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Variations of surface and bottom currents in eastern part of the Charlie-Gibbs Fracture Zone during the Late Quaternary

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The sedimentary processes prevailing in the Charlie-Gibbs Fracture Zone (CGFZ) are gravity flows. They rework pelagic sediments and contourites, and hereby mask the paleoceanographic information partly. The aim of this study is to trace the North Atlantic Current (NAC) position via North Atlantic Polar Front (PF) migrations, as well as changes in bottom currents intensity in eastern part of the CGFZ during the Late Quaternary.

The sediment core AMK-4515 (52°03.14" N, 29°00.12" W; 370 cm length, water depth 3590 m) is located in the southern valley of the CGFZ. This natural deep corridor is influenced by both the westward Iceland-Scotland Overflow Water (ISOW) and underlying counterflow from the Newfoundland Basin. An alternation of the calcareous silty clays and hemipelagic clayey muds in the studied section indicates similarity between our core and long cores taking from CGFZ [1, 2].

Planktonic foraminiferal distribution and sea-surface temperature (SST) derived from these allow for tracing the PF and NAC latitudinal migrations during investigated period. So-called *sortable silt mean size* ($\overline{SS}$) was used as proxy for reconstruction of bottom current intensity. The age model is based on $\delta^{18}O$ data, as well as ice-rafted debris (IRD) counts and $CaCO_3$ content.

A sharp facies shift was found at 80 cm depth in the investigated core. According to [2] we refer sediments below this level to upper part of turbidite, which was formed as a result of massive slide. Therefore, only the upper section (0-80 cm) is valid for paleoreconstruction. Stratigraphic subdivision of this section allows to allocate 3 marine isotope stages (MIS) covering the last 35 ka.

It was found that late MIS 3, early MIS 2 and MIS 1 were characterized by active penetration of the relatively warm NAC waters into the Arctic. The PF was located south of the investigated site only during MIS 2 (18-21 ka). During late MIS 3 (28-35 ka), early MIS 2 (21-28 ka) and beginning of the early deglaciation (~16 ka), the PF in the winter seasons was shifted to the south of its modern position.

Influence of the bottom currents within the investigated interval led to accumulation of current-affected sediments at least in the southern valley of CGFZ and probably to beginning of the channel-related drift formation. According to the grain size data, maximal bottom currents speed occurred at the MIS 3/2 boundary. Intensifications of the bottom currents of the Newfoundland Basin water within MIS 2 have no relationship with any climatic cyclicity, which is common for the ISOW.

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References:

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