

Breakup of Eastern Gondwanaland: Genesis of Bangladesh's Petroleum System

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The geological evolution of Bangladesh is related to the breakup of eastern Gondwanaland, the associated northward movement of the Indian Plate and its ultimate collision with the Asian Plate. The movement and interaction of these plates has defined the pattern of basin formation, structure, and the development of petroleum systems within Bangladesh.

The palaeogeographic reconstructions of the region suggest three post rift tectonic stages in the sedimentary section of the Bengal Basin, Bangladesh: the drift stage (Late Cretaceous to Eocene), an early collision stage (Oligocene to Middle Miocene) and a late collision stage (Late Miocene to Recent). The sedimentary units comprising coal, coaly shale and sandstones that exist within the pre-rift and rift stage are confined in the Platform Shelf of the basin. This coal-bearing interval can be considered as a potential source within the Permo-Carboniferous Gondwana section.

During the drift stage, shallow marine conditions prevailed in the western and northern parts of the basin while the rest of the area was under deep marine conditions. An associated stratigraphic play is developed along the Eocene shelf edge with the deposition of potential oil prone source rocks within the Paleocene-Eocene Cherra and Kopili Formations and defined as the Bogra Petroleum System of western Bangladesh. The collision stage is represented by voluminous (>10km) clastic sedimentation contemporaneous with the uplift of the Himalayan and Indo-Burma ranges during Oligocene-Recent time. The Oligocene Jenam Formation, the major source component of the current proven petroleum system of the Surma Basin in northeast Bangladesh, and the Miocene Bhuban Formation, the possible source for the Hatia Petroleum System of southern Bangladesh, were deposited during this major influx of sediments.

Although the Surma Petroleum System has been the historic focus of exploration, significant wildcat opportunities may exist in the underexplored Hatia and in the largely unexplored Bogra Petroleum Systems.