

# IAS

INTERNATIONAL ASSOCIATION OF SEDIMENTOLOGISTS

# Newsletter

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## REPORT

### Maurice Tucker Lecture Tour – Last step

#### *Awesome outcrops in Argentina*

As part of my IAS Lecture tour I visited Argentina in November 2006 and attended the 4<sup>th</sup> Latin American Sedimentological Congress in San Carlos de Bariloche. This was a wonderful opportunity to escape the British winter, when southern South America is enjoying clear blue skies and sunny days. It is amazing how much general knowledge of other cultures you pick up through travel, but as an earth scientist, you also learn a lot too about the regional geology, just by travelling around and keeping your eyes open, along with some background reading. With regard to Argentina I was particularly intrigued with the story of the Precordillera in north-western Ar-

gentina – a thin strip of the Andes composed of distinctive Cambro-Ordovician sediments which were originally located in the southeast USA on the edge of Laurentia. The Precordillera succession is composed of many 100's m of shallow-water, cyclic carbonates, succeeded by deepwater sediments as the microplate drifted across the ocean to be stuck on the western side of Gondwana. It is a fascinating story – known for some time through the work of Ricardo Astini and others.

Sergio Matheos reported on the extremely successful Bariloche conference in the March 07 IAS Newsletter so here I will give some



Figure 1. Aeolian sandstone in the Tordillo Fm (Upper Jurassic), Picún Leufú Anticline.



Figure 2. Shallow-marine mostly clastic parasequences which contain thin shelly limestone units. Lajas Fm (Mid Jurassic).



*Figure 3. Mixed clastic-carbonate parasequences in the Agrio Fm (Lr Cretaceous), overlain at the top of the cliff by evaporites of the Huitrin Fm. Bajada del Agrio.*



*Figure 4. Parasequence in the Agrio Fm (Lr Cretaceous) with higher frequency cycles in the deeper-water, mudrock part marked by nodule layers. Bajada del Agrio.*

highlights of the succeeding field-trip to the Neuquen Basin.

### Neuquén Basin

Luis Spalletti organised a 4-day field excursion to the Neuquén Basin and 14 people were treated to the whole variety of sedimentary rocks, often in spectacular outcrops, amid wonderful scenery in the foothills of the Andes, and mostly with the sun shining. The Neuquén Basin is a back-arc basin, formed in late Triassic times, and comprising a near-continuous stratigraphic record up to 4000 m thick extending to the early Cainozoic. The Neuquén Basin is a major petroleum province, and the special feature here is that many of the reservoir rocks can also be studied at outcrop.

There are many very interesting sedimentological stories to be read from the Neuquén rocks; here are some highlights.

Being a basin bounded by the Andean magmatic arc from the open ocean, there were times when the basin was cut-off from the sea. In some cases this led to water stratification in the basin and black

shales were deposited (source rocks). At other times it appears that deserts or lakes were widely established, not unlike the case for the Zechstein Basin of western Europe in the Permian, or the Paradox (and other) basins in the Palaeozoic of North America. One example of such is the Upper Jurassic Tordillo Formation (see Fig. 1), a clean, large-scale cross-bedded aeolian sandstone, which contains hydrocarbons in the subsurface. This is part of a Kimmeridgian lowstand wedge resulting from a tectonically-enhanced sea-level fall.

Carbonates developed at many horizons through the Jurassic-Cretaceous, mostly as prograding



*Figure 5. Tidal bundles in the Lajas Fm (Mid Jurassic) at Bajada de Los Molles.*



Figure 6. Upper Jurassic-Lower Cretaceous succession at the Picún Leufú Anticline showing 2 clear sequences of increasingly calcareous, bed thickening-up, shallowing-up Tithonian carbonates.

ramps, well seen on seismic. Many of these are comprised of metre-scale cycles, some showing clear thickness stacking patterns; other formations are much more disorganised. Mixed clastic-carbonate cycles are common too (e.g. Lajas Fm, Mid Jurassic, Fig 2; Agrio Fm, Lr Cretaceous, Figs 3-4), and of particular interest is that many show no sign of subaerial exposure at their tops. Indeed many cycles 'end' in mid-shoreface facies. Many of these cycles are 10-30 metres thick - more like 4<sup>th</sup> -order, and within them a higher frequency cyclicity can often be seen (Fig. 4).

In the mixed-facies cycles, the carbonates are often 0.5-1 metre-thick bioclastic packstones full of large, often rolled bivalves, occurring above a coarsening-upward clastic unit. So then the question is the

sequence stratigraphic interpretation: is the sequence boundary below the carbonate, so the clastics are highstand/FS/LS and the carbonate is then a transgressive unit overlain by a flooding surface, or, is the sequence boundary above the carbonates, so the latter represent the later



Figure 7. Sponges encrusting a drowning surface on a Tithonian sequence boundary, Picún Leufú Fm.



*Figure 8. Turbidites forming coarsening/thickening upward packages in the Los Molles Fm (Mid Jurassic). La Jardinera Creek.*

highstand after TS/early HS clastics. All this is very interesting, and prompted much argument. When there are no clear exposure surfaces/palaeosols, identifying sequence boundaries becomes difficult, even arbitrary.

The embayed nature of the Neuquén Basin and the restriction caused by the Andean magmatic arc enhanced the tidal current regime in the basin. Tidal features are thus common in the shoreface sandstones and also in some of the carbonates. Wonderful tidal bundles were seen in the mid-Jurassic Lajas Fm, with clayey-coaly drapes (Fig. 5).

In the Upper Jurassic/ Lower Cretaceous (Tithonian) several prograding carbonate sequences (Quintuco/Vaca Muerta Fms) form spectacular outcrops in the Picún Leufú anticline (Fig. 6). The platforms are again composed of metre-scale cycles, becoming more calcareous upwards, but again with little evidence of exposure at their tops. At one sequence boundary, which is also a drowning surface beginning the next sequence, the surface is encrusted with sponges, partly silicified (Fig. 7), and bored too. That is neat.

There are 3 units (Tabanas, Angulico and Huitrin Fms) of mostly basin-centre 'saline giants', even with potash salts. Especially interesting are the mud mounds that developed within the Oxfordian (Augulico) evaporite basin between phases of drawdown.

There are spectacular turbidite successions in the Neuquén Basin, and the excursion was delighted to bump into Emiliano Mutti leading another field trip at the La Jardinera Creek locality, where the Los Molles Formation is seen. The turbidites there show a strong packaging (Fig. 8), of thickening-upward bed cycles, separated by black mudrocks and pinstripe shales. Large-scale dewatering structures, sandstone dykes and sills, broad channels and beautiful flute marks are there to be admired and photographed (Fig. 9). Much fun was had discussing the mechanisms of deposition of the graded sandstone beds – turbidity flows developed from slumps versus more persistent hyperpycnal flows generated from a delta front. The mechanisms of generating the bed cyclicity in the turbiditic sandstones is also a hot topic of course: autocyclicity though lobe and



*Figure 9. Large dewatering structure in the turbiditic Los Molles Fm (Mid Jurassic). Fortín Primero de Mayo Place.*





*Figure 10. Persistent, thin dolomitic sandstone in Lr Cretaceous deeper-water succession.*

channel migration / progradation, versus allocyclicity through millennial- to Milankovitch-scale climate and/or sea-level changes. Just recently (Zavala et al. 2006, JSR, 76, 41-59), hyperpycnites were described from the lacustrine Rayoso Fm (Lower Cretaceous) in Neuquén, characterised by inverse grading, amalgamated bedding, climbing ripples and plane beds.

One very interesting feature of the Neuquén basin is that some relatively thin facies units are extremely laterally extensive but they are embedded within contrasting facies. In the Upper Agrio Fm (Lr Cretaceous) a very persistent bed, up to 3 metres thick, seemingly a ferroan dolomitic sandstone, with some cross-bedding and bivalves, occurs within marine mudrocks. This burial dolomitic unit can be followed for many kilometres across the

countryside (Fig. 10). Another persistent unit, also in the Lower Cretaceous, is the Avilé Sandstone of aeolian and fluvial origin. This is encased within marine mudrocks too. These persistent units of distinctive, out-of-sequence, facies are another feature of a basin with an erratic connection to the world ocean through tectonic movements related to the magmatic arc, so that sudden changes of sea-level and / or salinity are not uncommon. The Avilé Sandstone is interpreted as a result of a sharp sea-level drop in the Hauterivian; but this correlates with a major fall on the 'global' sea-level chart, so it may be eustatic.

And just one other sedimentological gem to note (Fig. 11) – a spectacular and huge fluvial channel with lateral accretion (Pliocene), which even a carbonate sedimentologist can appreciate (well



Figure 11. Fluvial channel in Pliocene gravels. Huarenchenque Fm, Las Lajitas.

a nice place for a coffee stop at least). Also seen on the excursion were spectacular ignimbrites with columnar joints, pyroclastic surge deposits, lapilli tuffs, as well as volcanoes themselves in the distant high Andes.

The Neuquén Basin is definitely a must-see place for all sedimentologists – wide-open spaces, wonderful exposures, clear geometries and sequences, along with noisy rock parrots, soaring condors and pink flamingos, all make for a great field trip.

Thanks to Luis Spalletti and his helpers for organising a superb trip providing many fond memories of Argentina. Thanks to you all....

*Maurice Tucker  
Durham England*

*For information on the Neuquén  
Basin see Veiga et al. (2005).  
Geological Society of London Special  
Publication, 252.*

## ANNOUNCEMENT

### 9<sup>th</sup> International Symposium on Fossil Algae

*Zagreb, Croatia, 19-20 September 2007*

Following the 8<sup>th</sup> International Symposium on Fossil Algae held in Granada, Spain, 2003, and celebrating the 100<sup>th</sup> anniversary of research on fossil algae in Croatia, the 9<sup>th</sup> Symposium will be held in Zagreb, Croatia, 19-20 September 2007. The Symposium is organized by the Croatian Geological Survey (formerly Institute of Geology) in collaboration with the Croatian Geological Society, INA-Industrija nafte d.d. (Croatian Oil Company) and the Department of Geology, Faculty of Science.

Two field-trips are planned: pre-symposium field-trip to Dinarides Mountains, and post-symposium field-trip to NW Croatia and Zagreb surroundings.

During the Symposium we will have an opportunity to show you both the great natural heritage of Croatia as well as selected scientific discoveries in the field of fossil algae research.

#### Programme

**15-18 September:** Pre-Symposium field-trip: Permian to Cretaceous calcareous algae and carbonate platform

evolution (Dinarides Mountains)

#### **19-20 September:**

Scientific sessions in Zagreb.

**21-22 September:** Post-Symposium field-trip: Triassic and Miocene succession of North-West Croatia.

Scientific sessions will be held at the INA-Naftaplin building, Subiceva 29, Zagreb. INA-Naftaplin is a research department within INA-Croatian Oil Company.

#### Scientific topics

Presentations of any aspect of calcareous algae and microbes are welcome, including:

- Biomineralization and algal- or microbe-induced sedimentation
- Stromatolites
- Taxonomy and systematics
- Evolutionary history
- Living vs. fossil
- Biogeography and palaeoclimatology
- Ecology and palaeoecology
- Biostratigraphy
- Taphonomy and diagenesis
- Significance of algae in





hydrocarbon and mineral  
resources formation

### Publications

Symposium publications will include Abstract Book and Field Trip Guidebook. Abstracts will be peer-reviewed before their final acceptance. Selected papers arising from oral and/or poster presentations will be published in *Geologia Croatia* (former *Geoloski Vjesnik*), a scientific journal of the Croatian Geological Survey and the Croatian Geological Society. It has been

published continuously since 1947 and has a long record of papers on fossil algae. It is published biannually and has a very good printing quality. Detailed instructions for authors are on the *Geologia Croatia* web-page.

### Important dates

- 31 May 2007  
Symposium and field-trip registration
- 31 May 2007  
Submission of abstracts
- 1 July 2007 Final payment of all fees

### Contacts:

*Alisa Martek  
Hrvatski Geoloski Institut  
(Croatian Geological Survey)  
HR-10000 Zagreb  
Sachsova 2, POB  
Croatia  
alisa.martek@hgi-cgs.hr  
Tel.: 385 1 6160 786  
Fax: 385 1 6144 718*

*Tonci Grgasovic  
Hrvatski Geoloski Institut  
(Croatian Geological Survey)  
Sachsova 2, POB  
HR-10000 Zagreb  
Croatia  
tonci.grgasovic@hgi-cgs.hr  
Skype: tgrgasovic  
Tel.: 385 1 6160 707  
Fax: 385 1 6144 718*

# Long-term Sea-level Changes & Effects

## *Workshop Announcement*

*October 8-10, 2007*

*Salt Lake City, Utah, USA*

Over the past 15 years, there has been significant progress in reconstructing the history of long-term sea-level changes. In large part, this is due to ocean and onshore drilling providing unparalleled means of sampling Cretaceous through Holocene stratigraphic records. Recent drilling advances, together with new views on the roles of tectonics and sediment dynamics, necessitate re-evaluation of the fundamental assumptions used in sea-level studies. To review past results, re-evaluate strategies and foster new proposals and collaborations, the Joint Oceanographic Institutions, DOSECC, and the Chevron Corporation are sponsoring the workshop *Drilling to Decipher*

Long-term Sea-level Changes and Effects.

To participate in this workshop, visit: [www.joiscience.org/sealevel](http://www.joiscience.org/sealevel). All interested scientists, researchers, and students are encouraged to apply. Participation will be limited to optimize workshop goals. Partial travel support is available. Applications are due July 13, 2007.

Please contact Craig Fulthorpe ([craig@utig.ig.utexas.edu](mailto:craig@utig.ig.utexas.edu)), Ken Miller ([kmg@rci.rutgers.edu](mailto:kmg@rci.rutgers.edu)), or Andre Droxler ([andre@rice.edu](mailto:andre@rice.edu)) for further information.

*Co-Convenors: Craig Fulthorpe, Ken Miller, Andre Droxler, Gilbert Camoin, and Stephen Hesselbo*



## IAS Postgraduate Grant Scheme

**IAS** has established a grant scheme designed to help PhD students with their studies. We are offering to support postgraduates in their fieldwork, data acquisition and analysis, visits to other institutes to use specialised facilities, or participation in field excursions directly related to the PhD research subject.

**Up to 10 grants, each of about € 1000 are awarded twice a year.**

These grants are available for IAS members only, and only for PhD students. Students enrolled in MSc programs are **NOT** eligible for grants. Research grants are **NOT** given for travel to attend a scientific conference, **NOR** for acquisition of equipment. Student travel grants for conferences can be usually obtained directly from organizers of the meeting.

The **Grant Scheme Guidelines** provide a summary of required information needed for successful a Grant Application. Applications are evaluated on the basis of the scientific merits of the problems, the capability of the researcher, and reasonableness of the budget.

Supervisor's Letter Guidelines list the information needed.

### IAS Grant Scheme Guidelines

The application should be concise and informative and contains the following information (limit your application to 4 pages):

Research proposal - 2 pages maximum

Bibliography - ½ page

Budget - ½ page

Curriculum Vitae – 1 page

Recommendation letter (or e-mail) from the supervisor supporting the applicant is mandatory and the research proposal must be sent directly to the Treasurer of IAS by the application deadline.

### Guidelines for letter from supervisor

The letter from the supervisor should provide an evaluation of the capability of the student to carry out the proposed research, the significance and necessity of the research, and reasonableness of the budget request. The letter must be sent directly to the Treasurer of IAS by post or e-mail by the application deadline (Patric Jacobs, Department of Geology and Soil Science, Ghent University, Krijgslaan 281/S8, B-9000 Gent, BELGIUM. E-mail: patric.jacobs@ugent.be). An application form is on our website (<http://www.iasnet.org>).

### Grant application

Research Proposal –

- ♦ **Title**
- ♦ **Introduction:** Introduce the topic and provide

relevant background information; summarise previous work by you or others. Provide the context for your proposed study in terms of geography, geology, and /or scientific discipline.

- ♦ **Motivation:** It should have a clearly written hypothesis or a well-explained research problem of geologic significance. It should explain **why** it is important. Simply collecting data without an objective is not considered wise use of resources.
- ♦ **Methods:** Outline the research strategy (methods) that you plan to use to solve the problem in the field and/or in the laboratory. Please include information on data collection, data analyses, and data interpretation.
- ♦ **Facilities:** Briefly list research and study facilities available to you,

such as field and laboratory equipment, computers, library.

- ♦ **Bibliography** – provide a list of key (5-10) publications that are relevant to your proposed research. The list should show that you have done adequate background research on your project and are assured that your methodology is solid and that the project has not been done already.
- ♦ **Budget** – Provide a brief summary of the total cost of the research. Clearly indicate the amount (in euros) being requested. State specifically what the IAS grant funds will be used for.
- ♦ **Curriculum Vitae** - Name, postal address, e-mail address, university education (degrees & dates), work experience, awards and scholarships, independent research projects, your abstracts and publications.

**Application deadlines:** 1<sup>st</sup> session: March 31  
2<sup>nd</sup> session: **September 30**

**Recipient notification:** 1<sup>st</sup> session: before June 30  
2<sup>nd</sup> session: **before December 31**

## CALENDAR

### ALLUVIAL FANS 2007 \*

18-22 June, 2007  
Banff, Alberta,  
Canada

Dr. Philip Giles  
Department of Geography  
Saint Mary's University  
Halifax, Nova Scotia, Canada  
E-mail: [alluvialfans2007@smu.ca](mailto:alluvialfans2007@smu.ca)  
Web-page: <http://husky1.smu.ca/~pgiles/AF2007/AlluvialFans2007.htm>

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### 13<sup>TH</sup> BATHURST MEETING OF CARBONATE SEDIMENTOLOGISTS \*

July 16th - 18th  
2007  
Norwich, UK

Convenors Dr A. Kendall and Dr J. Andrews  
School of Environmental Sciences,  
University of East Anglia, Norwich, NR4 7TJ, UK  
e-mail: [Bathurst.meeting@uea.ac.uk](mailto:Bathurst.meeting@uea.ac.uk)

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### 4<sup>TH</sup> INTERNATIONAL LIMNOGEOLOGY CONGRESS \*

July 11-14, 2007  
Barcelona  
Spain

Contact: Dr. Lluís Cabrera  
Dpto. de Estratigrafía, Paleontología y G.M.  
Facultad de Geología  
Universidad de Barcelona  
E-08028 Barcelona  
E-mail: [lluis.cabrera@ub.edu](mailto:lluis.cabrera@ub.edu)  
Web-page: [www.ilic2007.com](http://www.ilic2007.com)

**2<sup>ND</sup> INTERNATIONAL SYMPOSIUM OF THE IGCP PROJECT 507 ON  
PALEOCLIMATES OF THE CRETACEOUS IN ASIA AND THEIR GLOBAL  
CORRELATION**

*20-25 August, 2007  
Seoul National University,  
Seoul, Korea*

*Contact: Prof. Yong Il Lee  
School of Earth and Environmental Sciences  
Seoul National University, Seoul 151-747, Korea  
E-mail: lee2602@plaza.snu.ac.kr*

*Dr. Hyoun Soo Lim  
Korea Polar Research Institute  
KORDI, P.O. Box 32, Incheon 406-600, Korea  
E-mail: tracker@kopri.re.kr  
Website: <http://igcp507.kopri.re.kr>*



**25<sup>TH</sup> MEETING OF SEDIMENTOLOGY  
(SEDIMENTOLOGY AND ENVIRONMENT) \***

*September 4-7, 2007  
Patras,  
Greece*

*Avraam Zelilidis  
Department of Geology University of Patras  
26500 Patras, Greece  
Phone/Fax: +26 10996272  
Mobil Phone: 697 203 4153  
E-mail: [ias7inform@upatras.gr](mailto:ias7inform@upatras.gr)  
Web-page: <http://ias2007.geology.upatras.gr/>*

**SEDIMENT 2007**

*12-14 September 2007  
Brixen/Bressanone,  
Italy*

*Web-page: [http://www.uibk.ac.at/geologie/  
sediment2007/index\\_en.html](http://www.uibk.ac.at/geologie/sediment2007/index_en.html)*

**9<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON FOSSIL ALGAE**

*19-20 September 2007  
Zagreb,  
Croatia*

*Tonci Grgasovic, Hrvatski Geoloski Institut  
(Croatian Geological Survey), Sachsova 2, POB.  
HR-10000 Zagreb, Croatia. E-mail:  
[tonci.grgasovic@hgi-cgs.hr](mailto:tonci.grgasovic@hgi-cgs.hr). Skype: [tgrgasovic](https://www.skype.com/user/tgrgasovic).  
Tel.: 385 1 6160 707, Fax: 385 1 6144 718  
Alisa Martek, Hrvatski Geoloski Institut (Croatian  
Geological Survey), Sachsova 2, POB. HR-10000  
Zagreb, Croatia. E-mail: [alisa.martek@hgi-cgs.hr](mailto:alisa.martek@hgi-cgs.hr).  
Tel.: 385 1 6160 786, Fax: 385 1 6144 718*





## 26<sup>th</sup> MEETING OF SEDIMENTOLOGY \*

1-3 September, 2008  
Bochum, Germany

Dr. Adrian Immenhauser  
Ruhr-University Bochum  
Faculty of Earth Sciences  
Institute for Geology, Mineralogy and Geophysics  
Universitätsstrasse 150  
D-44801 Bochum/Germany  
E-mail: [adrian.immenhauser@rub.de](mailto:adrian.immenhauser@rub.de)  
Website: <http://www.ruhr-uni-bochum.de/sediment/>

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## 18<sup>th</sup> INTERNATIONAL SEDIMENTOLOGICAL CONGRESS \*

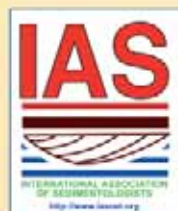
26 September  
1 October, 2010  
Mendoza,  
Argentina

Eduardo Piovano  
GIGES  
Dpto. Química, Facultad de Ciencias  
Avda. Velez Sarsfield 1611  
X5016GCA, Cordoba, Argentina  
E-mail: [epiovano@efn.uncor.edu](mailto:epiovano@efn.uncor.edu)

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Contributions to be sent to:

José Pedro Calvo  
IAS General Secretary  
Instituto Geológico y Minero de España  
c/ Ríos Rosas, 23,  
28005, Madrid, Spain  
Tel.: +34 913 495 962  
Fax: +34 913 495 817  
[jose.calvo@igme.es](mailto:jose.calvo@igme.es)