SUSPENDED SEDIMENT DISTRIBUTION AND VARIABILITY ON SEASONAL AND TIDAL TIME SCALES IN THE WINYAH BAY ESTUARY

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A zone of high turbidity was present in Winyah bay, South Carolina in 1996. Based on field observations, it was found that the suspended sediment concentration within the turbidity maximum zone varied in response to river discharge and semidiurnal tide. The location of the turbidity maximum zone also varied in response to semidiurnal tide but was always well correlated with high salinity values. The suspended sediment concentration was higher after periods of high discharge and lower after perods of low discharge. In response to the semidiurnal tidal cycle, there was a well defined distinction in both magnitude and the vertical extent of the turbidity maximum zone between the ebb and flood tide as a result of differences in salinity stratification. Suspended sediment concentration during the flood tide was always greater than suspended sediment concentration during the ebb tide. Tidal assymetry resulted in well mixed conditions near the bottom during peak flooding tide whereas stratification prevailed during ebb tide. During slack waters, the water column was transparent whereas at times of maximum current velocities, the water column was highly turbid. Therefore, the bottom sediemtns were resuspended by the strong tidal currents typical of the bay. As a result, during the flood tide suspended sediments were dispersed high in the water column in a well developed zone of high turbidity. During the ebb tide, salinity stratification prevailed in the water column and the suspended sediments were then restricted to the bottom by the pycnocline.