

Geology of the Andover area: Concealed strata - Cretaceous

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Authors: J Thompson, K A Lee, P M Hopson, A R Farrant, A J Newell, R J Marks, L B Bateson, M A Woods, I P Wilkinson and N J Smith.

Lower Cretaceous strata in southern Britain show considerable vertical and lateral thickness and facies variations. In the Wessex Basin the succession is generally most fully developed and thickest towards the various sub-basinal depocentres (**Whittaker et al., 1985**)^[1]. In this area of northern Hampshire the successions preserved relate to the Weald Sub-basin.

Regionally the Cretaceous period began with brackish to terrestrial deposition represented by the Purbeck Group as relative sea level fell following the essentially marine Jurassic. Subsequently, and despite renewed subsidence during the earliest Cretaceous, clastic deposition in the Weald Sub-basin was maintained in nonmarine facies, the Wealden Group, by abundant sediment supply from the rising London-Brabant Massif to the north and other more distant positive areas in Armorica and to the west and south-west.

Following deposition of the fluviatile and shallow lagoonal deposits of the Wealden Group, rising relative sea levels and a reduction of terrigenous input, resulted in the gradual submergence of the Wessex Basin and deposition of the tidally influenced shallow marine sandstones and mudstones of the Lower Greensand Group. The boundary between the Wealden and Lower Greensand groups is the Cimmerian Unconformity. A break in sedimentation representing the erosion of the Wealden and onlap of the Lower Greensand as the rising sea level encroached northward. Within the centre of the depocentres the break in deposition is represented by short time gaps and minor erosion but the time gap in deposition becomes progressively larger as basin margins are approached.

Continued deepening of the basin into the Albian at the end of the Lower Cretaceous, resulted in the deposition of the deeper water marine mudstones of the Gault Formation to the east and shallow water nearshore glauconitic sandstones of the younger Upper Greensand Formation to the west.

The Upper Cretaceous in England is represented entirely by the Chalk Group. This period represents the waning of the influence of extension tectonics (but not their cessation) within the Wessex Basin as worldwide rising sea levels promoted the development of the Chalk Sea. Land masses were distant at this time and terrigenous input at a minimum, allowing the deposition of pure coccolith-rich limestones over extensive areas of Britain and north-west Europe.

The oldest strata at outcrop in this district are of latest Early Cretaceous age and comprise the Upper Greensand Formation. These rocks occur in the north-east and north-west of the Andover district. Older Cretaceous strata are preserved at depth.

Purbeck Group

The Purbeck Group, comprising limestones and mudstones, does not crop out in the district.

However, evidence from the hydrocarbon boreholes (see the [Stratal thickness table](#)) and from the interpretation of seismic reflection data, suggests that about 35 to 60 m and exceptionally up to 164 m (within the faulted Kingsclere structure) of Purbeck Group strata occurs beneath the Lower Greensand unconformity across the south and east of the district. The Purbeck strata are probably present beneath much of this district but are known to be substantially absent to the north in the Newbury district.

Wealden Group

The Wealden Group, where fully developed, includes (in ascending stratigraphical order) the Ashdown, Wadhurst Clay, Tunbridge Wells Sand and Weald Clay formations. However, considerable formation thinning, erosion and onlap at the margins of the basin prevent full subdivision of the group in the Andover district although partial subdivision is possible, see **Booth (2002)**^[2]. Deposition was largely in a freshwater environment, in a large shallow lake or lagoon that occupied much of the present area of Wiltshire/Hampshire and the Weald.

Although the Wealden Group does not crop out in the district, it is present in the hydrocarbon boreholes in the [Stratal thickness table](#) and seismic interpretation indicates its presence at depth in the east and to the south. Adjacent to the North Pewsey and Kingclere faults the group is known to thicken as a result of more accommodation space being available on the downthrown side of that growth structure. The group is generally absent in the north but is proven to be between 118 and 179 m thick in boreholes and possibly up to 350 m at depth in the extreme south-east of the district.

Lower Greensand Group (LGS)

The Lower Greensand of the Vale of Pewsey to the west of this district typically consists of 5 to 10 m of glauconitic very fine- to medium-grained sand, with rare masses of cherty sandstone or chert and small polished pebbles, together with indurated sandy ironstones. Whilst the Lower Greensand only occurs at subcrop in this district up to 14 m of strata is proven in boreholes and a maximum thickness of 20 m is estimated from seismic sections.

Gault Formation (G)

The Gault Formation consists mainly of soft mudstone, light grey to dark grey in colour, slightly calcareous with disseminated glauconite and mica grains. It is shelly in part and is pyritous throughout, with some bright sand-sized pyrite crystals when unweathered and pyrite nodules with a radial crystal structure. Phosphatic nodules in layers are a feature of the lower part and frequently mark the base. The Gault Formation occurs only in the subcrop within the district but is known to be present at shallow depth beneath the Pewsey and Kingsclere anticlines.

The formation thickens from about 30 to 40 m in the east to at least 60 m at the western limit of the region and about 84 m in the Ham hydrocarbon well to the north of the district (see the [Stratal thickness table](#)).

References

1. ↑ Whittaker, A, Holliday, D W H, and Penn, I E P. 1985. Geophysical logs in British Stratigraphy. *Special Report of the Geological Society of London*, No. 18.
2. ↑ Booth, K A. 2002. Geology of the Winchester district. *Sheet Explanation of the British Geological Survey*. Sheet 299 (England and Wales).

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