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A note on the mid-Cretaceous foraminifera from B.P. 93/2-1 South Celtic Sea Basin

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The South Celtic Sea Basin forms one of a number of SW-NE trending Mesozoic basins offshore south-west England and is separated from the North Celtic Sea Basin by a positive feature, the Pembroke Ridge, which is formed by the Lower Palaeozoic metamorphic basement (Weighell *et al.* 1980). Its southern margin is bounded by an extension of the Cornubian granites, known as Haig Fras (Jones *et al.* 1988).

In the area of B.P. 93/2-1 the basin contains a thick sequence of gently folded Jurassic sediments lying unconformably on the Variscan basement, the overlying greensands and chalks of Cretaceous age are unconformable on the Jurassic sequences (Chapman, *pers. comm.*). The late Cenomanian over most of the Celtic Sea basin was marked by the onset of deeper water chalk sedimentation with a readily discernible influx of planktonic foraminifera (possibly the local representation of the mid-Cenomanian non-sequence of Carter and Hart (1977) as suggested by Weighell *et al.* (1980). The uppermost Cenomanian is marked by an argillaceous unit which is variably developed (1.5-2m) across the basin. This is also coincident with a strong gamma kick and is most probably the off-shore representation of the Plenus Marl Formation as seen in well-log records in many parts of the North Sea Basin. The Turonian saw the resumption of white chalk sedimentation over the region (Weighell *et al.* 1980).

B.P. 93/2-1 is situated in the northern part of the middle of the basin (Lat. 50°57'N, Long. 06°46'W) and penetrated a total depth of 2127m. This investigation was concerned with the downhole interval between 1030ft (320m) and 1120ft (350m) (Fig. 1). The upper Cenomanian and Turonian sediments from B.P. 93/2-1 comprise white chalk except for the uppermost Cenomanian (Plenus Marl Formation equivalent) where more argillaceous sediments are developed (Weighell *et al.* 1980). The samples were a mixture of side-wall-core and ditch cuttings, their relative positions being indicated in Fig. 1. The small size of the samples did not permit a detailed breakdown of the assemblages to produce such analyses as planktonic:benthonic ratios and differentiated planktonic morphotype diagrams as they did not yield sufficient specimens (Leary 1987).

The first appearance down-hole (FAD) of the planktonic foraminiferids *Rotalipora cushmani* (Morrow) and *Rotalipora greenhornensis* (Morrow) at 1107ft marks the top of the *R. cushmani* Interval Zone of Robaszynski and Caron (1979). Furthermore the FAD of benthonic microfauna consisting of *Gavelinella cenomanica* (Brotzen), *G. intermedia* (Berthelin), *G. baltica* Brotzen, forms the *G. reussi* (Khan) - *G. berthelini* (Keller) plexus, *Arenobulimina advena* Cushman, *Tritaxia pyramidata* Reuss and *Lingulogavelinella globosa* (Brotzen) suggests a late Cenomanian age, being very similar to the assemblages recorded from late Cenomanian sequences from coeval onshore sections from southern England (Leary 1987; Leary *et al.* 1989). This would indicate that during the uppermost Cenomanian the area around B.P. 93/2-1 was in a very similar shallow water environment to the coeval sections found along the southern coast of England and was not of the deep-water type previously described, found nearby at Goban Spur (Leary and Hart 1988). In addition, the rotaliporid population recovered from B.P. 93/2-1 is dominated by juveniles, further indicating shallow water conditions.

Fig. 1 shows the changes in the benthonic diversity from four sites across southern England and the two tie lines provide interesting correlations. The changes in the benthonic diversity and the extinction of *R. cushmani* within the Plenus Marls from the on-shore sections (Eastbourne and Dover) have been linked to the rise and expansion of the oxygen minimum zone during the late Cenomanian oceanic anoxic event (Leary 1987; Leary *et al.* 1989). In B.P. 93/2-1 the change in the benthonic microfauna postdates the FAD of *R. cushmani* in contrast to the on-shore sections. This may be a result of the very small samples available from side-wall-core. But both these major changes in the foraminiferal assemblage predate the geophysical correlation (gamma kick) of the off-shore representation of the Plenus Marls.

B.P. 93/2-1 yields a late Cenomanian foraminiferal assemblage more akin to those recovered from on-shore sections of southern England although the detailed changes in the assemblage are not the same as these other sections. It is suggested that the late Cenomanian assemblage from B.P. 93/2-1 represents a shallow water environment.

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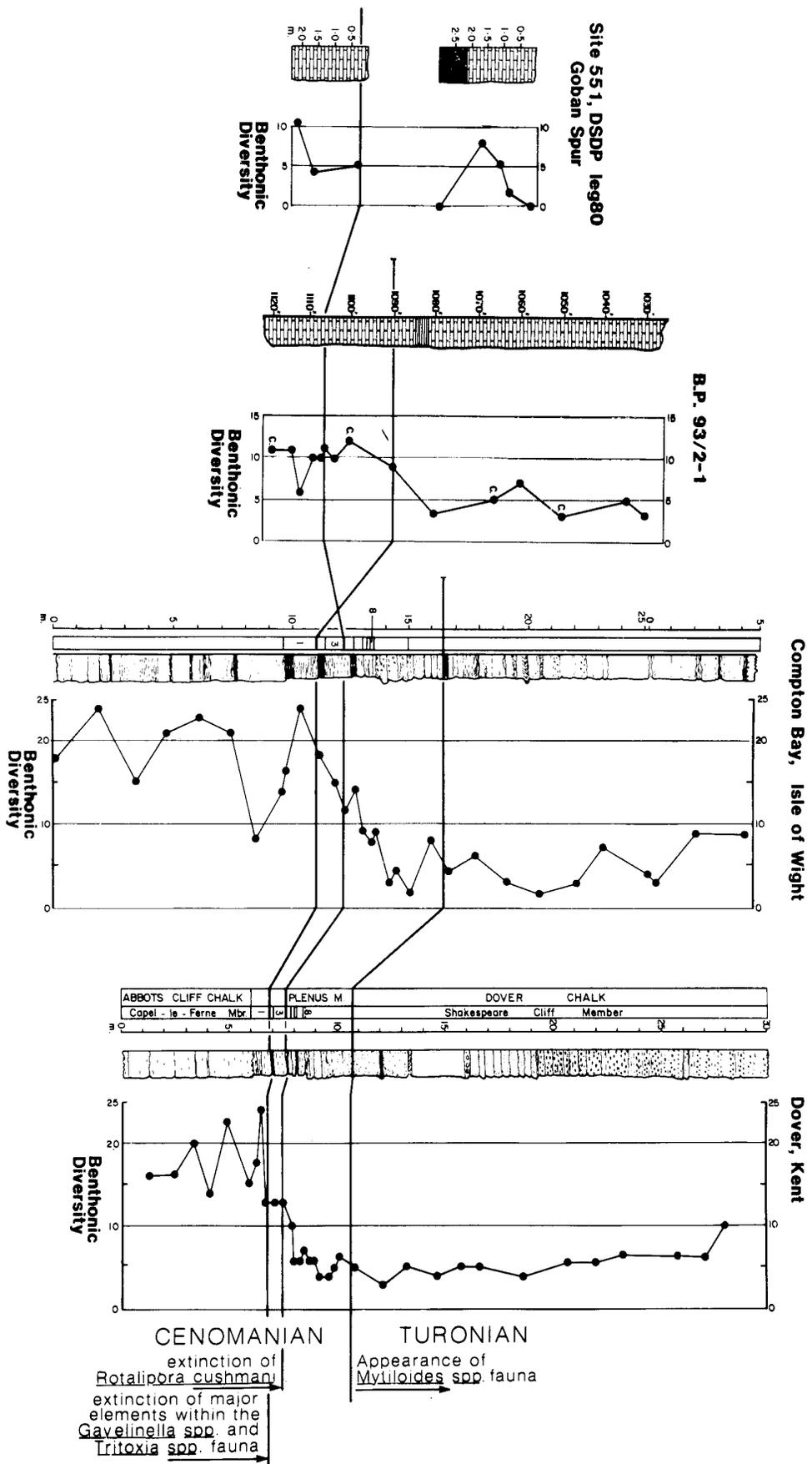


Figure 1. Comparison of benthonic diversities from B.P.93/2-1, the continental shelf (Goban Spur) and representative sections from the Anglo-Paris Basin.