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Quaternary fluvial, pedogenic and mass-movement processes at St George's Down, Newport, Isle of Wight

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ABSTRACT

Recent geological mapping on the Isle of Wight by the British Geological Survey has shown the 'Plateau Gravel' to be a mixture of fluvial, solifluction, pedogenic and marine deposits ranging from pre-Anglian to Holocene age. As part of the resurvey of the island, several new exposures of the 'Plateau Gravel' between Newport and Downend were examined. A working gravel pit on St George's Down, near Newport, revealed a succession of flint gravels with an inter-bedded sequence of laminated silts. An upper *in situ* succession of pre-Anglian fluvial gravels caps the plateau, but a second, probably younger suite of gravel-rich sediments is exposed in a quarry on a topographically lower spur. These overlie *in situ* Clay-with-flints resting on Upper Cretaceous Chalk. These lower sediments are well exposed and display a complex stratigraphy. They consist predominantly of flint gravel, but include a dipping succession of laminated silts and palaeosols preserved in a hollow or small channel feature, intercalated between two distinct solifluted cold-stage gravel sheets. Palynological and pedological evidence analysis suggests that these laminated silts and sands were deposited under a temperate climate but with frequent episodes of disruption caused by mass-movement and possibly freeze–thaw. The age of these laminated sediments are not known with any certainty but are likely to date to a temperate interval within the Late Pleistocene. The top of the laminated unit is cut by a heavily cryoturbated horizon presumed to be of Devensian age.

1. Introduction

Quaternary superficial deposits are important repositories of palaeoclimatic and palaeoenvironmental information. The Hampshire – Isle of Wight region contains an extensive sequence of Quaternary river terraces and raised beaches associated with the development of the Solent River. During the Quaternary this was the largest river in southern England, but has now been truncated by sea-level rise (Everard, 1954). The terrace gravels on the northern side of the Solent River have been recognised for over a century and numerous lithostratigraphical schemes have been erected (see Allen and Gibbard (1993) for a comprehensive review). Many of these terrace and raised beach deposits are important archaeological sites; some, such as Boxgrove (Roberts and Parfitt, 1999) are of international significance. Although they have been extensively discussed in the literature the correlation and age of these deposits remain a subject of debate (Westaway et al., 2006; Briant et al., 2009). However, relatively little attention has been focused on the extensive Quaternary deposits that crop out on the on the southern side of the Solent river on the Isle of Wight. Most of these deposits were mapped as 'Plateau Gravel' during the primary geological surveys during the nineteenth century. However, the precise age, genesis and significance of these deposits as shown on the published geological maps (British Geological Survey, 1976) and memoirs (White, 1921) is poorly understood. It is unclear whether they represent shallow marine sediments, raised beaches, fluvial river terraces or solifluction sheets. Understanding the genesis and chronology of the 'Plateau Gravel' and placing its constituent parts into a robust chronostratigraphic framework will significantly improve the potential to interpret the archaeological record on the southern side of the Solent River. Recent remapping of the island by the British Geological Survey (BGS; in prep) demonstrates that the 'Plateau Gravel' are an amalgam of lithologically, temporally and genetically distinct deposits, and include Clay-with-flints, periglacial solifluction deposits ('Head'), fluvial gravels, raised beaches and palaeosols. An understanding of the age and origin of these enigmatic deposits is critical to developing our knowledge of how the Isle of Wight fits into regional patterns of sea-level change, palaeoclimate and river system development within southern Britain, and contribute to the debate on the Quaternary uplift history of central southern England.

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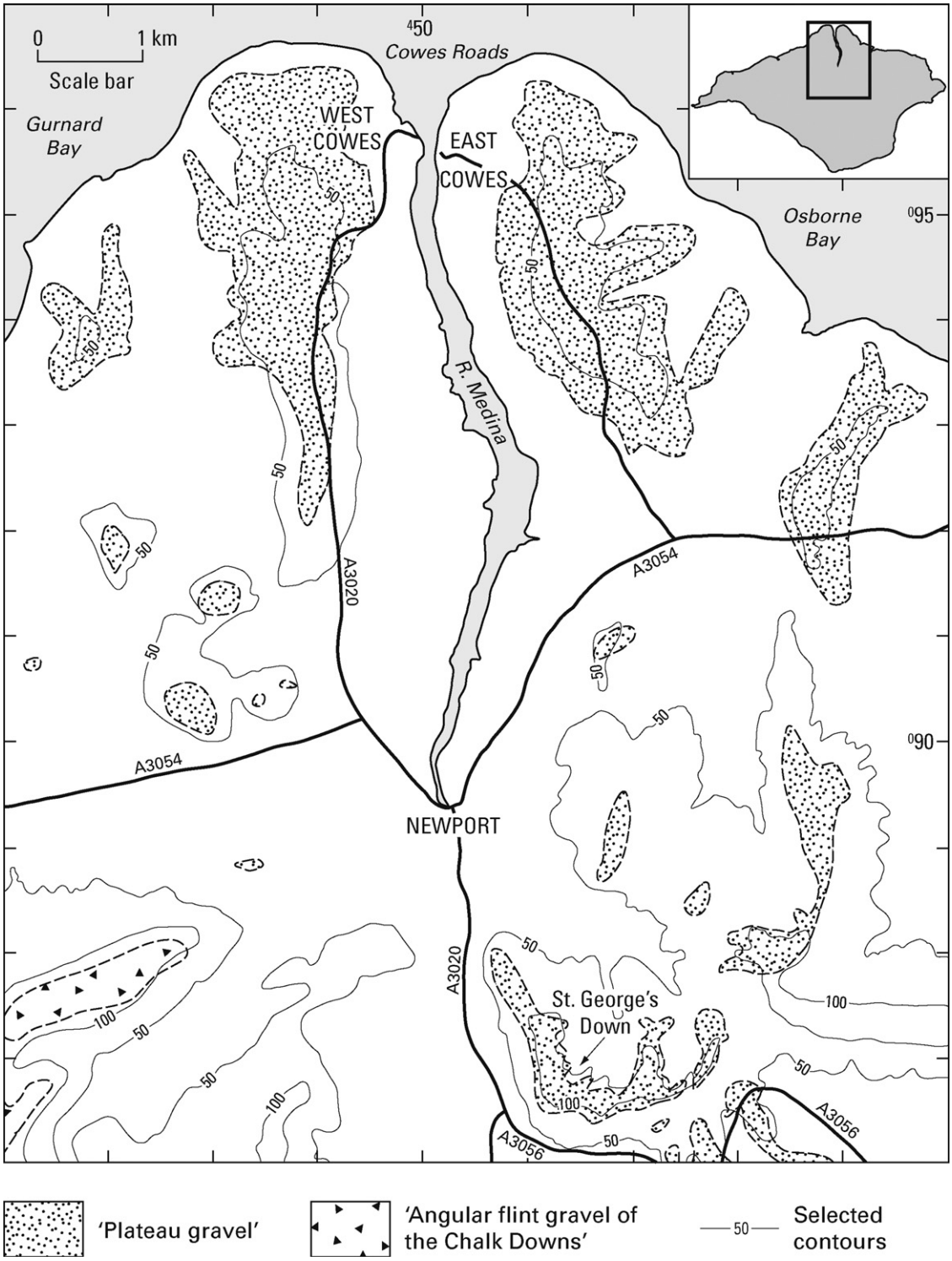

Fig. 1. The St George's Down outcrop and its relationship to other outcrops of the Plateau Gravel in the north-central part of the Isle of Wight. The terminology is based on the British Geological Survey memoir (White, 1921).

In this context, examining good sections through these deposits is critical. During the recent resurvey, a new section in the 'Plateau Gravel' was identified in the Bardon Vectis quarry on St George's Down near Newport (Fig. 1). The quarry, active at the time of the survey, is located 1.5 km southeast of Newport, adjacent to the Shide Chalk pit [SZ 506 881], but previous workings extended across much of the plateau between Shide and Arreton Cross [SZ 530 867]. This paper describes the deposits seen in the present working quarry (2009–2010) and provides evidence for a multiphase, polygenetic origin for the 'Plateau Gravel'.

2. History of research

Although there has been a long history of geological investigation on the Isle of Wight, relatively little has been published on the extensive gravel and sand deposits (the 'Plateau