

The Fold and Thrust Belt Offshore Northern Sumatra

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While “modern” hydrocarbon exploration started in the North Sumatra Basin in the mid 1880’s, the fold and thrust belt located in the Andaman Sea has seen relatively little drilling and almost no discussion in the literature. This fold and thrust belt covers an area of a ca. 6500 sq km, with the leading edge forming a large arcuate structural front that extends offshore up to 50 km. The primary detachment level appears to be in the transgressive M. Miocene Baong Shale, with the main phase of movement occurring in the Pliocene. Seismic data suggest relatively limited overall compression with the majority of the shortening expressed as low relief, tightly spaced folds occurring in fold sets. Localized ramp zones appear to form above or immediately outboard (N) of underlying structural highs, and are probably associated with dip changes in the main detachment horizon as it drapes over the underlying rift structures. The existing model for the origin of the fold and thrust belt is that it formed as the downdip compressional element of a linked updip extensional system, expressed as normal growth faults that occur near the present day coastline. However multiple lines of evidence suggest that the thin-skinned offshore fold belt is the leading edge of a basement-seated thrust zone directly related to the Barisan Uplift and bounded by lateral tear zones that correlate to 1) regional wrench systems in the Basin and 2) a major bend in the North Sumatra Fault Zone. The impact of this structural interpretation on the known petroleum systems in the Basin will be discussed.