A Shallow-marine Oxygen Isotope Curve: Glacio-eustatic Control on Late Pliocene Cyclothemms, Mangaopari, N.Z.
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Deep-sea Pliocene-Pleistocene oxygen isotope curves provide a proxy for glacio-eustatic sea-level changes. A detailed oxygen isotope curve has been obtained for a regressive, cyclothematic, shallow-marine sequence from the Mangaopari Basin, SE North Island, New Zealand. Tephrochronology, magnetostratigraphy and biostratigraphy indicate deposition of the section between 3.4 and 1.6 Ma. High-frequency, 5-30 m thick, sedimentary cycles (sequences) superimposed on the overall shallowing-upward nature of the basin fill comprise both lowstand and highstand sediment and correspond closely with changes in the isotope curve, i.e. are of glacio-eustatic origin.

Two isotope curves have been generated, a general curve through the complete section with a resolution of approximately 10 ky or better, and a detailed curve over selected sedimentary cycles with a resolution of 1,000 years or better. The close similarity between the general curve and the established oceanic isotope curve indicates that oxygen isotope stages 91-47 are represented in the Mangaopari section. As the isotope signature becomes more negative (i.e. interglacial), the sediment response is one of grain-size fining and sediment starvation leading to shelf shallowed generation. However, the deepest-water facies within a cycle is not always coincident with the deepest faunal and sedimentologic signature, which often lags the isotopic curve. Conversely, as the isotope signature becomes more positive, a coarsening-upward, shallowing sediment response occurs and is prolonged through the highstand. The coarsest-grained sediments are coincident with the most positive isotope values.

Some deeper-water mudstone cycles (deposited entirely seaward of the glacial lowstand shoreline) show an inverted isotope signature, with more negative isotope values correlating with lowstand (glacial) sediment facies. The inverted cycles indicate paleoceanographic and paleogeographic changes were important and changing factors during deposition of the succession. The paleoceanographic implication of a 3-6 degrees celsius warming during glacials is supported by subantarctic fauna during interglacial times.

Poster - Wednesday June 04 '97
Sequence Stratigraphy - Paleoclimate
New Garden Terrace Room
35. M. Ha: High-resolution sequence stratigraphy of submarine fan successions of the lower Karasun Group, a Plio-Pleistocene forearc basin fill in the Boso Peninsula, Japan
36. T.P. Storey: Basei Transgressive Surfaces and Palaeodioropic Clock - Unique Datum for Dating Stage Boundaries and Enclosed Faunas
38. A.M. Schwab, F. van Buchem, G.P. Eberl: Seismic Scale Geometries in Subsurface and Outcrop of the Upper Devonian Carbonate System in W. Canada: Testing the Coherency Between a Detailed Palaeoecologic Survey and a Seismic Survey
39. L.M. Arens, F. Azambuja, C. Nilo: Climatic Controls on Stratigraphy in a Rift Succession - Macei6
40. G. Vakarcs, V. Abreu, G. Baum, P.R. Vail: Glacioeustasy as the Primary Control on Depositional Sequences in a Tectonically Active Setting, Paran basin, Hungary
41. J.V.P. Guzzetti: Stratigraphic Response to Climate Changes: Example from the Lower Cretaceous of Raccoonoo Basin, Northeast Brazil
43. Z. Tang, F.J. Longstaffe, J.P. Parnell: Zeolite Cementation and Effects on Reservoir Quality of Peri Triassic, Volcanogenic Sandstones from the Junggar Basin, Northwest China
44. A.J.V. Garcia: Paleogeographic and Paleoclimatic Primary Controls on Cretaceous Sandstone Diagenesis, Northeastern Brazil
47. J.P. Duggan, E.W. Mountjoy, D.G. Green: Timing of Late Cements at the Swan Hills Simonette C Field (Mid-Late Devonian), Deep Alberta Basin, Canada
48. M.W. Wallace: Hydrothermal mineralization, Carling Basin, Western Australia
51. K. Woo: Origin of the Carbonate Concretions of the Middle Mooney Sedimentary Rocks in Pohatkin Basin, Korea
52. R.G. Brown, N.P. James: Rock Packaging and Textural Evolution of a Middle Ordovician Carbonate Ramp, Black River Group, Southeastern Ontario, Canada
53. D.G. Green, E.W. Mountjoy, J.P. Duggan: Bural Cementation and Hydrocarbon Emplacement (Kaybob South, Swan Hills FM, and Pine Creek, Leduc FM) of West-Central Alberta
55. I.S. Al-Aasm, J. Packard: Neomorphism: A Tale of Divergence from Two Mississippiian Dolomites

Paleogeographic and Paleoclimatic Primary Controls on Cretaceous Sandstone Diagenesis, Northeastern Brazil

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Paleogeographic and arid to semi-arid paleoclimatic conditions played an important rule on diagenetic processes, mainly on the distribution and composition of early carbonate cements in Lower Cretaceous pre-rift fluvial sandstone of the Marrania Formation, a hydrocarbon reservoir in Sergipe-Alagoas Basin, northeast Brazil.

Loose packing sandstone was the resulted of a extensive diagenetic pre-compactional poikilitopic carbonate cementation. Mg-free calcite was the carbonate cement in the more proximal deposits at the north of the paleobasin, while Fe/Mn zonated and unzonated dolomite was the carbonate cement in the southern distal sandstone.

The association of diagenetic cementation and a pervasive telodiagenetic dissolution was responsible to the best reservoir quality found in the Marrania Sandstone.

The occurrence of similar association of diagenetic processes in correlated west African coast basins is speculated. Sysmic data from Gabon and Congo basins indicate that the same erosional phase, related to the telodiagenetic dissolution and porosity improving in loose packing sandstone, affected the pre-rift sequence in these African basins.

The predictibility capacity of these porosity generation model could be improved by the mapping of the unconformity surface and by a detailed petrologic investigation of the pre-rift African sandstone.