INTERNATIONAL ASSOCIATION
OF SEDIMENTOLOGISTS

NEWSLETTER

Nº 189 December 2003

CONTENTS

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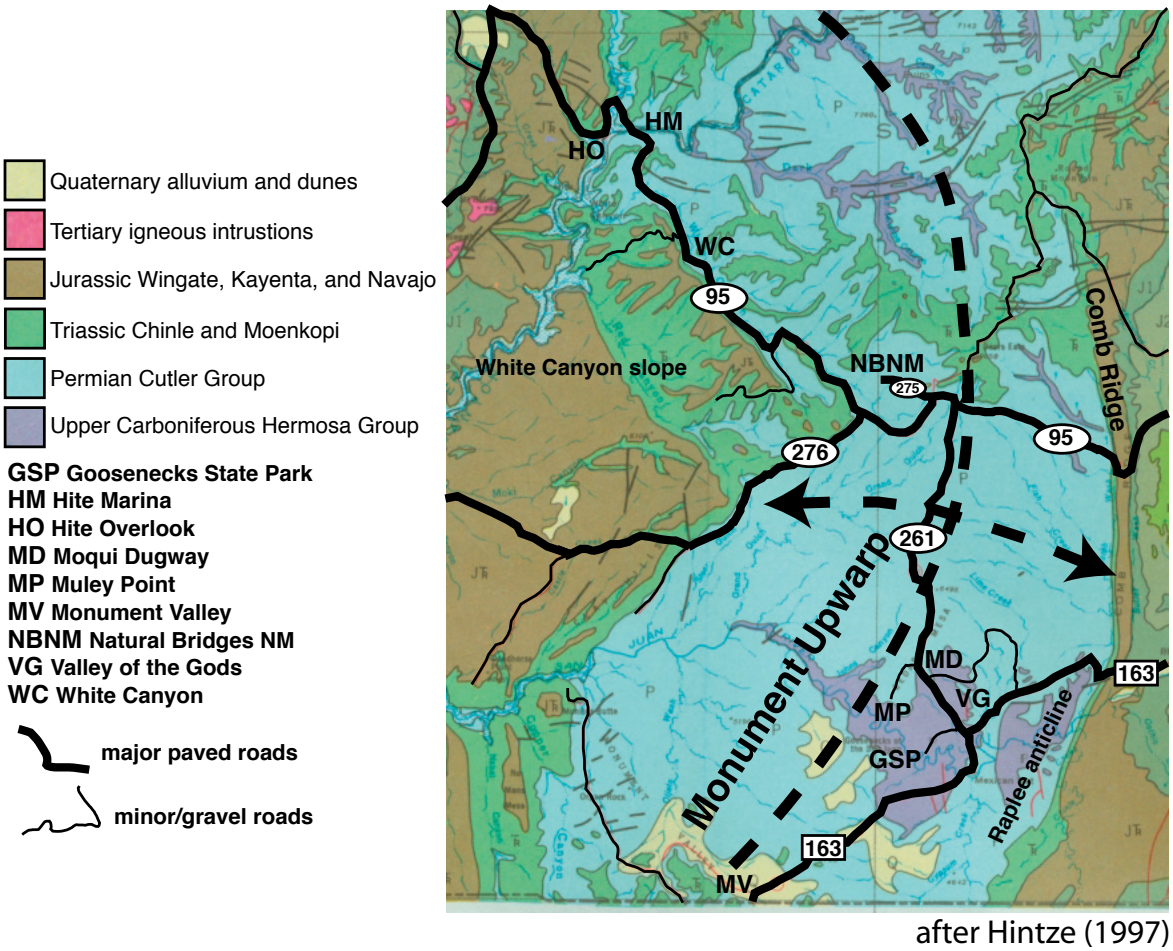
SUPER SEDIMENTOLOGICAL EXPOSURES

UPPER PALEOZOIC AND LOWER MESOZOIC CONTINENTAL AND MARINE SUCCESSIONS OF THE MONUMENT UPWARP, ARIZONA AND UTAH, USA

Spectacular canyon and cliff exposures of Late Carboniferous through Jurassic sedimentary rocks are exposed in southeastern Utah along the Monument Upwarp (Fig. 1). These exposures include classic carbonate bioherms in the Late Carboniferous Paradox Formation and the "western movie" scenery of the buttes and mesas of Monument Valley. Several US National Park units and state and tribal parks are in this region and most almost all other lands are US federal property managed by the US Bureau of Land Management (BLM). The exposures described in this brief overview are all accessible on paved or improved gravel roads and established trails; however, many more can be seen via four-wheel drive vehicles or river rafting.



after Hintze (1997)

Figure 1. Location and geologic map of Monument Upwarp area, Arizona and Utah, USA

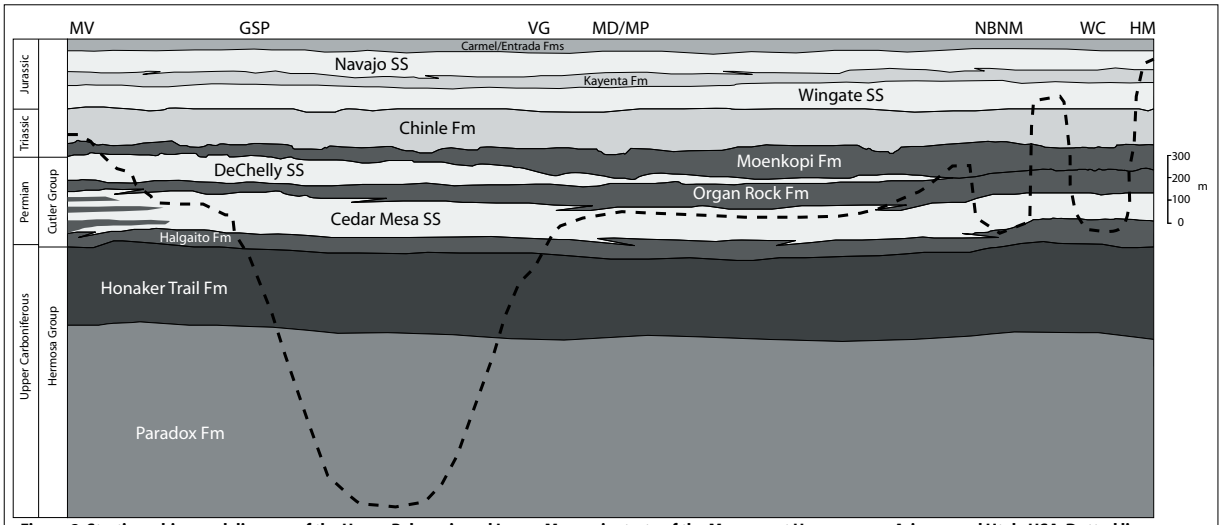


Figure 2. Stratigraphic panel diagram of the Upper Paleozoic and Lower Mesozoic strata of the Monument Upwarp area, Arizona and Utah, USA. Dotted line refers to approximate modern land surface (outcrop) at each locality. MV: Monument Valley, GSP: Goosenecks State Park, VG: Valley of the Gods, MD/MP: Moqui Dugway/Muley Point, NBNM: Natural Bridges National Monument, WC: White Canyon, HM: Hite Marina.

The Monument Upwarp is a large fold in the relatively flat-lying strata of the Colorado Plateau. Although the structure has a long history of subtle movement, most of the structural relief is related to compression during the Late Mesozoic/Early Tertiary Laramide orogeny. The fold trends roughly north-south and is asymmetrical with a steeper east limb defined by the Comb Ridge monocline and a less steep west limb termed the White Canyon slope (Fig. 1). The outcrops within the uplift have been exposed by incision of the Colorado and San Juan Rivers and their drainage systems.

The Late Paleozoic though Early Mesozoic strata exposed in and around the Monument Upwarp were deposited in a series of sedimentary basins related to several older mountain-building events that affected the region. The oldest strata, the Late Carboniferous Hermosa Group and Late Carboniferous-Permian Cutler Group (Fig. 2), were deposited in the Paradox basin. This basin was created by subsidence west of the Uncompaghre/ Ancestral Rocky Mountains uplifts to the east, which, in turn, were most likely compressional features related to the collision of Gondwana with the southern margin of the Laurentian plate (Ouachita-Marathon orogeny). The Early Mesozoic strata (Fig. 2), were deposited in basins associated with dynamic subsidence related to the east-dipping subduction of the Farallon plate beneath the North American plate.

The fill of these basins in the Monument Upwarp area recorded marine and then continental deposition under dominantly arid Pangaean and post-Pangaean conditions (with some notable exceptions) (Fig. 2):

1. Late Carboniferous: cyclic shelf carbonates, evaporites and siliciclastics of the Pinkerton Trail, Paradox, and Honaker Trail Formations
2. Latest Carboniferous-Permian: aeolian erg sandstones (Cedar Mesa, DeChelly, and White Rim Sandstone) and loessites (Halgaito Formation), with dryland fluvial sandstones and associated low-relief aeolian sand sheets (Organ Rock Formation)
3. Early Triassic: tidal flat, sabkha, and dryland fluvial sandstones and mudstones (Moenkopi Formation)
4. Late Triassic: fluvial sandstones,

lacustrine and floodplain mudstones and carbonates (Chinle Formation)
5. Early Jurassic: eolian sandstones (Wingate and Navajo Sandstones) and dryland fluvial sandstones (Kayenta Formation)

Significant unconformities separate the Permian DeChelly and White Rim Sandstones and Organ Rock Formation from the overlying Early Triassic Moenkopi Formation and the Moenkopi Formation from the overlying Late Triassic Chinle Formation.

Selected outcrops to be visited:

Monument Valley Tribal Park (MV on Fig. 1): Organ Rock Formation, DeChelly Sandstone, Moenkopi and Chinle Formations

The spectacular buttes and mesas of Monument Valley are some of the most iconic scenery of the western US. This area has been the site of numerous movies, television shows, and commercial advertisements. The floor of the valley and lower slopes of the buttes and mesas are comprised of red and reddish brown sandstones and siltsones of the Permian Organ Rock Formation, deposited by dryland fluvial systems, low-relief aeolian sand sheets and other erg-margin depositional systems. The vertical cliff faces are aeolian erg deposits of the Permian DeChelley Sandstone. The Lower Triassic Moenkopi (Hoskinni Member) and Upper Triassic Chinle Formation (Shinarump Member) comprise the thinner-bedded units that cap some of the mesas. Monument Valley Tribal Park is part of the Navajo Nation and there is an entrance fee to some of the interior portions of the park. However, many vistas can be view from pullouts along US RT 163.

Figure 3. San Juan River at the Goosenecks from Muley Point. Monument Valley is in the background. Upper Carboniferous marine carbonates of the Hermosa Group are exposed in the canyon while Permian Cutler Group aeolian and dryland fluvial sandstones and mudstones are exposed in the buttes and mesas. Triassic fluvial sandstones cap the buttes.

Goosenecks State Park (GSP on Fig. 1) (Paradox and Honaker Trail Formations)

The San Juan River has incised meanders deeply into the Monument Upwarp and these features are best viewed at this small state park (and at Muley Point, see below). These spectacular canyons expose the Late Carboniferous Hermosa Group shelf carbonate and siliciclastic deposits. The Pinkerton Trail Formation, exposed near river level in the canyons around Goosenecks, is the oldest unit in the Hermosa Group and was deposited in outer and restricted shelf carbonate environments. The overlying Paradox Formation was deposited on the southern margin of the Paradox basin, which contains contemporaneous evaporite deposits further to the north. The Paradox Formation in this area contains phyloid algal and chaeteid bioherms which are petroleum reservoirs for the numerous active producing wells in the Monument Upwarp region. The Honaker Trail Formation overlies the Paradox and consists of alternating shallow water carbonate facies and reddish mudstones and sandstones. The park consists mainly of overview points at the canyon rim. However, an established trail (Honaker trail) 2.6 km north of the park descends from the canyon rim to river level and allows access to all of the formations.

Valley of the Gods (VG on Fig. 1) (Halgaito Formation)

The Valley of the Gods road is an improved gravel loop which connects UT RT 261 with US RT 163. The road traverses the terrain around the base of Cedar Mesa through extensive outcrops of buttes and mesas of the Permian Halgaito Formation of the Cutler Group. The Halgaito consists of reddish and reddish brown siltstones, mudstones, and sandstone. It interfingers with the overlying aeolian sandstones of the Cedar Mesa and seems to have been deposited as erg-margin and downwind loess blankets and by dryland fluvial systems associated with the Cedar Mesa erg. This loop drive should only be attempted by two-wheel drive vehicles in good weather; four-wheel drive vehicles may be needed if the road is wet and muddy.

Moqui Dugway (MD on Fig. 1) (Halgaito Formation and Cedar Mesa Sandstone)

The Moqui Dugway ia a steep, partially paved road (UT RT 261) with a series of tight switchbacks that climbs up and over Cedar Mesa north of Mexican Hat, UT. There are panoramic views of the Valley of the Gods and the canyons of the San Juan River at various pullouts along the road. The road is cut into the Halgaito Formation (first switchback at the base of the mesa) and Cedar Mesa Sandstones of the Permian Cutler Group. Large-scale cross stratification and reddish interdune deposits, including permineralized roots in the Cedar Mesa Sandstone can be examined at several of the pullouts. The Raplee anticline, a smaller, en echelon fold in the eastern limb of the Monument Upwarp is also visible to the south along the San Juan River.

Muley Point, Glen Canyon National Recreation Area (MP on Fig. 1) (Paradox and Honaker Trail Formations)

At the top of the Moqui Dugway, an improved gravel road to the west leads another 8 km to another view of the incised meanders of the San Juan River into the Late Carboniferous Pinkerton Trail, Paradox, and Honaker Trial

Formations of the Hermosa Group. This time the view is from high above, on the rim of the Cedar Mesa Sandstone.

Natural Bridges National Monument (NBNM on Fig. 1) (Cedar Mesa Sandstone and Organ Rock Formation)

This small national monument preserves three large natural bridges carved into the Permian Cedar Mesa Sandstone. Large-scale cross stratification in the sandstone and reddish interdune mudstone deposits with fossil roots can all be examined along short trails which lead to the bases of each of natural bridges. There are also longer loop trails which lead to more remote parts of the national monument.

White Canyon (WC on Fig.1) (Cedar Mesa Sandstone, Organ Rock, Moenkopi, and Chinle Formations, Wingate Sandstone, Kayenta Formation)

The road between Natural Bridges National Monument and Hite, UT (UT RT 95) follows White Canyon for most of its length. The bottom of White Canyon is in the Permian Cedar Mesa Sandstone (downstream from Natural Bridges). The canyon walls on either side are made up of the overlying Permian Organ Rock Formation, Lower Triassic Moekopi Formation, Upper Triassic Chinle Formation, and Lower Jurassic Wingate and Kayenta Formations. Several prominent aeolian sandstone beds in the Organ Rock can be traced along the canyon walls, generally thickening to the north, Although difficult to pick out from the paved road, there are significant unconformities between the Permian and Triassic strata and between the Lower and Upper Triassic strata. The basal members of Upper Triassic Chinle Formation (Shinarump, Monitor Butte, and Moss Back Members) all have been mined or prospected for uranium mineralization in White Canyon and several mine dumps are visible along the canyon walls. There are two gravel roads which lead off to the west of White Canyon and climb up the western canyon wall. Radium King road (BLM RD 258), near Fry Canyon resort, and Blue Notch road (BLM RD 206A) both provide views of the canyon and access to close examination of the uppermost Permian though Upper Triassic strata. Both of these roads should only be attempted by high-clearance two-wheel drive vehicles or four-wheel drive vehicles in good weather.

Hite Marina (HM on Fig. 1) and Hite Overlook (HO on Fig.1), Glen Canyon National Recreation Area (Organ Rock Formation, White Rim Sandstone, Moenkopi Formation, Chinle Formation, Wingate Sandstone, Kayenta Formation, Navajo Sandstone)

UT RT 95 crosses the Colorado River at Hite, UT in Glen Canyon National Recreation area near the upstream end of Lake Powell. Glen Canyon and its tributaries have extensive exposures of the Upper Permian through Lower Jurassic strata. The aptly named White Rim Sandstone is a prominent aeolian unit that occurs immediately below the Permian-Triassic unconformity (it is truncated to the south). This unit contains significant tar sand deposits between Hite and Cayonlands National Park to the east. There are good views of the strata around the marina and the near the bridge over the Colorado River. However, better views are from an established overview point 8 km north of the bridge on UT RT 95, looking back to the south from the north rim of Glen

Canyon. There are also views of the Tertiary laccoliths that form the Henry Mountains to the north.

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Accommodations

Kayenta, AZ
Anasazi Inn at Tsegi, Box 1543, Kayenta, AZ 86033, 520-697-3793
Best Western Wetherill Inn, P.O. Box 175, Kayenta, AZ 86033, 928-697-3231
Hampton Inn, US 160, Kayenta, AZ 86033, 928-687-3170
Holiday Inn, P.O. Box 307, Kayenta, AZ 86033, 928-697-3221
Bluff, UT
Calabre B&B, 127 4th West St., Bluff, UT 84512, 435-672-2252
Calf Canyon B&B, 7th East at Black Locust Bluff, UT 84512, 888-922-2470
Desert Rose Inn & Cabins, 701 W. Highway 191, Bluff, UT 84512, 435-672-2303
Recapture Lodge, Box 309, Bluff, UT 84512, 435-672-2281Wayside Inn, P.O. Box 6, Bluff, UT 84512, 435-672-2287
Blanding, UT
Best Western Gateway Inn, 88 East Center, Blanding, UT 84511, 435-678-2278
Comfort Inn, 711 S. Main St., Blanding, T 84511, 435-678-3271
Rodgers House B&B Inn, 412 S. Main St., Blanding, UT 84511, 800-355-3932Super 8 Motel, 755 S. Main St., Blanding, UT 84511, 800-800-8000
Fry Canyon, UT
Fry Canyon Lodge, UT RT 95, Fry Canyon, UT 435-259-5334
Mexican Hat, UT
Burch's Motel, US 163, Box 337 Mexican Hat, UT 84531, 435-683-2221
Canyonlands Motel, US 163, Box 11 Mexican Hat, UT 84531, 435-683-2230
Mexican Hat Lodge, US 163, Box 175 Mexican Hat, UT 84531, 435-683-2222

San Juan Inn, US 163, Box 276 Mexican Hat, UT 84531, 800-447-2022
Valley of the Gods B&B, Box 307 Mexican Hat, UT 84531, 970-749-1164

Monument Valley, UT

Gouldings Lodge, Box 360001, Monument Valley, UT 84536, 435-727-3231

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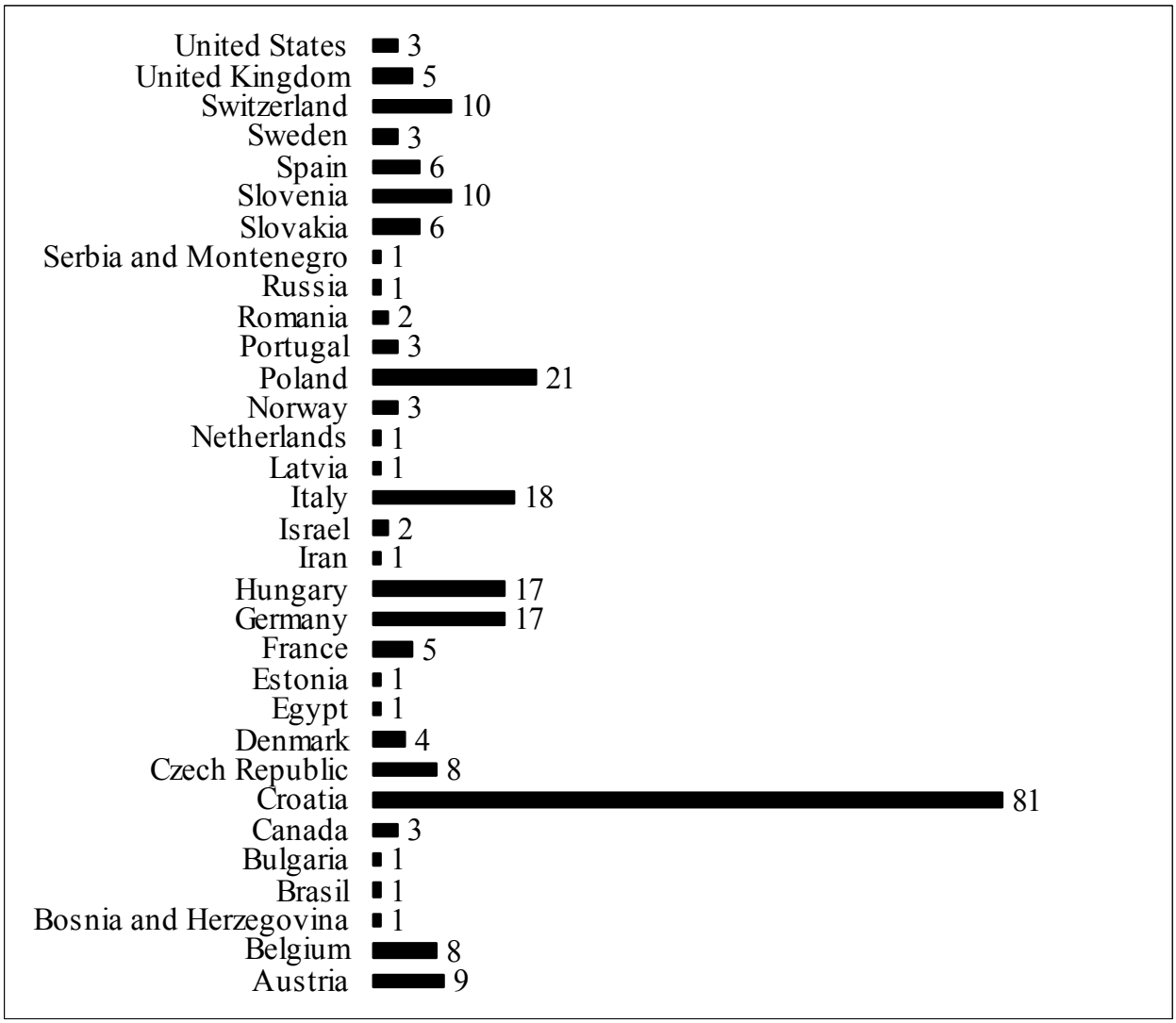
University of Minnesota Duluth
Duluth, MN 55812 USA

Report on the

22nd IAS MEETING OF SEDIMENTOLOGY
Opatija - Croatia, September 17-19, 2003

The *22nd IAS Meeting of Sedimentology* was held in the Convention Centre of the Grand Hotel Adriatic, in a small touristic town Opatija, located on the eastern Adriatic coast where Central Europe and the Mediterranean meet. It was the second IAS Meeting held in Croatia - the first one, 4th IAS Regional Meeting of Sedimentology, was held in Split in 1983. The Meeting in Opatija was organized by the Institute of Geology (Zagreb) and the Croatian Geological Society. The sponsor was Ministry of Science and Technology of the Republic of Croatia.

First, a short statistics. Among 254 participants coming from 32 countries young ones prevailed. Scientific Program was divided into 14 themes, and authors presented their works with 72 lectures



organized in two parallel sessions, and 141 posters. There were 8 invited keynotes. A short course and workshop were held the day before official start of the meeting. Three pre-meeting and three post-meeting filed trips were running.

Keynotes were presented by eminent Croatian and foreign sedimentologists. Topics of keynotes were focused on sedimentation on carbonate platforms, siliciclastic systems, mixed clastic–carbonate environments, and problems of palaeosoil formation. The diversity of keynotes topics as well as well-known names from the sedimentological world attracted many participants and keynotes were visited very well. Six of these keynotes were published in Croatian national geological journal Geologia Croatica, which represented part of the official meeting materials, together with the Abstract Book (edited by Igor Vlahović) and Field Trip Guidebook (edited by Igor Vlahović and Josip Tišljar). This issue of Geologia Croatica is already distributed to geologists and institutions worldwide. Keynotes will be available for download from the official journal web site: http// www.geologia-croatica.hr.

Themes from the Scientific Program covered different aspects of sedimentology and complemental disciplines. Most of presentations dealed with processes on the carbonate platforms and their evolution, but deep-marine environments, coastal and shelf systems, and non-marine environments were also topics of high interest. However, it is peculiar that themes such as environmental sedimentology and geoconservation, as well as aquifer sedimentology did not obtain expected impact although they are very important for the protection of modern environments.

Workshop entitled *Oil and gas exploration in sedimentary basin: examples from the Pannonian Basin in Croatia* was held in the Croatian national oil company INA d.d. - Naftaplin. Young sedimentologists were instructed on the basics of handling various types of subsurface data and how to develop exploration leads independently and eventually to locate prospects. At short course *The role of clay minerals in the Earth sciences* participants were introduced about XRD method for the determination of clay minerals in sediments.

Pre- and post-meeting field trips attracted 105 participants. Field trips were focused to the Mesozoic Adriatic Carbonate Platform sedimentation and unconformities marked by soil formation, platform carbonates of the Julian Alps, pre-platform deposits, and sedimentation in the Miocene Pannonian basin. These field trips comprised outcrops and sections over large part of Croatia: from Split area, over Lika and Gorski Kotar region, Istrian Peninsula to the mountains of north Croatia, and one field trip was partly running in neighbouring Slovenia.

The Social Program offered the Icebreaker party which was held the evening before the start of the meeting, and the Country Dinner which was organized in the middle of the meeting at Paladnjaki Village in the heart of the Istrian Peninsula. Participants tasted typical Istrian domestic food and wine, and enjoyed in local folk music as well as in modern dance music. It was really a good fun, and it was not easy to stop musicians at 1.00 after midnight and to say to dancers that they should be fresh for the Scientific Program which continued in the morning.

Finally, we may say that we believe that it was a very good meeting in any sense. Organizers have received many thanks and compliments from participants as well as from IAS Bureau members, what was a big reward for the Organizing Committee (lead by Davor Pavelić, president and Josip Halamić, secretary) and Scientific Committee (lead by Josip Tišljar, president). Interesting sedimentological discussions and social events, picturesque Opatija, pleasant host people, warm Adriatic Sea in front of the Convention centre, and sunny days additionally contributed to this impression.

Davor Pavelić
Igor Vlahović
Josip Halamić
Organizing Committee of the 22nd IAS Meeting of Sedimentology
Institute of Geology
Zagreb, Croatia

IAS 2003, 22nd IAS MEETING
OPATIJA, CROATIA, 17-19 SEPTEMBER 2003

Some personal reflections

My chief impression from the meeting in Opatija was of the healthy state of both the science of sedimentology and the IAS. This was expressed not only through the numbers attending (around 270, from 35 countries) and the excellent associated publications (Abstracts book, Guidebook for all the fieldtrips, plus a special issue of *Geologia Croatica* containing keynote papers), but also by the diversity of issues addressed and of techniques (including many new ones) used. The sedimentary rock record is the product of myriads of interacting processes and many different skills are needed to unravel them. So today's sedimentologist must be part chemist, part physicist, part biologist and part mathematician, as well as a practised field geologist, and all these aspects were in evidence at the meeting. This diversity of approach was especially notable in the programme of keynote talks, which spanned the thematic spectra of carbonates to siliciclastics, syn-, to post-depositional processes, microscopic to palaeogeographical contexts, and academic to applied aspects.

I particularly liked Andrea Mindszenty's characterization of time, in her keynote talk, as the 'Jolly Joker' in the genesis of fossil soil horizons on carbonate substrata (which vary in character according to the interplay of ferric stabilization and water table movements linked with changes in relative sea level). Her point was nicely complemented by Goran Durn's detailed analysis of *terra rossa* in the Mediterranean region, in his keynote address. Indeed, time's knavery runs throughout the sedimentary record, and that is one reason why uniformitarianism applied at the inappropriate level of entire depositional systems – i.e., attempting simply to map modern environments onto ancient examples – often goes wrong. Merely identifying ('pigeon-holing') the components of such systems is not enough to understand them, because the relative rates of the genetic processes concerned also affect the final outcome. To take a culinary analogy, the custard that (as a typical Englishman) I like to put on my pudding is made essentially from eggs and milk, together with a little sugar and butter (plus optional flavourings, such as vanilla and a bay leaf). In order to create the correct, creamy texture, it is necessary to stir it continuously while heating it very slowly. If the same ingredients are heated too rapidly, without sufficient stirring, something more like scrambled egg results, which may be fine for breakfast, but no good for my pudding. The difference between the two contrasting outcomes arises not from any significant difference in the ingredients, but from a difference in the relative rates of the formative processes (heating and stirring). Hence we need to assess the relative rates of sedimentary and post-depositional processes in order fully to understand the rock record. A similar point was made in other keynote talks by, for example, Guy Plint, who distinguished the relative contributions of interacting eustasy and tectonics (flexural subsidence) to stratal geometries within a Cenomanian delta complex in western Canada, and Maurice Tucker, who showed how

variations in sea level change and the availability of clastics may interact to yield several different kinds of mixed clastic-carbonate sequences.

A perennial objective of sedimentology, then, must be the continual refinement of ways of estimating the time involved in such processes. This theme was picked up in a number of presentations at the meeting, especially those concerned with the controls on depositional cyclicity. That issue was, again, neatly introduced in a keynote talk, by André Strasser and Elias Samankassou, who used cyclostratigraphic analysis (based on likely precessional cycles) to compare rates of accumulation of lagoonal to intertidal deposits in the Holocene and the Kimmeridgian-Berriasian. The controls on such sedimentary cyclicity have been debated for many years, but it was interesting to see the variety of field and analytical methods that are now being brought to bear on the problem. I was particularly impressed by the potential of the relatively cheap field technique for recording variations in magnetic susceptibility (Anne-Christine da Silva *et al*). Although the allocyclic versus autocyclic control debate continues, I got the impression from the contributions to this meeting that – to use another culinary analogy – allocyclicity, driven by orbitally forced climatic cycles, is usually the *maître-chef*, but one whose products may be variously embellished by an army of autocyclic *sous-chefs*. The continuing challenge is thus to tease apart their relative contributions.

Another aspect of the meeting that I very much appreciated was its instructional value. In my role as a teacher, I have also to be a permanent student in order to keep up-to-date (or at least to try to do so!). The careful integration of the themes of the field trips, the keynote talks and the presentation sessions (including many excellently produced posters) provided a learning experience that was greater than the sum of its parts. So, for example, the field trip that I went on (A1, which illustrated that part of the Adriatic Carbonate Platform that is exposed in Istria), provided a fitting overture to the keynote talk of Igor Vlahović *et al*., on the geological history of the platform and to the following session on carbonate platforms in general. Moreover, the complementary excursion on subaerial unconformities in Istria matched the keynote presentations of Andrea Mindszenty and Goran Durn, mentioned earlier, again accompanied by many other relevant talks and posters. Other field excursions likewise matched conference themes, and for the more clastically-minded folk, for example, there were also field trips and presentations on that other great arm of Croatian geology, the Pannonian Basin, including a very informative keynote review of its stratigraphy and hydrocarbon reserves by Bruno Saftić *et al*. Such beneficial integration of the programme was the product of long and meticulous planning by our Croatian hosts and the final success of the meeting was a tribute to their dedicated organization. Nor was such excellent planning limited to the scientific content: who could forget the wonderful conference dinner of delicious local produce and cuisine at Paladnjaki Village, with accompanying dancing and music? To Davor Pavelić, Josip Halamić and their colleagues on the Organizing Committee, as well as Josip Tišljar, Mladen Juračić and others on the Scientific Committee, all delegates owe a very big '*Hvala*!'.

But the story does not end there. Delegates were able to see for themselves the high quality of the scientific content and international editing and production standards of *Geologia Croatica* from the special issue (**56**/1) provided to them at the meeting. It is to be hoped that many will decide to submit suitable papers for publication in subsequent numbers of this excellent journal.

Peter Skelton
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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.

Up to 10 grants, each of 1000 Euros, are awarded twice a year.

These grants are available for IAS members only, and only for postgraduates. The application must include a short CV and a budget. A letter from the supervisor supporting the application must be sent directly to the Treasurer of the IAS.

An application form is on our website *(http://www.blackwellpublishing.com/uk/society/ias*) or can be requested from the Treasurer's Office (IAS, Office of the Treasurer, Ghent University, Department of Geology and Soil Science, Krijgslaan 281/S8, B-9000 Gent, Belgium; E-mail: *Patric.Jacobs@rug.ac.be*

Applications must be sent to the Treasurer of the IAS.

Application deadlines:	**1st session:**	**March 31**
	2nd session:	September 30
Recipient notification:	**1st session:**	**before June 30**
	2nd session:	before December 31

Erratum: Christopher BANKS, a recipient of an IAS grant in the past session (see Newsletter nr. 187, August 2003), is from Keele University, UK (University of Birmingham was written in the Newsletter).

Announcement

CONFERENCE ON GLACIAL SEDIMENTARY PROCESSES AND PRODUCTS
University of Wales, Aberystwyth, 23-27 August 2005

Sponsor: International Association of Sedimentologists (IAS)
Co-sponsors: International Commission of Snow and Ice (ICSI)
International Glaciological Society (IGS)
Antarctic Climate Evolution (ACE); Scientific Commission on Antarctic Research

The aim of this conference is to promote dialogue between researchers in the fields of contemporary glacial processes, glacial sedimentology and ice sheet modellers in order to advance these fields in an integrated way. Contributions are invited from researchers working on all aspects of glacial sedimentary processes and products in glaciomarine, glaciolacustrine and terrestrial settings, from Archaean times to the present day. Contributions addressing the following themes are particularly encouraged:

1. Contemporary glacial processes
- •Debris entrainment and transport by contemporary glaciers
- •Depositional processes at contemporary glaciers
- •Role of thermal regime in depositional processes
- •Ice-marginal, glaciolacustrine and glaciofluvial processes and sediments
- •Glacial processes and products in fjordal, continental shelf and deep ocean environments
- •Subglacial and proglacial deformation of sediments
- •Tectonic controls on glacial sedimentation
- •The preservation potential of glacigenic successions
- •The role of catastrophic events in glacial sedimentary environments
- •Linking glacial sediments to glacier dynamics

2. The sedimentary record of past glacial systems
- •Case studies from a process perspective
- •Recognising styles of glaciation in the geological record
- •Reconstructing former glacier thermal regimes from sedimentary products
- •The role of tectonic setting in glacial sedimentology
- •Using mineralogical, geochemical and biological criteria to define glacial sedimentary regimes
- •Glacier-volcano interactions
- •Applied aspects, e.g. application of glacial sedimentology to hydrocarbon and mineral exploration
- •Sedimentary evidence for/against the "Snowball Earth" hypothesis

3. Modelling glacial depositional systems
- •Quantitative aspects of sediment delivery to continental margins
- •Seismic stratigraphy of glaciated continental margins
- •Numerical modelling of former ice sheets and glaciers constrained by geological data

•Modelling interaction between ice streams and subglacial environments, in particular the influence of deformable sediment on ice flow
•Modelling subglacial erosion, sediment transport and long-term landscape evolution

Publication
Delegates are invited to contribute papers to an IAS Special Publication arising from the conference. Papers should be submitted to the Editors by 1 August 2005. Refereeing will follow the guidelines used for the IAS journal *Sedimentology*. Reviewing will take place over the following 6 months. Publication is anticipated by September 2006. Deadlines will be strictly adhered to.

Web site
A conference web site will be established shortly.

Organising Committee & Editorial Board

Professor Michael Hambrey, Dr Neil Glasser, Dr Bryn Hubbard
Centre for Glaciology
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FIELD EXCURSIONS
2 day post-conference trip on glacial sediments and landforms in West Wales
1 day: Castles (Caernarfon, Harlech) and Darwin's glacial landscapes in Snowdonia, North Wales
1 day: Coastal scenery and St David's Cathedral, South Wales

Report on the

5th CONGRESS OF THE SPANISH TERTIARY GROUP (V CONGET)

Granada, September 23-25, 2003

Last September, the *5th Meeting of the Spanish Group of the Tertiary* (V CONGET) took place in Granada (Spain). The conference was organised by the Department of Geology of the University of Granada, the Geological Society of Spain (SGE) and the Spanish Institute of Geology and Mining (IGME). The Group has been organising periodical meetings since 1991, where Stratigraphy, Sedimentology, Tectonics and Palaeontology specialists meet to debate different aspects of Tertiary geology in Spain and other countries.

This time, about 100 researchers from Spain, United Kingdom, Portugal and Tunisia have met in Granada. 50 contributions have been exposed as either talks and posters, all distributed in six thematic sessions focused in *Palaeogeography and Sedimentary Models, Stratigraphy, Palaeontology, Tectonics and Regional Geology, Sedimentary Petrology and Geology and Marine Geophysics*, giving an update in research in the Iberian Peninsula, North Africa and South America. Moreover, four scientific field trips, which allowed the assistants to get in touch with several main aspects of the Tertiary formations in the Betic Cordillera (southern Spain), were advertised. The field trips focused in: *Margin Systems in the Tertiary of the Guadix Basin: stratigraphic architecture and control factors* (leaded by J. Fernandez, F. Garcia, J. M. Soria and C. Viseras), *The Tertiary in Sierra Espuña area* (leaded by M.Martin, A. Martin-Algarra and J. Serra-Kiel), *The sedimentary record of Cabo de Gata Block* (leaded by J. C. Braga and J. M: Martin) and *Neotectonics and sedimentation in the Granada Basin* (leaded by A. C. Lopez Garrido and C. Sanz de Galdeano)

Two publications came out from the conference: one covers the summaries of the contributions and has been published as 5th number of the journal *Geotemas*, a publication of the Geological Society of Spain. The other one is a field guide book entitled *Geologic Itineraries in the Tertiary of the Betic Cordillera*, which is published in Spanish by the Stratigraphy and Palaeontology Department of the University of Granada.

Two key-notes have been given as well: (1) *Tectonic, climate and source area controls on Oligocene-Miocene continental sedimentation in the northern Ebro Basin (Huesca province)*, presented by Dr. Gary Nichols (Royal Holloway University of London), and (2) *Hydrocarbon exploration in the Tertiary of Spain: problems and challenges*, given by Dr. Wenceslao Martinez de Olmo (Repsol-YPF). The scientific program was supplemented by a palaeontology exhibition: *The large trip to Occident: Iberic fauna 1,800,000 years ago*. The exhibition includes a very interesting selection of vertebrate remains from

the Fonelas P-1 palaeontological site (Guadix Basin, Betic Cordillera). It was presented by Dr. Alfonso Arribas (IGME), who outlined the importance of the findings facing the reconstitution of the continental fauna dispersion during the Tertiary – Quaternary boundary.

The Spanish Group of the Tertiary and the institutions involved in the organisation of the V CONGET dedicated the meeting to honour the career of Professor Juan Antonio Vera, from the University of Granada. Dr. J.A. Vera is a prestigious sedimentologist and stratigrapher who has made an extremely significant contribution to the knowledge of the geology of Spain and adjacent areas.

One more time, the CONGET has revealed itself as an interesting forum for the exchange of knowledge about the Tertiary, as seen from a multi- discipline – perspective. The next CONGET will take place in the beautiful city of Salamanca, probably in 2006. Those who want to share their knowledge about the Tertiary will be welcomed.

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CALENDAR

FIFTH INTERNATIONAL CONFERENCE ON ASIAN MARINE GEOLOGY
January 13-18, 2004, THAILAND (Bangkok)
Contact: Thanawat Jarupongsakul
Department of Geology, Faculty of Science,
Chulalongkorn University
Bangkok 10330, Thailand
Fax: (662) 2185464-5
E-mail: thanawat@sc.chula.ac.th
Web-page: http://www.geocities.com/geology5th
Circular download: http://www.gsj.jp/HomePage.html

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FIRST ANNUAL MEETING OF IGCP-475 DeltaMAP
(Deltas in the Monsoon Asia-Pacific region: 2003-2007)
January 15-20, 2004
Bangkok & Ayutthaya, Thailand
Contact: Dr. Yoshiki Saito
MRE, Geological Survey of Japan/AIST
Central 7, Higashi 1-1-1, Tsukuba, 305-8567
Japan
E-mail: yoshiki.saito@aist.go.jp
Fax: (81) 298613747
Tel: (81) 298613895
or
Dr. Steven Goodbred, Jr.
Marine Sciences Research Center
Stony Brook University
Stony Brook, NY 11794-5000, USA
E-mail: sgoodbred@notes.cc.sunysb.edu
Fax: (1)-631-632-8820
Tel: (1)-631-632-8676
Circular download: http://www.gsj.jp/HomePage.html

12TH MEETING OF SWISS SEDIMENTOLOGISTS (SwissSed)
January 31, 2004
SWITZERLAND (Fribourg)
Contact: André Strasser,
Department of Geosciences, Geology-Palaeontology,
Pérolles, 1700 Fribourg, Switzerland.
Tel : +41 26 300 89 78
E-mail: andreas.strasser@unifr.ch

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MARINE SANDWAVE AND RIVER DUNE DYNAMICS WORKSHOP
April 1-2, 2004
Enschede, The Netherlands
Contact : Déborah Idier
University of Twente
Faculty of Engineering Technology
Group Water Engineering and Management
PO Box 217
7500 AE Enschede
The Netherlands

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ICHNIA 2004: THE INTERNATIONAL CONGRESS ON ICHNOLOGY
April 9-13, 2004
Trelew (Patagonia), Argentina
Contact: Luis Buatois
E-mail: ichnolog@infovia.com.ar
Web-page: www.ichnia2004.com

LE 2ème COLLOQUE SUR LE JURASSIQUE MAROCAIN
April 21-22, 2004, MOROCCO (Marrakech)
Contact: Prof. A. Ait Addi
Département de Géologie (FST)
B.P.: 549-Guéliz, Marrakech-Maroc
Tel: (212) 44 43 34 04
Fax: (212) 44 43 31 70
E-mail: aitaddi@fstg-marrakech.ac.ma
Web-page: www.ucam.ac.ma/fssm/cjm2

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TIDALITES-2004
6th International Conference on Tidal Sedimentology
August 2-5, 2004
Copenhagen, Denmark
Contact: Jesper Bartholdy
Institute of Geography, University of Copenhagen, Oster Voldgade 10, Dk-1305 Copenhagen K, Denmark
E-mail: jb@geogr.ku.dk
Web-page: www.geogr.ku.dk\tidalites
Fax nr. +45 35 32 25 01
Tel. nr.: +45 35 32 25 00

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32nd INTERNATIONAL GEOLOGICAL CONGRESS
August 20-28, 2004
Florence, Italy
Contact: Chiara Manetti
Dipartimento di Scienze della Terra
Via La Pira, 4
50121 Firenze, Italy
e-mail: casaitalia@geo.unifi.it
Phone/Fax: + 39 055 2382146
Web-page: www.32igc.org

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
Contact: Gilbert Camoin
CEREGE, UMR CNRS 6635
Europole Mediterraneen 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

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23rd IAS MEETING OF SEDIMENTOLOGY (including Special Session to honour Peter Friend)
September 15-17, 2004, PORTUGAL (Coimbra)
Contact: Rui Pena dos Reis
Universidade de Coimbra, Dpto. Ciências da Terra
Largo Marquês de Pombal, 3014 Coimbra (PORTUGAL)
E-mail: penareis@ci.uc.pt
Web-page: www1.ci.uc.pt/ias/

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2nd INTERNATIONAL MAAR CONFERENCE
September 15-29, 2004, HUNGARY (Kecskemet-Lajosmizse)
Contacts:
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
Dr. Karoly Nemeth
Geological Institute of Hungary
Stefania ut 14
Budapest H-1143, Hungary
E-mail: nemeth_karoly@hotmail.com
Web-page: http://www.mafi.hu/2IMC_Homepage/2IMC_Homepage_Files/WelcomePagePictures/2IMC.html

SEDIMENTARY BASINS OF LIBYA, 3RD SYMPOSIUM. Geology of Eastern Libya basins and adjacent areas.
November 21-23, 2004
Binghazi, Libya
Contact: The organising committee
National Oil Corpaoration (NOC)
P.O. Box 2855
Tripoli, Libya
E-mail: eastlibya@noclibya.com
Tel./Fax: (+218) 21-480 46 43

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24th IAS MEETING OF SEDIMENTOLOGY
January, 10-13, 2005, OMAN, (Muscat)
Contact: 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

7TH INTERNATIONAL SYMPOSIUM ON THE CRETACEOUS
September 5-9, 2005
Neuchâtel, Switzerland
Contact: 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 ;
thierry.adatte@unine.ch
Web-page: http://www-geol.unine.ch/
Fax nr.: 0041-718 26 01

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GONDWANA 12 CONFERENCE
November 6-11, 2005, ARGENTINA (Mendoza)
Contact: Carlos W. Rapela & Luis A. Spalletti
Web-page: http://cig.museo.unlp.edu.ar/
gondwana

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17TH INTERNATIONAL SEDIMENTOLOGICAL CONGRESS
August 27 – September 1, 2006
Fukuoka, Japan
Contact: Ryo Matsumoto
Department of Earth & Planetary Sciences
University of Tokyo
Hongo
Tokyo 113, Japan
E-mail: ryo@eps.s.u-tokyo.ac.jp
Web-page: http://sediment.jp/

Boxed announcements have
full or partial IAS sporsonship