

A REVISED DESCRIPTION AND FIELD GUIDE FOR THE KIMMERIDGE CLAY FORMATION AT KIMMERIDGE, DORSET, UK: EUDOXUS AND AUTISSIODORENSIS ZONES.



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A combination of cliff and foreshore exposures in the type section of the Kimmeridge Clay Formation at Kimmeridge, Dorset enables the succession to be accessed at beach level. Accurate thickness measurements can be made in the cliffs, but palaeontological collecting is difficult due to their weathered state. In contrast, there are extensive outcrops in a relatively unweathered state in the intertidal zone from where all the better preserved fossils, mostly ammonites, bivalves, gastropods and vertebrates, have been collected in situ. The cliff and foreshore exposures are mostly separated by beach deposits that make bed-by-bed correlation between the two difficult at most stratigraphical levels because of the repetitively uniform lithology of the mudstones. Ortho-rectified air photographs and sidescan sonar surveys of the intertidal area have been combined with digitally rectified photographs of the cliff sections to produce a stratigraphical succession of numbered units based on the rhythmic nature of the Kimmeridge Clay. The revised classification has made it possible to collect material from any of the exposures in the exposed part of the Eudoxus and Autissiodorensis zones and place them in the stratigraphical succession with an accuracy of ± 0.1 m or better. This greater accuracy is important for describing fossil ranges and making correlations between outcrop and borehole sections.

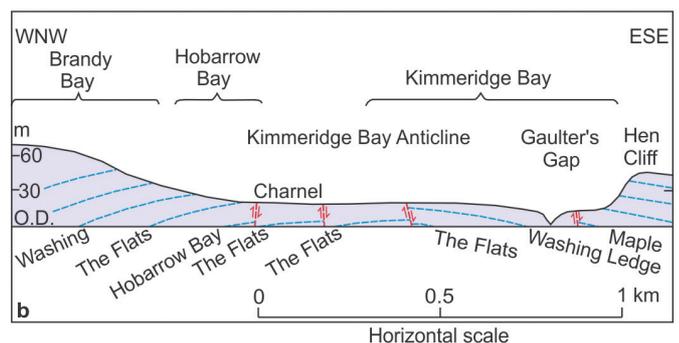
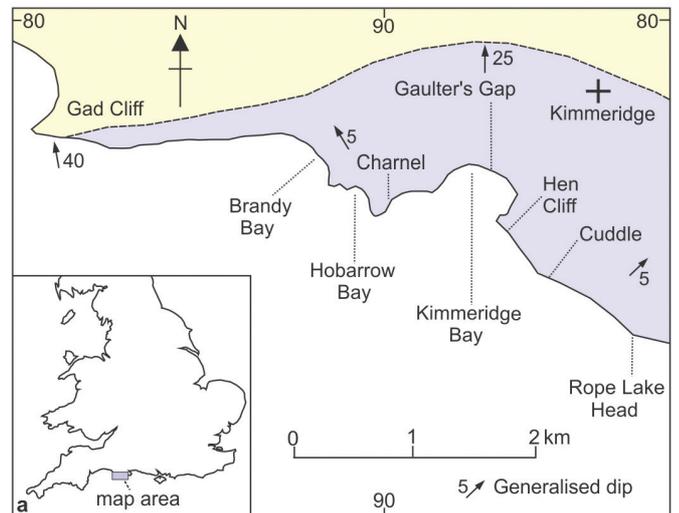
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INTRODUCTION

The type section of the middle and upper parts of the Kimmeridge Clay Formation, cliff and foreshore sections close to the village of Kimmeridge, Dorset (Figure 1a), exposes a total of c. 400 metres of strata out of a total formational thickness of 550 metres which has been proved in continuously-cored boreholes in that area. The scientific and educational importance of the cliff and foreshore exposures is recognised by their status as a Geological Conservation Review (GCR) site (Wright and Cox, 2001), a Site of Special Scientific Interest (SSSI) and their inclusion as one of the key localities in the East Devon and Dorset Coast World Heritage Site.

The stratigraphy of the formation is well documented. It has been divided into 13 biozones based on ammonite assemblages (Ziegler, 1962; Cope 1967, 1978) which cover the Kimmeridgian Stage and the correlatives of much of the Tithonian and Volgian Stages. All except the youngest zones have subsequently been re-defined as chronozones Page (*in* Simms *et al.*, 2004). The succession has been further divided into 63 chronostratigraphical units based on a combination of lithological, sedimentary, palaeontological and geophysical characters (Gallois, 2000 and references therein). The present account describes the succession exposed in the faulted Kimmeridge Bay Anticline in which all except the lowest part is repeated in Kimmeridge Bay and Brandy Bay (Figure 1b). The lithological succession ranges from the Hobarrow Bay Stone



Left Figure 1. (a) Geological sketch map of the Kimmeridge Clay outcrop in the Kimmeridge area; (b) Sketch section showing the outcrops of the principal named 'stone' bands in the cliffs between Brandy Bay and Gauley's Gap.