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A palynological investigation of a Middle Jurassic Limestone from the Malton area, North Yorkshire

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A palynological investigation of a Middle Jurassic Limestone from the Malton area, North Yorkshire

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Foreword

This report is a restudy of the palynology of a sample of Middle Jurassic Limestone from a disused quarry at Mowthorpe Dale Wood, near Malton, North Yorkshire.

Contents

Summary

The sample yielded rare Jurassic pollen and spores which are not age diagnostic. Therefore, based on these data, no conclusion as to the biostratigraphical age is possible. Various lines of evidence, such as the organic leanness and the diverse macrofauna of this unit, point towards a correlation with the Lebberston Member of the Cloughton Formation. However, these factors are not conclusive, and a study of the beds surrounding the limestone unit is strongly recommended.

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1 Introduction

The palynology of a single sample of the suspected Dogger Formation from North Yorkshire was studied by Riding (2007) in order to determine its biostratigraphical age. This sample proved barren of palynomorphs. However, the sample was from the weathering zone, so it was diecided to undertake a restudy using unweathered material.

The sample material is a hard, light brown bioclastic limestone. This lithotype is characteristic of either the Dogger Formation or the overlying Lebberston Member of the Cloughton Formation. There is a major dinoflagellate cyst bioevent in the Dogger Formation which can distinguish the Opalinum and Murchisonae (ammonite) chronozones. This is the range top of the *Parvocysta* group (Riding, 1984). This study was undertaken in order to help better understand the regional geological history of the area, and to contribute to the geological mapping of this area.

2 Sample Details

The sample was collected by J. Ford and S. Price during the summer of 2007 from a disused quarry at Mowthorpe Dale Wood, near Terrington, approximately 10 km WSW of Malton, North Yorkshire. The grid reference of this locality is 469060 469160, and the elevation is approximately 85 m. This sample was registered as BGS micropalaeontological sample MPA 56633.

The field relationships suggest that this limestone, which is the quarried unit, attains a thickness of around 2-3 m. It is underlain by grey mudstones which may be the Whitby Mudstone Formation or the Cloughton Formation. The overlying unit is a ferruginous, non-marine sandstone, which may be the Saltwick Formation or the Cloughton Formation.

3 Palynology

The palynoflora is described in this section. Because the sample is a pure limestone, it was prepared using HCl dissolution (Riding and Kyffin-Hughes, 2004).

Like the original sample, this residue proved to be organically sparse. Wood and plant tissue are present in moderate levels. Modern fungal material is also present in significant proportions. Several modern pollen grains (contaminants) were observed; these included *Alnus* and *Pinus*. However, some *in-situ* Jurassic palynomorphs were observed. These are all spores and pollen; they comprise *Classopollis*, *Cyathidites* and ?*Todisporites*. Unfortunately these sparse miospores are non-age diagnostic and cannot distinguish the individual formations within the Ravenscar Group. No marine palynomorphs were encountered.

The results are marginally better than in the original report, however the palynofloras cannot unequivocally distinguish the Dogger Formation from the other units of the Ravenscar Group. It is clear that the limestone exposed in the disused quarry at Mowthorpe Dale Wood is organic–lean. The Dogger Formation normally is moderately to highly palynomorph-rich (Riding, 1984). Furthermore, based on lithology sample MPA 56633 seems atypical of the Dogger Formation, which is typically highly ferruginous. Moreover, the macrofauna appears to be significantly more diverse than those in the Dogger Formation.

These lines of evidence appear to mitigate toward the limestone being part of the Cloughton Formation, however they are not conclusive. It is recommended that samples of the strata above and below this limestone unit be sampled in order to attempt clarification of this stratigraphical problem.

4 Conclusions

The sample yielded rare Jurassic pollen and spores which are not age diagnostic. Therefore, based on these data, no conclusion as to the biostratigraphical age is possible. Various lines of evidence, such as the organic leanness and the diverse macrofauna of this unit, point towards a correlation with the Lebberston Member of the Cloughton Formation. However, these factors are not conclusive, and a study of the beds surrounding the limestone unit is strongly recommended.

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5 References

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