

## 10. SEDIMENTARY PROCESSES IN THE ESTUARINE REGION

### 10.1 INTRODUCTION

There have been drastic changes in the world's shorelines since the retreat of the last ice age. Over the past ~ 6,000 years, the rate of rise of sea level has been relatively low (0.08 m/100 yr) compared to the period ~ 20,000 - 6,000 BP (0.8 m/100 yr) (Fig 7.1). It is not surprising, therefore, that many of today's estuaries have been "around" approximately in their present configuration only in the past few millennia. Even in the absence of sea level change, estuaries are highly dynamic and in many ways reflect the type of macro-scale processes characteristic of oceans.

Estuarine shorelines change under the action of hydrodynamic forcing and associated sediment transport. Where sediments play a recognizable role, estuaries almost never attain true hydrodynamic/sedimentary equilibrium. Usually there is a quasi-equilibrium characterized by long-term changes in the bottom bathymetry. An important issue posed by potential effects of sea level rise pertains to our ability to predict various facets of estuarine response to sea level rise, including shoreline configuration, bottom sedimentation and marsh development/degradation.

### 10.2 SHORELINE CONFIGURATION

Much of the knowledge of shoreline changes is based on geological evidence which has been used to develop scenarios for estuarine formation, development and eventual demise. Two edited volumes by Schwartz, Spits and Bars (1972) and Barrier Islands (1973), are collections of important papers in the subject area. Spits and Bars covers seventeen papers, from 1890 to 1971. Barrier Islands covers forty papers, from 1845 to 1972.

More recent set of papers (also of geological nature) edited by Leatherman (1979) shows that there is new emphasis on descriptive modeling of barrier island and inlet morphologic changes, much of it based on holocene shoreline recession evidence. Reference must also be made to a series of papers recently edited by Nummedal et al. (1987) on shoreline response to sea level change.