Using Gravity Filters to Reveal the Non-Volcanic and Recessed Rifted Margin of Mauritania and its Along-Strike Transition with the Protruding Volcanic Margin of the Guinea Plateau

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Abstract

The Mauritanian rifted-passive margin remains one of the least explored areas of the Mauritania-Senegal-Guinea-Bissau-Conakry (MSGBC) basin that includes: (1) the transition from the unrifted, full-thickness, continental crust of the West African Craton; (2) a relatively narrow and tapered zone of thinned continental crust in the coastal, shelf and slope area; and (3) Jurassic oceanic crust in the ultradeep area of the Central Atlantic Ocean that includes the Cape Verde volcanic islands of Miocene to Recent age. In this study, we use gravity filters to reveal the boundaries of all three crustal provinces along with the localized volcanic margin of the Guinea Plateau and its transition to the non-volcanic margin that characterizes the central and northern Mauritanian margin. Key gravity filters used include: (1) the horizontal gradient of upward-continued Bouguer anomaly that reveals the extent of high-density and back-stepped frontal slope of the carbonate passive margin and the transition area between the non-volcanic rifted margin and the volcanic rifted margin of the Guinea Plateau; (2) the vertical gradient of upward continued Bouguer anomaly that reveals a north-south marginal rift trending with the most distal area of thinned, continental crust and fractures with the oceanic crust that terminate at the continent-ocean boundary; and (3) the tilt derivative map showing a possible zone of the exhumed mantle that is parallel to the continent-ocean boundary.