

ings of St. Paul (Wunderstätten) an assignment to the *Calopteris conferta* Zone is inferred (FRITZ & KRAINER, 2007).

**Thickness:** Between 30 and 50 or even 100 meters (KRAINER, 1987b).

**Lithostratigraphically higher rank unit:** -

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Stagnock Formation and Lower Paleozoic of Magdalensberg Group (tectonic contact).

**Overlying unit(s):** Gröden Formation.

**Lateral unit(s):** -

**Geographic distribution:** Gurktal Alps west of the village of Turrach (northwestern Styria) and central Carinthia between Ulrichsberg in the west and St. Paul in the east (KRAINER, 1987b).

**Remarks:** -

**Complementary references:** -

**Gröden-Formation / Gröden Formation**  
(description see Carnic Alps and Drau Range)

## Grazer Paläozoikum / Graz Paleozoic

The Graz Paleozoic (GP) comprises an outcropping area of approximately 1,250 km<sup>2</sup> resting tectonically on metamorphic Austroalpine units. The GP itself represents a pile of nappes which is overlain unconformably by the Upper Cretaceous Kainach Gosau and by Neogene sediments of the “Styrian Basin” in the south. The nappes consist of different facial developments.

FRITZ & NEUBAUER (1990) discerned a Basal, an Intermediate, and an Upper Nappe Group in which lithological similarities, the tectonic position, and metamorphic overprint of the nappes were considered. This concept of a tectonic tripartite arrangement in the sense of FRITZ & NEUBAUER (1990) is the conceptual base for the lithostratigraphic arrangement shown in the ASC 2004:

1) The Basal Nappe Group (upper Silurian–Lower Devonian) comprises the Schöckel Nappe and the Anger Crystalline Complex. Besides the Alpine (Early to Late Cretaceous) deformation of the Graz Paleozoic in this basal nappe system minor Variscan deformation under upper greenschist facies condition (with rarely occurring amphibolite facies) is detected. The Schöckel Nappe is made up of pre-Devonian rocks (Passail Group, Taschen Formation) and the Devonian Peggau Group. Generally, volcanics dominate the upper Silurian to Lower Devonian, and carbonates the Middle Devonian. Part of the Peggau Group is the Schönberg Formation with Meggen-type lead/zinc-barite Sedex mineralizations (EBNER et al., 2000).

2) The Intermediate Nappe Group (lower Silurian–Upper Devonian) includes the “Laufnitzdorf Nappe” and the “Kalkschiefer Nappe” (Lower to Upper Devonian). Both Nappes occur in different structural levels. The former development contains pelagic limestones, shales and volcanics, the latter limestones and siliciclastics.

3) The Upper Nappe System (upper Silurian–upper Carboniferous) comprises the Rannach- and Hochlantsch Nappes. Both have a similar facial development, especially in the Emsian–Givetian. Successions of the Rannach Nappe are composed of volcanoclastic rocks (Silurian–Lower Devonian; Reinerspitz Group), siliciclastics and carbonates rich in fossils (Lower–Middle Devonian; Rannach Group) of a littoral environment followed by the pelagic Forstkogel Group (Upper Givetian–Serpukhovian) and the shallow marine Dult Group (Bashkirian/?Moskavian) (HUBMANN & MESSNER, 2007; EBNER et al., 2008).

According to a paleogeographical interpretation of the entire Paleozoic succession, the formations of the Rannach- and Hochlantsch Nappes are interpreted to have been de-

posite nearest to the shore, while the “Laufnitzdorf Facies” represents the most distant from shore. Successions of the Schöckel Nappe occupy an intermediate position in this conception (HUBMANN, 1993).

The stratigraphic sequence indicates a sedimentation area changing from a passive continental margin with the continental breakup (alkaline volcanism) to shelf and platform geometries during the Silurian to Devonian time span. Sea-level changes and probably synsedimentary tectonics had affected both, the lithologic development (i.e., alternations of dolostones and limestones) and the formation of stratigraphic gaps and mixed conodont faunas (EBNER et al., 2000, 2008).

Recently, GASSER et al. (2010) published a new structural sketch of the Graz Paleozoic which gets along with only two nappes, a basal one characterized by intensely deformed units which show a penetrative foliation with a pronounced stretching lineation and an upper one comprising less metamorphic sequences. In this conception the lower nappe system consists of sequences of the Laufnitzdorf Facies, the Kalkschiefer Facies (partly) and the Schöckel Facies whereas the upper nappe system comprises the Kalkschiefer Facies (partly), the Rannach Facies and the Hochlantsch Facies.

## Taschen-Formation / Taschen Formation

BERNHARD HUBMANN

**Validity:** Valid; first description by SCHWINNER (1925: “Taschenschiefer”); formalized by FLÜGEL (2000: p. 38; Taschen-Schiefer-Formation); change of name into Taschen-Formation by EBNER et al. (2000).

**Type area:** ÖK50-UTM, map sheet 4223 Weiz (ÖK50-BMN, map sheet 164 Graz).

**Type section:** Not defined, but FLÜGEL (2000) selected a type region at Taschen, a little village east of Peggau; ÖK50-UTM, map sheet 4223 Weiz, ÖK50-BMN, map sheet 164 Graz (N 47°12'27" / E 15°22'59").

**Reference section(s):** -

**Remarks:** Tectonic position of the formation and its relationship to the Rannach Nappe or Schöckel Nappe respectively is not clarified at the moment.

**Derivation of name:** After “Taschen”, an area east of Peggau, approx. 25 km north of Graz.

**Synonyms:** Partly: Semriacher Schiefer (CLAR, 1874); obere Schiefer (HERITSCH, 1917b); Grünschiefer-Serie (SEE-

WANN, 1929); Chloritschiefer des Bergler Kogel (FLÜGEL, 1957); Stanzberg Serie (GRÄF, 1958); erzführende Serie (WEBER, 1990); Arzberg Schichten (EBNER & WEBER, 1978); Waldstein-Formation (FRITZ, 1991).

**Lithology:** Alkaline volcanoclastics; sometimes intercalations of dark coloured shales.

**Fossils:** -

**Origin, facies:** -

**Chronostratigraphic age:** Presumably pre-Ludlow.

**Biostratigraphy:** -

**Thickness:** Several hundreds of meters.

**Lithostratigraphically higher rank unit:** Peggau Group (FLÜGEL, 2000).

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Successions of the Passail Group.

**Overlying unit(s):** Semriach Formation, ?Schönberg Formation.

**Lateral unit(s):** -

**Geographic distribution:** Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheets 133 Leoben, 134 Passail, 162 Köflach, 163 Voitsberg, 164 Graz.

**Remarks:** -

**Complementary references:** -

### St. Jakob-Formation / St. Jakob Formation

BERNHARD HUBMANN

**Validity:** Valid; first description and nomination by THALHAMMER (1982: "St. Jakob-Gruppe"); formalized by FLÜGEL (2000: p. 11; "St. Jakober-Formation"); change of name into St. Jakob-Formation by EBNER et al. (2000).

**Type area:** ÖK50-UTM, map sheet 4223 Weiz (ÖK50-BMN, map sheet 134 Passail).

**Type section:** Not defined, but according to FLÜGEL (2000) the type region is in the vicinity of St. Jakob in Breitenau (N 47°23'05" / E 15°26'11").

**Reference section(s):** -

**Remarks:** THALHAMMER (1982) distinguished within the "St. Jakob-Group" three units which were adopted by FLÜGEL (2000) as members of the St. Jakob Formation (see below).

**Derivation of name:** After the village St. Jakob, 52 km north of Graz.

**Synonyms:** Carbonschichten der Breitenau (VACEK, 1891); partly: Karbon der Breitenau (FLÜGEL, 1953a); Magnesit der Breitenau (H. FLÜGEL, 1975).

**Lithology:** Limestones, siliciclastics and alkaline metavolcanites.

**Fossils:** Conodonts.

**Origin, facies:** Pelagic environment.

**Chronostratigraphic age:** Llandovery–Givetian; does not reach up into the Eifelian as indicated in the ASC 2004.

**Biostratigraphy:** *costatus* Zone and *varcus* Zone.

**Thickness:** Up to 280 m.

**Lithostratigraphically higher rank unit:** Laufnitzdorf Group.

**Lithostratigraphic subdivision:** FLÜGEL (2000) discerned three members:

Aibl Member: Limestones, sandstones, alkaline volcanoclastics; about 180 m in thickness.

Breitenau Member: Magnesites and dolomites; up to 100 m in thickness.

Schattleiten Member: Succession of limestones, argillaceous shales and silt/sandstones; 80–100 m in thickness.

**Underlying unit(s):** Tectonic contact to Kogler Formation.

**Overlying unit(s):** Tectonic contact to Kogler Formation.

**Lateral unit(s):** Unknown because of tectonic boundaries.

**Geographic distribution:** Styria, highland in the surroundings of Graz; ÖK50-UTM, map sheet 4223 Weiz (ÖK50-BMN, map sheet 134 Passail).

**Remarks:** -

**Complementary references:** GOLLNER et al. (1982), FLÜGEL & NEUBAUER (1984).

### Semriach-Formation / Semriach Formation

BERNHARD HUBMANN

**Validity:** Valid; first description by CLAR (1874: "Semriacher Schiefer"); formalized by FLÜGEL (2000: p. 47; Semriacher-Phyllit-Formation); change of name into Semriach-Formation by EBNER et al. (2001).

**Type area:** ÖK50-UTM, map sheet 4223 Weiz (ÖK50-BMN, map sheet 164 Graz).

**Type section:** No type section defined, but FLÜGEL (2000) selected a type region at Windhofkogel (1,064 m) east of Semriach (N 47°13'28" / E 15°26'09").

**Reference section(s):** -

**Remarks:** Tectonic position of the formation and its relationship to the Rannach Nappe or Schöckel Nappe respectively is not clarified at the moment.

**Derivation of name:** After Semriach, a small town northeast of Peggau-Deutschfeistritz, approx. 30 km north of Graz.

**Synonyms:** Semriacher Schiefer (CLAR, 1874); partly: Untere Schiefer (HERITSCH, 1906); Phyllite von Semriach and Phyllite von Passail (SCHWINNER, 1925); Serie der Phyllite (SEEWANN, 1929); Schiefer der Passailer Mulde (H. FLÜGEL, 1975).

**Lithology:** Sericite phyllites with insertions of green schists; marbles.

**Fossils:** -

**Origin, facies:** -

**Chronostratigraphic age:** Presumably pre-Devonian.

**Biostratigraphy:** -

**Thickness:** Presumably several hundreds of meters.

**Lithostratigraphically higher rank unit:** Passail Group (FLÜGEL, 2000).

**Lithostratigraphic subdivision:** FLÜGEL (2000) discerned two members:

Hundsberg Member: Coarse grained quartzites and quartzitic slates; 10 to 50 m in thickness.

Rötschgraben Member: White to bluish-white fine-grained marbles; few meters in thickness.

**Underlying unit(s):** In its southern outcropping area the formation shows a tectonic contact to green schists of the Taschen Formation. North of Plenzengreith a marble ho-

# 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 / LOPINGIAN								
		WUCHIAPINGIAN / Dzhulfian	255										
		CAPITANIAN	260										
		WORDIAN	265										
		ROADIAN	270										
		PERMIAN	LOWER PERMIAN / CISURALIAN			KUNGURIAN	275						
						ARTINSKIAN	280						
						SAKMARIAN	285						
						ASSELIAN	290						
		PERMIAN	TRIAS			GZHELIAN	295	TRIAS	U. CARBONIFEROUS / PENNSYLVANIAN				
KASIMOVIAN	300												
MOSKOVIAN	305												
BASHKIRIAN	310												
TRIAS	LOWER CARBONIFEROUS / MISSISSIPPIAN			SERPUKHOVIAN	315								
				VISEAN	320								
				TOURNAISIAN	325								
PERMIAN	DEVONIAN			FAMENNIAN	330	DEVONIAN	UPPER DEVONIAN						
				FRASNIAN	335								
				GIVETIAN	340								
		EIFELIAN	345										
		DEVONIAN	LOWER DEVONIAN	EMSIAN	350								
				LOCHKOVIAN	355								
		PERMIAN	DEVONIAN	LUDFORDIAN / GORSTIAN	359.2			DEVONIAN	MIDDLE DEVONIAN				
				HOMERIAN / SHEINWOOD	365								
				TELYCHIAN	370								
				AERONIAN	375								
RHUDDANIAN	380												
PERMIAN	SILURIAN			HIRNANTIAN	385								
				LLANDOVERY	390								
PERMIAN	DEVONIAN			WEN-LOCK / LOW	395	DEVONIAN	LOWER DEVONIAN						
				PRAGIAN	400								
				LOCHKOVIAN	405								
		Zlichovian	410										
		PERMIAN	SILURIAN	LUDFORDIAN / GORSTIAN	416								
				HOMERIAN / SHEINWOOD	420								
		PERMIAN	DEVONIAN	TELYCHIAN	425			DEVONIAN	UPPER ORDOVICIAN				
				AERONIAN	430								
				RHUDDANIAN	435								
				HIRNANTIAN	440								
PERMIAN	SILURIAN			LLANDOVERY	443.7								
				HIRNANTIAN	445								
PERMIAN	DEVONIAN			WOLYER	450	DEVONIAN	MIDDLE ORDOVICIAN						
				DARRIWILIAN	455								
				TRIMA-DOCIAN	460								
				PAIBIAN	465								
		PERMIAN	SILURIAN	WOLYER	470								
				DARRIWILIAN	475								
		PERMIAN	DEVONIAN	WOLYER	480			DEVONIAN	LOWER ORDOVICIAN				
				PAIBIAN	485								
				PERMIAN	SILURIAN					WOLYER	490		
										PAIBIAN	495		
PERMIAN	DEVONIAN			WOLYER	500	DEVONIAN	UPPER CAMBRIAN						
				PAIBIAN	505								
				PERMIAN	SILURIAN					WOLYER	510		
										PAIBIAN	515		
				PERMIAN	DEVONIAN					WOLYER	520	DEVONIAN	MIDDLE CAMBRIAN
										PAIBIAN	525		
		PERMIAN	SILURIAN					WOLYER	530				
								PAIBIAN	535				
		PERMIAN	DEVONIAN					WOLYER	540	DEVONIAN	LOWER CAMBRIAN		
								PAIBIAN	542				



### 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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