EVALUATION OF A SEASONAL SEDIMENT MODEL

OF ORDY POND, O‘AHU, HAWAI‘I:

LAYER-BY-LAYER COMPOSITIONAL DATA

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Abstract

This study evaluated a seasonal sediment model for Ordy Pond, Oahu, Hawaii. The model hypothesized that laminated sediments from Ordy Pond were deposited according to seasonal influences. This model was based on modern water column characteristics, particulate material collected from sediment traps, and samples from laminated sediment cores. The model provides a set of predictions for mineral, chemical, and isotopic characteristics for Ordy Pond deposits.

To validate this seasonal sediment model, sediment samples from a 17.5m sediment core were analyzed on a layer-by-layer basis. Visual, mineral, and isotopic analyses were done on a total of seventy-one samples from six different laminated core sections. Specific attention was focused on the differences of inorganic and organic carbon weight percents (wt%), $\delta^{13}C_{carb}$ and $\delta^{18}O_{carb}$ isotopic values, and the percentage of diatomaceous silica in the light vs dark-colored sedimentary laminae.

Most of the analyzed sections of core showed no significant differences between light and dark laminae, indicating the lack of a strong seasonal signal in the deposits. Furthermore, diatomaceous silica is an abundant component of much of the sediment column, although diatoms were not observed in the modern water column or particulates. These results infer that the seasonal sediment model does not apply to the entire sediment core. The modern water column of Ordy Pond does not accurately represent the nature of the pond and its deposits throughout its Holocene history since inundation of the sinkhole.