Coastal Processes schools case study:

Sidmouth, South Devon

Explanatory notes

South West Coastal Monitoring commissioned aerial photography of the area around Sidmouth in East Devon in 2007, just a year after SWCM was launched.

Such photography is just one way the scientists at the SWCM track the changes for the programme, which works on behalf of the area's maritime local authorities and coastal groups, as well as the Environment Agency and Defra, and is managed by Teignbridge
District Council.

The scientists are also regularly seen on the beaches of the region, from Beachley Point in Gloucestershire to Portland Bay in West Dorset, physically charting the changes taking place due to erosion and deposition, natural coastal processes caused by the weather and tides.

The coast is divided into segments, so accurate measurements can be made from the same points time and again. This produces graphs called beach profiles, which again can then be used to show the changes taking place. Comparing profiles taken at Pennington Point at Sidmouth shows that the levels of the beach there have fallen in some places by more than a meter – since 2007. The data also shows what happened after a large rock fall in 2012.

Photographs taken along the profiles help us to see the differences for ourselves. Data produced by LiDAR – which is similar to radar but which uses light instead of radio waves – has added to the information available.

Coastal Process Scientist Emerald Siggery from SWCM said: "There have been a number of cliff falls at Pennington Point in recent years. Our data, which includes aerial photography, topographic surveys, and LiDAR, has given us accurate measurements of the changes.

"The data that we have collected highlights some of the contributing factors to the cliff failure at Pennington, with a good correlation between the erosion of the beach, at the toe of the cliff, and increased activity on the cliff face."

The huge amount of information gathered by the SWCM over the last 17 years is freely available. Among its many uses is informing projects such as beach management plans which help make sure the region's beaches – among our greatest natural assets – remain in good condition and themselves help protect homes and businesses from flood risk.

SWCM data is freely available: southwest.coastalmonitoring.org

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Sidmouth, on the south coast of the county of Devon, is a tourist resort which sits on the Jurassic Coast, designated by UNESCO as a World Heritage Site. The River Sid meets the English Channel here. Pennington Point is to the east of the town.









The images on this page and the next were taken by the SWCM as part of their monitoring, and show the cliffs at Pennington Point.

What happened to the cliffs between 2007 and 2017?

Why do you think this has happened? Look closely at the cliffs – do they look like hard granite or soft sandstone? Will this make them more or less likely to erode?

Which processes acting on the cliffs cause erosion?



Figure 1 Aerial imagery of Sidmouth displaying cliff erosion lines from the years 2007, 2009, 2012, and 2017.

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Figure 2 Side on imagery of Sidmouth cliff erosion from years 2007, 2012, 2014, 2017, and 2024.

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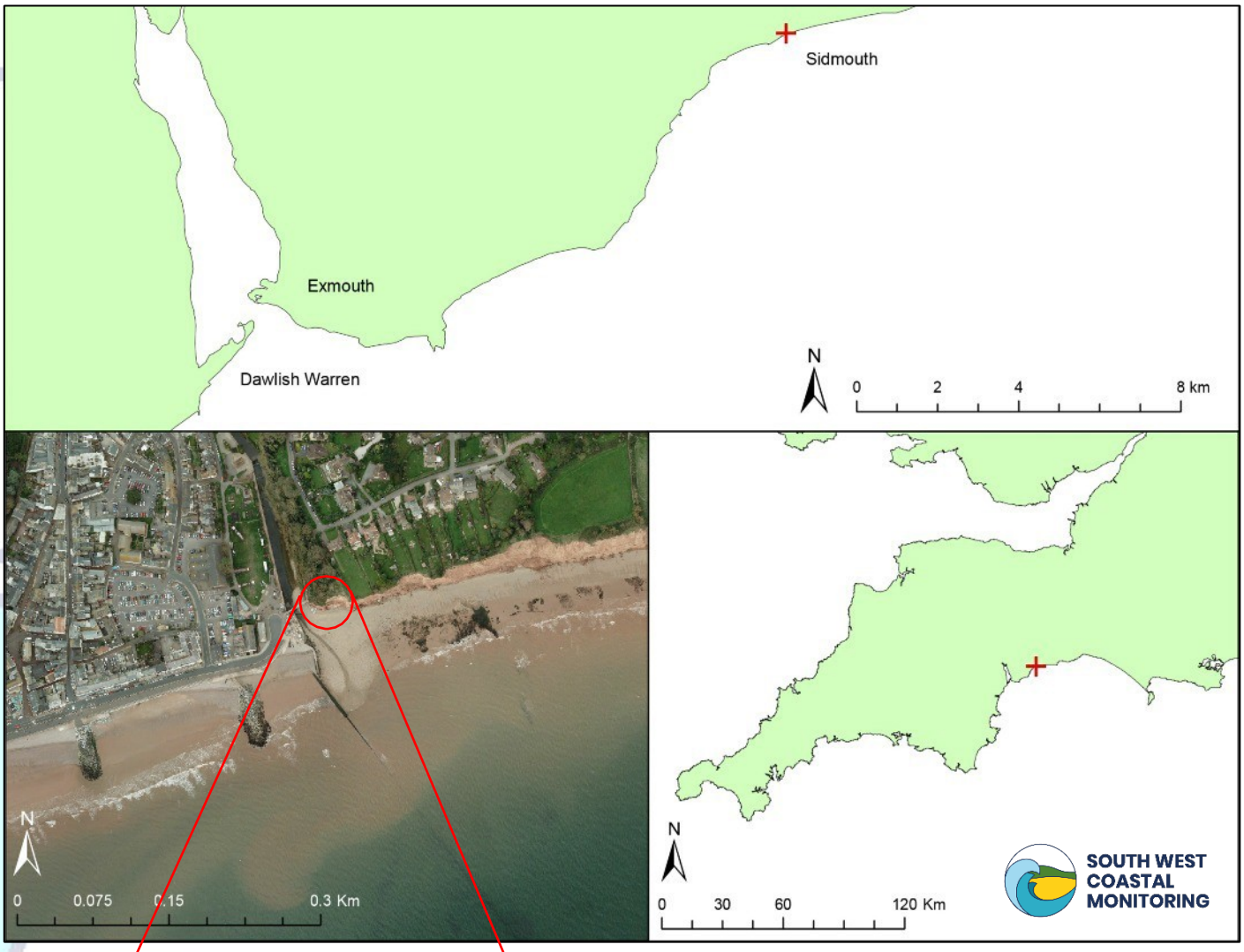




Figure 3 A map location of Sidmouth, within the southwest, showing the location of Sidmouth cliff fall.

4 When SWCM survey the cliffs they use airborne survey methods such as aerial photography and LiDAR, sometimes from a UAV or drone. What are the advantages of this?

5 When you see cliffs which look like this on the coast how should you approach them:

a) With caution
b) With enthusiasm – there may be fossils to find below!
c) Don't approach them: they are unstable and unsafe.

6 What could be done to try to minimise the cliff erosion?

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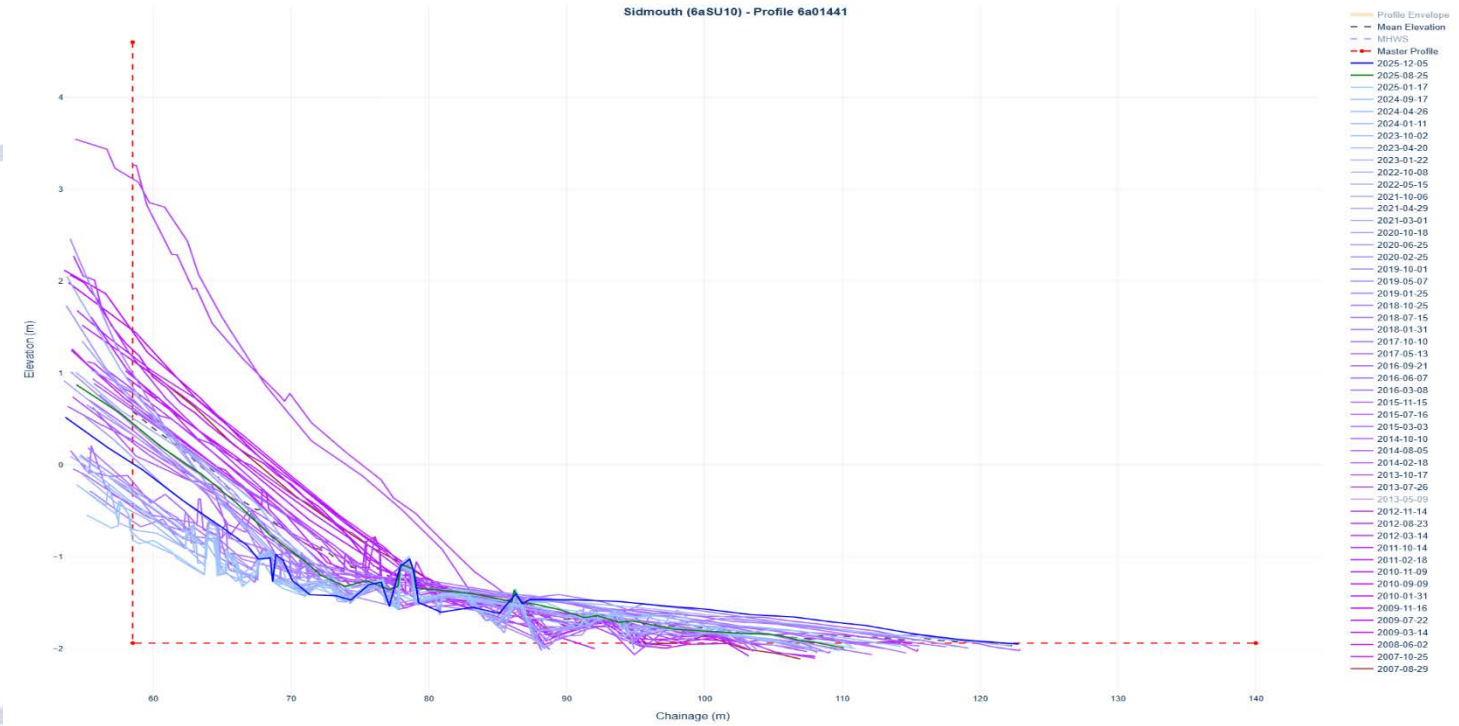


Figure 4 – Side on view of profile 6a01441 displaying topographic profiles between the years 2007 and 2025.







Figure 5 Photographs (to the left) of Sidmouth cliffs, looking east, from profile 6a01441. Taken by EDI surveys.

7 At the top of the page is a graph showing changes to a beach profile from Pennington Point. The first profile is from 2007 (Dark purple) and the latest is from December 2025 (solid dark blue line). The accompanying photos were taken on the same profile. Measuring from the master profile (broken red line) what has happened to the level of the beach between 2007 and 2025? Can you use the photographs to support you view?

8 What do you think happened between 2012 and 2013, where the beach appears to accrete dramatically? (Light purple solid lines) Where do you think this additional sediment came from?

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