

## Unterer Althofenkalk / Lower Althofen Limestone

THOMAS J. SUTTNER

**Validity:** Invalid; first observations within the limestone deposits near Althofen were made by REDLICH (1905) and later described in more detail by HABERFELNER (1936). A description including all criteria necessary for a formal lithostratigraphic characterization is provided by SCHÖNLAUB (1971c: Figs. 1, 2, p. 291).

**Type area:** ÖK50-UTM, map sheet 4102 Althofen (ÖK50-BMN, map sheet 186 Sankt Veit an der Glan).

**Type section:** Ancient quarry of Aich (SCHÖNLAUB, 1971c: Figs. 1, 2, p. 289) some hundred meters NNW of the town Treibach-Althofen (N 46°52'46" / E 14°28'03").

**Reference section(s):** -

**Derivation of name:** After the town Althofen, Carinthia.

**Synonyms:** -

**Lithology:** Platy limestone with chert, dark flaser and laminated limestone with black marly layers and crinoidal debris layers interbedded, light grey dolomite, thin bedded limestones.

**Fossils:** Conodonts, crinoids, ostracods?, radiolarians, tentaculites.

**Origin, facies:** Marine limestone, pelagic unit.

**Chronostratigraphic age:** Emsian–Eifelian.

**Biostratigraphy:** The conodont assemblage hints to an Emsian age, but definite zones are not mentioned (SCHÖNLAUB, 1971c).

**Thickness:** Approx. 40 m.

**Lithostratigraphically higher rank unit:** Althofen Group (see Text-Fig. 3 and remarks).

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Mölbling Dolomite (conformable contact); Mölbling Limestone (conformable contact).

**Overlying unit(s):** Reef-debris limestone of Althofen (conformable contact).

**Lateral unit(s):** Prank Metaclastics; Ursch Dolomite (Kaindorf Dolomite); Eisenhut Group.

**Geographic distribution:** Carinthia, in the area between Althofen and Töscheldorf.

**Remarks:** The Althofen Group (compare Text-Fig. 3) was introduced by SCHÖNLAUB (1971c). This group is subdivided into four distinctive units, consisting of the Lower Althofen Limestone, Reef-debris limestone of Althofen, Althofen Limestone Breccia and the Upper Althofen Formation.

**Complementary references:** SCHÖNLAUB (1979, 1992), NEUBAUER & PISTOTNIK (1984), KREUTZER et al. (1997).

## Riffschuttkalke von Althofen / Reef-debris limestones of Althofen

THOMAS J. SUTTNER

**Validity:** Invalid; first observations within the limestone deposits near Althofen were made by REDLICH (1905) and later described more in detail by HABERFELNER (1936). A description including all criteria necessary for a formal lithostratigraphic characterization is provided by SCHÖNLAUB (1971c: Figs. 1, 2, p. 297).

**Type area:** ÖK50-UTM, map sheet 4102 Althofen (ÖK50-BMN, map sheet 186 Sankt Veit an der Glan).

**Type section:** Ancient quarry of Aich (SCHÖNLAUB, 1971c: Figs. 1, 2, p. 289) some hundred meters NNW of Treibach-Althofen (N 46°52'46" / E 14°28'03").

**Reference section(s):** -

**Derivation of name:** After the town Althofen.

**Synonyms:** Graue Riffkalke (HABERFELNER, 1936); Althofen Biogenschuttkalke (SCHÖNLAUB, 1971c).

**Lithology:** Grey massive limestone, rich in macrofossils.

**Fossils:** Calcareous green algae, conodonts, crinoids, red algae, rugose and tabulate corals, stromatoporoids.

**Origin, facies:** Shallow marine limestone, neritic unit.

**Chronostratigraphic age:** Eifelian.

**Biostratigraphy:** Conodonts constricting the age of the unit to late Eifelian (SCHÖNLAUB, 1971c), but a distinct zone is not mentioned.

**Thickness:** Approx. 3 m.

**Lithostratigraphically higher rank unit:** Althofen Group (see remarks at Lower Althofen Limestone).

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Lower Althofen Limestone (conformable contact).

**Overlying unit(s):** Althofen Limestone Breccia (unconformable contact).

**Lateral unit(s):** -

**Geographic distribution:** Carinthia, in the area between Althofen and Töscheldorf.

**Remarks:** -

**Complementary references:** SCHÖNLAUB (1979, 1992), NEUBAUER & PISTOTNIK (1984), FENNINGER & HUBMANN (1994), KREUTZER et al. (1997).

## Nock-Gruppe / Nock Group

BERNHARD HUBMANN

**Validity:** Invalid; name and position of the unit published within a lithostratigraphic frame in SCHÖNLAUB & HEINISCH (1993: "Nock Group").

**Type area:** ÖK50-UTM, map sheet 3106 Radenthein (ÖK50-BMN, map sheet 183 Radenthein).

**Type section:** No type section defined; type region at the Nockalmstraße (Nockalmhof: N 46°57'15" / E 13°43'37").

**Reference section(s):** -

**Derivation of name:** After the "Nockberge", mountains of rounded shape.

**Synonyms:** Nock-Serie (LOESCHKE, 1989b); partly: Nockgruppe (HOLDHAUS, 1933), vulkanogene Basisfolgen (NEUBAUER & PISTOTNIK, 1984).

**Lithology:** Greenschists and phyllites; in the upper part limestones occur.

**Fossils:** Conodonts (from limestones in the upper part of the succession).

**Origin, facies:** Probably shallow marine environment.

**Chronostratigraphic age:** ?Middle–Upper Ordovician.

**Biostratigraphy:** -

**Thickness:** Some hundreds of meters?

**Lithostratigraphically higher rank unit:** -  
**Lithostratigraphic subdivision:** -  
**Underlying unit(s):** Different units of the Kaser Group.  
**Overlying unit(s):** Rosental Formation.  
**Lateral unit(s):** -  
**Geographic distribution:** In the area of the Nockalm road; ÖK50-UTM, map sheet 3106 Radenthein (ÖK50-BMN, map sheet 183 Radenthein).  
**Remarks:** -  
**Complementary references:** NEUBAUER & PISTOTNIK (1984), LOESCHKE (1989b), SCHÖNLAUB & HEINISCH (1993).

### Rosental-Formation / Rosental Formation

BERNHARD HUBMANN

**Validity:** Invalid; name of the formation and position of the unit published within a lithostratigraphic frame in SCHÖNLAUB & HEINISCH (1993: "Rosental Fm.").  
**Type area:** ÖK50-UTM, map sheet 3106 Radenthein (ÖK50-BMN, map sheet 183 Radenthein).  
**Type section:** No type section published; type region Rosental (N 46°54'25" / E 13°48'48"), a valley in the Nockalm area. NEUBAUER & PISTOTNIK (1984) published a section (location point 1 in Fig. 1 and section 1 "Nockstrasse" in Fig. 2).  
**Reference section(s):** -  
**Derivation of name:** After Rosental in Carinthia, a valley north of Bad Kleinkirchheim.  
**Synonyms:** Partly: "Vulkanogene Basisfolgen" of NEUBAUER & PISTOTNIK (1984).  
**Lithology:** Phyllites with various ferruginous dolomites and cherty intercalations that are overlain by tuffites and greenschists.  
**Fossils:** Conodonts.  
**Origin, facies:** Probably shallow marine environment.  
**Chronostratigraphic age:** Upper Ordovician.  
**Biostratigraphy:** -  
**Thickness:** ?  
**Lithostratigraphically higher rank unit:** -  
**Lithostratigraphic subdivision:** -  
**Underlying unit(s):** Units of the Nock Group.  
**Overlying unit(s):** ?Eisenhut Group.  
**Lateral unit(s):** -  
**Geographic distribution:** Along the Nockalm road in the area of the Rosentaler Alm up to an altitude of 1,800 m; ÖK50-UTM, map sheet 3106 Radenthein (ÖK50-BMN, map sheet 183 Radenthein).  
**Remarks:** -  
**Complementary references:** -

### Eisenhut-Gruppe / Eisenhut Group

BERNHARD HUBMANN

**Validity:** Invalid; first nomination by PETERS (1855: "Eisenhut-Schieferserie"), comprehensive description by KERNER & LOESCHKE (1991: "Eisenhutschiefer").

**Type area:** ÖK50-UTM, map sheet 3106 Radenthein (ÖK50-BMN, map sheet 184 Ebene Reichenau).

**Type section:** No type section defined; typical rocks are exposed at Eisenhut mountain (N 46°57'08" / E 13°55'42") (see sections in KERNER (1990) and KERNER & LOESCHKE (1991)).

**Reference section(s):** -

**Derivation of name:** After Eisenhut (2,441 m), a mountain near Turracher Höhe, approximately 65 km northwest of Klagenfurt.

**Synonyms:** Eisenhut-Schieferserie (PETERS, 1855); Eisenhutschiefer (SCHWINNER, 1932, 1938); Eisenhut-Schiefer (IIIb) (SCHWINNER, 1936); Eisenhutschiefer (HERITSCH, 1943; SCHÖNLAUB, 1979; KERNER & LOESCHKE, 1991); Eisenhutschiefer der Turracher Höhe (SCHÖNLAUB, 1979); "Eisenhutschiefer partim" (FLÜGEL & NEUBAUER, 1984); Eisenhutschieferserie (MULFINGER, 1988); volcanoclastic Eisenhut Group (SCHÖNLAUB & HEINISCH, 1993).

**Lithology:** Weakly metamorphosed lila-colored ash tuffs, dark-green hyaloclastites and green tuffites, dolomite lenses.

**Fossils:** Conodonts within the dolomite lenses.

**Origin, facies:** According to KERNER & LOESCHKE (1991) the formation of most of the rocks of the Eisenhut Group is the result of intra-plate volcanic activity which occurred in a tensional tectonic regime on thinned continental crust during the Silurian. Phreatomagmatic processes were responsible for the formation of the tuffs and hyaloclastites.

**Chronostratigraphic age:** Lower Silurian–(presumably) Lower Devonian.

**Biostratigraphy:** -

**Thickness:** About 200 m.

**Lithostratigraphically higher rank unit:** -

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Rosental Formation.

**Overlying unit(s):** ?

**Lateral unit(s):** Murau Group (?).

**Geographic distribution:** Gurktal mountains; ÖK50-BMN, map sheet 184 Ebene Reichenau.

**Remarks:** -

**Complementary references:** -

### „Klastische Gruppe“ / "Clastic Group"

BERNHARD HUBMANN

**Validity:** Invalid; comprehensive description of the unit by MULFINGER (1988: "Klastische Serie").

**Type area:** ÖK50-UTM, map sheet 3106 Radenthein (ÖK50-BMN, map sheet 184 Ebene Reichenau).

**Type section:** No type section defined; MULFINGER (1988) mentioned typical occurrences at Rapitzsattel (2,088 m; N 46°55'56" / E 13°56'35"), Torer and Spielriegel to Schafferalm (1,365 m; N 46°58'10" / E 14°00'14").

**Reference section(s):** -

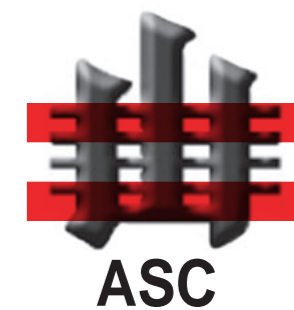
**Derivation of name:** Collective name for a unit built up by various clastic rocks.

**Synonyms:** Klastische Serie (MULFINGER, 1988).

# 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							
		PERMIAN	UPPER DEVONIAN	FAMENNIAN	365			PERMIAN	UPPER DEVONIAN
				FRASNIAN	370				
				375					
380									
385									
390									
395									
PERMIAN	MIDDLE DEVONIAN			GIVETIAN	395				
				EIFELIAN	400				
				405					
		410							
PERMIAN	LOWER DEVONIAN	EMSIAN	415	PERMIAN	LOWER DEVONIAN				
		PRAGIAN	420						
		LOCHKOVIAN	425						
		430							
		435							
		440							
		443.7							
		PERMIAN	UPPER ORDOVICIAN			HIRNANTIAN	445	PERMIAN	UPPER ORDOVICIAN
						450			
						455			
460									
465									
470									
475									
480									
485									
488.3									
PERMIAN	MIDDLE ORDOVICIAN	TREMACIAN	490	PERMIAN	MIDDLE ORDOVICIAN				
		495							
		500							
		505							
		510							
		515							
		520							
		525							
		530							
		535							
PERMIAN	LOWER ORDOVICIAN	PAIBIAN	540	PERMIAN	LOWER ORDOVICIAN				
		545							
		550							
		555							
		560							
		565							
		570							
		575							
		580							
		585							
CAMBRIAN	UPPER CAMBRIAN	490	CAMBRIAN	UPPER CAMBRIAN					
		495							
		500							
		505							
		510							
		515							
		520							
		525							
		530							
		535							
CAMBRIAN	MIDDLE CAMBRIAN	540	CAMBRIAN	MIDDLE CAMBRIAN					
		545							
		550							
		555							
		560							
		565							
		570							
		575							
		580							
		585							
CAMBRIAN	LOWER CAMBRIAN	590	CAMBRIAN	LOWER CAMBRIAN					
		595							
		600							
		605							
		610							
		615							
		620							
		625							
		630							
		635							



- 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

© Commission for the Paleontological and Stratigraphical Research of Austria (CPSA) of the Austrian Academy of Sciences and Austrian Stratigraphic Commission

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

The Austrian Stratigraphic Chart 2004 - Paleozoic is a supplement of:  
 Hubmann, B., Ebner, F., Ferretti, A., Kido, E., Krainer, K., Neubauer, F., Schönlaub, H.-P. & Suttner, T.J. (2014): The Paleozoic Era (them), 2<sup>nd</sup> edition. - In: Pillner, W.E. (Ed.): The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions) - Vol. 1 - Abhandlungen der Geologischen Bundesanstalt, 66, 9-133, Wien.

Printing: Graßl Druck & Neue Medien GmbH, Bad Vöslau 2014