

BEACHROCK DEVELOPMENT ALONG THE NORTH COAST OF CORNWALL

F.M.P. HOWIE



Howie, F.M.P. 2009. Beachrock development along the North coast of Cornwall. *Geoscience in South-West England*, **12**, 85-94.

Induration of beach material as a result of carbonate cementation to form sedimentary beachrock has rarely been reported from high latitude coastlines. The stratified beachrock exposed in the upper intertidal zone in Harlyn Beach, Harlyn Bay, north Cornwall, UK, appears homologous to the now poorly exposed cemented beachrock first described in the 1960's from the adjacent Little Cove in Mother Ivey's Bay, Cornwall. This study focuses on the field characteristics and mineralogy of the Harlyn beachrock deposit. The beachrock appears as an eroding relict deposit set in a currently high wave energy environment. Preliminary studies utilising petrography, scanning electron microscopy (SEM), Inductively Coupled Plasma Emission spectroscopy (ICP) and X-Ray diffraction (XRD) indicate that the Harlyn beachrock is composed of medium to coarse grained comminuted shell sand, lithologically comparable to the present beach sand, cemented by at least one phase of epitaxial low-Mg calcite. Limited development of beachrock with broadly similar features in the intertidal zone along the east side of the Camel Estuary, north Cornwall, UK, is also reported. Further work is required to develop a model for the development of beachrock in the context of geochemistry, sea-level fluctuations, local dune formation and movements and climate change during the Late Quaternary along the north Cornwall coast.

29 Pendarves Road, Penzance, Cornwall, TR18 2AJ, U.K.
(E-mail: fmp-howie@msn.com).

Keywords: Cornwall, beachrock, Harlyn Bay, Camel Estuary, coastal processes.

INTRODUCTION

The occurrence of carbonate cemented beach sand along the north Cornwall coast, UK, (Figure 1), was described by Clarke (1968) who identified the intertidal cemented limesand reefs and cemented beach above high water in Little Cove, Mother Ivey's Bay, north Cornwall, as beachrock and by Bird (2000, p.115) who described the cemented sands in the adjacent Harlyn Bay, north Cornwall, as 'beach rock'. The beachrock deposits developed in Harlyn Bay have been well exposed over the past few years whereas the deposits in Little Cove are currently substantially covered by banked beach sands. However, laminae of beachrock are found adhering to the cliffs in Little Cove and the beach there is littered with beachrock pebbles, both of which appear identical to the Harlyn Bay material. Along the coasts of the British Isles, apart from the aforementioned, the few reported occurrences of beachrock include Tucker and Wright (1990, p.323), who refer to low-Mg calcite cemented beachrock on south-west UK beaches but give no localities or details, Pentecost (2005, p.305-6) who refers to widespread Quaternary beachrock in the UK but again with little in the way of detail, high-Mg calcite and aragonite cemented beach sand and beachrock on North Uist, Scotland (Kneale and Viles, 2000) and aragonite cemented beachrock in Clew Bay, Ireland (Sellwood, 1994).

The aim of this paper is to provide a preliminary description of the geomorphological and mineralogical characteristics of the beachrock occurring in the upper intertidal zone at Harlyn Bay on the north coast of Cornwall, UK, and to compare these with the beachrock described from other high latitude, high energy tidal beach localities along the NW European Atlantic coastline. The main area of beachrock investigated in this study

is situated in Harlyn Beach (Figure 2). Beachrock-type deposits occurring inter-tidally in Daymer Bay and on the beach near Rock along the east side of the Camel Estuary, Cornwall, UK, (Figure 1) are briefly described. The present study was carried out over 2008-2009.

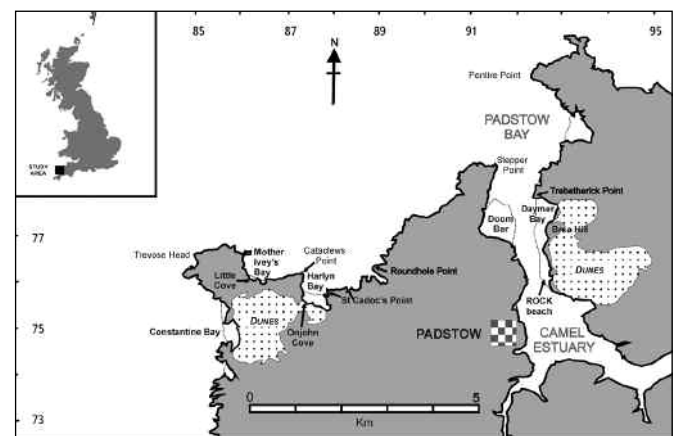


Figure 1. Sketch map of north Cornwall coast between Constantine Bay and Pentire Point with location of Harlyn Bay, Daymer Bay, Rock Beach and landmark features. Inset map of the UK indicating the location, of the study area on the north coast of Cornwall.