

Monitoring Water Quality in Reservoir with IRS-1A-LISS-1

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An attempt has been made to quantify the relationship between the variation in IRS-1A-LISS-1 Radiance data and field measured change in secchi disc depth. Secchi disc depth was measured for 47 predetermined sampling locations in reservoir surface water. At extinction point (secchi depth), water samples were collected from all the sampling locations. Suspended sediments of eight locations representing various reaches of the reservoir were selected for mineralogy, particle size and optical property analysis. The LISS-1 radiance value in band 1 (0.45-0.52), band 2 (0.52-0.59) and band 3 (0.62-0.68) were used in a regression analysis. The absorption infrared band 4 (0.77-0.86) was not included in the analysis. In these, the dependent variable was secchi depth (SD) and the LISS-1 radiance data was the estimator, Forty seven data sets of 20 Oct. 1988 from Tawa reservoir surface water were used to obtain an estimator equation for SD, The verification of the estimator equation was tested by applying it to a data set of 21 measurements of 28 Sep. 1988 for this reservoir. The coefficient of correlation between observed and estimated values for the 28 Sep. 1988 data set was $r = 0.92$ for SD, indicating that the equation could accurately predict the water clarity (SD) for this reservoir on new occasions from IRS-1A-LISS-1 spectral data. It is shown that mineral composition and optical properties of suspended sediments influence the reflected radiance of water quality. It is concluded that IRS-1A-LISS-1 data provide a useful means of mapping water quality in reservoir.

The Effect of Properties of Sediment Type on the Relationship between Suspended Sediment Concentration and Radiance

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A laboratory experiment was designed to determine the spectral characteristics of different types of sediment suspended in water in the visible and near infrared wavelengths (0.452-0.9 micro m) using a four channel radiometer. Field collected sediments were suspended in water to produce different concentration levels for the measurement of radiance. Spectral measurements of turbid water showed a distinctive difference in the behaviour of radiance with change in the organic suspended sediment concentration and type. It was noted that the correlation between the suspended sediment concentration and the radiance varied with the

mineral proportion of the sediment. The clay minerals of low specific gravity had larger values of radiance than those from high specific gravity non-clay minerals. Based on the results obtained, it appears that an algorithm to estimate suspended sediment concentration can be developed from radiance.

Treatment of Municipal Effluents: A Conceptual Model

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Available treatment techniques for wastewater, municipal and industrial are expensive either in terms of cost or in terms of energy or land requirement. Problems in running the system and the recurring expenditure involved in maintenance of the system are other aspects not appreciated when considering the available techniques. This leads to call for an alternative technique which is compatible with the problem of a developing economy. It is attempted here to develop an integrated conceptual model which is less expensive, consumes relatively low energy, is easy to operate and maintain and would be acceptable to the community. End-uses of the treated effluents are a beneficial aspect and can generate revenue to meet a reasonable part of the running expenses. The model could also be coupled with scientific land-use planning which is very much needed in developing countries.

Role of Neotectonics and Climate in Development of the Holocene Geomorphology and Soils of the Gangetic Plains between the Ramganga and Rapti Rivers

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Fifteen soil-geomorphic units have been delineated from the Gangetic Plains between the Ramganga and Rapti rivers. They were identified by remote sensing and field checks. On the basis of degree of profile development, their soils are grouped into five members (QGHI to QGH5, QGH5 being the oldest) of a soil chrono-association. Tentative ages assigned to QGHI to QGH5 are < 500, >500, >2500, 8000 and 13,500 yr B.P., respectively.

From the early Holocene to about 6500 yr B.P. a cold, arid to semi-arid climate prevailed and pedogenic calcrete developed over large areas in the Gangetic Plains. Later, a warm and humid

climate and improved drainage resulted in complete removal of calcrete from soil profiles in some areas or its dissolution and re-precipitation in lower horizons in other areas.

Neotectonics seems to have played a significant role in the evolution of the geomorphology and soils of the area. It determined areas of active sedimentation, pedogenesis and erosion (in upland regions). It led to tilting and sagging of large blocks resulting in shifting and increase in sinuosity of the rivers. Tectonic slopes/faults determined the courses of large rivers.