ISSN 2294-4931

IAS

NwLtr 255

February 2015

www.sedimentologists.org

International Association of Sedimentologists

IAS Bureau and Council

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EDITORIAL

Newsletter 255 is, for the most part dedicated, to IAS Postgraduate Students Grant reports.

Jackson, Dingle, Peters, Veloso and Perez present some results obtained also thanks to the IAS.

In the central part Stephen Lokier, from the Petroleum Institute of Abu Dhabi proposes a Carbonate Petrography Survey. Announcements close the Newsletter.

Please note that the website www.sedimentologists.org has a new vest and that Student Grant applications have been updated.

I would like to remind all IAS Members that:

- the IAS Newsletter 255 is published on-line and is available at: http://www.sedimentologists.org/publications/newsletter
- the next IAS Meeting will be held in 2015 in Krakow (Poland). For details, please check: http://www.sedimentologists.org/meetings/isc
- CALL for nominations for the Richard W. Faas Research Prize is open.
- IAS at EGU (April) 2015 General Assembly, Vienna.
- CALL for manuscripts for the new Open Access Journal «The Depositional Record»

The Electronic Newsletter (ENIAS), started in November 2011, continues to bring information to members. For info 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)

REPORT

Newsletter Front Cover 2014

The front cover of IAS Newsletter 2014 represent a telescopic alluvial fan formed along the sandy cliffs of Fraser Island (Australia) (Fig. 1).

Fraser Island (24° 35'-26° 20'S, 152° 45'-153° 30'E) is a World Heritage Site on the southeastern coast of Queensland (Fig. 2).

Area

Approximately 166,283 hectares.

Land Tenure

The state of Queensland, private tenure, and the government of Australia.

Altitude

Sea level to 240 metres.

Physical Features

The region largely reflects Quaternary geomorphological processes along a fluctuating coastline, influenced by earlier geological history and the continental shelf (Fig. 3). Fraser Island, 122 kilometres (km) long and 5-25 km wide is claimed to be the biggest sand island in the world. The sand mass is the major geological element, with the sand extending 30-60 m below present sea level. The area represents a complete sequence of sand dunes, extending from the Holocene period (less than 10,000 BP) to before the last Pleistocene interglacial period (120,000-140,000 BP). The sand derives from granites, sandstones and metamorphic rocks in river catchments to the south and from the seafloor. Fossiliferous Lower Cretaceous marine charts are exposed in the intertidal zone on the west of Fraser Island.

The hydrology of the sand masses is of considerable interest and importance due to the unique strata and the almost unaltered catchments of the region. Notable features are the sand mass aquifers and the dune lakess (Fig. 4) The aquifers consist of an extensive regional freshwater 'lens' within each porous sand mass and perched aquifers associated with more or less impervious organically bound sands. Groundwater on Fraser Island is stored in massive reserves (estimated to be around 10 to 20 million megaliters (ML)) within the sand mass, of which almost six million ML is above sea level. A further 400,000 ML may be retained in the perched aquifers. Water may be stored for up to

Figure 1.- Telescopic alluvial fan along the coast of Fraser Island (photo V. Pascucci)

70 to 100 years. The 40 perched, window and barrage dune lakes are unusual in the world, due to their number, size, elevation, depth and oligotrophic waters. The perched lakes on the island comprise more than half the known perched lakes in the world. Some of the perched lakes, formed in wind scoured depressions that later become impermeable due to collection of organic matter, are estimated to be up to 300,000 years old, and contain in their organic sediments a continuous record of changes to the island's

Figure 2.- Fraser Island is the largest and northernmost of a series of sand islands created from south-to-north longshore transport.

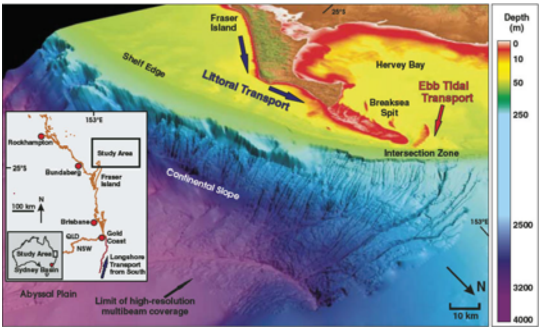

Figure 3.- Fraser Island and its subaqueous extension, called Breaksea Spit, extend out away from the Australian margin as it starts to curve toward the west. This is where the sand transport aspect of the system is very interesting. The constructional Fraser Island-Breaksea Spit has built out to the edge of the continental shelf. When sand is reworked and transported along the system it intersects the shelf edge thus transporting the sand into the deep sea (called 'intersection zone' in their figure above). Note the erosional conduits cut into the continental slope just below the intersection zone (multibeam image from www.eoearth.org).

hydrology and vegetation through Quaternary glacial and interglacial cycles. Window lakes form in low elevation dune depressions that intersect the Island's regional water table. Barrage lake are thought to originate from groundwater springs, dammed by a wall of landward migrating sand.

Climate

Conditions are maritime subtropical with mean annual temperatures ranging from 14.1 degrees Celsius (°C) minimum to 28.8° C maximum. Rainfall is high, reaching 1800 millimetres (mm) on the highest dunes in the center of Fraser Island.

Vegetation

Comprises seven main vegetation types: closed forest including rainforest and tall eucalypt forest dominated by satinay and brushwood; blackbutt forest; scribbly gum and wallum banksia communities; communities of wet sites often dominated by Melaleuca spp.; coastal communities; Callitris forest and woodlands; and mangrove and salt marsh. There is clear zonation and succession of plant communities according to salinity, water table, age and nutrient status of dune sands, exposure and frequency of fires, creating a generally east-west sequence of vegetation.

Fauna

Fraser Island is noted for the presence of the false water-rat Xeromys myoides. (Source: Environmental Protection Agency)

The native plant communities support a significantly diverse fauna, due to the variety and specialization of a large number of habitats, although diversity within habitats is low. Few species are endemic to the sandy coastal heath area.

The island is noted for its low number and abundance of introduced species, presence of false water-rat Xeromys myoides (VU), and high genetic purity of dingo Canis lupus relative to other areas in eastern Australia. Over 300 bird species have been recorded including red goshawk Erythrotriochis radiatus (EN), black breasted button quail Turnix melanogaster(EN), beach stone curlew Esacus neglectus and ground parrot Pezoporus wallicus.

Figure 4.- Dune lake at Fraser Island (photo V. Pascucci)

Cultural Heritage

Aboriginal people are thought to have first occupied the region about 40,000 years ago. The earliest date for the occupation of Fraser Island is currently 1,500-2,000 years, although it is possible that further archaeological work may reveal evidence of earlier occupation. Four main groups of Aborigines dominated the Great Sandy region before the arrival of Europeans. Visible remains of Aboriginal settlement include middens, canoe and gunyah trees, and a few other markings such as scars where bees nests have been removed. Although examination of the archaeological potential of the region has been restricted, a number of sites have been located, particularly adjacent to the eastern shore. Over 200 shell middens have been found on Fraser Island.

Citation

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STUDENT CORNER

IAS Postgraduate Grant Scheme Report -1st session, 2014

TIMING OF PLEISTOCENE MIS 5E SEA-LEVEL OSCILLATIONS: EVIDENCE FROM THE EXUMA CAYS, BAHAMAS

INTRODUCTION

Sea level has fluctuated throughout Earth's history with variable frequency and amplitude. During the Pleistocene, these changes occurred quickly with large amplitudes due to the waxing and waning of ice sheets. New evidence from the Exuma Cays and New Providence, Bahamas (Fig. 1), indicates that sea level during the last interglacial highstand (MIS 5e) 129-116 kybp was not a single rise and fall but actually oscillated 10+ m. This finding corroborates earlier reports of highstand oscillations in the Bahamas and elsewhere (Reid, 2010; Thompson and Goldstein, 2005; Kindler and Hine, 2009; Thompson et al., 2011). High-frequency sea-level changes are most commonly linked to orbital forcing mechanisms (Milankovitch frequencies) with durations of ~20, 40, and 100 kyrs. The 10+ m oscillation recorded in the Bahamas requires another, yet unexplained, suborbital forcing mechanism of much shorter duration.

Recognition that sea level oscillated 10+ m during one sea-level highstand has major implications for the origin and duration of shallow-water depositional cycles in cyclostratigraphy, raising key questions: What is the sedimentary record of inter-highstand sea-level oscillations? How much complexity do these oscillations add to the stratigraphic architecture? Could these oscillations produce sedimentary cycles that are of short (a few thousand years) duration and thus of suborbital frequency? Could these oscillations have the ability to produce individual depositional cycles separated by exposure horizons? If so, it questions the hitherto accepted notion that carbonate cycles are primarily produced by orbitally-controlled sea-level fluctuations.

RESEARCH OBJECTIVES

The goal of this project is to decipher the timing and duration of high-frequency suborbital sea-level oscillations during Pleistocene highstands (particularly MIS 5e), document the stratigraphic heterogeneity of the Exumas windward

Figure 1.- The study area includes the Exuma Cays windward margin and New Providence, Bahamas.

margin produced by these sea-level oscillations, and assess the significance of this process for generating heterogeneity within carbonate cycles. The Exumas windward margin is ~200 km long, 10 km wide, and represents an exploration-scale, stacked succession of carbonate grainstones that include facies deposited over a range of water depths (i.e. reef to eolian dunes). Stratigraphic evidence from the Exumas, combined with data from New Providence, indicates that sea-level oscillated 10+ m within ~13 ky during the last interglacial sea-level highstand (Pleistocene MIS 5e, 116-129 kybp) based on the elevations of beaches, reefs, and exposure horizons in cores and outcrops. In addition, at the end of the late substage, sea level fell in downstepping pulses. Our working model of MIS 5e sea level is constructed from the facies successions in the Exumas and New Providence from this study, Reid (2010), Halley et al. (1991), and Aurell et al. (1995), and provides evidence for the creation of two carbonate cycles within MIS 5e. The amplitude of the mid- MIS 5e oscillation was a minimum of 10 m, which is enough to expose and re-flood a shallow-water carbonate platform like Great Bahama Bank and add a complete depositional cycle within a few thousand years. The implications of this process are far reaching not only for understanding short-term climate changes but also because of the stratigraphic complexity added to the sedimentary system. Dating the Pleistocene strata in cores and outcrops from the Exuma Cays is essential to understanding the timing and duration of the MIS 5e sea-level oscillations. We aim to delineate how the timing and duration of MIS 5e oscillations influenced sedimentation patterns, stratigraphic architecture, complexity in windward margin grainstone belts, and how fast and extensive heterogeneity within carbonate cycles is produced.

METHODS, RESULTS, & BUDGET JUSTIFICATION

Fourteen cores were drilled (maximum depth: 23 m) along ~100 km of the Exumas margin to document stratigraphic heterogeneity produced by Pleistocene sea-level oscillations. Cores document successions of subtidal, reef, beach, and eolian environments from the last interglacial highstand (MIS 5e) 129-116 kybp as well as 1-2 older highstands 300,000-400,000 ybp (MIS 9 and/or 11). Because the margin is composed of primarily carbonate oolitic-peloidal grainstones, whole rock amino acid racemization (AAR) was first utilized to date the Pleistocene successions. While the data yielded general highstand ages, U-Th dating was used to achieve more precise age dates to determine the timing and duration of the oscillations within MIS

5e. U-Th dating was conducted at the Neptune Isotope Laboratory at the University of Miami with Dr. Ali Pourmand. Numerous oolitic-peloidal grainstone samples from the Exumas cores were pre-screened and 6 were selected for U-Th dating. The samples were prepared and analyzed following the methods of Pourmand et al. (2013). Unfortunately, despite screening efforts, the 6 U-Th dates display open-system behavior and are therefore not reliable. Our analyses are currently ongoing and in 2015 we plan to continue to date additional samples, focusing on varying grain compositions, outcrop samples, and incorporating samples from New Providence. The IAS grant money awarded was used to measure these 6 U-Th age dates ($200 USD each, $1200 USD total) at the Neptune Isotope Laboratory at the University of Miami.

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FACTORS CONTROLLING THE DYNAMICS OF GANGA RIVER (INDIA)

Many of the rivers of the Ganga Plain are prone to abrupt switching of channel courses (avulsion) causing devastating floods over some of the most densely populated regions on earth. Despite this, our understanding of the factors that control the dynamics of these river systems downstream of the mountain front is surprisingly limited. Rivers in the east Ganga Plain can be broadly defined as shallow aggrading channels that frequently avulse and flood, whilst those in the west are described as degrading systems with incised channels. Factors that are likely to exert control on this spatial contrast in river morphology, namely sediment flux and grain size, are being investigated as part of my PhD. Our current understanding of sediment flux

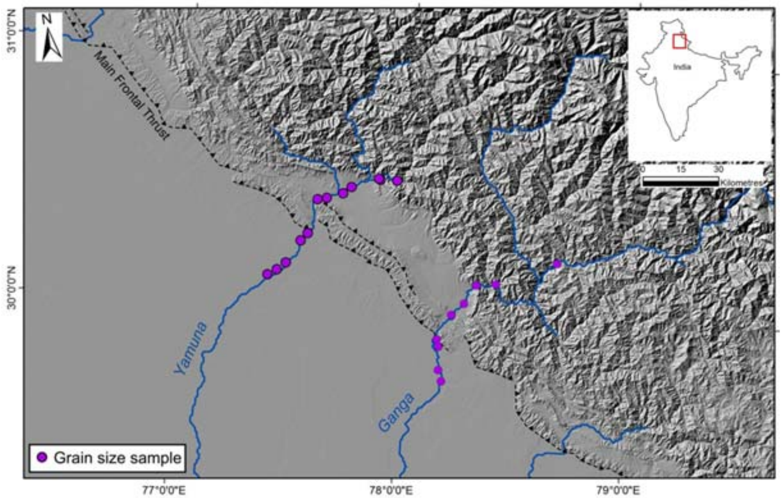

Figure 1.- Location of Yamuna and Ganga River grain size sampling locations. The Main Frontal Thrust denotes the southernmost limit of notable Himalayan mountain topography.

Figure 2.- (Left) Measuring grain size on the Ganga River; (Right) Cross bedded sand deposits left at Bagwan following the 2013 Alaknanda flooding

at the Himalayan mountain front is based largely on modern suspended sediment data from gauging station networks, however these data are often limited for catchments in the Ganga

Plain and are often restricted to suspended load. Furthermore, there are few detailed studies on grain size distributions across the mountain front, which is known to exert a control on channel morphology.

With the financial support of the IAS, I was able to spend four weeks during October 2014 working along the Yamuna and Ganga Rivers in the west Ganga Plain (Figure 1). One aim of this fieldwork was to collect detailed grain size measurements from bedload exposed on gravel bar deposits within the modern channels as they exit the Himalayan mountains. Both surface and subsurface measurements were obtained using photo counting and volumetric sieving methods, respectively (Figure 2). At each site 100-350 kg of gravel bar deposit was sieved though 0.1, 1, 2 and 4 cm sieves. Pebbles coarser than 8 cm were individually weighed, and 1 kg samples of the <0.1 cm fraction have been brought back to the UK for further sieving. Measurements were taken from ~50 km upstream of the mountain front and continued downstream, where accessible, until gravel deposits were exhausted at the gravel-sand transition. Interestingly, this is the first study that has documented the location of the gravel-sand transition in these rivers. Given the large tectonically active upstream areas (9,419 and 19,666 km^2 for the Yamuna and Ganga, respectively), widespread occurrence of mass wasting processes and low abrasion rates associated with transport of coarse sediment reported within these catchments, it was surprising that the gravel-sand transition was documented within 15-20 km downstream of the mountain front on both rivers. This translates that all sediment coarser than sand exported from the Himalayas is trapped within the first 15-20 km downstream of the mountains. Two 25 m linear transects were also taken on each bar surface to document changes in the lithology of surface pebbles.

In addition to this, a number of river and terrace sand samples were collected for detrital ^{10}Be cosmogenic radionuclide analysis (Figure 2). ^{10}Be concentrations obtained from this analysis will be used to deduce sediment fluxes along the Himalayan mountain front, averaged over 10^2-10^4yr timescales. Following the 2013 Alaknanda flooding, ^{10}Be sampling locations documented by Lupker *et al.*

(2012) were also resampled to compare post event ^{10}Be concentrations with pre event concentrations in the Ganga River. Samples were also taken from preserved 2013 flood deposits. By doing so, it is possible to compare the effects of an event of a known magnitude on catchment-averaged erosion rates calculated from detrital ^{10}Be concentrations. The results from this cosmogenic analysis will be available later in 2015.

These data will be further complimented by comparative measurements collected from the Karnali, Gandak and Kosi rivers in the east Ganga Plain in spring 2015.

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GLACIAL HISTORY, TIMING AND ASSOCIATED PALAEOENVIRONMENTS OF THE NOW-SUBMERGED CONTINENTAL SHELF OF WESTERN IRELAND

Introduction

Despite the thoroughness of investigation into the last (Devensian) British-Irish Ice Sheet (BIIS), our understanding of its extent, timing and style of deglaciation is still evolving (cf. Clark et al. 2012). This project aims to reconstruct the former glacial history, timing and associated palaeoenvironments of the now-submerged continental shelf of western Ireland (Fig. 1a). Recent geomorphic analyses (Benetti et al. 2010; Ó Cofaigh et al. 2010) and this project's ongoing sedimentary analyses are providing long-sought-after evidence of glaciation in this study area; this evidence suggests that ice behaviour in the area may have affected regional BIIS mass balance, which could have contributed to ice sheet thinning.

Methods

This research employs sedimentology, geomorphology, micropaleontology and geochronology to analyse sediment cores gathered on the glaciated continental shelf west of Ireland. Sedimentary analyses include Lithofacies descriptions, shear strength measurements, Multi-sensor core logger measurements, X-radiograph analysis and Grain size analysis. The geomorphology of glacial landforms in the study area is revealed by Irish National Seabed Survey and OLEX bathymetric data (Fig. 1b). Micropaleontological analyses provide

Core	Interval (cm bsf)	Sample material	Surrounding lithofacies	Radiocarbon age (Cal BP)	Lab #
42	36	Bivalve shell	Upward-finning sand	19,336-19,027	Poz-66484
45	94	Bivalve shell	Unconsolidated, matrix-supported diamicton	20,405-20,103	Poz-66430
53	70	Mixed benthic foraminifera	Massive, silty fine sand	16,984-16,775	Poz-66485

Table 1: radiocarbon results funded by IAS 2014, 1st session grant scheme.

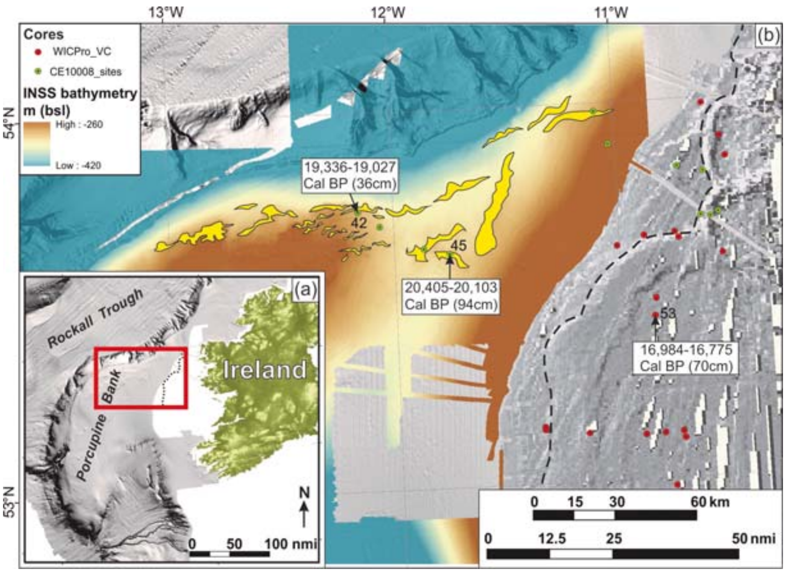

Figure 1.- **(a)** shaded relief bathymetry of Irish National Seabed Survey (INSS) data and digital elevation model (DEM) topography of NASA Shuttle Radar Topography Mission data showing the study area (red box) in context with major surrounding landforms. Dotted line within red box correlates to the dashed line in (b). **(b)** Study area shown by INSS bathymetric DEM (brown to blue) overlain onto the aforementioned shaded relief data. Coarse-resolution OLEX® data (grey) depicts the eastern study area bathymetry; dashed line indicates the western edge of a large moraine (Clark et al. 2012). Yellow polygons highlight glacial landforms near the shelf break. Dates funded by IAS for cores 42, 45 and 53 (labelled) are provided and help to elucidate a general pattern of east-by-southeast ice retreat.

foraminifera assemblage data that bolster sedimentological interpretations and elucidate information on ice proximity during sediment deposition. Geochronologic analyses are being carried out on calcareous fauna/ microfauna sampled from glacial and ice-proximal sediment strata.

IAS grant use/results

€1,000 was allocated to this project for the dating of calcareous marine fossils and microfossils. Three radiocarbon ages (Table 1) were procured with the IAS grant from cores CE10008_42, CE10008_45 and CE14004_53—henceforth 42, 45 and 53, respectively (Fig 1b). These radiocarbon ages help to reveal the rate and pattern of BIIS retreat (Fig. 1b). These data allow the results of this research to be correctly applied to the last BIIS and thus further knowledge of the suspected tenuous stability of marine-terminating ice sheets. This information may prove valuable to predictive models for current ice sheets (e.g.: Gladstone et al. 2012).

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PETROPHYSICS AND PETROGRAPHY STUDY OF OUTCROP FOR MODELLING PURPOSES

Introduction

This study is part of my PhD project at the University of Zaragoza, Spain. The main goal of the PhD project consists in modelling of two Cretaceous sandstone outcrops of Iberian Ranges to evaluate the impact of local sedimentary heterogeneity in simulation study of CO_2flow. A geological model is built from the detailed sedimentary study of outcrop and the analysis of its hydrodynamic parameters, such as porosity and permeability. The sedimentary structures and heterogeneities at outcrop scale represents the scale of individual bedforms and laminae (Yoshida et al. 2001) supplying detailed information which could be impossible or difficulty to get from seismic scale and/or core scale. The integration of high-resolution sedimentary heterogeneity into reservoir or groundwater flow models improves the accuracy of fluid flow behaviour prediction.

One of the selected outcrops is

Figure 1.- Soria in Spain.

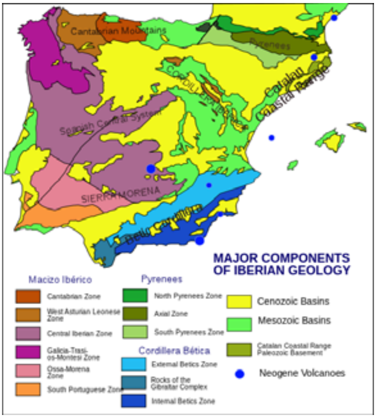

Figure 2.- Geological sketch of Spain.

located at the base of Pico Frentes (Sierra de Cameros) at 10 km far from Soria (Fig. 1). The studied interval has a clastic-dominant composition and represents the top of Utrillas Fm. deposited during the Albian age (Wiedmann, 1962). The Utrillas Fm. has a vast extent (hundreds of kilometres) in the Iberia Basin (Fig. 2) and it is overlying the «Weald facies» deposit by an unconformity contact. The studied profile has a maximum thickness of 50m and 145 m-long. The outcrop is composed of four main sandstone beds interbedded with shales and marls; these deposits have been studied by Melendez (1978) that classified them as the channel deposits (sandstone) in a tidal mud environment (shales and marls) where the sand proportion (Net to Gross) increases towards the top of profile, as well as the marine influence.

The objective of this study, sponsored by IAS grant, is to collect sandstone samples to describe them at microscopic scale (thin section) in terms of sandy facies: grain size distribution, sorting of grains, nature of matrix and grains, presence of cements or asphalt; and then sandy facies are correlated with petrophysics parameters, such as porosity and permeability.

Methodology

Three sedimentary sections were measured in the SW-NE direction, perpendicular to sandstone at the Southern, the middle and the Northern side of outcrop (Fig. 3). On the base of the sedimentary description of the logged section and onsite studies, was put in place a sampling schema. This consisted of collecting samples from different facies inside the sandstone beds for petrography and petrophysics studies. Samples were extracted using a portable rock core drill that allowed extracting cores of 10-20cm length and 8-9.5cm in diameter. 43 samples were described by petrography observation, whereas only in 23 samples were possible to measure porosity and permeability; the presence of very coarse grains and/or the need to clean samples to remove asphalt have difficult to extract plugs with a perfect shape for petrophysics measurement.

Preliminary Results

The studied sedimentary record represents a clastic sequence of thicker shale and marl beds (ten meters) interbedded with sandstone beds of 1.5m to 5m-thick. Four sandstone beds are studied and are called, from the base to the top of profile: B1, B2, B3 and B4 (Fig. 3). The sandstone beds B1, B2 and B3 are composed of coarse sand with spread or aligned pebbles and an upward decreasing grain size tendency to the top. The lower boundary surface of beds is erosive of concave shape and the upper boundary surface of beds is flat and covered with an iron oxide crust that locally reaches up tens of centimetres in thickness. The upper surface of beds shows bioturbation structures such as circular hollows that

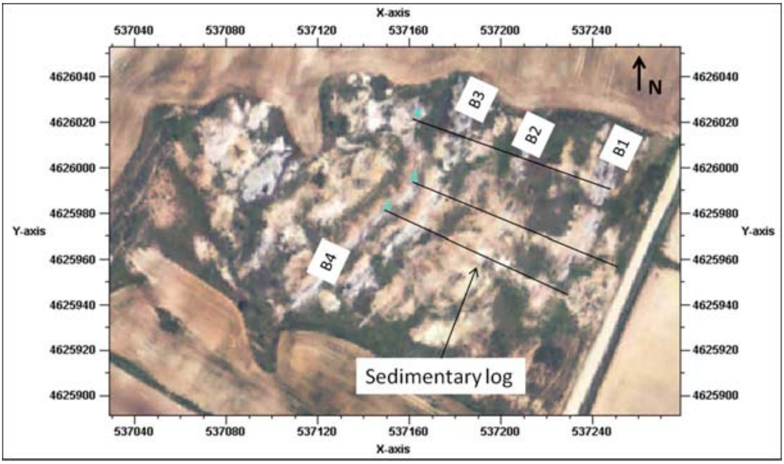

Figure 3.- Aerial photo of outcrop showing the location of the three sedimentary sections and the location of sandstone beds: B1, B2, B3 and B4.

represent the top of burrows. The B4 bed is composed of fine sand grains with a grey colour; sedimentary structures as oscillation ripples and planar horizontal bedding are presented. There are zones impregnated by asphalt in every sandstone bed; the distribution and volume of impregnation vary between sandstone beds, the B4 bed has the higher asphalt content and the finer sand size.

The preliminary petrographic study of 43 samples has showed the subarkose dominant composition of samples where the percentage of feldspars varies from 10% to 20% of clastic components; tourmaline and opaque minerals are the principal heavy minerals. The grain shape is subrounded to subangular and most of grains are fractured; many of these fractures are filled up with a red colour matrix. The trough cross bedding is the main bedding sedimentary structure, but planar bedding are presented where sediment is finer. The clay matrix content ranges from 5% to

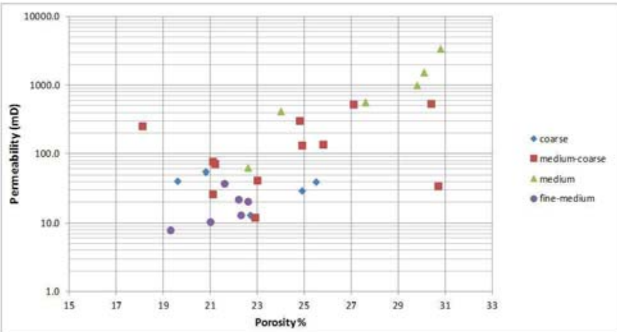

Figure 4.- Permeability (K) versus porosity (Phi) plot as function of grain size class.

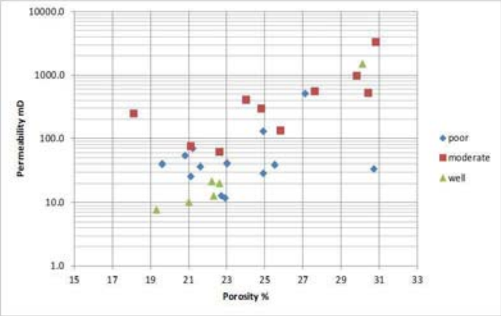

Figure 5.- Permeability (K) versus porosity (Phi) plot as function of sorting class.

20%; samples from every sandstone beds have a red colour matrix that replaces totally the clay matrix in some samples. The asphalt impregnation is present in all sandstone beds, except in the bed at the base of profile; in some samples, impregnation reaches up 10% of whole content. In terms of grain size distribution, samples were classed in 4 categories: coarse (30% of samples); medium-coarse (40% of samples); medium (14% of samples); fine-medium (16% of samples). In terms of grain sorting, samples were classed in 3 categories: poor sorting (49% of samples); moderate sorting (33% of samples), well sorting (19% of samples).

The petrophysics study of samples was carried out in 23 samples and consisted in estimating and permeability from helium picnometry and Darcy's laws, respectively; before the measuring samples were cleaned out with toluene in a Soxhlet system to remove asphalt from the pores. The porosity was measured in every sample and values vary from 18% to 31%. Three direction of permeability have been measured: Kj, Ki and Kv; where Kj is the horizontal permeability parallel North direction, Ki is the horizontal permeability perpendicular to North direction and, Kv is the vertical permeability perpendicular to sedimentary bedding. The permeability values range from to 3390mD. The K (permeability) versus Phi (porosity) plot as function of sand size class and sand sorting shows a correlation between the K and Phi variation and sedimentary class. Looking at the K plot as function of sand size class (Fig. 4), samples of coarse class has the porosity values no greater than 26% and the permeability values lower than 54mD; samples of medium-coarse class has the porosity values widespread on the range of values while permeability do not exceed 535 mD. The Figure 5 is the K versus Phi plot as function of sand sorting class; the sandy facies of moderate sorting class has a better K and Phi range of values than sandy facies of poor selection. Samples from sandy facies of well sorting class and fine-medium size class have the lower values of K and Phi.

Work ongoing

This study is a preliminary work to construct a sandy facies map of outcrop where the sandy facies have a range of porosity and permeability values associated with them. Different class of sandy facies are defined by petrography study; the sandy facies class is any sedimentary feature that has a good correlation with petrophysics values, so it is essential a detailed sedimentary model of outcrop to determine the best sedimentary features which the best correlation with petrophysics. Further, the presence of asphalt in the pores has been studied in the attempt to qualify and to quantify how it impacts on current petrophysics. The sandy facies model of outcrop will be built from sandy facies map and sedimentary study of outcrop, this model is then used to build the reservoir model with petrophysics properties for flow simulation studies.

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IAS Post Graduate Grant Scheme Report – 2nd Session 2013

SEDIMENTARY EVOLUTION OF THE SOUTHWESTERN SCOTIA SEA (ANTARCTICA): TECTONIC AND PALAEOCEANOGRAPHIC IMPLICATIONS

Background & Rationale

The Scotia Sea is located to the east of the Drake Passage, which is in between the southern tip of South-America and the northern end of the Antarctic Peninsula (Fig. 1). It is usually considered the last barrier for complete establishment of circum-Antarctic deep-water flow and the determination of the Antarctic Continent isolation (Lawver *et al.*, 1992). To the north of the southern boundary of the Scotia Sea several continental blocks bound small sedimentary basins, from west to east: Ona, Protector, Dove and Scan (Barker *et al.*, 1991; Bohoyo *et al.*, 2007). The importance of the Scotia Sea evolution in the circulation of the southern ocean had been reveal in several works (e.g. Naveira-Garabato *et al.*, 2002) and the role played by the evolution of the southern Scotia Sea small basins have been largely taken into account (e.g. Maldonado *et al.*, 2006).

Several works have been considering the sedimentary record of some of these basins during the last years (Maldonado *et al.*, 2006; Pérez *et al.*, 2014a, b). The tectonic implications of the southwestern Scotia Sea – Ona Basin– have been recently studied (Maldonado *et al.*, 2014). These authors identified eight seismic units within the sedimentary record above the igneous crust. They are named VIII to I from bottom to top and are bounded by six marked stratigraphic discontinuities. However, there is a lack of a detailed study of its sedimentary record in terms of tectonic and palaeoceanographic changes and implications.

The main objective of the research-stage at Royal Holloway University of London (RHUL) was to complete the Scotia Sea research developed during last years. Therefore a basin analysis is proposed in the Ona Basin for determining the present and ancient depositional and erosional features and decoding their sedimentary evolution. In addition, the tectonic control in the evolution of the sedimentary record is evaluated. This area has not been studied until now, although constitutes

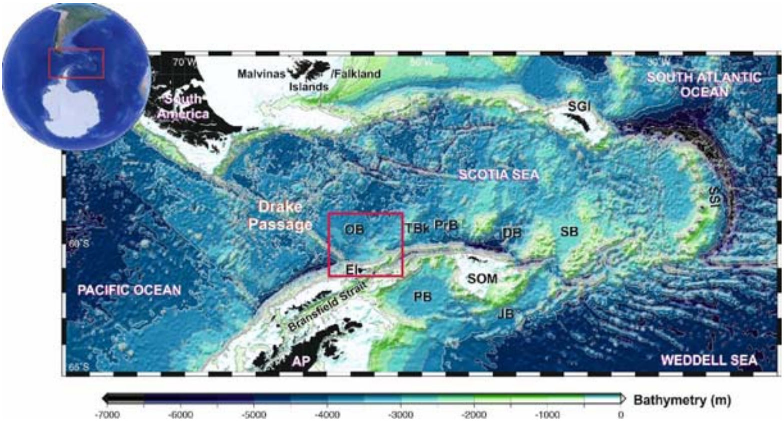

Figure 1.-Simplified bathymetric map of the Scotia Sea derived from the GEOSAT gravimetric anomaly map (Sandwell and Smith, 1997). Morphological and oceanographic features: AP, Antarctic Peninsula; DB, Dove Basin; EI, Elephant Island; JB, Jane Basin; OB, Ona Basin; PB, Powell Basin; PrB, Protector Basin; SB, Scan Basin; SGI, South Georgia Island; SOM, South Orkney Microcontinent; SSI, South Sandwich Islands; TBk, Terror Bank.

a key area for the first steps of the circum-Antarctic circulation as well as for the deep water from the Weddell Sea –Weddell Sea Deep Water (WSDW)– and its though to the Pacific Ocean since middle Miocene.

Methods

A regional morpho-sedimentary and seismic-stratigraphic analysis has been executed based on Multichannel Seismic reflection (MCS) profiles available in the southwestern Scotia Sea. Most of the MCS data were obtained by the SCAN group during several Antarctic cruises supported by the Spanish Antarctic Program. The dataset have been completed with the MCS profiles obtained by different institutions during several geophysical cruises. Most of these seismic data are available in stack version in the Antarctic Seismic Data Library System hosted at OGS (http://sdls.ogs.trieste.it).

The seismic units have been individualized following the traditional interpretation criteria followed basic seismic-stratigraphic analytical methods (e.g. Payton, 1977). The picking of the discontinuities has been done through Kingdom Suite™ software, and the thickness maps of the units were done via the same software with a classical kriging algorithm. To help the description, the area has been divided in Western and Eastern Ona basins by the Ona High as previously defined by Maldonado *et al*. (2014).

Preliminary results

The three lower units –VIII, VII & VI– present reflections of massive to low-middle amplitude and discontinuous to low lateral continuity. These reflections usually present onlap terminations to basement top and concordance to the top boundary. These units are restricted to the major basement depressions. The intermediate units –V & IV– have middle-high amplitude reflections of middle lateral continuity. The common terminations are onlaps and, to the top of Unit IV strong erosive truncation areas and toplap terminations break the concordant general trend. These units distribution is highly restricted by the basement morphology. In the upper units –III, II & I–, the high amplitude and lateral continuity are remarkable. The inner reflections are usually concordant and organized in drifts and wavy morphologies. Gentle drift morphologies are particularly abundant within Unit I; however they are usually restrained in the previous relief inasmuch as this unit fills the previous hollows formed by channels and levees morphologies associated to units III and II. Nonetheless, the three upper discontinuities usually conform erosive surfaces and present associated channels. The present-day erosion is especially marked over Ona High where in the southern drift, Unit I is almost totally erase and the reflexions of the lower units are completely truncated by the nowadays seafloor. These upper units are widespread distributed. The figure 2 shows the distribution of the eight identified units.

Discussion & Further work

The lowest units identified within Ona Basin are the oldest units recording in Scotia Sea and have been formed during the first episodes of oceanic spreading related to the Eocene Drake Passage opening (Fig. 2). The oldest –Unit VIII– is deposited during a climatic warming started in the Eocene Climate Optimum (Dieckmann *et al.*, 2004). This warming period finish at *ca.* 40 Ma and the two following units (VII and VI) were During Unit V sedimentation the depocentres formed in relatively closed morphology areas –displaced slightly eastwards of the main basement depressions (Fig. 2). This distribution is related to an unrestricted pass of the eastward water masses of the area only limited by the palaeo-configuration of the Scotia Arc fragments, because the SFZ was established as a significant structural relief at middle Miocene (Martos *et al.*, 2013) or upper Miocene (Livermore *et al.*, 2004). Therefore the Antarctic Circumpolar Current crossed widespread through the Drake Passage. In addition, this unit was deposited during a cooling trend and ice sheets grown (Naish *et al.*, 2001; Zachos *et al.*, 2001; Bart, 2003; Dieckmann *et al.*, 2004) that restricted the oceanward sediment input.

The widespread Unit IV depocentre along the southern edge of the Western Ona Basin links a most developed eastward flow of the ACC (Fig. 2) related to a pulse in the separation between the Antarctica and South-America (Lagabrielle *et al.*, 2009) and the opening of this passage to deep flows (20 Ma; Pagani *et al.*, 2000). This was combined to a great input of sediments tentatively supplied by the southward ice sheets that grew up related to M1-glaciation and melted before the Mid-Miocene Climate Optimum (24 Ma and 15 Ma, respectively; Tsuchi, 1992; Zachos *et al.*, 2001, 2008).

There are a highly marked contrast between the southern-priority Unit IV distribution and the subsequent northern-priority Unit III distribution within the Western Ona Basin (Fig. 2). The whole sediment input of the continental margin of the Elephant and Clarence islands and its eastwards continuation to the SOM is restricted to relatively thin margin-attached depocentres during the upper Miocene. This period was characterized by the grown of the Antarctic Peninsula ice sheets (Anderson *et al.*, 2011) in the

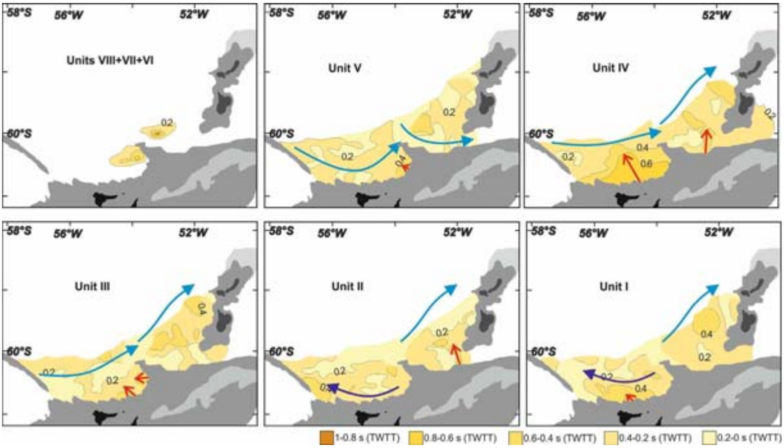

Figure 2.-Regional sedimentary distribution of the main seismic units identified in Ona Basin. Sedimentary thickness expressed in TWTT. The inferred bottom current flows are represented over the sedimentary thickness maps. Red arrows represent down-slope transport; light-blue arrows represent CDW flow; dark-blue arrows are the WSDW flow.

onset of a general warming episode (Hillebrand and Erdmann, 2005). In addition to the Eastern Ona Basin depocentres distribution, the sedimentation during this unit is under the influence of different bottom water than the lower units were. The inferred flow-direction is westwards, with a NW component between both basins. This water Unit II represents a low sedimentation period, in the range of the Unit V. There are no important inputs of the continental margin, and the main depocentres are also restricted to the relatively closed morphology areas (Fig. 2). The lack of important depocentres related to Unit II could indicate a stronger flow of the WSDW in the Western Ona Basin. According to previous proposed ages (Maldonado *et al.*, 2006, 2014), both units, V and II, was deposited associated to cold events. The M1-glaciation took place during Unit V formation (Villa and Persico, 2006) and the West Antarctic Ice Sheets emplacement occurred during Unit II deposition (Zachos *et al.*, 2001, 2008; McKay *et al.*, 2012). Both units were emplaced during periods of relative temperature dropping that could carry the growth of the continental margins associated ice sheet and with this a restriction of the oceanwards sediment input.

The incipient southwestward Unit II depocentre might indicate an onset of the SFZ elevation according to previous proposed ages (Livermore *et al.*, 2004; Martos *et al.*, 2013). This depocentre is more prominent in relation to the Unit I, and in addition a northwestern depocentre is formed during this period. Both depocentres are related to the SFZ formation and the restriction of the WSDW flow to the Pacific Ocean (Martos *et al.*, 2013) during relative stable climatic conditions (Hillebrand and Erhmann, 2005). An increase in the margin sediments input during the upper Pliocene and Quaternary is manifested by the margin-attached depocentres of the Unit 1 (Fig. 2).

In the southeast of Western Ona Basin there is a migration to the north of the erosion area between Discontinuity-c, Discontinuity-b, Discontinuity-a and the nowadays seafloor. These record the northwards expansion of the WSDW since its instauration in the Scotia Sea and the linked northward migration of the CDW.

A detailed study of the obtained result is already required. The correlation of the main stratigraphic changes to those regional tectonic and climatic changes has to be completed. The integration of these study with the recent publications done in the eastern basins of the south Scotia Sea (Galindo-Zaldívar *et al.*, 2014; Pérez *et al.*, 2014a, b) allows to compete a regional work with global implications that is going to be submitted to a high impact research journal.

Acknowledgements

Many thanks to the IAS Postgraduate Grand for support of travel expenses from Spain (Granada) to UK (London) and the accommodation costs during part of the stay period. Also the people providing support from the Royal Holloway University of London. This work was performed in collaboration with the Continental Margins Research Group (CMRG) at Royal Holloway University of London (UK) and was also financially supported by the COMPASS consortium.

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CONSISTENCY AND REPEATABILITY IN THE CLASSIFICATION OF CARBONATE THIN SECTIONS

We need your help!

We are currently undertaking a project aiming to assess the degree of consistency and repeatability in the petrographic classification of carbonate thin sections.

As part of this study we are conducting a short on-line survey that will take between no more than 20-30 minutes to complete.

For the study to have value we need the participation of as many people as possible. We seek volunteers both from academia and from industry and at all levels of academic background.

'If you can describe a carbonate thin section then we want your input!'

The survey can be accessed at this address:

https://www.surveymonkey.com/s/Carbonate_Petrog_Study

or by using the QR code below.

If you require any further information about this project then please contact Stephen Lokier (slokier@pi.ac.ae).

Thank you.

ANNOUNCEMENTS

GEOLOGY OF REEFS

RUSSIAN ACADEMY OF SCIENCES
INSTITUTE OF GEOLOGY, KOMI SCIENCE CENTER, URAL BRANCH
SCIENTIFIC COMMITTEE ON PROBLEMS OF LITHOLOGY AND SEDIMENTARY MINERAL RESOURCES: LITHOLOGY AND GEOCHEMISTRY OF CARBONATE DEPOSITS DIVISION
THE NATIONAL COMMITTEE OF REEF RESEARCH

Syktyvkar, Republic of Komi, Russia
June 15-17, 2015

Science session:

- Lithofacies diagnostics of organic buildups
- Paleoecological analysis of reef ecosystems
- Geochemical aspects of reefs and reef-like fabrics
- Microbial carbonates and bacterial lithogenesis
- A complex analysis of areas with reef formations

Field trips:

Pre-symposium: 11–14 June. Upper Devonian reefs and Domanic facies of the South Timan (provisional cost 300 US $).

Abstracts:

Submit your abstract in Word-format (Microsoft Word 97/2000/XP *.doc). The file should be named after the first author's surname followed by underscore and specification - 'text', 'table' or 'figures' (e.g. Ahlberg_text.doc). It should not exceed four page A4, including summary, table, figures and references.

Manuscripts are accepted in English. The abstract should be written according to the next style. the padding edge of the page – 2,5 cm. Font – 12 pt, Time new roman. Citations are given in the form of number of reference at the straight brackets (e.g., [1]). The references given at the end of the text, font size 10 pt

Figures must be saved separate to text. Please do not embed figures in the manuscript file. Files should be saved as one of the following formats: TIFF (tagged image file format), JPG . Please provide the highest quality figure format possible (e.g. 300 dpi). All figures must be numbered in the order in which they appear in the manuscript (e.g. Figure 1, Figure 2). In multi-part figures, each part should be labelled (e.g. Figure 1(a), Figure 1(b)). Figure captions must be saved separately, as part of the file containing the complete text of the manuscript, and numbered correspondingly. The filename for a graphic should be descriptive of the graphic, e.g. Figure1, Figure2a.

Oral and poster presentations

Oral presentations are limited to 12 minutes plus 3 minutes for questions. PowerPoint presentations (ppt, pptx or pdf format) will be shown on 3X3 m screen.

Posters will be displayed throughout the entire meeting immediately next to the scientific sessions lecture hall. Size of posters should be A0.

Official website: http://conf.uran.ru/Default.aspx?cid=reefs.

Deadlines:

Abstract submission: March 1, 2015
Cost of field work April 1, 2015
Third circular with program: May 15, 2010
Registration of the participants of the meeting: July 14, 2015
Meeting opening: July 15, 2015

Registration fee - **50** $

Accomodation – 60–100 $ per person/ per night in the hotels.

The medium cost of meals in Syktyvkar is 10–30 $ per day.

Address:

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STRATI2015

The congress follows the invitation by the International Commission on Stratigraphy (ICS) of the International Union of Geological Sciences (IUGS) to be held in Graz (Austria), July 19-23, 2015. The congress will be open to all topics in stratigraphy. The technical program will range from the Archean to the Holocene, across all techniques and applications of stratigraphy and the discoveries that the stratigraphic record reveals about the Earth system. In addition, it will also serve as the primary venue for ICS business, for ICS subcommissions to meet and awarding the ICS stratigraphy prizes.

Location

Graz is the second largest city of Austria and a well suited location for organizing international conferences. Graz is also well known for cultural highlights, which is reflected in its status as a UNESCO World culture heritage site. Graz is located about 200 km south of Vienna and can be reached by plane (from Vienna, Munich, Frankfurt, Berlin, Stuttgart and Zurich) or by train.

Venue and organization

The congress will take place on campus of the University of Graz, Austria. It will be organized by the Institute of Earth Sciences of the University of Graz in cooperation with other Austrian Earth Sciences institutions representing the Austrian Earth Science community (e.g., Geological Survey of Austria).

Accomodation

The organisation of accomodation for the conference participants will be managed by the Graz Tourist Office, the official tourism unit of the city of Graz: http://www.graztourismus.at/

Scientific sessions

31 session proposals have been submitted (http://strati2015.uni-graz.at/sessions/) and abstract submissions will be accepted end of January.

Field trips

11 field trips are announced (6 Pre- and 5 Post-Conference) ranging from 1 to 5 days and including Austria, Italy, Slovenia and Croatia, Hungary, Czech Republic and Romania.

Registration rates

	Early Registration before 29 May 2015	Standard Registration after 30 May 2015
Regular Participant	Euro 300.–	Euro 400.–
Students	Euro 150.–	Euro 200.–
Senior (65 & Retired)	Euro 220.–	Euro 300,–
Accompanying persons	Euro 50.–	Euro 70.–

Deadlines

Abstract submission: deadline 24 April 2015

Conference registration and payment:

Early registration: deadline 29 May 2015

Standard registration: from 30 May 2015

Field-trip registration and payment: deadline 30 April 2015

Contact

If there are any conference inquiries please contact us:

Conference homepage: http://strati2015.uni-graz.at/

Conference e-mail: strati2015@uni-graz.at

Personal contact conference chair: werner.piller@uni-graz.at

Postal address:

2nd International Conference on Stratigraphy - Strati 2015
c/o: Institute of Earth Sciences, Department of Geology and Palaeontology University of Graz, Heinrichstrasse 26, 8010 Graz, Austria

SPECIAL IAS GRANTS OR 'INSTITUTIONAL IAS GRANTS'

Special IAS Grants or Institutional IAS Grants are meant for capacity building in 3rd 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 members. Applications should provide 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 will money be transferred to the grant recipient.

IAS STUDENT GRANT APPLICATION GUIDELINES

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.

Recommendation letter (by e-mail) from the PhD supervisor supporting the applicant is mandatory, as well as recommendation letter (by e-mail also) from the Head of Department/ Laboratory of guest institution in case of laboratory visit.

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

Guidelines for recommendation letter from supervisor:

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 sent directly to the Treasurer of the IAS by e-mail, and before the application deadline.

It is the responsibility of the applicant to make sure that his/her supervisor submits the recommendation letter in time. No reminders will be sent by IAS, neither to the applicant, nor to the supervisor. Applications without letter of support will be rejected.

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 researchproposal 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

When you apply for a grant, your PhD supervisor will receive an automated e-mail with a request to send the IAS a letter of recommendation by e-mail. You should, however, check with your supervisor everything is carried out the way it should be. It will be considered as a plus for your application if your

PhD supervisor is also a member of IAS.

Supervisor's name: ....

Supervisor's e-mail: ....

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 fill in his/her name and e-mail address to solicit his/ her advise about your visit.

Name of Head of guest Department/ Laboratory: ....

E-mail address of Head of Guest Department/Laboratory: ....

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 had contact in the past with the Head of the Guest Department/Laboratory (if appropriate)

CALENDAR

23rd SwissSed Meeting,

28th February 2015
University of Fribourg, Switzerland

http://www.unifr.ch/geoscience/geology/en/research/swissed/swissed-2013

EUROPEAN GEOSCIENCES UNION GENERAL ASSEMBLY 2015*

12th-17th April 201 5
Vienna
Austria

http://www.egu2015.eu/
egu2015@copernicus.org

First International Congress on Continental Ichnology (ICCI-2015)*

21th – 27th April 2015
El Jadida
Morocco

Abdelouahed Lagnaoui
abdelouahedlagnaoui@yahoo.fr

Past Gateways
Paleo-Artic Spatial and Temporal Gateways

18th – 22nd May
2015
Postdam
Germany

http://www.geol.lu.se/pastgateways

Quadrennial International Limnogeology Congress (ILIC6)*

15th -19th June
2015
Reno
Nevada

Michael Rosen
mrosen@usgs.gov

31st IAS MEETING OF SEDIMENTOLOGY*

22nd-25th June
2015
Krakow
Poland

Micha³ Adam Gradziñski
michal.gradzinski@uj.edu.pl
https://www.sedimentologists.org/ims2015

The 2nd International Conference on Tomography of Materials and Structures (ICTMS)

29th June – 3rd July
2015
Quebec City
Canada

http://ictms2015.ete.inrs.ca

15th Bathurst Meeting of Carbonate Sedimentologists*

13th-16th July
2015
Edinburgh,
UK

Rachel Wood
Rachel.Wood@ed.ac.uk

Second International Congress on Stratigraphy STRATI 2015*

19th-23rd July, 2015
Graz
Austria

http://strati2015.uni-graz.at/
strati2015@uni-graz.at

MinPet 2015

10th-12th September, 2015
Leoben,
Austria

minpet2015@unileoben.ac.at
http://minpet2015.unileoben.ac.at

XII GEOSED MEETING*

21st-27th September, 2015
Cagliari
Italy

Stefano Andreucci
sandreucci@unica.it,
Luca G. Costamagna
lucakost@unica.it

2015 National Chinese Conference of Sedimentology

Late October 2015
Wuhan,
Hebei

http://ccas2015.yangtzeu.edu.cn (in Chinese).

International Symposium on Aeolian Deposits in Earth History

12th-13th October 2015
Beijing
China

Shiling Yang
yangsl@mail.iggcas.ac.cn
http://www.conferencenet.org/conference/ISADEH.htm

5th International Conference on Alluvial Fans*

29th November – 4th December 2015
Christchurch
New Zealand

James Driscoll
james.driscoll@monash.edu

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

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