Time-dependence of Salinity and Preliminary Estimates of Residence Time in a Monsoonal Estuary

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The salinity field of the estuaries that are located on the west coast of India and experience the Indian Summer Monsoon (ISM) is never in a steady state. This is a consequence of the characteristics of river runoff that they experience. We refer to such estuaries as monsoonal estuaries (Vijith et al., 2009). Here we discuss properties of these estuaries, particularly time-dependence of the salinity field, using the Mandovi estuary in Goa as an example. Characteristics of freshwater influx in an estuary determine the time that a parcel of freshwater introduced in the estuary spends in the estuary. This in turn determines characteristics of processes such as primary productivity in the estuary and fate of pollutants that enter the estuary. A physical attribute which can be used as a time scale for studying such processes is the residence time of freshwater (Monsen et al., 2002). We expect that the residence time of a parcel of freshwater that enters a monsoonal estuary will differ considerably between the wet summer monsoon and the longer dry season. Our preliminary estimates suggest that the residence time in the Mandovi varies approximately from 1 to 100days, the former being the value during spells of high precipitation during the wet season, and the latter being typical towards the end of the dry season. The residence time also varies with the location where the parcel enters the estuary. This paper discusses a preliminary study of the likely consequences of such variations in the Mandovi estuary.

Keywords: estuary, monsoonal, salinity, runoff, time-dependence, residence time, Mandovi.

References

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