



The relationships between volcanism, tectonism and hydrothermal activity on the Mid-Atlantic Ridge south of the equator

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Using data from the complete bathymetric and side-scan (TOBI) coverage of the Mid-Atlantic Ridge 2-14 °S collected since 2004 in conjunction with the results of extensive prospecting for hydrothermal systems in this area we attempt to formulate a general model for the interplay between volcanism, tectonics and hydrothermalism on a slow-spreading ridge. The model defines three basic types of ridge morphology with specific hydrothermal characteristics: (a) A deep, tectonically-dominated rift valley where hydrothermalism is seldom associated with volcanism and much more likely confined to long-lived bounding faults (b) a shallower, segment-centre bulge where a combination of repeated magmatic activity and tectonism results in repeated, possibly temporally overlapping periods of hydrothermal activity on the ridge axis and (c) a very shallow, inflated axis beneath which temperatures in all but the uppermost crust are so high that deformation is ductile, inhibiting the formation of high-porosity deep fractures and severely depressing hydrothermal circulation. This model is used together with predicted bathymetry to provide forecasts of the best places to look for hydrothermal sites in the remaining unexplored regions of the South Atlantic