



## **Alteration of submarine permafrost at the North Siberian continental margin**

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Empirical data as well as modelling experiments show that the stability of the Arctic cryosphere is today under immense threat due to global warming. Along the circum-arctic ocean periphery this cryosphere is comprised of terrestrial permafrost. However, during Quaternary times this frozen landscape was repeatedly changed due to fluctuations in both temperature and sea-level which particularly affected the wide and shallow Siberian shelves. As western part of the Beringian landmass this region was subaerially exposed during the LGM when global sea level was lowest. During the ensuing deglacial time sea-level rose gradually changing a terrestrial permafrost landscape into a shallow, marine shelf environment. Various geochemical, micropaleontological, palynological, and sedimentological data obtained from both conventional gravity cores and drill cores reveal the strong influence of this transformation process on the shelf environment. The sediments from just below the Holocene sediment package drilled on the outer shelf confirm the existence of permanently frozen, ice-bearing terrestrial sediments underneath. However, the oxygen isotope composition of the ice indicates that the frozen sediments were altered by re-freezing processes during and after the last global transgression. This assumption is further corroborated by high-resolution acoustic data, emphasizing the overall fragility of the natural state of submarine permafrost in the Arctic.