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Microfossil evidence for a mid-Jurassic squid egg-laying area in association with the Christian Malford Lagerstätte

Malcolm Hart (1), Alex De Jonghe (2), Keith Duff (3), Kevin Page (1), Gregory Price (1), Christopher Smart (1), and Philip Wilby (4)

(1) University of Plymouth, School of Geography, Earth & Environmental Sciences, Plymouth PL4 8AA, United Kingdom (mhart@plymouth.ac.uk, +44 1752 584776), (2) Fugro Robertson Ltd, Tyn-y-Coed, Llanrhos, Llandudno LL30 1SA, United Kingdom (alex.de.jonghe@fugro-robertson.com, +44 1492 583416), (3) Department of Geology, University of Leicester, University Road, Leicester LE1 7RU, United Kingdom (keith@duff21.fsnet.co.uk), (4) British Geological Survey, Keyworth, Nottingham NG12 5GG, United Kingdom (p.wilby@bgs.ac.uk, +44 115 9363276)

In the 1840s, during the construction of the Great Western Railway west of Swindon, a number of beautifully preserved coleoids (belemnites and squid-like cephalopods) were found. These famous specimens of Belemnoteuthis and Mastigophora, as well as a number of fish, were eventually described as a fossil lagerstätte under the name of the "Christian Malford Squid Bed". Many of these specimens, which come from the Phaeinum Zone (Callovian) of the Oxford Clay Formation, contain soft tissue, muscle fibres and the content of their ink sacs.
In October 2007 the British Geological Survey funded an excavation of the site some ∼100 m from the original borrow pits alongside the railway. This pit yielded some new coleoid specimens as well as many ammonites, bivalves and gastropods, all of which are exquisitely preserved. Some of the bedding surfaces recovered are plastered with monospecific assemblages of foraminifera (In the 1840s, during the construction of the Great Western Railway west of Swindon, a number of beautifully preserved coleoids (belemnites and squid-like cephalopods) were found. These famous specimens of Belemnoteuthis and Mastigophora, as well as a number of fish, were eventually described as a fossil lagerstätte under the name of the "Christian Malford Squid Bed". Many of these specimens, which come from the Phaeinum Zone (Callovian) of the Oxford Clay Formation, contain soft tissue, muscle fibres and the content of their ink sacs.

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The exceptional abundance of statoliths and squid hooks recorded in the samples from the core is thought to represent a Jurassic squid-breeding ground which existed for a substantial interval of late Callovian time. The annual spawning of female squids massively enlarges their ovaries and this breaks down the body wall leaving spent individuals to die. The lack of belemnites in the same strata suggests that the animals involved (unknown at present) did not possess a calcified "guard". The highest numbers of statoliths occur over a 3 m thickness of strata with the greatest abundance ∼1 m below the Christian Malford Squid Bed. The numbers recorded in this part of the Phaeinum Zone are well above background levels in the rest of the Jurassic in the UK (Malcolm Clarke, pers.com.) where one has to wash several kg of sediment to recover <200 statoliths.

The occurrence of abundant, though low diversity, foraminiferal assemblages in the same samples point to an oxic, though possibly stressed, environment. The significant proportion of deformed foraminifera in the assemblages appears to confirm that the environment was less than optimum.

CLARKE, M.R. 2003. Potential of statoliths for interpreting coleoid evolution: A brief review. Berliner Paläobiol. Abh., 3, 37-47.