

### **A Remote-Predictive Geologic Map of the Mid-Atlantic Ridge Between 22.6°N - 19.6°N: Implications for Tectonic Evolution and Massive Sulphide Mineralization**

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The slow-spreading Mid-Atlantic Ridge between 22.6° N and 19.6° N displays a high degree of tectonic complexity, with evidence for ridge segment propagation, transform fault elimination, and ridge jumps. Remote-predictive geological mapping is used for the first time to investigate the evolution of the Mid-Atlantic Ridge at these latitudes to better understand these processes and identify potential areas for future mineral exploration. Using Global Multiresolution Topography data and ship-track bathymetry gathered on cruise FKt230303, a 1:250000 scale map of the Mid-Atlantic Ridge has been developed. Three previously known massive sulfide deposits occur near the ridge, with potential for further mineralization on mapped structures such as two oceanic core complexes and a rifted volcano, which are indicative of crustal-scale faulting and magmatic focusing. The area contains three spreading centers: the TAMMAR Kane Macrosegment (TKMS), and the Central and South Segments, which are all offset by second degree non-transform offsets. Two abandoned spreading centers (ASCs) are also mapped: ASCs North and South. Assuming a full spreading rate of 21 mm/year, evolutions for two offsets are proposed. At 21.5° N, ridge jumps initiated by a change in the regional stress field occurred at ~ 1.9 Ma. This formed the TKMS and Central Segment and caused the death of a transform fault. After, southward propagation of the TKMS began. At 20.6° N, ASC South was discontinuous from the South Segment about a second degree NTO since ~ 15.1 Ma. This NTO was stable until ~ 7.38 - 6.19 Ma, when the South Segment briefly propagated northward until ~ 4.09 - 3.43 Ma, when ASC South began propagating southward. Southward propagation continues today via the Central Segment as a ridge jump from ASC South occurred around 1.9 Ma. Around 457 Ka, magma focusing within the NTO valley constructed the Puy des Folles volcano.