

# **MAGELLANPLUS WORKSHOP - DRILLING THE CRETACEOUS-PALAEOGENE TROPICAL SOUTH ATLANTIC**

**2-4 February 2015 – Newcastle University, UK**

The Cretaceous rift basins of the tropical South Atlantic were globally significant sites of organic carbon production, biotransformation and burial. These conditions changed irreversibly with the opening of the Equatorial Atlantic Gateway in the late Cretaceous, a fundamental reconfiguration of the world's oceans and climate. Large uncertainties still remain regarding the exact timing of the EAG opening, the tectonic and subsidence history of the tropical South Atlantic, and the effects of EAG opening on tropical South Atlantic climate and ecosystems.

On a global scale, tropical climate conditions are poorly constrained during the Cretaceous and Paleogene greenhouse intervals, with an urgent need for new high-quality multi-proxy climate data collection from continental margins and corresponding deep sea sites. Furthermore, the recovery of sedimentary sequences down to deep subsurface organic rich strata (black shale) provides new constraints on the deep biosphere biogeochemical processes that link microbial communities, organic carbon diagenesis and fluid migration into active petroleum systems.

To fill the critical shortfall in detailed and high-quality information from the Cretaceous EAG and the northern sub-basin of the South Atlantic two IODP pre-proposals have recently been developed, targeting these fundamental challenges from an African and tropical South American perspective;

- The Nigeria Transform Margin proposal (pre-840) linking comprehensive palaeo-environmental studies with cutting-edge research of an active petroleum system, and
- The Equatorial Atlantic Gateway proposal (pre-864) identifying the Pernambuco Plateau on the northeastern Brazilian continental shelf, as a strategic location immediately adjacent to the proposed final opening segment of the EAG.

Both drilling proposals investigate key periods of earth-ocean history, with a focus on global climate perturbations (OAEs, hyperthermals) within the context of the opening of the EAG and the flooding of the northern South Atlantic sub-basin, (ii) constrain the tectonic evolution of the EAG and its global implications for both the connectedness of Late Mesozoic oceans, as well as the geodynamic controls on the South Atlantic rift and passive margin development, and (iii) pioneer microbial studies that explore the biogeochemistry associated with petroleum systems, including source rocks and sediments charged with hydrocarbons.

With financial support from the ECORD/ICDP MagellanPlus Workshop Series Programme, a two-day workshop was hosted on 2-4 February 2015 at Newcastle Newcastle, UK. 32

experts from 8 countries, 14 research institutions and representatives from two major oil companies, Shell and BG, joined to evaluate and further improve the strategy and focus of both IODP pre-proposals, making this event an excellent example of an integrated and truly joined industry-academia partnership.

Building on a number of plenary sessions, the team split into breakout groups addressing central challenges including “paleoclimate and biogeochemistry”, “marine biota”, “deep biosphere”, “tectonic models”, and “site selection, drilling plans and risk assessment”. The constructive discussions and clearly defined action plans constitute a critical step towards the development of competitive full proposals, with submission dates targeted later in 2015 and 2016.

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<http://www.ecord.org/magellanplus.html>



Group photo of the ECORD MagellanPlus workshop “Drilling the Cretaceous-Palaeogene tropical south Atlantic’ hosted in February 2015 at Newcastle, UK. Front (from left): José Magalhães (UFPE, BRA); Carlos D’Apolito (Birmingham, UK); Haydon Mort (UFPE, BRA); Obinna Chudi (Edinburgh, UK); Onos Esegbue (Newcastle, UK); Ignace Schmiermann (Shell NIGERIA); Christian Heine (Shell, NL); Jessica Whiteside (Southampton, UK); Claire Loptson (Bristol, UK); Kara Bogus (IODP-TAMU, USA); Sev Kender (Nottingham); Sandra Arndt

(Bristol, UK); Stephanie Grimshaw (BG Group, UK); Karlos G. D. Kochhann (Kiel, GER); Julia R. de Rezende (Newcastle, UK). Top row (from left): Mohammad Alaween (Newcastle, UK); Kirsty Edgar (Bristol, UK); Alex Dickson (Oxford, UK); Christian Maerz (Newcastle, UK); Tom Dunkley Jones (Birmingham, UK); Tom Wagner (Newcastle, UK); Tiago Alves (Cardiff, UK); David Naafs (Bristol, UK). Not on the group photo: Andrea Moscariello (Geneva, CH); Neil Mitchell (Manchester, UK); Ana Suárez-Suárez (Newcastle, UK); Ian Head (Newcastle, UK); Wen Shi (Manchester, UK); Pim Van Bergen (Shell U.K.); Sadat Kolonic (Shell NIGERIA); Colin Grant (Shell, NL); Maads Huuse (Manchester); Stephen Jones (Birmingham).

## AGENDA

- 1<sup>st</sup> February**     Venue: Atrium of Devonshire Building  
 Registration and icebreaker (5-7.30 pm)
- 2<sup>nd</sup> February**     Venue: Old Library Building, 1<sup>st</sup> floor Research Beehive (rooms 2.20 and 2.22)
- 8.30-9.00            *Registration*
- 9.00-9.45            Welcome and introduction to workshop scope (**Wagner, Dunkley Jones**)
- 9.45-10.40          Industry perspective on tropical South Atlantic drilling (20 mins + 5 mins discussion each)
- Colin Grant, Sadat Kolonic (Shell) - Niger petroleum system perspective**
- Stephanie Grimshaw (BG UK/Brazil) – Brazil continental margin perspective**
- 10.40-11.00        IODP strategic dimension
- Andrea Moscariello (Geneva), Chair of ECORD-ILP**
- 11.00-11.30        *Coffee break*
- 11.30-12.45        Keynote presentations on main themes:
1. Microbiology/deep biosphere - **Ian Head (Newcastle)** – 30 mins
2. Tectonic models - **Tiago Alves (Cardiff), Christian Heine (Shell), Maads Huuse (Manchester)** - 45 mins
- 12.45-13.30        *Lunch buffet*
- 13.30-15.00        Keynote presentations - continued:
3. Modelling– **Sandra Arendt (Bristol)** – 30 mins
4. Marine biota – **Kirsty Edgar (Bristol)** – 30 mins

5. Sediment biogeochemistry & paleoclimate - **Alex Dickson (Oxford)** – 30 mins
- 15.00-16.30 Breakout groups – initial proposal review, identification of key challenges
- 16.30-17.00 Punch lines, new ideas, and cross-proposal synergies from breakout groups, and definition of next tasks for day 2
- from 19.00 *Joined dinner in town*
- 3<sup>rd</sup> February** Venue: Old Library Building, 1<sup>st</sup> floor Research Beehive (rooms 2.20 and 2.22)
- 9.00-9.30 Brief summary of 1<sup>st</sup> day and allocation of tasks for day 2 (**Wagner, Dunkley Jones**)
- 9.30 -10.00 Technical challenges to drill near active petroleum systems - **Kara Bogus (JR Operations-TAMU)**
- 10.30-13.00 Breakout groups, continued *incl coffee break* – proposal specific challenges
- 13.00-14.00 *Lunch buffet*
- 14.00-16.30 Summary from breakout groups followed by refining proposal text
- 16.30-17.00 Summary of day 2 and identification of tasks for day 3
- from 19.00 *Joined dinner in town*
- 4<sup>th</sup> February** Venue: Old Library Building, 1<sup>st</sup> floor Research Beehive (rooms 2.20 and 2.22)
- 9.00-9.30 Brief summary of 2<sup>nd</sup> day and allocation of tasks for final morning (**Wagner, Dunkley Jones**)
- 9.30 -11.30 Breakout groups, continued *incl coffee break* - refining existing proposal text
- 11.30-13.00 Summary of refined proposals, outstanding tasks, time lines for full proposals (to be followed up by proposal co-proponents), closing of workshop
- 13.00-14.00 Lunch buffet (*optional*)
- 14.00 Departure home

## LIST OF PARTICIPANTS

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