DRAINAGE SYSTEMS ASSOCIATED WITH THE LATEST PLEISTOCENE - HOLOCENE PALEOSHORELINE ON THE NEW YORK - NEW JERSEY CONTINENTAL MARGIN

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Systems of channels that delivered sediment to the latest Pleistocene-Holocene paleoshoreline on the New York - New Jersey Continental Margin were studied with high-resolution subbottom profiles (CHIRP) and sediment cores. The data was collected from the outer shelf (80 -140 m of water depth) from the R/V Endeavor during the summer of 2002. Radiocarbon ages obtained from shallow-water mollusk assemblages of intertidal affinity permitted to develop a chronology and to locate the Last Glacial Maximum (LGM) shoreline at 120 m of present water depth. The ages obtained were calibrated and correlated to Sidall et al. (2002) global sea-level curve. The LGM paleoshoreline was characterized by broad beaches (1 km long), barriers and lagoons (1 km wide,10 to 15 m deep), and deltas that extended several kilometers off-shore from the paleoshoreline. Together these data provide evidence that the head of Hudson Canyon was subaerially exposed from 90 to 120 m of present water depth and fluvial channel systems delivered sediment directly to the head of the canyon. The channels studied are ~5m deep and 10m wide and form anastomosing patterns near the head of Hudson Canyon representing at least two episodes of incision. The oldest channel cutting episode dated southwest of the canyon is beyond the resolution of radiocarbon and we speculate that it occurred during glacial stages 4 and 3. The fill of the youngest channel is 12000 BP to 10500BP.

Heavy mineral assemblages and SEM/EDX analyses permitted to identify the provenance of the LGM channel sediments as originating from two distinct sources: 1) high-grade metamorphics possibly derived from the Paleozoic Hartland Terrain; and 2) basic igneous possibly derived from the Mesozoic Newark Basin. These sediments are found to the northeast and southwest of the Hudson Canyon, respectively. In contrast, during the early Holocene deglaciation the drainage was derived from the mixing of the same sources. This indicates that heavy mineral assemblages can be used as a stratigraphic tool to unravel the history of the Laurentide Ice Sheet. Future goals are to study heavy mineral assemblages from Pleistocene sediments recovered by the Ocean Drilling Program, Site 1073 from the Hudson Apron. The longer record will permit to track changes in drainages shedding information on previous glaciations of the margin.