



ELSEVIER

Disponible en ligne sur

ScienceDirect
www.sciencedirect.com

Elsevier Masson France

EM|consulte
www.em-consulte.com/en

Revue de
micropaléontologie

Revue de micropaléontologie xxx (2016) xxx-xxx

ARAMCO-CIMP special volume

Provincial Devonian spores from South China, Saudi Arabia and Australia

Des spores provinciales du Dévonien provenant de Chine du Sud, d'Arabie Saoudite et d'Australie

John E.A. Marshall^{a,b,*}, Huaicheng Zhu^{a,*}, Charles H. Wellman^c, Christopher M. Berry^d,
Yi Wang^a, Honghe Xu^a, Pierre Breuer^e

^a State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing 210008, China

^b Ocean and Earth Science, University of Southampton, National Oceanography Centre, SO14 3ZH Southampton, UK

^c Department of Animal and Plant Sciences, University of Sheffield, Alfred Denny Building, Western Bank, S10 2TN Sheffield, UK

^d School of Earth and Ocean Sciences, Cardiff University, CF10 3YE Cardiff, UK

^e Saudi Aramco, Geological Technical Services Division, Biostratigraphy Group, 31311 Dhahran, Saudi Arabia

Abstract

A spore assemblage from Maoshan, Luquan County, Yunnan Province, South China includes well known Mid Devonian spores including *Archaeozonotriletes variabilis*, *Cirratriletes monogrammos*, *Grandispora libyensis*, *Geminispora lemurata*, *Cymbosporites magnificus* and *Ancyrospora* spp. which constrain the age to Givetian (late Mid Devonian). There are also elements that occur in the Givetian of South China and Australia such as *Archaeoperisaccus indistinctus* (senior synonym of *A. rhacodes*) that also occur very rarely in Saudi Arabia. The Maoshan assemblage moreover contains species of *Rotaspora*. In the Adavale Basin of Australia and Saudi Arabia there is a similar plexus of provincial species of *Rotaspora* but of Emsian age. In addition, there is the morphologically distinct spore *Tribojasporites*, a genus that was only known previously from the Emsian of Australia. The converse also occurs with spores such as *Dictyotriletes biornatus*, only previously known from the late Pragian to mid Emsian of Saudi Arabia, found as rare specimens in Maoshan. This demonstrates that the Maoshan spore assemblage contains spores that are restricted to the northern margin of Gondwana but with younger ranges and represent relict populations that survived in isolation on the South China terrane. Blooms of the hydrodictyacean chlorococcalean alga *Musivum gradzinskii* previously known only from Poland and Saudi Arabia are also present at Maoshan.

© 2016 Published by Elsevier Masson SAS.

Keywords: Devonian; Miospores; Stratigraphy; China; Saudi Arabia; Australia; Biogeography

Résumé

Un assemblage de spores de Maoshan, Département de Luquan, Province du Yunnan, Chine du Sud comprend des spores bien connues du Dévonien Moyen tels qu'*Archaeozonotriletes variabilis*, *Cirratriletes monogrammos*, *Grandispora libyensis*, *Geminispora lemurata*, *Cymbosporites magnificus* et *Ancyrospora* spp. qui contraignent l'âge au Givétien (Dévonien Moyen supérieur). Il y a aussi des éléments qui apparaissent dans le Givétien en Chine du Sud et Australie tels qu'*Archaeoperisaccus indistinctus* (synonyme senior de *A. rhacodes*) qui sont rarement trouvés en Arabie Saoudite. L'assemblage de Maoshan contient en outre des espèces de *Rotaspora*. Dans le bassin d'Adavale en Australie et en Arabie Saoudite, il existe un plexus similaire d'espèces provinciales de *Rotaspora* mais d'âge Emsien. De plus, il existe des spores morphologiquement distinctes de *Tribojasporites*, un genre qui était connu antérieurement dans l'Emsien d'Australie. L'inverse existe également avec des spores telles que *Dictyotriletes biornatus*, précédemment connu du Praguén supérieur à l'Emsien moyen d'Arabie Saoudite, qui apparaît rarement à Maoshan. Cela démontre que l'assemblage de spores de Maoshan comprend des espèces, qui se limitent à la marge nord du Gondwana, mais avec un âge plus jeune, et représentent des populations reliques, qui ont survécu en isolement sur le terrane de Chine du Sud. Des blooms d'algues Hydrodictyacées (Chlorococcales) *Musivum gradzinskii*, précédemment connu seulement en Pologne et Arabie Saoudite, sont également présents à Maoshan.

© 2016 Publié par Elsevier Masson SAS.

Mots clés : Dévonien ; Miospores ; Stratigraphie ; Chine ; Arabie Saoudite ; Australie ; Biogéographie

* Corresponding authors.

E-mail address: hc Zhu@nigpas.ac.cn (H. Zhu).

<http://dx.doi.org/10.1016/j.revmic.2016.10.003>

0035-1598/© 2016 Published by Elsevier Masson SAS.

1. Introduction

Present day China is an amalgam of terranes. During the Palaeozoic, a group of these terranes (e.g., Indochina, North and South China; Xiao et al., 2010 and Fig. 1) were spread across the Palaeo-Asian Ocean including a series of volcanic arcs (the Altaids) that intermittently linked through to Siberia and Kazakhstan (Xiao and Santosh, 2014). These terranes coalesced as part of a continuing series of collisions during the Palaeozoic and early Mesozoic. The distribution of these dispersed terranes and their palaeofloras is of some significance as they acted as gateways (Xu et al., 2012, 2014) for the migration of Devonian plants during the global spread of the first forests.

One key characteristic of the Devonian faunas on these terranes was endemism that was particularly demonstrated by the highly unusual early Devonian fossil fish from South China (Zhao and Zhu, 2007). Similar endemism in the plants and spore palynofloras is not so obvious although the floras are clearly different (Wang et al., 2007, 2010), generally lacking some major Devonian plant groups (e.g. progymnosperms) and are very much dominated by lycopods.

This contribution focuses on Devonian deposits in Yunnan on the South China Block. Here the younger Mid Devonian (Givetian) spore floras were described in a number of monographs by Lu and Ouyang (1978) and Lu (1980a, 1988) but with few unique morphotypes that are unknown elsewhere in the Devonian. Here we introduce the spore palynoflora from a new section of the Haikou Formation at Maoshan (Fig. 2) in Yunnan. These are also late Mid Devonian in age but contain a number of distinct morphotypes. We can now understand their significance following the recent publications by colleagues (Al-Ghazi, 2007; Breuer et al., 2007; Breuer and Steemans, 2013;

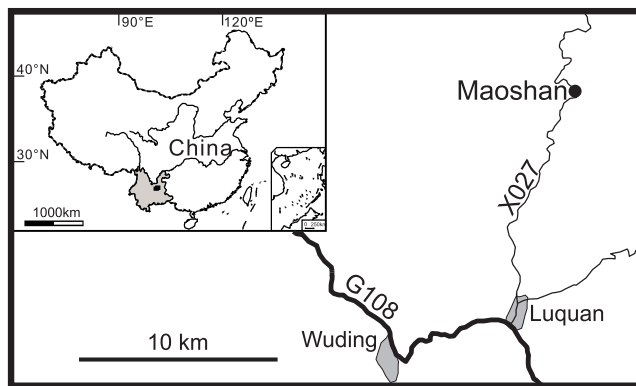


Fig. 2. Location of Maoshan in Yunnan, China. The locality is off the X027, Luda Road. The insert map of China has Yunnan shaded grey.

Breuer et al., 2015) on the CIMP-Saudi Aramco Project that has filled an information gap on the Arabian Plate. This enables a more detailed comparison of spore ranges and biogeography between Arabia, China and Australia.

2. Material and methods

In 2006, a small set (14) of Haikou Formation samples were collected from a section at Maoshan. When these proved to contain a very interesting assemblage the locality was revisited (2014) and a closely spaced set of 43 samples collected through a measured (Fig. 3) and internally correlated section. These samples were processed by standard palynological methods of 30% HCl to remove carbonates, followed by decant washing to neutral then demineralisation with 60% cold HF. The samples were again washed to neutral and then sieved at 15 µm. Any remaining

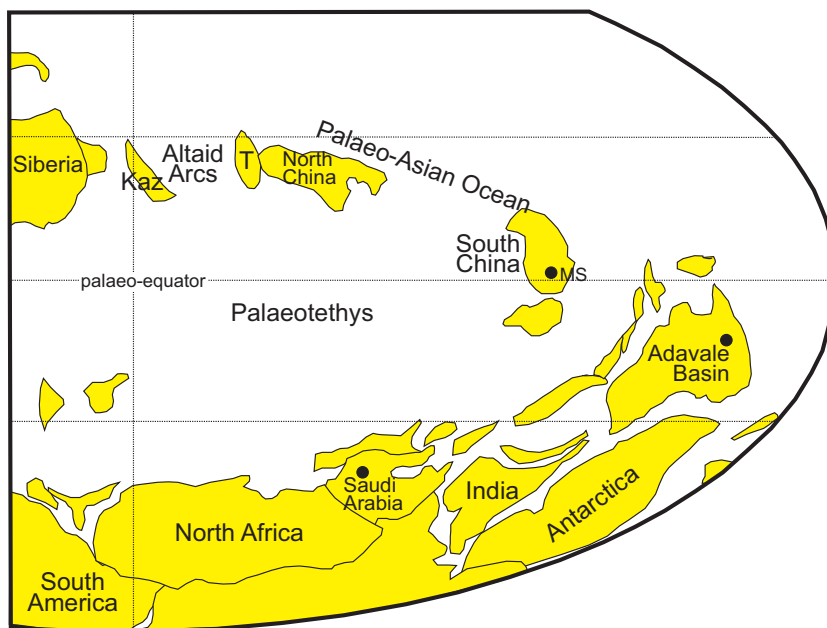


Fig. 1. Location of Maoshan (MS) on the South China Block. It is one of a series of isolated terranes within Palaeotethys that links northern Gondwana to Siberia. The location of the Devonian spore assemblages from Australia (Adavale Basin) and Saudi Arabia are also shown. Kaz: Kazakhstan; T: Tarim. Map from Domeier and Torsvik (2014).

Download English Version:

<https://daneshyari.com/en/article/5788438>

Download Persian Version:

<https://daneshyari.com/article/5788438>

[Daneshyari.com](https://daneshyari.com)