

anomaly trending east-northeast and two large magnetic aureoles located north of the central part of the SRMA. Forward potential field models indicate that the southern margin of the linear anomaly is the northern margin of the Orpheus Graben. A south-dipping fault separates rocks of the Meguma terrane to the south from rocks of the Avalon terrane to the north of the graben. The Meguma terrane is modeled as one unit with average density of 2750 kg/m<sup>3</sup> and average magnetic susceptibility of 2x10<sup>-3</sup> SI. The offshore Avalon terrane has been modeled as five geological units based on differences in magnetic susceptibility and density, in the range of 10x10<sup>-3</sup> to 20x10<sup>-3</sup> SI and 2600 to 2700 kg/m<sup>3</sup>, respectively. Upper crustal units beneath the Avalon terrane offshore have higher susceptibility and lower density than units beneath the onshore Mira terrane, suggesting that the offshore area is a different part of Avalonia, perhaps equivalent to the Antigonish Highlands or the eastern part of Avalon terrane in Newfoundland. The source of the large linear anomaly is interpreted to be a belt of mafic volcanic rocks at a depth of 6–15 km in the offshore Avalon terrane. The large magnetic aureoles have associated gravity anomalies indicating that they are caused by granite plutons and magnetic rocks in the surrounding contact metamorphic aureoles. In the Gabarus Bay area, similar magnetic aureoles are associated with the Devonian Deep Cove granite and other intrusions. Two granitic bodies south of the Orpheus Graben in the Meguma terrane have densities and magnetic susceptibilities similar to Devonian plutons in the adjacent onshore part of the Meguma terrane.

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**Sources of magnetic and gravity anomalies on the Scotian Shelf southeast of Cape Breton Island, Nova Scotia, and onshore-offshore geological correlations using geophysical modeling**

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The Scatarie Ridge Magnetic Anomalies (SRMA) form a prominent northeast-trending belt, 100 km long by 25 km wide, on the Scotian Shelf southeast of Cape Breton Island. The area is inferred to be part of the Mira terrane, a component of the Avalonia realm of the northern Appalachian orogen. The magnetic anomalies range from 300 nT to 600 nT with the centres reaching highs of 1000 nT. Associated with the magnetic anomalies are positive gravity anomalies that range from 10 to 30 mGal. This study used forward-modeling software to model magnetic and gravity data to investigate possible sources of the SRMA. The interpretations are constrained by physical property data measured in samples collected from onshore areas, and by multichannel seismic lines collected by PetroCanada and the Geological Survey of Canada Frontier Geoscience Project (Lithoprobe East). Using the second derivative magnetic map, the SRMA has been resolved into a linear