

ESTIMATING Climate VARIABILITY for the Lower Hudson River Region Using a TWO-TRACER approach: oxygen isotopes and Mg/Ca ratios

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Abstract

The primary goal of this pilot study is to develop the tools to evaluate climate variability (decadal to centennial scale) of the Hudson River region based on climate reconstructions from a time slice between 4,900 and 5,100 yr. B.P. This will be accomplished by estimating salinity changes and fluctuations in freshwater discharge rates into the Hudson River by estimating salinity and temperature from two proxies: Mg/Ca ratios, and stable isotope records obtained from bivalve shells. These data will be obtained from a nine meter core (SD-30) previously drilled in the Hudson River near Nyack. The Hudson River flow is recorded by the position of the salt wedge, with extreme flow rates and salinity changes in the estuary resulting from watershed droughts or excess precipitation. Mg/Ca ratios obtained from the bivalve species *Mercenaria mercenaria* will provide estimates of temperature changes. With an estimate of temperature, it will be possible to evaluate salinity using oxygen isotope records. These salinity changes will serve as proxies for climate variability (i.e., long-term precipitation patterns). This study is part of a larger collaborative effort that includes C. McHugh, L. Burckle, and D. Peteet, in developing a climate record for the Hudson River Region from historical times to over 6,000 yr. B.P.