

BIOCHRONOLOGY AND CORRELATION OF SEQUENCE BOUNDARIES:
COMPARISON OF PALEOGENE AND NEOGENE RECORDS.

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Calcareous microfossil biostratigraphy constitutes the primary means to decipher unconformities in the fossil record, and to tie the unconformable sequence boundaries on the shallower part of the shelf to the marine record in the deeper part of the basin. This was achieved for Neogene sequences along a transect from shallower sites (~600 m paleodepth) to deeper sites (~2000 m) in the northern Gulf of Mexico, and for Paleogene sequences from onshore locations to slope environments on the New Jersey margin. Integrated calcareous nannofossil and planktonic foraminiferal stratigraphy were both complemented when possible with strontium isotope stratigraphy and magnetostratigraphy. Using integrated magnetobiochronology, a temporal interpretation of each sedimentary record was established along these transects. Comparison between these interpretations show that there is no basic difference between the architecture of the Paleogene and the Neogene records, even for time intervals when glacio-eustasy was unlikely to have been an effective means of sea level lowering. It also reveals that the concept of a conformable part of a sequence boundary is elusive and unlikely to be recognizable with any degree of certainty. In fact the stratigraphic record may be more adequately divided into allostratigraphic units rather than into sequences sensu Van Wagoner et al. (1988). Comprehensive temporal interpretation of the stratigraphic record is a prerequisite for sound comparisons at the regional level between faunal assemblages on both sides of the boundary between allostratigraphic units: the age of the uppermost deposits below the unconformity and of the lowermost deposits above it may vary greatly along a regional transect in an unpredictable fashion. Also, the hiatus associated with the boundary may be of long duration and may correspond to more than one of the sea level events in the EXXON chart. On the hand, temporal interpretations allow determination of synchronous stratigraphic levels located immediately below or above sequence boundaries, even in broadly separated regions. Such temporal interpretations permit comparisons of faunal changes which have occurred at the same time in different basins and/or different environments. This approach is a prerequisite for studies of global evolutionary changes.