

Biostratigraphy: Smaller foraminifers are represented by a *Globivalvulina-Hemigordius* assemblage similar to the fauna in the adjacent western areas of the Southern Alps (BOECKELMANN, 1988; JENNY-DESHUSSES, 1991). Despite the absence of larger foraminifers, the presence of *Paraglobivalvulina* and *Paradagmarita* indicates Late Permian.

Thickness: The Bellerophon Formation has a measured thickness of 175 m.

Lithostratigraphically higher rank unit: -

Lithostratigraphic subdivision: -

Underlying unit(s): Gröden Formation.

Overlying unit(s): Werfen Formation.

Lateral unit(s): The sections in the Carnic Alps suggest a stronger marine influx than in the Dolomites where bituminous limestones, rauhwackes, marls and gypsum layers dominate. This neritic-lagoonal facies was termed "Batiotic Facies" by ACCORDI (1959). In northern Slovenia similar lithologies like in the Carnic Alps occur which change towards east and west between open marine and lagoonal to evaporitic sequences (Zazar Formation).

Geographic distribution: In Austria the *Bellerophon* Formation occurs mainly in the Naßfeld and Gartnerkofel area.

Remarks: -

Complementary references: -

Karawanken / Karavanke Mountains

Pre-Variscan Sequence

Pre-Variscan sediments of the Karavanke Mountains are more or less constricted to occurrences at the Eisenkappel and Seeberg area (SIEWERT, 1984). Corresponding deeper marine sections are exposed within the Trögen area (MOSHAMMER, 1987). The units of the southern Karavanke Mountains, close to the Slovenian border (RAMOVŠ, 1999), show affinities to the Carnic Alps in their depositional development of mainly neritic to pelagic carbonates. Both regions are located south of the Periadriatic Lineament (BAUER, 1984; BAUER & SCHERMANN, 1984), which implies a similar palaeolatitudinal setting within the southern realm of the Rheic Ocean. The pre-Variscan sediments of the Karavanke Mountains (Text-Fig. 4) crop out within an area of about 25 km in W-E extension and 3.5 km in N-S extension. During the Ordovician mainly shallow marine sediments were deposited. During the Silurian to Middle Devonian times in the Seeberg area only pelagic limestones and deeper marine shales including tuffs occur. The environmental conditions changed to a shallow marine carbonate facies with reef complexes during the Middle and Late

Devonian. However, Mid-Devonian reefs are not as well developed as the Givetian reefs in the Carnic Alps. Subsequently, lower Carboniferous pelagic limestones and flysch sediments became the dominant facies which closely resembles the succession in the Carnic Alps.

Schillkalke / Coquina Limestones

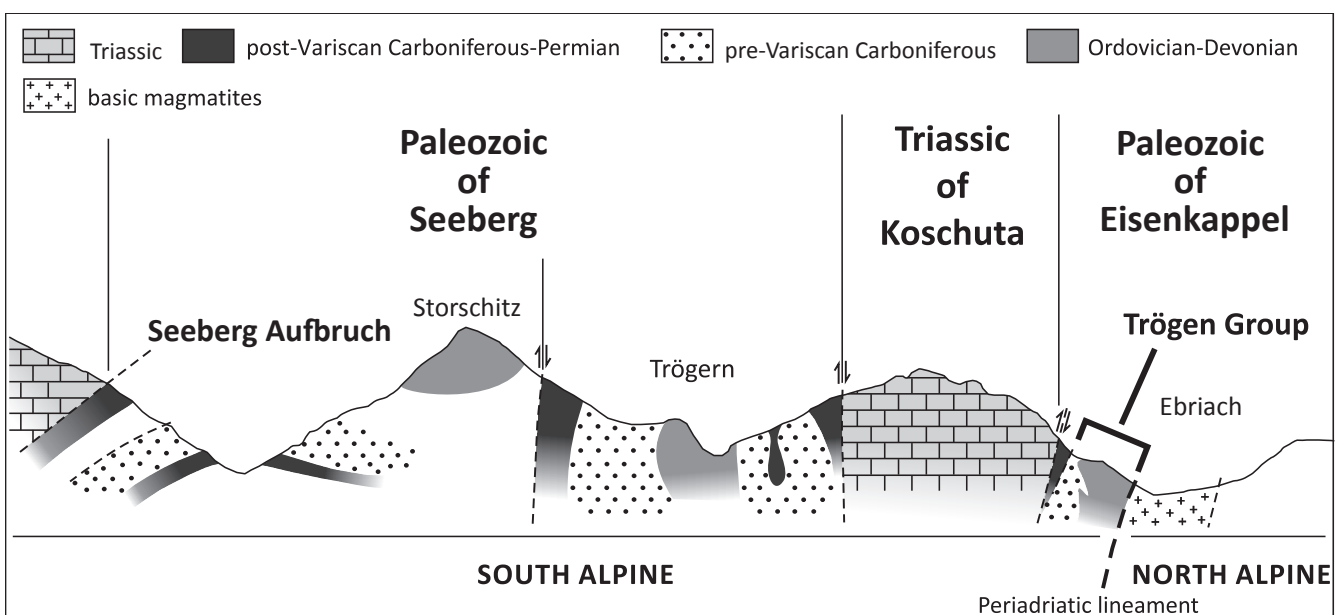
THOMAS J. SUTTNER

Validity: Invalid; described by KUPSCH et al. (1971); biostratigraphy by MOSHAMMER (1989).

Type area: ÖK50-UTM, map sheet 4114 Bad Eisenkappel (ÖK50-BMN, map sheets 212 Vellach, 213 Bad Eisenkappel).

Type section: -

Reference section(s): Feistritzgraben (SCHÖNLAUB, 1979); Trögen Klamm section-group A (MOSHAMMER, 1989, 1990), N 46°28'04" / E 14°30'28".



Text-Fig. 4. Simplified S-N transect through the Eastern Karavanke Mountains.

Derivation of name: After facies characters.

Synonyms: Gebankte Kalke (KUPSCH et al., 1971); schillreiche Kalke (LOESCHKE & ROLSER, 1971: p. 153); Kalk (MOSHAMMER, 1989: Fig. 3).

Lithology: Grey bioclastic flaser limestone.

Fossils: Brachiopods, bryozoans, crinoids, conodonts, ostracods, trilobites.

Origin, facies: Marine limestone, neritic unit.

Chronostratigraphic age: Upper Ordovician (Katian).

Biostratigraphy: *ordovicicus* conodont zone (MOSHAMMER, 1989: p. 625).

Thickness: Approx. 8 m.

Lithostratigraphically higher rank unit: -

Lithostratigraphic subdivision: -

Underlying unit(s): -

Overlying unit(s): "Untere Schichten" (unconformable contact?).

Lateral unit(s): Equivalent units are seen within the Ordovician limestones of the Carnic Alps (MOSHAMMER, 1989).

Geographic distribution: Karavanke Mountains (Eisenkappel and Seeberg area).

Remarks: Following KUPSCH et al. (1971) the south-alpine Paleozoic units of the Eastern Karavanke Mountains (Text-Fig. 4) are separated by the Triassic of the Koschuta (Trögen Klamm). The area to the south is called the Paleozoic of Seeberg (Seeberg Aufbruch sensu SIEWERT, 1984; informal) and the area north if it is known as Paleozoic of Eisenkappel (Trögen Group sensu MOSHAMMER & FLÜGEL, 1987; formalized). In general, the Seeberg Aufbruch ("Window") can be distinguished from the Trögen Group according to differences within the depositional environment that developed regionally (LOESCHKE & ROLSER, 1971; SIEWERT, 1984: p. 41–45; MOSHAMMER, 1990: Fig. 2).

Complementary references: LOESCHKE (1974), JAEGER et al. (1975), SCHÖNLAUB (1979), MOSHAMMER (1987), SCHÖNLAUB & HISTON (1999, 2000), HUBMANN et al. (2003, 2006).

„Untere Schichten“ / “Untere Schichten”

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Validity: Invalid; "Untere Schichten" first mentioned by GAERTNER (1931); additional work on this unit has been done by KUPSCH et al. (1971) and SCHÖNLAUB (1979).

Type area: ÖK50-UTM, map sheet 4114 Bad Eisenkappel (ÖK50-BMN, map sheets 212 Vellach, 213 Bad Eisenkappel).

Type section: -

Reference section(s): Feistritzgraben (SCHÖNLAUB, 1979).

Derivation of name: In the strict sense the name "Untere Schichten" represents a lithostratigraphic term that was introduced by GAERTNER (1931: p. 133).

Synonyms: Tonschiefer-Lydit-Sedimentation (KUPSCH et al., 1971).

Lithology: Blackish shale and sandstones.

Fossils: Brachiopods, graptolites.

Origin, facies: Marine limestone, neritic unit.

Chronostratigraphic age: Upper Ordovician (Hirnantian).

Biostratigraphy: *persculptus* graptolite zone (SCHÖNLAUB, 1979: Fig. 19, p. 45).

Thickness: Approx. 20 m.

Lithostratigraphically higher rank unit: -

Lithostratigraphic subdivision: -

Underlying unit(s): Coquina Limestones (unconformable contact?).

Overlying unit(s): Nodular Limestone (unconformable contact).

Lateral unit(s): Equivalent units are exposed within the Carnic Alps (JAEGER et al., 1975).

Geographic distribution: Karavanke Mountains (Eisenkappel and Seeberg area).

Remarks: -

Complementary references: LOESCHKE (1974), SCHÖNLAUB & HISTON (1999, 2000).

Knollenkalk / Nodular Limestone

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Validity: Invalid; mentioned by ROLSER (1968) and KUPSCH et al. (1971); biostratigraphy of an equivalent, but more distally deposited unit by MOSHAMMER (1989).

Type area: ÖK50-UTM, map sheet 4114 Bad Eisenkappel (ÖK50-BMN, map sheets 212 Vellach, 213 Bad Eisenkappel).

Type section: -

Reference section(s): Section near Gehöft Illitsch south of Finkenstein (SCHÖNLAUB, 1979); Trögen Klamm section-group A (N 46°28'04" / E 14°30'28"), B (N 46°28'00" / E 14°30'24"), E (N 46°28'00" / E 14°30'30") published by MOSHAMMER (1989, 1990).

Derivation of name: After facies characters.

Synonyms: grobspätige Crinoidenkalkfazies (SCHÖNLAUB, 1975); schwarze Kieselschiefer (MOSHAMMER, 1989).

Lithology: Bedded crinoidal limestone, dark siliceous shale.

Fossils: Brachiopods, chitinozoans, conodonts, crinoids, trilobites.

Origin, facies: Marine limestone, pelagic unit.

Chronostratigraphic age: Llandovery.

Biostratigraphy: *stauognathoides* and *celloni* conodont zones (MOSHAMMER, 1989: p. 625).

Thickness: Approx. 15 m.

Lithostratigraphically higher rank unit: -

Lithostratigraphic subdivision: -

Underlying unit(s): "Untere Schichten" (unconformable contact).

Overlying unit(s): Cardiola Formation (unconformable contact).

Lateral unit(s): -

Geographic distribution: Karavanke Mountains (Eisenkappel and Seeberg area).

Remarks: -

Complementary references: LOESCHKE & ROLSER (1971), LOESCHKE (1974), SCHÖNLAUB (1979), TESSENHORN (1983), MOSHAMMER (1987), SCHÖNLAUB & HISTON (1999, 2000).

Austrian Stratigraphic Chart 2004 - Paleozoic

(sedimentary successions)

Austrian Stratigraphic Commission



ERA	SYSTEM / PERIOD / SERIES / EPOCH	STAGE / AGE	DURATION Ma	Global Classification					
				ERATHM / ERA	SYSTEM / PERIOD / SERIES / EPOCH				
PALEOZOIC	PERMIAN	CHANGHSINGIAN / Dorashanian	251	PERMIAN	MID PERMIAN / GUADALUPIAN				
		WUCHIAPINGIAN / Dufallian	255						
		CAPITANIAN	260						
		WORDIAN	265						
		ROADIAN	270						
		PERMIAN	LOWER PERMIAN / CISURALIAN			KUNGURIAN	275		
						ARTINSKIAN	280		
						SAKMARIAN	285		
						ASSELIAN	290		
		PERMIAN	UPPER PERMIAN / CARBONIFEROUS PENNSYLVANIAN			GZHELIAN	295	PERMIAN	LOWER PERMIAN / CISURALIAN
KASIMOVIAN	300								
MOSKOVIAN	305								
BASHKIRIAN	310								
PERMIAN	UPPER PERMIAN / CARBONIFEROUS PENNSYLVANIAN			SERPUKHOVIAN	315				
				VISEAN	320				
					325				
PERMIAN	LOWER PERMIAN / MISSISSIPPIAN			TOURNAISIAN	330	PERMIAN	LOWER PERMIAN / MISSISSIPPIAN		
				335					
				340					
		345							
		350							
		355							
		359.2							
		365							
		370							
		375							
PERMIAN	UPPER DEVONIAN	FAMENNIAN	380	PERMIAN	UPPER DEVONIAN				
		FRASNIAN	385						
		GIVETIAN	390						
		EIFELIAN	395						
		DEVONIAN	LOWER DEVONIAN			EMSIAN	400		
						405			
		PRAGIAN	410						
		LOCHKOVIAN	415						
		PERMIAN	LOWER DEVONIAN			LUDFORDIAN	420	PERMIAN	LOWER DEVONIAN
						GORSTIAN	425		
HOMERIAN	430								
SHEINWOOD	435								
TELYCHIAN	440								
AERONIAN	445								
RHUDDANIAN	450								
HIRNANTIAN	455								
PERMIAN	UPPER ORDOVICIAN			460	PERMIAN	UPPER ORDOVICIAN			
				465					
		470							
		475							
		480							
		485							
		488.3							
		490							
		495							
		500							
PERMIAN	MIDDLE CAMBRIAN	PAIBIAN	505	PERMIAN	MIDDLE CAMBRIAN				
		510							
		515							
		520							
		525							
		530							
		535							
		540							
		542							
		CAMBRIAN	LOWER CAMBRIAN			545	CAMBRIAN	LOWER CAMBRIAN	
550									
555									
560									
565									
570									
575									
580									
585									
590									



- Legend**
- pelagic, offshore, siliciclastic
 - pelagic, nearshore, calcareous
 - shallow marin, neritic
 - terrestrial-continental, coarse clastic
 - terrestrial-continental, fine clastic
 - evaporite (chloride, sulphate)
 - rhyolite, dacite
 - (basaltic) andesite, trachyandesite
 - basalt
 - phyllite
 - mixed-facies (in corresponding colors)
 - coal (may include several seams)
 - ? position/age doubtful/controversial
 - | equal units
 - \ older unit left \ younger unit right
 - hiatus
 - unconformity
 - GSSP
 - Fm. Formation
 - Ls. Limestone

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Cutout and English adaptation of the "Die Stratigraphische Tabelle von Österreich 2004": Geological Survey of Austria

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