### Commission Internationale de Microflore du Paléozoïque

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*Timofeevia phosphoritica*  
Vanguestaine. Vesicle diameter c. 33 microns

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CIMP homepage:  
http://www.cimp.ulg.ac.be
Opinion: ‘Peak Oil’ and industrial biostratigraphy

Mike Stephenson, mhste@bgs.ac.uk

In the past few weeks a project on the ‘future of geological surveys’ has been underway at the British Geological Survey. One of the topics of discussion has been the effect of future trends on geological survey work. In particular the effects of the growth of the Chinese economy and of computing technology were discussed. During this period I became interested in ‘Peak Oil’ and its possible effects on industrial biostratigraphy and palynology.

‘Peak Oil’ is the concept that there will be a time when maximum rate of oil production is reached and that there are far reaching geopolitical ramifications related to its real or perceived occurrence. The study of ‘Peak Oil’ is a complex mix of geology, geopolitics and economics. ‘Peak Oil’ will have a very strong influence on how a geological survey will do business in the future and also on how palynologists involved in commercial or applied work for oil companies will work in the future.

Some researchers say that ‘Peak Oil’ is about to occur and that very high oil price and geopolitical change is imminent. The graph below shows one opinion of the timing and form of ‘Peak Oil’, though there are as many opinions as there are authors.

‘Peak Oil’ according to Campbell (2004). Diagram courtesy of M. I. Al-Husseini, GeoArabia, Gulf Petrolink, Bahrain.

The study of ‘Peak Oil’ was pioneered by the Association for the Study of Peak Oil, ASPO (http://www.peakoil.net/), and numerous books have been published on the subject. Amongst these is the 2005 book ‘Half Gone’ by ex-stratigrapher Dr Jeremy Leggett.

‘Peak Oil’ seems to have a control on oil price. One reason for present high oil prices (according to numerous articles) is that demand is equal to supply for the first time for many years. Most companies and countries are now producing at close to 100% of capacity. Thus oil prices are rising. When ‘Peak Oil’ is reached it is widely thought that the markets will react psychologically and prices will suddenly rise at a higher rate. This is because of the perception that ‘oil is finally running out’. Whether supply is still good, prices will still rise because of this perception.

No one seems to know when ‘Peak Oil’ will occur. The main problem is that few are very honest about their reserves. Companies want to keep their stock high and please their shareholders. The alternative energy lobby also tend to underestimate to time to ‘Peak Oil’, for obvious reasons.

Few countries are doing anything about ‘Peak Oil’. President George Bush is believed to have tacitly
acknowledged the problem by talking about America’s ‘Addiction to oil’. The USA reached its own local ‘Peak Oil’ in 1970, and Britain, 2000.

How might ‘Peak Oil’ affect industrial biostratigraphy? I tried to think about this by looking at previous local ‘Peak Oils’ in the USA and Britain. In Britain the approach to North Sea ‘Peak Oil’ was associated with a switch from technology aimed at exploration to technology (including palynology) aimed at production and reservoir geology. As ‘Peak Oil’ approached, many big companies left the North Sea and a larger number of smaller companies took over. This opened up new opportunities. Overall the little oil that is left generally needs more technology (including palynology) to get it out.

Perhaps more clear is the relationship in the USA between peak oil and new technology aimed at getting ‘difficult oil’ out. ‘Peak Oil’ in the USA was related to the evolution of coal bed methane extraction technology and steam injection technology. Neither of these technologies would have evolved without the threat and high prices associated with ‘Peak Oil’.

The key for applied industrial palynologists is to see new opportunites as these technologies evolve. For example, how can palynology contribute to steam injection technology, which aims at getting heavy slow flowing oil out of reservoirs? Can palynology help to model reservoirs into which waste water (after condensation) must be pumped? How can industrial palynology contribute to understanding complex hydrocarbon reservoirs that contain many mudstone baffles?

Probably industrial palynologists should be thinking more about this.

CIMP members are reminded that PALYNOS, the newsletter of the “International Federation of Palynological Societies” (IFPS), is no longer distributed in hard copy. However, all issues of PALYNOS are made available in electronic format on the IFPS website <http://geo.arizona.edu/palynology/ifps.html>. PALYNOS is published biannually in June and December.

Forthcoming conferences

IGCP 503 Annual Meeting

Glasgow, Scotland

August 29 - September 1, 2006: the Meeting

September 2-4, 2006: Excursion to southern Scotland

This will be the main IGCP 503 meeting in 2006 and it will be organised by Alan Owen. The main part of the conference will be from 30 August to 1 September with registration on Tuesday 29 August. There will be an afternoon mid-conference excursion and various evening social events including a whisky tasting. In addition, there will be a one-day pre-conference excursion.
including the Ordovician-Silurian boundary stratotype section at Dob's Linn on Tuesday 29 August and a 3-4 day post-conference excursion concentrating on the classical Ordovician and Silurian successions in southern Scotland at Girvan and in the Pentland Hills.

The main focus of the meeting will be on changing palaeogeographical and palaeobiogeographical patterns in the Ordovician and Silurian, but contributions on any topic relevant to the aims of IGCP 503 will be welcome.

Alan Owen (a.owen@ges.gla.ac.uk)

More details will appear on the IGCP 503 website soon.

Prague CIMP meeting


SEPTEMBER 2-6, 2006

Prague, Czech Republic

Institute of Geology, Academy of Sciences of the Czech Republic, Prague & Charles University Prague, Institute of Geology and Palaeontology

ORGANIZING COMMITTEE

Jiri Bek, Oldrich Fatka, Jirina Dasková and Rainer Brocke

GENERAL INFORMATION

The CIMP General Meeting will convene in Prague, the capital of Czech Republic, from 2-6 September 2006.

Czech palynology has a long research tradition of Palaeozoic palynomorphs, including acritarchs, spores and pollen. The meeting is open to all palynologists interested in any aspects of Palaeozoic palynology. The scientific program will include symposia, contributed talks, posters, poster sessions, and meetings of working groups, associated with workshops.

Pre-conference and post-conference field trips are planned to the Barrandian Early Palaeozoic.

Prague, the capital of Czech Republic, is one of the most beautiful cities in Europe with attractive sites of medieval architecture. The landscape and art have created a manifold collection of monuments from the tenth Century – starting with Romanesque churches up to modern buildings – making thus a unique open-air gallery on a relatively small area lying on Ordovician to Devonian rocks.

LANGUAGE

The official language of the meeting is English

SCIENTIFIC PROGRAMME:

The scientific program will consist of invited papers, contributed talks and papers and poster sessions. Each participant is invited to present results of original research or reviews of particular subjects.

PROVISIONAL FORM OF THE MEETING

Meeting theme: Palaeozoic palynology in space and time

TOPICS:

A. Palaeozoic marine microplankton

Contributions are welcome on any aspect of marine microplankton, including acritarchs, prasinophycean algae and associated forms.

B. Palaeozoic spores and pollen

Contributions are welcome on any aspect of spores and pollen, including cryptospores, microspores and megasporps.

C. Chitinozoans, dinoflagellates and scolecodonts
Contributions are welcome on any aspect of chitinozoan, dinoflagellate and scolecodont research, including taxonomy, biostratigraphy, palaeoenvironments, palaeoecology and palaeogeography.

D. Open presentations

Contributions will be welcome on all aspects of Palaeozoic palynology, including non-marine microplankton, kerogen studies, organic palynofacies, palaeoecology, palaeoenvironments, palaeogeography, taphonomy and taxonomy.

Presentations from students as talks or posters are most welcome on any aspect of Palaeozoic palynology and will be placed in the appropriate session.

WORKSHOPS:

1. Permo-Carboniferous of Gondwana (sponsored by Petroleum Development Oman)

Chairman: Mike Stephenson, British Geological Survey, UK (probably Tuesday, 5th September)

MEETINGS OF CIMP SUBCOMMISSIONS

Meetings of CIMP subcommissions will be every day after scientific programme.

GENERAL CIMP ADMINISTRATIVE SESSION

General CIMP administrative session will be the last afternoon.

EPPC 2006, September 6-11, 2006, Prague, Czech Republic


Contact details:

7EPPC 2006, Conference Partners, Sokolská 26, 120 00 Prague 2, Czech Republic, Mobile phone: + 420 608 408 708, Phone: + 420 224 262 108 - 09, Fax: + 420 224 261 703, 224 262 109, E-mail: eppc2006@conference.cz

AASP 39th Annual Meeting, Philadelphia


Organizers

Thomas Demchuk

Doug Nichols

The American Association of Stratigraphic Palynologists (AASP) invites all interested parties attending the October 2006 GSA meeting in Philadelphia to come by the AASP Booth #1231 in the Micropaleo Corner. We would like to meet you and give you further information about us and/or attendance at one of our sponsored events (Topical Sessions listed below).

The AASP web site (http://palynology.org) includes a meetings page that lists our special events this year (e.g., a pre-meeting trip to the premier birding site of Cape May, New Jersey; an evening get-
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together with other micropaleontology workers – NAMS and Cushman Foundation.

We hope that our fellow palynologists (professional, industry, academic or student) will be presenting in one of the Topical Sessions sponsored or co-sponsored by AASP, but even if you are not, please visit http://www.geosociety.org/meetings/2006/sessions/topical.asp for more information about our sessions. Feel free to drop by. We look forward to meeting you!

T9. “Ice House”/”Hothouse” – An Analysis of Late Paleozoic Floras and Their Response to Global Climate Change. Tuesday AM, 8:00-12:00, Convention Center 113-A

T108. Stratigraphic Palynology: Applications to Geologic Problems. Monday AM, 8:00-10:30, Convention Center 112-B

Abstract Deadline: 11 July. The electronic submission form will go offline at midnight, Pacific Time. Absolutely, no abstracts will be accepted after this deadline has passed. Accepted abstracts will be posted in mid-August, with links to speakers and titles.

Birbal Sahni Institute of Palaeobotany
15-17 November, 2006
Changing Scenarios in Palaeobotany Part of BSI's Diamond Jubilee

Celebration, Birbal Sahni Institute of Palaeobotany, Lucknow, India.

Non-Indian Registration fee: before 31 March, 2006, $ 500
Conference Web Page
www.bsip.res.in/

XVI ICCP, Nanjing China
June 21- June 24, 2007

Important dates
April 15, 2006: First Circular available online
May 15, 2006: Distribution of the First Circular mainly by e-mail
December 31, 2006: Deadline for returning the Reply Form from the 1st Circular
February 1, 2007: Second Circular available online and distribution
April 1, 2007: Deadline for pre-registration and abstract submission
May 1, 2007: Third Circular available online.
December 31, 2007: Deadline for manuscript submission to the proceedings volume

Proposed sessions:
• S1 Carboniferous and Permian Palaeobotany and Microflora
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• S2 Carboniferous and Permian Macro-and microfossils
• S3 Devonian F-F Mass Extinction and Mississippian Recovery
• S4 Biotic Turnovers during the mid-Carboniferous boundary and Early
• S5 Carboniferous and Permian Reef, Biofacies, and Basin Analysis
• S6 Evolutionary Palaeogeography and Palaeoclimatology
• S7 Integrative Stratigraphy and High Resolution Biostratigraphy
• S8 Isotopic Geochemistry and Geobiology in the Permo-Carboniferous
• S9 Gondwana and Peri-Gondwana Faunas, Stratigraphy, and Geology
• S10 Bio-Diversity Patterns and Quantitative Analysis of Biotic Databases
• S11 Stratotypes, Boundaries, and Global Correlations
• S12 End-Permian Biotic Mass Extinction and Early-Triassic Recovery
• S13 Pangea formation and breakup
• S14 Cyclothemic Stratigraphy and Sequence Stratigraphy
• S15 Carboniferous and Permian Coal, Petroleum, and Economic
• S16 Computerized Palaeontology
• S17 Palaeontological Education for the Public

IPC 2006: Conference Report
Mike Stephenson
SECOND INTERNATIONAL PALAEONTOLOGICAL CONGRESS (IPC2006), BEIJING, PEOPLE'S REPUBLIC OF CHINA, JUNE 17-21, 2006

This congress followed the highly successful first IPC2002 held in Sydney, and focussed on new research findings relating to fossil organisms, with emphasis on the convention theme ‘Ancient Life and Modern Approaches’.

A series of scientific sessions including plenary and special sessions, general and topic symposia, short courses and special group meetings were arranged. In addition, pre-, post congress and mid-conference field excursions were organized to examine the best-exposed strata and well-preserved fossil localities in China. Excellent social events and programs were arranged and focussed on tours of Beijing's historic attractions, museums, art and galleries.
PKU Hall - Meeting place for IPC2006 Opening, Plenary and Closing Sessions

The sessions were held on the campus of Peking University in Beijing. Founded in 1898, Peking University (PKU) is the first national university in Chinese modern history. The university consists of five faculties (Humanities, Social Sciences, Sciences, Medicine, and Information Technology and Engineering) with more than 30,000 students, of which approximately 4,000 are international students. The landscaped campus of Peking University, Yan Yuan, is located in what used to be part of an ancient royal garden near the Yuanming Gardens and the Summer Palace.

The Department of Geology (School of Earth and Space Sciences) at Peking University was established in 1909, as one of the earliest departments in the Science Faculty. Since its establishment, the department has played an important role in geological education and research in China and is considered the cradle of Chinese geologists and paleontologists.

Yingjie Conference Center, PKU - Meeting Place for IPC2006 General, Special and Topical Sessions

The Sunshine Hall in the Yingjie Conference Center

SCIENTIFIC SESSIONS

These consisted of plenary sessions, special sessions, general sessions and topical sessions.

Plenary sessions lasting 40 minutes provided some general reviews of new important fields:

1. Per E. Ahlberg (Uppsala University, Sweden): Closing the gap: intermediate character suites and lifestyles at the fish-tetrapod transition
2. Derek E.G. Briggs (Yale University, USA): Molecular Taphonomy
3. Dianne Edwards (University of Cardiff, UK): The greening of Earth and its consequences
4. Douglas H. Erwin (Smithsonian Institution, USA): The Cambrian radiation
5. Else Marie Friis (Swedish Museum of Natural History, Sweden): Secrets of Cretaceous flowers unravelled by X-ray tomography

6. Shuzhong Shen (Nanjing Institute of Geology & Palaeontology, CAS, China): The greatest end-Permian catastrophic events: Progress and perspectives from China

7. Roger Summons (Massachusetts Institute of Technology, USA): Molecular Evidence for Radical Changes in Ocean Chemistry, Globally, Across the Permian Triassic Boundary


For me the highlights of the plenary sessions were Per Ahlberg’s discussion of the evolution of fish and tetrapods, particularly since the discovery of articulated *Acanthostega*, and Dianne Edwards’ discussion of early records of interactions between terrestrial plants, invertebrates and fungi.

Special sessions were designed to address broad fundamental and interdisciplinary issues in palaeontology. Each session included keynote talks, invited talks and volunteer talks.

S1. Palaeoembryology and developmental biology in Earth history
S2. Geo-biodiversity: taxa, morphology and ecology
S3. The EARTHTIME project (cancelled)
S4. Evo-devo, palaeontology and evolution (replacing former symposium S4 entitled ‘Geological records of astronomical processes and their impact to biological evolution’)
S5. Fossil microbial communities and their geological processes (cancelled)
S6. Past and present global changes and biotic saltations.

Within the special sessions there were relatively few palynological talks, apart from those by Sateeja & Rai on acritarch evolution across the Precambrian-Cambrian boundary and Huimei Chi’s talk on ultrastructure of Neoproterozoic microfossils.

General symposia: These focussed on branch disciplines of paleontology and were mostly composed of volunteer oral and poster presentations.

G1. Palaeobotany
G2. Microflora (merged to G1)
G3. Invertebrate paleontology
G4. Vertebrate paleontology
G5. Fossil lagerstaetten
G6. Trace fossil and ichnofacies
G7. Palaeoecology, paleobiogeography, paleogeography and paleoclimate
G8. Reef evolution (cancelled)
G9. Computer analysis of fossil data & morphometrics (cancelled)
G10. Impact stratigraphy, chemostratigraphy (cancelled)
G11. High-Resolution and High-Impact Biostratigraphy
G12. Integrative stratigraphy
G13. Paleoanthropology (merged to G4 and G14)

Amongst the general sessions, G1 was most relevant to palynologists, after G2 was merged with G1. Interesting talks included Mohammad Ghavidel-Syooki’s talks on Iranian Cambrian
and Ordovician palynology and Akiko Tomitani’s talk about evolution in cyanobacteria.

Topical symposia: These provided opportunities to exchange information about major international projects in planning, on going or in conclusion.

T1. Earliest Evidence of Life on Earth (replacing the former T1 symposium title: ‘Archean paleobiology and implications for astrobiology’)

T2. Neoproterozoic paleobiology and geobiology (IGCP 512)

T3. Cambrian radiations and extinctions

T4. Ordovician World: temporal and spatial changes in physical and biotic environments (IGCP 503)

T5. Middle Paleozoic vertebrate biogeography, paleogeography and climate (IGCP 491)

T6. Early vascular plant diversity and environmental interactions

T7. Devonian land-sea interaction: evolution of ecosystems and climate (IGCP 499)

T8. Late Paleozoic: the end-Permian extinction following a 100 m.y. long stability

T9. Triassic Marine vertebrates and marine ecosystem

T10. Life and environment of Triassic Time (IGCP 467)

T11. Triassic-Jurassic boundary events (IGCP 458)

T12. Marine and non-marine Jurassic: biodiversity and ecosystems (IGCP506)

T13. Reconstructing the Lower Cretaceous terrestrial ecosystem—evidence from the Jehol Biota in China and its lateral equivalents in other areas

T14. Dawn of the Danian (65-61 Ma) (IGCP 522)

T15. Neogene climate, biodiversity change and ecosystem

T16. Mammals: phylogeny, divergence and biogeography

T17. The evolutionary history of vent, seep and other chemosynthetic ecosystems (combined with T19. Note: former T17 on Neogene climate merged to session T15)

T18. Ancient molecules and isotope signals: methodology and application (replacing former T18 entitled "Molecular clock vs. lineage divergences from fossil record")

T19. Black smokers & cold seep faunas (merged to session T17)

T20. Evolution of the pelagic realm

T21. Stratigraphy of orogeny belts


T24. Sharing information sources of paleontology and stratigraphy (cancelled)

T25. The past, present, and future of paleontology in China


Amongst the topical sessions perhaps the most interesting for me was T2 which discussed Neoproterozoic paleobiology and geobiology and T8 which discussed the end-Permian extinction following a 100 m.y. long stability.

The main palynological abstracts of IPC 2006 will be reproduced in the next issue of CIMP Newsletter by
kind permission of the IPC 2006 organizers.

IPC 2006 Excursion travelogue
Tibetan Himalayas
Mike Stephenson

This was my first visit to the Himalayas. For me it was an opportunity to see Upper Paleozoic to Triassic successions of Tibet. The trip was lead ably by Xiaochi Jin of the Institute of Geology, Chinese Academy of Geological Sciences and was designed to show the Ordovician to Cretaceous on the northern slope of the Tibetan Himalayas along Road G318, which is also locally called the Sino-Nepalese Road (from Lhasa to Katmandu). The route is shown below.

OUTITENARY
The excursion began on June 22 with a flight from Beijing to Lhasa and an overnight in Lhasa. The next day we drove from Lhasa to Xigaze (Shigatse) and overnighted there. Along the route we looked at the Quxu Granites, Cenozoic sediments and the river valley of the Yarlung Zangbo near Dagzhuka, and the Cretaceous Xigaze Group.

On June 24 we drove from Xigaze to Nyalam and overnighted in Nyalam. The city of Xigaze is located close to the Yarlung Zangbo suture zone. It lies to the north of the ophiolite suites and sits on the Xigaze Group, which is often interpreted as sediments related to the Himalayan suturing process in the Late Cretaceous. Besides the Xigaze Group, we saw between Xigaze and Lhaze, outcrops of serpentinized basic intrusives, Paleogene red beds (mainly conglomerate), and deformed Upper Triassic clastic successions. From Lhaze to Nyalam we passed over two passes with elevations of more than 5000 m.

On June 25 we visited Devonian and Carboniferous sections and again overnighted in Nyalam. Well-exposed Devonian and Carboniferous sediments appear about 2 km south of the village of Yalai and extend northwards. The Devonian system here is composed in the lower part of about 30 m thick
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shale and thin-bedded siltstone containing graptolites and tentaculitids, and in the middle-upper part of about 250 m of thick medium-bedded sandstones. Carboniferous sediments are, generally speaking, composed of alternations of whitish quartz sandstones and dark siltstones and mudstones or shales.

On June 26 we visited Permian and Triassic sections and overnighted in Nyalam. Permian sediments appear several hundred meters north of Yalai village. However, it is difficult to draw a clear boundary between the Permian and Carboniferous, because fossils appear only in limited horizons and the lithology of the Permian is similar to that of the Carboniferous. Diamictites can be found in the lower part of Permian succession. The Permian succession extends northwards past the village of Naxing, and has a thickness of about 2 km.

Permian sediments exposed to the south of the village of Naxing

Permian diamicrite with large clasts of varied lithology

Triassic sediments appear approximately from the middle point between the village of Naxing and the village of Tulong. The lower part of the Triassic is composed of limestones and some clastic sediments. The middle part comprises fine clastic sediments and more or less rhythmically deposited calcareous beds, which are relatively more resistant to weathering and form small ridges. The upper part of the Triassic is composed of predominantly of sandstones.

Triassic sediments near the village of Naxing

On June 27 we drove from Nyalam to Tingri and overnighted there. At 4600m this was the highest overnight spot, and only around 50 km from Mt. Everest (Mt. Qomolangma)

The last day of the excursion, June 28 saw us drive from Tingri to Lhasa where the excursion ended.

PhD News

Early Carboniferous palynofloras from Western Argentina

Cecilia R. Amenábar

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Palynological studies of the Lower Carboniferous and Devonian/Carboniferous boundary of Argentina are still scarce, especially if compared with information about Upper Carboniferous palynofloras and the features of the Carboniferous/Permian boundary. Nevertheless, during the last years, detailed studies on Early Carboniferous microfloras from many sections of the Malimán and El Ratón formations cropping out in the
Argentinean Precordillera, ca. 30° S and 69° W, have been carried out as the subject of my PhD thesis.

The Early Carboniferous Malimán and El Ratón formations belonging to the Uspallata-Iglesia Basin, are part of the Angualasto Group (Limanino and Césari, 1993), which overlies Devonian strata in an angular unconformity. Apart from the rich palynoflora, these rocks contain plant remains and marine invertebrates that suggest an Early Carboniferous age.

The palynological assemblages obtained from the Malimán Formation at the type locality (La Cortadera creek) contain 77 species of Early Carboniferous spores, mostly smooth and ornamented acavate forms, with subordinate pseudosaccate and cingulizonate forms. The preservation of the palynomorphs is moderate to good, most of them being fragmented, corroded and obscured, probably due to the high thermal maturity that occurred as a consequence of syn- or postdepositional tectonic activity and igneous intrusions that affected the palynologically rich strata of the Precordillera area. Together with these indigenous palynomorphs, a high percentage (12.5-55%) of reworked spores and palaeomicroplankton, from the Early Devonian (Emsian), Middle-Late Devonian (Givetian-Early Famennian) and probably Late Silurian age are also recorded (Amenábar, 2006).

The diagnostic species are mainly Colatisporites decorus, Raistrickia clavata, Crassispora trychera and Schopfites claviger, which are recorded in the Late Tournaisian and persist upwards into younger assemblages of Viséan age. In addition, Turnau et al. (1997) and Utting and Giles (2004) discussed the correlation between the Tournaisian-Viséan biozones from Western Europe
and Canada, where the base of the Viséan is marked by the incoming of the *Lycospora* genus throughout Europe together with *Densosporites columbaris* and *Vallatisporites cilliaris* in Canada. In consequence, the correlation between the early Viséan Euroamerican assemblages and Argentinean ones is difficult to establish if it is based on the first appearance or presence of *Lycospora* spp., which is also known to be absent or rare in both in Australia (Playford, 1991) and the rest of South America, although some patchy occurrences could be registered in the Amazon Basin (Melo and Loboziak, 2003). Nevertheless, avoiding the *Lycospora* genus as a diagnostic taxon, and thus considering the other diagnostic species mentioned above, they could be useful to establish the age of the Mailman’s assemblage.

As an example, *Schopfites claviger* indicates the base of the Viséan in terms of the Australian palynozonation, while the same species appears in the Late Tournaisian in Euroamerican assemblages (Higgs et al., 1988). Therefore, if the Malimán Formation palynoassemblage is compared with the Australian palynofloral succession, an Early Viséan age can be suggested for the assemblages, while comparing to the Euroamerican ones, a Late Tournaisian age is also possible.

New palynological data obtained from the Malimán and El Ratón formations at new localities will be incorporated in the next years and will allow proposition of a biozonation and correlation scheme for the Early Carboniferous of Argentina. Comparison with other assemblages of Gondwana and the rest of the world will be feasible too, and it will make evident the necessity of revising other Argentinean or South American microfloras of Early Carboniferous age in order to achieve a more accurate stratigraphical range. Moreover, these palynological data will be combined with other paleontological records (plant remains and invertebrate fossils) with the purpose of obtaining a more precise age of the units. The last method will be a valuable tool to characterize the hiatus between the Early Carboniferous and the underlying Devonian deposits, which are under study, too (Amenábar et al., 2006 a, b, c).

References


Introduction
The Upper Paleozoic strata of the Paraná Basin in Brazil correspond to the Gondwana I Supersequence (Milani, 1997) and are related to a transgressive-regressive cycle, comprising the Tubarão and the Passa Dois groups. These units bear a significant fossil content, including invertebrates, vertebrates and plant macro- and microfossils. However, horizons that can be independently dated using marine fauna are scarce, preventing correlation and accurate age calibration. In this context, palynology seems to be the most efficient biostratigraphic tool for Upper Carboniferous to Middle Permian deposits of this basin, because of the abundance, diversity and widespread distribution of spore-pollen assemblages.

Taxonomic and palynostratigraphic studies have been developed in the last few years at the Laboratório de Palinologia of the Instituto de Geociências, Universidade Federal do Rio Grande do Sul. This article presents recent results obtained by this research group, which includes work from students in palynology supervised by the first author. Studies aim at improvement of the palynological succession in the basin, especially the Tubarão Group.

Taxonomy
Species of cingulizone spores related to the genus Lundbladispora were described from Brazilian strata, allowing a new diagnosis and selection of a lectotype for L. riobonitensis Marques-Toigo & Picarelli 1984. This species was differentiated from the similar L. braziliensis (Pant & Srivastava) Marques-Toigo & Pons emend. Marques-Toigo & Picarelli 1984, and the work was informed by

South American News
Progress at the Laboratório de Palinologia of the Instituto de Geociências, Universidade Federal do Rio Grande do Sul
Taxonomic and biostratigraphic studies on Late Paleozoic strata of the Paraná Basin, Brazil
Paulo A. Souza, Cristina M. Félix, Tiago V. Fischer, Eduardo Premaro, Larissa P. Smaniotto, Ana L. O. Mori, Cássio A. Abreu, Márcia E. Longhim, Adriana R. Rossi, Rodrigo Neregato & Daiana R. Boardman
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studies of species of *Selaginella* (Smanioto & Souza, 2005).

Taxonomic analysis of monosaccate pollen grains related to the genera *Plicatipollenites* Lele 1964 and *Crucisaccites* Lele & Maithy 1964 recorded in the Paraná Basin were recently published (Félix et al., 2006). In this basin, these genera are represented by six species: *P. malabarensis* (Potonié & Sah) Foster 1975, *P. gondwanensis* (Balme & Hennelly) Lele 1964, *P. trigonalis* Lele 1964, *P. densus* Srivastava 1970, *C. latisulcatus* Lele & Maithy 1964 and *C. monoletus* Maithy 1965. Based on analysis of samples from new localities, new slides of published sections or from scientific collections, and on the examination of available papers, synonymy lists have been proposed, and modifications have been made to the ranges of some species. Furthermore, the main morphologic characters of distinction between these species are discussed, in order to facilitate their identification and use in biostratigraphic and paleoenvironmental analysis. The genus *Cannanoropollis* Potonié & Sah 1960 has been studied and new taxonomic proposals have been obtained (Félix & Souza, in preparation). The palynological content of the Itararé Formation has been studied from samples of distinct localities in the basin and new taxonomic proposals have been made (Premaor et al., 2006; Premaor et al., submitted).

Palynostratigraphy

A review of published papers and results of analysis of new material have allowed improvements to the palynostratigraphy of the Carboniferous and Permian strata of the basin. Based on first and last occurrences of certain species of pollen taxa, four palynozones were erected and formalised by Souza & Marques-Toigo (2003) and Souza (2006), these are the *Ahrensisporites cristatus*, *Crucisaccites monoletus*, *Vittatina costabilis* and *Lueckisporites virkkiae* Interval Zones, in ascending order. The *Ahrensisporites cristatus* and *Crucisaccites monoletus* Interval Zones occur at the basal and middle portion of the Itararé Subgroup, mainly in northeastern part of the basin, and are dated as late Pennsylvanian. The *Vittatina costabilis* Interval Zone is subdivided into two units, in ascending order the *Protohaploxypinus goraiensis* and the *Hamiapollenites karrooensis* Subzones, and is recognized in the glacial (Itararé Subgroup) and post-glacial sequence (Rio Bonito Formation and the base of the Palermo Formation). The *Lueckisporites virkkiae* Interval Zone occurs from the uppermost Rio Bonito Formation, through the Palermo and Itararé formations, and into the Serra Alta and Teresina formations. Palynostratigraphical correlation suggests that the *Vittatina costabilis* Zone is Early Permian (early Cisuralian), while the *Lueckisporites virkkiae* Zone is regarded as late Early Permian to early Middle Permian (late Cisularian to early Guadalupian). Biostratigraphic work on the transition between the Itararé Subgroup and the Rio Bonito Formation has been developed based on samples from boreholes distributed in the basin, from São Paulo (northeastern portion) to the Rio Grande do Sul State (southmost portion). This refinement is needed because the *Protohaploxypinus goraiensis* Subzone (basis of the *Vittatina costabilis* Zone) occurs within both lithostratigraphical units, which reflect a different climate context. Palynological data from the units above the Itararé Formation are scarce and biostratigraphy is mainly based on fossil vertebrates and
invertebrates. Thus, the Rio Grande do Sul group has worked with new samples trying to get best results for palynological correlation.

SHRIMP analysis performed on euhedral and prismatic grains of zircon recorded within bentonitic layers of the Irati Formation revealed an age of ca. 278.4 ± 2.2 Ma (Santos et al., 2006) interpreted as the crystallization age of a volcanic eruption. In this way, the Irati Formation (related to the Lueckisporites virkkiae Zone) is likely Lower Permian (Cisuralian), Artinskian in age, in accordance with ages attributed by palynology (Souza & Marques-Toigo 2005; Souza 2006), as summarized in Fig. 1. New radiometric ages are needed for this section, to allow a better correlation with the global stratigraphic chart, because it is based exclusively on extra-Gondwanic data. Traditional radiometric methods (Rb/Sr) have been also developed.

References


CIMP website

The University of Sheffield has discontinued its hosting of the CIMP website, but the University of Liège, Belgium has just taken over stewardship. The new website is http://www.cimp.ulg.ac.be

More contributions

Please contribute articles to the Newsletter. Items on new techniques, research, book reviews and ideas are all welcome.