

Gravity measurements in Pictou County, Nova Scotia

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A Bouguer Gravity contour map has been constructed using gravity data measured by the Nova Scotia Research Foundation Corporation (NSRFC). Approximately 300 gravity stations from eleven different NSRFC gravity surveys, carried out between 1958 and 1982, have been reprocessed for this study. Natural Resources Canada (NRC) gravity stations in the area, numbering about 200, have also been included in the dataset. The area covered by the gravity map includes the Carboniferous basins of Pictou County, Nova Scotia, and the adjacent areas.

The dominant anomaly is a large, positive feature with an east-west to northeast-southwest trend produced by the higher density Hadrynian, Cambrian, Silurian and Devonian rocks of the Cobequid Highlands. The eastern termination of the Cobequid Highlands is clearly delineated on the gravity map. To the east is part of a second positive anomaly resulting from the higher density basement rocks of the Antigonish Highlands. Between these two large positive anomalies is a narrow, east-west trending negative (-7 mGals) anomaly which results from the lower density, Upper Carboniferous sediments of the Stellarton graben. The Stellarton graben anomaly lies at the head of a gravity embayment extending southwards from the large area of more negative gravity values in the north of the map area. These negative anomalies result from the thickening of Carboniferous and younger sediments of that part of the

Magadalen basin which underlies the Northumberland Strait.

To the south of the Stellarton graben anomaly are a series of low amplitude positive anomalies which form a sinuous east-west to north-south pattern. These anomalies may reflect higher density rocks within, or underlying, the Carboniferous sediments together with higher density, older volcanic and sedimentary rocks to the east.

Two other negative anomalies are of significance: the first coincides with mainly Hadrynian and Cambrian strata, Cambrian volcanics and isolated granitoid rock outcrops (Hadrynian, Cambrian and Devonian) in the Moose River area. It is suggested that this -7 mGal anomaly is due to a lower density, granitic complex beneath a thin veneer of sedimentary strata. The second negative anomaly (-5 mGals) in the Kemptown area is presently interpreted to result from thickening of lower density Carboniferous strata.

First and second vertical derivative and horizontal derivative maps have been generated from the Bouguer gravity data. These enhance the higher frequency content and delineate previously mapped fault trends, and indicate the continuation of some faults and the presence of previously unmapped structures.

The regional and residual Bouguer gravity maps are to be used for more detailed interpretation and modelling of specific anomalies.