Ber. Inst. Erdwiss. K.-F.-Univ. Graz	ISSN 1608-8166	Band 23	Valencia 2017
International Conodont Symposium 4	Valencia, 25-30th June 2017		

The *Annulata* Event at the Pramosio Bassa section

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Locality *- About 300 m N of Casera Pramosio Bassa, Pramosio area, at coordinates N 46° 35' 23.1", E 13° 01' 58.5".*
Lithostratigraphic unit *- Pal Grande Fm.*
Age *- Famennian (Late Devonian);* Palmatolepis rugosa trachytera–Palmatolepis gracilis expansa *zones* (*Lower* trachytera–*Lower* expansa *zones*).
What to see *- Levels with stromatactis structure, and a level rich in fossils of* Prionoceras *and others ammonoids*.

How to get there

Casera Pramosio is easy to reach by car taking the white road that starts from Laipacco in the tract from Paluzza to Timau along the National road 52b connecting Tolmezzo (Udine) to Austria. The Pramosio Bassa (PB) section is north to Casera Pramosio, about ten minutes walking a few dozens of meters on the left side of the path number 402 at altitude 1540 m (Fig. 1).

Historical outline

The Pramosio area was studied by Michele Gortani since the beginning of the 20th century. The Pramosio Bassa section was briefly described by Perri et al. (1998) and Spalletta & Perri (2001). Mossoni (2014) studied magnetic susceptibility, magnetic hysteresis and major elements content of the section. The results of this study fit very well with the palaegeographic position of the Carnic microplate during the Late Devonian hypothesized by Schönlaub (1993) and von Raumer & Stampfli (2008). According to these Authors the Carnic microplate was located far away from land. Mossoni (2014) demonstrated that during the limestone deposition the detrital input was scarce, this is consistent also with the transgressive event considered as triggering cause of the *Annulata* radiation. All the studied parameters show values consistent with the identification of the Upper *Annulata* Event in correspondence of the level of sample PB5a (Mossoni, 2014). In the Carnic basin a general transgressive tendency from the Lower *marginifera* Zone to the base of the Lower *postera* Zone (*Palmatolepis marginifera marginifera–Polygnathus styriacus* zones of Spalletta et al., 2017) was inferred by Perri & Spalletta (2000) based on conodont biofacies analysis. Hartenfels & Becker (2016) report that the level yielding a mass occurrence of *Prionoceras* (bed of sample PB5a) can be considered as an equivalent of the

Figure 1. Location map of the Pramosio Bassa section.

Wagnerbank of Thuringia. According to Hartenfels & Becker (2016) the goniatite-rich limestone of the Wagnerbank represents a regressive phase in the highest part of the *annulata* Zone (UD IV-A).

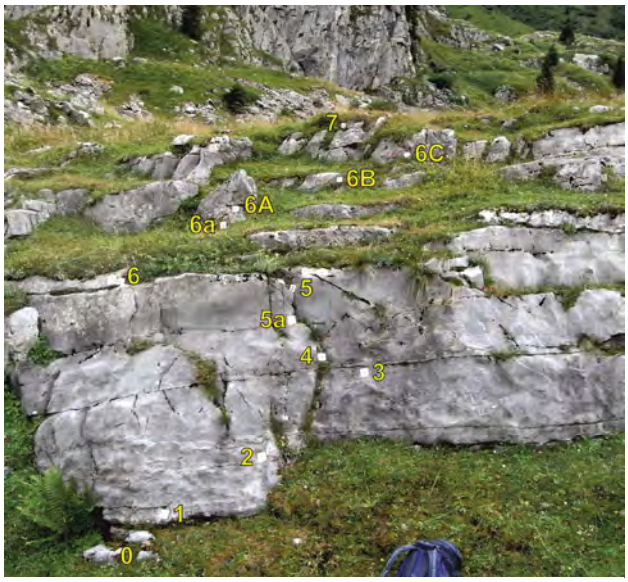

Figure 2. View of the Pramosio Bassa section with location of conodont samples.

Lithology and fossil content

The studied section here presented (samples PB0-PB7) has a thickness of about 5 m, even if it continues for ca 10 m above a faint tectonic disturbance, corresponding to a cover interval. The uppermost sample of the second part of the section (PB15) was attributed to the upper part of the *Bispathodus ultimus* Zone of Spalletta et al. (2017) for the entry of *Siphonodella praesulcata* Sandberg. The Pal Grande Fm. is constituted by limestone here represented by wackestone-packstone rich in conodonts, ammonoids, brachiopods, trilobites, and crinoids. The residues from acid-leaching yielded also some vertebrate microremains. The level in correspondence of sample PB5a is very rich in fossils of *Prionoceras* and others ammonoids (Hartenfels & Becker, 2016). The original bedding planes are mm-cm thick, but the stratification now appears in beds 10 to ca 100 cm thick, often separated by mm levels of ochraceous pelite, with laterally irregular thickness along the exposure. The limestone sequence is also interested by levels with stromatactis structures. Black shales levels equivalent to the *Annulata* Black Shales are not present (Figs. 2, 3).

Palaeonvironment

The limestone of the Pal Grande Fm. deposited in a pelagic environment from slope to open basin. It has to be highlighted that the depth of the Carnic basin during the Late Devonian was moderate, likely not exceeding some dozens of meters. The pelagic character of the formation is mainly due to deposition in one area far away from coasts.

Conodonts

In the interval PB0-PB7 thirteen conodont samples with average weight of 1.6 kg were collected from the Pramosio Bassa section (Figs. 2, 3). Only the P1 elements were identified and counted. Their abundance is variable from a minimum of 16 elements per kg of rock in sample PB6 to a maximum of 1870 in sample PB6C where a peak of *Branmhela werneri* is registered. P2 and ramiform elements are scarce in all samples. The state of preservation is quite good. The Colour Alteration Index (CAI) is 4.4 (Brime et al., 2008).

Thirty-three taxa belonging to eight genera (*Alternognathus*, *Bispathodus, Branmehla, Mehlina*, *Icriodus*, *Palmatolepis, Polygnathus* and *Pseudopolygnathus*) were identified (Fig. 3, 4).

Biostratigraphy

The occurrence of *Palmatolepis rugosa trachytera* Ziegler in sample PB0 allows the attribution of level PB0 to the *Palmatolepis rugosa trachytera* Zone (equivalent to the Lower *trachytera* Zone of Ziegler & Sandberg, 1990). The interval PB1-PB5 was referred to the *Pseudopolygnathus granulosus* Zone (Upper *trachytera* Zone) due to the entry of *Pseudopolygnathus granulosus* Ziegler in sample PB1. The upper part of the zone can be discriminated by the entry of *Palmatolepis gracilis sigmoidalis* Ziegler in sample PB3. The interval PB6-PB6B was referred to the *Polygnathus styriacus* Zone (Lower *postera* Zone) by the entry of typical *Polygnathus rhabdotus* Schäfer in sample PB6, even if the zonal marker enters only in sample PB6B. The interval PB6C-PB7 was referred to the *Palmatolepis gracilis*

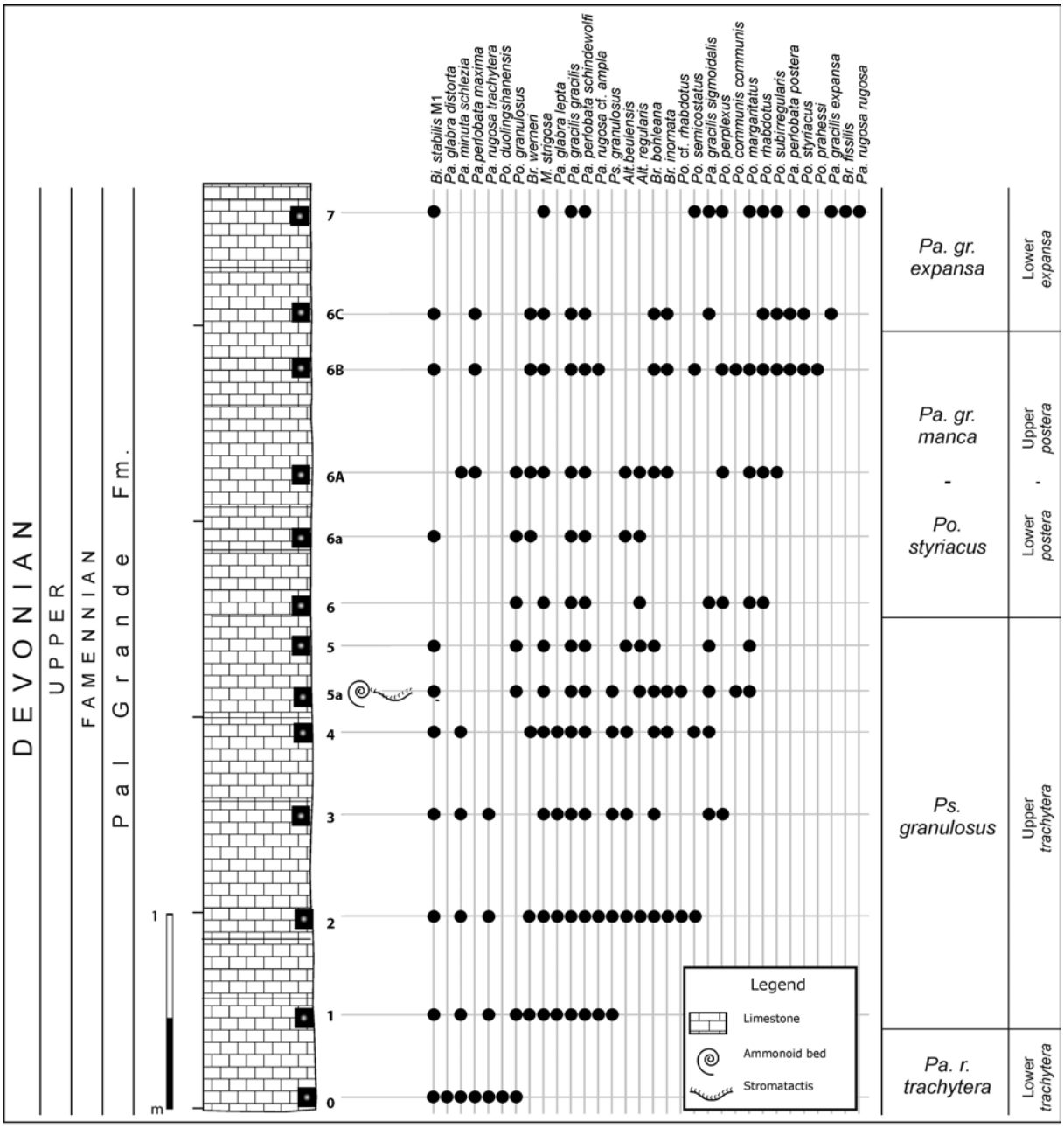

Figure 3. Stratigraphic column and conodont distribution of the Pramosio Bassa section (modified after Mossoni, 2014).

expansa Zone (Lower *expansa* Zone) as the zonal marker enters in sample PB6C. The absence of *Palmatolepis gracilis manca* Helms as well as of other taxa entering within the *Palmatolepis gracilis manca* Zone (Upper *postera* Zone) prevented the identification of this zone below the *Palmatolepis gracilis expansa* Zone (Fig. 3).

Acknowledgements
We would like to thank the Screm family that is running Casera Pramosio. Along many years, coming back to Casera Pramosio after field work was like going back home. The warm, friendly hospitality offered there and the fire in the fireplace have often been the only light during many rainy, cold days. Thanks to Mr. Paolo Ferrieri who made the SEM photographs.

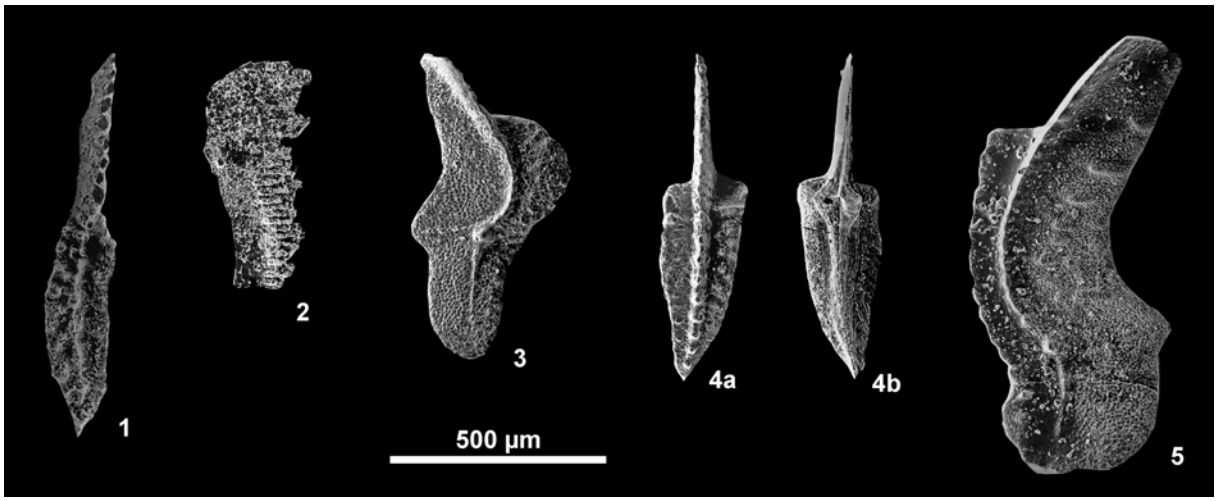

Figure 4. Conodonts from the Pramosio Bassa section. Elements 1, 2, 4 and 5 refigured from Spalletta & Perri (1998).
1. *Alternognathus regularis* Ziegler & Sandberg, sample PB2. **2.** *Mehlina strigosa* (Branson & Mehl), sample PB5; **3.** *Palmatolepis perlobata schindewolfi* Müller, sample PB7. **4.** *Polygnathus rhabdotus* Schäfer, sample PB7, **a.** upper view, **b.** lower view. **5.** *Palmatolepis rugosa trachytera* Ziegler, sample PB2.

References

BRIME, C., PERRI, M.C., PONDRELLI, M., SPALLETTA, C. & VENTURINI, C. (2008): Polyphase metamorphism in the eastern Carnic Alps (N Italy-S Austria): clay minerals and conodont Colour Alteration Index evidence. - International Journal of Earth Science, 97: 1213-1229.

HARTENFELS, S. & BECKER, R.T. (2016): The global Annulata Events: review and new data from the Rheris Basin (northern Tafilalt) of SE Morocco. - In: BECKER, R.T., KÖNIGSHOF, P. & BRETT, C.E. (eds): Devonian Climate, Sea Level and Evolutionary Events. - Geological Society, London, Special Publications, 423: p. 291-354. http://doi.org/10.1144/SP423.14

MOSSONI, A. (2014): Selected Famennian (Late Devonian) events (Condroz, Annulata, Hangenberg) in Sardinia and in the Carnic Alps: conodont biostratigraphy, magnetic susceptibility and geochemistry. - Ph.D. thesis, Università di Cagliari, 171 p., Cagliari.

PERRI, M.C. & SPALLETTA, C. (2000): Late Devonian-Early Carboniferous transgressions and regressions in the Carnic Alps (Italy). - Western Australian Museum Records, Supplement 58: 305-319.

PERRI, M.C., SPALLETTA, C. & PONDRELLI, M. (1998): Late Famennian conodonts from the Pramosio Bassa section (Carnic Alps, Italy). - In: PERRI, M.C. & SPALLETTA, C. (eds): Southern Alps Field Trip Guidebook, ECOS VII. - Giornale di Geologia, Special Issue, 60: 228-233.

SPALLETTA, C. & PERRI, M.C. (1998): The Lower *expansa* Zone (Late Devonian) in the Pramosio section (Carnic Alps, Italy). - In: PERRI, M.C. & SPALLETTA, C. (eds): Southern Alps Field Trip Guidebook, ECOS VII. - Giornale di Geologia, Special Issue, 60: 234-241.

SPALLETTA, C. & PERRI, M.C. (2001): Subdivision and substages of the Famennian, an opinion and possible candidates for the upper part. - SDS Newsletter, 18: 65-66.

SPALLETTA, C., PERRI, M.C., OVER, D.J. & CORRADINI, C. (2017): Famennian (Upper Devonian) conodont zonation: revised global standard. - Bulletin of Geosciences, 92(1): 31-57. doi: 10.1340/bull.geosci.1623

SCHÖNLAUB, H.P. (1993): Stratigraphy, biogeography and climatic relationships of the Alpine Paleozoic. - In: VON RAUMER, J. & NEUBAUER, F. (eds): The Pre-Mesozoic Geology in the Alps. Springer, Heidelberg, 65-91.

VON RAUMER, J.F., & STAMPFLI, G.M. (2008): The birth of the Rheic Ocean – Early Paleozoic subsidence patterns and subsequent tectonic plate scenario. - Tectonophysics, 461: 9-20.

ZIEGLER, W. & SANDBERG, C.A. (1990): The Late Devonian Standard Conodont Zonation. - Courier Forschungs-Institut Senckenberg, 121: 1-115.