

:: Drilling the Cretaceous Palaeogene Tropical South Atlantic - 2-4 February 2015, Newcastle (UK)

Convenors: T. Wagner and T. Dunkley Jones

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 (EAG) 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.



Participants of the workshop: 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)

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 in Newcastle, UK. 32 experts from 8 countries, 14 research institutions and representatives from two major oil

companies, Shell and BG, joined the workshop 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>