

Chemical and isotopic study of water and sediments from Kolleru lake, Andhra Pradesh, India

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The Kolleru Lake in the southern state of Andhra Pradesh in India is the largest natural freshwater lake. It lies between the deltas of two major rivers, namely the Godavari and the Krishna and is about 35 km inland from the present day shoreline. Water chemistry and stable isotopic study on the carbonate fraction of the lake sediments exhibit heterogeneous variability. While the carbon and oxygen isotope ratios of the carbonate fraction vary considerably ($\delta^{13}\text{C} = -13.7$ to -5.4 ‰ and $\delta^{18}\text{O} = -7$ to -1.5 ‰ VPDB) and plot along a mixing line between two end members (freshwater and seawater), the water samples are characterized by high contents of Na (619 ± 358 ppm), Cl (819 ± 581 ppm), TDS (2350 ± 1168 ppm) etc. In the Wilcox diagram these samples show high to very high salinity hazard and medium to very high sodium hazard, indicating that the pre-monsoon waters of the lake are not suitable for irrigation purpose. In addition, concentration of certain toxic cations like chromium, iron etc show two to four times higher values when compared to the worldwide average of these in freshwater. Indiscriminate anthropogenic activity in the form of aquaculture, livestock farming, disposal of domestic and aquaculture effluents are responsible for the present degraded quality of water in the lake. More specifically, the freshwater lake is slowly being transformed into a brackish water lake and needs immediate attention