Global Calcareous Nannoplankton Trends Across the Middle Miocene Transition: A Statistical Study

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Abstract
Calcareous nannoplankton, a group of calcifying phytoplankton that includes Coccolithophores, are vulnerable to changes in Earth’s climate and ocean circulation. Calcareous nannoplankton records are documented at several sites worldwide. This group has a long fossil history recorded in marine sediments, which can provide information on how those organisms coped with climate change in the geologic past. The Middle Miocene transition (~15 to 13.8 million years ago) was marked by a major increase in the Southern Annular Mode, global cooling, a shift in the global carbon cycle, and changes in ocean circulation patterns. This cooling phenomenon transformed communities at all latitudes, though compositional differences in the fossil assemblage were retained in the Atlantic Ocean suggesting that variability is an important factor to consider. Regardless of the compositional differences, there may be similarities among global locations that can be identified and provide information on the impact of global cooling to the entire nannoplankton community.

Introduction and Background
During the middle Miocene transition (~15 to 13.8 million years ago) the climate on Earth began to phase from a warmer to a relatively cooler climate (Holbourn et al., 2014). This transition is characterized by major expansion of ice sheets on land as well as changes in ocean circulation. The two predominant datasets used during this project are from Site U1338 and the other from (Henderiks et al., 2020) dataset for climate and society.

The objectives of this project are:
1. Compare calcareous nannoplankton datasets using diversity metrics and multivariate statistics.
2. Interpret and analyze plots made in RStudio.
3. Determine possible influences in nannoplankton community structure and composition.

Methods
Diversity metrics and multivariate statistical analyses. Our results show that calcareous nannoplankton datasets are compared to those from the equatorial Pacific Ocean using diversity from ocean drilling sites in the the North, South, and equatorial Atlantic Oceans to those from the equatorial Pacific Ocean using diversity metrics and multivariate statistical analysis. Our results show that calcareous nannoplankton datasets are compared to those from the equatorial Pacific Ocean using diversity from ocean drilling sites in the the North, South, and equatorial Atlantic Oceans to those from the equatorial Pacific Ocean using diversity metrics and multivariate statistical analysis.

Results and Discussion
Our results show that calcareous nannoplankton datasets are compared to those from the equatorial Pacific Ocean using diversity from ocean drilling sites in the the North, South, and equatorial Atlantic Oceans to those from the equatorial Pacific Ocean using diversity metrics and multivariate statistical analysis.

Conclusions
Our results show that calcareous nannoplankton datasets are compared to those from the equatorial Pacific Ocean using diversity from ocean drilling sites in the the North, South, and equatorial Atlantic Oceans to those from the equatorial Pacific Ocean using diversity metrics and multivariate statistical analysis.

References

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