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## **Structural Style and Deformation History of Assam & Assam Arakan Basin, India: from Integrated Seismic Study\***

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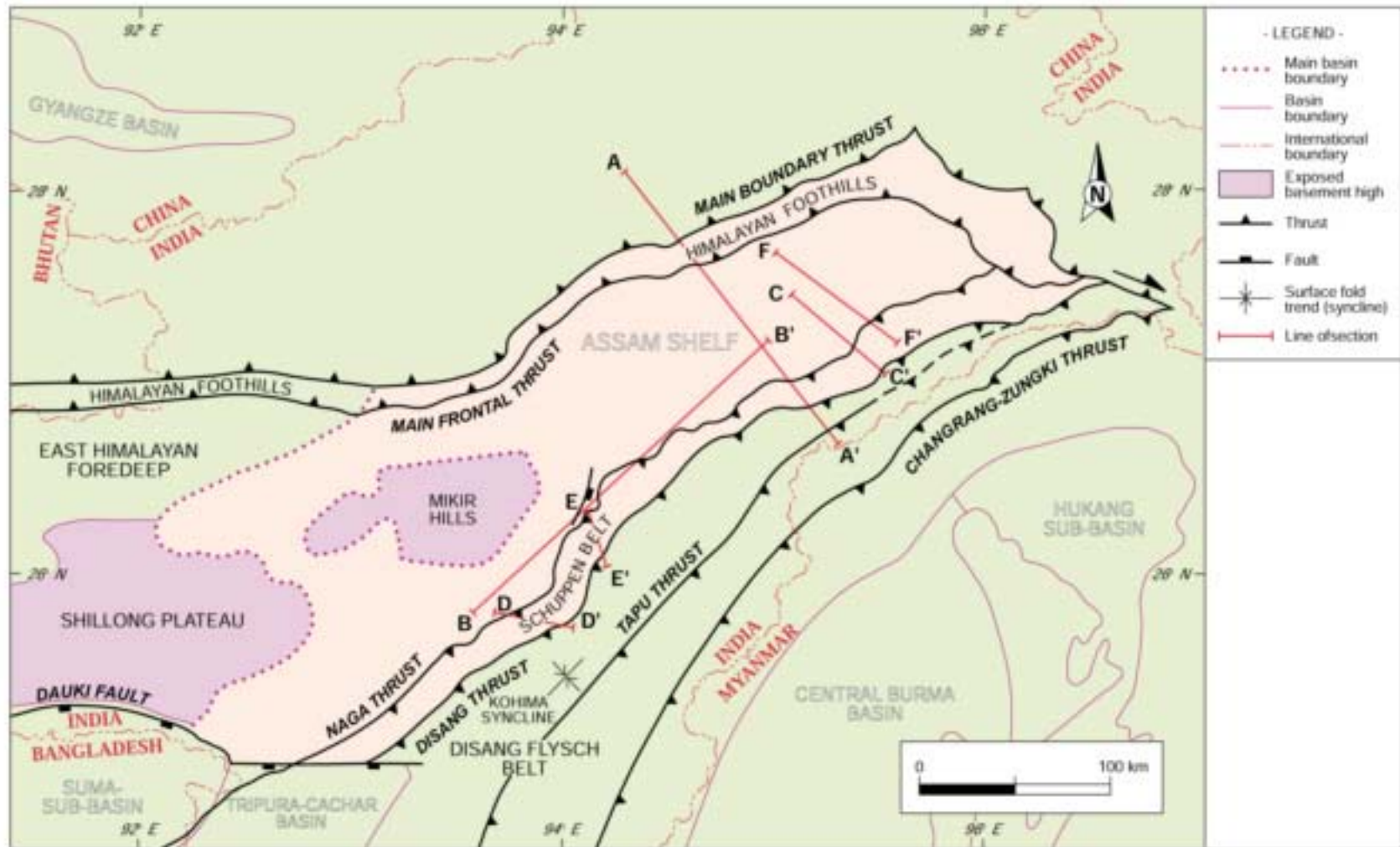
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### **Abstract**

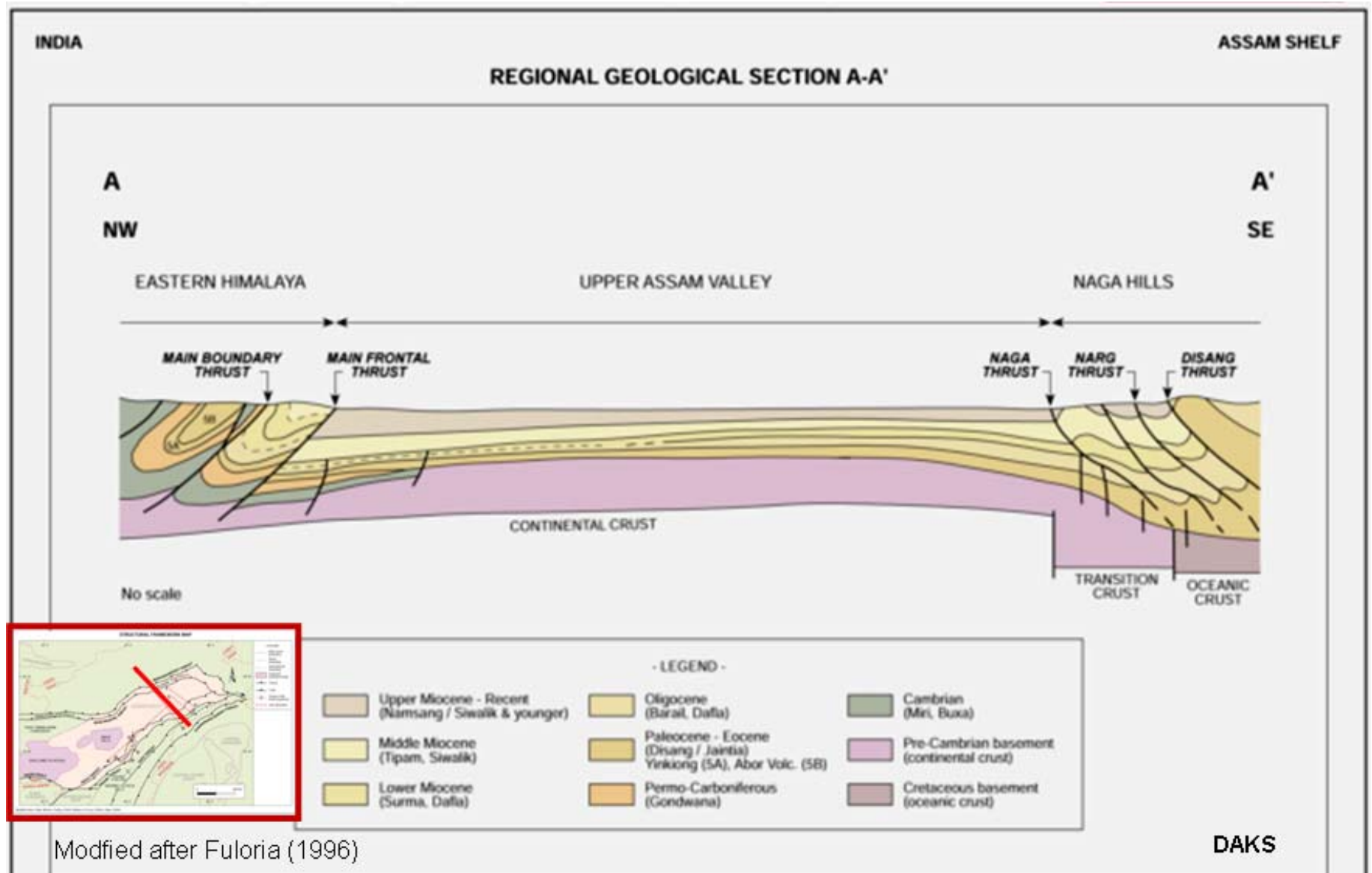
Assam Shelf located in Northeastern part of India has an extent of around 40,000 km<sup>2</sup> of area and belongs to the northeastern prolongation of the Indian Peninsular Shield, bounded in the northwest by the Eastern Himalayan Fold Belt and in the southeast by Naga-Patkai foldbelt. Tectonically, Assam-Arakan basin has been defined as a poly-history basin that evolved synchronous with the other East-Coast basins of India, concomitant with the rifting and subsequent drifting of the Indian Plate from Eastern Gondwanaland. The basin was initiated in an extensional phase and later was modified by different episodes of a compressive phase. Superimposition of compressive phase on extensional regime modified the earlier extensional structures that indicate the poly-phase / poly-history nature of the basin. About 7000m of sediments ranging in age between Cretaceous to Recent are expected to be present in the deepest part of basin.

For the last fifty years of exploration in the basin, considerable geoscientific data has been generated. Structural style and deformation history of Assam Shelf has been an imperative need with the available datasets. In this endeavor efforts have been made to interpret seismic data of thirty-one 3-D volumes and 500 2-D seismic lines, along with sixty or more exploration wells, and their integration with stratigraphic sections has enabled an understanding of 3-D geometry, spatial organization, genesis, and evolution of folds and faults leading to conceptualization, characteristics, and evolution of the structural style of Assam Arakan Basin. Interpretations suggest that two major longitudinal high-angle normal fault systems trending NE-SW and E-W have been identified in addition to the three inverted extensional faults. The transverse system of faults is the result of a youngest episode of compressive movement. The E-W and NE-SW longitudinal faults and the associated structures acted as major areas of entrapment of hydrocarbons. Inter play of extensional, compressive and lateral movement clearly explains the hydrocarbon accumulation pattern in the area. The purpose of this paper is to document an example of the structural patterns resulting from interacting normal and inverted extensional faults, and to illustrate the process of iterative seismic interpretation and structural modeling in a complexly deformed basin, based on the interpretation of a 2-D and 3-D seismic dataset.

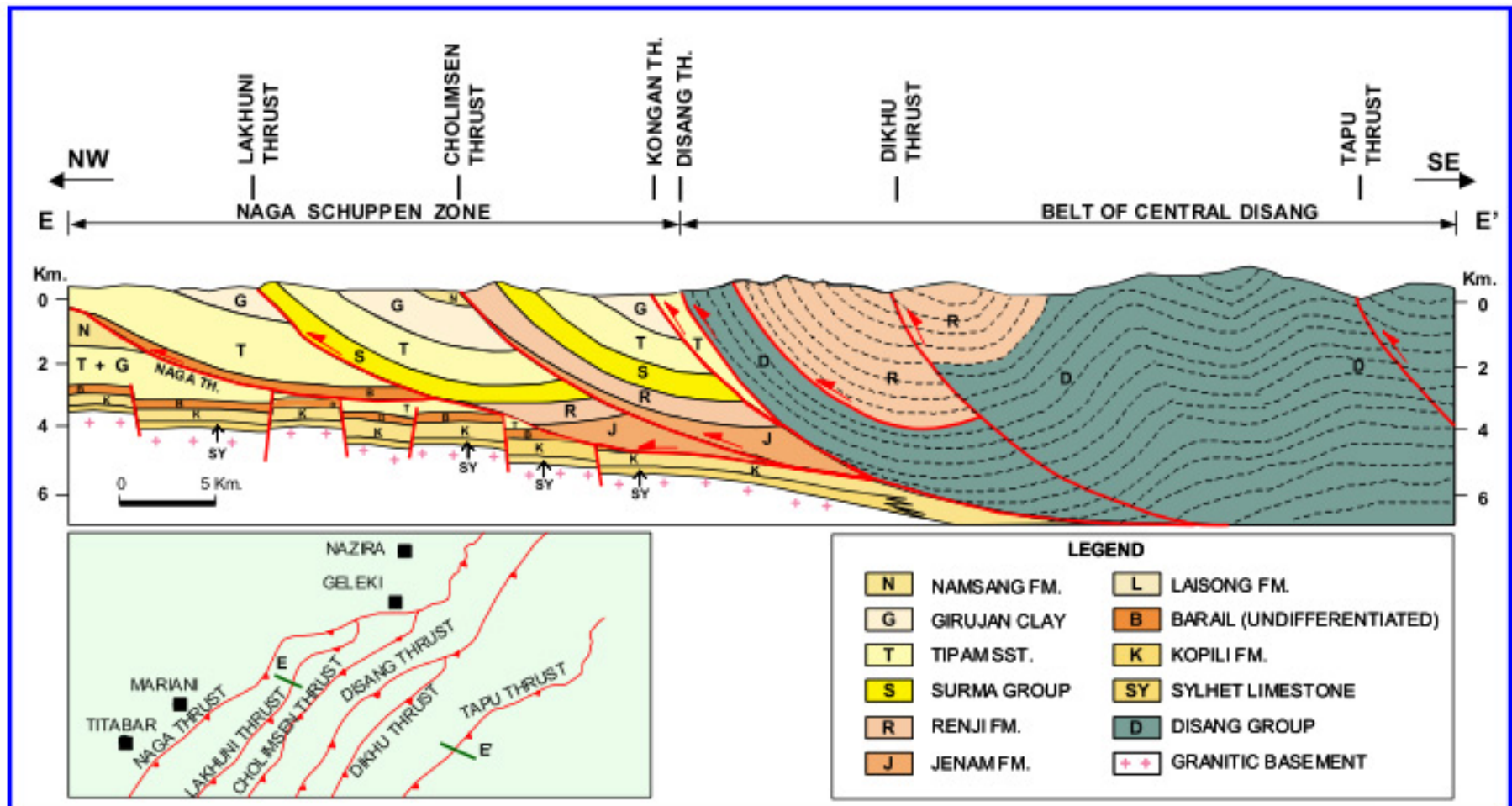


Modified after: Naik, Mishra, Padhy (1993), Mathur & Evans (1964), Hiller (1994)

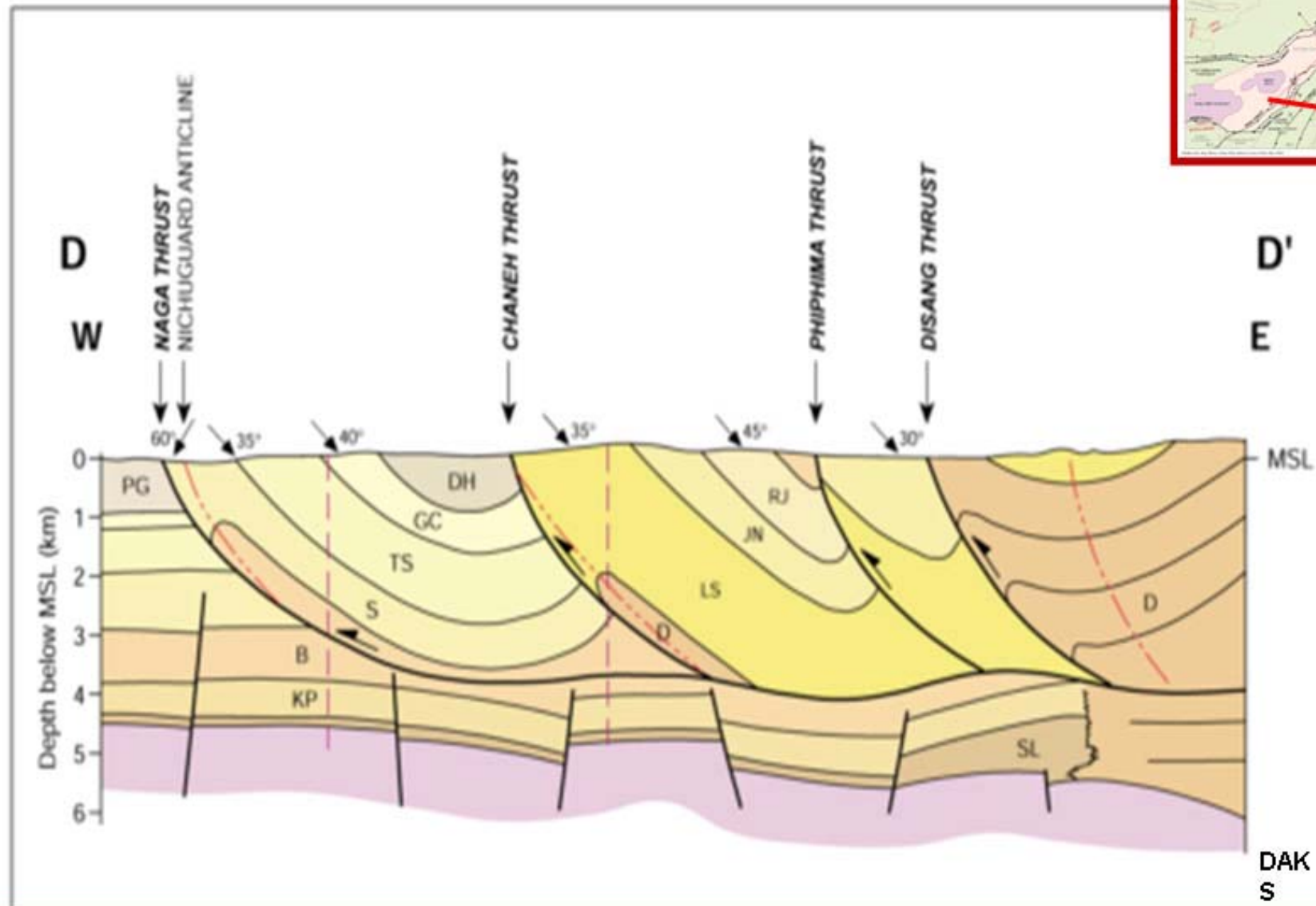
Structural framework map, Assam Arakan basin and environs.



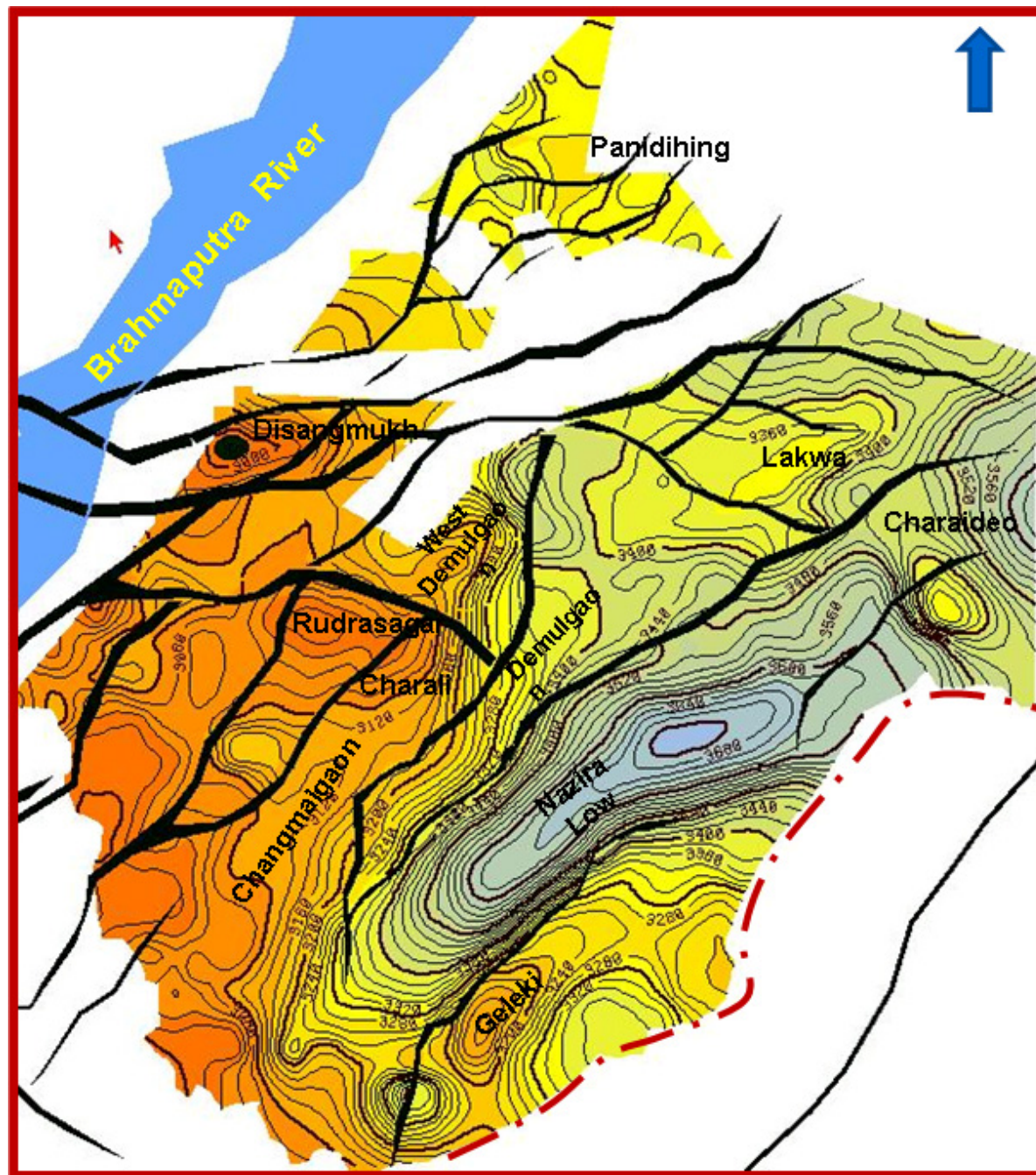
Regional geological cross-section A-A', from Eastern Himalayas, across Upper Assam Valley, to Naga Hills.





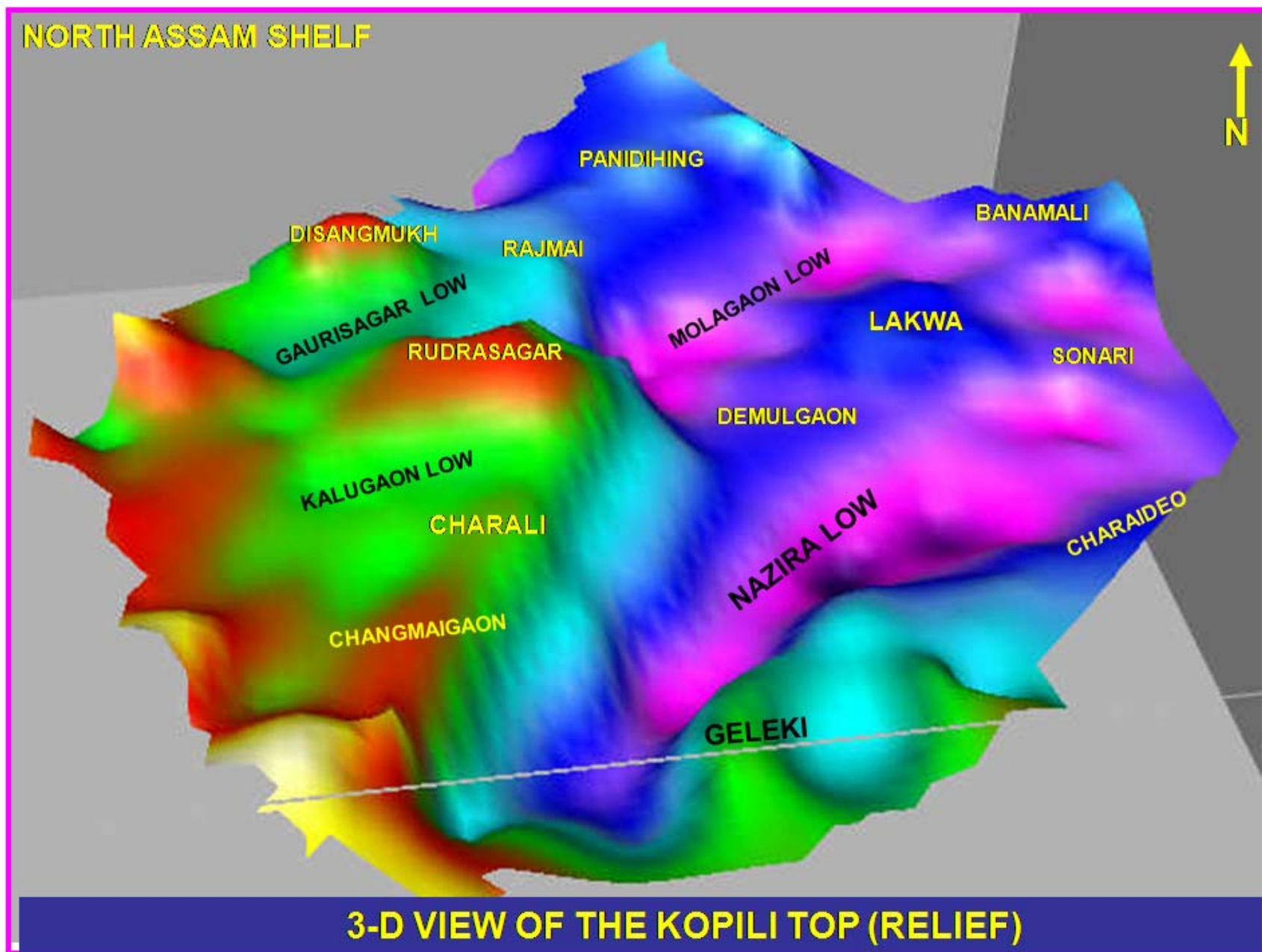


Regional geological cross-section D-D', showing Naga, Chaneh, Phiphima, and Disang thrusts.



TWT structural map, North Assam Shelf, near top of basement.





3-D structural view, North Assam Shelf, on top upper Eocene Kopili Formation.

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