

Report of the Meeting of the Kimmeridgian Working Group

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The Kimmeridgian Working Group Meeting organized under auspices of the International Subcommission on Jurassic Stratigraphy took place in Poland between 18 and 21 May 2015 at the Polish Geological Institute – National Research Institute in Warsaw, with a one and a half day excursion to the Jurassic outcrops in the Wieluń Upland (Polish Jura). It was arranged to discuss new advances in recognition of a unique base of the Kimmeridgian Stage, the Oxfordian/Kimmeridgian boundary since 2006 when the first proposal for the GSSP was made (see Wierzbowski *et al.*, 2006).

Fifteen researchers were present, mainly members of the Kimmeridgian Working Group: C. D’Arpa (Geological Museum, University of Palermo), M. Barski (Geological Faculty, University of Warsaw), E. Głowniak (Geological Faculty, University of Warsaw), J. Grabowski (Polish Geological Institute – NRI), S. Hesselbo (University of Exeter, chairman of ISJS), M. Hodbod (Polish Geological Institute – NRI), B. Matyja (Geological Faculty, University of Warsaw), A. Mironenko (Russia), N. Morton (former ISJS chairman, France), M. Rogov (Geological Institute, Russian Academy of Science, Moscow), G. Schweigert (Staatliches Museum, Stuttgart), J. Smoleń (Polish Geological Institute – NRI), K. Sobień (Polish Geological Institute – NRI), A. Wierzbowski (Polish Geological Institute – NRI), H. Wierzbowski (Polish Geological Institute – NRI), J. Wright (Department of Earth Sciences, Royal Holloway, University of London). Twelve presentations were given (including two posters). These included several aspects of the Oxfordian/Kimmeridgian boundary such as ammonite biostratigraphy, dinoflagellate cyst biostratigraphy, magnetostratigraphy, geochemistry (both carbon and oxygen records as well as other geochemical data along with geochemical studies which enable the recognition of the paleoenvironmental changes in the succession). A book of abstracts of the presentations plus field guide was given to participants. That can be obtained by other members of the KWG as a PDF after sending a request to Marta Hodbod (e-mail: marta.hodbod@pgi.gov.pl), the secretary of the Kimmeridgian Working Group Meeting.

The following presentations were given during the Meeting:

- A. Wierzbowski – “The quest for the uniform Oxfordian/Kimmeridgian boundary”.
- M. Rogov – “New data on the Kimmeridgian ammonite succession of the Boyarka section (north of Central Siberia) and the Arctic perspectives of the tracing Oxfordian-Kimmeridgian boundary”.
- G. Schweigert, H. Jantschke – “The ammonite fauna of the *bimammatum* biohorizon in SW Germany and its correlation value between Subboreal and Submediterranean biozonations”.
- M. Rogov – “Ammonite biostratigraphy of the Oxfordian-Kimmeridgian transitional beds of Moscow, Kaluga and Ivanovo regions (central part of the European Russia)”.
- A. Mironenko – “New Upper Oxfordian localities in Moscow region, central Russia”.
- M. Barski – “Dinoflagellate cyst biostratigraphy of the Oxfordian/Kimmeridgian boundary in central Poland – preliminary report”.

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Fig. 1. Participants of the Meeting during the field-excursion at the hotel in the Wieluń Upland

- J. Grabowski, K. Sobień – “Magnetostratigraphy of the Oxfordian/Kimmeridgian boundary and investigations in Polish sections”.
- M. Hounslow, J. Wright, M. Galvin – “Magnetostratigraphy of the proposed GSSP Flodigarry section: detailed data from bed 35, the Pseudocordata-Baylei boundary”.
- H. Wierzbowski – “Seawater temperatures and variations in $\delta^{13}\text{C}$ values of marine carbonates in European basins during and after the Middle-Late Jurassic transition (Late Callovian – earliest Kimmeridgian)”.
- C. D’Arpa, A. Cusumano, P. Di Stefano, G. Meléndez – “Middle and Upper Jurassic record in the Western Sicily successions”.
- J. Grabowski, K. Sobień, H. Wierzbowski, A. Wierzbowski, W. Robaczyński – “Palaeoenvironmental changes across the Oxfordian/Kimmeridgian transition (Upper Jurassic, Wieluń Upland, central Poland): evidences from rock magnetism and inorganic geochemistry”.
- A. Wierzbowski, B.A. Matyja, J. Smoleń – “The palaeobiological factors as a clue for recognition of the environmental-climatic conditions at the Oxfordian/Kimmeridgian transition (Upper Jurassic, Wieluń Upland, central Poland)”.

Field studies included visiting two sections in the Wieluń Upland: the Katarowa Góra (Łobodno) section and the Bobrowniki section. Both have been recently described (Wierzbowski *et al.*, 2010; Wierzbowski, Matyja, 2014), and the results of these studies are important for correlation of the Subboreal and Boreal zonal schemes with the Sub-mediterranean one – thus for the recognition of the global Oxfordian/Kimmeridgian boundary.

The ammonite stratigraphy which is the basis for recognition of the boundary in question is based on the Sub-boreal–Boreal ammonite successions studied in the Staffin Bay section, Isle of Skye (Matyja *et al.*, 2006), proposed, and accepted by the Kimmeridgian W.G. in 2007 as the primary standard (GSSP) of the Oxfordian/Kimmeridgian boundary. The main problem (still not formally settled) which was discussed during the Meeting relates to definition

of the base of the Subboreal Baylei Zone. This zone is historically, and formally, accepted by both the Kimmeridgian W.G. and the ISJS as the lowest zone of the Kimmeridgian. However, a stratigraphical gap has been observed in many British sections – notably also those on the Dorset Coast which were the basis for the original definition of the Kimmeridgian Stage by Salfeld (1913) – compared with the complete succession in the Staffin Bay section, Isle of Skye (Matyja *et al.*, 2006). Here the base of the zone in question has been proposed at the base of the newly recognized *Pictonia flodigarriensis* horizon. Discussion during the Meeting was concentrated on the correlation potential of this horizon, compared with the *Pictonia densicostata* horizon, for the recognition of a global Oxfordian/Kimmeridgian boundary. The occurrence at the same horizon of the oldest representatives of the Boreal subgenus *Plasmatites* of the genus *Amoeboceras* is important for wider correlation – because these ammonites are known from the Submediterranean successions in central Europe in both Germany and Poland. Discussions during the Meeting over ammonite collections containing specimens representative of the different faunal provinces had additional importance for clarification of correlation problems.



Fig. 2. Large ammonite *Vineta* from the uppermost part of bed B of the Bobrowniki section (cf. Wierzbowski, Matyja, 2014) found during excursion



Fig. 3. At the Bobrowniki quarry, Wieluń Upland

Although **definition** of the Kimmeridgian Stage is based mostly on Subboreal and Boreal ammonites, it is crucial for **correlation** of the base of the Stage that its position in relation to levels characterized by ammonites showing wider correlation potential in Submediterranean-Mediterranean and other extra-Boreal areas (such as South America, southern Asia, and eastern Africa) can be established. Here other groups occur, especially aspidoceratids in which changes in the lineage seem to be of great importance. The position of the *Pictonia flodigarriensis* horizon (which is also marked by appearance by the oldest Boreal *Plasmatites*) seems to correspond to the boundary interval between the Submediterranean-Mediterranean ammonites zones Hypselum and Bimammatum. This is also marked by a large turn-over in aspidoceratid faunas (*cf.* Bonnot *et al.*, 2009; Jantschke, 2014) and may be considered as specially suitable for correlation of the defined base of the Kimmeridgian Stage. This problem was one of the most important discussed during the Meeting.

Of special interest are new results of magnetostratigraphic studies obtained from the Staffin Bay section in Isle of Skye from the previously non-sampled interval at the Pseudocordata-Baylei zonal boundary (*i.e.* the Oxfordian/Kimmeridgian boundary) as defined at the base of the *Pictonia flodigarriensis* horizon. The studies showed that the magnetozone 2r (base of correlated marine anomaly chron M26r) coincides with the base of the *Pictonia flodigarriensis* horizon. This provides an ideal secondary marker for the base of the Kimmeridgian, allowing high-resolution correlation in marine and non-marine strata to this boundary interval. However, these results show some discrepancies with those obtained by Przybylski *et al.* (2010) from Polish sections but based on samples showing extremely weak magnetization and diamagnetic magnetic susceptibility.

The results of an integrated biostratigraphic, magnetic and geochemical study of the beds at the Oxfordian/Kimmeridgian boundary interval in central Poland were also presented. These included the analysis of magnetic susceptibility (MS), anhysteretic remnant magnetization (ARM) and isothermal remnant magnetization (IRM) together with elemental geochemistry. The results indicate the paleoenvironmental conditions which existed during deposition of the beds in question, including identification of a tectonically enhanced omission surface which can be correlated with the Oxfordian/Kimmeridgian boundary in the Subboreal Province and gave support for wider correlation (*cf.* Wierzbowski *et al.*, 2015).

Before preparing a final proposal for the base of the Kimmeridgian Stage, documents presenting the current state of knowledge in relation to the Oxfordian/Kimmeridgian boundary will be sent this year by the Convenor to all the members of the KWG. These can be supplemented or commented on by the all those interested in order to provide a full basis for voting and a final decision. Subsequently the documents, after final editing will be published, including dissenting comment if appropriate in one of the forthcoming issues of the journal *Volumina Jurassica*.

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