



Permafrost Maps of the White, Barents and Kara Seas

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Subaqueous permafrost zone in the continental shelf of the Arctic seas of Russia formed due to a complex of geologic and paleoenvironmental conditions. By genesis, permafrost rocks of the shelf are divided into two types, (i) the relict ones, formed on land and then transported to sea and (ii) frozen rocks formed under the landfast ice. The first type bodies have thickness from first to first hundred meters and exhibit a variety of cryogenic textures. Subpermafrost water of different composition and origin occurs underneath. Second type permafrost is not more than first tens of meters thick, has mainly lenticular texture, humidity varying from 50 to 60% and the content of unfrozen water being at least 18-20% of total volume.

In the White Sea, individual pockets of relic permafrost occur, and in the Barents Sea they are yet more abundant and thick. At the Kara Sea shelf the belt of permanently negative rock temperature is estimated as 10-500 m thick. The temperature of the subaqueous frozen zone here is not below -0,5° or -0,8°C.

Direct estimates of thickness and position of the top of the permafrost zone are extremely scarce. Very few drillholes are the only source of data.

To assess the position and thickness of permafrost, for the first time in the world's practice of research of marine permafrost we used the method of transient of the electromagnetic field in the proximal zone. Presented maps are based on interpretation of the data obtained by this method and all the rest of the available materials.

We managed to determine the thickness and depth of the permafrost zone along the two main regional profiles and some off-profile points (shown on the abovementioned maps). Seismic and drilling data were also used to conclude on the morphology of the permafrost zone.

All maps (permafrost thickness map, permafrost depth map and subseafloor water temperature map) are isoline and scaled 1: 10 000 000.

Areas of frozen, chilled and thawed rocks are outlined in the maps. The depth of the permafrost top varies widely, dropping down beneath coastal shallow waters and rising up beneath open sea, thus correlating negatively with the sea depth.