Annual Manganese Peaks in Hudson River Sediment Core LWB1-08

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We have been studying a sediment core LWB1-08 taken from the Hudson River south of Piermont Marsh and adjacent to Yonkers, NY. ITRAX X-Ray Fluorescence (XRF) logging of this core showed large peaks in silica that correlated with coarse sediment layers. We infer that these represent times of high current velocities in the river, which most commonly occur during the spring freshet. XRF data also showed regular peaks in manganese, which we are fairly confident are annual, due to the redox-sensitive nature of manganese and increased mixing of the water column during annual spring freshets in the Hudson. A chronology based on the manganese peaks from three XRF scans dated the coarsest sediment layer in the core to 1913, the year of the large historical spring flood in the Hudson. According to our manganese chronology, the Pb data from the XRF scans show sharp increases around the years 1860 and 1880, corresponding to times when coal burning became abruptly more common in New York City and the surrounding Hudson Valley area, perhaps due to the introduction of the Hudson River railroad line and power generation in New York City, respectively. There was also a smaller lead peak in the early 1760's, near the bottom of the core, which could be interesting for future study. We are waiting for results from ^{14}C dating and ^{137}Cs dating for added stratigraphic markers to confirm that our manganese-based chronology is accurate.