

beiden Seiten des Pielachtales, auf denen solche Reste bisher nicht gefunden wurden, könnten niveaueutsprechende Felsterrassen sein. Über das Alter dieser Terras-

sen können solange keine Angaben gemacht werden, als sie nicht mit entsprechenden Hochterrassenresten im Molassevorland korreliert sind.

Blatt 57 Neulengbach

Bericht 1995 über biostratigraphische Untersuchungen auf Blatt 57 Neulengbach

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The samples analysed in this report were collected by Dr. Wolfgang SCHNABEL and Dr. Zdenek STRANIK during the year 1995 in the area of the map sheet ÖK 57 Neulengbach. All works were done within the framework of the geological mapping of the Wienerwald-Flysch organized by the Geologische Bundesanstalt Wien.

The majority of the rock samples (mostly silty claystones) were strongly lithified, which demanded the two-step mechanic desintegration. The samples had to be, after destruction using hydraulic press and boiling with washing soda, finally mechanically desintegrated at the sieve using rubber stopper. That influences in some cases unfavourably the preservation of microfossils.

Biostratigraphic interpretations are based on known stratigraphical ranges of agglutinated foraminifera and zones of GEROCH & NOWAK (1984) and BUBÍK (1995a). Planctonic foraminifera were stratigraphically evaluated using the zonal charts of CARON (1995) and BLOW (1979).

More than 139 species of agglutinated foraminifera (68 of them till now not referred in published papers from the Rhenodanubian Flysch) and several calcareous benthic and planktonic species were determined in the studied samples. Cores of radiolarians and diatoms, fish teeth, shark scales, sponge spicules and echinoid spines were present in some samples. If possible the representatives of other fossil groups were determined (radiolarians, diatoms).

In addition to the local zonation based on the agglutinated foraminifera established in the report from the field season 1994 (BUBÍK, 1995 MS), three new zones improve the biostratigraphic subdivision of the Laab nappe. The *Caudammina gigantea* Zone and *Rzehakina fissistomata* Zones enable to divide the earlier established *Rzehakina epigona* Zone. The newly evidenced Lower Eocene sediments can be assigned to the *Reophax nodulosus* Zone.

Agglutinated Foraminifera Zones

- 1) *Plectrocurvoides alternans* Zone
(sensu GEROCH and NOWAK, 1984)
Stratigraphic range: Late Albian–Cenomanian.
- 2) *Uvigerinammina jankoi* Zone
(sensu GEROCH and NOWAK, 1984),
resp. U. ex gr. jankoi Zone (BUBÍK, 1995a)
Stratigraphic range: Turonian–Early Campanian.
- 3) *Rzehakina epigona* Zone (BUBÍK, 1995 MS)
Definition: Lower boundary is given by the first occurrence of *Rzehakina epigona* and *Glomospirella grzybowskii*, upper boundary by the last occurrence of *Rzehakina epigona*, *Caudammina excelsa*, *C. ovulum* and *Glomospirella grzybowskii*. The zone is also characterized by the occurrence

of *Remesella varians*, *Spiroplectammina dentata*, *Recurvoides pseudosymmetricus* etc. The zone can be subdivided into two (sub-)zones in some cases: *Caudammina gigantea* Zone and *Rzehakina fissistomata* Zone.

Stratigraphic range: Campanian–Paleocene.

- 3a) *Caudammina gigantea* Zone (= *Hormosina gigantea* Zone sensu GEROCH and NOWAK, 1984)
Definition: Interval from the first occurrence of *Caudammina gigantea* (GEROCH) to the first occurrence of *Rzehakina fissistomata* (GRZYBOWSKI).
Stratigraphic range: Campanian–Maastrichtian.
Sample: 57/2438.

- 3b) *Rzehakina fissistomata* Zone (sensu GEROCH and NOWAK, 1984, modified by BUBÍK, 1995a)
Definition: The lower boundary is given by the first occurrence of *Rzehakina fissistomata* (GRZYBOWSKI), the upper boundary coincides with the upper boundary of the *Rzehakina epigona* Zone defined above.
Stratigraphic range: Paleocene.
Sample: 57/2426.

- 4) *Reophax nodulosus* Zone (sensu BUBÍK, 1995a)
Definition: The lower boundary is defined by the first occurrence of *Reophax nodulosus* BRADY as well as rare *Eratidus* sp. (sensu BUBÍK, 1995b). It is not possible to study the upper boundary of the zone, because the younger sediments are missing.
Stratigraphic range: Lower Eocene.
Sample: St125.

An extensive documentation of samples and a list of identified foraminifera has been handed over to the archive of the Geologische Bundesanstalt.

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The samples analysed in this report were collected by Dr. Wolfgang SCHNABEL and Dr. Zdenek STRANIK during the year 1995 in the area of the map sheet ÖK 57 Neulengbach. All works were done within the framework of the geological mapping of the Wienerwald flysch organized by the Geologische Bundesanstalt Wien.

Rock samples from the Laab nappe (mostly silty claystones to clayey shales) were strongly lithified. The samples had to be, after destruction using hydraulic press and boiling with washing soda, finally mechanically desintegrated at the sieve using rubber stopper. Part of the samples collected in the Hauptklippenzone and Greifenstein nappe are represented by clays and desintegration was easy, using washing soda only.

Biostratigraphic interpretations are based on known stratigraphical ranges of agglutinated foraminifera and

zones of GEROCH and NOWAK (1984) and BUBIK (1995a, 1995 MS). Planktonic foraminifera were stratigraphically evaluated using the zonal charts of ROBASZYNSKI et al. (1984), CARON (1995) and BLOW (1979). The *Ammobaculites problematicus* Zone of Cenomanian–?Turonian age was for the first time proved in the abyssal red-brown claystones of the Laab nappe.

Biofacies study was restricted to samples from hemipelagites and focussed on red and variegated sediments which are lithologically homogenous but biofacially heterogeneous. The biofacies sensu BUBIK (1996) were used. Four biofacies have been identified within the Laab nappe and Hauptklippenzone:

***Rhabdammina-Rzehakina* Biofacies**

Characteristic biofacies of hemipelagic intercalations in flysch sediments deposited in turbidite fans below the CCD (mostly in the area of continental rise).

***Recurvoides-Paratrochamminoides* Biofacies**

Interpreted as the biofacies of abyssal plain with fine detrital input (influence of distal clay-silty turbidites). The *Rhabdammina-Rzehakina* biofacies was probably situated mostly in abyssal paleodepths. The *Recurvoides-Paratrochamminoides* biofacies nevertheless differs by its extreme distality in terms of turbidite sedimentology. Oligotrophy and decreased detritus influx connected with distality influenced strongly the benthic biota.

***Marssonella* Biofacies**

Characteristic biofacies of slope marls with mixed calcareous agglutinated benthic assemblages deposited in the bathyal zone above the CCD.

***Glomospira-Rhizammina* Biofacies**

Biofacies characterized by low diversity agglutinated assemblages with abundant "*Rhizammina*" sp. and ammonitidae interpreted as a result of low-oxygen conditions.

Local agglutinated foraminifera zones used in this report are:

- *Bulbobaculites problematicus* Zone (= *Ammobaculites problematicus* Zone sensu GEROCH and NOWAK, 1984): Late Cenomanian–Early Turonian.
- *Uvigerinammina jankoi* Zone sensu GEROCH and NOWAK, 1984, respectively *U. ex gr. jankoi* Zone (BUBIK, 1995a): Turonian–Early Campanian.
- *Rzehakina epigona* Zone (BUBIK, 1995 MS): Campanian–Paleocene.
 - a) *Caudammina gigantea* Zone (= *Hormosina gigantea* Zone sensu GEROCH and NOWAK, 1984): Campanian–Maastrichtian
 - b) *Rzehakina fissistomata* Zone (sensu GEROCH and NOWAK, 1984, modified by BUBIK, 1995a): Paleocene.
- *Reophax nodulosus* Zone (sensu BUBIK, 1995a), Lower Eocene.

Results

Lower Cretaceous of the Hauptklippenzone

The Lower Cretaceous is represented by light-grey marls and red-brown silicified claystones from point St174. Light-grey marls with mass occurrence of calcified radiolarians and mixed agglutinated-calcareous foraminifera assemblage of the *Marssonella* biofacies show some similarities to the Tlumačov Marl of the Rača unit in Moravia. The foraminifers allow only coarse stratigraphic determination in the Valanginian–Aptian interval. Red-brown claystones contain unusual biofacies with frequent

radiolarians, a poor agglutinated *Rhizammina-Glomospira* assemblage and poor calcareous benthos. Such fossil content suggests slow oxygen conditions, although it contrasts with the red brown color of sediment. Red-brown claystones contain foraminifera without stratigraphic value, nevertheless the Lower Cretaceous is probable.

Formation of Red Clays (Hauptklippenzone)

These Sediments are mostly represented by red-brown, grey and green-grey banded or streaked non-calcareous clays. In contrast with the red-brown claystones of the Laab nappe, lithification is very low or absent. The fossil content consists usually of agglutinated foraminifera dominated by *Nothia* sp. Such assemblages indicate the *Rhabdammina-Rzehakina* biofacies. The status of accessory calcareous planktonic and benthic taxa within this non-calcareous clay is questionable and could represent both re-deposition and field-contamination. The study samples can be subdivided into three stratigraphic levels:

- 1) Turonian–Campanian (*Uvigerinammina jankoi* Zone, respectively *U. ex gr. praejankoi* Zone). The presence of *Uvigerinammina praejankoi* and *Thalmannammina neocomiensis* indicates Turonian age (samples St 172, St175, St192, St195).
- 2) Campanian–Maastrichtian (*Caudammina gigantea* Zone). The benthic fauna consists of a mixture of older taxa of the *Uvigerinammina jankoi* Zone (*Uvigerinammina cf. praejankoi*, *U. jankoi*, *Pseudobolivina munda*, *Trochammina gyroidinaeformis*) and marker species of the *Caudammina gigantea* Zone (*Caudammina gigantea*, *Glomospira diffundens*, etc.). Sparsely calcareous benthos occurs. The older fauna belongs to the *Recurvoides-Paratrochamminoides* biofacies, the younger one to the *Rhabdammina-Rzehakina* biofacies. It is not easy to recognize, whether the older fauna is resedimented or tectonically mixed (sheared) with the younger one. Resedimentation of the *Recurvoides-Paratrochamminoides* biofacies faunal elements to the more proximal (?shallower) *Rhabdammina-Rzehakina* biofacies could be explained by shearing of abyssal clays in an accretionary prism (samples: St216, St220).
- 3) Paleocene (?Eocene). The fossil content consists of a mixture of resedimented Early Cretaceous–Cenomanian radiolaria and foraminifera, agglutinated species of the *Uvigerinammina jankoi* Zone (*Recurvoides-Paratrochamminoides* biofacies) and *Caudammina gigantea* Zone (*Rhabdammina-Rzehakina* biofacies) with rare elements of Paleocene both planktonic (*Eoglobinerina cf. eobulloides*, *Chiloguembelina cf. wilcoxensis*) and benthic ("*Trochammina*" sp. 4 and "*Arenobulimina*" cf. *gerochi*). The last mentioned species may indicate even Eocene age (samples St173, St194).

Turonian Green-Grey Calcareous Claystones (Hauptklippenzone)

Such sediments are represented by one sample (St186). Thanatocoenosis of foraminifera contains rare calcareous and predominantly agglutinated benthos with *Uvigerinammina praejankoi*, *U. jankoi* etc. and plankton with *Marginotruncana coronata*, *M. pseudolinneiana* etc. The lithostratigraphic position of such an isolated occurrence is unknown. According to the benthic foraminifera the claystones represent rather muddy turbidite claystones deposited under the CCD than slope sediment of the *Marssonella* biofacies.

Abyssal Red and Variegated Claystones

The red and variegated claystones with high-diversity agglutinated assemblages of the *Recurvoides-Paratrochamminoides* biofacies were found within the Hauptklippenzone

and Laab nappe. This claystone represents the most distal (and ?deepest) sediments in the studied area. The assemblages contain often the redeposited elements of the *Rhabdammina-Rzehakina* biofacies (abundant *Nothia* sp.) and rarely of the *Marssonella* biofacies (*Gaudryina carinata*, *Spiroplectammina carinata*). Three biostratigraphic zones based on agglutinated foraminifers have been distinguished:

- 1) *Bulbobaculites problematicus* Zone (Late Cenomanian–Early Turonian).
Sample 3040-1.
- 2) *Uvigerinammina jankoi* Zone (Turonian–Early Campanian). The presence of *Pseudobolivina variabilis* indicates Turonian age.
Samples St152, St221.
- 3) *Caudammina gigantea* Zone (Campanian–Maastrichtian).
Samples 3032-1, 3050.

Kaumberg Formation

Claystones of the Kaumberg Formation are red-brown, green-grey-streaked, green-grey, dark spotted and even (exceptionally) black-grey. They are often silty and more lithified (up to clayey shales). Agglutinated assemblages are predominantly of the *Rhabdammina-Rzehakina* biofacies, only one sample of black-grey claystone (sample 3032-2) can be assigned to the *Glomospira-Rhizammina* biofacies (?Cenomanian/Turonian boundary event). Three stratigraphic levels were distinguished:

- 1) Cenomanian: Poor assemblages of ?*Rhabdammina-Rzehakina* biofacies with *Haplophragmoides falcato suturalis*, *Plectorecurvoides irregularis*, "*Gaudryina filiformis*" etc. and without *Uvigerinammina* representatives.
Samples 2991, 2997.
- 2) *Uvigerinammina jankoi* Zone (resp. *U. ex gr. jankoi* Zone).
Samples St154, St155, St164, St167, St207, St212, St254, St256.
- 3) *Caudammina gigantea* Zone with *Uvigerinammina cf. jankoi* (Lower Campanian).
Sample: St230.

Laab Formation

The samples taken mostly from turbidite silty claystones (Te interval) contain usually poor, predominantly agglutinated fauna and less frequent calcareous benthos and plankton (redeposited from bathyal *Marssonella* biofacies) usually stratigraphically inconclusive. Autochthonous assemblages can be assigned to the *Rhabdammina-Rzehakina* biofacies. Two zones based on agglutinated foraminifera have been distinguished:

- 1) *Rzehakina epigona* Zone (Campanian–Paleocene) characterized by the presence of *R. epigona*, *Glomospirella grzybowskii*, etc.
Samples: St251, St253, 3068.
In some cases the allochthonous (redeposited) plankton with *Subbotina velascoensis*, *S. triangularis* and *S. triloculoides* allowed more accurate age determination to the Late Paleocene–basal Eocene (sample 3002-1).
- 2) *Reophax nodulosus* Zone (Early Eocene). Sample St205B. The same age indicates allochthonous plankton with *Pseudohastigerina wilcoxoensis* and *Subbotina triangularis* in the sample 3061.

Greifenstein Nappe (Aitlengbach Formation)

The turbidite claystones of the Aitlengbach Formation usually contains, besides agglutinated foraminifera redeposited calcareous benthos and plankton, helpful for age determination. Redeposition from the shelf area (bivalves, echinoids) were rarely found. Nevertheless a part of samples remains stratigraphically inconclusive or even barren. Benthic assemblages from the hemipelagites are from the

Rhabdammina-Rzehakina biofacies. Three stratigraphic levels have been distinguished:

- 1) Campanian–Maastrichtian (autochthonous assemblage of the *Rzehakina epigona* Zone with Late Senonian globotruncanids).
Sample St210A.
- 2) Lower Paleocene (mixture of Cretaceous to Paleogene redeposited plankton and benthos with *Globoconusa daubjergensis*, *Eoglobigerina spiralis*, etc.).
Sample St171.
- 3) Upper Paleocene (with *Muricoglobigerina aquiensis*).
Sample 2203.

Further Documentation can be found in the "Archiv der Geologischen Bundesanstalt".

Bericht 1994–1995 über geologische Aufnahmen in der Flyschzone des Wienerwaldes (Laaber Decke) auf Blatt 57 Neulengbach

WOLFGANG SCHNABEL

Im Jahre 1994 wurde mit der Neuaufnahme der Laaber Decke begonnen und zwar im Gebiet der Kaumberger Schichten westlich des Schwechattales und deren Umrahmung durch die Laaber Schichten. Die Arbeiten wurden 1995 fortgesetzt und erfolgen in enger Kontaktnahme mit Zd. STRANIK, wobei dieser das Gebiet östlich des Schwechattales bearbeitet.

Die letzte zusammenhängende geologische Karte dieses Gebietes, von der alle seither erschienenen Darstellungen abgeleitet werden, ist die von G. GÖTZINGER (Geologische Karte der Umgebung von Wien 1 : 75.000, 1952). Es zeigte sich, daß sie auch heute noch eine gute Grundlage für die Neubearbeitung darstellt, da darauf die Erstreckung der Kaumberger Schichten und deren Abgrenzung zu den Laaber Schichten größtenteils den Gegebenheiten entspricht (Unterschiede gibt es in der Gegend des Gerichtsberges; s.u.). Die Forschungen von S. PREY (1961–1979) beschränkten sich auf punktuelle Profilaufnahmen zu stratigraphischen Zwecken, ebenso die Arbeiten von P. FAUPL (N. Jb. Geol. Paläont. Mh., 1975 und 1976) die die Fazies und Paläogeographie der Kaumberger Schichten näher beleuchten.

Im folgenden wird getrachtet, die Benennung der „Schichten“, soweit sie Formationen im Sinne der modernen stratigraphischen Nomenklatur entsprechen, mit der Bezeichnung „Formation“ zu versehen. Das ist bei den Kaumberger Schichten einwandfrei gegeben, die ab nun „Kaumberg-Formation“ (Kaumberg-Fm.) heißen. Bei den Laaber Schichten mit ihrer Unterteilung in die Hois- und Agsbachschichten ist die Stellung in der neuen Formationshierarchie vorerst nicht so klar, um eine Kontinuität zu gewährleisten, werden sie hier als „Laab-Formation“ (Laab-Fm.) bezeichnet, worunter die Hois- und Agsbachschichten vorerst noch mit ihren alten Bezeichnungen fallen.

Der im Berichtszeitraum kartierte Bereich umfaßt das Gebiet der Kaumberg-Fm. vom Schwechattal gegen W bis über das Tal des Coronabaches hinaus und deren Nordrand mit der Laab-Fm. bis zum Höhenrücken Lammerauerg – Eigerin – Großer Hollerberg – Hirschenstein über das Coronatal bis zum Steinriegel. Weitere Begehungen erfolgten im Gebiet des Gerichtsberges (Übergang vom Triesting- ins Gölsental) bis zur Blattgrenze.