

Sedimentation in Thermally Stratified Lakes of Kumaun Region

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ABSTRACT

Sedimentation and consequent eutrophication of lakes are the two major problems of Indian lakes. Sedimentation processes inside a lake depends mainly on the temperature profile of the lake.

Comprehensive data about various limnological and hydrological processes related to lake sedimentation are few and far between and this poses a serious handicap to estimate the sedimentation rate. A simple methodology based on Stokes' law has been suggested in this report to have a first hand idea about the rate of sedimentation in a lake, if the temperature profile of the lake and sieve analysis results about the sediments are available.

The suggested methodology has been applied to three lakes (Bhimtal, Khurpatal, and Sattal) in Kumaun region of Nainital district , Uttar Pradesh. The lakes are warm monomictic with one circulation period during winter. The lakes get stratified with on set of spring in March. According to the calculation, for a difference of 10°C between two depths in the water columns, the density difference would be 0.0018, suggesting quite stable thermal stratification. Destratification occurs in November and the lakes remain homothermal till the end of February. It has been observed that settling time of a sand particle and a silt particle are almost same for stratified and homothermal lake conditions for this region. However, in case of a clay particle, the settling time is more than that of sand and silt for both stratified and homothermal conditions.

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