

IPTC 12923

Assessment of Cretaceous Palaeogeography and Palaeo-Earth Systems Model Results: Climate Proxies, Model/Data Comparisons and Sensitivity Tests

James Peter Harris, Fugro Robertson Ltd.; Robert Crossley and Nick Stronach, Robertson Research Intl. Ltd.

Copyright 2008, International Petroleum Technology Conference

This paper was prepared for presentation at the International Petroleum Technology Conference held in Kuala Lumpur, Malaysia, 3–5 December 2008.

This paper was selected for presentation by an IPTC Programme Committee following review of information contained in an abstract submitted by the author(s). Contents of the paper, as presented, have not been reviewed by the International Petroleum Technology Conference and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the International Petroleum Technology Conference, its officers, or members. Papers presented at IPTC are subject to publication review by Sponsor Society Committees of IPTC. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the International Petroleum Technology Conference is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of where and by whom the paper was presented. Write Librarian, IPTC, P.O. Box 833836, Richardson, TX 75083-3836, U.S.A., fax +1-972-952-9435.

Abstract

Global palaeotectonics and palaeoenvironments maps for late Palaeozoic – Cenozoic time slices were prepared and a new method relating topography and bathymetry to plate tectonic environments was used as the basis for palaeo digital elevation models (DEMs). These were gridded in GIS and used to provide the topographic and bathymetric boundary conditions for coupled ocean-atmosphere general circulation models (GCMs), and a barotropic model to simulate palaeotides. The compilation of the base maps is based on a global database of palaeoenvironmental, lithofacies and climate proxy data, the legacy of over 25 years of petroleum geological studies and an equally extensive source rocks database. Here this approach is used to provide some unique insights on the Mesozoic hot-house World for two Cretaceous time slices. Climate proxy data were used to test the veracity of the modelling results and a series of sensitivity tests were designed. Together these justified the modeling approach, provide a measure of uncertainty and reveal the range of Cretaceous climates and environments that are responsible for the source rocks and reservoirs deposited at the chosen time-slices.