



Vertical structure of organic-rich fine sediment relevant to resuspension: Lake Apopka, Florida

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Wind-induced resuspension potential of organic-rich bottom sediment in many shallow lakes of Florida is a major management concern. If resuspension remains unabated, high oxygen demand of these waters typically rich in nutrients tends to bring about an abundance of toxic algae and drastic loss of fish population. A case in point is the highly eutrophic Lake Apopka in central Florida which has an area of 12,500 ha and a mean depth of about 2 m. The development of a water management strategy for this and similar lakes requires a thorough understanding of fine sediment dynamics peculiar to bottom muck. Although lake muck is fine-grained, from its surface down to a depth of 1 to 2 m it is significantly stratified with respect to material composition and density. As a result, characteristic parameters defining the state of the bottom, its resuspension by wind and settling of suspended matter tend to differ from those of beds of inorganic matter. In addition, above the bed surface defined by the so-called space-filling density of solids, a fluid-like, almost entirely organic, “fluff” layer can exist without dewatering to form a solid bed. Modeling the response of this lake sediment to wind requires a detailed characterization of the state and transport behavior of stratified muck. This characterization and its significance in sediment transport modeling are described for Lake Apopka.