

while others are oosparites and biosparites with fusulinids, echinoderms and microproblematica (*Tubiphytes*, *Epi-mastopora*). Some others are massive indistinct limestone clasts not known from the Trogkofel Limestone.

**Fossils:** In the limestone clasts fusulinids, smaller foraminifers, crinoids, bryozoans, corals, sponges, ostracods and microproblematica (*Tubiphytes*, *Archaeolithoporella*, *Epi-mastopora*) were identified.

**Origin, facies:** The origin of the Treßdorf Limestone is yet not fully understood. It either represents a lateral equivalent of the Trogkofel Limestone or reworked Trogkofel and Zweikofel Limestones formed at a later stage.

**Chronostratigraphic age:** Based on the fusulinids in the breccias KÄHLER & KÄHLER (1980) concluded an Artinskian age for the Treßdorf Limestone. In addition, they pointed out that this limestone is much younger than the Trogkofel Limestone near Forni Avoltri.

**Biostratigraphy:** Fusulinids, i.e., representatives of *Pseudofusulina* and *Praeparafusulina* in the clasts of the Treßdorf Limestone were identified by KÄHLER & KÄHLER (1980) and partly revised by FORKE (1995b, c, 2002).

**Thickness:** Maximum thickness is less than 10 m.

**Lithostratigraphically higher rank unit:** -

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Trogkofel Limestone (?).

**Overlying unit(s):** Trogkofel Conglomerate (not indicated in the ASC 2004), Tarvis Breccia, Gröden Formation.

**Lateral unit(s):** It has been suggested that the more than 120 m thick Coccau/Goggau Limestone occurring along the old road from Tarvisio to the village of Coccau/Goggau is a lateral equivalent of the Treßdorf Limestone. However, in the Coccau/Goggau Lst. a more diversified fusulinid fauna occurs which is slightly different from the one in the Treßdorf Limestone suggesting different ages of both limestones. Apparently coeval limestones occur in the western Karavanke mountains of Slovenia.

**Geographic distribution:** Carnic Alps in the vicinity of Treßdorf Alm and close to Coccau/Goggau near Tarvisio (Italy).

**Remarks:** -

**Complementary references:** -

### Tarviser Brekzie / Tarvis Breccia

HANS P. SCHÖNLAUB

**Validity:** Invalid; the term was introduced by HERITSCH (1928b) to designate a breccia horizon at the road near Coccau/Goggau half distance between the Austrian/Italian border and Tarvisio (Italy).

**Type area:** Vicinity of the village Coccau/Goggau, Carta Geologica d'Italia 1:100.000, F° 14<sup>A</sup> Tarvisio (1968). ÖK50-UTM, map sheet 3117 Nötsch im Gailtal (ÖK50-BMN, map sheet 200 Arnoldstein).

**Type section:** Outcrop at the road near Coccau/Goggau (Italy) southeast of the church of Upper Coccau (N 46°30'49" / E 13°36'41") (BUGGISCH & FLÜGEL, 1980).

**Reference section(s):** According to FORKE (pers. comm.) better outcrops are located near Forni Avoltri (Italy) and in Dovzanova soteska (Slovenia).

**Derivation of name:** After the city of Tarvisio (German: Tarvis) in the Regione Autonoma Friuli-Venezia Giulia, Italia.

**Synonyms:** Breccia di Tarvisio, Conglomerato di Sesto (Sexten-Konglomerat) (BUGGISCH et al., 1976; BUGGISCH & FLÜGEL, 1980; SCHÖNLAUB & FORKE, 2007).

**Lithology:** The Tarvis Breccia east of Straniger Alm consists of a 10 m thick succession of massive dolomite, Rauhwaacke, interbedded red siltstones and greyish dolomitic breccias. It thus contrasts with the Trogkofel Breccia which is composed of carbonate clasts (reworked Trogkofel Limestone) with a negligible amount of siliciclastics (BUGGISCH et al., 1976). Such clasts have diameters of 2 to 8 cm and are cemented either in a fine-grained dolomitic matrix or a grey massive homogenous one.

**Fossils:** The breccia does not contain any fossils.

**Origin, facies:** The breccia was formed during tectonic uplift of the Lower Permian succession under karstic conditions resulting from an arid environment. Synsedimentary faults have aided the formation of mainly subaerial fan deposits of strongly varying thickness intergrading with the base of the Gröden Formation.

**Chronostratigraphic age:** The age of the Tarvis Breccia can only indirectly be inferred from the underlying fossiliferous Trogkofel Lst. indicating a late Artinskian age and the "Illawara Reversal-Event" identified some 170 m above the base of the overlying Gröden (Val Gardena) Formation near Paularo and also in the Dolomites (MAURITSCH & BECKE, 1983; DACHROTH, 1988). According to MENNING (2001) this event occurred 265 Ma ago in the uppermost Wordian Stage (Middle Permian). The formation of the breccias can thus be attributed to a time interval between the end of the Artinskian and the beginning of the Wordian.

**Biostratigraphy:** -

**Thickness:** Maximum thickness is some 10 m.

**Lithostratigraphically higher rank unit:** -

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** In the area between Straniger Alm and Passo del Cason di Lanza the Tarvis Breccia rests unconformably on the Auernig Formation, north of Gartnerkofel (Reppwand), however, on Trogkofel Limestone.

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

**Lateral unit(s):** Conglomerato di Sesto (Sexten-Kalkbrekzie) in the westernmost Carnic Alps (FLÜGEL & KRAUS, 1988; SCHÖNLAUB, 2000c).

**Geographic distribution:** Carnic Alps of northern Italy and southern Austria (Naßfeld area, surroundings of Straniger Alm and Passo del Cason di Lanza, west of mountain Seikofel near Sexten).

**Remarks:** A summary of the various breccia horizons at the base of the Gröden Formation was published by BUGGISCH et al. (1976) and BUGGISCH & FLÜGEL (1980). In the Naßfeld area detailed sedimentological investigations to characterize the deposits according to their stratigraphy and genesis have not been carried out. All those deposits at the base of the Gröden Formation above the Auernig Group are herein described as "Tarvis Breccia" while those resting directly on the Trogkofel Limestone are named "Trogkofel Breccia" and "Trogkofel Conglomerate", respectively. However, these are neither mentioned in the ASC 2004, nor described herein.

**Complementary references:** -

# 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 / Dufuflian   | 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 / GORSTIAN | 420                           | PERMIAN        | LOWER DEVONIAN             |
|            |   |                             |   |                       |                                       | HOMERIAN / SHEINWOOD  | 425                           |                |                            |
| TELYCHIAN  | 430   |                             |   |                       |                                       |                       |                               |                |                            |
| AERONIAN   | 435   |                             |   |                       |                                       |                       |                               |                |                            |
| RHUDDANIAN | 440   |                             |   |                       |                                       |                       |                               |                |                            |
| HIRNANTIAN | 443.7   |                             |   |                       |                                       |                       |                               |                |                            |
| 445        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 450        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 455        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 460        |   |                             |   |                       |                                       |                       |                               |                |                            |
| PERMIAN    | UPPER ORDOVICIAN                              | DARRIWILIAN                 | 465   | PERMIAN               | UPPER ORDOVICIAN                      |                       |                               |                |                            |
|            |   | 470                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 475                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 480                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 485                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 488.3                       |   |                       |                                       |                       |                               |                |                            |
|            |   | 490                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 495                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 500                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 505                         |   |                       |                                       |                       |                               |                |                            |
| PERMIAN    | MIDDLE CAMBRIAN                               | PAIBIAN                     | 510   | PERMIAN               | MIDDLE CAMBRIAN                       |                       |                               |                |                            |
|            |   | 515                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 520                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 525                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 530                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 535                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 540                         |   |                       |                                       |                       |                               |                |                            |
|            |   | 542                         |   |                       |                                       |                       |                               |                |                            |
|            |   | CAMBRIAN                    | LOWER CAMBRIAN                                |                       |                                       | 542                   | CAMBRIAN                      | LOWER CAMBRIAN |                            |
|            |   |                             |   |                       |                                       | 540                   |                               |                |                            |
| 535        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 530        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 525        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 520        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 515        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 510        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 505        |   |                             |   |                       |                                       |                       |                               |                |                            |
| 500        |   |                             |   |                       |                                       |                       |                               |                |                            |



- 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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