ORAL PRESENTATION

CHRONICLES OF SALT MARSHES WRITTEN IN DIATOM LANGUAGE

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The sharp distinction between freshwater and marine diatom floras has been successfully used to reconstruct the history of sea-level and coastline changes since 19th century. Classifications of diatom species into salinity categories are still a favorite tool for interpreting diatom data in sediment cores from coastal locations, including intertidal marshes. Coastal wetlands and salt marshes are not, however, just zones where two separate floras come into contact, but unique and heterogeneous ecosystems supporting specialized biological communities. Disentangling environmental drivers of diatom community structure in these habitats is akin to decoding a forgotten language that was used for writing a historic account of environmental change in coastal regions. Our goal in studying diatom assemblages from New York and New Jersey salt marshes is to advance their use as indicators of past and present conditions. Using several sets of modern diatom data collected for various research projects, we identified species' preferences for habitat, substrate type, sediment texture, salinity, and nutrient content. In order to understand the origins of diatom populations found in marsh sediments, we also examined diatoms inhabiting adjacent water bodies and intertidal sand- and mudflats. These data, together with other biological and geochemical proxies were used to reconstruct environmental history of the coast, assess human impacts, and estimate resilience of salt marshes to storms, hurricanes and sea level rise. Our investigation of seven cores collected from salt marshes in New Jersey revealed dramatic changes in the composition of diatom assemblages over the last ~ 200-250 years, and especially in a few last decades, following a relative stable period of approximately 1800 years. We attribute these changes mostly to cultural eutrophication, as the most evident shift in diatom assemblages is towards the dominance of species associated with high nitrogen content of sediments, such as *Halamphora* spp., *Fallacia pygmaea*, *Planothidium* cf. *frequentissimum*, *Navicula johnsonii*, *N.* cf. *willisiae* and others. In some locations, metal pollution appears to be related to changes in diatom assemblages. The most conspicuous alterations of marsh ecosystems in the late Holocene were apparently caused by storm events as evidenced by an increase of planktonic and tychoplanktonic diatoms in marsh sediments and disappearance of diatoms typically associated with vegetated marshes. Careful ecological species profiling in conjunction with multidisciplinary approach to sediment core analysis can shed great light on the history of costal ecosystems.