

## Report of the Callovian Stage Task Group, 2013

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### HISTORY OF THE GSSP CANDIDATE AT ALBSTDT-PFEFFINGEN

The Callovian Working-Group was set up in 1983 with J.H. Callomon as coordinator. The first meeting was held during the Symposium in Erlangen in 1984, followed by some more working group sessions during the ISJS meetings.

The stratotype section was chosen to be situated in a section in the Roschbachtal, 1 km west of the centre of Albstadt-Pfeffingen (Swabia, SW Germany). The level adopted was the base of a thin bed marking the biohorizon of *Keplerites kepleri* at the base of the Herveyi Zone of the Callovian Stage. The choice of locality for the GSSP primary standard, at Albstadt-Pfeffingen, was considered and then ratified conjointly by a Working Group of 18 members in 1990.

However an objection was raised by Reiner Jordan (Geological Survey of Lower Saxony), who protested that the proposed section was “not complete” and “condensed”. He submitted his objection directly to the ISJS, which was then published in the *Newsletter* 24 (1997, p. 7) with the comment that the case would have to be reopened. Since then, the received opinion has been that the proposal would be rejected, although no formal proposal has been submitted. The proposal of 1990 was only revived and presented at the 5th Jurassic Colloquium in Vancouver in 1998 (Callomon, Dietl, 2000). The final step, the formal procedure to obtain ratification of the proposals by ICS, has not been completed to date.

In the meantime complementary stratigraphic data has been generated: strontium isotope stratigraphy (McArthur, in Callomon, Dietl, 2000), palynology (Smelror, Dietl, 1994), foraminifera (Franz, Knott, 2012), ostracodes (Beher *et al.*, 2010), magnetostratigraphy (J. Ogg, in Callomon, Dietl, 2000; Callomon, 2005; Guzhikov *et al.*, 2009, in ref. 2010). A systematic description of the guide fossil *Keplerites kepleri* (Opiel) is still lacking, which is important to distinguish it from species of the Upper Bathonian that occur on the Russian Platform and in Greenland. The ammonite successions around the Bathonian-Callovian transition of the classical areas of Swabia and Northern Germany were checked again during the summer of 2013. Concerning this matter some new findings are presented:

The type locality of *Keplerites kepleri* lies at the Achalm, a hill near Eningen, 5 km east of Reutlingen. There is good material from here in the collections, including the type of *K. kepleri*, but there is no detailed description of a section. At Pfeffingen we have large collections from precisely located horizons (Callomon, Dietl, 2000, fig. 3a, beds 5, 6a). The question arises whether the levels at Eningen and Pfeffingen are truly of precisely the same age. Our closer examination has shown two differences: concerning the primary ribs, the ammonite assemblage of Eningen is more diverse, and otherwise forms from Pfeffingen are slightly thicker (Wb/D is 0.45 : 0.50), but finally the conclusion is that they are the same. But what about the other finding points Lautlingen, Plettenberg, Aichelberg and Bissingen? Here the kepleritides seem to be slightly smaller and more densely ribbed, and they are similar to those in England.

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However, the few pieces found are not sufficient to make a reliable distinction. In contrast, the rich fauna of Klingenbachtal shows significant differences: the specimens of *Kepplerites* here have more primary ribs than in Albstadt and on average they correspond to the type of *Kepplerites traillensis* Donovan. This means that the Albstadt-Pfeffingen section must have a gap between the *keppleri* horizon and the *hochstetteri* horizon. The horizon with *Kepplerites* aff. *traillensis* is absent here.

According to Callomon (2001) *Kepplerites keppleri* (Oppel) is a good guide fossil because of its relatively wide distribution, occurring in Japan, Queen Charlotte Islands, Alaska, Arctic Canada, Greenland, Russian Platform, Caucasus, Southern Germany, Switzerland, France and England. Most specimens presented in Callomon's pictures are not *K. keppleri*, but very similar to *Kepplerites traillensis*. One might now suspect that *Kepplerites traillensis* migrated at the end of the Bathonian from the Russian Platform probably along the northern edge of the Tethys to Central Europe and evolved here into *Kepplerites keppleri*. As it was, *Kepplerites* became immediately extinct in Greenland and Europe and this short event appears to correlate well. Later, during the Herveyi Zone, ammonite faunas of the different basins became increasingly endemic, making correlation difficult.

The standard succession of ammonite faunal horizons in the proposed boundary stratotype area of the central Swabian Alb is as follows:

Keppleri subzone:	<i>Cadoceras</i> sp. nov.	(Blumberg-Zollhaus)
	<i>Cadoceras suevicum</i>	(Albstadt)
	<i>Cadoceras quenstedti</i>	(Albstadt)
	<i>Kepplerites keppleri</i>	(Albstadt, Eningen)
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Discus subzone:	<i>Kepplerites</i> aff. <i>traillensis</i>	(Klingenbachtal)
	<i>Clydoniceras discus/hochstetteri</i>	(Albstadt)
	<i>(Clydoniceras discus/hollandi)</i>	(Lochenbach)

In the Upper Bathonian of Greenland and the Russian Platform two parallel lineages of *Kepplerites* evolve side by side (Callomon, 1993; Mitta, 2008). One group is relatively large and thick (*rosenkrantzi-peramplus-traillensis-keppleri*), the other (*tychonis-svalbardensis-vardekloeftensis-tenuifasciculatus*) is smaller and slimmer and has 10 primary ribs more on the last whorls. In Central Europe there coexists in addition to *Kepplerites keppleri* a second densely ribbed species, which is very similar to *Kepplerites vardekloeftensis* or *K. tenuifasciculatus*. This rare species occurs in the *hochstetteri* horizon and the *keppleri* horizon.

In the Upper Bathonian we had a rising sea level with a highstand at the Bathonian-Callovian boundary. It so happens that the region of Albstadt-Pfeffingen (and many others) lay in a somewhat sediment-starved basin.

## ALTERNATIVE SECTIONS

At the Task Group meeting during the 7th International Jurassic Congress in Kraków some reservations against the Albstadt section were expressed and it was agreed that possible alternative localities on the Russian Platform and in Greenland should be examined.

(1) *The Russian Platform*: The Prosek Section in the region of Nizhny Novgorod, on the Middle Volga, has been proposed as new candidate for GSSP by Dmitry Kiselev and Michail Rogov (2007). The ammonite biostratigraphy is based primarily on two genera, *Cadoceras* and *Kepplerites*, with widely intermittent incursions of some *Macrocephalites*, but no *Homoeoplanulites*. At first glance, this profile has some advantages over that of Albstadt: the sediments are thicker and promise a more continuous record, with better results for magnetostatigraphy (Guzhikov *et al.*, 2010). However, fossils are only well preserved in two concretionary layers. The lower one contains *Kepplerites svalbardensis* and *K. cf. rosenkrantzi*, and can be roughly correlated with the Calyx Zone of East Greenland. The upper with *Cadoceras elatmae* and *Macrocephalites verus* is similar to the upper Keppleri Subzone of Central Europe. Between these two faunal horizons, fossils are only crushed and badly preserved. So the diagnostic guide-species, *Kepplerites keppleri*, and thus the Bathonian-Callovian boundary cannot be clearly identified.

(2) *East Greenland*: It seems that the Bathonian-Callovian boundary in the Jameson Land (see Callomon, 1993) may have been drawn a little too low and the Upper Bathonian there is even more extensive than previously thought.

The study of the ammonites was preliminary and the most likely correlation seemed to be between fauna 25 and 26, that of *Kepp. traillensis* Donovan, and *Kepp. keppleri*. More recent studies suggest however that the base of the Callovian should lie higher, at faunal horizons 29–30 (Mitta, 2008). Some previously unpublished sections across the Boreal Bathonian-Callovian boundary in East Greenland have been described. The first two lie in central Jameson Land at Fossilbjerget and show probably the best-developed ammonite biostratigraphy across the boundary in Greenland (Callomon, 2005). They are therefore the candidates for a boundary stratotype (SSSP) in the Boreal secondary standard zonation. A third succession which yielded a good ammonite and dinoflagellate biostratigraphy lies far on the east coast of Store Koldewey (Piasecki *et al.*, 2005).

## CURRENT AND FUTURE ACTIVITIES OF THE TASK GROUP

It is our primary concern to complete the proposal and procedures for ratification by the ICS of the GSSP for the base of the Callovian Stage in the near future. The basis for discussion has to be the proposal as outlined in Vancouver (Callomon, Dietl, 2000). On the other side, it has been suggested that the decision of the Callovian Task Group in 1990 should perhaps be refreshed today.

The future program of the Task Group is the dissemination of knowledge, as ammonite correlation of the GSSP with other areas and other index fossils. Much remains to be done in many parts of the world and many gaps remain to be filled in the ammonite biostratigraphy of the Callovian Stage. Your new coordinator welcomes contributions.

This year about a dozen colleagues expressed a desire to join the Task Group, either as active members at present working, or as passive members interested but not working on problems of Callovian stratigraphy. Membership is not restricted, and readers of this report wishing to join are invited to do so by informing the coordinator.

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