

**STABLE WATER-ISOTOPE STUDIES FOR DECIPHERING  
THE RECENT STRUCTURE AND HOLOCENE EVOLUTION  
OF THE EAST ANTARCTIC ICE-SHEET MARGIN NEAR 12° E**

**(Abstract)**

by

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**ABSTRACT**

Since 1978 scientists from the German Democratic Republic, in collaboration with members of Soviet Antarctic Expeditions, have been studying the isotopic composition of ice and snow, as well as the trapped gas content of glacier ice from northern Queen Maud Land near 12°E, in order to decipher recent structures and Holocene evolution of this part of the margin of the East Antarctic ice sheet.

Along a 180 km north-south profile three large bodies could be distinguished: (1) Novolazarevskaya Ice Shelf (100 km wide, ≈700 m thick); (2) the ice cover (30 km wide, ≈300 m thick) of the Skaly Instituta Geologii Arktiki nunataks ["Skaly IGA"], with a scarp to the Schirmacher oasis; and (3) a firn glacier (50 km wide, c. 1000 m thick), filling the depression between "Skaly IGA" and the Wohlthat massif.

The ice-flow conditions of the surface layer are known. On the basis of isotope profiles from Soviet drilling sites on the ice shelf (447 m core) and on the firn glacier (809 m core), from the scarp and slope of the inland ice to

the south of the Schirmacher oasis (ablation zone), and from numerous pits through the surface layer, a preliminary stratigraphic model has been developed.

On the basis of recent flow conditions, the basal layer of Novolazarevskaya Ice Shelf and that of the inland ice of the "Skaly IGA" region were identified as relics of late Pleistocene ice cover by their mean deuterium content of -390 and -330‰ respectively. The old ice is covered by Holocene layers of regional origin ( $\delta D = -230$  to  $-150$ ‰); in the ice shelf there are also layers derived from the interior of Antarctica ( $\delta D = -350$  to  $-280$ ‰).

The isotope profile of the firn glacier (range of  $\delta^{18}O$  variations -32.3 to -18.1‰, identifiable annual layers of about 20 cm of ice to a depth of 500 m) represents a unique record of the last 7-8 ka for this region. It is also supported by measurements of the total air content trapped in ice samples ( $V = 107-127$  cm<sup>3</sup>/kg) taken from the 809 m core. Details will be published elsewhere.

More information is expected to be provided by isotope studies of extended blue-ice fields and ice-cored moraines.