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Palynology of Faroe-Shetland Basin well 206/05-1 between 3155.08 and 3901.90 m

Energy Systems and Basin Analysis Programme
Commissioned Report CR/17/127

BRITISH GEOLOGICAL SURVEY

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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 206/05-1 was undertaken. Nine core samples were taken for palynology between 3155.08 and 3901.90 m in order to provide age determinations and additional facies information.

Samples 1 to 6 (3155.08 to 3269.07 m), yielded sparse palynomorph floras including the dinoflagellate cyst *Ambonosphaera staffinensis* in sample 6 (3269.07 m). This occurrence indicates a Late Jurassic, probably Mid Oxfordian to Mid Volgian, age. The palynologically productive interval between 3155.08 and 3269.07 m represents marine deposition. The interval between 3272.08 and 3901.90 m (samples 7 to 9) proved entirely barren, and cannot be dated.

1 Introduction

As part of detailed sedimentological logging of conventional core from offshore well 206/05-1, nine samples between 3155.08 and 3901.90 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 seven samples are listed in Appendix 1.

2 Palynology

The palynological data in this study are depicted in Appendix 2. Samples 1 to 6 (3155.08 to 3269.07 m) produced very sparse palynofloras. Samples 1 to 6 are rich in amorphous organic material. The palynologically productive interval (3155.08 to 3269.07 m) produced low numbers of indigenous marine and terrestrially derived palynomorphs, hence represents marine deposition.

There are very few age-diagnostic palynomorphs present. The principal one is the dinoflagellate cyst *Ambonosphaera staffinensis* in sample 6 (3269.07 m) (Table 1). This species has a consistent range of Mid Oxfordian to Mid Volgian (Late Jurassic), but can be rarely present in the Early Cretaceous (Barremian) (Poulsen and Riding, 1992, fig. 2). No exclusively Cretaceous taxa were observed. The only other forms with any biostratigraphical significance are *Systematophora* sp. in sample 3 (3168.88 m), and *Cribroperidinium* sp. in sample 2 (3159.89 m). These two genera are typically (but not exclusively) Late Jurassic (Riding and Thomas, 1992). Due to the sparsity of the palynofloras, biostratigraphical interpretations resolved to the level of ammonite zones are not feasible herein. The low diversity pollen, spores and miscellaneous palynomorphs are not biostratigraphically significant. They are, however, consistent with the Late Jurassic age determination.

Samples 7 to 9 (3272.08 to 3901.90 m) proved barren of palynomorphs, hence no age determinations are possible. In terms of palynofacies, samples 7 and 8 are rich in amorphous organic material and sample 9 (3901.90 m) yielded abundant wood fragments.

3 Conclusions

Samples 1 to 6, between 3155.08 and 3269.07 m, produced sparse palynofloras including the dinoflagellate cyst *Ambonosphaera staffinensis* (sample 6 at 3269.07 m). The latter occurrence indicates a Late Jurassic (probably Mid Oxfordian to Mid Volgian) age. The productive interval between 3155.08 and 3269.07 m represents marine deposition. Samples 7 to 9, between 3272.08 and 3301.90 m, proved entirely barren, and cannot be dated using palynology.

4 References

POULSEN, N E, and RIDING, J B. 1992. A revision of the Late Jurassic dinoflagellate cysts *Ambonosphaera*? *staffinensis* (Gitmez 1970) comb. nov., and *Senoniasphaera jurassica* (Gitmez & Sarjeant 1972) Lentin & Williams 1976. *Palynology*, Vol. 16, 25–34.

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 studied (measured depths).

Informal No.	BGS Registration No.	Depth (m)
1	MPA 67624	3155.08
2	MPA 67625	3159.89
3	MPA 67626	3168.88
4	MPA 67627	3175.41
5	MPA 67628	3183.79
6	MPA 67629	3269.07
7	MPA 67630	3272.08
8	MPA 67631	3274.92
9	MPA 67632	3901.90

Appendix 2 – palynology data

206/05-1									
Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
MPA Number	**67624**	**67625**	**67626**	**67627**	**67628**	**67629**	**67630**	**67631**	**67632**
Depth (m)	**3155.08**	**3159.89**	**3168.88**	**3175.41**	**3183.79**	**3269.07**	**3272.08**	**3274.92**	**3901.9**
Comments	**sparse**	**sparse**	**v. sparse**	**sparse**	**sparse**	**v.sparse**	**barren**	**barren**	**barren**
Age interpretation	**Late Jurassic**					**Mid. Oxf. to Mid Volg.**	**Indeterminate**		
Palaeoenvironment	**Marine**						**Indeterminate**		
PTERIDOPHYTE SPORES:									
Cyathidites spp.	X				X				
spores - indeterminate		X		X	X				
GYMNOSPERM POLLEN:									
bisaccate pollen - undifferentiated				X	X				
Callialasporites spp.				X					
Perinopollenites elatoides	X				X				
pollen - indeterminate	X								
DINOFLAGELLATE CYSTS:									
Ambonosphaeria staffinensis						X			
Cribroperidinium spp.		X							
dinoflagellate cysts - indet.						X			
Systematophora spp.			X						
MISCELLANEOUS:									
foraminiferal test linings	X	X	X	X	X	X			
Micrhystridium sp.				X					
Tasmanites spp.		X	X	X					
KEROGEN TYPE PERCENTAGES									
wood	20	20	25	15	20	20	30	15	70
plant fragments	10	5	5	15	5	10	15	5	…
palynomorphs	5	5	15	25	20	20	…	…	5
amorphous organic material (AOM)	65	70	55	45	55	50	55	80	25