

## OUTCROPS ALONG THE SONNBERG FOREST ROAD NEAR GUTTARING

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### Topics:

Marlstone and limestone with larger foraminifera and calcareous nannoplankton

### Tectonic unit:

Gurktal nappe complex

### Lithostratigraphic unit:

Sittenberg Formation

### Chronostratigraphic unit:

Ypresian

### Biostratigraphic unit:

calcareous nannoplankton Zone NP12

### Location:

Forest road to the west of Guttaring

### References:

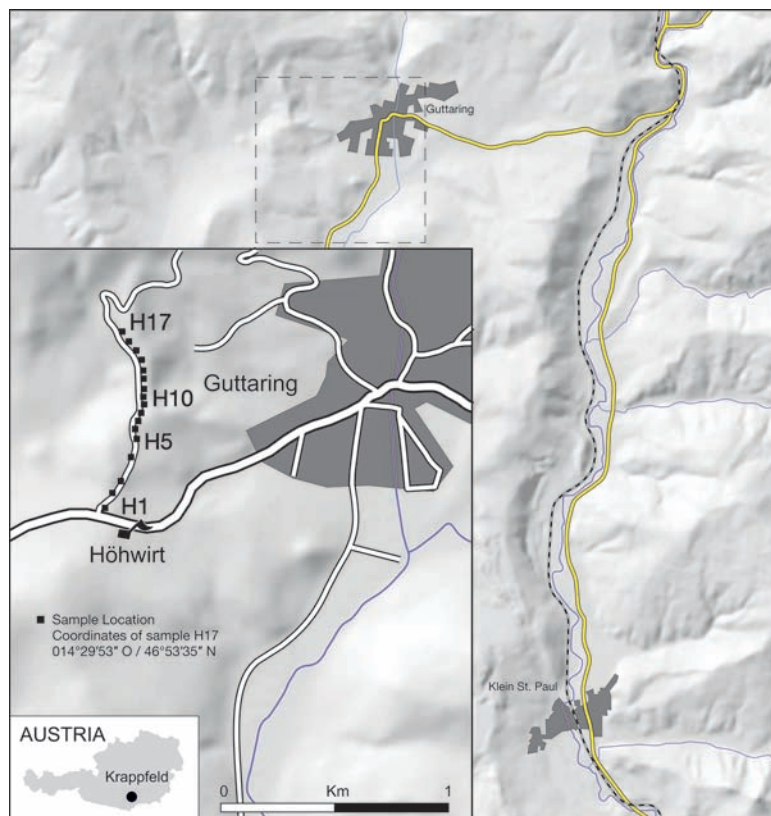
van Hinte 1963; Egger et al., 2009, Wilkens, 1989

Along the first part of the forest road red claystone indicates the presence of the terrestrial Holzer Formation. Actually, in this area coal seams with a thickness of up to almost 2 meters were mined till the 1950s. The Holzer Formation is about 100 m thick in the Sonnberg region, whereas its thickness in the Dobranberg area is only 8 m. The facies of the Eocene in both regions is also different. Predominant marlstone suggests that deposition in the northern Krappfeld (Sonnberg) took place in deeper water than in the southern part (Dobranberg). Few limestone beds consist essentially of nummulites (Fig. A3.32)

Nineteen samples were analyzed for calcareous nannoplankton from the forest road section.

### Figure A3.31 ►

Location of outcrops and sample points along the Sonnberg forest road



The lowermost sample (Höhwirt 1) is barren, whereas the other samples contain moderately to well preserved nannofossils. Regularly occurring nannoplankton taxa are: *Campylosphaera dela* (Bramlette & Sullivan, 1961) Hay & Mohler, 1967, *Coccolithus formosus* (Kamptner, 1963) Wise 1973, *Coccolithus pelagicus* (Wallich, 1877) Schiller, 1930, *Coronocyclus bramlettei* (Hay & Towe, 1962) Bown 2005, *Pontosphaera exilis* (Bramlette & Sullivan, 1961) Romein, 1979, *Pontosphaera pulchra* (Deflandre in Deflandre & Fert, 1954) Romein, 1979, *Pontosphaera versa* (Bramlette & Sullivan, 1961) Sherwood, 1974, *Reticulofenestra minuta* Roth, 1970, *Sphenolithus editus* Perch-Nielsen in Perch-Nielsen et al. 1978, *Sphenolithus moriformis* (Brönnimann &



**Figure A3.32 ▲**

Image of a thin-section from the uppermost limestone bed at the Sonberg section with nummulitids and discocyclinas.

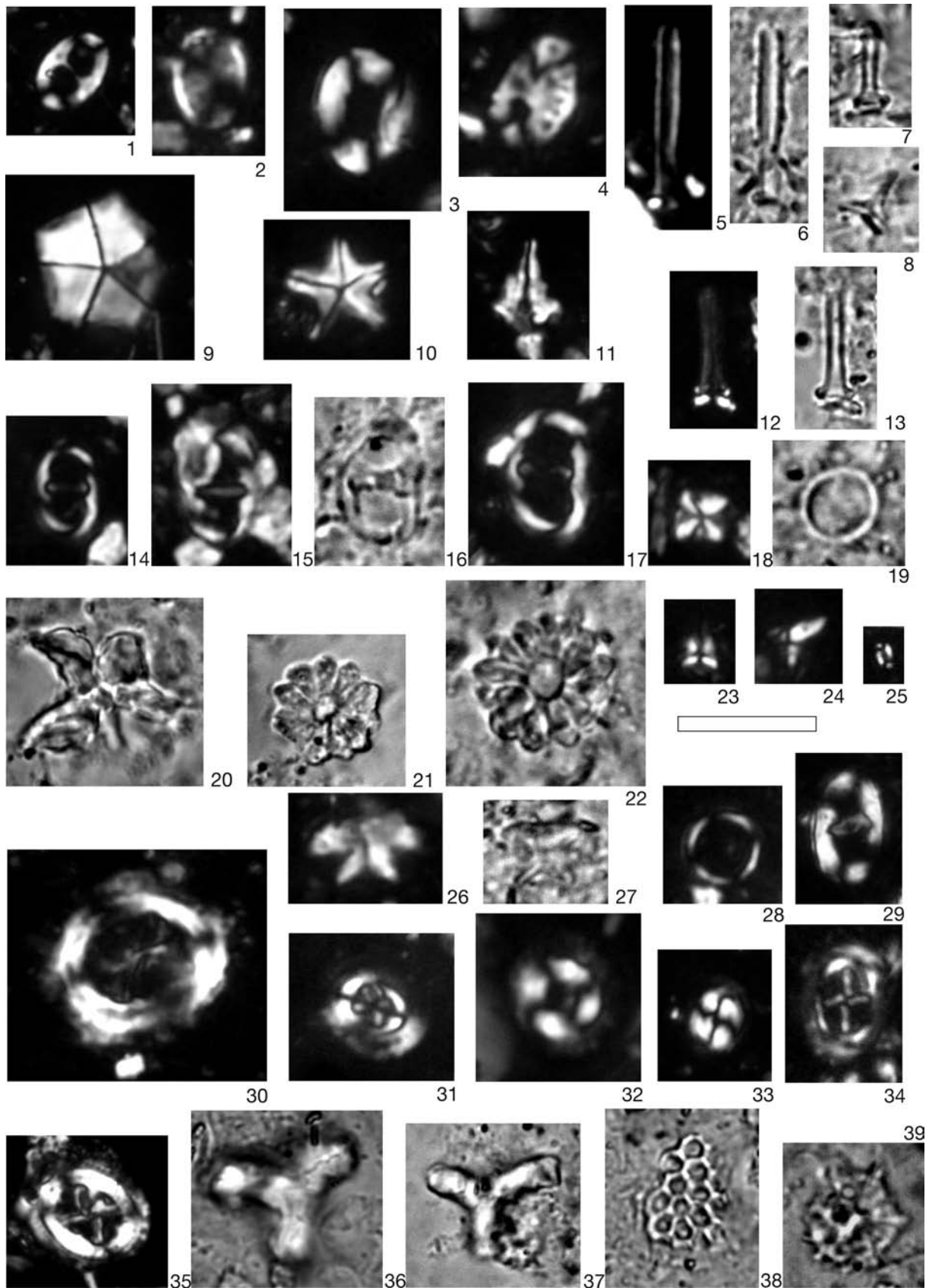
Stradner, 1960) Bramlette & Wilcoxon, 1967, *Sphenolithus radians* Deflandre in Grassé 1952, *Thoracosphaera saxea* Stradner, 1961, *Toweius* spp. and *Zygrhablithus bijugatus* (Deflandre, 1954) Deflandre, 1959. Discoasterids are presented by *Discoaster barbardiensis* Tan, 1927, *D. kuepperi* Stradner, 1959, *D. lodoensis* Bramlette & Riedel, 1954 and scarce *D. salisburgensis* Stradner, 1961. Also occur: *Blackites herculesii* (Stradner, 1969) Bybell & Self-Trail, 1997, *Braarudosphaera bigelowii* (Gran & Braarud, 1935) Deflandre, 1947, *Chiasmolithus consuetus* (Bramlette & Sullivan, 1961) Hay & Mohler, 1967, *Ch. grandis* (Bramlette & Riedel, 1954) Radomski, 1968, *Coronocyclus nitescens* (Kamptner 1963) Bramlette & Wilcoxon 1967, *Lophodolichus reniformis* Bramlette & Sullivan, 1961 etc. Stratigraphical important *Tribrachiatulus orthostylus* Shamrai, 1963 occurs sporadically in the studied samples.

Co-occurrence of *T. orthostylus*, *D. lodoensis* and *D. kuepperi* allow the stratigraphical attribution to nannoplankton Zone NP12 (Martini, 1971) for the whole succession.

The poor planktonic foraminifera assemblage consists predominantly of acarinids: *Subbotina triloculinoides* (Plummer, 1926), *Parasubbotina varianta* (Subbotina, 1953), *Acarinina coalingensis* (Cushman & Hanna, 1922), *Acarinina esnaensis* (LeRoy, 1953), *Acarinina esnehensis* (Nakkady, 1950), *Acarinina pseudotopilensis* Subbotina 1953, *Acarinina soldadoensis* (Brönnimann, 1952), *Acarinina wilcoxensis* (Cushman & Ponton, 1932), *Acarinina* cf. *subsphaerica* (Subbotina, 1947), *Morozovella gracilis* (Bolli, 1957) and *Morozovella marginodentata* (Subbotina, 1953). This indicates a deposition in the Ypresian within the range of planktonic foraminifera Zones P5 to E5.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Samples
barren	GM	GM	GM	P	GM	GM	G	GM	GM	G	GM	G	GM	GM	G	G	preservation
	F	R	F	R	F	F	F	F	R	F	R	F	F	F	C	C	abundance
	x					x		x		x		x			x	x	<i>Blackites herculesii</i>
																x	<i>B. creber</i>
														x			<i>B. vitreus</i>
												x				x	<i>Blackites truncatus</i>
	x					x	x			x		x	x	x	x		<i>Braarudosphaera bigelowii</i>
								x				x					<i>Braarudosphaera</i> sp.
								x					x				<i>Calcidiscus pacificanus</i>
		x	x		x	x	x					x	x	x	x	x	<i>Calcidiscus</i> sp.
	x	x	x		x	x	x	x		x	x	x	x	x	x	x	<i>Campylosphaera dela</i>
		x															<i>Chiasmolithus bidens</i>
							x	x		x		x	x			x	<i>Ch. consuetus</i>
	x					x							x	x	x	x	<i>Ch. grandis</i>
	x		x														<i>Clathrolithus ellipticus</i>
	x	x	x														<i>Coccolithus foraminis</i>
	x	x	x		x	x	x					x	x	x	x	x	<i>C. formosus</i>
								x					x			x	<i>C. latus</i>
	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	<i>C. pelagicus</i>
	x																<i>Coccolithus</i> sp.
		x	x		x	x		x		x	x	x	x	x	x	x	<i>Coronocyclus bramlettei</i>
			x		x	x	x				x		x	x		x	<i>C. nitescens</i>
		x						x					x				<i>Coronocyclus</i> sp.
																x	<i>Cyclicargolithus luminis</i>
			x		x				x		x	x		x	x	x	<i>Discoaster barbardiensis</i>
		x	x		x	x	x	x		x			x	x	x	x	<i>D. kuepperi</i>
	x		x		x					x			x				<i>D. lodoensis</i>
	x																<i>D. salisburgensis</i>
	x			x	x		x						x		x	x	<i>Discoaster</i> sp.
												x				x	<i>Lophodolichus acutus</i>
							x					x			x		<i>L. mochloporus</i>
							x	x									<i>L. nascens</i>
							x		x			x		x	x		<i>L. reniformis</i>
			x												x		<i>Lophodolichus</i> sp.
		x	x	x		x							x	x	x	x	<i>Markalius inversus</i>
													x				<i>Micrantholithus cf. astrum</i>
							x					x				x	<i>Micrantholithus attenuatus</i>
							x						x				<i>M. excelsus</i>
													x			x	<i>Micrantholithus</i> sp.
		x	x	x	x		x		x	x	x	x	x	x	x	x	<i>Micula decussata</i>
	x		x				x	x	x	x		x	x		x	x	<i>Pontosphaera exilis</i>
			x					x				x		x	x		<i>P. plana</i>
					x	x	x			x		x		x			<i>P. pulchra</i>
		x	x			x	x	x		x		x	x		x	x	<i>P. versa</i>
	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		<i>Pontosphaera</i> sp.
	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		<i>Reticulofenestra minuta</i>
			x		x	x	x							x			<i>Sphenolithus acervus</i>
		x	x		x	x	x	x		x	x	x	x	x	x	x	<i>S. editus</i>
	x	x	x		x	x	x	x			x	x	x	x	x	x	<i>S. moriformis</i>
	x	x	x	x	x	x	x					x		x	x	x	<i>S. radians</i>
	x						x			x			x	x			<i>Sphenolithus</i> sp.
	x		x			x	x	x		x			x		x	x	<i>Thoracosphaera heimii</i>
	x	x	x		x	x	x	x		x	x	x	x	x	x	x	<i>Th. saxea</i>
	x		x	x	x	x	x	x	x	x		x	x	x	x	x	<i>Toweius</i> spp.
	x									x						x	<i>Tribrachiatus orthostylus</i>
												x				x	<i>Triquetrorhabdus carinatus</i>
													x				<i>Trochoaster operosus</i>
			x					x		x		x	x		x	x	<i>Umbilicosphaera jordanii</i>
					x												<i>Zygodiscus adamas</i>
x	x		x		x		x	x	x	x	x	x	x	x	x	x	<i>Zygrhablithus bijugatus</i>
		x					x	x	x	x	x	x	x	x	x	x	<i>Zygrhablithus</i> sp.

**Table 1** ◀ Distribution of calcareous nannoplankton in the samples from the Sonnberg section



**Figure A3.33** ◀ = Plate Calcareous nannoplankton from the Sonnberg section

Lower Eocene calcareous nanofossils from the Sonnberg section

- Fig. 1 *Pontosphaera exilis* (Bramlette & Sullivan, 1961) Romein, 1979; Sample Höhwirt 2.  
 Fig. 2 *Pontosphaera versa* (Bramlette & Sullivan, 1961) Sherwood, 1974; Sample Höhwirt 4.  
 Fig. 3 *Pontosphaera rimosa* (Bramlette & Sullivan, 1961) Roth & Thierstein, 1972; Sample Höhwirt 15.  
 Fig. 4 *Pontosphaera pulchra* (Deflandre in Deflandre & Fert, 1954) Romein, 1979; Sample Höhwirt 6.  
 Figs. 5, 6 *Blackites herculesii* (Stradner, 1969) Bybell & Self-Trail, 1997; Sample Höhwirt 7.  
 Fig. 7 *Blackites creber* (Deflandre in Deflandre & Fert, 1954) Sherwood, 1974; Sample Höhwirt 2.  
 Fig. 8 *Blackites vitreus* (Deflandre, 1954) Shafik, 1981; Sample Höhwirt 15.  
 Fig. 9 *Braarudosphaera bigelowii* (Gran & Braarud, 1935) Deflandre, 1947; Sample Höhwirt 2.  
 Fig. 10 *Micrantholithus* cf. *astrum* Bown, 2005; Sample Höhwirt 14.  
 Fig. 11 *Zygrhablithus bijugatus* (Deflandre in Deflandre & Fert, 1954) Deflandre, 1959; Sample Höhwirt 2.  
 Figs. 12, 13 *Blackites truncatus* (Bramlette & Sullivan, 1961) Varol, 1989; Sample Höhwirt 2.  
 Fig. 14 *Lophodolithus acutus* Bukry & Percival 1971; Sample Höhwirt 8.  
 Fig. 15 *Lophodolithus mochlophorus* Deflandre in Deflandre & Fert, 1954; Sample Höhwirt 8.  
 Figs. 16, 17 *Lophodolithus reniformis* Bramlette & Sullivan, 1961; Sample Höhwirt 15.  
 Fig. 18 *Micula decussata* Vekshina 1959; Sample Höhwirt 4.  
 Fig. 19 *Coronocyclus nitescens* (Kamptner 1963) Bramlette & Wilcoxon 1967; Sample Höhwirt 4.  
 Fig. 20 *Discoaster lodoensis* Bramlette & Riedel, 1954; Sample Höhwirt 2.  
 Fig. 21 *Discoaster barbadiensis* Tan, 1927; Sample Höhwirt 17.  
 Fig. 22 *Discoaster salisburgensis* Stradner, 1961; Sample Höhwirt 4.  
 Figs. 23, 24 *Sphenolithus editus* Perch-Nielsen, 1978; Sample Höhwirt 4.  
 Fig. 25 *Reticulofenestra minuta* Roth, 1970; Sample Höhwirt 2.  
 Figs. 26, 27 *Discoaster kuepperi* Stradner, 1959; Sample Höhwirt 4.  
 Fig. 28 *Coronocyclus bramlettei* (Hay & Towe, 1962) Bown 2005; Sample Höhwirt 4.  
 Fig. 29 *Zygodiscus adamas* Bramlette & Sullivan, 1961; Sample Höhwirt 6.  
 Fig. 30 *Chiasmolithus grandis* (Bramlette & Riedel, 1954) Radomski, 1968; Sample Höhwirt 15.  
 Fig. 31 *Chiasmolithus consuetus* (Bramlette & Sullivan, 1961) Hay & Mohler, 1967 Sample Höhwirt 11.  
 Fig. 32 *Coccolithus formosus* (Kamptner, 1963) Wise 1973; Sample Höhwirt 15.  
 Fig. 33 *Coccolithus pelagicus* (Wallich, 1877) Schiller, 1930; Sample Höhwirt 2.  
 Fig. 34 *Campylosphaera dela* (Bramlette & Sullivan, 1961) Hay & Mohler, 1967; Sample Höhwirt 14.  
 Fig. 35 *Chiasmolithus bidens* (Bramlette & Sullivan, 1961) Hay & Mohler, 1967; Sample Höhwirt 3.  
 Figs. 36, 37 *Tribrachiatus orthostylus* Shamrai, 1963; Sample Höhwirt 2 (Fig. 36); Sample 17 (Fig. 37).  
 Fig. 38 *Clathrolithus ellipticus* Deflandre, 1954; Sample Höhwirt 2.  
 Fig. 39 *Trochoaster operosus* (Deflandre, 1954) Martini & Stradner, 1960; Sample Höhwirt 14.