

Numerical models

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This Chapter discusses various numerical models used to study the dynamics and horizontal distribution of salinity in Mandovi-Zuari estuaries. Earlier, a one-dimensional network model was developed (Unnikrishnan et al., 1997) for representing the complex estuarine system of Mandovi and Zuari. The network model could simulate and explain the observed decay of tides at the upstream side (Ganjam in Mandovi and Sanguem in Zuari estuary) caused by the high freshwater discharges during the southwest monsoon season. The observed increase in mean sea level during the period of high river discharge was also well simulated by the model.

Recently, a ‘hybrid model’ was developed (Manoj and Unnikrishnan, 2007), using a two-dimensional model for the wider regions of the estuaries and a one-dimensional model for narrower regions. The hybrid model is used to simulate the horizontal circulation and salinity distribution. It is found that the model reproduced the longitudinal salinity distribution in the estuaries very well during the dry season and reasonably well during the wet season.

The above studies showed the utility of numerical models in studying the dynamics of Mandovi- Zuari estuaries as well for determining the distribution of passive tracers such as salinity. Most of the above models were developed by treating the estuaries to be well mixed. This is a good approximation to simulate horizontal distribution of active and passive variables. The future challenge lies in developing capability to simulate the distribution in the vertical.