

'WORKING GROUP RUPELIAN' INTERMEDIATE PROGRESS REPORT

by

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ABSTRACT

The 'Working Group Rupelian' was founded during a joint biannual meeting of the RCNNS and RCNPS at Bremen, September 1989, with an assignment to prepare proposals for the formal designation of a stratotype section and of boundary stratotypes for the Rupelian Stage.

The group first met at Leuven (October 1990), where the 25 participants agreed on a number of recommendations, together forming a solid point of departure for future work. One of the excellent clay-pit sections in the Rupel cuesta, the Swenden clay pit at Rumst, was selected to be the future stratotype.

Several of these recommendations, however, soon had to be abandoned in view of information presented during the December 1990 meeting of the Subcommittee on Paleogene Stratigraphy at Tübingen, where it became clear that instead of the Hedberg rules the paper of Cowie *et al.*, 1986 should be applied in stratigraphy. Chronostratigraphical units have now to be defined by their lower boundary. In addition, the boundary-stratotypes of higher-rank stratigraphical units automatically also define the boundaries of corresponding units of lower rank. Thus, the recently defined Eocene-Oligocene boundary (the 19-m level of the Massignano section near Ancona, N. Italy) also defines the lower boundary of the Rupelian.

On May 13, 1991 the Working Group members met again to discuss new developments. It was concluded that, although a formal boundary stratotype for the Rupelian appears superfluous, the work on the stratotype of the Rupelian has to be continued in order to better assess its stratigraphical position in international schemes. Therefore plans were made to start multidisciplinary research on three sections, which should result in a well-documented proposal for a (unit-)stratotype section for the Rupelian in about 2 years' time. A correlation of the Massignano 19 m-level and the North Sea Basin should then also be attempted.

1. INTRODUCTION

About two years ago, at the last RCNNS/RCNPS-meeting in Bremen, the Working Group Rupelian was founded with the aim of putting forward proposals for the formal designation of stratotype sections for the Rupelian Stage. The designation of such stratotypes is the main task of regional committees. The fact that at the International Geological Congress in Washington (1989) the Rupelian was assigned global stage rank made it only logical to form such a working group.

A number of reports have already been published in the RCNNS/RCNPS-Newsletter (Janssen, 1990, 1991 ; Vandormael, 1991 ; Moorkens, 1992). A brief review will suffice here, together with the latest developments and some notes on possible future developments.

The Working Group's activities started with an ad hoc meeting, immediately following the business meeting of RCNPS and RCNNS in Bremen (October 1989) for brainstorming.

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2. THE LEUVEN MEETING (OCTOBER 1990)

The first formal meeting took place at the Geological Institute of the Catholic University of Leuven in October 1990. On the basis of a comprehensive hand-out, some 25 colleagues discussed what had to be done. This meeting resulted in the acceptance of a number of recommendations, which, in the opinion of all participants, presented a solid point of departure for activities. The text of the hand-out was published in the Newsletter (Janssen, 1991), and only the most important recommendations are repeated here. One of the basic ideas during the Leuven meeting was that stratotype sections had to be designated according actual rules, so as to preclude a formal rejection of the proposals on account of incorrect procedures. That is why the rules and nomenclature as prescribed in Hedberg's stratigraphic guide were strictly adhered to. Furthermore, several of the statements, especially those concerning the boundary stratotypes, were based on the original concept of the Rupelian, as laid down in two papers by Dumont (1849, 1851). The most crucial recommendations that were agreed upon are the following:

*** The formal stratotype of the Rupelian stage will have to be designated within the Rupel cuesta area.**

This delimitation of the Rupelian type area is directed by the original introduction of the Rupelian as a chronostratigraphical unit by Dumont in 1849.

*** The lower boundary of the unit stratotype of the Rupelian stage will have to be designated within an area where the Berg Sand Member is present, but should not necessarily be chosen at the base of the Berg Sands.**

Again, this recommendation is based on earlier literature, e.g. especially Dumont's 1851 paper. The second part of the recommendation reflects the existing uncertainty over the age interpretation of several deposits, such as the Ruisbroek Sands, and, especially, the deposits of the so-called 'Upper Tongrian'. It was considered opportune to postpone such a decision.

*** The upper boundary stratotype of the Rupelian stage cannot be designated in the Rupelian type area.**

Advancements in the study of the Rupelian deposits elsewhere in the North Sea Basin have

demonstrated that the sequence in the type area is incomplete and the youngest strata of the Boom clay are not outcropping. Sediments younger than those present along the Rupel cuesta, but apparently still of the same character, are known to occur in the area N of Antwerp, in the Eigenbilzen area, and near Winterswijk in the Netherlands.

*** The upper boundary stratotype of the Rupelian stage cannot be designated on the basis of existing knowledge.**

Most of these younger sediments still remain largely unstudied and their boundary with the Chattian stage is not clear yet. Obviously, new research is needed to settle these matters. Logically this base has to coincide with the base of the Chattian stage to be defined together with the Chattian unit-stratotype in Germany.

*** Designation of boundary stratotypes can only be considered in close cooperation with specialists on the involved older and/or younger stages.**

It was realised that designation of a lower boundary stratotype for the Rupelian at the same time meant the establishment of an upper boundary for the Latdorfian, and, similarly, in the case of the upper boundary, a lower boundary for the Chattian. The Working Group considered the Latdorfian to be the stage preceding the Rupelian, in line with earlier interpretations.

*** The Working Group Rupelian will propose to designate the section exposed in the Swenden claypit at Rumst, Belgium, stratotype for the Rupelian Stage.**

This statement is the direct result of the general consensus of opinion at the Leuven meeting. The designation of a formal unit- (or body-)stratotype can be prepared in the near future, but problems concerning both the upper and lower boundaries of the stage preclude a rapid decision on the boundary stratotypes. Therefore it was decided to focus on the well-exposed Rumst section as a unit-stratotype. Decisions on the boundaries should await future developments and additional studies.

A final point of discussion was the announcement of a meeting of the Subcommission on Paleogene Stratigraphy, to be held at Tübingen in December 1990, shortly after the Leuven meeting. The Working Group thought it wise to report on its existence and its activities at the Tübingen meeting. The Leuven meeting was rounded off by field

trips to classic Rupelian localities, viz. the Roelants (ex. Pellenberg) pit at Lubbeek-Heide, and the clay-pits of St. Niklaas, Kruibeke and Rumst, where participants put forward a slightly different approach for the future unit-stratotype and took samples.

3. THE SPS MEETING AT TÜBINGEN, DECEMBER 1990

A report on the activities of the Working Group Rupelian was presented by A.W. Janssen. However, it soon became clear that the premises of the Working Group differed from those of SPS. In his introductory talk Dr Graham Jenkins (chairman of SPS), pointed out that stratigraphers should focus on the designation of boundary-, rather than unit-stratotypes, since stages should be defined exclusively by the designation of a lower boundary-stratotype.

This recommendation conflicted with the view of the Working Group, who preferred to designate a lower boundary-stratotype subsequent to the designation of the unit-stratotype itself. Furthermore, Graham Jenkins declared that the Hedberg rules had never been adopted by the International Commission on Stratigraphy as a statutory policy document. Instead of the strongly criticised Hedberg rules the much more concise guidelines of Cowie *et al.* (1986) should be adhered to. This point of view being completely unknown amongst North Sea Basin geologists, it demonstrates the necessity of keeping in touch with bodies of higher rank than RCNPS.

A further important issue resulting from the Cowie *et al.* guidelines, and elucidated by Dr Jenkins, is that the boundaries of higher chronostratigraphical units invariably also define those of corresponding lower ranking units. Thus, the designation of the Cretaceous-Paleogene boundary defines the lower boundary of the Danian, and, similarly, a designation of the Eocene/Oligocene boundary also defines the lower boundary of the Rupelian as the Oligocene was recently subdivided into two stages, the Rupelian and the Chattian, at the Washington congress.

This statement is of great importance for the Working Group Rupelian and immediately affects its activities, since the Eocene/Oligocene boundary was designated by Premoli-Silva *et al.* (1988) at the 19 m-level in the Massignano section, near Ancona in northern Italy. This 19 m-level there-

fore also defines the lower boundary of the Rupelian.

4. THE SECOND LEUVEN MEETING, MAY 1991

Still suffering from shock, the working group reassembled for a one day meeting at Leuven on May 13, 1991. Most of the people present experienced difficulties in accepting the fact that the lower boundary of the Rupelian stage was defined in northern Italy. The only possible conclusion is, that in order to determine the lower boundary of the Rupelian in the North Sea Basin, a correlation between the Massignano 19 m-level and our area has to be established.

However, such a correlation, may prove to be extremely difficult to establish. The Massignano section does not yield macrofossils (considered to be an advantage by our Italian colleagues who prefer to work with open marine microfossils). The Eocene/Oligocene boundary is defined at the extinction level of Foraminifera of the hantkeninid group. Unfortunately such biota are restricted to tropical to warm temperate climatic belts and do not occur in the North Sea Basin. Therefore we have to rely on other correlation disciplines. The calcareous nannoplankton zone NP21 of Martini's standard zonation is known to straddle the newly defined Eocene/Oligocene boundary and thus cannot be used directly for boundary recognition. A refinement of the nanno-zonation might be possible however. Perhaps there is an event linked to another planktonic microfossil group (such as dinoflagellates) which could prove helpful in correlating the Massignano level with the North Sea Basin. It may be expected, that the entire Latdorfian or at least part of, will then turn out to be part of the Rupelian in its new concept.

In a discussion on the subdivision of the Oligocene, various colleagues expressed their preference for a threefold subdivision, viz. Latdorfian, Rupelian and Chattian. However, this point of view, is overruled by the Washington acceptance of a twofold subdivision of the Rupelian, a decision, influenced by an earlier RCNPS declaration in favour of a twofold subdivision, as an end result of a questionnaire. Therefore, a reconsideration of this decision does not seem appropriate.

As the designation of a lower boundary for the Rupelian is not necessary, and that of an upper

boundary superfluous, the question whether or not to maintain the Working Group Rupelian was raised.

All participants agreed that much work has still to be done. The Rupelian being a global stage, it might be expected that stratigraphers all over the world will search for data on the Rupelian in its type area. Therefore it was decided to continue preparations for the proposal of a unit-stratotype. This will be done in a multidisciplinary approach of at least three selected sections, i.e., apart from the proposed type section, those of St. Niklaas and Kruikebe, together representing the entire Rupelian sediment sequence outcropping in the type area. Several Working Group members promised to contribute in this project and plans were made to invite other specialists to co-operate. For this purpose a complete set of samples of the three selected sections was taken by the Leuven colleagues, assisted by T. Moorkens.

5. FURTHER ACTIVITIES

The results of this multidisciplinary research should form the base of a proposal for a formal unit-stratotype section available for discussion already in a year's time. It is hoped that the final proposal will be discussed at the next biannual meeting of RCNNS and RCNPS in 1993.

A correlation of the Rupelian lower boundary in the North Sea Basin was considered a second-order issue and of importance only after designation of the unit-stratotype. This has, however, not been completely worked out yet. It cannot be expected that the research project on the three sections will yield much useful information on the position of the Rupelian lower boundary and therefore it might prove necessary to work simultaneously on that item. For instance, a correlation might prove possible once a refinement of the nanno-zonation has been established, or by a study of dinoflagellate floras, present in the Rupelian type area and possibly present in the Massignano section. A magnetostratigraphic interpretation of the Massignano section is available; unfortunately some sampled Rupelian sections in the North Sea Basin showed negative results. It is hoped that the sequence stratigraphical and sedimentological study undertaken by N. Vandenberghe (1978, 1988) and E. Van Echelpoel (1990) can shed new light on this problem.

Then, once we know more or less exactly where the Rupelian lower boundary must be drawn in our area, do we discard the name Latdorffian? In itself, this is not improbable, as in the past various other well-known stage names have disappeared, e.g. Bolderian, or Anversian. This, however, would be a regressive step, since a discrimination between Latdorffian and Rupelian has often been demonstrated to be useful in our area. These are problems, that can only be solved once we know the position of the Rupelian lower boundary. Therefore it is my view that this correlation should receive some degree of priority and should at least be made into a project of the same rank as the designation of a unit-stratotype.

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