



# Newsletter

June 2004

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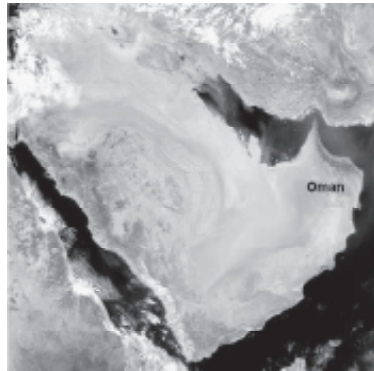
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## Super Sedimentological Exposures

### *Huqf Cambrian Clastics - Some Examples from Oman*

Multi-coloured clastic sedimentary outcrops of the Haima Supergroup of Cambrian age are well preserved in Oman in an area referred to as “The Huqf”. Located in the east of Oman, approximately 400 km from the capital Muscat, the Huqf (Figs. 1 & 2) is bounded to the northeast by a veneer of Quaternary alluvial gravels derived from the Oman Mountains and by the southern tip of the Wahiba dune Sands. To the west, the area is delimited by an escarpment of Cretaceous/Tertiary carbonates the eastern limit of the edge of the Jiddat Al Harasis plateau. Outcrops in the Huqf also include Precambrian carbonate deposits of the Huqf Supergroup (Fig. 3).

Stratigraphically, the Haima Supergroup is divided into the Nimr, Mahatta Humaid and Safiq Groups (Fig. 4). In the subsurface the Mahatta Humaid Group (MH) comprises a sequence dominated by siliciclastic rocks up to several kilometres in thickness. Several formations and members of the MH Group have been studied in outcrop (Millson *et al.*, 1996; Buckley, 1997). These, mainly clastic formations are host to some of the most prolific oil and gas reservoirs and constitute a major target for oil and gas exploration in the subsurface



*Fig. 1.- Satellite map showing Oman's position in the Arabian Peninsula*

of Oman. The most important of these formations and members include, from top to base, the Barik Sandstone Mbr and the mixed clastic-carbonate Al Bashair Mbr of the Andam Fm. The two members represent a series of stacked tidal/braid delta deposits separated by marine flooding surfaces and shallow marine to inter to supra tidal deposits respectively. These in turn are overlain by playa to sabkha deposits of the Miqrat Fm and finally the aeolian dominated sandstones of the Amin.

Rocks in the Huqf outcrop area range from Late Proterozoic to Cenozoic and are exposed in the core



Fig. 2.- Simplified geological map of Oman (Hanna, 1995)

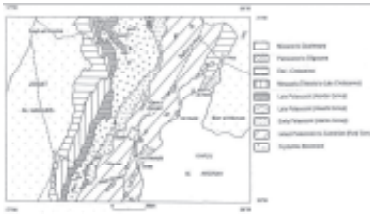
of a extensive Huqf structural high (Loosveld *et al.*, 1996) (Fig. 5). Broad open folds of Pan-African age are present in the core of the uplift. The east edge of the Huqf high is defined by east dipping normal to transtensional faults in a downfaulted coastal belt. The unfaulted western flank dips gently towards the Ghaba salt basin where sediments of the Huqf and Haima supergroups are typically deeper than 4 km. Halokinesis has played an important role in controlling accommodation space, structuration/trap timing and hydrocarbon migration/timing in the subsurface. The Huqf area is dissected by the sinistral Haushi – Nafun strike-slip fault system (Dubreuilh *et al.*, 1992). Locally structural styles are dominated by the development of folds associated with restraining bends and pull-aparts along this complex fault system.

## Haima SuperGroup Depositional Environments

The deposits of the Haima Supergroup form the thickest clastic fill of the North Oman salt basins (Fig. 6). The main clastic source areas are believed to be from the south and the depositional setting was initially continental with a more marine setting developed higher in the sequence. A number of transgressive-regressive cycles can be regionally identified within the Haima Supergroup as a whole. The Nimr Group and the lower part of the MH Group are continental in origin, comprising fluvial (Nimr Group), fluvial, playa and aeolian (Amin Fm) and inland sabkha/playa/aeolian (Miqrat Fm) dominated deposits (Fig. 7).

The overlying Andam and Ghudun Formations form three large scale transgressive–regressive cycles in which the Barik and Ghudun represent two prograding sandy braid delta systems prograding across a very shallow shelf. The basal part of the Al Bashair consists of tidal flat sediments with occasional thin carbonate beds. A depositional model for the Barik Sandstone Member suggests a proximal to distal south – north braided delta system.

Plant colonisation in modern depositional systems promotes stabilisation and trapping of water and wind borne sediments, the formation of organic acids in clays and the development of soil profiles. In the absence of land plants pre-Silurian fluvial and shoreface systems are likely to have been more strongly influenced by surface run-off. In the absence of binding (plant, soil) materials, unvegetated coasts would be prone to frequent modification,



*Fig. 3.- Geological sketch map of the Huqf area (Dubreuilh, 1992)*

with storms playing an important role in sediment (re) transport. Low depositional slopes may have meant that transgressions were rapid and widespread, even with relatively minor sea-level fluctuations.

Pre-Silurian continental fluvial environments were likely to have been dominated by braided river systems (Hjellbakk, 1993). Deltas formed by the progradation of a braided river into a standing body of water. Depositional units dominated by braided river and braid plain facies lack muddy facies, display size grading and lateral bar migration and commonly have a sheet geometry with high lateral continuity.

### Selected outcrops to be visited

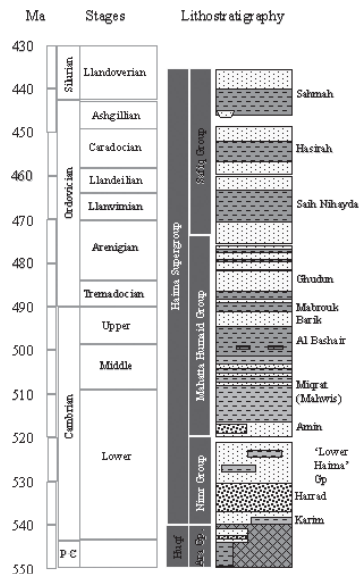
Stop 1:

Qarn Mahatta Humad (Miqrat S)

The upper part of the Miqrat outcrops in small hills bordering the sabkha to the east of the localities (Fig. 3). Mottled brown mudstones are intercalated with grey feldspathic/micaceous brown very fine to fine grained sandstones to siltstones. Grains are typically rounded and contain scattered medium sand to granules. Sandstones mainly occur as thin lenses up to 5cm thick. Occasionally thicker beds are

observed ( $<1\text{m}$ ). Sands comprise ca. 40% of the unit. Mud chip conglomerates occur both in the sands and the mudstones. The sands and the silts contain a wide range of sedimentary structures such as oscillation ripples, climbing ripples, trough cross-bedding and parallel lamination. Bed boundaries are often deformed by soft sediment deformation including load casts, flame structures and chaotic bedding. Metre scale mudcracks occur on bedding planes (Fig. 8).

The fine grained nature of the sediments, numerous sedimentary structures and indications for shallow water, frequent exposure suggest a playa (inland sabkha) setting, in a low relief continental environment. However, recent evidence in core data suggests a



*Fig. 4.- Simplified stratigraphic column of the Paleozoic and Precambrian in Oman*



Fig. 5.- Simplified tectonic map of Oman showing the major salt basins (modified from Loosveld et al., 1996)

possible marine incursion in the Lower Miqrat Formation (*pers com*). The sedimentary features observed in the outcrops suggest flash-flood deposition with deposition of thin widespread sheet sands and frequent reworking of existing deposits resulting in mud-flake conglomerates. Rapid emplacement of many of these

depositional units resulted in soft sediment deformation.

#### Stop 2a: SSW Edge Qarn Mahatta Humaid (Bashair - lower part ,ca. 70m)

The lower part of the Al Bashair consists of partly cyclical alternations of very fine grained quartz sandstones and clayey siltstones with intercalations of coarser-grained lithoclastics and thin carbonate beds. Lithologies are stacked in coarsening upward cycles several metres in thickness, capped by carbonate beds. This layered sequence forms a distinctive series of parasequences traceable some distance laterally. Clayey silts are greenish grey to red in colour and show evidence of low-angle cross-stratification to parallel lamination.

Within a number of beds an upward transition from symmetrical wave ripples to climbing wave ripples to low angle wavy lamination occurs in association with a fining upward trend into clayey silts. These bed bases are erosive and contain silty rip-up clasts, the beds range from cm to dm in

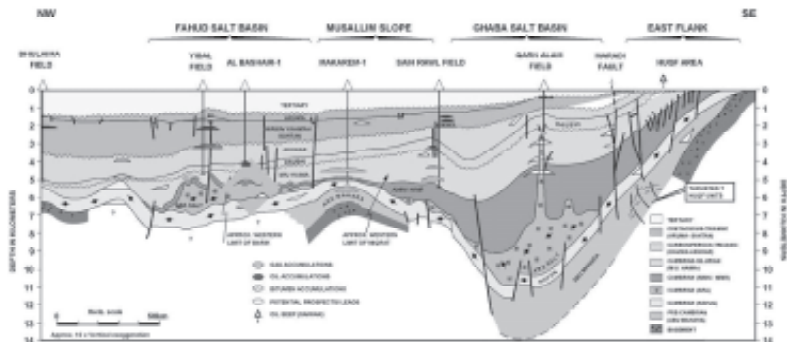
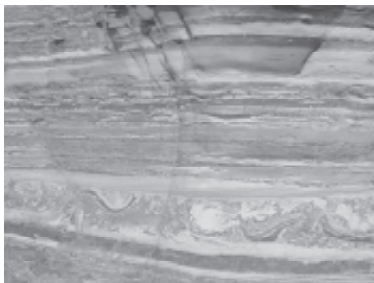


Fig. 6.- NE SW cross section highlighting the thick sediment deposition of the Haima clastics





*Photo of a typical Miqrat section showing spectacular soft sedimentation deformation structures. Note the pen on the left of the photo for scale*

erosive with relief up to and more than 1m. Sandstone beds are erosionally based and often stacked into packages of several meters in thickness. Sedimentary structures in the sands are dominated by large – scale trough cross-lamination and low-angle planar lamination. Locally, a rhythmic variation in the thickness of the cross beds is found, in association with mud flakes or drapes along cross-bed foresets. The main current indications are northward.

The sandstones occasionally form large-scale channels with widths of several hundred meters within the mudstone units. Fragments of trilobites and lingulids occur scattered in and at the top of sands. Small *Cruziana* trace fossils occur locally.

Mudrocks are typically less than 2m thick and contain thin sand-siltstone lenses and beds parallel or ripple laminated in character. Ball and pillow loading is common. Little structure is apparent in the mudrocks.

The Barik Sandstone Member may represent a series of stacked tidal/ braid delta deposits separated by marine flooding surfaces. The trough-cross bedded to plane bedded sandstones are interpreted as tidal

channel deposits, cutting down into mouthbar/shoreface sandstones with low-angle planar cross-stratification. However, no clear herring-bone cross bedding has been observed indicating that the tidal deposits are ebb-dominated.

#### Stop 4: Buah anticline (Amin, ca. 200m)

The light coloured basal part consists of trough cross-bedded, well sorted medium grained sands with gravel lags and rippled intervals. Mudrocks are absent. The middle part is poorly exposed and consists of an alternation of laminated to thin bedded poorly sorted red siltstones and grey sandstones. Low angle cross-bedded coarse sandstones are present locally near the base. Large meter-scale polygonal mud-cracks are observed in the red siltstones and claystones near the top of the unit. The basal part is overlain by a uniform package of clean, grey greyish brown quartzose sandstones, fine to medium grained occasionally conglomeratic. Large scale low to high angle cross bedding with foresets up to several metres are developed. The outcrop contains distinctive ball shaped concretions.

The basal part of the Amin is an aggrading sandy braid plain, occasionally aeolian re-worked, followed by a transition to a playa environment before periodic desiccation and the influx of aeolian sheet sands. The sequence is capped by a fully developed dune system.

*(The above outcrop descriptions were adapted from Vroon ten Hove 1996)*



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## Sedimentological research in Norway - a short review

Sedimentological research in Norway spans the spectrum from deep marine to continental environments. It involves investigations of clastics, carbonates, calcarenites and evaporites/chemical rocks, identified at outcrop, in cores or modern environments. Field areas stretch from New Zealand, southern Africa and South America in the southern hemisphere, to the Svalbard archipelago in the north, including both onshore and offshore localities. Being one of the major oil-producing nations in the world it is probably not surprising that much of our sedimentological research is in one way or another linked to petroleum geology. Such links include analyses of core and well data; sedimentological analyses of seismic data, reservoir modelling at all scales, investigations of ancient and/or modern field analogues, computational modelling of reservoirs and depositional mechanisms, or as experimental studies of different sedimentary rock properties. Research is spread between the Universities and Colleges in Norway, in addition to both national and international oil companies, and research centres.

A broad group of university and industry researchers have ongoing projects on Svalbard. The great exposures of seismic-scale deltaic, shallow marine and carbonate systems provide excellent conditions for hands-on experience with a wide variety of sedimentological facies. Results are published in international and national journals and much of the information is also available for students and others through different field courses. Some of the concepts of sequence stratigraphy evolved from sedimentological investigations at Svalbard. A more modern approach to sequence stratigraphic analysis is the study of the relations between facies stacking patterns in nearshore deposits and the corresponding shoreline trajectories from well, seismic and outcrop data. The study of shoreline trajectories has been tested on datasets from all around the world, and has evolved into an important tool for stratigraphic predictions.

Beginning in the 1950s, sedimentary basins off the Norwegian coast have been extensively investigated, with the focus of investigation gradually shifting northward, from the southern North Sea to the Barents Sea. As the number of big discoveries has decreased during recent years, it has become increasingly important to extract as much hydrocarbons as possible from existing reservoirs. This has triggered a massive research into enhanced oil recovery, involving: - improved reservoir understanding through detailed core studies, - investigations of both ancient and modern field analogues from different basins and geographic settings, - the relationship between tectonics, climate and sedimentation, - interpretation of seismic geometries, - reservoir modeling, - characterization and - visualization. The research covers both macro- (seismic and outcrop) and micro-scale (petrographical details) investigations, and results

have greatly improved existing depositional models of several important reservoirs. A wide variety of tools and methods are constantly being developed. One such method is the construction of reservoir models directly from digital 3D photorealistic outcrop models.

Research on improved oil recovery is the main focus of the Centre for Integrated Petroleum Research (CIPR). One of the aims of CIPR is to combine geology, chemistry, physics and mathematics in the order to obtain a better understanding of multiphase flow phenomena in porous media. The center was awarded the status of national *Center of Excellence* by the Research Council of Norway in 2002.

Problems related to submarine mass movements along both passive and active continental margins have received significant focus over the last years. Several meetings, symposia and conferences have been, and will be, arranged on this topic, covering both modern and ancient systems. Areas of research cover the fundamental processes of mass movements, regional differences, effects of mass movements, triggering mechanisms such as tsunamis, climate, as well as petroleum exploration aspects. Being able to identify the controlling factors for deep-marine sedimentation, what controls the geometry and architecture of deep-marine deposits, are important tools for improved reservoir prediction on both the explorational and reservoir scale.

Another branch of sedimentology that has received much attention during recent years is tidally-influenced deposits. Such deposits have commonly been linked to transgressive systems, but they also occur in other sequence-stratigraphic settings. Tidally influenced deposits form important reservoirs on the Norwegian continental shelf and much effort has been put into developing sequence stratigraphic models, involving detailed investigations of both modern and ancient field analogues in different geographical and tectonic settings, detailed core investigations and seismic analysis. The complexity and great variety of these deposits raise many interesting questions.

Other depositional systems undergoing detailed sedimentological analysis are fan deltas. The international research on alluvial-fan deltas has somehow lost momentum during recent years, but this exciting topic has now been rejuvenated by a series of detailed cases studies. Studies focus on facies anatomy and sequence stratigraphy of fan-deltaic complexes. A case study from Spitsbergen recognizes high-arctic fan deltas to be important recorders of regional deglaciation history and relative sea-level changes.

Palaeoclimatic reconstructions based on sedimentological investigations constitute an important part of university research. Such studies have been performed on core material from the deep marine, continental shelf, lakes and bogs from all around the world, in addition to investigations of moraines, colluvial and alluvial deposits. High resolution palaeoclimatic and sedimentological reconstructions from active rift basins provide important insight into the complex interplay between tectonics, sedimentation and climate.

The Bjerknes Centre for Climate Research (BCCR) is a joint climate research venture that integrates observationalists and modellers in a concerted interdisciplinary research effort, with the ambition to be a world-class centre on

studies of high-latitude climate change. The BCCR is the largest climate research group in Norway and in 2002 it was awarded the status of a national *Center of Excellence* by the Research Council of Norway.

In addition to siliciclastic deposits, there is a growing interest in carbonates, a relatively new venture for Norway, prompted in part by the northward spread of exploration activities into the Barents Sea region, and by the increased attention being given to international prospects by the large Norwegian oil companies. A joint chalk research project involves the development of a stratigraphic framework, characterization of fractured chalk reservoirs and geomechanics. In common with several of the earlier mentioned projects, one of the main goals here is related to improved oil recovery. The carbonate deposits of Spitsbergen have been extensively investigated at both the macro- and micro-scales. In recent years there has also been a growing interest in carbonate shelf and slope deposits in Spain and Italy, and high-resolution investigations of mixed siliciclastic/carbonate systems aimed at improving our understanding of these complex systems.

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## REPORT

### Sedimentology in Australia

Australia is a strongly resource-industry oriented country, hence much sedimentological work is done with companies. This is quite evident in the Annual and bi-annual petroleum conferences held within Australia, with a large proportion of applied sedimentological work being displayed, especially clastic sedimentology. Most work there is currently done on reservoir characterisation and sequence stratigraphy for petroleum reservoirs and for CO<sub>2</sub> sequestration sites.

The Geological Society of Australia also has a sedimentological group and showcases work at their bi-annual meetings. Here, hydrogeological and environmental research increasingly makes use of clastic sedimentology to solve water migration issues. This is especially important in understanding and managing dryland salinity, a large problem associated with irrigation in the arid parts of Australia.

Carbonate sedimentology is remaining strong in Australia with much work continuing on the tropical carbonates of northern Australian regions and the cool water carbonates in the southern margins.

#### *Planned meetings in Australia*

- \* Australian Society of Exploration Geophysicists (ASEG) – Petroleum Exploration Society of Australian (PESA) joint Conference, August 2004, Sydney
- \* 2<sup>nd</sup> Eastern Australasian Basin Symposium, September 2004, Adelaide
- \* Society of Petroleum Engineers Asia Pacific Oil & Gas Conference and Exhibition, October 2004, Perth
- \* Consortium for Ocean Geosciences of Australian Universities (COGS), June 2005, James Cook University, Townsville
- \* International Geological Correlation Program (IGCP), Project 447, visiting Australia in June 2005
- \* Central Australian Basin Symposium, NT BIRD, 2005, Darwin
- \* Western Australasian Basin Symposium IV, part of AAPG International Conference, October 2006, Perth
- \* Society of Petroleum Engineers Asia Pacific Oil & Gas Conference and Exhibition, Month TBC 2006, Adelaide

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## IGCP Project 499 - Devonian land-sea interaction: evolution of ecosystems and climate

The Devonian was a critical period with respect to the diversification of early terrestrial ecosystems. The geotectonic setting was characterized by the switch from the post-Caledonian to the pre-Variscan situation. Plant life on land evolved from tiny tracheophytes to trees of considerable size in combination with a global increase in terrestrial biomass, and vertebrates started to conquer the land. Extensive shallow marine areas and continental lowlands with a wide range of different habitats existed which are preserved in a large number of basins all around the world. Climate change finally led from greenhouse to icehouse conditions towards the end of the Devonian. Both rapid evolution of terrestrial ecosystems and climate change had a pronounced influence on sedimentation and biodiversity not only in the terrestrial but also in the marine realm ("Devonian Change"). A major goal of the proposed project will be to focus on controls and interactions of the respective facies parameters in different paleogeographic settings in order to refine the global picture by international co-operation in a number of case studies. Geoscientific co-operation will include a variety of disciplines, such as sedimentology, paleontology, stratigraphy, paleoclimatology, paleogeography, geochemistry, paleoceanography, and structural geology.

The rapid evolution of early life on land and its interaction with sedimentary processes, climate, and paleogeography, both on land and in marine settings, will be covered by studies in different terrestrial and marine facies. Increasing colonization of the land by plants in combination with soil-forming processes and changing runoff led to major changes of sediment input into the marine system. On the other hand, sediment input and climate are major controls for carbonate production and reef development. The study of responses and interactions thus needs detailed characterization of facies and high-resolution correlation which can only be provided by a refined stratigraphy, including biostratigraphy, lithostratigraphy, chronostratigraphy, etc. Characterization of facies and correlation of stratigraphic units is especially difficult in marine-terrestrial transitions and will be an important focus of the project. Resolution of sea-level changes will be enhanced by recognition and exact correlation of their effects which may be hidden just in these transitions. On the background of the global geotectonic situation (paleogeography s.l.), this will be an important prerequisite for a better discrimination of eustatic, climatic, and biotic controls, both on regional and global scale.

The focus of the project concerns the interrelated evolution of terrestrial and marine paleoecosystems with respect to biotic and abiotic factors in space and time. Studies will include individual paleoecosystems and their components as well as their paleobiogeographic distribution. Biotic and abiotic factors of paleoecosystems are controlled by both, earthbound and extraterrestrial triggers causing either cyclicity and/or distinct events. Thus in turn, such studies may give a clue to

underlying causes of global changes. The project will include sedimentologic and climatic controls of reef development and distribution as well as diversity, and paleoecology of reef building organisms throughout the Devonian, because the Middle to Late Devonian was a peak in reef development with reefs spreading into latitudes as high as 45-60 degrees. On the other hand, accommodation space for Early Devonian reefs was greatly reduced due to major input of sediment from the continents in combination with sea-level lowstand(s). A marked decline in reef development towards the end of the Devonian was probably caused by climatic deterioration.

The integrative kind of research which is needed for the success of the proposed project can only be carried out by a worldwide network of research groups representing different disciplines. Such a network can now be based on core groups successfully participating in the recently terminated IGCP 421. Furthermore, the project will extend the results of the former IGCP 328. It will actively interlink with the existing IGCP 491 which is mainly centered around vertebrate research. But, the proposed project will concentrate on the correlation and interaction of different ecosystems in a more general way. Special attention will be paid to coupling effects between the terrestrial and marine realm. Co-operation is also intended with the proposed IGCP "The Rheic Ocean: its origin, evolution and correlatives". Furthermore, an active network is represented by the members of the "Subcommission on Devonian Stratigraphy" (SDS). These existing networks will be integrated and thus providing the necessary base for an improved understanding of the Devonian period. A number of the respective colleagues and working groups have already agreed to contribute to the proposed project (see letters of support).

For supporting the network and communication among the participants there will be a website provided which will be hosted at the Senckenberg Research Institute and Natural History Museum (<http://www.senckenberg.de/igcp-499/>). It will include links to participating groups/institutions and other relevant sites such as funding agencies.

For further information see website and/or contact the leaders of the project at the following addresses:

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## ANNOUNCEMENT

### Holocene Environmental Catastrophes in South America: From the Lowlands to the Andes

*A joint meeting of IGCP 490 and ICSU/IUGS*

*Laguna Mar Chiquita, Córdoba Province, Argentina*

*13-19 March 2005*

The aim of IGCP 490 (*The role of Holocene environmental catastrophes in human history*) and ICSU/IUGS (*Dark Nature, Rapid natural change and human response*) joint meetings is to promote the interdisciplinary investigation of Holocene geological catastrophes, which are of importance for civilizations and ecosystems. Meetings involve earth scientists, biologists, archaeologists, anthropologists, historians, meteorologists, astrophysicists and health experts.

The main fundamental issues to be addressed in joint IGCP 490 - ICSU/IUGS meetings are:

- \* Chronology of climatic catastrophes (sudden event or short-duration chain of events). Three timescales are considered: 1) the entire Holocene (sedimentary and other paleo-records), 2) the last 5,000-4,000 years (written documents); and 3) the last few centuries (instrumental record).
- \* Causes and mechanisms of past environmental catastrophes
- \* Impacts on past civilizations and ecosystems
- \* Mechanisms of recovery

The meeting, hosted by the Research Center for Geochemical and Surficial Processes (University of Córdoba, Argentina; <http://www.efn.uncor.edu/investigacion/ciges/index.htm>) will be held in Miramar, a small village in the southern coast of Laguna Mar Chiquita in the pampean plains of central Argentina. Laguna Mar Chiquita is a highly variable and shallow saline lake. At present is the largest saline lake in South America (~ 6,000 km<sup>2</sup>) and also one of world's largest saline lakes. The 20<sup>th</sup> century history of the lake was characterized by alternating low and highstands intervals that have been disrupting human activities in the region.



Presentations on catastrophic and rapid environmental changes anywhere in the world will be welcome. The meeting will focus on the multidisciplinary study of well-dated high resolution records of climatic and other environmental catastrophes in South America. Contributions should deal with these major topics:

- \* Holocene climate changes in South America
- \* High resolution and continuous records of climatic and environmental changes
- \* Holocene fire history records
- \* Recent hydrological changes in South America
- \* Monitoring rapid geologic changes in semi-arid regions (i.e. dust storms, dune formations and reactivations, eolian deflations, hydrological changes)
- \* Environmental and social consequences of earthquakes, landslides, volcanic eruptions, cosmogenic impacts, karst collapses, tsunamis, floods, droughts
- \* Holocene climate and South American culture collapse
- \* Environmental impact on human health

**Conference conveners:** Eduardo Piovano (Research Center for Geochemical and Surficial Processes, CIGES University of Córdoba, Argentina) and Suzanne Leroy (Department of Geography and Earth Sciences, Brunel University, UK).

**Organizing Committee:** Marcelo Zárate (Universidad Nacional de La Pampa, Argentina), Marcela Cioccale (CIGES, UNC, Argentina), Eduardo Piovano (CIGES, UNC, Argentina), Gabriela García (CIGES, UNC, Argentina), Karina Lecomte (CIGES, UNC, Argentina), Diego Gaiero (CIGES, UNC, Argentina), Gabriela Zanor (CIGES, UNC, Argentina), José Sagayo (Universidad de Tucumán, Argentina)

The meeting will include keynote lecturers, a short course on tracking rapid geological change organized by the IUGS Geoindicators initiative as well as 2 day post-meeting field trip. The First Circular and further information on the meeting can be obtained by entering the web page of the conference: <http://www.efn.uncor.edu/investigacion/ciges/EVENTS.htm>

*Eduardo L. Piovano*  
*CIGES*  
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*X5016GCA – Córdoba, Argentina*  
*Phone: +54 351 434 4983*  
*Fax: +54 351 433 4139*  
*E-mail: [epiovano@efn.uncor.edu](mailto:epiovano@efn.uncor.edu)*

## CALENDAR

### **CLIMATIC & TECTONIC CONTROLS ON TRAVERTINE-FORMATION: THE CASE OF THE PANNONIAN BASIN\***

#### **Regional field course for graduates and undergraduates**

July 4-8 2004,  
Tata  
Hungary

A.Mindszenty or Z.Siklosy  
Department of Applied & Environmental Geology  
H-1117. Pazmany Peter setany 1/c  
Hungary

E-mail: [travertine@geology.elte.hu](mailto:travertine@geology.elte.hu)

Web-page: <http://travertinecourse.geology.elte.hu>

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### **TIDALITES-2004**

#### **6<sup>TH</sup> INTERNATIONAL CONFERENCE ON TIDAL SEDIMENTOLOGY**

August 2-5, 2004  
Copenhagen,  
Denmark

Jesper Bartholdy  
Institute of Geography, University of Copenhagen,  
Oster Voldgade 10, Dk-1305 Copenhagen K  
Denmark

E-mail: [jb@geogr.ku.dk](mailto:jb@geogr.ku.dk)

Web-page: [www.geogr.ku.dk/tidalites](http://www.geogr.ku.dk/tidalites)

Fax nr. +45 35 32 25 01

Tel. nr.: +45 35 32 25 00

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### **32<sup>ND</sup> INTERNATIONAL GEOLOGICAL CONGRESS**

August 20-28, 2004  
Florence  
Italy

Chiara Manetti  
Dipartimento di Scienze della Terra  
Via La Pira, 4  
50121 Firenze Italy

e-mail: [casaitalia@geo.unifi.it](mailto:casaitalia@geo.unifi.it)

Phone/Fax: + 39 055 2382146

Web-page: [www.32igc.org](http://www.32igc.org)

**INTERNATIONAL SYMPOSIUM ON "EARLY PALAEOZOIC PALAEOGEOGRAPHY AND  
PALAEOCLIMATE" (IGCP 503 OPENING MEETING)**

*September 1-3, 2004  
Erlangen, Germany  
(followed by a Field  
Meeting: "Ordovician  
and Silurian of Southern  
Sweden (Fågelsång,  
Öland, Gotland)") –  
September 4-12*

*Axel Munnecke  
Institute of Palaeontology, Erlangen University  
Loewenichstr. 28, D-91054 Erlangen, Germany  
Phone: +49 (0)9131 / 85-26957  
Fax: +49 (0)9131 / 85-22690  
E-mail: [palaeo2004@pal.uni-erlangen.de](mailto:palaeo2004@pal.uni-erlangen.de)  
Web-site: [http://www.pal.uni-erlangen.de/IGCP503/  
first\\_circular.html](http://www.pal.uni-erlangen.de/IGCP503/first_circular.html)*

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**WORKSHOP ON:**

**"MICROBIALITES AND MICROBIAL COMMUNITIES IN SEDIMENTARY SYSTEMS.  
BIOLOGICAL DIVERSITY, BIOGEOCHEMICAL FUNCTIONING, DIAGENETIC PROCESSES,  
TRACERS OF MODERN AND PAST ENVIRONMENTAL CHANGES"**

*September 6-9, 2004  
Paris  
France*

*Gilbert Camoin  
CEREGE, UMR CNRS 6635  
Europole Mediterranee de l'Arbois B.P. 80  
F-13545 Aix-en-Provence cedex 4  
Tel.: +33-4-42-97-15-14 Fax: +33-4-42-97-15-40  
E-mail: [gcamoin@cerege.fr](mailto:gcamoin@cerege.fr)*



**23<sup>rd</sup> IAS MEETING OF SEDIMENTOLOGY\***

**(including Special Session to honour Peter Friend)**

*September 15-17,  
2004, Coimbra  
Portugal*

*Rui Pena dos Reis  
Universidade de Coimbra, Dpto. Ciências da Terra  
Largo Marquês de Pombal, 3014 Coimbra (Portugal)  
E-mail: [penareis@ci.uc.pt](mailto:penareis@ci.uc.pt)  
Web-page: [www1.ci.uc.pt/ias/](http://www1.ci.uc.pt/ias/)*

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**2<sup>nd</sup> INTERNATIONAL MAAR CONFERENCE\***

*September 15-29, 2004  
Kecskemet-Lajosmizse  
Hungary*

*Dr. Ulrike Martin  
TU-Bergakademia, Institute fuer Geologie  
Bernhardt-von-Cotta-str-2  
Freiberg, D-09596, Germany  
E-mail: [ulrike.martin@geo.tu-freiberg.de](mailto:ulrike.martin@geo.tu-freiberg.de)  
Dr. Karoly Nemeth  
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E-mail: [nemeth\\_karoly@hotmail.com](mailto:nemeth_karoly@hotmail.com)  
Web-page: [http://www.mafi.hu/2IMC\\_Homepage/  
2IMC\\_Homepage\\_Files/WelcomePagePictures/2IMC.html](http://www.mafi.hu/2IMC_Homepage/2IMC_Homepage_Files/WelcomePagePictures/2IMC.html)*

## **DEEP-WATER SEDIMENTARY SYSTEMS OF ARCTIC AND NORTH ATLANTIC MARGINS**

*October 18-20, 2004*

*Stavanger*

*Norway*

*Marianne Blikas*

*Geological Society of Norway c/o NGU*

*N-7491 Trondheim, NORWAY*

*Phone: +47 73 904468*

*E-mail: [Marianne@geologi.no](mailto:Marianne@geologi.no)*

*Web-site: <http://www.geologi.no/cgi-bin/geologi>*

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## **SEDIMENTARY BASINS OF LIBYA, 3<sup>RD</sup> SYMPOSIUM. GEOLOGY OF EASTERN LIBYA BASINS AND ADJACENT AREAS.**

*November 21-23, 2004*

*Binghazi*

*Libya*

*The organising committee*

*National Oil Corporation (NOC)*

*P.O. Box 2855*

*Tripoli, Libya*

*Tel./Fax: (+218) 21-480 46 43*

*E-mail: [eastlibya@noclibya.com](mailto:eastlibya@noclibya.com)*

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## **12<sup>TH</sup> CONGRESS R.C.M.N.S.**

*2005 (exact date not*

*yet fixed)*

*Vienna, Austria*

*Martin Zuschin*

*Department of Palaeontology University of Vienna*

*A-1090 Vienna, Althanstrasse 14 Austria*

*e-mail: [martin.zuschin@univie.ac.at](mailto:martin.zuschin@univie.ac.at)*

*Mathias Harzhauser*

*Geological-Palaeontological Department*

*Natural History Museum Vienna*

*A-1014 Vienna, Burgring 7 Austria*

*e-mail: [mathias.harzhauser@nhm-wien.ac.at](mailto:mathias.harzhauser@nhm-wien.ac.at)*



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## **24<sup>th</sup> IAS MEETING OF SEDIMENTOLOGY\* (Scenic Sedimentology)**

*January, 10-13, 2005*

*Muscat*

*Oman*

*Peter Homewood*

*Carbonate Centre*

*Sultan Qaboos University*

*P.O. Box 36, P.C. 123*

*Al Khod, Sultanate of Oman*

*GSM: +968 924 14 68*

*Phone: +968 515 030 / Fax: +968 513 147*

*E-mail: [homewood@squ.edu.om](mailto:homewood@squ.edu.om)*

*Web-page: <http://www.squ.edu.om/sci/Centers/VR/IAS/home.htm>*

**HOLOCENE ENVIRONMENTAL CATASTROPHES IN SOUTH AMERICA: FROM THE  
LOWLANDS TO THE ANDES**

**Joint meeting of IGCP 490 and ICSU/IUGS**

*March 13-19, 2005  
Laguna Mar Chiquita,  
Province of Córdoba,  
Argentina*

*Eduardo Piovano  
CIGES  
Facultad de Ciencias Exactas, Físicas y Naturales  
Av. Velez Sarsfield 1611 X5016GCA  
Córdoba, Argentina  
Phone: +54 351 434 4983 Fax: +54 351 433 4139  
e-mail: [epiovano@efn.uncor.edu](mailto:epiovano@efn.uncor.edu)  
Web-page: [http://www.efn.uncor.edu/investigacion/  
ciges/EVENTS.htm](http://www.efn.uncor.edu/investigacion/ciges/EVENTS.htm)*

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**8<sup>TH</sup> INTERNATIONAL CONFERENCE ON FLUVIAL SEDIMENTOLOGY**

*August 7-12, 2005  
Delft  
The Netherlands*

*Salomon B. Kroonenberg  
Department of Geotechnology  
Delft University of Technology Mijnbouwstraat 120  
2628 RX Delft, The Netherlands  
e-mail: [Organizing.committee@8thfluvconf.tudelft.nl](mailto:Organizing.committee@8thfluvconf.tudelft.nl)  
Web-page: <http://www.8thfluvconf.tudelft.nl/>*

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**7<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON THE CRETACEOUS**

*September 5-9, 2005  
Neuchâtel  
Switzerland*

*Karl B. Föllmi or Thierry Adatte  
Institut de Géologie, Université de Neuchâtel, case  
postale 2, CH-2007 Neuchâtel, Switzerland  
E-mail: [karl.foellmi@unine.ch](mailto:karl.foellmi@unine.ch) ;  
[thierry.adatte@unine.ch](mailto:thierry.adatte@unine.ch)  
Web-page: <http://www.unine.ch/geologie/isc7/>  
Fax nr.: 0041-718 26 01*

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**THE NONMARINE PERMIAN**

*October 21-29, 2005  
Albuquerque,  
New Mexico, USA*

*Dr. Spencer G. Lucas  
New Mexico Museum of Natural History  
1801 Mountain Road NW  
Albuquerque, NM 87104 USA  
Phone: 505-841-2873/ Fax: 505-841-2866  
E-mail: [slucas@nmmnh.state.nm.us](mailto:slucas@nmmnh.state.nm.us)*

## **GONDWANA 12 CONFERENCE**

*November 6-11, 2005  
Mendoza  
Argentina*

*Carlos W. Rapela & Luis A. Spalletti  
Web-page: <http://cig.museo.unlp.edu.ar/gondwana>*

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## **PALAEOPEDOLOGY: NEW PERSPECTIVES ON OLD SOILS**

*July 10-13, 2006  
Cardiff  
UK*

*Susan B. Marriott  
School of Geography and Environmental Management  
Faculty of the Built Environment  
University of the West of England  
Coldharbour Lane, Bristol BS16 1QY, UK  
e-mail: [Susan.Marriott@uwe.ac.uk](mailto:Susan.Marriott@uwe.ac.uk)*

*V. Paul Wright  
Department of Earth Sciences  
Cardiff University  
Cardiff CF10 3YE, UK  
e-mail: [wrightvp@cardiff.ac.uk](mailto:wrightvp@cardiff.ac.uk)*

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*August 27 –  
September 1, 2006  
Fukuoka  
Japan*

## **17<sup>TH</sup> INTERNATIONAL SEDIMENTOLOGICAL CONGRESS\***

*Ryo Matsumoto  
Department of Earth & Planetary Sciences  
University of Tokyo  
Hongo, Tokyo 113, Japan  
E-mail: [ryo@eps.s.u-tokyo.ac.jp](mailto:ryo@eps.s.u-tokyo.ac.jp)  
Web-page: <http://sediment.jp/>*

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