Quantitative Meso-/Cenozoic Development of the Eastern Central Atlantic Continental Shelf, Western High Atlas, Morocco

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The Agadir Basin, Morocco, includes the Late Paleozoic to Cenozoic eastern continental shelf of the Central Atlantic. Biostratigraphy, lithofacies and sequence stratigraphic analysis as well as flexural basin modeling has been performed for a 116 km long transect between Im-n-Tanout and north of Agadir. The basin development can be subdivided into 8 stages: (1) early rift, late Permian to top Anisian, 259.3-234.4 My; (2) rift climax, Ladinian to top Carnian, 234.4-220.7 My; (3) sag, Norian to top early Pliensbachian, 220.7-191.5 My; (4) early drift, late Pliensbachian to top Tithonian, 191.5-144.2 My, S1 magnetic anomaly to chronozone M19; (5) mature drift, Berriasian to top Cenomanian 144.2-93.5 My, M19 to intra- C34; (6) mature drift with initial Atlasian deformation, 93.5-34.7 My, Turonian to late Eocene, intra-C34 to C13; (7) Atlasian deformation, 34.7-19.0 My, late Eocene to early Miocene, C13 to C6; (8) Atlasian uplift and basin inversion; 19.0-0.0, Early Miocene to recent, post-C6. Changes in thermo-tectonic subsidence in the Agadir Basin correlate with major platetectonic reconfigurations in the Central and North Atlantic domain: (1) major shifts of the sea-floor spreading axis; (2) major changes in sea-floor spreading halfrates; (3) the stepwise migration of crustal extension and sea-floor spreading to the North Atlantic and; (4) relative motions of the African and Eurasian plates since the Turonian. Two different long-term, large-scale stress fields and plate-force mechanisms controlled the Pliensbachian to recent development of the Agadir Basin. In the early Pliensbachian/middle Toarcian (193.1/186.5 My) to Cenomanian (93.5, intra-C34) ridge-push intra-plate forces varied because of shifts in the sea-floor spreading axis and changes in sea-floor spreading halfrates in the Central Atlantic. Variations in ridge-push intra-plate forces modulated the overall extensional stress fields and thermo-tectonic subsidence rates on the northwest African continental margin. In Turonian to late Eocene and recent times ridge-push forces were transmitted by strike-slip and thrusting along the convergent African-Eurasian plate boundary.