



HARROW & HILLINGDON GEOLOGICAL SOCIETY

A Local Group of the Geologists' Association

Founded 1973

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Wednesday 13th December at 8pm on Zoom

Fauna of the Cretaceous Upper Chalk; featuring Fossils from Harefield

Jon Noad, Stantec Consulting; University of Adelaide

Chalk seas covered much of the late Cretaceous world, and outcrop from the White Cliffs of Dover in the UK, one of the Earth's most famous geological landmarks, as far as western Australia. The stratigraphy of the Chalk has been refined in recent years, and this talk will focus on the Upper Chalk or White Chalk.

The Chalk is composed primarily of tiny coccolithophores, tiny circular discs formed as plankton disintegrate after death. These were deposited as thick, fluidized oozes in shallow warm seas, with little sediment input. Evidence of cyclicity in the sedimentation is demonstrated by the interbedded layers of flints, often representing casts of shrimp burrows. Common cemented hardgrounds were formed during pauses in sedimentation that may relate to relative sea level highs.

Fossils are often perfectly preserved in the thixotropic, very fine grained sediment, providing an excellent opportunity to study their morphology. Many of the inhabitants appear to show adaptations to the soft conditions, with giant flattened bivalves, and other molluscs covered with long spines.

The most abundant macrofauna were echinoids (sea urchins), including the heart shaped *Micraster*, which rapidly evolved as it perfected a lifestyle half buried in the sediment. It is one of the world's best biostratigraphic zone fossils.

Micraster echinoid fossils from Harefield



Other echinoderms, such as the domed *Echinocorys*, also seem to have adapted to life in the soup. There is also a rich pelagic fauna living in the water column, including ammonites, belemnites and nomadic sea lilies. Vertebrates include the fearsome mosasaurs, one of which even has a beer named after it. Exemplar fossils will include examples from our very own Harefield localities, many of which are sadly no longer exposed. The speaker collected Cretaceous fossils from several sites including gravel pits and disused chalk quarries, some of which doubled as film sets.

In addition to its palaeontological diversity, the Chalk has provided some rich oil and gas reservoirs in the southern North Sea. This is facilitated by its high porosity, allied to extensive fracture systems. The Tor Formation of the Upper Chalk is the best reservoir, typified by the Ekofisk Field, located in the Norwegian sector of the North Sea. This was the North Sea's first commercial discovery after more than 200 non-commercial exploration wells. In 2013 the field produced 127,000 barrels per day, with an estimated STOIP of 6.4 billion barrels. We will examine the various geological aspects of this field and discuss ongoing issues such as compaction and subsidence, and porosity enhancement.

By the end of the presentation, it is hoped that everyone listening gains a new appreciation for the Upper Chalk. Not simply a stack of dusty chalk, but instead a vibrant community living on the edge, in a setting that makes for one of the world's greatest, most fascinating and often misunderstood reservoirs.



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Bio

Jon Noad grew up in Ickenham and joined the HHGS when he was 12.

He graduated in 1985 and started working as a mining geologist in South Africa, then returned to the UK to work in marine cable laying and completed a Masters in Sedimentology at evening classes. This led to a full time PhD, working in eastern Borneo, after which he joined Shell International working Middle East exploration and in several production roles. He moved to Shell Canada in Calgary in 2006, followed by senior geoscience roles at Murphy, Husky and Gran Tierra (Colombia). Jon started a consultancy in 2017 and has run more than 50 field trips and courses for industry as well as teaching at several universities. He joined Stantec as a qualified Palaeontologist in 2022 and now undertakes site monitoring for new pipelines and construction projects.