

Winker, C. D. 1987. Neogene Stratigraphy of the Fish Creek - Vallecito Section, Southern California: Implications for early history of the Northern Gulf of California and Colorado Delta (San Andreas Fault). Ph.D. dissertation. University of Arizona. Tucson, Arizona. 622 pp.

The Fish Creek-Vallecito section is the most stratigraphically complete and structurally intact Neogene exposure in the Salton Trough, and thus provides a useful reference section for regional stratigraphic revision and historical interpretation of the early Gulf of California and Colorado Delta. The section comprises a marine sequence (Imperial Formation) bracketed by nonmarine units (Split Mountain and Alverson Formations below, Palm Spring Formation and Canebrake Conglomerate above). Recognition of distinct suites of locally-derived and Colorado River-derived sediment, combined with sedimentological evidence, led to revision of this sequence in terms of informal members and genetic-stratigraphic units: (1) pre-rift braided-stream deposits; (2) syn-rift conglomerates and volcanics, with local pre-marine evaporites; (3) pre-deltaic marine units, deposited primarily as small fan deltas; a progradational sequence of the ancestral Colorado delta, consisting of (4) an upward-shoaling marine sequence, and (5) a nonmarine delta-plain sequence; (6) lacustrine units; and (7) locally-derived basin-margin alluvium that interfingers with (4), (5) and (6).

Neogene palinspastic base maps for paleographic mapping were based on displacement histories for the Pacific-North American plate boundary and its constituent faults. The tectonic-sedimentary history consists of: (1) early to middle Miocene rifting that propagated southward from southern California to the Gulf mouth; (2) northward marine transgression of the rift basin, reaching southern California by the late Miocene; (3) development of the San Andreas-Gulf of California transform boundary by inboard transfer of intraplate slip; (4) earliest Pliocene initiation of the lower Colorado River and Delta by rapid epeirogenic uplift of the Bouse Embayment; and (5) late Pliocene or Pleistocene transpressive uplift in the western Salton Trough caused by outboard transfer of slip from the San Andreas fault. The stratigraphic succession in the western Salton Trough resulted largely from tectonic transport through a series of paleoenvironments anchored to the North American plate by the entry point of the Colorado River.