Gravity Measurements over Some Salt Structures in South Cape Breton Island and in the Vicinity of Antigonish, Nova Scotia, Canada

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ABSTRACT

Gravity data has been compiled from a number of surveys over part of the Antigonish sedimentary Windsor basin and part of south Cape Breton Island, Nova Scotia.

Automated gravity interpretation methods have been employed to compute models of the known salt structure near Pomquet and a profile of the Antigonish sedimentary basin. The salt structure model, assuming a density contrast of –0.30 g/cm^3, indicates the mass of the Antigonish salt structure is approximately 5.6 X 10^{10} metric tons. A 3 milligal negative gravity anomaly, located close to Tracadie, suggests thickening of the Windsor sediments and/or evaporites. A negative gravity anomaly under the waters of George Bay, north of Tracadie, suggests a possible salt structure in the offshore extension of the Antigonish Windsor sub-basin.

Model interpretations of negative gravity anomalies over known salt structures at St. Peters and Oban, in south-west Cape Breton Island, suggest masses of approximately 1.1 X 10^{10} and 3.4 X 10^{10} metric tons respectively. A sphere model, approximating the roughly circular negative gravity anomaly due to the suggested salt structure at Grande Anse, indicates a mass of about 3.7 X 10^9 metric tons, with the top of the sphere close to the surface. An extension of the Grande Anse low to the south east may represent a small salt-cored anticline.

New gravity data in the Baddeck area of Cape Breton Island reveals steep gradients over the south-west part of Iona. These gradients suggest a rapid thickening of the Windsor sediments and evaporites under the Bras D'Or Lake with the accompanying possibility of further salt structures.