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The Atwater Foldbelt, Northern Gulf of Mexico, and Its Place in the Global Spectrum

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The Atwater foldbelt is located in the northeastern Gulf of Mexico, south of the Louisiana coast. In the dip direction, it is approximately 50 km wide and in most places consists of 3 main structures. These vary along strike and are a combination of squeezed diapirs, folds and thrusts with as much as several kilometers of structural relief. Deformation probably began in the Cretaceous, but the bulk of the shortening took place from the Oligocene to the early Pliocene, driven by southward gravitational collapse of shelfal sediments detached on the deepest remnants of the Jurassic Louann salt. Total shortening is only about 15km but the resultant structures are among the largest in the leading edge of any thrust belt on Earth.

Two things set the Atwater foldbelt apart. First, the frontal structures carry an unusually thick sedimentary section. Depending on where it is measured, 6-10km of rock are involved in the deformation, which is 2-4 times the thickness found in the frontal edge of the Canadian Cordillera or the deepwater Nigerian foldbelt. Second, the frontal structure varies along strike from a detachment fold, which is common globally, to a salt-cored backthrust (effectively a triangle zone), which is unusual, if not unique among deepwater foldbelts.