

The Devonian in the Compte sections

José I. Valenzuela-Ríos¹, Jau-Chyn Liao¹ & Carlos Martínez-Pérez^{2,3}

¹Department of Botany and Geology, University of Valencia, c/Dr. Moliner 50, E-46100 Burjassot, Spain; jose.i.valenzuela@uv.es; jau.liao@uv.es

²Cavanilles Institute of Biodiversity and Evolutionary Biology, Universitat de València. C/Catedrático José Beltrán Martínez nº 2, Paterna, Valencia (Spain), 46980, Spain; carlos.martinez-perez@uv.es

³School of Earth Sciences, University of Bristol, Life Sciences Building, 24 Tyndall Avenue, BS8 1TQ, Bristol, UK.

The set of outcrops located along the former National Road N-260 and on the hill directly above the right bank of the Noguera Pallaresa river and on the forest track and hill on the left bank of the river constitutes one of the best and continues, but tectonically disrupted, Devonian successions in the Compte Subfacies (Fig. 1).

Dalloni (1913) already dated the Middle Devonian and Schmidt (1931) outlined the section and provided a tectono-stratigraphic scheme showing the relations between the Lower, Middle and Upper Devonian. Subsequently, Ziegler (1959) took 14 conodont samples along the previous scheme of Schmidt (1931) and was able to date the Emsian, the Middle Devonian and the Upper Devonian. The first detailed conodont study was undertaken by Boersma (1973). He focused only in the Compte Fm. and its three members (A-C) that roughly are equivalents of the modern Comabella, La Mena and Barousse Fms. respectively. His conodont record spanned from the *Icriodus obliquimarginatus* Zone through the *Scaliognathus anchoralis* Zone (Givetian-Tournaisian). Modern and more detailed conodont studies were accomplished by Valenzuela-Ríos et al. (2005), Valenzuela-Ríos & Liao (2012), Valenzuela-Ríos et al. (2015) and Slavík et al. (2016) for the Lochkovian and Pragian, Martínez-Pérez (2010), Martínez-Pérez et al. (2011) and Martínez-Pérez & Valenzuela-Ríos (2014) for the Emsian and Liao (2014), Liao & Valenzuela-Ríos (2008) and Gouwy et al. (2016) for the Givetian and Lower Frasnian.

The Lower Devonian in Compte is exposed in a fairly continuous section that is only moderately disturbed tectonically (section CP-I). The Lochkovian conodont record is essential for reinforcing the Pyrenean biostratigraphical framework, starts already in the *woschmidti* Zone and contains all the indexes of the overlain conodont zones up to the uppermost Lochkovian *gilberti-steinachensis* Zone (Valenzuela-Ríos et al., 2005; 2015; Valenzuela-Ríos & Liao, 2012). The Lochkovian/Pragian boundary is bracketed by the combination of conodont and fish records between Beds 49-55 (Valenzuela-Ríos et al., 2005). The Pragian is poor in conodont records and the Pragian/Emsian boundary cannot be yet identified in CP-I Section. The upper part of the section yielded Emsian conodonts of the Middle *excavatus* and *nothoperbonus* Zones (Martínez-Pérez, 2010; Martínez-Pérez et al., 2011; Martínez-Pérez & Valenzuela-Ríos, 2014).

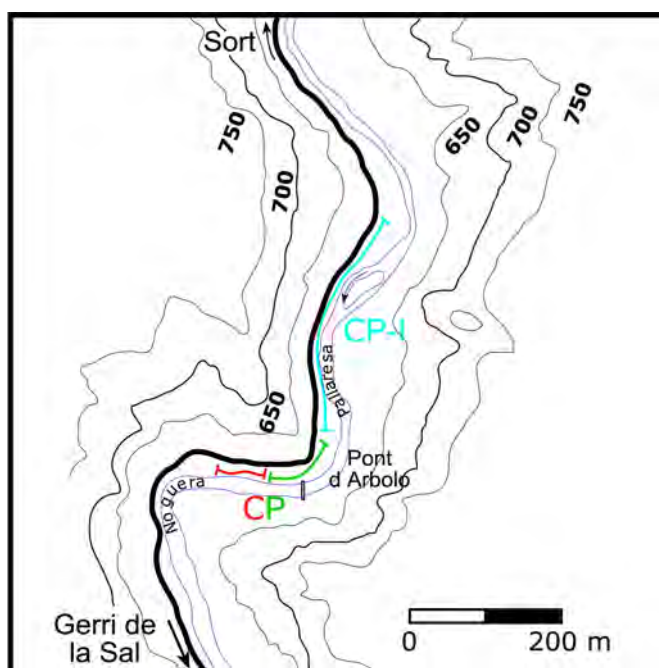


Figure 1. Location map of Compte sections, CP-I (Lower Devonian) and CP (Middle and Upper Devonian).

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

The Givetian (Middle Devonian) and early Frasnian (upper Devonian) is compiled from five sections along the road and in the hill (CP Section, Liao & Valenzuela-Ríos, 2008). The conodont record starts in the *timorensis* Zone and reaches, at least, to the Famennian *Pa. rhomboidea* Zone. Liao & Valenzuela-Ríos (2008) and Liao (2014) reported the detailed succession from the *hemiansatus-timorensis* to the Frasnian F3 Zone. Subsequent, sampling yielded conodonts of several Frasnian and Famennian Zones.

The sections at Compte exhibit probably one of the most complete Devonian successions in the Pyrenees and contain one of the best conodont records for several Stages (Lochkovian, part of Emsian, Givetian, Frasnian and Famennian). Ongoing research in new sections on the left bank of the Noguera Pallaresa river demonstrates the presence of Eifelian conodonts and would help to bridge the knowledge's gap around the Eifelian/Givetian transition in the Compte area. Besides conodonts other groups are also recorded in great numbers (fish microremains, lingulate brachiopods, dacryoconarids, ostracods, trilobites...) increasing the potential of these sections for correlations and reinforce their scientific value.

Acknowledgements

JCL is supported by the MINECO (Juan de la Cierva Postdoctoral Program, Ref. FJCI-2015-26813). This work represents a contribution to the IGCP-596 and IGCP-652 and to MINECO CGL2011-24775 project.

References

- BOERSMA, K.T.H. (1973): Devonian and Lower Carboniferous conodont biostratigraphy, Central Spanish Pyrenees. - *Leidse Geologische Mededelingen*, 49: 303-377.
- DALLONI, M. (1913): Stratigraphie et tectonique de la region des Nogueras (pyrenées centrales). - *Bulletin Société géologique du France*, 4, 13: 243-263.
- GOUWY, S., LIAO, J.-C. & VALENZUELA-RÍOS, J.I. (2016): Graphic correlation of the upper Eifelian to lower Frasnian (Middle-Upper Devonian) conodont sequences in the Spanish Central Pyrenees and comparison with composite standards from other areas. - *Palaeontologica Electronica*, 19.3.40A: 1-18. palaeo-electronica.org/content/2016/1620-pyrenean-givetian-correlation.
- LIAO, J.-C. (2014): Bioestratigrafía con conodontos del Givetiense y Frasnense del Pirineo Central Español. - Ph.D. thesis dissertation, University Complutense of Madrid, 533 pp.
- LIAO, J.-C. & VALENZUELA-RÍOS, J.I. (2008): Givetian and early Frasnian conodonts from the Compte section (Middle-Upper Devonian, Spanish Central Pyrenees). - *Geological Quarterly*, 52, 1: 1-18.
- MARTÍNEZ-PÉREZ, C. (2010): Conodontos del Emsiense (Devónico Inferior) del Pirineo Central Español. - Ph.D. thesis dissertation, University of Valencia, 376 pp.
- MARTÍNEZ-PÉREZ, C. & VALENZUELA-RÍOS, J.I. (2014): New Lower Devonian Polygnathids (Conodonta) from the Spanish Central Pyrenees, with comments on the early radiation of the group. - *Journal of Iberian Geology*, 40, 1: 141-155. DOI: 10.5209/rev_JIGE.2014.v40.n1.44095
- MARTÍNEZ-PÉREZ, C., VALENZUELA-RÍOS, J.I., NAVAS-PAREJO, P., LIAO, J.-C. & BOTELLA, H. (2011): Emsian (Lower Devonian) conodonts from the Spanish Central Pyrenees and the subdivision of the nothoperbonus Zone. - *Journal of Iberian Geology*, 37, 1: 45-64. doi: 10.5209/rev_JIGE.2011.v37.n1.4
- SCHMIDT, H. (1931): Das Paläozoikum der Spanischen Pyrenäen. - *Abhandlungen Göttingen Gesellschaft Wissenschaften*, 8: 980-1065.
- SLAVÍK, L., VALENZUELA-RÍOS, J.I., HLADIL, J., CHADIMOVÁ, L., LIAO, J.-C., HUŠKOVÁ, A., CALVO, H. & HRSTKA, T. (2016): Warming or cooling in the Pragian? Sedimentary record and petrophysical logs across the

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

Lochkovian–Pragian boundary in the Spanish Central Pyrenees. - *Palaeogeography, Palaeoclimatology, Palaeoecology*, 449: 300-320.

VALENZUELA-RÍOS, J.I. & LIAO, J.-C. (2012): Color change and Global Events, a hoax? A case study from the Lochkovian (Lower Devonian) in the Spanish Central Pyrenees. - *Palaeogeography, Palaeoclimatology, Palaeoecology*, 367-368: 219-230. doi: 10.1016/j.palaeo.2011.09.007

VALENZUELA-RÍOS, J.I., LIAO, J.-C., MARTÍNEZ-PÉREZ, C., CASTELLÓ, V. & BOTELLA, H. (2005): Datos preliminares sobre los conodontos y restos de peces del Lochkoviense (Devónico Inferior) de Compte-I (Valle del Noguera Pallaresa, Pirineos). - In: GÁMEZ, J.A., LIÑÁN, E. & VALENZUELA-RÍOS, J.I. (eds): *Memorias de las VIII Jornadas Aragonesas de Paleontología: "La cooperación Internacional en la Paleontología española. Homenaje al Profesor Peter Carls"*. 131-145.

VALENZUELA-RÍOS, J.I., SLAVÍK, L., LIAO, J.-C., CALVO, H., HUŠKOVÁ, A. & CHADIMOVÁ, L. (2015): The middle and upper Lochkovian (Lower Devonian) conodont successions in peri-Gondwana key localities (Spanish Central Pyrenees and Prague Synform) and their relevance for global correlations. - *Terra Nova*, 27: 409-415. DOI: 10.1111/ter.12172

ZIEGLER, W. (1959): Conodonten aus Devon und Karbon Südwesteuropas und Bemerkungen zur bretonischen Faltung (Montagne Noire, Massiv v. Mouthoumet, Span. Pyrenäen). - *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte*, 1959: 289-309.