**Ordovician to Early Devonian miospores**

**from South America: a state of the art review**

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For a long time, the miospore palynology of pre-Middle Devonian beds from South America has been little studied. Besides inaccessible private data belonging to petroleum societies and others, many papers on that matter have however recently been published, mostly on Brazilian and Argentinian localities. In this contribution, we critically review the current evidence.

The oldest cryptospores have been found in a Dapingian locality from Argentina. The material is poor and badly preserved. Those cryptospores have been interpreted as the earliest evidence for embryophytes (land plants). Despite of the presence of a tetrahedral tetrad, generally accepted as being exclusively linked to land plants, some authors questioned the embryophyte affinities of the Dapingian Argentinian cryptospore assemblage.

Late Ordovician cryptospore occurrences are infrequent in South America. In the Salar del Rincón Formation (Puna,northwesternArgentina), an assemblage of cryptospores has been isolated. The age of the Salar del Rincón Formation has been widely discussed. On the basis of various fossil evidences, the section crosses the Ordovician/Silurian boundary, ranging from the Hirnantian up to the Rhuddanian. Cryptospores are rare but diversified in the latest Ordovician part of the section. A typical assemblage has been collected from the Hirnantian beds, including among others *Pseudodyadospora petasus*, *Rimosotetras problematica*, *Segestrespora laevigata*, *S.membranifera*, ?*S. rugosa*, *Sphaerasaccus glabellus*.

The Hirnantian Caspalá Formation (Cordillera Oriental, northwestern Argentina) contains a rich assemblage of cryptospores, similar to the previous Ordovician one. The earliest trilete spores from the whole American continent are observed in the Caspalá Formation. They are: *Ambitisporites avitus*, *Leiotriletes* spp*.*, *Aneurospora*? sp*.* and *Chelinospora* cf*. prisca*.

The early Silurian is represented by the lower part of the post-glacial Lipeón Formation, in Cordillera Oriental and Sierras Subandinas, which yields less diverse cryptospore assemblages and only a few trilete spores (i.e. *Ambitisporites avitus*, *Leiotriletes* spp.) exclusively in the Caspalá section (Cordillera Oriental).

Three wells have penetrated Silurian beds from east Paraguay. Samples have been taken from the Itacurubi Group of the ParanaBasin. A biozonation has tentatively been established for the miospores observed in the Llandovery. However, recent observations in South America and other countries have demonstrated that the criteria used for this biozonation are no more relevant, except the first incoming of *Archaeozonotriles chulus*, close to the Aeronian/Telychian boundary.

Two other wells have been drilled through the upper part of the Eusebio Ayala, the Vargas Peña and the Cariyformations from east Paraguay and have been studied for miospores and chitinozoans. The *Archaeozonotriletes chulus/nanus* Morphon biozone characterizes the middle and upper Vargas Peña Formation and the lower Cariy Formation. The base of the *A. chulus/nanus* biozone of miospores corresponds approximately to the base of the chitinozoan *Conochitina proboscifera* biozone, *Desmochitina* cf. *densa* sub-biozone, and is probably close to the Aeronian/Telychian boundary.

Acritarchs and spores of the Tucunuco Group have been inventoried in different localities where the La Chilca and Los Espejos formations are outcropping, in the Central Precordillera of San Juan. No trilete spores were recorded in the Llandovery-Wenlock La Chilca Formation. In general, the abundance of trilete spores increases towards the upper levels of the Los Espejos Formation. Of special palaeogeographical and biostratigraphic interest is the presence of a possible, badly preserved ?*Streelispora newportensis* in the northern locality of Río Jáchal*.* Because of its importance a new sampling is necessary to confirm its presence. Moreover, *Chelinospora* cf*.cantabrica* is present in the lowest studied level of the same section, which appear in the *reticulata-sanpetrensis* (RS) biozone, suggesting a Ludlow–Early Pridoli? age. *Chelinospora retorrida*, *Cymbosporites paulus*? in Wellman 1993 and *Dictyotriletes* cf. *emsiensis*Morphon allow recognizing the Lochkovian *micrornatus-newportensis* (MN) biozone in the uppermost beds of the Los Espejos Formation. Thus, the Silurian/Devonian boundary was identified in that locality. Acritarchs and brachiopods support this age attribution.

Eighteen samples have been studied from Petrobras well 1-JD-1-AM in the Jandiatuba area, Solimoes Basin, northern Brazil. Fifty-three species were identified and it was possible to correlate the assemblage with the biostratigraphical scale of the Lower Devonian established in Europe. Authors have considered the samples as belonging to the biozone Z of the Oppel zone BZ. Numerous *Dictyotriletes* were recorded. Those ones that showed a morphological evolution from specimens similar to *Dictyotriletes granulatus* up to *D. emsienis* and *D.* cf. *subgranifer* were incorporated into the newly created morphon, *Dictyotriletes emsiensis*.

Hereby, we compare the successions of the main miospore events in South America with those from other palaeoplates. We also discuss the relationships between miospore and early land plant assemblages. The palaeogeographic implications of all those observations are herein evaluated.