

Regional Bathymetric Maps of the Iranian Makran Margin, a Subduction Zone, and the Northern Gulf of Mexico, a Passive Margin, are Similar from Differing Origins

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ABSTRACT

Regional bathymetric maps are sufficiently detailed to reveal the results of sediment and tectonic deformation along dynamic continental margins. Following plate tectonic mechanics, there are three resultant patterns; those caused by strike-slip, extension, and collision. Bathymetric patterns of the northern Indian Basin along the Makran Margin of southern Iran and Gulf of Mexico continental margins denote concentric ridges roughly paralleling the continent ever descending to deep ocean with secondary arcs within the larger arcs. The Makran is a subduction zone and northern Gulf is passive with a dynamic salt layer.

In the Makran, the ridges appear from compression within the subduction process, the ever uplifting of off-scraped sediments, the compression by the northward encroaching marine plate. Abundant sediments are derived from aerial and riverine sources moving downslope and major rivers, the Tigris-Euphrates and Indus via marine canyons, flanking the Makran Subduction Zone. The upthrust basement incorporates all sediments. The margin appears growing with time.

In the northern Gulf, the concentrically arched ridges are cored by buoyant salt having risen from an original enclosed sea evaporation and deposition onto shallow continental crust ever subsiding as rifting proceeds. Sediments originated from continental erosion and downslope migration. Buoyant salt uplifts and deforms sediments. Rising salt domes and ridges migrate downslope as part of overall regional salt movement along the ever enlarging margin. Adjacent continental and marine crust are stationary.