SCARBOROUGH HEADLAND

SETTING/ ORIGIN Scarborough Headland has sheer 110metre cliffs that have formed over 10.5 million years by effusive basaltic eruptions during the Miocene period, followed by concentrated wave erosion at the base of the cliff, since the sea-levels rose during the holocene period 6000years ago.

80m 6000yrs

cliff retreats original cliff position

⑦ Eventually the cliff face becomes unstable and gravity brings the cliff down. The process repeats itself and the cliff slowly retreats further inland and a wave cut platform results

⑥ Tectonic uplift and ground shaking can cause the weakened cliff to collapse, as it did most recently at Scarborough during earthquakes in 2011 and 2016

⑤ Rock weathering from rainfall, sunlight and halocasty causes chemical erosion and weakens the cliff face, accelerating its eventual collapse.

HYDRAULIC ACTION

ATTRITION

ABRASION

①a. The erosion sub-process of hyrdaulic action (the physical force of the waves hitting the fractures and joints of the basaltic lava) explosively forces air into the cracks and causes them to widen over time, eventually breaking off rocks and blocks of basalt.

The rocks that have broken off and fallen to the base of the cliff are pounded together by waves, breaking into smaller pieces in a sub-process called attrition

②

③ The rocks, stones and pebbles that result from attrition can then be carried by large waves and forced against the cliff face causing further mechanical erosion in a sub-process called abrasion

④ The three different types of wave erosion work together to erode a notch at the base of the cliff. Over time, this notch gets bigger and deeper under the cliff

①b The erosion is concentrated at the mean high-tide mark, when deep water allows larger waves with greater energy to reach the cliffs.

FACT FILE

LANDFORM
Coastal Cliffs

TYPE
Erosion Feature

PROCESSES
Cliff formation
- Tectonic
  - Volcanism
  - Tectonic Uplift
- Marine
  - Wave refraction
  - Wave Action
    - Hydraulic Action
    - Attrition
    - Abrasion
- Climatic
  - weathering

KEY FACTS
- 110m high
- 6000yrs of retreat
- 80m of retreat