Interessante Ergebnisse brachte die zusammenfassende Auswertung der Paläoströmungsdaten, die aufgrund der neu gesammelten Daten nunmehr getrennt für den Bereich der Atzbacher Sande und der Kletzenmarkt-Glaukonitsand-Formation vorgenommen wurde. Die gemittelte Haupttransportrichtung (67 % der Messungen, n = 159) in den Atzbacher Sanden liegt bei 79°, also ENE, das Mittel der stärker variierenden Nebentransportrichtung (33 % der Meßwerte) bei 288°, also WNW. Dies entspricht dem Paläoströmungsmuster, das für die Atzbacher Sande auch weiter im SW auf Blatt 47 und 48 bekannt ist. In der Kletzenmarkt-Glaukonitsand-Formation ändern sich die Verhältnisse zwar nicht grundsätzlich aber durchaus deutlich: die Haupttransportrichtung (57 % der Meßwerte, n = 66) liegt bei 103° (ESE), die Nebentransportrichtung (43 % der Meßwerte) bei 252° (WSW). Im Vergleich zu den Atzbacher Sanden fällt die geringere Akzentuierung in Haupt- und Nebentransportrichtung auf, sowie der Wechsel beider Transportrichtungen von der Nord- auf die Südseite der Diagrammrose. Die relative Nähe des Massivrandes wirkte hier also bereits deutlich ablenkend auf die Gezeitenströmungen des Molassemeeres. Die Ableitung des Grobkornanteils des Sedimentmaterials der Kletzenmarkt-Glaukonitsand-Formation vom N' Massivrand erfährt durch diese Daten eine Bestätigung.

Eine Betrachtung der Lagerungsverhältnisse der beteiligten Formationen in dem gesamten Raum zwischen Lambach-Gunskirchen im S und der N' Blattgrenze ergibt kein einheitliches Bild. Die Oberkante des Robulusschliers s.str. fällt zwischen Lambach und Grieskirchen, also in N–S-Richtung, von 420 m SH auf 340 m SH ab. Dies ergibt rechnerisch einen Einfallswinkel von 0,3°. Die Atzbacher Sande, die den Robulusschlier s.str. im S' Anteil des betrachteten Raumes überlagern, fallen parallel zum Trauntal, also gegen NE, um 20 m auf ca. 400 m SH ab. Dieser Trend eines E-gerichteten Einfallens setzt sich übrigens bis in den Bereich der W' Verbreitungsgrenze der Atzbacher Sande (Raum Zipf, Bl. 47 Ried) fort, wo deren Unterkante bei ca. 490 m SH liegt! Anders liegen die Verhältnisse N' vom Innbachtal, wo die Kletzenmarkt-Glaukonitsand-Formation das Hangende bildet. Deren Unterkante steigt von 340 m SH bei Grieskirchen gegen E, also parallel zur Trattnach, auf 360 m SH an und zeigt demnach ein W-Einfallen. Bezieht man den von R. ROETZEL kartierten Raum N' Schallerbach in die Überlegungen mit ein, so verstärkt sich dieser Trend noch: hier liegt nämlich die Basis des Glaukonitsandstein-führenden Sedimentpakets schon bei 380 m SH. Noch größere Ungereimtheiten ergeben sich bei einem Vergleich der Unterkanten des Ottnanger Schliers N' der Trattnach, nämlich 360 m SH und S' der Trattnach, 410 m SH. Es ergibt sich also ein Sprung um ca. 50 Meter. In beiden Bereichen ist allerdings ein W-Einfallen, entsprechend der liegenden Kletzenmarkt-Glaukonitsand-Formation, zu erkennen.

Eine Klärung der Frage, ob diese Lagerungsverhältnisse im jeweiligen Fall vor allem tektonisch bedingt sind, oder ob eine Heterochronie der Formationsgrenzen als Ursache anzusehen ist oder primäre topographische Gegebenheiten des ehemaligen Meeresraumes (z.B. ein Relief des ehemaligen Meeresbodens durch räumlich begrenzte, erosive und akkumulative Ereignisse) eine wichtige Rolle spielen, scheint bei den derzeitigen Möglichkeiten der chronostratigraphischen Auflösung nicht möglich zu sein. Auf seismischem Weg gewonnene, sequenzstratigraphische Zeitflächen wären hier wohl das einzig erfolgversprechende Instrument.

Blatt 55 Obergrafendorf

Bericht 1993 über geologische Aufnahmen in der Molassezone auf Blatt 55 Obergrafendorf

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In the year 1993, the geological mapping of Quaternary and Tertiary sediments on the map sheet 55 Obergrafendorf was concentrated to the field distribution of individual sediment types and delimitation of lithostratigraphic and tectonic units defined in the Alpine foredeep.

From the stratigraphic point of view, we have determined various sedimentary complexes of Holocene, Pleistocene, Miocene and Oligocene ages.

The mapping works on this sheet were quite difficult, due to very bad outcrop conditions and poor biostratigraphic data necessary for the stratigraphic recognition of sediments with similar lithologies. Large part of the studied area is covered by Quaternary alluvial, proluvial and deluvial sediments, the detailed division of which needs further field investigation. Reliable stratigraphic determination of Oligo-Miocene, mainly clayey-silty schlier sequences requires re-evaluation of already analysed samples. These contain relatively poor, badly preserved assemblages often with redeposited microfossils, hence a new micropaleontological investigation of repeated series of samples is necessary.

Relevant results of micropaleontological study together with a structural research, determined by the lack of measureable exposures, however, would enable us to work out a more precise stratigraphic and tectonic division of the Molasse Zone sediments in the East Alpine foredeep.

Holocene

In the studied area, the Holocene sediments are represented by fluvial and flood-plain deposits of the recent rivers and brooks. They are predominantly loamy-clayey and sandy-loamy, only sediments of the Danube and the Pielach rivers and partly also of the Kremnitzbach brook are gravelly and sandy-gravelly.

The most widespread Holocene deposits of the Pielach river are represented by younger parts of the recent valley filling. They are mostly gravelly and sandy. In the area between Grossierning and Markersdorf, the gravelly-sandy alluvial deposits are covered by loamy-clayey sediments of flood-plains. The Pielach Lowland between Haunoldstein and Obergrafendorf exhibits the frequently loamy,

clayey tributaries Sierning and Kremnitzbach, as well as the smaller tributaries Krickenbach, Halterleitenbach, Weitendorferbach, Zenobach, Kirchenwaldbach and Roggenbach. The Danube riverbed and river plain near Melk are covered by gravels. A deltaic alluvial cone of the Pielach was formed at its confluence with the Holocene valley of the Danube near Pielamund.

Proluvial Holocene deposits are rimming foots of elevated areas as alluvial and wash-out cones of brooks. They are represented by loams, subordinately by sands and gravels.

The Würm to Holocene loams and loess loams form deluvial and colluvial sediments confined to flat depressions, predominantly on the loess and clayey-silty substratum. Deluvial loams with rock fragments rim foots of hills built up of crystalline rocks of the Bohemian Massif in the northern part of the map sheet and cover slopes of elevated frontal parts of the Flysch Zone nappes along the southern margin of the Molasse Zone.

Pleistocene

The Pleistocene eolic sediments represented by silty loams are the most widespread surface rock type in the Molasse Zone on the sheet 55 Obergrafendorf. Loess sediments are of yellow-brown, light brown and rusty-brown colours and contain frequent concretions of pedogene carbonates. Tiny tests of steppe gastropods are also commonly occurring. Part of the above mentioned loess loams derived from eolic loess may also be ranged to the latest Pleistocene.

Erosional remnants of the Pielach and Danube rivers Pleistocene terraces are preserved in several areas. A few meters above the present level of the Pielach river, there are gravel accumulations of lower terraces of probably Middle Pleistocene age near Loosdorf, Albrechtsberg and between Haindorf and Pottschollach. The high terrace of the Pielach mentioned by FUCHS (1972) from the area between the villages Groß-Sierning, Marktfeld and Wurtendorf may be identified, due to the shortage of pebble material in the field, only based on the erosional morphological step.

Sporadic presence of pebbles at the altitude 280 m above sea level in the area of Wöllendorf and Loipersdorf likely represents rests of older gravel cones of the Pielach (FUCHS, 1972). However, further field mapping is necessary for their more precise delimitation.

The gravel terrace ascertained on the left bank of the Danube approximately 25 m above the actual Danube level is correlatable with the old Pleistocene terrace from Lehen (see FUCHS, 1964).

The gravel terrace remnants 55 m above the present Danube level north of Hub village correlate to gravels of the terrace south of Traismauer of the earliest Pleistocene age (FUCHS, 1970). Relics of terraces of similar composition and in the same altitude 290 m above sea level are present in the area NE of Pielachberg and near Ursprung.

On the Sandkogel hill NW of Anzendorf, in the altitude of 310 m, a gravel accumulation has been mapped which most probably corresponds to the Danube terrace from Rosenfeld of the earliest Pleistocene age (FINK, 1961).

The uppermost terrace mapped in the area of investigation is represented by gravels from the area near Gerolding in the altitude 390 m a.s.l. These are known from the literature (FUCHS, 1972) as the Danube terrace north of Mauer of the Late Pliocene (?) age.

Miocene

The Ottnangian Robulus Schlier is the youngest Miocene rock type distinguished in the mapped area near Kühberg, Hürmhof, Bischofstetten and Obergrafendorf. Schlier is composed of grey and yellowish-grey clayey-silty sediments passing to a more sandy development – the Prinzersdorf Sand in the area near Haunoldstein, Doppel and Hofing.

The Schlier sediments containing fragments of Eggenburgian sandstones – "Blockschichten von Mauer" – of the same age are outcropping on the Sierninger Hill near Haunoldstein and in Pfaffing bei Mauer. These sediments are lying subhorizontally in the northern part of the mapped area, in the middle part on the Kühberg Hill they are dipping 10° to the NE and in the southeastern part, on the slopes of the Im Hochholz massif near Obergrafendorf beds are dipping 30–45° to the SE. The Eggenburgian to Ottnangian age of these sediments has been determined on some localities. However, a more detailed stratigraphical division and further sampling is required.

The Kiscellian–Egerian age of microfauna has been found in the silty "Schlier" deposits along the belt starting E of Mank in the SW, going through Kalberhart and Anzenbach in the NE direction to the area of Hürm and Inning. Since the redeposition of this fauna from older sediments cannot be excluded here, the mapped boundary of the Kiscellian–Egerian and the Eggenburgian–Ottnangian Schlier in the area of Kühberg, Arnersdorf, Schlatzendorf and Graben bei Hag is only provisional and should be precised by further micropaleontological analyses.

The Melk Sands of the Egerian age are exposed on uplifted blocks of crystalline basement of the Bohemian Massif. Pale grey and yellowish-grey sands and sandstones occasionally with gravel beds ranged to the lower Melk Sands are to be found in isolated occurrences between Melk and Siegendorf. Yellow-grey fine-grained sands with thin intercalations of clays with Egerian microfauna in the area of Flinsbach represent the upper Melk Sands.

Oligocene

The folded Oligocene (Kiscellian–Egerian) silty schlier beds of pale grey and grey-yellow colours occur in front of the Flysch Zone units south of Obergrafendorf and east of Bischofstetten. In the area of Weghof (alt. 375), they reach dips as much as 80°. They built up most of the Im Hochholz massif here. The sediments are composed of claystones with siltstone and seldom sandstone intercalations. They are exposed also in the Pielach riverbed south of Obergrafendorf, dipping 60–70°. Similar sequences can be found in erosional outcrops near Radlhof and Gasten SE of Obergrafendorf. These sediments are ranged to the Subalpine Molasse Zone.