

# SUBCOMMISSION ON CRETACEOUS STRATIGRAPHY

ANNUAL REPORT 2008

## 1. TITLE OF CONSTITUENT BODY and NAME OF REPORTER

International Subcommittee on Cretaceous Stratigraphy (SCS)

### *SUBMITTED BY*

Prof. Isabella Premoli Silva, Chair

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## 2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

- *To facilitate international communication in all aspects of Cretaceous stratigraphy and correlation*
- *To establish a standard global stratigraphic subdivision and nomenclature for the Cretaceous, as part of the ICS standard global stratigraphic scale;*
- *To produce a stratigraphic table displaying agreed subdivision to substage level and intervals of disagreement, marking boundaries that are defined by a GSSP.*

## 3. ORGANIZATION

SCS is a Subcommittee of the International Commission on Stratigraphy.

*Membership:* Chair: Prof. Isabella Premoli Silva, Italy  
Vice Chair: Dr. Irek Walaszczyk, Poland  
Secretary: Dr. Silvia Gardin, France

There are an additional 15 Voting Members of the Subcommittee, from all the continents. Over 130 Cretaceous scientists from all over the world and in many different disciplines belong to one or more of the 9 Stage Working Groups of the SCS still active, or to the Kilian Group. All WG members are treated as Corresponding Members of the Subcommittee. Effectively, anyone with interest and expertise that can contribute to our objectives is welcome to do so. ***The great bulk of the Subcommittee's work is carried out by these Working Groups.***

### 3a. Officers for 2008-2012:

Chair:	Prof. Isabella Premoli Silva (Milan, Italy)
Vice-Chair:	Dr. Irek Walaszczyk (Warsaw, Poland)
Secretary:	Dr. Silvia Gardin (Paris, France)

*Include WEB address for Subcommission site; and indication of contents*

## 4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

The Subcommission has liaised with successive meetings of the *International Cretaceous Symposium*, which until 2004 have been promoted by the German *Subkommission für Kreide-Stratigraphie*. The SCS has now taken over the responsibility for selection of future venues, though the successful applicants will organize individual congresses. At the seventh Congress held in Neuchâtel, Switzerland, in September 2005, it was decided that the *8th International Cretaceous Symposium* will be convened in Plymouth, UK, in September 6-12 2009 by Prof. Malcom Hart.

The Subcommission organized the Symposium HPS-10 at 33<sup>rd</sup> International Geological Congress in Oslo, August 2008.

The Subcommission also liaises closely with the Subcommission on Jurassic Stratigraphy, especially over the definition of the Jurassic/Cretaceous boundary.

When appropriate, the Subcommission liaises also with IGCP projects. In particular, a strong liaison was established by our colleagues from IGCP 507 – “Cretaceous paleoclimatology”, and IGCP Project 506 - Marine and Non-marine Jurassic: Global correlation and major geological events (Project Co-Leader W. Wimbledon).

ICS has always been directly or indirectly linked to big international Projects as IODP, IGCP, and CHRONOS (Mesozoic Planktonic Foraminifera Working Group, MPFWG).

## 5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2008

### General Activities

The Subcommission on Cretaceous Stratigraphy organized the symposium **HPS-10 Stratigraphic subdivisions of the Cretaceous System: State of the art** (Conveners: I. Premoli Silva, Italy, F. Surlyk, Denmark, I. Walaszczyk, Poland), at the 33<sup>rd</sup> IGC in the aim to present the progresses made by the numerous Working Groups on Cretaceous stage boundaries since the session on Cretaceous stratigraphy held at the 32nd IGC 2004 in Florence and the discussion during the SCS meeting in Neuchâtel (Sept. 2005).

The state of the art on Cretaceous subdivision was overviewed and the problems concerning some GSSPs were discussed, i.e. base of the Coniacian, base of the Santonian, and subordinately base of the Campanian. Some presentations focused on stage boundaries and substage subdivisions approached by integrated multidisciplinary stratigraphies. In particular, cyclostratigraphic studies allowed to quantify stage to zone duration (Aptian, K/Pg) and to precise the age of the K/Pg boundary, respectively. Moreover, new evolutionary index taxa (Inoceramids) have been presented

(Albian, Maastrichtian) as well as the utility of the Re-Os geochronometer to organic-bearing sediments (Aptian/Albian and Cenomanian/Turonian boundaries). Finally, one presentation showed the arising difficulties in applying the “standard” planktonic foraminiferal zonal scheme outside the tropical paleoenvironmental regime. Ten abstracts have been included in the program (eight orals and two posters). The most positive point of the symposium (well attended) was the integrated multidisciplinary perspective finally applied in most of the presentations with also new techniques/proxies in cyclostratigraphy and radiometric dating.

A **business meeting** of the Subcommission was held at the 33<sup>rd</sup> IGC in Oslo during which some problems concerning the missing GSSPs were discussed. After a brief presentation by Walaszczyk dealing with the sections considered as GSSP candidates for the base Coniacian, the attendants agreed to explore the possibility of proposing a composite section merging the data from the Salzgitter-Salder section (northern Germany) with the Slupia Nadbrzeżna (central Poland). The complain about the poor accessibility and condition of the Tercy-les-Bains section, the approved Maastrichtian GSSP, was also considered.

A wealth of publications, even though most of them are not specifically dedicated to GSSP sections, contributed to construct a solide integrated multiple stratigraphic framework applicable worldwide.

Finally, the 1<sup>st</sup> International Meeting on Correlation of Cretaceous Micro-and Macrofossils (16-18 April 2008) was held at the Natural History Museum in Vienna. Convener: A. Lukeneder; Co-Conveners: H. Egger, M. Wagnreich. 35 scientists from 15 different countries attended the meeting.

### **The Kilian Group (Lower Cretaceous Ammonite Working Group).**

The 3<sup>rd</sup> International Meeting of the Kilian Group, convened by the Chairman Stéphane Reboulet, took place at the Natural History Museum in Vienna the 15 April 2008, the day before the 1<sup>st</sup> International Meeting on Correlation of Cretaceous Micro-and Macrofossils (16-18 April 2008). The Meeting was attended by 12 members from 8 countries: S. Reboulet, J. Klein (reporters), R. Barragán, M. Company, C. González-Arreola, A. Lukeneder, S. Naser Raisossadat, J. Sandoval, O. Szives, J. M. Tavera, Z. Vazícek, and J. Vermeulen.

Before starting the discussion on the Standard zonation, the chairman commented and made some recommendations on the working method. Firstly, new proposals made by members of the Kilian Group should be preferentially based on published or submitted data which have been reviewed or discussed previously by some members of the Kilian Group (see 2007 Digne report, Reboulet et al., 2007). New data presented during a meeting do not allow to have enough time for reflexion. Secondly, it would be preferable to keep zones which define the base of stages or substages as they have been recommended by the 1<sup>st</sup> (Birkelund et al., 1984) and 2<sup>nd</sup> International Symposiums on Cretaceous Stage Boundaries (Mutterlose et al., 1996 – Hauterivian stage; Rawson et al., 1996 - Barremian stage) or chosen in the 2004 Geological Time Scale (Ogg et al., 2004). Thirdly, it appears necessary to stabilize the Hauterivian-Barremian zonal scheme which has been often modified during the last 8 years (Hoedemaeker & Rawson, 2000; Hoedemaeker et al., 2003; Reboulet et al., 2006, this meeting). Fourthly, members of the Kilian Group should use the Standard zonation or correlate it with their local zonal scheme.

These different points will allow to preserve the stability in the stratigraphic nomenclature

(particularly for the first zones of sub/stages), to make easier the comparison of zonal schemes from different works and to improve communications. The aim of the Kilian Group is to define a Standard zonation but also to encourage other colleagues to use it. Consequently, Editors of journals will be informed by the chairman that authors should use the Lower Cretaceous Ammonite Standard zonation (when possible) or to add it aside the local zonal scheme.

Main results. The discussion mainly focused on the Hauterivian and Barremian zonal schemes. For the Hauterivian stage, the main changes concern the *Subsajnella sayni* and *Balearites balearis* Zones (Lower Hauterivian) with the introduction of one horizon (*Subsajnella begudensis* Horizon) and four subzones (*B. balearis*, *Binelliceras binelli*, *Crioceratites krenkeli*, *Spathicrioceras seitzi* subzones), respectively. For the Lower Barremian, the main amendments concern the introduction of two subzones in the *Taveraidiscus hugii* auctorum Zone (*T. hugii* auctorum and *Psilotissotia colombiana* subzones) and of four horizons in the *Kotetishvilia compressissima* Zone (*Holcodiscus fallax*, *Nicklesia didayana*, *Heinzia communis*, and *Subtorcapella defayae* Horizons). The *Coronites darsi* Zone is replaced by the *Moutoniceras moutonianum* Zone which comprises two horizons (*C. darsi* and *Heinzia caicedi* Horizons). The base of the Upper Barremian is defined by the base of the *Toxancyloceras vandenheckii* Zone and Subzone. The former *Hemihoplites feraudianus* and *Martelites sarasini* Zones are lowered in rank to subzones of the *Gerhardtia sartousiana* and *Imerites giraudi* Zones, respectively.

The report, which includes two tables, was submitted to Cretaceous Research (now in revision) and should be published in 2009.

### **The Berriasian GSSP and the J/K boundary.**

The Berriasian Working Group had its 2<sup>o</sup> meeting at the University of Provence, Marseille, on 12-13 April 2008, that was excellently hosted by Luc Bulot. The meeting was characterised by constructive discussions and the most useful presentations on practical indicators for the base of the Berriasian.

Luc Bulot gave an account of the actual distribution of ammonites in the type area for the Berriasian which was most revealing, Misha Rogov spoke on the vexed question of ammonite-based correlation in the Boreal realm, and Philip Hoedemaeker on the ammonite zonation in Spain. Other important talks focused on the use of nannofossils by Elisabetta Erba, calpionellids by Josef Michalik, foraminifers by Annie Arnaud, and written submissions on palynology from Boris Webbers and Oscar Abbink (North Sea/Netherlands), Chris Hunt (onshore UK) and from the Russian far east by Eugenia Bugdaeva and Valentina Markevich.

The key result of the meeting was the resolve all contributors made to look for greater resolution in the integration of looser historical ammonite zones (still lacking biohorizons), in this case the base of *jacobi/grandis* zone, with the much more precise evolutionary sequences, and thus finite markers, that have been discerned for nannofossils and calpionellids, alongside magnetostatigraphy.

The Working Group agreed to meet next in Milan and then again in Slovakia, hosted by Josef Michalik.

The meeting in Milan (organizer Elisabetta Erba), originally planned for October 2008, was postponed to the weekend of 6-8 March 2009, in the hope this makes it possible to have more complete attendance. To make a solid step forward, the Chairman W. Wimbledon proposes two things. Firstly, that people make presentations on individual sections at the Milan meeting, following the useful discussions in Marseille, and secondly that the results of this are combined for a joint

presentation to be given at the Cretaceous Meeting in Plymouth, 6-12 September 2009. The proposal is that each person at Milan makes a presentation and details a key section. More particularly, that in this section the proposed datums/events to be used to define the base of the Berriasian (approximating to base of *jacobi/grandis* zone, as already agreed) should be shown against details of litho-, bio- and chronostratigraphy. And, critically, the datum(s)/event(s) must be demonstrated in other sections/basins. That is, the usefulness and practical application of a datum needs to be proved in places other than the described section. And other alternative datums may be relevant. The issue of demonstrating the precise usability of markers in other sections is a key matter: the usable, repeatable marker comes first. If the datum is not widespread then it is not useful, and the section will fall.

The Working Group may have another meeting during the Cretaceous Symposium at Plymouth in September 2009.

### **Base Valanginian GSSP.**

The activities in 2007 concentrated on the section at Montbrun-les-Bains (S. France) that was logged again in more detail by Bulot and Reboulet in order to provide a reliable correlation to the Sr and <sup>13</sup>C curves established by McArthur et al. (2007, see above). For the same section detailed data of ammonites, calpionellids, and calcareous nannofossils (unpublished) are also available. In the alternate section at Rio Argos (Spain), originally studied by Ph. Hoedemaeker and revised by Aguado et al. (2000, Cret. Res., v. 21), although richer in ammonites, the calpionellid record is "weak" compared to Montbrun-les-Bains, mainly for preservation problems. Being the Chairman of the Valanginian WG, Luc Bulot, deeply involved also in problems concerning the Berriasian and J/K boundary, the GSSP proposal will be not submitted probably until the end of 2008.

### **Base Hauterivian GSSP.**

Luc Bulot has now received the various contributions from colleagues who have been analysing data from the intended GSSP at La Charce, France. He is collating the data to send to P. Rawson so that he can then put the whole draft report together, then send it to the chair of the group, Joerg Mutterlose, for him to check and send to members of the WG. The whole procedure is expected to be completed and the report sent to Voting members within the next 6 months.

### **Base Barremian GSSP.**

The Spanish colleagues (led by Miguel Company) have prepared data on the proposed section in Spain and as far as the chair, P. Rawson, knows it is more or less complete. Beginning in December after returning from Argentina, Peter Rawson will put the whole draft report together expecting to submit the GSSP proposal over the next year.

### **Base Aptian GSSP.**

A wealth of data have been added and published in 2007-08 by our French colleagues on the stratotype sections of Bedoulian and Gargasian substages including revised biostratigraphies,  $\delta^{13}\text{C}$  curve and cyclostratigraphy (published mainly in Notebooks on Geology). A memoir edited by Moullade et al., synthesising all the gathered data is in press in Notebooks on Geology (on-line). However, as magnetic signature in the French stratotype sections cannot be detected, the correlation to the base of magnetic chron M0, recommended at the 1995 Brussels Meeting for identifying the base of the Aptian, is still prevented. A formal proposal is expected soon by the chair of the WG.

### **Base Albian GSSP.**

The formal proposal has been prepared early in 2007 by J. Kennedy and distributed to the members of the WG for comments. Although the Chairman, M. Hart, has received only few answers overall, the proposal was sent to the Voting Members for approval. The ballot did not reach the quorum (6 YES, 5 NO, 1 abstain). Voting Members against the proposal sent some comments that have been forwarded to J. Kennedy for consideration. Due to Kennedy's health problem the proposal is still pending.

### **Base Coniacian GSSP.**

There is a general consensus to use the first appearance of *C. deformati erectus* (Meek), a well recorded cladogenetic speciation event, for identifying the base of the Coniacian. This event is clearly recognizable in the whole Euramerican biogeographic region, and in the Tethyan Realm; and it appears to be easily correlatable outside these areas. This Euramerican biomarker is therefore either valid on its own for recognizing the base of the Coniacian Stage directly, or it enables indirect correlation with most of the coeval marine successions elsewhere in the world. The inoceramid-based lower Coniacian boundary slightly post-dates the traditional ammonite (FAD of *Forresteria petrocoriensis*) position of the boundary. Among the candidate sections, included in the Brussels 1995 report, the Wagon Mound section (US Western Interior) is entirely Turonian and the Pueblo section (US Western Interior) appears to be incomplete a small distance above the boundary, and the Salzgitter-Salder section (northern Germany), was shown to be condensed or to contain a short gap just at the accepted boundary level. The Slupia Nadbrzeżna (central Poland), the most complete succession across the boundary known to date, is unfortunately poorly exposed. To overcome such multiple problems, there is a general agreement within the Subcommittee to propose as the boundary stratotype the Salzgitter-Salder - Slupia Nadbrzeżna composite section. The WG chair, I. Walaszczyk, is preparing the final report on the base of Coniacian, which will be submitted for publication in *Acta Geologica Polonica* and contemporaneously to the Subcommittee. The publication is almost ready; what is still needed to do is the isotope curves for the Slupia Nadbrzeżna section; these will be done by Silke Voigt still in 2008.

Lees J.A., 2008. The calcareous nannofossil record across the Late Cretaceous Turonian/Coniacian boundary, including new data from Germany, Poland, the Czech Republic and England. *Cretaceous Research*, v. 29, p. 40-64.

### **Base Santonian GSSP.**

The final proposal for the base Santonian at Olazagutia (Spain), prepared by the chair M. Lamolda, was distributed for approval and/or comments to the Voting Members at the end of July 2008. As positive votes did not reach the quorum yet, the Secretary solicited the non-performing Voting Members to vote few weeks ago.

### **Base Campanian GSSP.**

The paper on the base of the Campanian at the Waxahachie dam spillway section (northcentral Texas), announced in 2007 report, was published on *Cretaceous Research* in 2008. The problem concerning who owns the land where the Texas section is situated is still unsolved. Moreover, it is worth mentioning that the correlation of the Waxahachie dam spillway section and Seaford Head

(Sussex, England) section, with the pelagic successions based on calcareous plankton is not straightforward. No formal proposal has been submitted yet

Gale A.S., J. M. Hancock, W. J. Kennedy, M. R. Petrizzo, J. A. Lees, I. Walaszczyk, D. S. Wray, 2008. An integrated study (geochemistry, stable oxygen and carbon isotopes, nannofossils, planktonic foraminifera, inoceramid bivalves, ammonites and crinoids) of the Waxahachie Dam Spillway section, north Texas: a possible boundary stratotype for the base of the Campanian Stage. *Cretaceous Research*, v. 29, p. 131-167.

## **6. CHIEF PROBLEMS ENCOUNTERED IN 2008**

The need nowadays for a high-resolution framework to be exportable worldwide resulted in the necessity of re-visiting several candidate sections, already studied paleontologically, by implementing multiple biostratigraphies and stratigraphic tools other than fossils - those are profoundly affected by bioprovincialism in several intervals - like magnetostratigraphy, stable isotope stratigraphy, etc. In several cases, especially in the Late Cretaceous, the integration of multiple bio-, physical stratigraphies revealed that the candidate sections were unsuitable as GSSP. Consequently, new sections had to be searched and studied from the beginning. This resulted in a delay in submitting the GSSP proposals, taking also into account that scientists from different subdisciplines do not necessarily work at the same speed.

## **7. SUMMARY OF EXPENDITURES IN 2008 (ANTICIPATED THROUGH MARCH 2009):**

### **I. INCOME**

ICS subvention for 2008 (700 \$)	Euro 446.26
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Total income	Euro 446.26

### **II. EXPENDITURE**

Participation (travel, lodging, etc.) to the J/K meeting, Marseille (Chairman and others)	Euro 490.00
Chair Participation (partial) to 33° IGC, Oslo	Euro 637.00
Office (chair & secretary) expenses	Euro 355.00
Bank Expenses	Euro 12.00
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Total expenditure	Euro <b>1494.00</b>

## **8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2009):**

### **Membership of Cretaceous Subcommittee.**

The Voting Membership of the Cretaceous Subcommittee will be renewed during the next few

months. In fact, the mandate for 5 Voting Members expired in 2008. Nominations have already been requested.

### Meetings

- The 3<sup>rd</sup> meeting of the Berriasian and J/K boundary WG is planned for 2-4 March, 2008 in Milano, Italy.
- Official Meeting of the Subcommittee at the 7<sup>th</sup> International Cretaceous Symposium, September 2009 Plymouth (UK)
- 7<sup>th</sup> International Cretaceous Symposium, 6-12 September, Plymouth (UK)

### Work Plan and anticipated Results

- To bring recommendations for 6 of the remaining GSSPs to ICS as soon as possible
- To advance considerably on definition of criteria for identifying the base of the Berriasian and the J/K boundary.

## 9. BUDGET AND ICS COMPONENT FOR 2009

Office expenses (Fax, phone, postage, etc)	Euro 300
Organization expense for the J/K Milan Meeting	Euro 500
Support to participants to the J/K Milan Meeting	Euro 1,000
Contributions to help costs of participants to the SCS	
Official meeting at 7 <sup>th</sup> International Cretaceous Symposium, Plymouth (UK)	Euro 3,500
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<b>Total estimated expenditure</b>	<b>Euro 5,300</b>

## 10. SUMMARY OF CHIEF ACCOMPLISHMENTS OVER PAST FIVE YEARS (2004-2008)

*See Accomplishments in ICS Annual Reports 2004 to 2008 (above) for additional details.*

- Renewed research by WG members (resulting in a great number of publications, still ongoing), based on research needs pinpointed by the 1995 Brussels and 2005 Neuchâtel meetings.
- Completion of 2 GSSP proposals: Cenomanian (ratified 2002) and Turonian (ratified 2003).
- Presentation of the latest results to 7<sup>th</sup> International Cretaceous Symposium, Neuchâtel, Switzerland. September 4-9, 2005.
- Workshop on the Aptian ammonite zonation, held in Lyon (Nov. 2005) focused the discussion mainly on the ammonite faunal turnovers and the Lower/Middle Aptian (Bedoulian/ Gargasian) boundary in relation to the position of the Furcata Zone.
- Set up of the renewed Working Group on the Berriasian GSSP and the J/K boundary, chaired by W.A.W. Wimbledon (Dec. 2006-Spring 2007).
- 2<sup>nd</sup> Workshop of the Kilian Group on the Hauterivian-Barremian zonation, held in Digne-les-

Bains (Mai 2007), from the **Radiatus** (base of the Hauterivian) to the **Sarasini** (top of the Barremian) zones.

- 3<sup>rd</sup> Workshop of the Kilian Group on the Hauterivian and Barremian zonation, held in Vienna (April 2008)
- 1st official meeting of the renewed Working Group on the Berriasian GSSP and the J/K boundary, chaired by W.A.W. Wimbledon in Bristol (July 2007).
- 2nd official meeting of the Working Group on the Berriasian GSSP and the J/K boundary, chaired by W.A.W. Wimbledon in Marseille (July 2008).
- 33<sup>o</sup> Geological Congress, August 2008, Oslo: SCS Symposium on “Stratigraphic subdivisions of the Cretaceous System: State of the Art”. (Conveners: I. Premoli Silva, F. Surlyk & I. Walaszczyk).

The Chair and/or Vice Chair represented the SCS at:

SCS session at 32<sup>nd</sup> *International Geological Congress*, Florence, August 2004

SCS meeting during the 7<sup>th</sup> *International Cretaceous Symposium*, Neuchâtel, Switzerland, September 2005

1<sup>st</sup> meeting of the *Berriasian and J/K boundary Working Group*, Bristol (UK), July 2007

2nd meeting of the *Berriasian and J/K boundary Working Group*, Marseille, July 2008

SCS Symposium HPS-10 on “Stratigraphic subdivisions of the Cretaceous System: State of the Art”. (Co-conveners: I. Premoli Silva & I. Walaszczyk), at 33<sup>o</sup> Geological Congress, August 2008, Oslo:

## **11. OBJECTIVES AND WORK PLAN FOR NEXT 4 YEARS (2008-2012)**

### **Meetings**

- March 2009 – the 3rd Workshop of the Berriasian and J/K boundary WG is planned in Milano, Italy
- September 2009 - Subcommission Official Meeting at the 7<sup>th</sup> International Cretaceous Symposium, Plymouth (UK)
- 2009 - 7<sup>th</sup> International Cretaceous Symposium, Plymouth (UK)
- September 2010 – 4<sup>th</sup> Workshop of the Kilian Group at the 8<sup>th</sup> International Symposium “Cephalopods present an past”, Dijon (France), focused on problems of the Aptian and Albian stages

Details of other meetings are not yet available.

### **Objectives**

- To submit the proposals of Albian and Santonian GSSPs to ICS, and to submit them to Episodes for publication
- To bring recommendations for 6 of the remaining GSSPs to ICS as soon as possible
- To advance considerably on definition of criteria for identifying the base of the Berriasian and

- the J/K boundary.
- To communicate the results as widely as possible.
  - To develop new directions for the Subcommittee as GSSP proposals are completed. Specifically, future objectives will concern the subdivision of stages, with definition of substages and related GSSPs.

## **Work Plan**

2008 (end) - Complete voting on the proposals for the base of the Albian and Santonian  
2009 - Finalize proposals for the base of Valanginian, Hauterivian, Barremian, Aptian, Coniacian, and Campanian  
2010 - Finalize the proposal for the base of Berriasian (Jurassic/Cretaceous boundary)  
2010 to 2012 – Definition of substages.

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## **APPENDIX [Names and Full Addresses of Current Officers and Voting Members]**

### ***Subcommittee officers (with addresses)***

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### ***List of Voting Members***

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\* to be replaced in 2008

*List of Task Groups and their officers*

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**Coniacian WG:** Irek Walaszczyk, Poland. [i.walaszczyk@uw.edu.pl](mailto:i.walaszczyk@uw.edu.pl)  
**Turonian WG:** GSSP ratified. No chairman at present.  
**Cenomanian WG:** GSSP ratified. No chairman at present.  
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