Recent sediment geochemistry of an alkaline lake: Lake Acigöl (Denizli), SW Anatolia Turkey

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Lake Acıgöl (Denizli) is one of the largest alkaline lake in Turkey. Surface, and shallow core samples was studied to determine the effects of riverine and aeolian processes on sediment physical properties and sediment geochemistry. Total organic carbon, total nitrogen content and major and minor element geochemistry of Lake Acıgöl sediments were investigated. Major (Si, Ti, Al, Fe, Mg, Ca, K, Na, P, S) and trace elements (Mn, As, V, Cr, Ni, Cu, Zn, Sr, Y, Zr, Ba, Pb) showed significant differences in bulk chemical composition between the surface and shallow core samples. Sediment properties were examined by water content, loss-on-ignition (LOI). While most of core samples characteristic with relative LOI increase from bottom towards sediment surface, limited core samples that were taken from eastern shore of the lake show increase of LOI values from sediment surface towards bottom, suggesting shallow water levels, aeolian and dentritic riverine inputs on a regional scale. The Fe/Mn ratio was calculated to study changes in the redox potential. Distribution of Fe, Mn, and S concentration were related to redox condition of lake sediment and are due to mobilization of these elements in the pore waters. Calculated two particulate ratios (C:N and N:P) indicate predominantly lacustrine origin. Vertical changes of heavy metals occur in the all shallow downcore profiles, although the concentrations keep to ppm levels. Principal components analysis (PCA) was also used to examine all studied parameters and intercorrelations among the variables.