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Foraminifera from the Chalk of the Newbury area (1:50K sheet 267)

Internal Report IR/03/023

BRITISH GEOLOGICAL SURVEY

INTERNAL REPORT IR/03/023

Foraminifera from the Chalk of the Newbury area (1:50K sheet 267)

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Summary

This report describes the biostratigraphical age determinations of a suite of Chalk samples from 1:50K Sheet 267. Foraminifera indicate that Cenomanian to Santonian chalks are present.

1 Introduction

A suite of chalk samples from the Newbury area was examined for calcareous microfaunas (foraminifera) in order to determine the biostratigraphical ages. Comparison with other localities in southern England was carried out to relate the foraminiferal assemblages to the new lithostratigraphical framework for the Chalk.

2 Sample details and conclusions

The full listing of the species present in each sample is held on file in the Biostratigraphical Records of the BGS held in Keyworth.

National Grid References throughout this report refer to 100 km quadrant SU.

The foraminiferal zonation used herein is that of Wilkinson (2000).

2.1 MPA51398 PMH3629 34909 64215

The majority of species are long ranging. However, *Cibicides beaumontianus*, *Stensioeina granulata granulata* and a specimen tentatively assigned to *Stensioeina granulata polonica* were recorded. No members of the *cristata-usakensis* lineage were present. Zone BGS17i or 17ii is suggested. A position in the upper Seaford Chalk, but probably no higher than the Barrois Sponge Bed (and lateral equivalents) is indicated.

2.2 MPA51399 PMH3630 34942 67174

The presence of *Gavelinella cristata* together with *Bolivinooides strigillatus*, *Stensioeina granulata perfecta* and *Stensioeina excelsculpta excelsculpta* places the fauna within the upper part of zone BGS18 (subzones iii or iv). However, the absence of *Rugoglobigerina pilula*, *Archaeoglobigerina cretacea*, etc suggests a position below BGS 18iv. BGS18iii places the sample in the lower (but not basal) Newhaven Chalk, and a position within the upper part of the *U. socialis* to lower part of the *M. testudinarium* macrofaunal zones is inferred.

2.3 MPA51400 PMH3631 35385 63451

Species such as *Gavelinella baltica*, *Tritaxia pyramidata*, *Gavelinella berthelini*, *Arenobulimina anglicus* and *Gavelinella intermedia* indicate a position within the the Cenomanian (i.e. stratigraphically no lower than zone BGS1). The presence of *Marsonella ozawai* refines this to zones BGS1 to BGS2 (H. carcitanense to lower *M. saxbii* macrofaunal subzones), but the absence of *Pseudotextulariella cretosa* suggests the fauna is from BGS1 (H. carcitanense) rather than BGS2. Whether BGS 1 or 2, the lower part of the West Melbury Chalk is inferred.

2.4 MPA51401 PMH3632 35147 63831

Planktonic taxa dominate the foraminiferal assemblage. These include keeled *Marginotruncana pseudolinneana*, *M. marginata* and *Dicarinella imbricata*. Unkeeled *Hedbergella brittonensis* and *Whiteinella aprica* also occur. Benthonic foraminifera are rare, but include *Globorotalina michelinianus* and *Gyroidinoides nitidus*. The presence of *G. michelinianus* indicates a stratigraphical position no lower than the 'middle' part of the New Pit Chalk (base of BGS10), but *Marginotruncana pseudolinneana* does not enter the record until a little higher (Base BGS 11) in the upper part of the New Pit Chalk. The dominance of long-ranging species and absence of biostratigraphically confined taxa means that the fauna could be as high as the Lower Lewes Chalk (within the lower part of zone BGS12) at which point *D. imbricata* becomes extinct.

2.5 MPA51402 PMH3633 35735 63831

Stensioeina granulata polonica and *Reussella szajnochae praecursor* have a concurrent range in zone BGS17iii and basal 18i. The absence of *Gavelinella cristata* and *G. stelligera* suggests a position in the former rather than the latter zone. Stratigraphically, the concurrent zone of the two foraminifera is immediately below Peake's Sponge Bed (and lateral equivalents) in the highest *M. coranguinum* Zone.

2.6 MPA51403 PMH3634 35469 64042

Gavelinella stelligera, *Gavelinella cristata*, *Stensioeina exsculpta exsculpta* and *Reussella szajnochae praecursor* are present, placing the sample in BGS 18 or possibly the very basal part of BGS19. The presence of a single fragment tentatively assigned to *Vaginulinopsis scariformis*, and the absence of taxa such as *Stensioeina granulata perfecta*, *Bolivinoides* spp, etc *Rugoglobigerina pilula* etc makes a position in BGS18ii and above unlikely. BGS18i seems most likely and the basal Newhaven Chalk is suggested, although the very highest Seaford Chalk (i.e. immediately below Peake's Sponge Bed) can not be ruled out entirely.

2.7 MPA51404 PMH3635 36799 66152

Gavelinella cristata, *Stensioeina granulata perfecta*, *Stensioeina granulata granulata*, *Stensioeina exsculpta exsculpta* and *Rugoglobigerina pilula* places the sample within zone BGS18iv or very basal BGS19 (equating with the basal *U. anglicus* Zone to basal *O. pilula* zone). A position within the 'middle' part of the Newhaven Chalk is inferred.

2.8 MPA51405 PMH3636 37934 61791

Foraminifera are very rare, poorly preserved and mainly long-ranging planktonic species. No biostratigraphical conclusions can be drawn.

2.9 MPA51406 PMH3637 37850 61904

Although the foraminiferal association is more diverse compared to MPA 51405, species are long-ranging and of little biostratigraphical usefulness. Perhaps significant is the absence of

species of *Stensioeina*, which are consistently present in BGS14 and above (i.e. within the Seaford Chalk and above). The foraminifera are no older than BGS 10, characterised by the inception *Globototalites michelinianus*, in the New Pit Chalk. However, further refinement is not possible with certainty. *Gavelinella* sp. C of Bailey (PhD thesis) is apparently confined to the *M. cortestudinarium* macrofauna Zone (Foraminiferal zone A of Bailey, PhD thesis). Although not a satisfactory criterion to base a biostratigraphical conclusion, its presence here may indicate the upper part of the Lewes Chalk. This is supported by the presence of a single fragment tentatively assigned to *Osangularia cordieriana*, a species that appears for the first time at about the East Cliff Marls (and lateral equivalents), in other words, close to the Lewes/Seaford Chalk boundary.

2.10 MPA51407 PMH3638

Registered but not examined for foraminifera at this time.

2.11 MPA51408 PMH3639 37508 62252

Gavelinella cenomanica, *Gavelinella baltica*, *Gavelinella intermedia* and *Plectina mariaae* are frequent to common in the sample, indicating a Cenomanian age. This can be further refined by the presence of *Plectina cenomana* and *Rotalipora cushmani*, both of which are confined to the upper part of the stage. The former first appears at the base of zone BGS4 (*inermis* macrofaunal zone) and the inception of the latter is at the base of BGS4iii (*acutus* macrofaunal zone). Rare specimens tentatively assigned to *Lingulogavelinella globosa*, if correctly identified, may indicate the presence of BGS6, although other species that would be expected in that zone are not present. The assemblage can thus be placed within BGS4iii (-BGS6) and the Zigzag Chalk is inferred.

2.12 MPA51409 PMH3640

Registered but not examined for foraminifera at this time.

2.13 MPA51410 PMH3641 37314 62978

The concurrent range of *Stensioeina exsculpta exsculpta* and *Lingulogavelinella arnagerensis* places the association within zone BGS14 to BGS17ii (*coranguinum* macrofaunal zone) and the Seaford Chalk is inferred. The former species first appears between the Upper East Cliff Marl and the Hope Point Marl (and lateral equivalents) and ranges through to the basal Campanian. The latter species appears within the Turonian and disappears from the record a little above Whitaker's 3" Flint (and lateral equivalents). This age determination can be tentatively refined. *Archaeoglobigerina bosquensis*, a rare and patchily distributed species (which reduces its biostratigraphical usefulness somewhat) apparently has its inception within the uppermost Coniacian (within BGS 16). *Reussella kelleri*, a long ranging Lazarus species, is generally absent in the *coranguinum* Zone, below Whittaker's 3" Flint. If this holds true here, then stratigraphically the best fit is immediately above the latter flint band (basal BGS17ii). The Seaford Chalk is thus indicated and a position within the 'middle' part of the formation seems possible.

2.14 MPA51411 PMH3642 37980 66782

The presence of *Gavelinella cristata* and *Stensioeina granulata perfecta* places the lowest possible stratigraphical position immediately above Peake's Sponge Bed (and lateral equivalent). Their inception marks the base of foraminiferal zone BGS18 and subzone BGS18ii respectively. *Stensioeina granulata granulata* is also present suggesting a position no higher than BGS18iii, although the absence of species belonging to the genus *Bolivinooides* suggests the position is not as high as that. BGS18ii ('mid' *socialis* macrofaunal zone) and BGS18iii ('upper' *socialis* to *testudinarius* macrofaunal zones) indicate that the sample was taken from the lower (but not basal) part of the Newhaven Chalk Formation.

2.15 MPA51412 PMH3643

Registered but not examined for foraminifera at this time.

2.16 MPA51413 PMH3644

Registered but not examined for foraminifera at this time.

2.17 MPA51414 PMH3645

Registered but not examined for foraminifera at this time.

2.18 MPA51415 PMH3646 38535 62576

The occurrence of *Lingulogavelinella arnagerensis* places the assemblage stratigraphically no higher than immediately above the Whitaker's 3" Flint (in the upper part of the Seaford Chalk). *Stensioeina exsculpta exsculpta* indicates a position above the East Cliff Marls. A more refined age determination is not possible, although the presence of frequent specimens of *Reussella kelleri* suggests the assemblage came from immediately above the Whitaker's 3" Flint. This last suggestion must be treated with caution. *Reussella kelleri* is a 'Lazarus' species which is generally absent in the lower part of the Seaford Chalk (lower part of the *coranguinum* Zone) below Whitaker's 3" Flint Band.

2.19 MPA51416 PMH3647

Registered but not examined for foraminifera at this time.

2.20 MPA51417 PMH3648

Registered but not examined for foraminifera at this time.

2.21 MPA51418 PMH3649

Registered but not examined for foraminifera at this time.

2.22 MPA51419 PMH3650

Registered but not examined for foraminifera at this time.

2.23 MPA51420 PMH3651 39793 62085

Foraminifer are not common in the sample. *Stensioeina granulata polonica* is the zonal index for BGS17 (upper part of the *coranguinum* Zone). The species appears first at the Chartham Flint (and lateral equivalents) and ranges up to Peake's Sponge Bed. Rare specimens of *Reussella kelleri* suggests that the sample of the sample may be from above the Whitaker's 3" Flint (and lateral equivalents), although this conclusion is only tentatively made (see MPA51415). The upper part of the Seaford Chalk is indicated.

2.24 MPA51421 PMH3652 39748 66361

Gavelinella cristata, *Stensioeina granulata perfecta*, *Stensioeina granulata granulata*, *Gavelinella stelligera*, *Reussella kelleri* were among the species recorded from the sample. Specimens of *Bolivinoidea*, *Rugoglobigerina pilula*, *Archaeoglobigerina cretacea* and other species characteristic of higher stratigraphical levels were not present. This suggests that the assemblage is of BGS18ii age ('mid' *socialis* Zone) in the lower, but not basal, Newhaven Chalk.

2.25 MPA51422 PMH3653

Registered but not examined for foraminifera at this time.

2.26 MPA51423 PMH3654 39091 67067

Gavelinella cristata, *Stensioeina granulata perfecta*, *Reussella szajnochae praecursor*, *Gavelinella stelligera* formed the largest part of the assemblage. This suggests that the assemblage is of BGS18ii age ('mid' *socialis* Zone). Species of *Bolivinoidea* were not found, but very rare, poorly preserved specimens tentatively assigned to *Stensioeina exsculpta gracilis* and *Rugoglobigerina pilula* were noted. If they are correctly identified and in situ, then the age of the association would be stratigraphically slightly younger (BGS18iv; *U. anglicus* Zone). The association is no younger than very basal BGS19i (*pilula* macrofaunal zone). The Lower, but not basal, Newhaven Chalk is indicated.

3. References

WILKINSON, I.P.2000. A preliminary foraminiferal biozonation of the Chalk Group (In preparation for the Holostrat Project: Upper Cretaceous). *British Geological Survey Internal Report*, IR/00/13, 21pp.