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EDITORIAL

Newsletter 262 reports on events recently sponsored by the IAS:

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- The 5th annual Sedimentary Provenance Analysis (SPA) Short Course held at the Department of Sedimentology and Environmental Geology, Geoscience Center, University of Göttingen (Germany).

Report session closes with a summary of the meeting between The Italian Sedimentologists and Ronald J. Steel held at the University of Basilicata (Italy).

The central part of the Newsletter is dedicated to the presentation of the Early Career Scientists Committee.

Reports of the PGS occupies the final part of the Newsletter.

Since Newsletter 256, a new session named “Frames from the World” is launched. This time, it is dedicated to the EGU Meeting. Anybody is welcome to contribute to the sessions sending to me pictures.

Please note that a new research grant has been launched: the Early Career Scientists Research Grants.

IAS has restyled the webpage (www.sedimentologists.org): please have a look at it, log in and fill the spaces under your profile, and renew your membership for 2016. Remember that being an IAS member gives you the following benefits:

- access to the online versions of Sedimentology and Basin Research, including all issues ever published;
- access to the printed versions of Sedimentology and Basin Research at very favourable rates;
- access to the IAS Member Directory;
- the Friendship Scheme which gives free membership to people in less-developed countries;

- the electronic Newsletter;
- a network of National Correspondents, which report on the activities in their countries;
- International Sedimentological Congress every four years at reduced fees;
- annual Regional Meeting and meetings sponsored by the IAS at reduced fees;
- special lecturer tours allowing sedimentology groups to invite a well-known teacher to give talks and short courses in their country;
- travel grants for PhD student members to attend IAS sponsored meetings;
- research grants for PhD student members (maximum 1.000 Euros);
- institutional grants for capacity building in 'Least Developed Countries' (LDC), (maximum 10.000 Euros)
- biannual Summer Schools focused on cutting edge topics for PhD student members.

I would like to remind all IAS members that:

- the IAS Newsletter 262 is published on-line and is available at: http://www.sedimentologists.org/publications/newsletter
- the next IAS Meeting will be held from 10-12 October 2017 in Toulouse (France). For details, please click: https://www.ims2017.sciencesconf.org

The Electronic Newsletter (ENIAS), started in November 2011, continues to bring monthly information to members. For information on ENIAS contact ias-office@ugent.be

Check the new Announcements and Calendar. Meetings and events shown in CAPITAL LETTERS and/or with * are fully or partially sponsored by IAS. For all of these meetings, IAS Student Member travel grants are available. Students can apply through the IAS web site. To receive the travel grant, potential candidates must present the abstract of the sedimentological research they will present at the conference. More info @ www.sedimentologists.org

Vincenzo Pascucci
(IAS General Secretary)

PhD Field Trip to South-Central Pyrenees, Spain

We are writing in regards to the annual PhD Fieldtrip of the Department of Geology and Petroleum Geology (GPG) at the University of Aberdeen. We are planning to run a fieldtrip to the South-Central Pyrenees in 2015 and we would like to request funding to allow the trip to go ahead. The chosen area offers a wide range of geology – from deep water to terrestrial sedimentation followed by a complex structural geology common in foreland

basins.

The previous PhD fieldtrips have been a great success with positive feedback from all participating students. These fieldtrips are important not only academically but also socially because it is a great opportunity to new PhD students integrate within an informal atmosphere. The trip aims to expand students' knowledge in geology including field analogues to promote discussions on various aspects of petroleum systems. In the past these trips have focused on Scottish geology, but this year we would like to look at an area with spectacular exposures that many students may never have seen, in order to gain a complete understanding of geological processes on a basin-wide scale which allows us to relate to petroleum systems.

We are currently at the planning stage for this year's trip to the South-Central Pyrenees and are in the process of trying to secure funding. This year 20 PhD students have signed up for the trip. There is a significant cost involved in taking such a large group on a fieldtrip, and in previous years the majority of the fieldtrip costs have been covered very generously by industry sponsorships.

We have estimated the cost to be approximately £5,486.00 (details in appendix). We would be very grateful for any contribution you may be able to make towards the PhD field trip costs, and of course sponsorship will be acknowledged on any materials produced for the trip.

If you would like any further details, please do not hesitate to contact any member of the GPG Fieldtrip Committee.

Yours sincerely,

PhD Fieldtrip Committee 2015
Aaron Barker, Alistair Swan, Carmelo Sammarco, Patricia Pinter & Thisiane Dos Santos

The 54th British Sedimentological Research Group (BSRG) Annual General Meeting

The 54th British Sedimentological Research Group (BSRG) Annual General Meeting was held at Keele University from the 19th – 22nd December 2015. The conference kicked off with the reservoir quality workshop ran by Badley Ashton on the 19th. The Sunday commenced with the annual AGM fieldtrip to Castleton ran by The University of Manchester. The core workshop also ran on the Sunday and and was ran by the BGS and Imperial College London. On the Sunday evening the Ice Breaker commenced within Keele University's very own Sustainability Hub where the majority of the 213 attendees came.

Monday 21st of December is where the main events and academic forward-thinking research was displayed with 40+ talks and 45 posters. To start the days of forward-thinking science Professor Mark Ormerod officially opened the conference. Next we heard from our first keynote for the event Philip Richards of the BGS. Next the conference separated into the traditional parallel sessions which where suggested by the membership and included linked depositional systems, reservoir quality and diagenesis, teaching of sedimentology and the characterisation of mudstone-rich successions which was jointed

hosted with the Clay Minerals Group.

Following the afternoon break we heard from our second keynote speaker Gary Nichols of Nautilus. The sessions then broke back into the parallel sessions. This was followed by the AGM

meeting and the poster session.

That evening the conference dinner occurred which was within majestic Keele Hall Ballroom. After the food Keele Jazz Band, entirely composed of undergraduate students, provided music for the event.

Tuesday the 22nd commenced with the continuation of the parallel sessions. Following the lunch break we had our final keynote from Oliver Jordan of Statoil.

The 54th BSRG AGM convenors are especially grateful to Ichron part of the RPS Group, BP, International Association of Sedimentologists, Robertson (CGG), Badley Ashton, Statoil, Clay Minerals Group, and Beta Analytical Limited.

Sedimentary Provenance Analysis (SPA) Short Course at Göttingen University

The 5th annual Sedimentary Provenance Analysis (SPA) Short Course was held at the Department of Sedimentology and Environmental Geology, Geoscience Center, University of Göttingen, from September 29 to October 2, 2015. The course was well attended with 32 participants including

Group photo of participants and lecturers of the 5th annual Sedimentary Provenance Analysis (SPA) Short Course at the University of Göttingen in autumn 2015.

22 M.Sc. and Ph.D. students, 7 post-docs, and 3 participants from the industry. The attendees came from 12 countries including Algeria, Brazil, Czech Republic, France, Germany, Hungary, Ireland, Italy, Pakistan, the Netherlands, Turkey, and the United Kingdom. The organising committee and host lectures, Hilmar von Eynatten, István Dunkl und Guido Meinhold, and the invited guest lectures, Heinrich Bahlburg (University of Münster, Germany) and Gert Jan Weltje (University of Leuven, Belgium) provided an overview about the potential and the methods of sedimentary provenance analysis for reconstructing the parent rocks of sediments, the climatic and tectonic-geomorphic conditions under which sediments formed as well as the evolution of sediment-forming processes through time and space. The first day covered the principles of SPA, including an introduction to heavy mineral analysis. At the ice-breaker, held in the evening of the first day, the participants could come together and reflect on the first day's lectures with some drinks and finger food. The second day started with single-grain chemical analysis on heavy minerals and went on to geochronological methods. The third day gave an overview about compositional data analysis and provenance modelling, which was followed by low-temperature thermochronological techniques such as fission track and (U–Th)/He analysis, and the statistical treatment of geochronological data. An optional laboratory tour provided the opportunity to see some of the facilities at the Geoscience Center Göttingen and how some of the techniques mentioned during the course are handled by the operators. The final day of the short course provided an overview about zircon U–Pb geochronology as well as Nd and Hf isotopes as combined tools in provenance research. Presentations of various case studies by the lecturers demonstrated the potential of sedimentary provenance analysis in academic research and in exploration for raw materials. During the whole time of the course, the attendees had the opportunity to present their own data and problems in form of a poster which was then discussed during coffee breaks and after the afternoon sessions within the group to find solutions and/or the best ideas for further investigation. Overall, the course has received very positive feedback. Financial support to participate at the SPA Short Course was provided to students by the International Association of Sedimentologist (IAS) and the Deutsche Geologische Gesellschaft –Geologische Vereinigung (DGGV).

We are already looking forward to the upcoming SPA Short Course in September 20 –23, 2016 (http://www.sediment.uni-goettingen.de/spa).

Hilmar von Eynatten, István Dunkl, Guido Meinhold

Early Career Scientists Committee

The IAS Bureau is pleased to announce the formation of the Early Career Scientists Committee. This committee is formed of Early Career scientists who's role is to represent the upcoming generation of sedimentologists, ensuring that their voice is heard in the IAS. If any of our Early Career members have any thoughts or ideas about how the IAS can work for you then please do not hesitate to get in contact with one of the committee members.

Federica Barilaro

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I am Dr Federica Barilaro, Ph.D in Earth Sciences (3rd of February 2013) at Milan University, with a special focus on non-marine carbonates. The main topic of my Ph.D research was the definition of geometries, depositional environments, abiotic versus biotic fabric types, diagenesis and reservoir properties of Pleistocene and modern hydrothermal travertines as a guide to the South Atlantic reservoirs. My fieldwork activities in Tuscany (Italy), Germany, U.S.A., together with the attendance to many meetings and the summer internship at the Statoil Research Centre Bergen (Norway) have definitely been the positive note of my Ph.D hard times... but surprises never cease! In 2014, I held a Post-Doc position at the Geomicrobiology group of ETH of Zurich. Actually, I am conducting my scientific research particularly on the processes that lead the precipitation of hydrothermal travertines, calcareous tufa and lacustrine carbonates, eating Swiss Chocolate, fondue and great Brazilian dishes with nice people.

Last but not least: in 2013, I have been officially awarded as "The Queen of Continental Carbonates" from colleagues and friends. So, beware of imitations and feel free to contact me.

Andrea Di Capua

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Background

I am Andrea Di Capua, an Italian geologist with a PhD in Clastic Sedimentology and a MSc in Sedimentology and Structural Geology, earned at the University of Milan - Bicocca. I investigate the role of volcanism in ancient sedimentary records both in marine and non-marine settings, with a particular focus on the comparison between volcanically-controlled and tectono-climatically controlled sediment supply. I am a gipsy geologist who loves to spend time in the field. From the Alps to the Patagonia desert, I am always on the trail of ancient volcanism in the obscure pages of the sedimentary record. Although I might be in the field, feel free to contact me and wait: someday I will be back and answer you.

Fulvio Franchi

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I obtained my PhD in in Earth Sciences at Università degli Studi di Bologna in April 2013 on the project "Comparative geomicrobiology of the mounds in the Moroccan Sahara: implications for Mars astrobiology", financed by the Italian Ministry of University and Research. I have 6 years of experience in carbonate sedimentology, petrography and planetary geology.

I currently hold a position as Lecturer of Sedimentology and Stratigraphy at BIUST where I endeavour to create a new research group in sedimentology.

My ongoing research includes the geochemical characterization of non-common carbonates in the Mediterranean Sea; sedimentological/geochemical characterization of mud mounds in northern Africa; astrobiological characterization of spring mounds as Mars analogues; stratigraphy of the Transvaal Supergroup.

Emilia Jarochowska

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I am a "biogeologist" – I have MSc degrees in both geology and biology and my PhD revolved around sequence-stratigraphic controls on fossil distribution and diversity patterns. My research and teaching focus on integration of carbonate sedimentology and paleobiology

by addressing time-averaging, depositional and stratigraphic resolution, taphonomy in carbonate environments, and ecology of carbonate-precipitating organisms. During my PhD I have worked in the Ukraine, Sweden, Poland, and the UK. I also participate in teaching at the International Course on Carbonate Microfacies ("Flügel Course") in Erlangen. As a student I received a lot of support and professional advice from IAS and its members. Now I hope to make my own contribution through the Early Career Scientists Committee. I cooperate with young scientists from my home country, Poland, as well as from China, Russia, or Uzbekistan – and one of my aims is to support their integration in the international sedimentological community. My second aim is to stimulate exchange of expertise between sedimentologists and (paleo)biologists.

The Midland Platform of central England – a tropical carbonate platform, humid both now and then

Miquel Poyatos-Moré

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I am a geoscientist with a PhD in Clastic Sedimentology and Stratigraphy and MSc in Exploration of Sedimentary Reservoirs. I have 2.5 years of experience in postdoctoral academia, industry-funded research and training in sedimentary geology and basin analysis. At present, I am based as a Research Associate at the University of Manchester, as part of the Stratigraphy Group. As a member of the Early Career Scientists Committee of the IAS, I aim to make my experience available to the next generation of scientists, ensuring that our opinion will be heard by the rest of the sedimentary community.

The Permian basin-floor to shelf succession in the Tanqua Karoo (South Africa).

Joanna Pszonka

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Currently, I am an assistant professor at the Mineral and Energy Economy Research Institute of the Polish Academy of Sciences and a postdoctoral researcher at the Freiberg University of Mining and Technology, Germany. I am working on sedimentary geology; my research focuses on deep marine systems, basin analysis, diagenetic processes in mineral resources and cathodoluminescence. As a Carpathian Geologist, I work mainly in the Polish and Slovak Flysch and Inner Carpathians.

Beforehand, I studied at the Jagiellonian University and the AGH University of Science and Technology in Krakow, Poland, where I graduated with a Master's and later Doctoral degree in Geology.

Anna Reusch

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I have just finished my PhD at the Geological Institute at ETH Zürich, Switzerland in the field of subaqueous sedimentology (especially postsedimentary processes), limnogeology and paleoseismology. In May 2016, I started a PostDoc Project at the University of Bremen in the field of seismic reflection profiling, paleotectonics and general sedimentology. I was an IAS Student member during my PhD and am very motivated to be actively involved in the IAS Early Career Scientists Committee. Please do not hesitate to contact me in case you have any questions!

My research interests include:

- Subaqueous sedimentology, especially subaqueous mass movements: depositional and post-depositional sedimentary processes
- Subaqueous paleoseismology and lacustrine/marine geohazards
- Limnogeology
- vGeotechnical and physical properties of sediments
- Subsurface sediment mobilisation and fluid seepage structures
- High-resolution seismic reflection profiling and swath bathymetry
- Processing of (multichannel) seismic reflection data

The Italian Sedimentologists meet Ronald J. Steel:

A 2-DAYS WORKSHOP AT THE UNIVERSITY OF BASILICATA, POTENZA, ITALY.

Ron Steel is a well-known Professor and Davis Centennial Chair at UT Austin and Honorary Professorial Fellow at Heriot-Watt University Scotland. He has over 180 published papers, edited 9 books, received 6 best paper or poster awards, and graduated 120+ MS and PhD students from the

Figure 1.- Logo of the meeting

Figure 2.- Participants of the workshop

universities of Bergen, Wyoming and UT Austin. He is being awarded the prestigious SEPM Twenhofel Medal in June 2016.

In occasion of his stay at the Department of Sciences of the University of Basilicata in Potenza (southern Italy) as 'visiting scientist', a two-days-long workshop was organised, aiming to welcome Prof. Steel in Italy and introduce him to the latest science news and learn about scientific breakthroughs and discoveries from a representative part of the Italian community of Sedimentologists.

The meeting was held the 5th and 6th of May 2016 in Potenza. The two days started with two key notes provided by Prof. Steel on the status and future of Sequence Stratigraphy and on the construction of shelves by deltas, the growth of shelf margins and the mechanisms of shelf-edge sand delivery into deep-water areas.

The key notes were followed by a number of invited talks from some representative Italian Sedimentologists, which showed results of ongoing research projects encompassing a number of different topics: (i) the comprehension of the mechanisms of sedimentation from continental to shallow-marine to deep-sea areas based on modern studies across the Italian continental shelf, (ii) the study of climate in driving sedimentary processes in the Mesozoic and Cainozoic carbonate realm depicted from successions exposed in Italy, (iii) the recent developments and advances in sedimentological studies applied in the prevention and mitigation of natural hazards in the Italian territory.

The two daily sessions were complemented with an open poster

Figure 3.- Ron Steel getting the meeting t-shirt from Sergio Longhitano

exhibitions, where participants have had the possibility to show and discuss with the attendees the synthesis of their recent works.

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IAS Postgraduate Grant Scheme Report 2nd Session 2012

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Introduction

I started my PhD project, entitled "The record of the Early Aptian Oceanic Anoxic Event 1a (Selli Event) in the Apulian and Apennine Carbonate Platforms (Southern Italy)", at the Università degli Studi della Basilicata, Potenza (Italy), in November 2011. The main objective of this study is to investigate the response of the Apulian and Apennine Carbonate Platforms to OAE 1a and, where possible, to infer biogeochemical perturbations at a global scale. In 2012, second session, I received an IAS postgraduate grant as additional financial support for my project.

Similar to other OAEs, the record of the Early Aptian OAE 1a (Selli event, ~120 Ma) has been investigated mainly in deep-water successions, although in recent years geological evidences of record have been found also in shallow-water sections. However, shallow-water carbonate platforms represent an important element of the carbon cycle (Weissert & Erba, 2004) and are particularly sensitive to environmental changes (Hallock, 2001). Therefore, they offer the unique possibility of looking at the response of shallow-water tropical ecosystems to CO_2 triggered palaeoenvironmental crises. Moreover, several geochemical proxies, such as strontium and carbonate-associated sulphate (CAS), are exclusively stored in carbonate minerals that are usually absent within the reducing depositional environment of black-shale deposition in the deep ocean.

In my PhD study, two successions of shallow-water platform carbonates are investigated for lithium isotopes, CAS and redox-sensitive trace metals: the Monte Raggeto section, which makes part of the Apennine carbonate platform, and the Santa Maria 4 core that has ben drilled in the Apulian carbonate platform. Furthermore, for Li-isotope analyses two additional sampling sites are taken into account, i.e. Resolution Guyot with shallow-water carbonates from the mid-Pacific and the Coppitella section, which is representative of the proximal part of the Ionian basin.

The isotopic ratio of lithium isotopes was analysed in order to assess the role of weathering as both an OAE initiator (by fuelling the oceans with nutrients) and terminator (*via* CO_2 sequestration). Thanks to the IAS postgraduate grant it was possible for me to stay in Oxford to perform these analyses at the University of Oxford.

Lithium has two stable isotopes – ^{6}Li and ^{7}Li – and is predominantly found in silicate minerals. Carbonates, instead, represent only a minimal sink. In modern oceans, lithium has a residence time of about 1 Myr (Huh *et al.*, 1998) and, thus, is homogeneously distributed throughout the oceans with an isotopic ratio of ~31‰ (Tomascak, *et al.*, 1999). Lithium isotopes are largely controlled by weathering of silicate rocks (Chan & Edmond, 1988; Chan *et al.*, 2006; Hathorne & James, 2006) and the more slowly changing hydrothermal/volcanic processes (Hathorne & James, 2006; Misra & Froelich, 2012). Both processes introduce isotopically relatively light lithium into the oceans. Thus, short-term perturbations in the lithium-isotope record must be triggered by changes in the weathering processes of silicate rocks. During the weathering process, clay minerals are formed, which preferentially incorporate the lighter lithium isotope, leaving a relatively heavy solution behind (Huh *et al.*, 1998, 2001; Kisakürek *et al.*, 2005). Changes in silicate weathering rates or congruencies can be seen in the marine $\delta^{7}Li$ record: enhanced rates and/or more congruent silicate weathering result in a negative shift in $\delta^{7}Li$ values. This is expected to happen in the Li-isotope record at the onset of OAE 1a.

Sample Material and Methods

Resolution Guyot was located in the Mid-Pacific and is composed of poorly cemented platform carbonates spanning from the Hauterivian to Albian (Jenkyns, 1995). The Aptian is characterised by debris beds of Caprinid rudists, cyclic packstone-wackestones and algal laminites as well as oolitic grainstones (Jenkyns & Wilson, 1999). The other three sections, Monte Raggeto, Santa Maria 4 core and Coppitella, were positioned in the former central Tethyan realm. The Monte Raggeto section is representative of the inner part of the Apennine Carbonate Platform and is mainly composed of cyclic mudstone-wackestones and wackestone-packstones with intercalated packstone-grainstones (Di Lucia *et al.*, 2012). The carbonates of the Santa Maria 4 core were deposited in the inner part of the Apulian Platform and are characterised principally by mudstones to packstones and algal laminites. The Coppitella section is representative of the proximal part of the Ionian basin, facing the Apulian Platform to the east and is made of limestone and marl alternations (Luciani *et al.*, 2001).

For pinpointing the record of OAE 1a and correlating the sections, prior studies have been taken into account. For the Coppitella section, the record of OAE 1a has been identified on the basis of carbon-isotope and biostratigraphy (Luciani *et al.*, 2001). Resolution Guyot has been analysed by Jenkyns (1995), who recognized the typical carbon-isotope signature of OAE 1a. For the Monte Raggeto section Wissler *et al.* (2004) and Di Lucia *et al.* (2012) identified the record of OAE 1a on the basis of carbon-isotope stratigraphy, which is supported by sequence, cyclo- and magnetostratigraphic investigations (Amodio *et al.*, 2013, 2003; D'Argenio *et al.*, 2011, 2004; Wissler *et al.*, 2004). The carbon-isotope record of the Santa Maria 4 core (analysed in this study) does not give an unequivocal signal. However, a correlation with the Monte Raggeto section on the basis of cyclo- and sequence stratigraphy was possible, thereby pinpointing the stratigraphic signature of OAE 1a (Amodio *et al.*, 2013, 2003; D'Argenio *et al.*, 2011). The nomenclature of the $\delta^{13}C$ intervals of the carbon isotope excursion associated with the Selli event is taken from Menegatti & Weissert (1998) and Brawlower *et al.* (1999). The correlation can be seen in Fig. 1.

It is important to note that the carbonates of Resolution Guyot are the most poorly lithified rocks of all four sections analysed. The sediments have been accumulated in the middle of the palaeo-Pacific Ocean, excluding any basinal restriction. Therefore, we consider this succession as the most promising section for yielding a pristine $\delta^{7}Li$ signal.

Sample preparation and geochemical analyses have been carried out at the Department of Earth Sciences of the University of Oxford. For Li isotope analyses, approximately 0.2 grams of bulk carbonate were leached in 0.2M HCl for 2 hours. This weak concentrated acid was chosen in order to avoid the contribution of silicates, which have a high Li concentration and a relatively low Li isotopic ratio. The liquid was then separated from the residue and passed through a two-step cation exchange column chromatography with diluted HCl as eluant in order to purify the samples (Marschall *et al.*, 2007 and Pogge von Strandmann *et al.*, 2011). Lithium isotopes have been measured on a Thermo Finnegan Neptune multi-collector ICP-MS using sample-standard bracketing method with the LSVEC rock standard. During one analytical session each sample has been measured three times, whereas each individual measurement is composed of 10 ratios. The accuracy of the measurements and external reproducibility has been determined by measuring seawater obtaining a value of 31.4 ± 0.6‰ (2sd, n = 5), which agrees perfectly with the long-term 3 year uncertainty value recorded at Oxford of 31.3 ± 0.6‰ (n = 45).

Results

As expected, a pronounced negative shift of about 4.5–11‰ from pre-OAE 1a values can be observed, with a minimum close to the base of the C3 interval (Fig. 2). The Coppitella section starts just below the onset of OAE 1a and does not show a negative shift. However, this section has low $\delta^{7}Li$ at its base, which could correspond to the minimum recorded in the other sections. Subsequently, all sections record a recovery to slightly more positive Li-isotope values during the C4–C5 interval. Following this recovery, although not as evident in every section, $\delta^{7}Li$ values decrease gently to a second minimum at the end of the C8 interval and eventually recover to values similar to the pre-event state. In the Coppitella section, however, a second negative shift starts earlier (within the C7–C8 interval) and no data are available above the C8 interval, where the recovery phase is expected.

Interpretation and Discussion

Before evaluating the observed negative shifts in δ^7Li as primary seawater signal, other possible explanations have to be discarded. Leaching of silicates during sample preparation would add relatively negative Li-isotope values. However, according to Pogge von Strandmann *et al.* (2013), leaching silicates has a sizeable effect when Al/Ca in carbonates is ≥ 0.8 mmol/mol. In all of our samples Al/Ca were below 0.5 mmol/mol and also Mg/Ca and Mn/Ca ratios do not show any specifically high values. As a consequence, leaching of silicates should have had a very limited impact on δ^7Li_{sample}.

Li isotopes have different fractionation factors in different $CaCO_3$ polymorphs. Whereas aragonite δ^7Li is about 11‰ lighter than seawater, calcite δ^7Li is usually in the range of 3–5‰ lighter than seawater. As a result, a shift to light Li-isotopes might be related to an increase in the abundance of aragonite. However, no facies shift is observed at the onset of the negative spike and it is unlikely that such a shift occurred coevally in four different sections of different palaeoceanographic settings. For the same reason diagenesis as driving factor for the observed shift seems to be unlikely.

Therefore, we argue that the coeval excursion in Li isotopes reflects a primary signal of changes in δ^7Li in the palaeo-oceans. As discussed above, more negative Li-isotope values can be produced by a sudden (with respect to its residence time) increase in hydrothermal/volcanic activity, an increase in weathering rates and congruent weathering. Other proxies record intensification in hydrothermal activity of 7-35%, such as Sr (Jones & Jenkyns, 2001; Fig. 3) and Os isotopes (Bottini *et al.*, 2012; Tejada *et al.*, 2009; Fig. 3), and a 3x increase in weathering rates (Ca isotopes: Blättler *et al.* 2011; Fig. 3). Changes in hydrothermal activity, however, generally occur on much longer timescales than changes in weathering. Thus, we would expect weathering rates and/or congruencies to have a much larger influence on Li isotopes. In order to disentangle the single role of each potential factor, dynamic modelling will be performed.

Although the general isotopic trends seem to be consistent in all four sections, with some minor differences that could emerge due to smaller gaps in the carbonate platform sections or in relation to slight discrepancies in the age models, absolute δ^7Li values differ dramatically from one section to the other. The highest δ^7Li values are recorded in the Resolution Guyot, with pre-OAE 1a values of about 26-27‰ and minimum values reaching about 20-21‰. The lowest δ^7Li values are recorded at the Monte Raggeto section and the Santa Maria 4 core: the Li isotope curves of the two Tethyan carbonate platforms seem to be shifted of about 4-6‰ to lower values with respect to the Resolution Guyot. The values recorded in the Coppitella section are intermediate, being lighter than the ones from the Resolution Guyot of about 2‰ for the first part of the curve (from C3 to the base of C7) before dropping to distinctly lower values in the C7 interval. Thus, it can be observed that the sections closest to the continent, i.e. in this case the most involved successions into mountain building processes, have lighter pre-OAE Li isotope values. It could be hypothesised that this differences in absolute values reflect the influences of the adjacent continent. A river outfall in the nearby carrying lighter Li isotopes in the suspended load from basaltic and/or terrestrial origin (Pogge von Strandmann *et al.*, 2010) might cause local variations since the suspended load is highly depended on the discharge (Gislason *et al.*, 2006). Other local effects as like upwelling/downwelling and/or submarine groundwater discharge, which has been proposed to have an influence on Ca isotopes (Holmden *et al.*, 2012) might also have played a role. However, lithium isotopes are thought to be distributed homogenously throughout modern oceans and most likely also during Late Cretaceous times (Pogge von Strandmann *et al.*, 2013). Therefore, local effects can be ruled out and diagenetic overprints due to an incorporation into the mountain change might be a more plausible explanation. Differences in original mineralogy (calcite *vs* aragonite) additionally might have had influenced absolute values of Li isotopes. However, all these biases were not able to eliminate the signal but rather shifted the δ^7Li curve to more negative values.

Acknowledgements

I thank the IAS for the financial support that I received in the second session of 2012. Originally, I was awarded this money to pay for strontium isotope analyses.

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Meanwhile a schedule conflict occurred and I had to change the order of analyses. While waiting for analysing strontium isotopes, I went to the University of Oxford to work with Hugh Jenkyns and Philip Pogge von Strandmann to analyse lithium isotopes. At this point, instead of waiting for the Strontium isotope analyses, it was more convenient to use the money from the IAS grant for my accommodation in Oxford as I have had no additional expenses for the lithium-isotope analyses.

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Figures

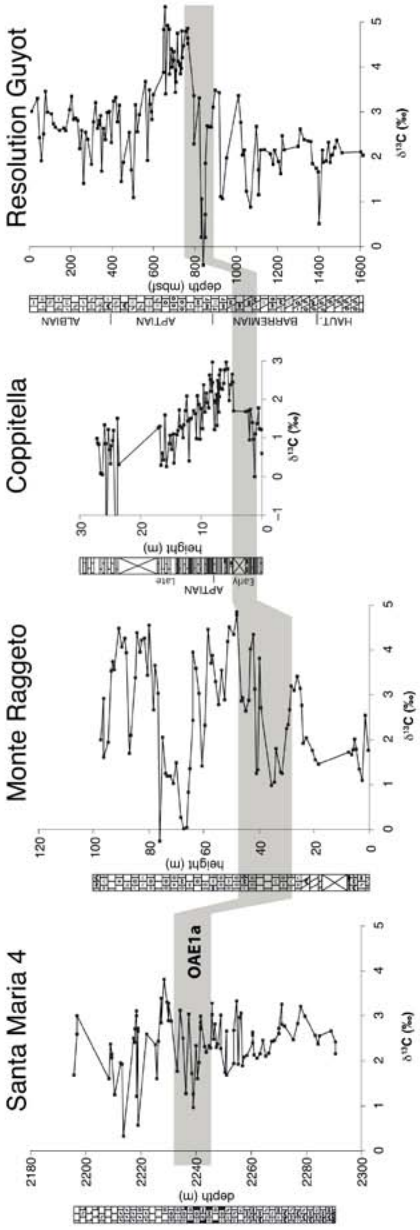


Fig. 1 – Correlation of the four sections based on carbon-isotope, cyclo-, sequence and magnetostratigraphic information of previous studies. Black lines illustrate carbon-isotope curves of the individual sections. Grey band indicates the stratigrahic position of OAE 1a. See text for further explanation.

Fig. 2 – Lithium-isotope record (red curve) during OAE 1a (grey bar). Green arrows indicate the positions of the two negative shifts at the onset of OAE 1a and a second one after the event.

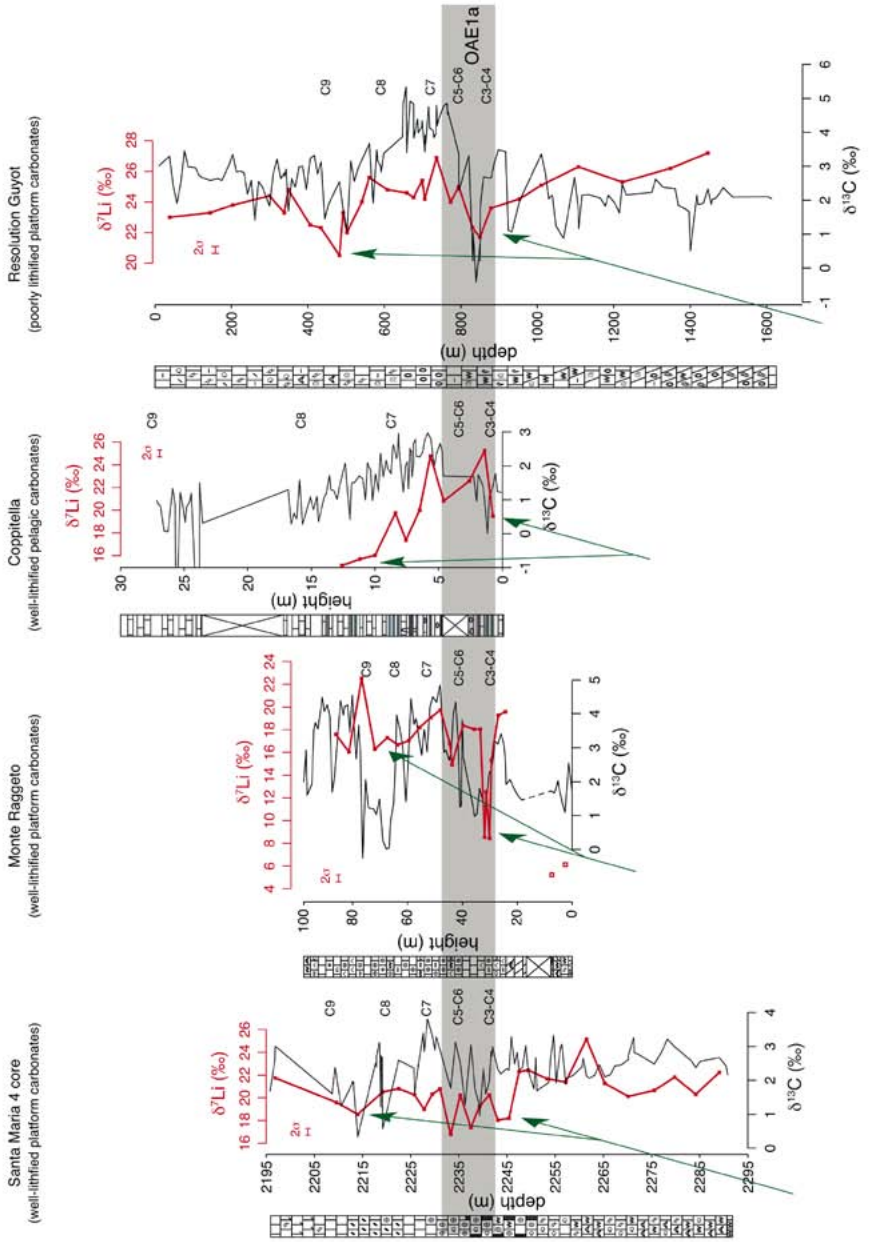
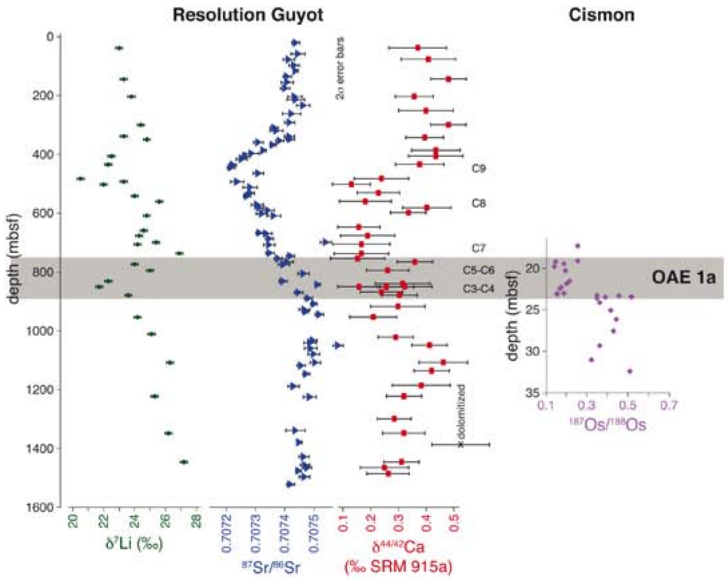


Fig. 3 – Li-isotope curve plotted against the records of Sr isotopes (proxy for hydrothermal activity) and Ca isotopes (indicator for enhanced weathering), all measured on Resolution Guyot, and Os isotopes analysed on the Cismon core. Note the similar trend in all isotopic records with a negative shift at the onset of OAE 1a. See text for further explanation.



Cenozoic basin evolution and uplift history of the central Andean plateau, southern Peru

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University of Houston

The purpose of this project is to test predictions of geodynamic models of formation of the central Andean plateau of South America. These models are testable as they make specific spatial and temporal predictions for surface uplift and basin formation, which allows us to discriminate between the models, and to better understand what geodynamic processes may have been active during plateau formation. To determine the spatial and temporal aspects of uplift and subsidence in southern Peru I have been using a variety of techniques, specifically basin analysis and isotopic geochemistry. Below is a preliminary synthesis of my findings following two field seasons and five semesters of work, as well as a plan to complete this project.

This project can divided into two main parts: Basin analysis and paleoaltimetry. First, the basin analysis portion of this project is focused in field sites in the Western Cordillera and the Altiplano. Over the past two field seasons my field assistants and I have logged nearly 10 km of stratigraphy at the decimeter scale, documenting key observations including grain size, sedimentary structures, conglomerate clast compositions, and paleoflow directions, among others. Work in the Western Cordillera is ongoing, however, work in the Altiplano is beginning to wrap up. I have completed the maps and stratigraphic sections (> 6 km composite section), basin modeling (geohistory analysis and flexural modeling), as well as the geochemical work (six detrital zircon U-Pb samples with > 300 analyses per sample) for publication. I am currently in the writing stages of this portion of the project.

New age control based on maximum depositional ages from detrital zircon U-Pb samples show the composite stratigraphic section we measured is representative of nearly the entire Cenozoic Era. Deposits are interpreted as alluvial (dominantly fluvial with some alluvial fan deposits) in an overall coarsening-upward package, consistent with deposition in a foreland basin system. Geohistory analysis through decompaction and backstripping the composite stratigraphic section (methods outlined in Van Hinte, 1978 and Angevine et al. (1990)) give an estimate for subsidence rate and magnitude. Although sedimentation rates vary throughout the Cenozoic (from 0.05 to 0.4 mm/yr), they show a characteristic subsidence profile that is also largely consistent with deposition in an evolving foreland basin system (DeCelles and Giles, 1996). These findings in the Altiplano of southern Peru are largely consistent with previous work further south along strike in southern Peru for the Eocene – Miocene (Carlotto, 2013; Perez and Horton, 2014), as well as Cenozoic findings in Bolivia (e.g., Horton et al., 2002).

The second part of this project focuses on reconstructing the elevation history of the northern Central Andean Plateau and encompasses all three major physiographic regions of southern Peru: the Western Cordillera, the Altiplano, and the Eastern Cordillera. The main technique we use is volcanic glass paleoaltimetry based on stable isotopic analysis of 'heavy hydrogen' (deuterium, ^{2}H) in hydrated volcanic glass from ignimbrite or tuff deposits chronologically constrained by zircon U-Pb analysis. Volcanic glass has been shown to hydrate on the thousand year time scale following volcanic eruption and quenching of initially anhydrous glass. After hydration occurs, a gel layer forms at the edge of the glass. This gel layer hypothesized to form through large cation diffusion, which inhibits corrosion resulting in a closed system that effectively gives us a snapshot of the ancient environmental water shortly after the timing of eruption.

Over the past two field seasons we have collected and analyzed approximately 70 volcanic glass samples from 12 different locations across southern Peru. Results show that the Western Cordillera was likely at high (>3 km) elevation by 25 Ma near the Puquio area, and low elevations until the middle

Miocene further south, closer to Arequipa. The southern samples give results that are consistent with one of the few published works using this technique (Saylor and Horton, 2014). The Altiplano of southern Peru has no available estimates for the timing of attainment of high (>3 km) of topography. Our results show a middle Miocene pulse in surface uplift rate, and uplift to approximately modern elevations during this pulse. The Eastern Cordillera data are currently being further analyzed, but preliminary results show slow surface uplift beginning in the latest Oligocene.

These results allow us to evaluate geodynamic models. Early subsidence in the Altiplano is likely due to lithospheric flexure, interpreted as due to loading from high topography in the Western Cordillera. When combined with previously published records of crustal shortening and exhumation, the paleoaltimetry data may be explained by multiple geodynamic processes involving Eocene–early Miocene development of high topography in the Western Cordillera through foundering of dense lithospheric mantle in a spatially-variable sense, followed by pulsed middle Miocene–present building of the Altiplano, and slower, incremental uplift of the Eastern Cordillera.

This work has resulted in multiple conference abstracts (Saylor et al., 2014; Sundell et al., 2014a, 2014b, 2014c, 2014d, 2015b), a new collaboration between the University of Houston and Universidad Nacional de San Antonio Abad del Cusco through with Dr. Jose Cardenas, and is currently being prepared in a manuscript to be submitted to Basin Research late spring – early summer of 2016.

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IAS Postgraduate Grant Scheme Report 2nd Session 2014

SAHARAN DUST

Introduction

Every year, 182 million tons of mineral dust are transported from the Sahara westward over the Atlantic Ocean, of which about 140 million tons is deposited between 15 and 75°W (Yu et al., 2015). This dust can influence regional and global climate, by scattering and absorbing solar and reflected radiation, by changing cloud properties, and by affecting the Earth's albedo. This depends on particle characteristics including size, shape, composition and mineralogy (Shao et al., 2011). In addition, transportation and deposition of Saharan dust can show distinct seasonal differences (Prospero et al., 2014), which can be the result of several factors including different dust-transporting air layers, differences in source areas, seasonal migration of the high-intensity dust cloud, or changes in depositional processes (Grini and Zender, 2004).

Research objectives

So far I have investigated Saharan-dust samples from seven subsurface sediment-traps along a unique transect in the Atlantic Ocean at 12°N, right under the high-intensity dust plume originating from the African continent (Prospero, 1981). A study by Stuut et al. (2005) shows that dust collected from sediment-traps and ocean-floor sediments are a very good representation of dust from the atmosphere. Grain-size distributions have been measured for the sediment-trap samples, spanning the sampling period from October 2012 to November 2013, using a laser particle-size analyzer (Coulter LS13 320, at NIOZ, The Netherlands). In the first year of monitoring I observed a lateral decrease in grain size from source to sink, and also seasonal variations (van der Does et al., in prep).

At a research station on the easternmost coast of Barbados (13°10'N, 59°30'W), samples of trade-wind aerosols have almost continuously been collected since 1965 (Prospero and Lamb, 2003). Grain sizes of the last years of sampling have been measured with a Coulter Counter (Coulter Multisizer 3, at RSMAS, Miami, USA; unpublished data). For this study I proposed to extend our existing transect in the Atlantic Ocean with this Caribbean research station. The goal

was to compare the different methods of measuring grain-size with the Coulter Counter and the laser particle-size analyzer, by measuring both trans-Atlantic and Barbados dust samples on both particle-size analyzers.

Besides particle-size analysis, I performed geochemical analyses (Sr, Nd, Hf and REE) on five of the sediment-trap samples, in order to gain insights into different source regions of the dust, and especially to investigate if there is a possible influence of Amazon sediments to the samples. The samples chosen for these analyses have shown very high sediment fluxes, raising the question of a possible input of Amazon river particles. They represent two of the five stations along the trans-Atlantic transect: at 12°N 23°W (Station M1), and 12°N 49°W (station M4). Also three soil sediment samples from Mauritania were analyzed as potential source sediments.

Methods

Particle-size standard sediments were analyzed on the Coulter Multisizer 3 (MS3) at RSMAS (Rosenstiel School for Marine and Atmospheric Science at the University of Miami, Miami, USA) to be compared to standards measured on the Coulter LS 13 320 at NIOZ (Royal Netherlands Institute for Sea Research, Texel, The Netherlands). Tests were performed with different stirring speeds and background measurements on the MS3, using the 100 µm aperture tube. Three standards were measured: a 15µm garnet standard from Coulter, Ballotini A (median: 39.09 µm, mode: 41.68 µm) and Ballotini B (median: 61.47 µm, mode: 72.94 µm) glass-bead made at NIOZ.

The geochemical analyses were performed in the Neptune Isotope Lab at RSMAS, with the help of Dr. Ali Pourmand. First, the marine sediment-trap samples had to be treated to remove all biogenic constituents (biogenic carbonates, organic matter, biogenic opals and Fe- and Mn-oxides) and isolate the 'lithogenic' fraction. The two largest sediment-trap samples were split in half, of which one the bulk sample and the other half the lithogenic fraction was analyzed.

The samples were then prepared following the method described by Pourmand et al. (2014): The samples were fused with LiBO2 alkali flux to ensure complete dissolution of refractory minerals. Sr, Nd, Hf and REE's were separated by three-stage extraction chromatography, for high-precision isotope and elemental analysis on a Thermofisher Scientific Neptune Plus multi-collection inductively coupled plasma mass spectrometer (MC-ICP-MS). To check for possible contaminations, procedural blanks were processed and analyzed.

Preliminary results / implications / ongoing work

Grain-size measurements show a good reproducibility between both methods for the 15 µm garnet standard (Fig. 1A). The slight offset is expected for different methods, and if this offset is consistent it can be used to normalize the dust grain-size data. However, the Coulter Counter was unable to properly measure the Ballotini A and B standards (Fig. 1B). In theory, the 100 µm aperture tube of the MS3 should be able to measure particles up to 60 µm. It became clear that the method is not suited to measure particles larger than 42 µm. The Coulter Counter registers all particles above this threshold in the 42 µm size bin, resulting in the extremely high peak at this grain size. This makes it impossible to compare the two grain-size analyzing methods for these standard sediments. It also means that the sediment-trap samples that should be used for this comparison study won't yield usable results on the Coulter Counter, since the modal grain-size of these samples ranges between 5 and 35

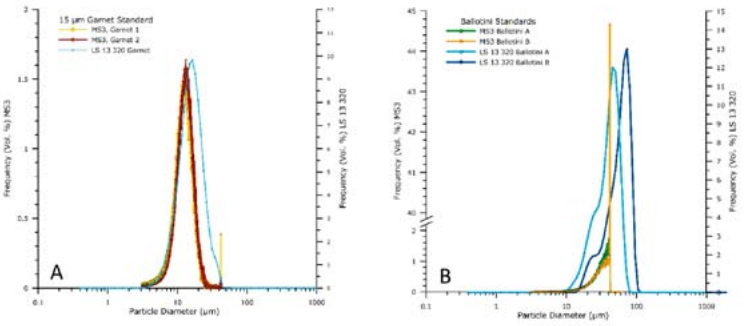

Figure 1.Particle-size distributions of 15 µm garnet Coulter-standard (A) and Ballotini A & B NIOZ standards (B), measured on Coulter Multisizer 3 (MS3; RSMAS) and Coulter LS 13 320 (NIOZ).

µm (depending on the sample location and season), thus having a significant amount of particles coarser than 42 µm (van der Does et al., in prep).

Alternatively, Barbados samples will be measured on the Laser particle sizer (LS 13 320) at NIOZ, to allow a one-way comparison of the two grain-size analyzing methods. This way hopefully the two methods can be normalized against each other, so that the two datasets can be combined and the trans-

Atlantic transect expanded. A main difference between the two types of samples is that the trans-Atlantic samples are a combination of both dry- and wet-deposited dust, and the Barbados samples only contain dry-deposited dust, which could result in a difference in grain size for similar periods. These analyses still have to be performed.

The Sr, Nd and Hf isotopes and REE concentrations of five sediment-trap samples and three soil sediments from Mauritania were analyzed at RSMAS. The sediment-trap samples show many similarities to dust isotope data from the literature, as published by Pourmand et al. (2014), which showed Sr-Nd-Hf isotopic composition of Saharan dust collected at Barbados. Strontium isotope ratios (87/86Sr) show a grain-size effect (finer particles have higher 87/86Sr), as has been previously demonstrated in literature (Meyer et al., 2011). Other features shown by the isotope data are differences between the samples of two different locations of the sediment traps, suggesting a sorting effect over greater distances, influences on the dust during transportation or depositional processes, or different sources for proximal and distal dust.

REE concentrations from the sediment-trap samples show distinct differences from Amazon River sediments (Abouchami et al., 2013). Based on these results, we feel confident to reject the hypothesis of Amazon river sediments arriving at the sampling station. Two of the soil samples from Mauritania fall within the same isotopic range as dust collected at other source regions, as shown by Scheuvens et al. (2013). One of the soil samples is outside of this range, and needs further investigation to draw any conclusions about it. However, soil sediments from possible source areas are not necessarily the same material as the aerosols that are deflated as dust for trans-Atlantic transport (Pourmand et al., 2014).

Ongoing work

Samples from Barbados will be measured on the Coulter LS 13 320 at NIOZ, which will result in a one-way comparison between the two grain-size analyzing techniques. A possible difficulty is that the Barbados-samples are small (47 mm) filters, and are of a one-day resolution. This means that they yield very little material, which might be hard to detect with the laser particle sizer. More samples will be analyzed on Sr, Nd, Hf isotopes and REE concentrations, to give better insight in seasonal and spatial trends. Also atmospheric samples collected offshore Africa will be analyzed, to compare to the samples from Barbados samples by Pourmand et al. (2014) of the same time period (2005). This IAS grant fueled the collaboration with Prof. Prospero and Dr. Ali Pourmand and their groups, which will continue in the future and result in joint papers.

Acknowledgements

The grant money of –1000 was used for the flight ticket Amsterdam–Miami (–554) and housing for 4 weeks (–903). The geochemical data will be presented during an oral presentation at the DUST2016 conference in Castellaneta Marina, Italy, in June 2016.

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PSG Grant Report

Recipient: Robin Honlet (KU Leuven)

This short report focuses on the scientific activities financed with the grant received by the recipient in the 2nd session of the IAS 2014 Grant Scheme. According to the submitted application, the money will be used to pay expenses related to the application of clumped isotope paleothermometry on dolomite cements occurring in Carboniferous platforms in the Cantabrian Zone (NW Spain). Samples for measurements were collected during fieldwork in August 2014 and August 2015. The recipient performed the measurements at the Qatar Stable Isotope Lab of the Carbonate Research group of Imperial College (London) under the supervision of Dr. Cédric John.

So far, only measurements on dolomite cements have yielded reliable results. Measurements on limestone and replacive dolomite are ongoing but more challenging, probably due to the influence of impurities like sulfur or clay.

The dolomite cement samples that have been measured were sampled in the Bodón Unit, which is one of the structural units of the Cantabrian Zone, the Variscan foreland fold-and-thrust belt on the Iberian Peninsula. Samples were collected in different parts of the Bodón Unit to cover a large part of the unit (approximately 40 by 6 km). Resulting temperatures as deduced from the clumped isotope abundances range from 100 to 140°C. This range corresponds with that of microthermometric temperatures as deduced in a previous study on the dolomite in the Bodón Unit (Gasparrini et al., 2006). However, clumped isotope temperatures and microthermometric temperatures of individual samples tend to show a lack of consistency. For some samples, fluid inclusions yield higher temperatures, while for other samples the clumped isotopic composition indicates higher precipitation temperatures. Possible reasons for this inconsistency include recrystallization, solid-state bond reordering or the unknown effects mentioned above. An extended database with more samples (both clumped isotope concentrations and fluid inclusion homogenization temperatures) might give answers to the questions originated from the first set of measurements.

In order to get an overview of the thermal history of the entire Bodón Unit, Rock-Eval pyrolysis was used to estimate the maturity of organic-rich material of different levels in Carboniferous strata. These estimations allow a recalculation to the maximum temperatures experienced by the studied samples (through conversion in equivalent vitrinite reflectance temperatures). These temperatures provide a framework in which dolomitization and dolomite precipitation temperatures can be interpreted, as they represent the ambient temperature (in this specific case) experienced by the host rocks. The measurements were performed at IFP Energies nouvelles (Paris).

The temperatures deduced from the Rock-Eval pyrolysis of organic matter range from 130 to 188°C. They are in most of the studied outcrops significantly higher than the temperatures

deduced by clumped isotope paleothermometry and fluid inclusion microthermometry, which is remarkable since the dolomite occurrences in the Bodón Unit have been described as hydrothermal (Gasparrini et al., 2006). The definition of hydrothermal dolomite strictly implies fluid or mineral products emplaced into a host formation at a temperature higher (5°C or more) than the ambient temperature of the host (Davies and Smith, 2006).

Our first results indicate that on a broad scale, clumped isotope paleothermometry and fluid inclusion microthermometry of dolomite cements yield comparing temperatures. When looking in detail, one can expect that local diagenetic effects can influence both temperatures at the scale of an outcrop locality. Moreover, the results of the Rock-Eval pyrolysis show that an origin other than "hydrothermal" could be argued for the studied dolomite bodies.

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Microbial binding in Neogene and Holocene carbonate slopes

The present report aims to clarify the scientific activities financed with the grant received by the recipient in the 2nd session of the IAS 2014 Grant Scheme. According to the original application, the money was used to pay expenses related to my stay in the Rosenstiel School of Marine and Atmospheric Science (University of Miami) for the study of microbial stabilization in slope from Bahamas. Two cores, Clino and Unda, from the Bahamas Drilling Project (1990) were selected to test the significance of microbial binding in non-Mediterranean Neogene carbonate slopes. These cores proceed from the leeward margin of Northwest Great Bahama Bank and contain deposits from late Miocene to Pleistocene in age. Upper slope to platform margin deposits occurs in the interval from 290 m to 350 m, Sequence G (Messinian), of Unda core. A preliminary overview of 40 thin sections from this interval suggested the presence of microbial binding (all thin sections were collected by Prof. Dr. Christian Betzler from depths between 292,61 m to 359,61 m, and studied in the bachelor thesis of Gitta Zachman, 2000). Other coatings, such as red algal binding and micritic envelopes, also occur. However, the study of the core sections of Unda at the University of Miami did not lead to establish an unequivocal contribution of microbial activity in the slope architecture. The occurrence of microbial micrite in Unda and Clino facies was not enough for a detailed analysis, and the study area was necessarily shifted.

According to the suggestions of my host in the University of Miami, Prof. Dr. Gregor P. Eberli, three steep carbonate slopes from the Holocene of the Tongue of the Ocean (Bahamas) were selected to identify the factors controlling their angles (Fig. 1A). Data of slope inclination and morphology as well as description of superficial features of the Tongue of the Ocean slopes were extracted from the Ph.D. thesis of Dr. Michael Grammer (1991). Polished slab and thin section description were subsequently performed at the Rosenstiel School

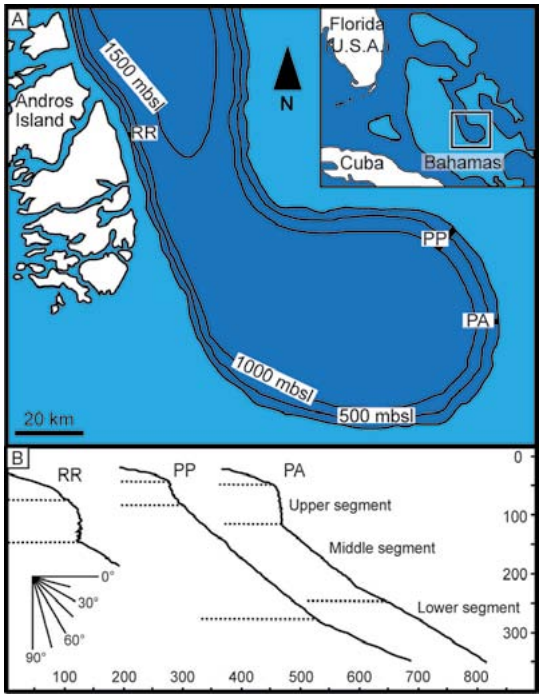

Fig. 1. A Location of the Tongue of the Ocean (Bahamas) with the three studied slopes (RR-Rock Range, PP-Privitt Place, and PA-Palmer Point). B Tongue of the Ocean slope profiles with different segments with different angles.

of Marine and Atmospheric Science (University of Miami) during March and April of 2015 with the funding provided by the IAS Postgraduate Grant Scheme. A total of 90 samples from the three slopes were selected to define facies and microfacies. These data were later compared with the data from the slopes of the Upper Miocene carbonate platform in Spain (Reolid et al., 2014) to identify the factors controlling the steep angles in both examples.

The preliminary results show that the Tongue of the Ocean presents slopes with linear profiles and steep angles over 35° (Fig. 1B). The matrix and some bioclasts present microfabrics suggesting the presence of microbial activity during the deposition, including: (1) clotted micrite patches, locally connecting bioclasts or infilling primary pores, which can present (2) porostromate structures; (3) dense micritic masses; (4) trapping/binding structures; (5) micritic envelopes; and (6) peloidal texture. The depositional geometries and the facies distribution in the Tongue of the Ocean slopes are similar to those in the Cariatiz carbonate platform and are the response to different sedimentary processes including rockfalls, gravity flows and in-situ carbonate production. The presence of an extensive microbial influence in the studied slopes seems to play a significant role in the control of slope geometries. Currently, this research is being incorporated into a manuscript entitled “Microbial binding: controlling factor of slope angles in Neogene and Holocene carbonate slopes” that is aimed to be submitted

within the next months to the IAS journal Sedimentology.

References:

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Reolid, J., Betzler, C., Braga, J.C., Martín, J.M., Lindhorst, S. and Reijmer, J.G. (2014) Reef Slope Geometries and Facies Distribution: Controlling Factors (Messinian, SE Spain): Facies,60, 737-753.

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Scleractinian corals from the Lower Cretaceous of the Neuquén Basin, west-central Argentina: palaeogeographic and palaeoclimatic implications

Introduction

The Neuquén Basin in West-Central Argentina was a back-arc basin intermittently connected to the Pacific Ocean. It encompasses a complete succession of latest Triassic to late Cretaceous marine and continental clastic, evaporitic and carbonatic deposits (Howell et al., 2005). Early Cretaceous marine faunas from the basin have been described since the late nineteenth century but there are unbalanced data among different taxa. In particular, scleractinian corals are far less studied than other marine invertebrates. Only two publications dealt with cretaceous corals of the basin. Gerth (1928) described five scleractinian species, and Weaver (1931) repeated Gerth's list and added one species. Since then, scleractinian taxonomy has been greatly improved by the systematic use of thin sections, morphometrics and statistical methods (Loeser and Jiménez González, 2012), making old taxonomic works outdated. Furthermore, Cretaceous coral faunas have been relative well studied from low latitude Tethyan carbonate platforms, while those from higher latitudinal localities are poorly known worldwide (Kiessling et al., 1999). Therefore, a detailed and accurate study is needed to provide a greater picture of Cretaceous scleractinians and investigate their role as carbonate producers at mid-latitudes.

Research objectives

A PhD project in the Department of Geology of the University of Buenos Aires has been launched in March 2013 to study the Early Cretaceous (Valanginian-Hauterivian) coral fauna from the Neuquén Basin under the supervision of Dr Dario Lazo (University of Buenos Aires, Argentina). This PhD project has several goals as follows: 1) to study the taxonomy of the scleractinian coral fauna; 2) to study the stratigraphic distribution and age of the fauna based on associated ammonoids; 3) to study their palaeogeographic affinities; 4) to perform sedimentary facies analysis of the coral bearing beds; and 5) to investigate palaeogeographic and palaeoclimatic implications comparing them with the well-studied

Figure 1.- Coral biostrome at Bajada del Agrio-Neuquén

coral faunas and facies from tropical Tethyan carbonate platforms.

After the Late Jurassic global reefal retraction, the Valanginian-Hauterivian time interval was a transitional period prior to the reefal increase that took place from the Barremian onwards. Few coral species and few coral-dominated biostromes occurrences are known from this time interval worldwide (Beauvais, 1992), and climatic changes were sharp and affected profoundly reefal systems and carbonate producers (Föllmi, 2012). Therefore, the proposed project is relevant to fill this gap of information. Furthermore, the Neuquén Basin had a mid-latitudinal position during the Cretaceous, and thus represents a key region to understand the controversial Cretaceous latitudinal gradient in biodiversity, palaeoclimate and distribution of carbonate producers.

We propose that a thorough taxonomic knowledge of this mid-latitude coral fauna along with a detailed sedimentologic study of coral bearing facies would be key tools to understand poorly known issues such as Cretaceous marine seaways, latitudinal gradient in coral biodiversity, palaeoclimatic events including arid-humid alternation, and oceanic anoxic events recorded at the same time at tropical latitudes.

Methodology and results

Around 1000 coral specimens have been newly collected from 32 Lower Cretaceous localities of the Neuquén Basin since 2013. As coral taxonomy is a difficult task and studies made without expert advice are somehow misleading,

Figure 2.- Ramose corals at Agua de la Mula-Neuquén

Dr Hannes Loeser, a well-known expert on Cretaceous corals (Loeser, 2000; Loeser et al., 2003, 2005), was appointed Assistant Director of the present PhD project. Thin and polished sections and acetate peels have been prepared from around 100 well-preserved specimens. Samples were scanned, measured and analyzed using the PaleoTax software, a database system to record taxonomic and morphometric data (Loeser, 2004). Samples were described and identified taxonomically up to the genus level.

Dr Loeser works at Estación Regional del Noroeste, Instituto de Geología of the Universidad Nacional Autónoma de México at Hermosillo (ERNO). This institute has many facilities that are useful for the present project such as a thin section laboratory, microscope laboratory and high resolution scanner for scanning thin sections; and includes a complete database on Mesozoic and Recent scleractinian corals including access to all associated references (ca. 16,000; printed copies and PDFs). The database consist on about 39,000 images, mainly scanned thin sections, peels and samples of fossil and extant corals and includes information on taxonomy, stratigraphy, age and geographic location of coral faunas worldwide. Visitors have full access to all facilities.

A three-week research internship at Dr Loeser's laboratory at Hermosillo, Mexico, was done in September 2015 to compare the Neuquén coral samples with those from Dr Loeser's collection and database to perform a detailed taxonomic analysis up to the species level, establishing a complete and updated faunal list of the

Cretaceous scleractinian fauna from the Neuquén Basin. As a result the diversity of the studied fauna was significantly increased in comparison to previous studies and now it is composed of 6 families, 8 genera and 23 species as follows:

Order Scleractinia

Family Actinastraeidae

Actinastraeopsis gracilis (Orbigny, 1850)
Actinastraeopsis qiebulaensis (Liao, 1982)
Stelidioseris kunthi (Bölsche, 1871)
Stelidioseris pattoni (Wells, 1933)
Stelidioseris regularis (Fromentel, 1857)
Stelidioseris revellei (Hamilton, 1956)
Stelidioseris ruvida (Prever, 1909)

Family Columastraeidae

Eocolumastrea cf. gortanii (Prever, 1909)
Eocolumastrea magna (Prever, 1909)
Eocolumastrea neuquensis (Gerth, 1928)
Eocolumastrea rosae (Prever, 1909)
Eocolumastrea sp.
Eocolumastrea whitneyi (Wells, 1932)
Eocolumastrea wintoni (Wells, 1933)

Family Thamnasteriidae

Ahrdorffia vaughani (Wells, 1932)

Family Acroporidae

Holocoenia collinaria (Orbigny, 1850)
Holocoenia triboleti (Koby, 1897)
Holocoenia cf. triboleti (Koby, 1897)

Family Madreporidae

gen. et sp. indet.

Family Leptophylliidae

Ovalastrea dubia (Fromentel, 1857)
?Periseris sp. 1
?Periseris sp. 2
?Periseris sp. 3

It is worth to mention that a precise and updated taxonomy of the studied corals is mandatory to perform accurate palaeobiogeographical, palaeoecological and facies analysis. These studies will be performed in the second stage of the present PhD project.

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Universidad de Buenos Aires, Argentina

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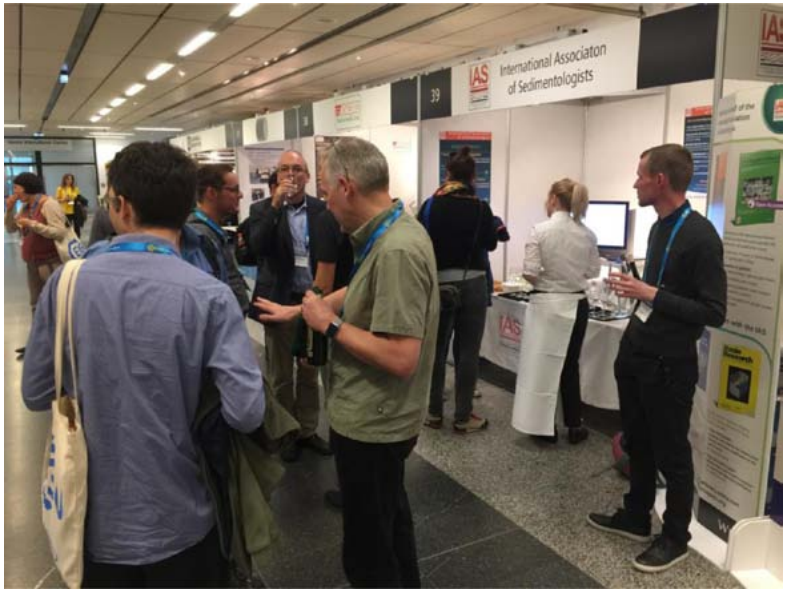
IAS at the EGU 2016 General Assembly

As in previous years, IAS was again present at the EGU 2016 General Assembly. Jointly with SEPM, IAS sponsored or co-sponsored 5 oral/poster sessions and 2 pico-sessions.

IAS also had booth in the exhibition, where the following events were organized:

20 April 2016: Meet the editors of The Depositional Record reception



21 April 2016: Business card raffle. The following winners could take home a free copy of one of the IAS Special Publications: Cianna Wyshnytzky, Andrea Succo and Maarten Van Daele

Early Career Scientists Research Grants

Post-Doctoral Research Grants are intended as a seed to assist early-career post-doctoral researchers in either establishing a proof of concept, in order to support applications to national research funding bodies, or to fund areas of a project that were not included in the original project scope.

Up to 4 grants, each to a maximum of –2,500, are awarded twice per year to Early Career IAS members – those that have secured their Ph.D. within the previous 7 years.

Applicants should apply for a Post-Doctoral Research Grant via the IAS website. The application requires submission of a research proposal with budget and CV (template provided on the submission webpage), and a letter of support from the researcher's supervisor, line manager or Head of School.

Eligibility:

- Applicants must be full members of the IAS.
- Applicants must have secured their Ph.D. within the previous 7 years.
- Applicants can only benefit from a Post-Doctoral grant on one occasion.

Proposals will be ranked on the following criteria:

- Scientific quality of research, novelty and timeliness, likely output.
- Feasibility.
- Cost effectiveness.
- The scientific and publication track record of the investigator.
- Demonstration that the proposed work cannot be conducted without a grant.
- Researchers that are not supported by substantial funding.
- Preference is given to applications for a single purpose (rather than top-ups of other grant applications).

Application requirements:

Applications must be made via the IAS web site.

- Research Proposal, maximum 3 pages A4, including:

→Rationale and scientific hypothesis to be addressed
→Specific objectives of the research
→Anticipated achievements and outputs
→Methodology and approach
→Research plan

→A list of pending and previous applications for funds to support this or related research.
- CV of the applicant, maximum 2 pages A4.
- Justification of the proposed expenditure, up to 1 page of A4. If other individuals are to be involved with the project, this document must include a clear explanation of their role and costs.

Examples of funding

- Direct costs of fieldwork.
- Laboratory analysis.
- Specialist equipment (not computers).

Funding exclusions

The IAS does not offer funding for the following costs:
- Investigator's salary costs.
- Travel to attend a scientific conference, workshop or exhibition.
- Core funding or overheads for institutions.
- Student tuition fees and summer research bursaries.

Deliverables

- The IAS should be acknowledged in all reports, presentations and publications produced as a result of the awarded grant.
- A report should be submitted to the IAS detailing the outcomes of the research.
- Where a publication is produced then this may be submitted in lieu of a report.

INSTITUTIONAL IAS GRANT SCHEME (IIGS)

IIGS Guidelines

Special IAS Grants or Institutional IAS Grants are meant for capacity building in third world countries. There exists a list of 'Least Developed Countries' (LDC) by the UN. This list categorizes countries according to income per capita and is yearly updated.

Grants are allocated to allow Geology Departments in LDC to acquire durable sedimentological equipment for teaching and research (like sieves, calcimeters, auger drilling tools, etc.) or tools that can be used by all geology students (like general geology/sedimentology textbooks, IAS Special Publications (SP), memory sticks with back issues of Sedimentology or SP, etc). Therefore, the grant application should clearly demonstrate to increase the recipient's capacity to teach sedimentology at the undergraduate level (Bachelor) in a durable way. It should also indicate in what way it would enable to support sedimentological research at the graduate level (Master).

Applicants should have a permanent position at their University and should be IAS Full Members. Applications should be submitted by email to the Office of the Treasurer (ias-office@ugent.be) and contain the following information (not exhaustive list):
- the mission statement of the University/Geology Department
- the approval of the University Authorities to accept the grant
- a list of permanent teaching and technical staff members of the Geology Department (with indication of their area of research)
- the structure of the geology undergraduate and graduate courses (Bachelor/Master programme with indication of courses and theoretical and practical lecture hours)
- the number of geology students
- the actual facilities for geology/sedimentology students
- a motivation of application
- a budget with justification
- the CV of the applicant, including a sedimentology research plan

The institutional grant scheme consists each year of 2 sessions of 1 grant of 10.000 Euro. Applications run in parallel with the PhD research grant scheme (same deadline for application and recipient notification). The IAS Grant Committee will seek recommendations from relevant National Correspondents and Council Members (eventually including visitation) before advising the IAS Bureau for final decision. Additional funds made available by the recipient's University are considered as a plus.

Items listed in the application will be bought through the Office of the IAS Treasurer and shipped to the successful applicant. By no means money will be transferred to the grant recipient.

POSTGRADUATE GRANT SCHEME (PGS)

PG Guidelines

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

Up to 10 grants, each of about 1,000 Euro are awarded, twice a year. These grants are available for IAS Student Members only. Students enrolled in MSc programs are not eligible for funding and research grants are not given for travel to attend a scientific conference, nor for the acquisition of equipment.

Applicants should apply for a postgraduate grant via the IAS website. The application requires submitting a research proposal with budget and CV (template provided on the submission webpage) and a letter of support from the student's supervisor. After the deadline has passed, the IAS Bureau evaluates the submitted applications and makes a final selection. Applicants are personally informed by the Office of the Treasurer about their grant. The grants are transferred to the applicants' bank account upon submission of a short scientific and financial report.

Eligibility and selection criteria:

- Applicants must be enrolled as a PhD student;
- Applicants can only benefit from a postgraduate grant once during their PhD;
- In the evaluation process preference will be given to those applications that i) can convincingly demonstrate that the proposed work cannot be conducted without the grant, and ii) are not supported by substantial industry funding.

Application

The application should be concise and informative, and contains the following information (limit your application to 1250 words max.):

- Research proposal (including Introduction, Proposal, Motivation and Methods, Facilities) – max. 750 words
- Bibliography – max. 125 words
- Budget – max. 125 words
- Curriculum Vitae – max. 250 words

Your research proposal must be submitted via the Postgraduate Grant Scheme application form on the IAS website before the application deadline. The form contains additional assistance details for completing the request. Please read carefully all instructions before completing and submitting your application. Prepare your application in 'Word' and use 'Word count' before pasting your application in the appropriate fields.

A recommendation letter from the PhD supervisor supporting the applicant is mandatory, as well as a recommendation letter from the Head of Department/Laboratory of guest institution in case of laboratory visit. The letter needs to be uploaded by the candidate, when submitting his/her application, and not be sent separately to the Office of the Treasurer.

Please make sure to adequately answer all questions.

Deadlines and notifications

Application deadline 1st session: 31 March.

Application deadline 2nd session: 30 September.

Recipient notification 1st session: before 30 June.

Recipient notification 2nd session: before 31 December.

NOTE: Students who got a grant in a past session need to wait 2 sessions (1 year) before submitting a Postgraduate Grant Scheme grant application again.

Students whose application was rejected in one session can apply again after the notification deadline of the rejected grant application

Application Form

- Research Proposal (max. 750 words)
- Title: .....
- Introduction (max. 250 words): .....

Introduce briefly the subject of your PhD and provide relevant background information; summarise previous work by you or others (provide max. 5 relevant references, to be detailed in the 'Bibliography' field). Provide the context for your PhD study in terms of geography, geology, and/or scientific discipline.

- Proposal (max. 250 words): ...

Describe clearly your research proposal and indicate in what way your proposal will contribute to the successful achievement of your PhD. Your application 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 (max. 125 words): .....

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. Justify why you need to undertake this research.

- Facilities (max. 125 words): .....

Briefly list research and study facilities available to you, such as field and laboratory equipment, computers, library.

- Bibliography (max. 125 words)

Provide a list of 5 key publications that are relevant to your proposed research, listed in your 'Introduction'. The list should show that you have done adequate background research on your project and are assured that your methodology is solid and the project has not been done already. Limit your bibliography to the essential references. Each publication should be preceded by a '*'-character (e.g. *Surlyk et al., Sedimentology 42, 323-354, 1995).

- Budget (max. 125 words)

Provide a brief summary of the total cost of the research. Clearly indicate the amount (in Euro) being requested. State specifically what the IAS grant funds will be used for. Please list only expenses to be covered by the IAS grant. The IAS will support field activities (to collect data and samples, etc.) and laboratory activities/analyses. Laboratory activities/analyses that

consist of training by performing the activities/analyses yourself will be considered a plus for your application as they will contribute to your formation and to the capacity building of your home institution. In this case, the agreement of the Head of your Guest Department/Laboratory will be solicited by automated e-mail.

- Curriculum Vitae (max. 250 words)

Name, postal address, e-mail address, university education (degrees & dates), work experience, awards and scholarships (max. 5, considered to be representative), independent research projects, citations of your abstracts and publications (max. 5, considered to be representative).

- Advise of Supervisor and Head of Guest Department/Laboratory

The recommendation letter from the supervisor should provide an evaluation of the capability of the applicant to carry out the proposed research, the significance and necessity of the research, and reasonableness of the budget request. The recommendation letter must be uploaded by the applicant together with the rest of the application content. Applications without letter of support will be rejected. It will be considered as a plus for your application if your PhD supervisor is also a member of IAS.

If you apply for laboratory analyses/activities, please carefully check analysis prices and compare charges of various academic and private laboratories as prices per unit might differ considerably. Please first check whether analyses can be performed within your own University. If your University is not in a position to provide you with the adequate analysis tools, visiting another lab to conduct the analyses yourself strengthens your application considerably as it contributes to your formation and to capacity building of your home University. Please check with the Head of Department/Laboratory of your guest lab to assure its assistance during your visit. You should add a letter of support from him/her with your application.

Finally, before submitting your application, you will be asked to answer a few informative questions by ticking the appropriate boxes.

- is your supervisor a member of IAS
- was this application your own initiative
- did you discuss your application with your Supervisor
- did you already have contact in the past with the Head of the Guest Department/Laboratory (if appropriate)

CALENDAR

Siberian Early Career GeoScientists Conference*

13th – 24th June 2016
Akademgorodok, Novosibirsk, Russia

Marianna I Tuchkova
tuchkova@ginras.ru

24th International Karstological School (IKS)

13th – 17th June 2016
Postojna Slovenia

Adrijan Košir
adrijank@icloud.com
http://iks.zrc-sazu.si/en/

The 3rd Meeting of the Working Group on Sediment Generation Analysis of sediment properties and provenance: tools for paleo-environmental reconstruction*

4th–6th July 2016
Leuven, Belgium

wgsg3@kuleuven.be
http://ees.kuleuven.be/wgsg3/

The 6th International Maar Conference (IMC)*

30th July – 3rd August 2016
Changchun, China

Jing Wu
wujing@mail.iggcas.ac.cn
www.imc.csp.escience.cn

International Maar Conference*

28th July – 6th August 2016
Changchun City
NE China

Karoly Nemeth
K.Nemeth@massey.ac.nz
http://imc.csp.escience.cn/dct/page/1

35th International Geological Congress*

27th August – 4th September 2016
Cape Town
South Africa

http://www.35igc.org/

Italian Geological Society 88th Congress*

7th – 9th Sptember 2016
Napoli
Italy

Mariano Parente
Mariano.parente@unina.it
http://www.sginapoli2016.it/

XV Argentinian Meeting of Sedimentology (XV RAS) and VII Latin American Congress of Sedimentology (VII CLS)*

20th - 23th September 2016
Santa Rosa
Argentina

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adrianamehl@gmail.com
xvras2016@gmail.com
http://aasnoticias.blogspot.be/2015/03/xv-reunion-argentina-de-sedimentologia.html

Meeting on Sedimentary Basins, their Infill and Stratigraphy*

22th–25th September 2016
Eskişehir, Turkey

Faruk Ocakoğu
focak@ogu.edu.tr
http://calistay.sedimantoloji.org/

6th Sedimentary Provenance Analysis (SPA) Short Course

20th - 23rd September 2016
Göttingen
Germany

http://www.sediment.uni-goettingen.de/spa2016/

Dolomieu Conference on Carbonate Platforms and Dolomite 200 plus 25 years Dolomite*

4th–7th October 2016
Selva di Val Gardena, Italy

info@dolomieu.org
http://www.dolomieu.org/

Second EAGE/TNO Workshop on Deltaic Reservoir Connectivity

27th–28th October 2016
The Hague, Netherlands

www.eage.org

AGU Chapman Conference on Submarine Volcanism: New Approaches and Research Frontiers*

29th January – 3rd February 2017
Hobart,
Tasmania, Australia

James White
james.white@otago.ac.nz
http://chapman.agu.org/submarinevolcanism/

33rd IAS MEETING OF SEDIMENTOLOGISTS*

10th–12th October 2017
Toulouse (France)

Delphine Rouby
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http://ims2017.sciencesconf.org/

*** THESE EVENTS HAVE FULL OR PARTIAL IAS SPONSORSHIP**

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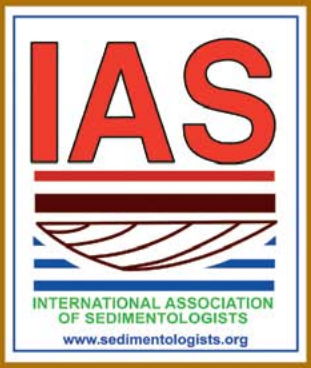
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