# DELTA PROGRADATION WITHIN A TRANSGRESSION OF SEA-LEVEL: EXAMPLES FROM THE NEW JERSEY CONTINENTAL MARGIN

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The sequence stratigraphic model proposed by Vail and coworkers to explain processes of sediment transport and erosion on continental margins needs to be evaluated within the local conditions of each margin. On the New Jersey continental margin, delta progradation, which is characteristic of the low-stand systems tract (LST) in the Vail model, is documented to have occurred within the transgressive systems tract (TST) to high-stand (HST) in Pleistocene sediment recovered during the Ocean Drilling Program Legs 150 and 174A. These deltaic facies are represented by sandy muds with soft-sediment deformation including lithic and mud clasts of Cretaceous to Eocene age within a Pleistocene matrix. Cretaceous to Eocene strata are deeply buried beneath the shelf but they are exposed along river beds on the coastal plain. The age and lithology (kaolinite) of the clasts suggests that these components of the chaotic sandy muds were transported from the coastal plain across the shelf by rivers and deposited on the outer shelf. Through slumping some of these deposits reached the upper slope. Seismic-reflection profiles along the strike of the shelf show that the sandy muds are contained within lobate-shaped deposits above a sequence boundary. Three events of delta progradation are recorded within an overall transgression of sea-level. The underlying strata are composed of reworked glauconitic sands that constitute the initial flooding surface, sands rich in heavy minerals, which are interpreted as lag deposits, and dolomite-cemented sands. Carbon and oxygen isotopes show that cementation took place within a mixing zone near the sediment/water interface to sulfate-reduction environments. The timing for the deposition of delta progradational facies on the upper slope at ODP Sites 1073 and 903 was derived from oxygen-isotope stratigraphy that was constructed for the Pleistocene and calibrated to SPECMAP (Imbrie et al., 1984) with radiocarbon ages, nannoplankton biostratigraphy, and calcium-carbonate and opal stratigraphy.

A possible explanation for continued deltaic progradation after the initiation of sea-level rise is that ice loading from the Laurentide Ice Sheet located ~150 km away during glacial maxima, depressed the crust. This depression must have had a profound effect on sediment dispersal along the southern edge of the ice sheet. We hypothesize that marked changes in river drainage and lake development may have been withheld from the outer shelf until glacial retreat allowed crustal rebound and a renewed seaward dip for the coastal plain sediments to be transported further offshore.