

The Interrelation between Fe Speciation, Temporal and Spatial Distribution and Phytoplankton Population in Lake Kinneret

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The chemical speciation of Fe with respect to its bio-availability was studied in the epilimnion of Lake Kinneret (Sea of Galilee), a mesotrophic lake in the Jordan River Rift Valley. Comparable annual patterns, vertical profiles, and horizontal scatter of Fe and algae, indicate that Fe temporal and spatial distribution is strongly influenced by algal abundance. The strong Fe-algae association was attributed to Fe accumulation by the lake's dominant algae *Peridinium gatunense*. Different bio-available Fe forms (dissolved, Fe(II), and Fe-oxine) were found to be biologically mediated, as their annual

distribution correlates with chlorophyll a concentrations. Fe(II) concentrations of 1nM (at the detection limit) to 17nM were measured in the oxygenated, high pH, epilimnion waters. The Fe(II) presence was attributed to algal promoted extracellular Fe reduction, and was studied in a series of Fe reduction experiments with natural algal population and laboratory cultures. Highest Fe reduction rates were determined in dinoflagellate-dominated lake waters. These results agree with maximum Fe(II) concentrations measured at seasons of dinoflagellates abundance in the lake.