

Report on: The Kimmeridgian (Upper Jurassic) Global Stratotype Section and Point in Scotland, UK

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The International Subcommittee on Jurassic Stratigraphy is pleased to announce that the Global Stratotype Section and Point for the base of the Kimmeridgian Stage (Upper Jurassic) has been formally agreed and ratified. The agreement represents the culmination of two decades of work by an international team lead by Andrzej Wierzbowski (University of Warsaw, Poland). The proposal received unanimous support from the International Commission on Stratigraphy (ICS) and International Union of Geological Sciences. Professor David Harper, Chair of the ICS commented:

“I am absolutely delighted that the GSSP for this well-known Jurassic stage has been nailed. My sincere thanks to the team who have worked assiduously over a number of years to secure a highly suitable section on the Isle of Skye for its definition and a suite of iconic fossils for its correlation. The definition and correlation of GSSPs are at the core of the mission of the ICS and we move one significant step nearer to completing the ICS Timescale chart”.

The boundary will be placed 1.25 ± 0.01 m below the base of Bed 36 in the foreshore at Flodigarry, Staffin Bay, Isle of Skye, Scotland, UK where it is marked by the appearance over a short stratigraphic interval of several new ammonite taxa. A significant advantage of this section and point is that abundant and well-preserved ammonites from two faunal provinces are found together and this considerably facilitates global recognition and correlation of the boundary in the field. The ammonite faunas delineate the base of the Subboreal ammonite Baylei Zone, the corresponding base of the Densicostata Subzone marked by the base of the *flodigarriensis* horizon, and, independently, the base of the Boreal ammonite Bauhini Zone (Fig. 1). Addi-



Fig. 1. *Pictonia flodigarriensis* Matyja, Wierzbowski et Wright

This is one of the three key Subboreal ammonites that mark the base of the Kimmeridgian Stage. The ammonite is named after the hamlet of Flodigarry where the stratotype is defined. Note that, although flattened, the details of the fine ribbing and the original nacreous shell are exquisitely preserved

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tional markers of the boundary are provided by dinoflagellate cysts, magnetostratigraphy and strontium- and carbon-isotope data. The GSSP lies within open marine, thermally immature mudrocks that contain exceptionally well-preserved organic matter, nannofossils and bivalves. The excellent preservation of the mudrocks has permitted direct radio-isotopic dating using the Re-Os isotopic system. In the Submediterranean-Mediterranean successions the corresponding stratigraphic level is close to the boundary between the Hypselum and Bimammatum ammonite zones.

The Kimmeridgian Stage was originally named after the tiny village of Kimmeridge which lies on the Jurassic Coast, a UNESCO World Heritage Site in southern England, UK. The boundary sections on the Dorset coast are, like many sections, condensed and associated with at least one small hiatus and so were not suitable for defining an international standard.

The GSSP at Flodigarry is on the publically owned foreshore accessed by a short footpath from the road in the small rural community of Flodigarry. The site is managed for the Scottish Government by The Scottish Government Rural Payments and Inspections Directorate and lies within the Trotternish Ridge Site of Special Scientific Interest (Fig. 2) which provides statutory protection from development.

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The results of detailed studies of the GSSP section were published in several papers prepared by the members of the Kimmeridgian Working Group of the International Subcommission on Jurassic Stratigraphy (ISJS) which appeared mostly between 2006–2018 (see *e.g.*, Matyja *et al.*, 2006; Wierzbowski *et al.*, 2006, 2016, 2018; Barski, 2018; Ustinova, 2018. The members of the Kimmeridgian Working Group involved in the final proposal were: Andrzej Wierzbowski (Poland), Marcin Barski (Poland), Angela L. Coe (U.K.), Mark W. Hounslow (U.K.), Bronisław A. Matyja (Poland), Gregory Price (U.K.), Maria Ustinova (Russia), Hubert Wierzbowski (Poland), John K. Wright (U.K.) with contribution from: Francois Atrops (France), Jacek Grabowski (Poland); Emanuela Mattioli (France), Nicol Morton (France), James G. Ogg (USA), Federico Olóriz (Spain), Kevin Page (U.K.), Horacio Parent (Argentina); Piotr Przybylski (USA), Mikhail Rogov (Russia), Guenter Schweigert (Germany), Anna Bertha Villaseñor (Mexico).

The final summary will appear in *Episodes* – the journal of the International Union of Geological Sciences (IUGS).



Fig. 2. The dramatic landscape of the Trotternish Ridge Site of Special Scientific Interest, Isle of Skye, Scotland, UK where Middle and Upper Jurassic rocks are unconformably overlain by Paleogene lavas. The differing structural competency of these strata led to mass movement during the Quaternary and the development of a dissected landscape

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