U. SHORES

Field Note U8c6. Arniston shores – Geomorphological features – Beach cusps

Beach cusps at Arniston.

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Introduction

[From the Internet]:

Beach cusps are shoreline formations made up of various grades of sediment in an arc pattern. The horns are made up of coarser material and the embayment contains finer sediment.

They can be found all over the world and are most noticeable on shorelines with coarser sediment such as pebble beaches. However, they can occur with sediment of any size. They nearly always occur in a regular pattern with cusps of equal size and spacing appearing along stretches of the shoreline. These cusps are most often a few metres long. However, they may reach 60 m (200 ft) across (Figure 1).

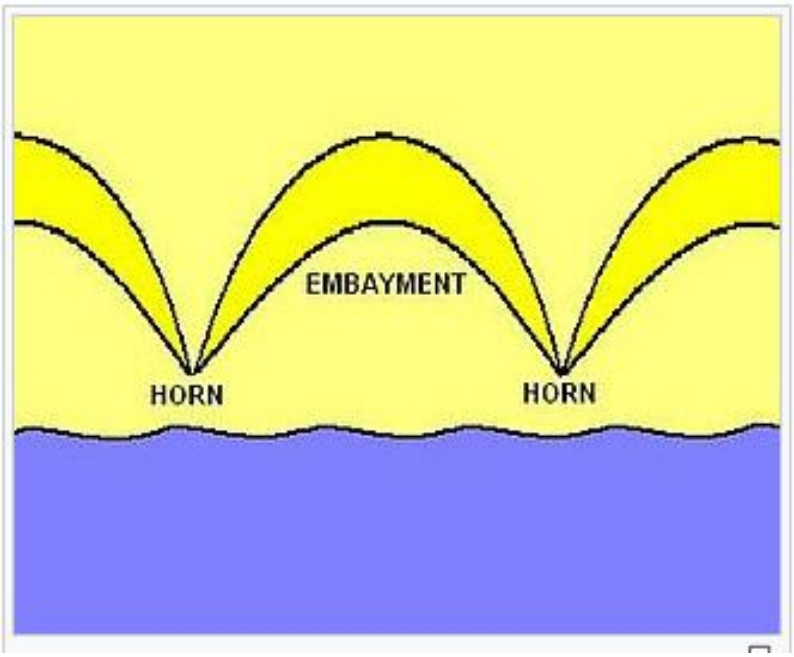

Figure 1. Beach cusps terminology.

Although the origin of beach cusps has yet to be proven, once cusps have been created, they are a self-sustaining formation. This is because when an oncoming wave hits the horn of a beach cusp, it is split and forced into two directions. The crashing of the wave into the cusps slows its velocity, causing coarser sediment to fall out of suspension and be deposited on the horns. The waves then flow along the embayments (picking up finer sediment) and run into one another in the middle. After this collision these waves attempt to flow back out to sea where they are met by incoming waves. Therefore, once the cusp is established, coarser sediment is constantly being deposited on the horn and finer sediment is being eroded away from the embayments. This process causes the horns and embayments to at least maintain their size, if not grow larger.

A beach with cusps is called ‘Cuspate Beach’.

Beach cusps at Arniston

Cusps are formed along Aniston East Shore (Figure 2).

Figure 2. Beach cusps (arrow) can be discerned from the satellite image.

The cusps on Arniston Shore are of pebbles (Figure 3).

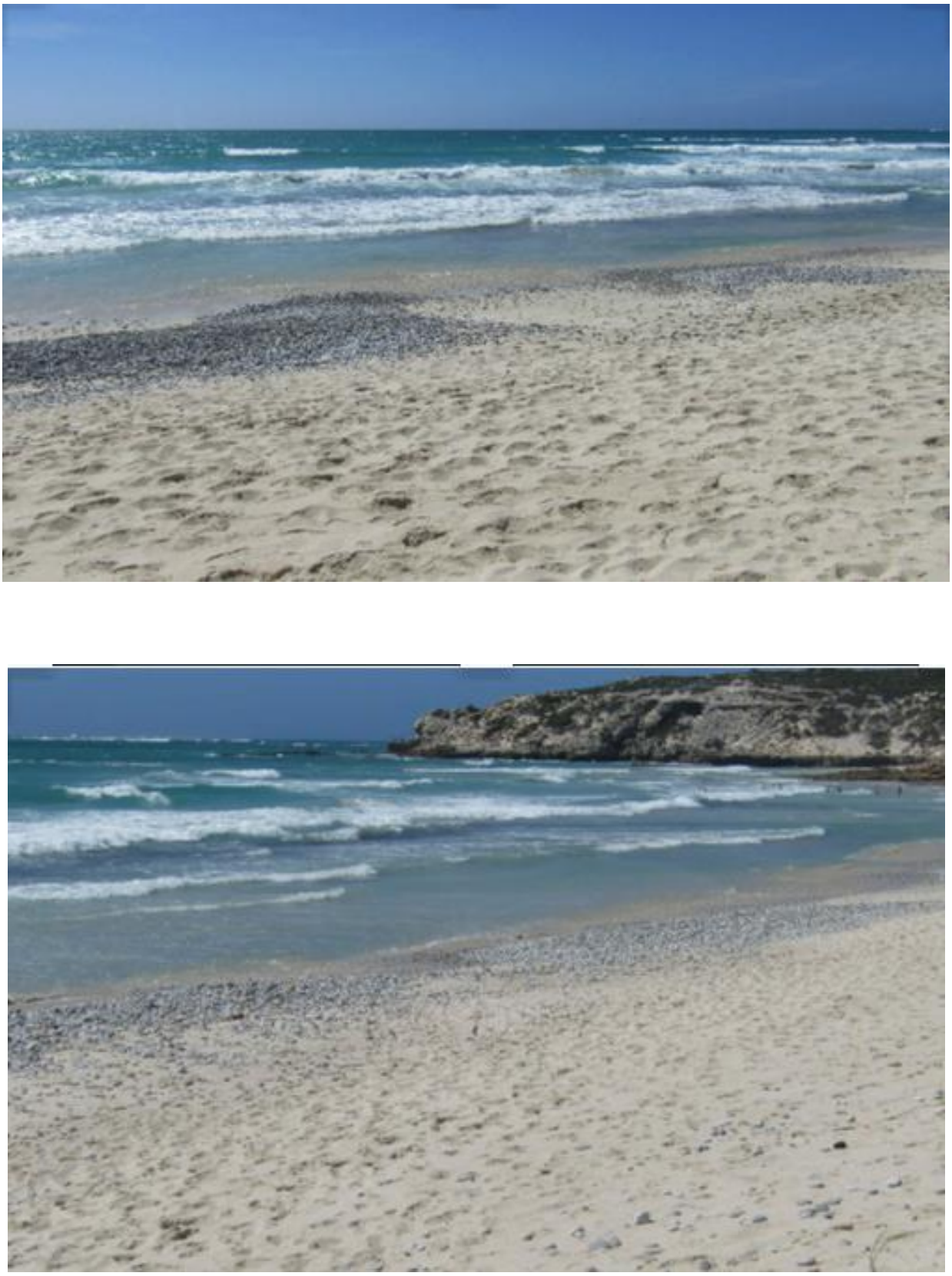

Figure 3. Top and bottom – pebble beach cusps along the Arniston East Shore.

The cusps along the Arniston shore do not exhibit perfect shapes. The reasons are that the pebbles are of various sizes (tiny and large) and that the current regime and the wave pattern are disrupted by the nearby headlands, the abrasion tables as well as the rocks, which protrude the beach face (Figure 4).

Figure 4. Top and bottom – beach cusps along the Arniston East Shore. Varying pebble sizes, and rocks along the beach interfere with the formation of geometrically perfect cusps.

The pebble cusps may disappear altogether with time (Figures 5 and 6).

Figure 5. The cuspate beach, view to the north. Top - in January 2022. Bottom - in Aug 2022.

Figure 6. The cuspate beach, view to the south. Top - in January 2022. Bottom - in Aug 2022.

