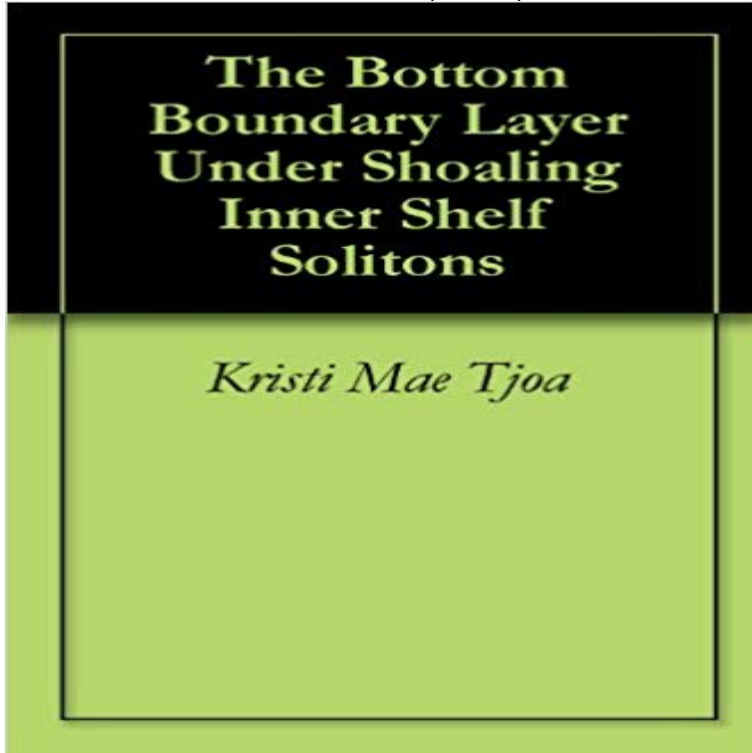


The Bottom Boundary Layer Under Shoaling Inner Shelf Solitons



The effects of shoaling inner shelf solitons on the bottom boundary layer have been observed and analyzed over a two month summer period at the Monterey Inner Shelf Observatory in Monterey, CA, during 2002. Utilizing CTD data to characterize the temperature field of the water column, Acoustic Doppler Current Profiler (ADCP) data to measure the velocity structure from 3m height above the bed (HAB) to the near surface, and Bistatic Doppler Velocity Sediment Profiler (BDVSP) data to measure the velocity structure and sediment concentration from a range of 60cm to 1cm HAB, solitary internal waves and internal tidal bores were regularly observed at the observation site. These events were characterized by their large isotherm displacements and the sudden change from near surface to near bed stratification as the internal tidal bores passed the observation site. Cross-shore timeseries revealed that the strongest events pushed water onshore near the surface and offshore near the bed, indicating a baroclinic water column during their passage. To analyze their effects on the bottom boundary layer, 3m HAB ADCP and BCDV velocities were compared with backscatter data and surface gravity wave energy at 3m HAB to determine their relative contribution to bed stress and resulting sediment suspension. As the strong internal waves passed, a logarithmic layer formed indicating that shear stress above the bed was occurring. This allowed the friction velocity within the log layer to be estimated. Combining this term with the stress contribution due to the wave energy, the total stress on the bed was then estimated. From this it was determined that typically moderate surface gravity wave forcing at the bed suspended sediment, while solitary internal waves and internal tidal bores continued to transport suspended sediment offshore near the bed.

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