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Middle Miocene Erosion in the Western Straits of Florida

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High resolution, single channel, sparker seismic reflection profiles from the western Straits of Florida (from 83°20'W to the Florida Escarpment, between 24°05' and 24°35'N) reveal that significant erosion of the seafloor occurred here during the Middle Miocene.

The top of the Early to Middle Miocene seismic sequence (our Seismic Sequence 6) truncates underlying seismic reflectors and exhibits erosional relief of 75-100 m (150 m maximum), particularly in the western half of the study area (west of 83°40' to 83°45'W). Sequence 6 is generally 100-150 m thick, but an elongate feature extending across the entire study area from north to south in the area of greatest erosion shows significant thickening (to a maximum thickness of 275 m). The sediments underlying this feature are acoustically transparent, in contrast to the acoutically-laminated character of Sequence 6 elsewhere, and indicate that this part of Sequence 6 is current deposited, presumably by the Florida Current (or its precursor). Erosion at the top of Sequence 6 presumably was effected during intensification of the Florida Current.

Early Tertiary, but not Late Cretaceous, seismic sequences underlying Sequence 6 show similar variations in thickness and acoustic character, suggesting that the Florida Current initiated flow in the western Straits of Florida during the Paleocene. However, significant erosion is not associated with the tops of these older sequences.

The Middle Miocene erosion occurring in the western Straits of Florida is temporally related to other erosional and mass wasting events in the Florida-Bahama region. A similar erosional surface overlain by Middle Miocene debris flows was penetrated at ODP Leg 101 Site 626 in the Straits of Florida off Miami, 450 km to the east of our study area. Early to Middle Miocene debris flows and slumps also were encountered at Site 627 north of Little Bahama Bank. A catastrophic collapse of the west Florida slope 200 km to the north occurred during the Middle Miocene. Lastly, the Great Abaco Member of the Blake Ridge formation in the Blake Basin contains gravity-flow deposits throughout the Miocene and shows peak sedimentation rates in the Middle Miocene. The underlying cause of these widespread episodes is unclear.