an area between the ice shelf calving line and about 40 km inland below the Ekström Ice Shelf. Up to now, its age is relatively unknown but could range from Cretaceous to Pleistocene. Therefore, this area would be predestined for exploring East Antarctica's development from a greenhouse

environment after the Gondwana breakup to a Cenozoic icehouse environment, thus enabling us to possibly reconstruct the history and variability of the East Antarctic Ice Sheet. We will present various sites for drill holes and would like to raise awareness and interest within the community of polar researchers. Due to the proximity to the Neumayer III Station, the logistics of possible future investigations will be easier and will have less of an environmental impact than if started elsewhere in Antarctica.