

**The Quest for a Novel Paleosalinity Indicator:
Did Tsunami Events Generated by an Extraterrestrial Bolide Cause a Change in
Salinity in the Hudson River Circa 2300 BP?**

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Evidence has been found for an impact-induced megatsunami event that occurred circa 2300 BP in the New York-New Jersey region and may have reached elevations of approximately 60 meters above sea level near the coast. If such a catastrophe were to take place today, it would affect millions of lives in the NY-NJ area. Impact indicators, consisting of vesicular aluminosilicate glass, colored carbon fibers, and various shocked minerals, have been identified in three estuarine sediment cores (CD01-02, VM32-2, and CD02-29A) in the Hudson River, as well as in one marine sediment core (All-124-GC1) close to the crater candidate in Carteret Canyon, situated off the mid-coast of New Jersey. The project aims to determine if tsunami events triggered by an extraterrestrial impact caused a change in salinity levels in the Hudson River.

Scolecodonts (jaws of polychaete annelids) exhibiting high traces of iodine have been identified at multiple depths of the aforementioned sediment cores. From scanning electron microscope analysis of the scolecodont's elemental composition, higher average iodine concentrations have been found in marine samples than in estuarine samples, as represented by the following results: 16.11% iodine in marine scolecodonts, 13.02%-14.15% iodine in estuarine scolecodonts, and 2.47% iodine in modern-day upriver scolecodonts for reference. Upon further examination, because scolecodont iodine concentrations increase as the coring sites move farther downriver to more saline waters, these various amounts of iodine have been found to positively correlate with Hudson River salinity levels, making these microfossils useful proxies for additional paleosalinity studies.

Salinity is vital to estuarine ecosystems and can be intricately connected to climate with increased precipitation leading to decreased salinity levels. Furthermore, air-water interactions can be influenced by salinity due to regions high in salinity having low dissolved oxygen concentrations as a result of less frequent vertical mixing. Future work includes obtaining more scolecodonts in order to continue testing within and beyond the tsunami layer. In the process of learning if tsunamis produce changes in salinity, this study has revealed that scolecodonts can serve as another practical paleosalinity indicator for the future.