



## **The response of rock cliff erosion to wave action and sea level change**

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An assessment of the influence of waves and sea level on rates of rocky cliff erosion is presented. This work is based on combined monitoring of the microseismic impact of waves upon the cliff base, detailed tide gauge records and 3D laser scanning of the cliff face. A micro-seismic monitoring system has been installed in a 70 m hard rock coastal cliff to assess the variation in marine influence acting on the base of the cliff throughout a 2 year period. The site, on the north east UK coastline, has a high tidal range of up to 7 metres, and is exposed to northerly storm surges, which are recorded by local tide gauge networks and wave buoys. This data is combined with detailed 3D laser scanning of the cliff face at monthly intervals. This technique generates 3D data of erosion to the cliff face and is capable of identifying losses as small as  $0.00001 \text{ m}^3$  across the  $1,500 \text{ m}^2$  area of the cliff face. The three datasets are combined to assess the increased rates of erosion with increased levels of wave impact on the cliff toe, and variable tidal level. The results are considered in the context of future sea level rise, with the aim of quantifying likely increases in cliff retreat, and alterations to the mechanisms of erosion to hard rock cliffs.