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Exploring variations in and controls upon cliff, platform and coastline geometry.

N.J. Rosser, M. Lim, E. Norman and D.N. Petley

Institute of Hazard and Risk Research, University of Durham, Science Laboratories, South Road, Durham, DH1 3LE, UK. (n.j.rosser@dur.ac.uk / tel: 00 44 191 334 1918)

This paper examines the high-resolution geometry of a 25 km section of rocky coastline with a view to establishing relationships between platform, cliff and coastline geometry. Methods of rapidly assessing the potential future coastline changes have, in the past, been based upon crude models of sea-floor slope, coastline crenulation, coastline aspect and cliff height. These approaches are commonly based upon relatively crude data on collected at low resolution. This research takes advantage of a newly collected high-resolution ($>$ 25 points per square meter) helicopter borne- LiDAR data set collected across a 25 km section of the North Yorkshire coast, UK. The data was collected with a Palmer scanner type LiDAR (TopEye II), which has the ability to image at an oblique angle onto near-vertical surfaces. This coastline is characterised by near vertical cliffs, comprised of interbedded limestones, sandstones and shales, and has an average long-term retreat rate of 0.05 to 0.1 m yr-1. The coastline features a series of enclosed bays, headlands, and sections of relatively straight cliff-line, with relatively little sediment on the foreshore. Erosion on this coastline has been assessed from the previous 120 years from mapping data, and show in place recession of up to 20 m. The data from the high-resolution LiDAR allows assessment of detailed foreshore topography, including the identification of steps and meso-scale embayments. Further, the data is of sufficient resolution to enable the identification of features upon the surface which may hold more significant control over the erosion potential, such as the presence and distribution of foreshore boulders. The results show significant correlations between basic coastline geometry, at the micro-, meso-, and macro- scale. It is hoped that this approach will form the basis of upscaling mon-

itoring data of coastal cliffs erosion collected using terrestrial remote sensing, to be applicable to wider coastal stretches.