

Foraminifera of the Hudson River Estuary: Interpretations of Paleoenvironment and Catastrophic Events

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We studied two sediment cores taken in 2002 in the Hudson River. Cores CD02-13 and CD02-23 were taken 32 and 26 km upriver from the mouth of the Hudson River, respectively. We used down core logger data to locate density offsets, and abnormally low magnetic susceptibility (MS) layers. The sediment was sampled just above and below density offsets at 2 cm intervals. Strata of low susceptibility were wet-sieved to locate wood or foraminifera. Wood was picked for AMS ¹⁴C dating at two depth horizons. We picked fresh appearing wood fragments, avoiding black coatings that might indicate reworked wood. At 305 cm depth in CD02-13, the corrected AMS ¹⁴C age is between 1264 BC and 1047 BC. At 325 cm depth in CD02-23, the corrected ¹⁴C age is between 1210 BC and 932 BC. Foraminifera and diatoms were picked for scanning electron microscope analysis and energy-dispersive X-ray microanalysis. Weathered, smooth surfaced marine foraminifera in core CD02-13 from 295-300 cm depth and in CD02-23 from 325-327 cm depth contained significant amounts of Mg. Sn coatings with detectable Ni were found in planktonic marine foraminifera in CD02-13 from 307-313 cm depth and in CD02-23 from 327-329 cm. Preliminary species identification found varying types of foraminifera at different stratigraphic levels: *Ammonia beccarii* and *Globigerinoides ruber* var *white* and *pink*. Foraminifera are absent in strata that contain larger amounts of wood and scolecodont jaws. Also present are marine and brackish diatoms such as *Auliscus* sp., *Campylodiscus* sp., and *Coscinodiscus* sp. Grain size analysis shows a possibly fining upward sequence in core CD02-23. Layers with planktonic and benthic species are associated with coarser grain sizes in CD02-13 and are accompanied by bivalve pieces. These layers such as at ~100cm depth are interpreted as being deposits during drought periods. Layers where Mg enriched benthic foraminifera are present which have been highly abraded are interpreted as being reworked and possibly come from a sudden erosional event such as a tsunami, hurricane, or large spring freshet. This work is important for climate predictions in the Hudson Valley region. Records of past climatic patterns in the sediment could give insight into future land-use planning, and the carrying capacity of large metropolitan centers such as NYC.