

Meeting report

Report on the 1st International Workshop of the IUGS Lower Cretaceous Ammonite Working Group, the ‘Kilian Group’ (Lyon, 11 July 2002)

1. Introduction

The Lower Cretaceous Ammonite Working Group forms part of the IUGS Subcommittee on Cretaceous Stratigraphy (Peter Rawson, chair) and is the successor of the Lower Cretaceous Cephalopod Team that formed part of IGCP Projects 262 and 362 respectively. The latter team had organized five Workshops (Klein & Hoedemaeker, 1999; Hoedemaeker & Rawson, 2000) and this is the first workshop under the new IUGS umbrella, which was organized by Stéphane Reboulet (Université de Lyon 1) directly after the 3rd French Symposium on Stratigraphy (Lyon, 8–10 July 2002). The workshop was attended by 18 members from 13 countries. The attendants agreed to call the group the ‘Kilian Group’ after the famous French palaeontologist W. Kilian.

The aims of the Kilian Group are to: (1) construct a standard ammonite zonation for the Lower Cretaceous Series, which is in fact the zonation for the Mediterranean Faunal Province, where all Lower Cretaceous stages except the Albian, were defined; (2) develop ammonite zonations for other key areas in the Tethyan, Boreal and Austral realms and to calibrate them with the ‘standard’; and (3) make recommendations on the definitions of Lower Cretaceous stage and substage boundaries to the appropriate stage Working Groups of the Subcommittee.

2. The standard zonation

The current Lower Cretaceous standard ammonite zonation was summarized by Hoedemaeker & Rawson (2000, p. 857). During the workshop in Lyon (11 July 2002) several amendments were agreed to the current scheme. They are shown in Fig. 1 and Fig. 2. The numbers in the text refer to the numbers in these two figures. The main changes were introduced in the Valanginian, uppermost Hauterivian and Lower Barremian.

2.1. Berriasian

Arguments have been put forward to elevate the subzones listed in Fig. 1 (based mainly on Le Hégarat, 1973) into zones. The Kilian Group follows the principle that the base of the zone or subzone should be defined by the first appearance of the index species. This would mean that the subzones of *Berriasella picteti* and *Berriasella privasensis* should be renamed, because the first appearances of these species are well below the bases of the subzones. *Erdenella paquieri* and *Tirnovella berriasensis* could be appropriate alternatives respectively. This will be discussed at the next meeting of the Working Group.

The lower boundary of the Berriasian Stage was also discussed briefly. It was argued that if geologists want to conserve the section at Berrias as the stratotype section, it is preferable to place the boundary at the base of the *Subthurmannia occitanica* Zone because of the virtual absence of ammonites and the frequency of intervals with reworked sediments below that zone.

1. The shift of the *Thurmanniceras otopeta* Zone from the Valanginian into the Berriasian as a subzone of the *Subthurmannia boissieri* Zone, is a consequence of the provisional recommendation of the congress in Brussels (Bulot, 1996) to define the Berriasian/Valanginian stage boundary by the first appearance of *Calpionellites darderi* at the base of calpionellid zone E. As this base is close to the first appearance of *Tirnovella pertransiens*, which defines the top of the *T. otopeta* Zone, the latter zone automatically moves into the upper Berriasian. This shift should also be considered provisional. It has, of course, consequences for the scope of the upper Berriasian, which becomes longer. Another consequence is that many ammonites which since their description by Sayn (1907) up to the present day have been considered characteristic for the Valanginian Stage, now occur also in the Berriasian.

2.2. Valanginian

The Lower Cretaceous Cephalopod Team’s zonation for the Valanginian Stage experienced several

STAGES		ZONES	SUBZONES	HORIZONS	
HAUTERIVIAN	Upper	<i>P. ohmi</i> 9	<i>P. picteti</i> 9		
			<i>P. catulloi</i> 9		
			<i>P. ohmi</i> 9		
		<i>B. balearis</i>			
		<i>P. ligatus</i>			
	Lower	<i>S. sayni</i>	<i>L. nodosoplicatum</i>		<i>C. cruasense</i>
					<i>O. (O.) variegatus</i> 8
				<i>C. loryi</i>	<i>O. (J.) jeannoti</i>
					<i>C. loryi</i>
				<i>A. radiatus</i>	
VALANGINIAN	Upper	<i>C. furcillata</i> 7	<i>T. callidiscus</i> 7		
			<i>C. furcillata</i>		
			<i>O. (O.) nicklesi</i>		
			<i>N. peregrinus</i>		
			<i>K. pronecostatum</i>		
	Lower 2	<i>S. verrucosum</i> 5	<i>B. campylotoxus</i>	<i>S. verrucosum</i>	<i>N. platycostatus</i> 4
					<i>S. fuhri</i> 4
				<i>K. biassalense</i> 3	
		<i>T. pertransiens</i> 2	<i>B. campylotoxus</i> 3		
BERRIASIAN	Upper	<i>S. boissieri</i>	<i>T. otopeta</i> 1		
			<i>T. alpillensis</i>		
			<i>B. picteti</i>		
			<i>M. paramimounum</i>		
	Middle	<i>S. occitanica</i>	<i>D. dalmasi</i>		
			<i>B. privasensis</i>		
			<i>S. subalpina</i>		
	Lower	<i>B. jacobi</i>			

Fig. 1. Ammonite zonation of the Berriasian–Hauterivian stages.

modifications from 1990 to 2000, reflecting a series of detailed published investigations of the French and Spanish successions that resulted in some conflicting interpretations of the biostratigraphy. The Kilian Group meeting recognized the need to stabilize the zonation. Hence Reboulet & Atrops' (1999) proposals for a Valanginian zonation, the Cephalopod Team's current zonation (Hoedemaeker & Rawson, 2000) and an alternative zonation circulated to the Kilian Group by Hoedemaeker, Klein & Janssen prior to the workshop formed the basis for an animated discussion, which resulted in the acceptance of the following changes of the current zonation. The revised zonation will be discussed fully in a paper to be published in *Cretaceous Research* at a later date.

2. Moving the *T. otopeta* Zone to the Berriasian results in the *T. pertransiens* Zone becoming the lowest zone of the Valanginian. A consequence is that the scope of the lower Valanginian becomes shorter.

3. The *Busnardoites campylotoxus* Zone is subdivided into a *B. campylotoxus* Subzone at the base and a *Karakaschicerias biassalense* Subzone at the top.

4. The *K. biassalense* Subzone is subdivided into a *Saynoceras fuhri* Horizon below and a *Neocomites platycostatus* Horizon above. The latter has a very wide Tethyan distribution, at least from Spain to Sumatra (Indonesia) (Baumberger, 1925); this is in strong contrast to *Saynoceras fuhri* which has hitherto not been found outside southeast France.

STAGES		ZONES	SUBZONES	
ALBIAN	Upper	<i>S.(S.) dispar</i>	<i>S.(S.) dispar</i>	
			<i>S. (F.) blancheti</i>	
		<i>M. inflatum</i>	<i>D. cristatum</i>	
	Middle	<i>E. lautus</i>	<i>E. lorricatus</i>	<i>H. spathi</i>
		<i>L. lyelli</i>		
	Lower	<i>D. mammillatum</i>	<i>L. tardefurcata</i>	
	APTIAN	Upper	<i>H. jacobi</i>	<i>D. nodosocostatum</i>
			<i>A. nolani</i>	
Middle		<i>P. melchioris</i>		
		<i>E. subnodosocostatum</i>		
Lower		<i>D. furcata</i> 14		
		<i>D. deshayesi</i>		
		<i>D. weissii</i>		
		<i>D. oylanensis</i> 13		
BARREMIAN		Upper	<i>P. waagenoides</i>	<i>G. provincialis</i>
			<i>C. sarasini</i>	
	<i>I. giraudi</i>			
	<i>H. ferudianus</i>			
	<i>G. sartousiana</i>			
	Lower	<i>A. vandenheckii</i>	<i>G. sartousiana</i>	
		<i>C. darsi</i> 12		
		<i>K. compressissima</i>		
		<i>N. pulchella</i> 11		
		<i>K. nicklesi</i> 11		
<i>T. hugii</i> auct. 10				

Fig. 2. Ammonite zonation of the Berriasian–Albian stages.

5. Following [Reboulet & Atrops \(1999\)](#), the *Saynoceras verrucosum* Zone is reduced by the transfer of the *Neocomites peregrinus* Subzone to the overlying zone. It thus comprises only the *S. verrucosum* and *Karakaschiceras pronecostatum* subzones.

6. [Reboulet & Atrops' \(1999\)](#) *Neocomites peregrinus* Zone is adopted, and divided into the *Neocomites peregrinus* and *Olcostephanus (O.) nicklesi* subzones. *N. peregrinus* is easily recognizable, frequently occurs in the Mediterranean Province, and has an inter-realm distribution (north Germany); it is, therefore more usable than the former zonal index, *Himantoceras trinodosum*. The first appearance of *O. (O.) nicklesi* is at virtually the same level as that of *Himantoceras trinodosum*. The workshop chose *O. (O.) nicklesi* as the index for the upper subzone because of its short range, while recognizing that the

longer ranging *H. trinodosum* is easily recognizable, and has, as an index, priority over *O. (O.) nicklesi*.

7. Following the proposals of [Reboulet & Atrops \(1999\)](#), the former *Criosarasinella furcillata* Subzone and *Teschenites callidiscus* Zone are united into the *C. furcillata* Zone because of the marked faunal renewal at the base of the *C. furcillata* Subzone, which makes it easily recognizable in the field. The former *H. trinodosum* Zone, comprising the *O. (O.) nicklesi* and *C. furcillata* subzones, is abandoned, and the former Zone of *Teschenites callidiscus* is reduced in rank to subzone.

2.3. Hauterivian

8. It was noted by [Bulot et al. \(1993\)](#), [Reboulet \(1996\)](#) and [Reboulet & Atrops \(1999\)](#) that the first appearance

of *Olcostephanus* (*O.*) *variegatus* is a few beds below the first appearance of *Lyticoceras nodosoplicatum*. Hence, the base of the horizon should be drawn a little below the base of the *L. nodosoplicatum* Zone.

9. After the holotype of *Ammonites angulicostatus* d'Orbigny was rediscovered, it became apparent that it is quite different from the neotype designated by Lapeyre (1974), and should be assigned to the genus *Crioceratites*. However, according to Company et al. (2002) the generic name *Pseudothurmannia* could be retained on account of Article 70.3.2. of the International Code of Zoological Nomenclature, fifth edition, 1999. Lapeyre's neotype belongs to *Pseudothurmannia ohmi* (Winkler). The Zone of '*Pseudothurmannia*' *angulicostata* auctorum has been renamed the *Pseudothurmannia ohmi* Zone, because virtually all specimens identified in accordance with Lapeyre's neotype in reality belong to *P. ohmi*. Company et al. (2002) added a third subzone to the *P. ohmi* and *Pseudothurmannia catulloi* subzones, the *Pseudothurmannia picteti* Subzone, because of the appearance of *P. picteti* in the upper part of the *P. catulloi* Subzone. So the top part of the former *P. catulloi* Subzone is now occupied by the *P. picteti* Subzone.

2.4. Barremian

Significant changes to the ammonite zonation of the lower Barremian were accepted following the arguments of Vermeulen (2002). The *Pulchellia communis* and *Pulchellia caicedi* horizons of the current zonation (Hoedemaeker & Rawson, 2000) are not acceptable, because Vermeulen's concept of horizon differs from that of the Working Group.

10. The name of the *Taveraidiscus hugii* Zone should be changed to the *T. hugii* auctorum Zone, since Tzankov (1935) defined a lectotype for this species (Ooster, 1861, part 4, pl. 24, fig 11 = Sarasin & Schöndelmayer, 1901, pl. 4, fig. 9) which differs from the generally used, but never defined, concept of the species.

11. The *Nicklesia pulchella* Horizon should be elevated to the rank of Zone. This zone occupies the upper part of the *Kotetishvilia nicklesi* Zone as previously conceived by the Working Group (Hoedemaeker & Rawson, 2000). Although this species occurs only in two beds (109b and 109c) of the Barremian stratotype section near Angles, it has a longer range in other areas.

12. The *Moutoniceras moutoni* Zone should be suppressed in favour of the *Coronites darsi* Zone because *M. moutoni* can easily be confused with the young whorls of *Moutoniceras nodosum*, which occurs in the underlying *Kotetishvilia compressissima* Zone. A drawback is that *M. moutoni* has never been recorded from the Angles stratotype section.

2.4.1. Aptian

13. Convincing arguments have been put forward (Raisossadat, 2002) to use *Deshayesites oglanlensis* rather than *D. tuarkyricus* as index for the basal zone of the Aptian, since the former species has a wide geographical distribution from Iran to Spain, whereas *D. tuarkyricus* has been found only in Turkmenistan.

14. Recent work on the Bedoulian/Gargasian boundary in southeast France (Conte, 1995; Atrops & Dutour, 2002) queries whether the Zone of *Dufrenoyia furcata* should mark the top Lower Aptian or basal Middle Aptian, i.e. whether it should be top Bedoulian or basal Gargasian. The Kilian Group decided that more detailed data should be presented before it can accept a shift of the boundary.

2.5. Albian

There is a need to investigate the possibility of merging the ammonite zonal subdivisions of Owen (1999) with that of Amedro (1992); the latter is based rigorously on first appearances.

3. Membership and next meeting of the Kilian Group

All Lower Cretaceous ammonite workers are welcome to join the Kilian Group by contacting the chairman. The next meeting of the Group will be in Neuchâtel (Switzerland) in 2005 together with the 7th International Cretaceous Symposium. (Hoedemaeker & Bulot, 1990; Sarasin & Schöndelmayer, 1901.)

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