

THE FIRST RECORD OF THE KIMMERIDGIAN (LATE JURASSIC) AMMONITE *AULACOSTEPHANUS YO* (D'ORBIGNY) IN SITU IN THE UK AND ITS STRATIGRAPHICAL SIGNIFICANCE

R.W. GALLOIS¹, R.ÉNAY² AND S.M. ETCHES³



Gallois, R.W., Énay, R. and Etches, S.M. 2015. The first record of the Kimmeridgian (late Jurassic) ammonite *Aulacostephanus yo* (d'Orbigny) in situ in the UK and its stratigraphical significance. *Geoscience in South-West England*, **13**, 445-449.

The Kimmeridgian ammonite *Aulacostephanus yo* (d'Orbigny) has been recorded from the *Aulacostephanus eudoxus* Zone and its correlatives over a geographically large area ranging from the French Channel coast to southern France, and eastwards into Germany and Russia, but has not previously been recorded *in situ* in the UK. It forms one of the few Kimmeridgian ammonite marker beds that is present in both the Subboreal and Submediterranean faunal provinces and provides an important link between the different provincial ammonite zonal schemes. Its discovery at a stratigraphically well-defined level in the Kimmeridge Clay at Kimmeridge, Dorset in a succession that is more complete than any other late Kimmeridgian succession in NW Europe, has clarified the relationship between the Boreal-derived (cooler water) and Tethyan-derived (warmer water) ammonite marker beds in the late Kimmeridgian.

¹ 92 Stoke Valley Rd., Exeter, EX4 5ER, U.K.

² Université Claude Bernard-Lyon 1, Département des Sciences de la terre, 2 rue M. Dubois, Bâtiment Géode, F., 69622 Villeurbanne, France

³ Ashfield, Kimmeridge, Wareham, Dorset, BH20 5PE, UK.
(E-mail: gallois@geologist.co.uk)

Keywords: Jurassic, Kimmeridgian Stage, Kimmeridge Clay, Dorset, zonal scheme, ammonites, Subboreal Province, Submediterranean Province.

INTRODUCTION

The Kimmeridgian Stage in NW Europe is represented by laterally variable successions of mudstones and limestones that were deposited in wholly marine environments that ranged from near-shore to outer shelf (Énay, 1980). Differentiation of the faunas in the Late Jurassic Boreal and Tethyan Faunal Realms resulted in Kimmeridgian times in a cooler-water Subboreal Province which included southern England and northern France, and a warmer-water Submediterranean Province which included central and southern France, SW Germany and Switzerland (Figure 1). This has given rise to different regional zonal and subzonal schemes, all of which are based on ammonites. The boundary between the two provinces was an extensive transitional area, named the Middle Europe Shelf by Énay (1980). It extended eastwards from the French Atlantic coast into southern Germany, Switzerland and east of the Anglo Brabant Massif as far as Poland. The western part was named the Western European Swell by Hantzpergue (1987, 1989). Notwithstanding the faunal differentiation at that time, marine pathways were present from time to time that allowed ammonites to migrate between the two provinces via the shallower water area of the Swell (Énay, 1980). These included northern and southern species of *Aulacostephanus* and warm-water species of *Aspidoceras* and its microconch *Sutneria*, *Crussoliceras* and *Gravesia* that have well defined stratigraphical ranges in the Kimmeridge Clay Formation (Callomon and Cope, 1971; Gallois and Cox, 1976; Énay *et al.*, 2014). They enable broad correlations to be made at some stratigraphical levels between the regional zonal schemes.

More detailed correlations between the provinces are largely dependent on the recognition of short-lived influxes of

particular ammonite species that were probably influenced by changes in water temperature and/or the opening of previously unavailable migration pathways. Such occurrences have been referred to as *fossiliferous episodes* (Mattéi, 1974), *flood occurrences* or *eco-events* (Wood *et al.*, 1984) and *horizons* (Hantzpergue, 1989). The last-named recognised 28 ammonite horizons in the correlative successions of the Kimmeridge Clay in central and southern France. The index forms include ammonites that originated either in the warmer-water Submediterranean Province or in the cooler-water Subboreal Province and adapted to the conditions of the swell, with the result that not all have been recorded in areas distant from the swell. A few of the named horizons have been recognised in the Kimmeridge Clay and in the equivalent successions on the Normandy and Boulonnais coasts. For example, Hantzpergue (1989) identified the Orthocera Horizon (*Orthaspidoceras orthocera* (d'Orbigny)) at the base of the Eudoxus Zone in the Kimmeridge Clay at Westbury, Wiltshire (Bed M 21 of Birkelund *et al.*, 1983; KC 24 of Gallois, in press), and Samson *et al.* (1996) recognised the same horizon at the base of the Argiles d'Ecqueville on the Normandy coast. One of the more widely distributed horizons, that of *Aulacostephanus yo*, has been recognised at all the localities shown in Figure 1 except Kimmeridge. The most northerly recorded occurrences in NW Europe are those on the Boulonnais coast where d'Orbigny (1850), Rigaux (1894) and Dr Alain Vadet (Vadet Collection No. 1345) recorded examples. The last of these was found *in situ* in the upper part of the Calcaires du Moulin Wibert Formation. The others probably came from the same formation (Alain Vadet pers. comm.).