

POTIGUAR BASIN: A MECHANICAL INDUCED STRESS FIELD

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The most studied Brazilian earthquakes are concentrated around Potiguar basin. Focal mechanism solutions show a regional strike slip regime with P axes paralleling the coast. Reverse and normal solutions are also shown. Using oil well data the present day stress field on sedimentary part of that basin was determined. Leakoff tests and hydraulic fracturing characterized a strike-slip fault regime on most part of the basin. But at shallow levels, both onshore and near shore, a reverse fault regime is well defined: a horizontal fracture could be induced above 600m. Offshore, a normal fault regime could be inferred on the shallow portion and an overpressure compartment beginning below 3500m, where $S_{h_{min}}$ increases according to hydraulic fracturing on sands and also by leakoff tests on shales. SH_{MAX} orientation by breakout analysis confirms previous studies, with a well-defined NW direction especially at onshore basin. Offshore wells do not show good quality data, but it was possible to find fault reorientation effects on a wellbore scale, and also on a more regional one. Finite element modeling suggest that SH_{MAX} paralleling the coast is a rotation mechanically induced by an well-oriented weak fault, that modify the stress tensor as it moves, placing SH_{MAX} orthogonal to the fault plane. This is, perhaps, the most satisfactory explanation for the observed stress field in Northeast Brazil. It is preferred to local sources, since the magnitude of the SH_{MAX} rotation is too large to be caused by the known local stress sources, like sediment deposits on continental margin.