Investigating the role of Iberia and its interplay with the Newfoundland, Canada, and Irish offshore margins using plate reconstructions

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The tectonic evolution of the southern North Atlantic Ocean is a subject of increasing interest due to its continental margins playing host to several world-class frontier regions for oil and gas exploration. The Newfoundland-Iberia conjugate margin pair serves as one of the best studied non-volcanic rifted conjugate margin pairs in the world and is a topic of constant scientific debate due to its complex plate kinematic history and geological evolution. Recent adaptability of the GPlates freely available plate tectonic reconstruction software provides an excellent tool for gaining insight on complex geological problems. The ability to account for regions of deformation, integration of various geological and geophysical datasets, and the ability to calculate temporal variations in crustal thickness, strain rates, and velocity vectors provide an optimal environment for solving crustal-scale geological and geophysical problems. Several uncertainties remain regarding the plate kinematic history of Mesozoic Iberia, such as its position and orientation at the Triassic-Jurassic boundary and its Cretaceous displacement and rotation prior to the Pyrenean orogeny. The aim of this research is to investigate the role of Iberia during the formation of the southern North Atlantic and its interplay with the Newfoundland and Irish offshore margins using deformable plate tectonic reconstructions. The aim of this approach will be to divide various regions of Iberia into smaller continental fragments where appropriate and accounting for deformation within these regions. These deformable plate models will be integrated with potential field datasets and various geological datasets such as the orientation of Triassic structures and dykes originating from the Central Atlantic magmatic province (CAMP). The need for more complicated plate tectonic models of Mesozoic Iberia using detailed geological and geophysical constraints is necessary for satisfying geological observations in the Pyrenees and the role of Iberia during the breakup of the Pangean supercontinent and preceding oceanic sea-floor spreading.

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