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The Brachiopod World

Abstracts for IBC 7

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A revisited Silurian- Lower Devonian brachiopod biostratigraphy of North Patagonian Massif, Ventania system and Southern Paraná Basin. A regional correlation

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The first collections of Silurian-Devonian brachiopods from South America were realized by Charles Darwin (1833) in the Malvinas Islands, during his voyage on the H.M.S. Beagle around the world and they were lately described by Morris and Sharpe (1846). After that Clarke's monograph (1913) provided an approach on systematics and paleobiogeography of this fauna. Contemporary works were mainly focused in the Proto-Andean margin but the Silurian-Devonian faunas from the Atlantic outcrops (Fig. 1) especially those of North Patagonian Massif (Müller, 1965), Ventania (Andreis, 1964), Eastern Paraguay (Harrington, 1950; Wolfart, 1961) and Uruguay (Méndez-Alzola, 1938), remained poorly studied.

The Silurian brachiopods reviewed come from Sierra Grande Formation (Northern Patagonia) and Vargas Peña Formation (Eastern Paraguay, Parana Basin). This two sections bearing iron levels, ranging from iron coating to oolitic ironstones. From the Sierra Grande Formation two oolitic iron levels are recognised; below the first iron level it is found the fauna described as *Heterorthella freitana-Clarkeia antisiensis* (Müller, 1965); below the second iron level, the suggested presence of *Conularia quichua-Bainella* sp hinted a Lower Devonian age. However, recent studies (Siccardi et al. 2014), allowed recognized the Llandoverian brachiopods *Eostropheondonta chilcaensis* (BENEDETTO, 1995), *Heterorthella*? sp, *Dalmanella*? sp, *Hindella*? sp. and Ressellerids (*Resserella*?, *Vysbiella*?). In addition, a trilobite assemblage dominated by *Eoleonaspis* sp, supports the Llandoverian age (Rustán et al. 2013). The Vargas Peña Formation is included in the siliciclastic sequence of the Itacurubí Group (Hirnantian-Lower Silurian) and its brachiopod faunas known from are composed by *Anabaia paraguayensis* (HARRINGTON, 1950), accompanied of scarce inarticulates (Obolidae? indet.); the age assigned to this assemblage is Aeronian to late Telychian (Tortello et al. 2012 and references therein). Even though, in the Paraguayan outcrops oolitic ironstones have not been found, they are mentioned in subsurface drills.

Fig.1. Outcrop location. **(A)** Eastern Paraguay. **(B)** Uruguay (Durazno Department). **(C)** Sierra de la Ventana. **(D)** Sierra Grande.

The Lower Devonian brachiopod faunas that integrate this study have been collected from outcrops of the Lolén Formation (Sierra de la Ventana) and the Cordobés Formation (Uruguay, Durazno Department). In the base of the Lolén unit, the uppermost in the Ventana Group (Silurian?-Middle Devonian), an assemblage composed by *Cryptonella sp, Schellwienella sp, Leptocoelia* sp and *Derbyia* sp was originally mentioned by Andreis (1964) Following contributions (Isaacson, 1975, 1991), have also mentioned the presence of *Proboscidina arcei* ISAACSON, 1977. The fauna of the Lolen Formation is characterized by the low diversity and the strong deformation. However, the new collection from the recent field works has allowed to confirm the presence of the taxon previously described, as well as to identify the brachiopods Mutationelidae? indet, *Orbiculoidea*? sp, and *Pleurothyrella?*sp., accompanied by the bivalves *Nuculites* sp. The age suggested for this brachiopod assemblage is Lochkovian-Pragian (Suarez-Soruco, 2000). Devonian brachiopods from Uruguay registered in the Cordobés Formation (Durazno Group) are more diversified and associated to the Cordobés Formation, a dominantly shaly sequence. An Emsian faunal assemblage, dominated by the brachiopods *Australocoelia palmata* (MORRIS AND SHARPE, 1846) and *Orbiculoidea bainii*? SHARPE, 1856, accompanied by the less abundant *Derbyina? sp.*, *Pleurochonetes falklandicus* (MORRIS AND SHARPE, 1846), *Iridistrophia? sp.* and *Gigadiscina collis* (CLARKE,1913) has been herein recognized. The mixed dominance could be explained due to the overlap of the *Orbiculoidea* and *Australocoelia* communities.

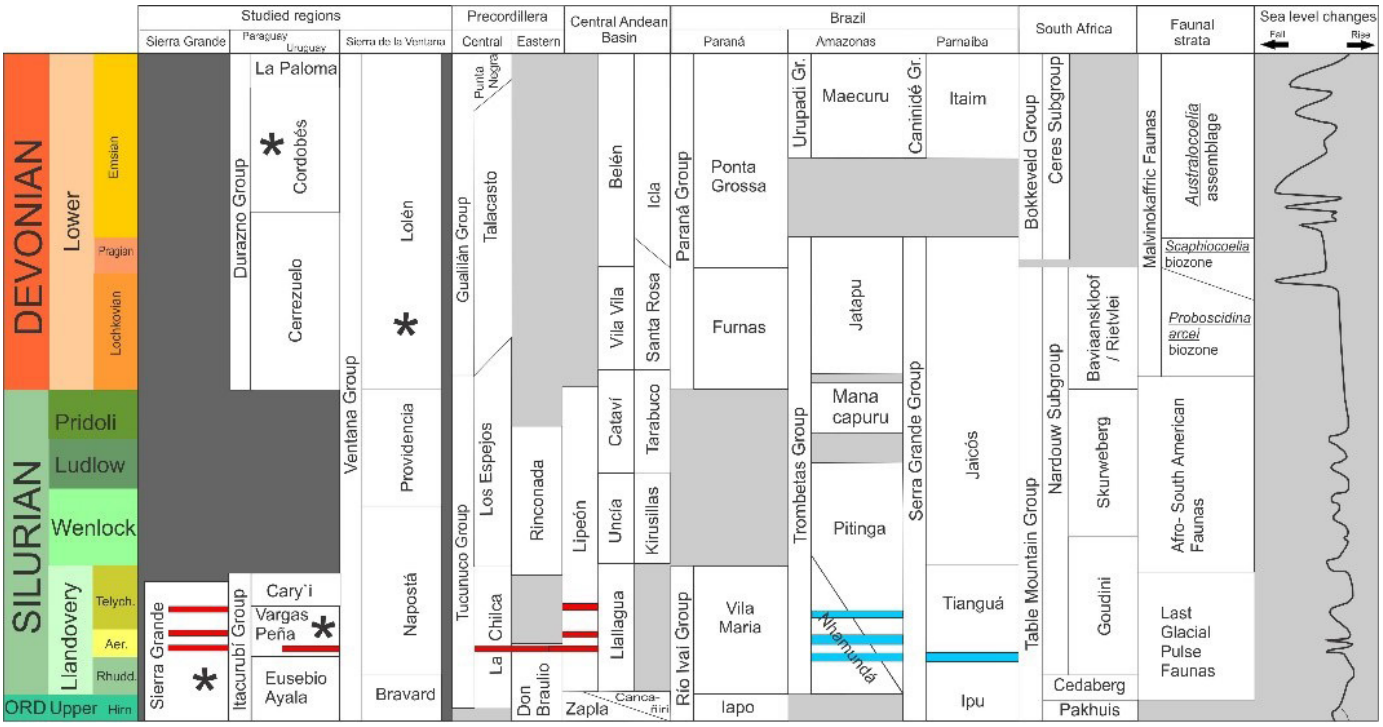

Fig.2. Regional correlations. Red lines represent oolitic ironstones, light blue lines glacial horizons. The brachiopods assemblages mentioned are pointed in the columns as asterisk.

According to the available data the Silurian correlations with others South American basins could be based on key faunal assemblages and sedimentary events: oolitic ironstones in the Proto-Andean margin and the glacial event in the North-eastern Brazil. The presences of oolitic ironstones between the faunas considered would provide an additional correlation tool. The oolitic ironstones are well-known from the Proto- Andean margin and having a biostratigraphical control. The oldest ages defined are Late Rhuddanian and the youngest, Late Telychian. When considering the hypothesis of the ironstones deposition and the glaciation events (Caputo, 1998), they could be traced as a response of interglacial early transgressive stages, during the last pulse of the Early Palaeozoic Glacial event. In the Sierra Grande Formation the *Eostropheondonta* and Ressellerids association dominate the brachiopod assemblage having an Ordovician mark, plus the absence of Ordovician key genera indicate a (Lower?) Rhuddanian age. Wenlockian faunas have not been registered in the studied sections. The correlations proposed are schematised in Fig.2.

Within the Lower Devonian interval, three key species could be recognised: *Proboscidina arcei*, *Scaphiocoelia boliviensis* WHITFIELD, 1890 and *Australocoelia palmata*. The first one, apart from being founded in Sierra de la Ventana, it is abundant during Lochkovian-Pragian times in several Bolivian localities and South Africa (Uppermost Nardouw Subgroup, Baviaanskloof Formation. Meanwhile *Scaphiocoelia* is traditionally proposed as a Pragian key genus, but it restricted to Bolivia and South Africa and records from others basins (Brazil and Precordillera) are confusing. During the Emsian stage, *Australocoelia palmata* became a common (and dominant) component of most of the shallow water brachiopod assemblages.

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The tommotiid *Dailyatia* from the Lower Cambrian of South Australia – Complications to the brachiopod stem

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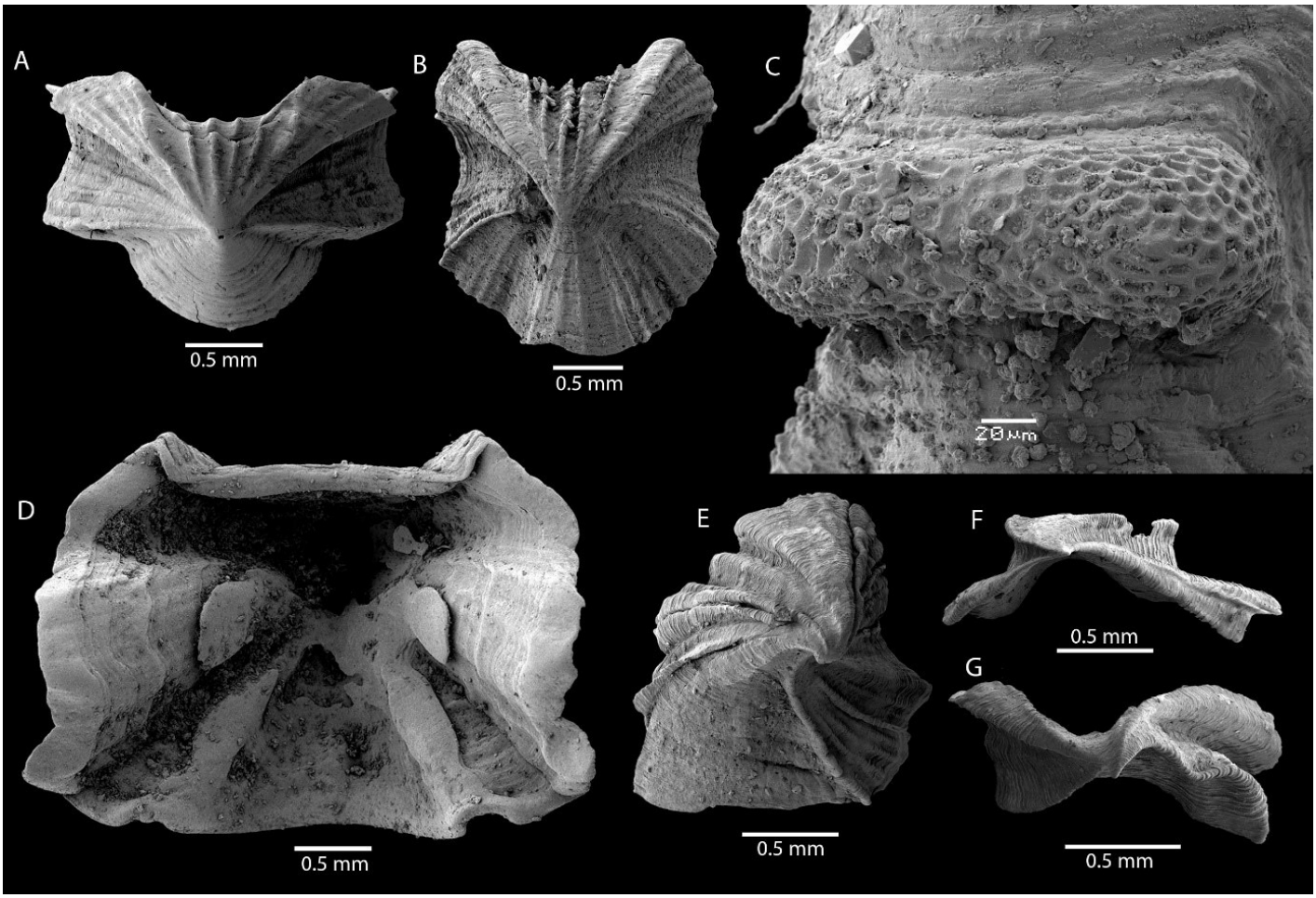

Fig. 1. *Dailyatia* sclerites from the Arrowie Basin of South Australia. A, A1 sclerite in apical view. B, A2 sclerite in apical view. C, detail of A1 sclerite apex with preserved "larval" structures. D, internal view of A1 sclerite showing two pairs of internal platforms and scar-like features. E, B sclerite in apical view. F, C1 sclerite in apical view. G, C2 sclerite in apical view.