$$A = \left[\frac{24}{5} \frac{\mathcal{D}_*}{\rho g \sqrt{g}\, \kappa^2}\right]^{2/3} \tag{7.7}$$

in which ρ is the mass density of water, g is the gravitional constant and κ is the ratio of spilling breaking wave height to water depth ($\kappa \approx 0.8$).

All models of beach profile response described earlier require the identification of a limiting depth of motion h_* in Eq. 7.3 and h_{b_0} and h_{b_L} in Eq. 7.4. Hallermeier (1981) has proposed an approximate method for predicting this depth, h_*, based on average annual significant deep water wave height, $\overline{H}_s$, and period $\overline{T}_s$ and sediment size D,

$$h_* = (\overline{H}_s - 0.3\sigma)\, \overline{T}_s\, (g/5000D)^{0.5} \tag{7.8}$$

in which σ is the standard deviation of the significant wave height.

The models presented heretofore invoke the concept of a limiting depth of motion, a depth seaward of which conditions are static or at least there is no substantial exchange of sediment with the more active shoreface. This assumption seems innocent and quite natural, yet the consequences are very substantial. If no interchange with the shelf profile occurs, erosion is the only possible shoreline response to sea level rise, i.e. there can be no shoreward transport contributions from the continental shelf. There is evidence that shoreward sediment transport is a major contributor to shoreline stability in many areas. The erosion along the south shore of Long Island and at Montauk Point is clearly too small to provide the well-documented westward net transport at Fire Island (Dean, 1986; Williams and Meisburger, 1987).

Dean (1987) has suggested that during the more rapid rate of sea level rise up to 6,000 year BP, the shoreward shelf transport was not sufficient to maintain a stable shoreline. However, with the relative sudden sea level rise reduction by an order of magnitude, the same rates of shoreward sediment transport generally led to reduced erosion rates and in some cases to stable or accreting shorelines; Fig. 7.6 illustrates the concept. The equilibrium mechanics associated with this concept are much different than those employed by Bruun. Recognized are the natural variability of waves and sediment sizes with sorting resulting in coarser sediment close to shore. It is hypothesized that a particle of a given size is in equilibrium when it is in a certain water depth at a particular distance from shore. With sea level rise and