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NOVEL LUMINESCENCE DATING APPROACHES TO PROVIDE UNIQUE INSIGHTS INTO COASTAL GRAVEL BARRIER DYNAMICS

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The ongoing threat of climate change makes coastal zones vulnerable to erosion and flooding. Gravel barriers act as natural flood protection, and so their sustainable management is crucial. This can be informed by understanding their past response to climate change. However, our knowledge of past gravel barrier dynamics is poor and restricted by the difficulty in providing accurate ages of past changes in coarse clastic environments.

Luminescence dating is a versatile technique that determines the time elapsed since a mineral grain was last exposed to sunlight and buried. Our standard approaches typically use silt or sand grains for dating, which can be challenging in gravel barrier settings where the preservation of finer grain sizes is limited. Therefore, in this study we explore the potential of the novel rock burial dating approach to directly date the cobbles from gravel barriers. We also use luminescence dating approaches to provide insights into sediment depositional dynamics prior to burial by comparing the relative signal resetting of different minerals.

The aim of our research, which is part of the NERC funded #gravelbeach project, is to enhance our understanding of coastal barrier dynamics over geological timescales (mid- to late-Holocene) by establishing a chrono-stratigraphic framework for drowned barriers and overwashes in gravel-dominated beaches in the UK. We have obtained two deep cores (~5 m depth) at Borth and Abbotsbury and have performed stratigraphical analyses on them, providing us a rare window into their past dynamics as well as the interaction between gravel barrier beach and back-barrier environments.