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NATURAL ENVIRONMENT RESEARCH COUNCIL

# A palynological investigation of three auger samples from Sheet 203

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BRITISH GEOLOGICAL SURVEY

INTERNAL REPORT IR/04/062

# A palynological investigation of three auger samples from Sheet 203

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# Foreword

This report comprises a palynological study of three samples from the suspected Oxford Clay Formation (Peterborough Member) of 1:50,000 Sheet 203.

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# Summary

Samples 1, 2 and 3 are all of mid Callovian age, largely on dinoflagellate cyst evidence, hence are from the Peterborough Member of the Oxford Clay Formation. These samples are all thought to be referable to the Jason Zone.

# 1 Introduction

Three auger samples from the suspected Oxford Clay Formation from 1:50,000 geological sheet 203 were studied for their palynomorph content. All three samples are thought to be from the Peterborough Member. This study aimed to determine age and palaeoecology. Of particular interest is the lithostratigraphy to member level of the Oxford Clay Formation. The biostratigraphical resolution of Callovian-Oxfordian dinoflagellate cysts is generally sufficient to enable the differentiation of the three members of the Oxford Clay Formation. This work has been undertaken in order to help the geological mapping of this region.

## 2 Sample Details

The three samples studied are listed below. The columns are, respectively, the (informal) sample number, the BGS micropalaeontological registration number (prefixed MPA), the collectors number (prefixed AMB), the grid reference and details of the location.

1	MPA 52404	AMB 708	TL 0615 5490	850 m on 265° from Grange Farm, Ravensden
2	MPA 52405	AMB 709	TL 06228 56149	800 m on 360° from Brook Farm, Ravensden
3	MPA 52406	AMB 710	TL 0850 5674	450 m on 255° from Smartwick Farm, Wilden

## 3 Palynology

In this section, the palynofloras are described in three main sections, referring to the three samples. Full listings of palynomorphs, including semiquantitative data, are held on the respective BGS micropalaeontology/palynology data sheets, which have been archived.

The consistent occurrence of relatively low proportions of marine microplankton indicates that the samples were all deposited in open marine conditions.

### 3.1 SAMPLE 1 – AMB 708

Sample 1 produced an abundant and well-preserved organic residue and palynoflora. Wood fragments and other plant tissues are common. The palynoflora is overwhelmingly dominated by the gymnospermous pollen grain *Classopollis classiodes*, with lesser proportions of Jurassic miospores and dinoflagellate cysts. The pollen flora also includes bisaccate pollen, *Callialasporites dampieri*, *Callialasporites microvelatus*, *Callialasporites trilobatus*, *Callialasporites turbatus* and *Cerebropollenites macroverrucosus*. The pteridophyte spores are less prominent diverse and include *Cyathidites* spp. and *Leptolepidites* spp. Miscellaneous microplankton are also present and include acritarchs and foraminiferal test linings.

The dinoflagellate cysts observed are not diverse and comprise complex chorate forms, *Ctenidodinium* sp., *Mendicodinium groenlandicum*, *Nannoceratopsis pellucida*, *Rhynchodiniopsis cladophora* and *Sentusidinium* spp. This association is characteristic of the mid Callovian due to the absence of early and late Callovian markers. The dinoflagellate cysts observed are all relatively long-ranging, but are entirely characteristic of the Peterborough Member. There is a marked dinoflagellate cyst diversification event in the Athleta Zone. None

of these distinctive forms were observed. The low diversity of this flora strongly suggests a correlation with the Jason Zone.

### 3.2 SAMPLE 2 – AMB 709

Sample 2 produced an organic residue and palynoflora similar to those of sample 1. The palynomorph preservation was fair and diversity is lower. The only dinoflagellate cyst recorded was *Nannoceratopsis pellucida*. The similarity of the palynoflora and the absence of early and late Callovian markers again indicates that this sample is from the Peterborough Member and that it is probably referable to the Jason Zone.

### 3.3 SAMPLE 3 – AMB 710

Sample 3 yielded a palynoflora and residue reminiscent of those from samples 1 and 2. The palynomorph preservation is good and diversity is relatively high. Gymnosperm pollen is dominant and largely comprises bisaccate pollen, *Callialasporites* spp., *Cerebropollenites macroverrucosus* and *Classopollis classoides*. Dinoflagellate cysts are, by contrast, rare and the association comprises complex chorate cysts, an indeterminate gonyaulacacean form, *Mendicodinium groenlandicum*, *Nannoceratopsis pellucida* and *Pareodinia ceratophora*. The occurrence of these relatively long-ranging forms, in the absence of early and late Callovian marker species indicates that sample 3 is mid Callovian in age and is from the Peterborough Member. It is probably referable to the Jason Zone.

## 4 Summary

Samples 1, 2 and 3 are all of mid Callovian age, largely on dinoflagellate cyst evidence, hence are from the Peterborough Member of the Oxford Clay Formation. These samples are all thought to be referable to the Jason Zone.