

Investigation Title(s):

Investigation into the formation of a depositional landform (barrier beach) and the impact of longshore drift on beach and pebble morphology.

Investigation into the need for and effectiveness of coastal management on a high energy coastline.

Location:

Chesil Beach

Target Audience:

Ideal location for GCSE coastal fieldwork or as a base for A Level NEA projects.

**Logistics (access, parking, toilets etc):**

Chesil Beach can be accessed at several locations, the best being West Bay, Burton Bradstock, Abbotsbury, Chesil Beach Visitor Centre and Chiswell. The Fleet lagoon impacts access between Abbotsbury and the Chesil Beach Visitor Centre and the lack of good car parks for minibuses or coaches impacts access between Burton Bradstock and Abbotsbury. Minibuses can be parked at all the above locations, but coaches may need to park in the village of Burton Bradstock before walking 5 mins to the beach. The Abbotsbury Sub-Tropical Gardens have allowed coaches to park in their coach park before a 5 min walk to the beach, but plenty of notice is needed. Toilets at all locations, except Chiswell.

Geographical Concepts Underpinning Investigation):

Chesil Beach has been formed by eustatic sea level rise. Eroded material was transported out to an ancient coastline by rivers, before then being pushed back to the coastlines current position by rising sea levels. Longshore drift, acting in a mainly NW-SE direction, is now the main process acting upon the beach, although weaker longshore drift in the opposite direction does occur (SE-NW)

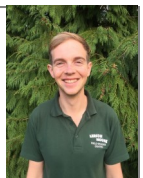
It would be expected that the beach would get wider and taller in a SE direction, with pebbles also getting smaller and more rounded in the same direction. However, due to the presence of an occasional weaker SE-NW longshore drift pebbles are usually found to be bigger in a SE direction as larger pebbles cannot be moved by the weaker longshore drift. This process has occurred for approximately 11,000 years leading to almost perfect sorting due to pebble size.

References & Web Sites:

Coastal management at Chiswell - https://www.dorsetcoast.com/wp-content/uploads/2017/09/Storms-and-Coastal-Defences-at-Chiswell_WEB.pdf
SCOPAC sediment transport map - <https://www.scopac.org.uk/sts/wb-pb.html>
Video about how Chesil Beach was formed - https://www.youtube.com/watch?v=iCQM64G0WIo&list=PLYjVgCmONG4V1T26ZW33XiC5higQT4I_8&index=3

Reviewer:

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Data Collection Opportunities:

Longshore drift can be examined on the day by using float experiments and looking at wave counts and wave direction.

Beach profiles can be conducted at a number of sites to determine beach width, height and angle.

Pebble length and angularity can also be analysed to determine changes with distance along the coast.

Field sketches of coastal management schemes alongside questionnaires amongst beach users and local communities are also useful qualitative data collection methods.

Sampling methods can be discussed as to their appropriateness. We prefer to collect pebbles at random whilst using a stratified sampling method for beach profiles.

Chesil Beach is an extremely exposed piece of coastline. Care must be taken when working on the beach if there are large waves and nobody should be entering the sea for any reason due to strong currents. Cliff falls at West Bay and Burton Bradstock are common so work should not be carried out underneath them. Care should also be taken when conducting fieldwork on the beach as fishing hooks are discarded and jellyfish can be found washed up.

Data Presentation, Analysis, Statistical Applications:

Comparative beach profiles can be plotted on graph paper or on MS Excel, pebble size can be presented nicely by box plots and pebble angularity by pie charts, divided bar graphs or similar. Proportional arrows of longshore drift float experiments are also a good presentation method.

If longitude and latitude of fieldwork sites is collected, then ArcGIS Online can be used to create geo-located graphs and maps.

If enough data has been collected, then statistical tests such as a T-test or Mann-Whitney U can be carried out on differences between pebble sizes.

Evaluative Issues:

Many limitations exist in the various data collection methods; including human error, limited sample sizes, bias etc. Antecedent conditions can also provide local discrepancies. However, the main aspect to remember is that longshore drift can act in opposing directions, which then impacts predictions and hypotheses to do with pebble size.

