Pore Pressure Modeling in the Cachar Area of Assam, India

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Formation overpressure has been reported in several wells drilled in the Cachar fold-thrust belt, as in many Tertiary sedimentary basins of southeast Asia. No regional model explaining the causal mechanisms for these overpressures exists. A model has been developed using regional data to explain and predict these overpressures. A study of fourteen wells has indicated that a combination of four mechanisms is responsible to variable degrees at different places: 1. High sedimentation and burial rates of Surma sediments during Miocene, leading to disequilibrium compaction. 2. Rapid uplift during detachment folding and later thrust-related folding, under high horizontal shortening rates. 3. Rapid erosion after uplift, also under high horizontal shortening rates. 4. Hydrocarbon buoyancy effect due to possible (substantial) hydrocarbon columns. In the Masimpur area, a pressure transition zone, also a pressure seal has been identified just below the Srikona thrust. It coincides with the brittle deformation zone associated with the Srikona thrust, marked by intense brecciation. Following uplift and erosion, pressure dissipation has been greater in the hangingwall than in the footwall, and overpressures are significantly greater below the Srikona thrust. The pore pressure model has significant implications for the dynamic capacity of the Renji sandstone reservoir. Considering the structural uncertainty regarding the top of reservoir at the crest of Masimpur structure, the Dynamic Capacity Model has been used to predict the possible height of hydrocarbon accumulation. The two extreme scenarios range from an initial water-phase pressure at the fracture gradient (which would prevent any hydrocarbon accumulation) to a substantial gas column. The model developed for the Masimpur structure is applicable elsewhere in the Cachar area too, as validated by existing well data.