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Sequence Biostratigraphy and a new Nannofossil Zonation of the Pleistocene Gulf of Mexico

Sequence biostratigraphy is the relationship between fossil biostratigraphic events (extinctions, evolutionary first occurrences, assemblage changes) and sequence stratigraphy. Microfossil abundances are generally very low in expanded marine sections except at maximum flooding surfaces (MFS). It has also been noted that many biostratigraphic events coincide with MFS's. Key to improving the resolution and accuracy of zonation schemes (particularly for calcareous nannofossils) is the methodology of finding definitive faunal / floral assemblage changes or extinction points for each MFS. Initially, fourth and fifth order (50 - 100 ka) MFS's are identified in a single section by increases in marine fossil abundances and diversity, as well as by log signature. The fossil assemblage found within each MFS is examined in detail to determine if a distinctive assemblage change or extinction (either local or global) characterizes the MFS. This requires identifying all species found in a sample using either exact species counts or a highly subdivided method of abundance quantification, and paying particular attention to abundance and morphometric changes of common species. These biostratigraphic events are then compared to those found in nearby sections to determine their consistency. Biostratigraphic zonations gain accuracy as more assemblage changes and extinction points are associated with a given MFS.