

Kimmeridgian Foraminiferal Faunas of Northern Eurasia: Significance for Interregional Correlations and Palaeobiogeography

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Abstract

Foraminifer is a very useful microorganism to perform biostratigraphical zonation of the Upper Jurassic. Foraminiferal biozones are calibrated by the ammonite standard zones and can be used for intra- and interregional correlations. Furthermore, the fossil record of foraminiferal faunas is well known among basins of the Northern Eurasia and is also used for accurate palaeoenvironmental, palaeobiogeographical, or biofacial reconstructions. It allows identifying a complex set of biotic and abiotic events which may be used to propose a more general palaeoecological and palaeoceanographical reconstruction of the Subboreal, Boreal, and Arctic seas. Then, the late Kimmeridgian Northern Eurasian seas formed a network of well-connected palaeobasins during the sea-level rise and resulted in rather similar palaeoenvironmental conditions.

Keywords

Late Jurassic, Foraminifers, Palaeoceanography, Northern Eurasia

The study of the Upper Jurassic of the western part of Northern Asia and Europe dates back to the end of the 19th century. The biostratigraphical analyses were performed near the end of the 20th century. At that time, most of the micropalaeontological investigations across different regions of Europe and Western Siberia were performed separately. Various interpretations on the ob-

served taxa by different authors resulted in problematic interregional correlations. The first generalized micropalaeontological investigation was performed by Kuznetsova [1], based on foraminiferal assemblages from different regions of western, eastern and northern Europe, as well as Siberia and Arctic Canada. This work introduces the occurrence of widely spread marker-species of the Kimmeridgian foraminiferal zone, which may be used for interregional correlations. In this way, recent studies based on foraminiferal assemblages from different regions of Northern Eurasia (**Figure 1(a)**) have shown that many of the previously described foraminifer species could be assigned to several single species, characterized by wide intraspecific variabilities [2] [3].

Then, the Kimmeridgian representatives of the genus *Pseudolamarckina* have shown that the East-European index-species *Pseudolamarckina pseudorjasanensis* was characterized by wide intraspecific variabilities and may encompass various previously described Kimmeridgian species of pseudolamarckiniids. The first appearance of *P. pseudorjasanensis* is recorded from the latest early Kimmeridgian of sub-Mediterranean and peri-Tethyan to Arctic regions [4] [5] (**Figure 1(b)**). Furthermore, it is recorded during the late Kimmeridgian together with a high number of widely distributed species. The Kimmeridgian foraminiferal *P. pseudorjasanensis* Zone appears to be an important interregional marker, which is used for the correlation of various widespread sections across Subboreal, Boreal and Arctic basins.

The composition of the upper Kimmeridgian foraminiferal associations of Northern Eurasia underlines the occurrence of two rather different assemblages

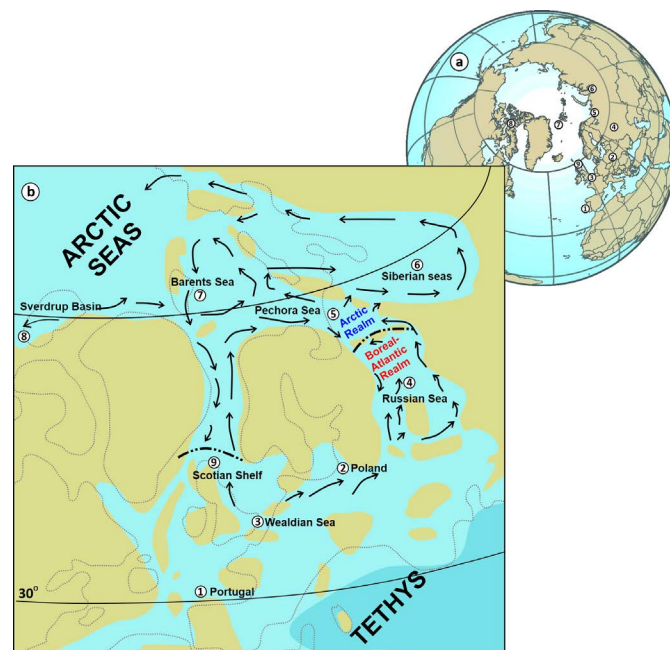


Figure 1. a. Geographical location of the studied regions of interest; b. Palaeobiogeographical and palaeoceanographical reconstructions of the Late Kimmeridgian North Eurasian seas.

that respectively belong to the Boreal-Atlantic and the Arctic realms [6] (**Figure 1(b)**). Furthermore, some rare species of nodosariids, ceratobuliminiids and lituoliids are significant for biostratigraphical correlations, and are recorded from the Arctic to peri-Tethyan regions. This indicates good connections between the Kimmeridgian palaeobasins. During the Late Jurassic, the Subboreal to Boreal and southern Arctic regions were covered by shallow epeiric surface water, influenced by terrestrial inputs and restricted in seawater circulation [6]. The occurrence of common foraminiferal associations between regions of Western Europe and Western Siberia, as well as across the Greenland-Norwegian seaway indicates the periodic connections probably associated with changes of sea-level and palaeoceanographical conditions (**Figure 1(b)**). The Subboreal Western European Sea was probably affected during the Late Jurassic by northern cold-water inputs, interpreted to have flowed southward through the western side of the Greenland-Norwegian Seaway along the coast of the Greenland and Canada territories. On the other hand, a warm water current was characterized by southwest to northeast orientation and probably favored the migration of typical taxa of the Boreal-Atlantic Realm [3] [4] [5] [6] [7].

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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