

Preliminary studies on the geochemistry of the Cauvery river basin

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Abstract. Samples of water and sediments were collected over a three year period from the entire region of Cauvery river basin excluding the estuary. On the basis of our observations, we have calculated the average composition of the Cauvery river at several locations from the catchment to the river mouth, the downstream profile of sediment load, annual erosion rates, solute and sediment fluxes and have predicted on long term changes. The sediment chemistry was determined by x-ray fluorescence (XRF) technique, and calculated mean compositions of the Cauvery and its tributary bed and the suspended sediment were compared to those of world average river sediments. Downstream profiles of some of the elements appear to be controlled by size and mineralogical characteristics besides local factors specific to the location of the samples. Interelemental relationships indicated good correlation among the transition elements indicating their co-genetic behaviour within the drainage basin.

Keywords. Geochemistry; Cauvery river basin; sediment load; annual erosion rates; x-ray fluorescence; co-genetic behaviour.

1. Introduction

Geochemical cycling of elements is receiving wide attention due to the need for understanding the pathways of pollutants through our present environment. River processes form a major link in the geochemical cycle. Several attempts have recently been made to understand river transport of materials. The most important of these are by Gibbs (1977), Martin and Meybeck (1979) and by Milliman and Meade (1983). Global estimates on fluxes given by Garrells *et al* (1975), Martin and Meybeck (1979) and Nriagu (1979) are largely based on studies of a few low-sediment rivers such as the Amazon and Yukon and some large North American rivers. Asian rivers contribute more than 70% of the global sediment input to world oceans (Milliman and Meade 1983); thus any understanding of the geochemical behaviour of elements in our environment would require the study of large Asian rivers. With this objective in mind, the authors have been studying the large rivers of the Indian sub-continent. The present report is based on preliminary studies on the geochemistry of the entire Cauvery river basin.

2. The Cauvery river basin

The Cauvery river is the eighth largest river (in terms of discharge) in the Indian subcontinent. It has a drainage area of about 90,000 km² covering a distance of 800 km, from Coorg in the Western Ghats to the river mouth at the Bay of Bengal. Hemavati, Kabini, Bhavani and Amaravati are the major tributaries. Some of the important hydrological data for the Cauvery river basin are summarised in table 1.