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Systematic Palaeontology

Ammonite taphonomy and stratigraphy of the Bajocian at Maizet, south of Caen (Calvados, NW France)

*Taphonomie et stratigraphie des associations à ammonites du Bajocien de Maizet, au sud de Caen (Calvados, NO France)*Giulio Pavia^{a,*}, Aldo Defaveri^b, Lionel Maerten^c, Marco Pavia^a, Marta Zunino^a^a Dipartimento di Scienze della Terra, via Valperga Caluso 35, 10125 Torino, Italy^b via Pilipari 4/B, 15004 Valmadonna (AL), Italy^c 3, impasse du Moulin, 14114 Ver-sur-Mer (Calvados), France

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ABSTRACT

A study of the ammonite assemblages from the “Oolithe ferrugineuse de Bayeux” Formation of Bajocian age is presented herein. The section at the locality of Maizet shows a high level of stratigraphic condensation, and taphonomic reworking is common within the sequence. All the ammonites being studied are classified herein as having been reworked, transported or displaced on the sea-floor prior to burial, and as such, are determined taphonomically as being resedimented or reelaborated fossil elements. Seven evidences of reelaboration within the sequence under investigation are detailed here. The palaeontological units, so-called taphorecords, characterized by distinctive taphonomic features, are used to directly or indirectly assign beds to biochronostratigraphic units. In addition, identification of taphorecord relationships regarding successive or contemporaneous deposition allows their registratic succession and order of depositional events to be inferred. The latter may be deduced on the basis of bed succession or by reference to stratigraphical intervals that now are only represented in the stratigraphic column by fossils. Deposition by tractional currents and winnowing is indicated by sharp bed-base and by reworked fossil elements. Biochronostratigraphic correlation with other sections of the inland Bajocian successions in the Calvados area (Bretteville, Feuguerolles) highlights a common depositional evolution that may be related to an eastward-deepening carbonate ramp.

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R É S U M É

L'étude traite des assemblages d'ammonites bajociennes de la formation dite « Oolithe ferrugineuse de Bayeux ». La coupe de Maizet illustre une section condensée, avec un remaniement taphonomique omniprésent. Toutes les ammonites sont des éléments remaniés qui ont été transportés ou remobilisés avant l'enfouissement. Sur la base de paramètres taphonomiques, on peut distinguer les éléments resédimentés de ceux réélaborés, ces derniers sur la base de sept critères de réélaboration. Les fossiles ont été regroupés dans des tapho-enregistrements montrant une conservation distinctive ; par conséquent, il a été possible d'attribuer directement ou indirectement tous les niveaux

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de Maizet à des unités biochronostratigraphiques. La relation de succession temporelle entre tapho-enregistrements permet de reconstituer leur succession enregistrée et l'ordre chronologique des événements sédimentaires. Ces derniers sont, soit matérialisés par les niveaux successifs de la coupe, soit rapportés à des intervalles stratigraphiques qui ne sont plus représentés dans la colonne stratigraphique, si ce n'est que par les fossiles. Les surfaces irrégulières en base de banc et les éléments remaniés suggèrent que ces dépôts carbonatés ont été affectés par l'action de courants de traction. La comparaison biochronostratigraphique avec d'autres coupes du Bajocien affleurant au sud de Caen (Bretteville, Feuguerolles) permet de retracer une évolution commune des dépôts, qui peuvent être attribués à une rampe carbonatée s'approfondissant vers l'est.

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1. Introduction

The well-known formation “Oolithe ferrugineuse de Bayeux” in the Calvados area (NW France) has been the focus of a variety of palaeontological and stratigraphic studies since the mid-19th century. The richness and diverse nature of the fossil record of this formation provided data that lead to the establishment of the Bajocian stage, as it was named in 1849 (d'Orbigny, 1849–1852, p. 157). The latter was more precisely defined in 1850 on the basis of the ammonite record (d'Orbigny, 1842–1851, p. 606), and the succession described in detail in 1852 from the section of Les Hachettes near Sainte-Honorine-des-Pertes (d'Orbigny, 1850–1852, p. 477). More than one century later, Rioult (1964, 1980; see also Fürsich, 1971; Parsons, 1974) stated that this section should be regarded as the stratotype of the Bajocian Stage. Although the I.U.G.S selected the stratotype (the Bajocian GSSP) at the locality of Cabo Mondego in Portugal (Pavia and Enay, 1997), the Les Hachettes section still retains its historical value.

Besides Sainte-Honorine, d'Orbigny (1842–1851, 1850–1852; see also Rioult, 1964) referred to other localities near Bayeux and in the area south of Caen (Fig. 1). Among the former, worthy of mention are the sites at Saint-Vigor and, above all, at Sully which was previously mentioned by de Caumont (1824), and further described by Brasil (1895; see also Haug, 1910, p. 1008) and Bigot (1928). As to localities in the area south of Caen, the inland succession at Moutiers-en-Cinglais (Dufrénoy and de Beaumont, 1848) was recognized by d'Orbigny (1850–1852) as being thicker than on the coast. Over the last 40 years many localities have been investigated: Pavia (1994; see also Martire and Pavia, 1996) correlated the succession of Sully to those of Les Hachettes and Saint-Côme-de-Fresné; Gabilly and Rioult (1974) briefly described the Lower Bajocian succession in the May-sur-Orne quarry; Gauthier et al. (1996) studied the fossiliferous outcrop of the Feuguerolles-sur-Orne quarry; Pavia and Martire (2010; see also Martire and Torta, 2000) gave a detailed account of the biochronostratigraphical subdivision of the Bretteville-sur-Odon section.

The successions occurring in the coastal sector north of Bayeux and those south of Caen differ significantly, depending on the degree of their stratigraphic condensation (sensu Gómez and Fernández-López, 1994). The former are extremely condensed, typified by successions at the localities of Les Hachettes and Sully, whereas the latter

are more expanded as may be observed at the localities of Feuguerolles-sur-Orne and Bretteville-sur-Odon, as well as at the Évrecy section (refer to Pavia, 1994). Thus, description of further sections is considered to be of great importance in order to update current knowledge of the Bajocian successions in the Calvados area.

The present paper is a report of field studies carried out in September 2010 at the Maizet locality, where an almost complete section of the “Oolithe ferrugineuse de Bayeux” Formation was sampled. In particular, the stratigraphy of the fossiliferous deposits is discussed in detail, because the condensed fossil-assemblages recorded show a high degree of taphonomic reworking. The latter conclusion is supported by the biochronological data and is based on correlation with the sections mentioned above, deemed as being useful for tracing the Fe-oolithic succession within the inland Bajocian outcrops in the area of Calvados.

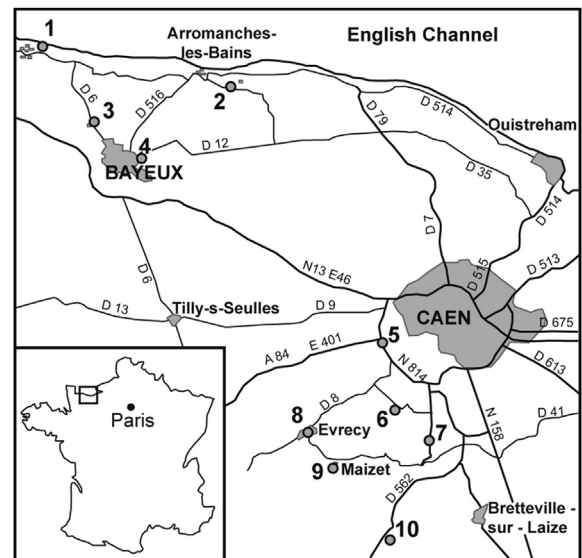


Fig. 1. Geographical location of the cited Bajocian outcrops in Calvados. 1. Sainte-Honorine-des-Pertes. 2. Saint-Côme-de-Fresné. 3. Sully. 4. Saint-Vigor. 5. Bretteville-sur-Odon. 6. Feuguerolles-sur-Orne. 7. May-sur-Orne. 8. Évrecy. 9. Maizet. 10. Moutiers-en-Cinglais.

Fig. 1. Localisation géographique des gîtes du Bajocien cités dans l'article. 1. Sainte-Honorine-des-Pertes. 2. Saint-Côme-de-Fresné. 3. Sully. 4. Saint-Vigor. 5. Bretteville-sur-Odon. 6. Feuguerolles-sur-Orne. 7. May-sur-Orne. 8. Évrecy. 9. Maizet. 10. Moutiers-en-Cinglais.

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