The Tail of the Bank Mud: a deposit originating from Agassiz –driven outburst floods?

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Along the Labrador and northeastern Newfoundland continental margins we recognize distinct Holocene sediment layers rich in detrital carbonate (DC) that likely originated through entrained glacial sediment eroded from Paleozoic limestone and dolomite bedrock flooring Hudson Bay and Strait, and transported in plumes and ice rafts by catastrophic discharges from glacial lakes in both the inner and outer branches of the Labrador Current. Radiocarbon dating shows that two DC layers on the northern Northeast Newfoundland Shelf correlate to glacial Lake Agassiz outbursts and retreat of the Noble Inlet ice advance, respectively. Foraminiferal faunas indicate the layers are associated with reduced-salinity waters. DC layers in a recently re-examined core from southern NENS suggest that outburst floodwaters likely continued traveling southward in the Labrador Current toward Grand Bank, where on the southern margin of the Bank an enigmatic deposit of sandy mud has long been known. The Tail of the Bank Mud consists of silty and clayey sand, the deposit is up to 30 km wide, and extends 200 km along the edge in present-day water depths of 55 to 120 m. The Mud rests unconformably on an erosional surface formed by the last marine transgression, which was submerged here after 10 ka. Recognition of outburst floods issuing from Hudson Strait into the Labrador Current raises a possibility that suspended plumes and ice-rafted sediment carried by these floods may have been a source for the Mud, and that mixing of early Holocene marine and floodwater could explain its known lower-salinity fauna. This is supported by new analysis of two cores that reveals two DC layers with the same foraminiferal fauna as found in DC layers farther north that are correlated to the Holocene lake outburst floods. The recognition of Holocene-aged DC layers and oxygen isotope evidence in Scotian Slope cores also indicates that outburst reduced-salinity waters had been transported south of Grand Bank at this time.

We hypothesize that icebergs and outburst waters flowed over and around the Grand Bank and were transported over the shelf edge into the northern zone of the Gulf Stream. Warmer water temperatures and decreased current velocity in the deeper water facilitated deposition on the Tail of the Bank. Some of the reduced-salinity waters may have been carried by the Gulf Stream and North Atlantic Drift to the Nordic Seas, where they could have decreased thermohaline circulation, and contributed to a cold event.

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