

MICROPALAEONTOLOGY NOTEBOOK

An Ipswichian foraminiferal assemblage from the Gwent Levels (Severn Estuary, UK)

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Andrews *et al.* (1984) documented the occurrence of palaeo-beach deposits underlying Holocene alluvium at Llanwern, inland on the Caldicot (Gwent) Levels near Newport. These deposits at Llanwern (ST360872) lie at -3.6 to -4 m OD and were studied by Andrews *et al.* (1984) from borehole samples only. The sediments comprised sands and gravels with abundant intertidal and rocky shore molluscs suggesting a beach depositional setting, close to an intertidal lagoon. Locke (1971) also noted the widespread occurrence of coarse basal sands and gravels underlying the Holocene deposits of the Caldicot Levels and interpreted them as an ancient beach. Radiocarbon dates obtained from mollusc specimens yield a date of 25450 ± 750 BP, indicating a pre-Holocene age. Amino acid racemization (AAR) studies assign these deposits to AAR Group II, oxygen isotope substage 5e, c. 120 000–130 000 BP (Andrews *et al.*, 1984), equivalent to the Ipswichian interglacial of Great Britain.

In the spring of 1991, a coarse yellow sand unit was found exposed low within the intertidal zone (c. -4 m OD) on the foreshore at Goldcliff, Gwent (ST374828). The unit occurs stratigraphically lower than the Holocene deposits, which at Goldcliff comprise blue/grey clay and peat of the Wentlooge Formation, deposited under brackish–freshwater conditions (Allen & Rae, 1987). This represents a similar stratigraphic succession to that observed at Llanwern by Andrews *et al.* (1984) some 4 km inland, and given Locke's (1971) remarks, the probability is that the coarse yellow sand exposed at Goldcliff is a seaward extension of the Ipswichian palaeo-beach. If correct, it was considered possible that the coarse sand unit at Goldcliff may have been deposited under more distal, perhaps subtidal conditions, as the location is a considerable distance (c. 4 km) from the presumed Ipswichian palaeo-shoreline.

A 1 kg sample of the sediment was collected for foraminiferal analysis to ascertain the depositional environment of the coarse sand unit at Goldcliff. The sample was processed by wet sieving through a $63 \mu\text{m}$ mesh, with the $>63 \mu\text{m}$ retained and left to air dry. Specimens were picked, identified and counted from an aliquot of the sample; the results are given in Table 1. The sediment comprises fine quartz sand with some degree of carbonate cementation.

The diverse assemblage comprises benthonic Foraminifera only, mainly of a hyaline type, with only a single specimen of a porcellaneous species. The assemblage is interpreted as being a mixed death assemblage, with brackish water and stenohaline forms being found. *A. beccarii* and *H. germanica* are typical of the modern clay/silt-grade tidal flat environment in the Severn Estuary (Murray & Hawkins, 1976), whilst smaller species, such as *B. pseudoplicata*, *B. variabilis*, *B. marginata*, *F. fusiformis*, and *T. angulosa*, are characteristic of the suspended shoreward transport of extra-estuarine tests from fully marine conditions on the continental shelf (Murray & Hawkins, 1976; Murray, 1987). Other larger species, such as *C. lobatulus* and *E. margaritaceum*, are subtidal species and may represent the intra-estuarine subtidal component of the assemblage, although there are no modern data to corroborate this. These latter two species dominate the assemblage, suggesting that they may represent *in situ* deposition in a subtidal habitat. Interestingly, no agglutinating forms were encountered. In the modern estuary, agglutinating species (e.g. *Jadammina macrescens* and *Trochammina inflata*) are common on the extensive saltmarshes bordering the estuary, along with *Elphidium williamsoni* (Murray & Hawkins, 1976); thus, it is somewhat surprising that none of these saltmarsh species were encountered in this mixed death assemblage which does contain other intertidal species, although in the modern Severn Estuary it is uncommon to find saltmarshes and sandy shorelines co-occurring at the same locality.

Although scope for further research is evident, it is apparent that there is a seaward palaeoenvironmental gradient represented in the coarse Ipswichian deposits underlying the Gwent Levels, from the intertidal deposits at Llanwern to the subtidal sands exposed at Goldcliff.

Foraminifera have also been reported from the Burtle Beds (Kidson *et al.*, 1978), an interglacial marine deposit occurring in the Somerset Levels on the southern side of the Severn Estuary. The Burtle Beds comprise two lithological divisions, a lower clay unit and an upper sand unit. Foraminifera indicate an intertidal mudflat depositional setting for the Burtle Clays, dominated by *E. williamsoni*, *H. germanica*, and *A. beccarii*, but the overlying Burtle Sands yields a much more diverse mixed death assemblage, dominated by *C. lobatulus*, thought to indicate channel sand deposition, and in many

respects is similar to the assemblage described here from Goldcliff. Again, although the Burtle Sands assemblage comprises intertidal, subtidal and stenohaline species, both *J. macrescens* and *T. inflata* were not encountered, suggesting that the interglacial Severn Estuary perhaps lacked the widespread saltmarshes that characterize it at present.

Kidson *et al.* (1978) tentatively assign an Ipswichian age for the Burtle Beds, mainly based on comparisons with other sites; however, Andrews *et al.* (1979) and Andrews *et al.* (1984) suggest a more complex chronology, including the possibility of a post-Ipswichian sea-level event. The foraminiferal assemblage described here from the Ipswichian deposits of Goldcliff indicates a similar depositional environment to that of the Burtle Sands (subtidal mixed death assemblage, characteristically lacking saltmarsh species), and also suggests the slim possibility of a common age.

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Species	% count
Indigenous species	
<i>Ammonia beccarii limnetes</i>	2.1
<i>Ammonia beccarii tepida</i>	1.6
<i>Cibicides lobatulus</i>	18.6
<i>Elphidium margaritaceum</i>	46.1
<i>Haynestina germanica</i>	13.7
Exotic species	
<i>Bolivina pseudoplicata</i>	1.6
<i>Brizalina variabilis</i>	0.5
<i>Bulimina marginata</i>	2.1
<i>Cassidulina obtusa</i>	1.6
<i>Elphidium earlandi</i>	1.1
<i>Elphidium excavatum</i>	2.1
<i>Elphidium macellum</i>	0.5
<i>Fursenkoina fusiformis</i>	0.5
<i>Glabratella milleti</i>	1.1
<i>Lagena</i> spp.	0.5
<i>Quinqueloculina oblonga</i>	0.5
<i>Trifarina angulosa</i>	4.4
Total foraminifera specimens	182
Ostracod valves	present
Bivalves	present
Gastropods	present
Echinoid spines	present

Table 1. Percentage counts of Foraminifera from Goldcliff, Gwent.