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Calcareous Nannofossil Records Of Miocene Sea Level At The Marion Plateau (Northeastern Australia); And Plioceneplеistocene Formation Of Cold Water Carbonate Mounds (North Eastern Atlantic Continental Margin)

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Abstract
The revised age models for the upper Oligocene to middle Miocene

interval of the Marion Plateau have been used to identify eleven sequence boundaries and sequences sets at the Marion Plateau; MSA1.2 (23.1 Ma), MSA1.4 (22.1 Ma), MSA2.1 (21.2 Ma), MSB1.1 (18.4 Ma), MSB1.2 (17.3 Ma), MSB2.1 (16.5 Ma), MSB2.2 (15.6 Ma), MSB2.3 (14.8 Ma), MSB3.1 (13.6 Ma), MSB3.2 (12.9 Ma), and MSB3.3 (11.8 Ma). The complementary Miocene oxygen isotope events Mi1, Mi1a, Mi1aa, Mi2, Mi2b, Mi3a, Mi3, Mi4, Mi5a, Mi5, and Mi6 are recognized in the Marion Plateau sequences. In addition correlation to sequences on the New Jersey margin, the Gulf of Papua, Great Australian Bight, and McMurdo Sound Antarctica indicate that these sequences are controlled by glacio-eustasy, primarily the increase of ice volume on Antarctica. Changes in the preservation, assemblage structure and diversity of calcareous nannofossils as well as %planktic foraminifera, %neritics coincide with transgressive phases and sequence boundaries. The principles of `highstand shedding' are illustrated at the Marion Plateau by enhanced preservation of calcareous nannofossil, deposition of glauconite, unconformities and condensed intervals associated with early to middle Miocene sequence boundaries. Variations in surface water nutrient and temperature conditions at the Marion Plateau throughout the Miocene coincide with climatic events of the early Miocene (23 - 17 Ma), the Middle Miocene Climatic Optimum (17.6 - 15.4 Ma), and Middle Miocene Climatic Transition (14.8 - 13.8 Ma), and the stepwise growth of ice sheets on Antarctica. Calcareous nannofossil communities show evidence for precessional and eccentricity orbital forcing during the Middle Miocene Climatic Optimum, as well as a significantly cooler surface water mass at the Marion Plateau coinciding with the onset of the Middle Miocene Climatic Transition and Mi3a (14.8 Ma) glacial event. Changes in surface water fertility and temperature during the Middle Miocene Climatic Optimum agree with other studies that posit growth of significant ice volume on Antarctica starting as early as ~17.35 Ma. Further evidence for significant cooling at the Mi3a (14.8 Ma) glacial event agrees with studies suggesting a step-wise cooling for the formation of a semi- permanent Antarctic ice sheet and thermohaline circulation, starting first at 14.8 Ma (Mi3a) and intensifying at 13.9 Ma (Mi3).