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Palynology of Faroe-Shetland Basin well 205/20-2 between 2958.81 and 2999.78 m

Energy Systems and Basin Analysis Programme
Commissioned Report CR/17/087

BRITISH GEOLOGICAL SURVEY

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Keywords

Palynology, Late Jurassic, Early Cretaceous, Faroe-Shetland Basin, biostratigraphy.

Bibliographical reference

RIDING, J B. 2018. Palynology of Faroe-Shetland Basin well 205/20-2 between 2958.81 and 2999.78 m. British Geological Survey Commissioned Report, CR/17/087. 9pp.

Keyworth, Nottingham British Geological Survey 2018

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Summary

As part of Phase 3 of the BGS Faroe-Shetland Consortium project on the Jurassic of the UK sector of the Faroe-Shetland Basin, detailed logging of core from well 205/20-2 was undertaken. Thirteen core samples were taken for palynology between 2958.81 and 2999.78 m in order to provide age determinations and additional facies information.

Samples 5 to 13 (2970.35 to 2999.78 m) all proved barren of, or very sparse in, identifiable palynomorphs, and hence no age assessments are possible in this succession. By contrast, the uppermost interval (samples 1 to 4; 2958.81 to 2968.08 m) is interpreted as being of Kimmeridgian to Middle Volgian age (Eudoxus to Anguiformis zones) based largely on sparse dinoflagellate cysts.

1 Introduction

As part of detailed sedimentological logging of conventional core from offshore well 205/20-2, thirteen samples between 2958.81 and 2999.78 m were collected for palynological analysis in order to provide biostratigraphical ages and palaeoecological information. The samples were all prepared using standard acid-based techniques. The samples, aqueous residues and microscope slides are held in the BGS collections at Keyworth, Nottingham. The sample details are listed in Appendix 1.The zones referred to are standard ammonite zones.

2 Palynology

The palynological data in this study are set out in Appendix 2. The samples all proved relatively sparse in palynomorphs. Indeed, samples 8 and 9 and 11 to 13 proved entirely barren, hence no age assessments are possible for these horizons. Dinoflagellate cysts were only observed in samples 1, 2 and 4, however these were poorly-preserved and sparse. These occurrences indicate marine deposition at these horizons. The organic residues in samples 1 to 11 are all dominated by wood fragments, thus implying a single genetic sedimentary succession.

The dinoflagellate cysts in samples 1, 2 and 4 comprise *Cribroperidinium* spp., ?*Dichadogonyaulax*? *pannea*, indeterminate forms, *Systematophora areolata* and *Systematophora* spp. This assemblage is typical of the Late Jurassic (Oxfordian to Volgian). A questionable specimen of *Dichadogonyaulax*? *pannea* was encountered in sample 2 (2960.77 m). This species is confined to the Kimmeridgian to Middle Volgian interval (Eudoxus to Anguiformis zones) (Riding and Thomas, 1992). The range base of consistent *Systematophora* is Oxfordian, and *Cribroperidinium* is typical of the Kimmeridgian to Volgian. The occurrence of the spore genus *Cicatricosisporites* in samples 1 and 3 is entirely consistent with this assessment.

In summary, the uppermost interval examined (samples 1 to 4; 2958.81 to 2968.08 m) is interpreted as being of Kimmeridgian to Middle Volgian age (?Eudoxus to Anguiformis zones). The remainder of the palynoflora is consistent with this assessment. Reworked Carboniferous spores (*Densoisporites* spp. and *Lycospora pusilla*) were observed in samples 1 and 2. By contrast, samples 5 to 13 (2970.35 to 2999.78 m) cannot be assigned a biostratigraphical age due to the paucity of the palynofloras.

3 Conclusions

The uppermost succession (samples 1 to 4; 2958.81 to 2968.08 m) is interpreted as being of Kimmeridgian to Middle Volgian age (?Eudoxus to Anguiformis zones) based largely on sparse dinoflagellate cysts. By contrast, samples 5 to 13 (2970.35 to 2999.78 m) all proved devoid of, or very sparse in, identifiable palynomorphs, and hence no age assessments are possible.

Reference

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

Appendix 1- list of samples (measured depths).

Informal No.	BGS Registration No.	Depth (m)
1	MPA 67512	2958.81
2	MPA 67511	2960.77
3	MPA 67510	2964.97
4	MPA 67509	2968.08
5	MPA 67508	2970.35
6	MPA 67507	2973.18
7	MPA 67506	2976.08
8	MPA 67505	2977.30
9	MPA 67504	2980.56
10	MPA 67503	2982.94
11	MPA 67502	2988.30
12	MPA 67501	2994.14
13	MPA 67500	2999.78

Appendix 2 – palynology data

205/20-2													
Number	1	2	3	4	5	6	7	8	9	10	11	12	13
MPA Number	67512	67511	67510	67509	67508	67507	67506	67505	67504	67503	67502	67501	67500
Depth (m)	2958.8	2960.8	2965	2968.1	2970.4	2973.2	2976.1	2977.3	2980.6	2982.9	2988.3	2994.1	2999.8
Comments	fair	sparse	sparse	sparse	sparse	sparse	sparse	barren	barren	sparse	barren	barren	barren
Age interpretation	Kimmeridgian to Mid Volgian				Indeterminate								
Palaeoenvironment	Marine		Terr. only	?Marine	Marine	errestrial taxa only		Indeterminate		Terr. only	Indeterminate		
PTERIDOPHYTE SPORES:													
Cicatricosisporites spp.	X		X			?							
Concavisporites sp.				X									
Coronatispora valdensis	?												
Cyathidites spp.	X	X	X	X		X	X			X			
Densoisporites spp. (reworked)	X												
Duplexisporites sp.			X										
Gleicheniidites senonicus	X			?		X	X			X			
Lycospora pusilla (reworked)	X	X											
Retitriletes spp.	X		X	X						X			
Sestrosporites pseudoalveolatus		X		X									
spores - indeterminate	X	X	X	X		X	X			X			
GYMNOSPERM POLLEN:													
bisaccate pollen - undifferentiated	X	X	X	X		X				X			
Callialasporites dampieri	X	X											
Callialasporites spp.	X												
Cerebropollenites macroverrucosus	X	X	X			X				?			
Perinopolleniteselatoides						X							
Vitreisporites pallidus		X	X										
pollen - indeterminate										X			
DINOFLAGELLATE CYSTS:													
Cribroperidinium spp.		X		X									
Dichadogonyaulax?pannea		?											
dinoflagellate cysts - indet.		X											
Systematophora areolata	X												
Systematophora spp.	X												
MISCELLANEOUS:													
Botryococcus	X												
foraminiferal test linings	X	X											
Micrhystridium spp.	X												
Tasmanites spp.	X				?								
KEROGEN TYPE (%)													
wood	52	72	73	77	87	78	72	95	98	95	87	…	..
plant fragments	22	13	17	12	10	7	5	5	2	4	5	…	…
palynomorphs	8	8	3	6	…	7	5	…	…	1	…	…	…
amorphous organic material (AOM)	18	7	7	5	3	8	18	…	…	…	8	…	…