Beach profiles

The material along a beach profile also varies in size and angularity, depending on distance from the shoreline (as Figure **6** shows).

- Larger pebbles tend to be near the top of the beach. Constructive waves will carry a range of sediment sizes up a beach due to the strong swash but, due to water percolating into the beach, the weaker backwash will only be able to drag back the smaller pebbles. Over time, this leads to the pebbles being sorted with large at the top through to smaller at the bottom.
- Pebbles at the bottom of the beach tend to be more rounded due to the constant action of the waves causing abrasion and attrition. Scree falling off a cliff face can also explain the presence of mostly angular pebbles near the top of the beach.

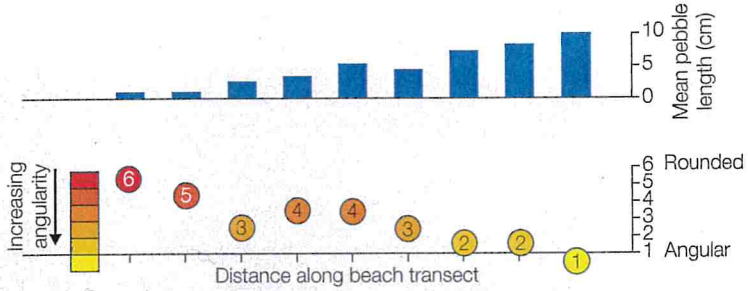

Figure 6 *Pebble size and shape along a beach transect*

Seasonal changes in wave type create summer and winter profiles – sediment is dragged offshore by destructive waves in winter and returned by constructive waves in summer (Figure **7**).

- Beach profiles are steeper in summer, when waves are more constructive than destructive. Constructive waves are less frequent and have a longer wavelength (6–9 per minute), so wave energy dissipates and deposits over a wide area (weakening the backwash).
- In winter, destructive waves occur at a higher frequency (11–16 per minute). Berms may be eroded by plunging waves and high-energy swash crashing down onto the beach. Strong backwash transports sediment offshore (depositing it as *offshore bars*). Sometimes, the backwash exerts a *rip current*, or undertow – dragging sediment back as the next wave arrives over the top (see 3.2).

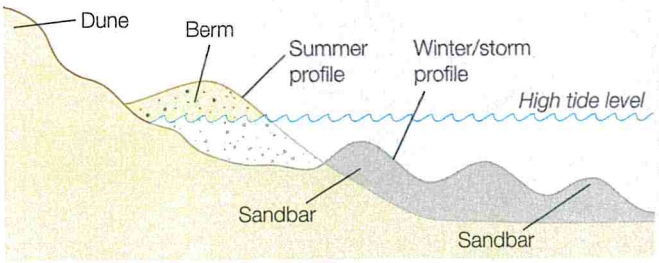

Figure 7 *Typical summer and winter beach and dune profiles*

Spits

A *spit* is a long, narrow feature, made of sand or shingle, that extends from the land into the sea (or part of the way across an estuary). Spits form on drift-aligned beaches (see Figure **3**). Sand or shingle is moved along the coast by longshore drift, but if the coastline suddenly changes direction (e.g. because of a river estuary), sediment begins to build up across the estuary mouth and a spit will form (see Figure **8**). The outward flow of the river will prevent the spit from extending right across the estuary mouth. The end of the spit will also begin to curve round, as wave refraction carries material round into the more sheltered water behind the spit. This is known as a *recurved tip*.

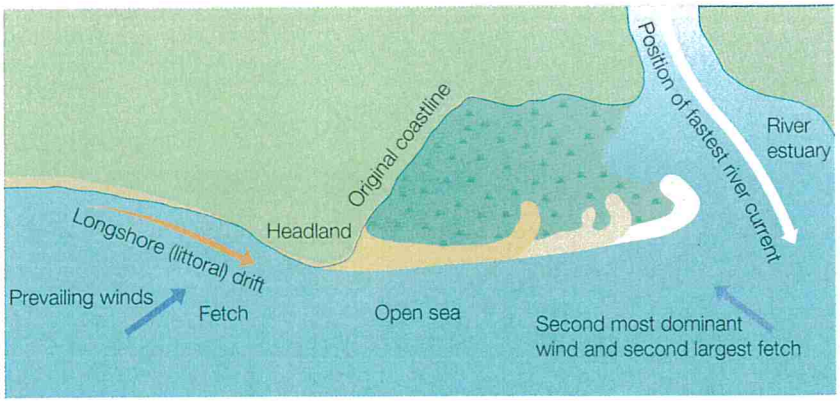

Figure 8 *The formation of a spit*