

Anatomy of a Rift System: Triassic-Jurassic Basins of Eastern North America

SCHLISCHE, ROY W., Rutgers University, New Brunswick, NJ, and PAUL E. OLSEN, Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY

Basins containing the early Mesozoic Newark Supergroup formed during the incipient rifting of Pangaea. The basins are characterized by the following: (1) The border fault systems (BFS) represent reactivated older faults. (2) A regionally persistent northwest-southeast to west-northeast-east-southeast extension direction reactivated northeast- to north-striking structures as predominantly normal dip-slip faults, forming half-grabens in their hanging walls, and east- to east-southeast-striking faults as strike-slip faults, forming transtensional basins. (3) The half-grabens are lozenge-shaped basins in which subsidence-fault slip was greatest at or near the center of the BFS and decreased to zero toward either end. (4) Transverse folds in the hanging walls immediately adjacent to the BF formed as a result of higher-frequency variations in subsidence. (5) Subsidence also decreased in a direction perpendicular to the BFS, commonly resulting in "reverse drag," which need not necessarily indicate the presence of listric faults. (6) Intrabasinal faults are overwhelmingly synthetic and predominantly post-depositional; rider blocks adjacent to the BFS indicate progressive footwall incisement as a result of footwall uplift. (7) Younger strata progressively onlap prerift rocks of the hanging wall block; this indicates that the basins grew both in width and length as they filled. (8) In all basins initial sedimentation was fluvial, reflecting an oversupply of sediment with respect to basin capacity; this gave way diachronously to lacustrine sedimentation as basin capacity exceeded the volume of sediment supplied. (9) Sediments were derived largely from the hanging wall block, which sloped toward the basin, and from streams that entered the basin axially; a direct footwall source was minor, owing to footwall uplift. (10) In strike-slip-dominated basins, subsidence was considerably less than in dip-slip basins, and mosaics of strike- and dip-slip faults are common.

AAPG Search and Discovery Article #91004 © 1991 AAPG Annual Convention Dallas, Texas, April 7-10, 1991
(2009)