

A palynological study of three mudstone samples from the Worton district, Wiltshire

Integrated Geoscience Surveys (Southern Britain) Programme Internal Report IR/06/046

BRITISH GEOLOGICAL SURVEY

INTERNAL REPORT IR/06/046

A palynological study of three mudstone samples from the Worton district, Wiltshire

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Key words

Upper Jurassic, palynology, biostratigraphy, lithostratigraphy.

Bibliographical reference

RIDING, JAMES B.. 2006. A palynological study of three mudstone samples from the Worton district, Wiltshire. *British Geological Survey Internal Report*, IR/06/046. 7pp.

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Foreword

This report comprises a study of the palynology of three samples of dark mudstone from the area around Worton, Wiltshire.

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Summary

The three mudstone samples from the Worton district are all from the upper part of the Kimmeridge Clay Formation (Upper Kimmeridgian). Sample 1 is referable to the Hudlestoni Zone (standard Kimmeridge Clay Bed numbers 42 to 45). Samples 2 and 3 are interpreted as Upper Kimmeridgian, standard Kimmeridge Clay Bed numbers 42 and above.

1 Introduction

Three samples of dark mudstone from the area around Cherry Farm, near Worton, Wiltshire were submitted for palynological analysis in order to derive age and palaeoenvironmental determinations. Because of a lack of macrofauna, the precise Mesozoic lithological unit of these samples in uncertain. The samples were collected by M. A. Woods during 2005.

2 Sample Details

The samples studied are listed in the table below. The columns are, respectively, the (informal) sample number, the BGS micropalaeontological registration number (prefixed MPA), the collector's number (prefixed WMD), the grid reference and the lithology.

1	MPA 54170	WMD 11066	ST 98263 57431	dark mudstone
2	MPA 54171	WMD 11067	ST 97657 57303	dark mudstone
3	MPA 54172	WMD 11068	ST 97657 57303	dark mudstone

Sample 1 was taken at a bankside exposure in a small lay-by on the western side of the road ca. 630 m at 343° from Cherry Farm near Worton, Wiltshire. The sample is suspected to be either Late Jurassic or 'Mid' Cretaceous in age.

Samples 2 and 3 were collected from a bankside adjacent to a footpath ca. 950 m at 303° from Cherry Farm near Worton, Wiltshire. Sample 2 is either Late Jurassic or 'Mid' Cretaceous in age and sample 3 is possibly from the Kimmeridge Clay Formation.

3 Palynology

The samples generally produced relatively abundant organic residues and palynofloras; the preservation of palynomorphs is moderately good. The kerogen assemblages are dominated by palynomorphs and fragments of plant tissue. Full listings of all the palynomorph taxa recognised are held on the respective BGS micropalaeontology/palynology data sheets, which have been archived.

The palynofloras comprise both miospores and marine microplankton, principally dinoflagellate cysts, thereby indicating that the samples were deposited in an open marine depositional setting. No discernible reworking was observed. The dinoflagellate cysts indicate Late Jurassic ages; no characteristic Early Cretaceous species were observed.

3.1 SAMPLE 1

This sample produced a relatively rich dinoflagellate cyst flora including common *Senoniasphaera jurassica*, and lesser proportions of chorate cysts, *Cribroperidinium globatum*, *Sentusidinium* spp., *Systematophora areolata* and *Systematophora* spp. The co-occurrences of *Cribroperidinium longicorne*, *Egmontodinium polyplacophorum*, *Rotosphaeropsis thula* and *Senoniasphaera jurassica* is indicative of the late Kimmeridgian Hudlestoni Zone (Riding and Thomas, 1988; 1992). This indicates that sample 1 is from the Kimmeridge Clay Formation.

The attribution to the Hudlestoni Zone also indicates that it is from standard Kimmeridge Clay Bed numbers 42 to 45 of Cox and Gallois (1981).

3.2 SAMPLE 2

This sample proved palynologically sparser than sample 1. Dinoflagellate cysts are present and chorate cysts, *Cribroperidinium globatum, Egmontodinium expiratum, Senoniasphaera jurassica Sentusidinium* spp., *Systematophora areolata* and *Systematophora* spp. were observed. The range base of *Egmontodinium expiratum* is late Kimmeridgian Hudlestoni Zone (Riding and Thomas, 1988; 1992). No forms with reliable intra-Kimmeridgian range tops are present. The lithological nature of sample 2 and the occurrence of *Egmontodinium expiratum* is indicative that sample 2 is from the upper part of the Kimmeridge Clay Formation (standard Kimmeridge Clay Bed numbers 42 and above of Cox and Gallois, 1981).

3.3 SAMPLE 3

This sample produced a rich dinoflagellate cyst flora including undifferentiated chorate cysts, Cribroperidinium Egmontodinium polyplacophorum, Kleithriasphaeridium globatum, porosispinum, Rotosphaeropsis thula, Senoniasphaera jurassica, Sentusidinium spp., Systematophora areolata, Systematophora daveyi and Systematophora spp. The range bases of Kleithriasphaeridium porosispinum and Rotosphaeropsis thula are in the late Kimmeridgian No species with reliable intra-Hudlestoni Zone (Riding and Thomas, 1988; 1992). Kimmeridgian range tops are present. However, the lithological nature of sample 3 and the occurrences of Kleithriasphaeridium porosispinum and Rotosphaeropsis thula are indicative that sample 3 is from the upper part of the Kimmeridge Clay Formation (standard Kimmeridge Clay Bed numbers 42 and above of Cox and Gallois, 1981).

4 Conclusions

The three mudstone samples from the Worton district are all from the upper part of the Kimmeridge Clay Formation (Upper Kimmeridgian). Sample 1 is referable to the Hudlestoni Zone (standard Kimmeridge Clay Bed numbers 42 to 45). Samples 2 and 3 are interpreted as Upper Kimmeridgian, standard Kimmeridge Clay Bed numbers 42 and above.

5 References

COX, B. M. and GALLOIS, R. W. 1981. The stratigraphy of the Kimeridge Clay of the Dorset type area and its correlation with some other Kimmeridgian sequences. *Institute of Geological Sciences Report*, No. **80/4**, 44 p.

RIDING, J. B. and THOMAS, J. E. 1988. Dinoflagellate cyst stratigraphy of the Kimmeridge Clay (Upper Jurassic) from the Dorset coast, southern England. *Palynology*, **12**, 65-88.

RIDING, J. B. and THOMAS, J. E. 1992. Dinoflagellate cysts of the Jurassic System. *In:* Powell, A. J. (ed.). *A stratigraphic index of dinoflagellate cysts*. British Micropalaeontological Society Publications Series. Chapman and Hall, London, 7-97.