

Regional and Local Stratigraphic Markers in Three Hudson River Cores Taken Near Peekskill, New York: LWB4-3

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Abstract

We have been studying the stratigraphy of core LWB4-3 taken in 2001 in the Hudson River near Peekskill New York along the transit path of the Peekskill meteorite. We measured magnetic susceptibility at 1 cm intervals down to 108 cm and chemical composition at 1 cm intervals down to 192 cm. The highest magnetic susceptibility occurs at 18 cm depth. This inferred Peekskill meteorite layer with high magnetic susceptibility contains locally higher concentrations of Ni and higher Ni/Cr ratios. Our identification of the high susceptibility, high Ni layer as coming from the fall of the Peekskill meteorite in 1991 is consistent with a uniform sedimentation rate in the core and the occurrence of the base of modern Pb at > 192 cm depth (below the base of the core). From previous work on cores from Central Park Lake, the base of modern Pb represents the year 1880 A.D. We also found other prominent horizons whose ages fit a linear sedimentation rate model. We found a peak in As, whose inferred age matches 1988, the year when Pb and Cu arsenide were banned as pesticides. In addition, we found a modest susceptibility peak above the Peekskill layer whose inferred age matches that of the 1996 Hudson River flood. We found a second modest susceptibility peak below the Peekskill layer whose inferred age matches that of the "Great Catskill Toilet Flush Flood" in 1980. This layer also has local maxima in Pb, Cu and Ca. The Catskills contain Devonian limestone that might be the source of excess Ca. Copper Mine brook is located on the east bank of the Hudson north of Peekskill and is a potential source of Cu during floods. Our core exhibits a distinct increase in Ca content starting at 20 cm depth and increasing towards the top of the core. This prominent increase in Ca may represent 1991 A.D, the time of the invasion of the zebra mussel. We are testing this depth range for calcium carbonate to determine if the upward calcium increase could be from the invasion of the zebra mussel, increased soil erosion or anthropogenic pollution. We found a peak in Pb at 112 cm depth whose inferred age matches that of the cessation of incinerator burning in 1938. Cs-137 and Pb-210 ages are in progress and may be available by the time of the meeting. We also saw an unusual horizon at a depth of 118 cm with a high peak of Cr. This would be approximately the year 1936, which corresponds to a large flood in the Hudson.

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