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The Late Cretaceous-Eocene Turbiditic Sedimentation in the Sinop Basin, North-Central Turkey: Response to Tectonic Changes in Basin Morphology

The east-trending deep-water basin, originally part of Black Sea rift system, evolved under the Pontide orogenic compression. The early volcanoclastic sedimentation was followed by the Late Campanian-Paleocene deposition of tabular, mud-capped sandy turbidites derived from the west, with a slight increase in turbidite thicknesses and a growing supply of calcareous sediment from contemporaneous basin-margin platform. The sheet-like turbidites lack evidence of lobes and indicate deposition by non-channelized currents of mainly low density, flowing parallel to the basin axis. The basin at that stage was still wide (~ 150km), but probably comprised of two troughs separated by incipient compressional ridge, which caused linear, non-radial sand dispersal. The succession's uppermost part shows rapid transition into tempestitic offshore facies and wave-worked shoreface calcarenites, attributed to the basin-floor uplift by compression. The overlying Late Paleocene-Early Eocene variegated mudstones indicate a relative sea-level rise, with the drowning of basin-margin carbonate platform, cessation of sediment supply, and seafloor oxidation. The basin was then split axially into two troughs by a pop-up ridge, while the inversion of its easternmost part, by volcanic-arc accretion, activated a siliciclastic source and reversed the transport direction. The overlying Eocene succession consists of isolated paleochannels (<2km wide, <150m deep) filled with thick sandy deposits of high-density turbidity currents and subordinate gravelly debrisflows, and surrounded by sheet-like, mud-capped turbidites. Parallel paleocurrent directions and scarcity of levees suggest basin-wide overbank flow. Northward backthrusting caused the axial channel in the Sinop trough to shift toward the northern margin, then narrowed the trough and terminated the sedimentation with tempestites and shallow-water bioclastic limestones. In the Boyabat trough, the sedimentation was terminated by westward progradation of an axial fluvio-deltaic system.