

New interpretations of early Eocene calcareous nannofossil evolution
Bybell, Laurel M., and Self-Trail, Jean M.
U.S. Geological Survey, Reston, VA 22092

For this study, early Eocene calcareous nannofossils were examined from closely spaced samples in numerous cores in the Gulf of Mexico and Atlantic coastal plains and the Atlantic continental shelf. Even within a small geographic area, the lower Eocene sediment package varies significantly from corehole to corehole in thickness and amount of time preserved. Therefore, it is recommended that global evolutionary conclusions should never be based on a geographically limited study area because erosion that results from marine transgressions and regressions can cause numerous, previously unrecognized, small unconformities. The duration of these hiatuses can vary significantly even within a restricted geographic area.

Species of the biostratigraphically important genus *Rhomboaster*, which are used to define standard calcareous nannofossil zones, were examined with both the light and scanning electron microscopes (SEM). In the past, accurate identification of individual species has been difficult (1) due to subtle morphologic variations within and between species, (2) because of the lack of detail and depth of field obtainable with a light microscope as opposed to a SEM, and (3) because individual specimens appear significantly different when viewed from various angles. The SEM, with its high resolution, greater depth of field, and ability to easily rotate and tilt specimens, was essential in solving these types of morphologic problems.

Using recently documented biostratigraphic ranges of several calcareous nannofossil species as a means of piecing together the various sections in the study area, it was possible to better understand and interpret the evolution of the genus *Rhomboaster*. This study has resulted in several taxonomic changes in this genus (i.e., recognition of two new species and combination of four other species), and has served as a model for delineating lineages within this group.