

order, organic-walled microphytoplankton (both acritarchs and prasinophyte phycmata). The miospore assemblage contains taxa representative of the Middle to Upper Devonian. The species biostratigraphically most relevant are *Chelinospora concinna*, *Cristatisporites triangulatus*, *Geminospora lemurata*, *Retusotriletes rugulatus*, *Aneurospora greggsii* and *Verrucosiporites scurrus*. These taxa define a stratigraphical range comprising the Biozones *optimus-triangulatus* and *ovalis-bulliferus*, which implies an upper Givetian-lower Famennian age, the oldest age established in the IPB.

Concerning the marine microflora, the most noticeable feature is the record of different taxa of prasinophyte phycmata assignable to the genus *Maranhites* such *M. moesii*, *M. brasiliensis* and *M. britoi*, indicatives of a higher vertical stratigraphic range comprising Middle and Upper Devonian age. The acritarch content includes sparse specimens of *Gorgonisphaeridium* spp. erratically recorded.

Evidence from the palynological assemblage suggests a shallow marine environment close to mainland consistent with the interpretation provided by previous sedimentological studies.

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### New data on the palynostratigraphy of the Carboniferous succession of Variscan externides (SW Poland)

Górecka-Nowak, A.

University of Wrocław, Institute of Geological Sciences (Poland).

The monotonous Carboniferous turbidite succession of Variscan externides, occurring under the Foresudetic Monocline, was studied palynologically. These studies provided new and interesting palynostratigraphical data. Miospores were obtained from rock samples from 10 boreholes. Majority of the studied rocks haven't had a palaeontological documentation until now. Thermal maturity of the organic matter was various and represented all stages - from mature to metamorphosed. The precision of the stratigraphical conclusions was limited by the general poor preservation of miospores.

Results of the palynostratigraphical studies indicate that two rock successions of different age occur in the studied profiles. The older one is of Viséan? and/or Early Namurian age and was recorded in all of the boreholes. Age of the rock samples with poor preserved miospore assemblages was interpreted as Viséan-Namurian. Rich and well preserved miospore associations with *Kraeuselisporites ornatus*, *K. echinatus*, *Crassispora kosankei*, *C. maculosa*, *Rotaspora* spp., *Savitrissporites nux*, *Grandispora spinosa*, *Schulzospora* spp., *Secarisporites remotus*, *Spinozonotriletes uncatu* and *Bellisporites nitidus* from three boreholes allowed to limit their age to Namurian A. In profiles Siciny IG 1 and Marcinki IG 1 the younger rock succession was recorded. Presence of taxa *Torispora secutis*, *Microreticulatisporites nobilis*, *Triquirites sculptilis*, *Vestispora laevigata* and *V. costata* indicate on its Westphalian C age. In the latter rocks reworked miospores of Viséan-Namurian age were recorded. The duplication of stratigraphic intervals in these two profiles and no evidence of the Upper Namurian and Lower Westphalian rocks in the studied boreholes indicates an important role of thrust tectonics in that area.

### Palaeoenvironmental evolution of the Itararé Subgroup at Itaporanga (Upper Carboniferous, Paraná Basin), São Paulo State, Brazil, based on paleontologic and palynofacies data

Souza, P. A.<sup>1</sup>; Di Pasquo, M.<sup>2</sup> & Azcuy, C. L.<sup>2</sup>

<sup>1</sup> Departamento de Paleontologia e Estratigrafia, Instituto de Geociências, Universidade Federal do Rio Grande do Sul. Av. Bento Gonçalves, 9500, CEP 91.540-000, Porto Alegre, RS, Brazil (paulo.alves.souza@ufrgs.br).

<sup>2</sup> Consejo Nacional de Investigaciones Científicas y Técnicas y Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Ciencias Geológicas, Pabellón 2, Ciudad Universitaria, 1428 - Buenos Aires, Argentina (medipa@gl.fcen.uba.ar, azcuy@ciudad.com.ar).

New palynological data are presented from the Itararé Subgroup, which is related to the Permocarboneous Gondwana glacial event in the Brazilian Paraná Basin and includes marine and continental strata. This study is based on four fertile core levels from the IG-01 borehole at Itaporanga, São Paulo State, northeastern basin. The section analysed corresponds to the middle-upper part of the Itararé Subgroup and revealed rich palynological assemblages. Thirty species of spores, seventeen monosaccate pollen grains (one species striate), six bisaccate pollen grains (two species striated), one praecolpate pollen grain species and other, colpate were identified from a total of fifty-eight microspore species. Paleophytoplankton species like *Deusilites tenuistriatus* Gutiérrez, Césari and Archangel'sky, *Botryococcus braunii* Kützing and *Brazillea scissa* (Balme and Hennelly) Foster have also been recognised. Seven species of spores and one of pollen grain are recorded for the first time in the Brazilian Paraná Basin: *Retusotriletes anfractus* Menéndez and Azcuy, *Cyclogranisporites firmus* Jones and Truswell, *Apiculatasporites parviapiculatus* Azcuy, *Dibolisporites disfacies* Jones and Truswell, *Convolutispora muriornata* Menéndez, *Cristatisporites stellatus* (Azcuy) Gutiérrez and Limarino, *Kraeuselisporites volkheimerii* Azcuy and *Circumplicatipollis plicatus* Ottone and Azcuy. Taxonomic results, including a new species of spore and a new genus combination were presented by Di Pasquo *et al.* (2003a; 2003b).

Taking into account previous paleontological information from this well related to marine bivalves and brachiopods, palynological composition, botanical affinities, palynofacies characters, and lithology, an evolution of the palaeoenvironment / paleoclimatic conditions of depocentre is proposed. A first stage reflecting estuarine conditions is registered at the 76 m level. A second one linked with restricted coastal lagoon and dry-wet temperate seasonally climate features, corresponds to the 54 m level. The last episode interpreted as a low energy and normal salinity shelf setting is recognized at the 37 m and 36,5 m levels. Therefore, a relative sea-level rise upward the upper section of the Itararé Subgroup is recognised. This transgressive event may correlate with the retreat of glaciers during an interglacial period.

Marine invertebrates comprise species distributed from the Late Carboniferous to the Early Permian in Brazil and correlated Gondwana basins, preventing their use in correlation and as biostratigraphical markers. Besides, they have been found in low diversity. The palynological assemblages are attributed to the Late Carboniferous *Crucisaccites monoletus* Interval Zone (Souza, 2000; Souza & Marques-Toigo, 2001), in which spores and monosaccate pollen grains are dominant.

DI PASQUO, M.; AZCUIY, C.L. & SOUZA, P.A. 2003a. Palinología del Carbonífero Superior del Subgrupo Itararé en Itaporanga, Cuenca Paraná, Estado de São Paulo, Brasil. Parte 1: sistemática de esporas y paleofitoplancton. *Ameghiniana*, 40(3): 277-296.

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## On the fine morphology of *Plicatipollenites malabarensis* (Potonié & Sah) Foster 1975

Zavialova, N. E.<sup>1</sup> & Stephenson, M. H.<sup>2</sup>

<sup>1</sup> Palynological Laboratory, Institute for Geology and Development of Fossil Fuels, Vavilova ul. 25, b. 1, 117312, Moscow, Russia [zavial@mail.ru](mailto:zavial@mail.ru).

<sup>2</sup> British Geological Survey, Keyworth, Nottingham, NG12 5GG, UK.

The trilete monosaccate pollen taxon, *Plicatipollenites malabarensis* is characterized by radial symmetry, a prominent trilete mark and a continuous endexinal fold encircling the pollen corpus. Pollen grains of the taxon from the Early Permian of the Arabian Peninsula were studied using light microscopy (LM, Fig. 1), scanning electron microscopy (SEM), and transmission electron microscopy (TEM). A "crochet-like" sculpture is visible on the both sides of the corpus in SEM (Fig. 2, 3). On TEM ultramicrographs this sculpture is distinguishable as a thin undulated ectexinal layer. The dark area around the proximal trilete mark (LM) is caused by a slight thickening of the endexine in that area, though the ectexine does not change in thickness or morphology