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TECTONICS AND SEDIMENTATION OF THE PIAUI-CAMOCIM SUB-BASIN,
CEARA BASIN, OFFSHORE NORTHEASTERN BRAZIL

by

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A thesis submitted to the Faculty and the Board of Trustees of the Colorado School of Mines in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Geology)

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To
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ABSTRACT

Although it was the last of the Brazilian equatorial marginal basins to be studied in detail, the Piauí-Camocim sub-basin presents the most fascinating structural geology of them all. The superposition of two major tectonic events (rifting and wrenching), quite distinct in nature, resulted in an abundance and diversity of geologic structures which is unparalleled by any other Brazilian basin.

The first tectonic event, the rift-stage (early Alagoas) (Alagoas is a Brazilian stage roughly equivalent to Aptian), created the basin through a series of normal faults predominantly oriented $N40^{\circ}-45^{\circ}E$ in the western part, and $N75^{\circ}-85^{\circ}E$ in the eastern part. Non-marine siliciclastic sediments constitute the rift depositional sequence. Continental drifting between South America and Africa followed (middle Alagoas-early Cenomanian), and a thick clastic sequence of transitional to marine sediments was deposited. Right-lateral wrenching was already taking place, but on a small scale.

During the middle Cenomanian (possibly 98-95 Ma) the separation between South America and Africa changed from north-south to east-west, along the oceanic Romanche Fracture Zone. Shear stresses developed. The right-lateral motion, the large bend in the Parnaíba Platform, and the different

average trends of previous rift faults from west to east, originated convergent wrenching. Transpression was greatly enhanced. Rift faults were reactivated as dextral strike-slip faults. Synthetic ($N65^{\circ}-70^{\circ}W$) and antithetic ($N0^{\circ}-20^{\circ}W$) strike-slip faults were formed. Flower structures developed along the fault trends. A large number of en echelon folds and shale ridges ($N20^{\circ}E$) were formed. By the time wrenching ceased, a transpressive belt of moderate dimensions (200 km x 50 km) had emerged in the Piaui-Camocim sub-basin, and sedimentation ceased in the area. It took the entire Late Cretaceous, the Paleocene and Eocene for this entire transpressive belt to be eroded and submerged again. Oligocene-Miocene shallow marine shelf sediments cover the Cretaceous rocks of this belt unconformably over most of the Piaui-Camocim sub-basin. Only to the north of the Atlantic High sedimentation was continuous throughout Late Cretaceous and Tertiary under the form of thick slope sequences.

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