

by

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Geochemistry Section

Introduction

Geochemical follow-up studies were conducted in three areas within the Avalon Zone in eastern Newfoundland (Figure 1) during the summer of 1983. These areas include: (A) a zinc anomaly near the town of Harbour Grace, an extension to the area studied by Dean and Meyer (1983); (B) a copper anomaly on the isthmus of Avalon, east of the village of Fair Haven, complementing a study by Howse (*this volume*) in the immediate area; and (C) a cobalt and minor lead anomaly in the Bonavista - Port Rexton area on the Bonavista Peninsula. In each of these areas, sediment samples were collected, generally at 300 m intervals along all streams, at stream junctions and on connecting streams between ponds. In the Fair Haven and Harbour Grace areas, water samples were also collected from the streams and the pH of the water was read on

site using a pH paper of intermediate range (4 to 7) and in the laboratory using a pH meter. The stream sediment samples were analyzed for Cu, Pb, Zn, Co, Ni, Ag, Mn, Fe, Mo, F and L.O.I. (loss on ignition). The water samples were analyzed for Cu, Zn, Mn and Fe.

Harbour Grace Area

The regional zinc anomaly northwest of Harbour Grace (Butler and Davenport, 1979) can be divided into three areas for more detailed studies (Figure 2), namely, (A) the Saltpit Pond area which was investigated by Dean and Meyer (1983) and Meyer et al. (1983), (B) the Ocean Pond area, and (C) the Victoria area. The field work in 1983 was designed to extend the Saltpit Pond area (also assessed in 1983 by a private company) to the east (the Victoria area) and to the south (the Ocean Pond area).

Most of the area investigated is located along the contact between the massive, green, quartz-rich sandstone and siltstone of the late Precambrian Renewes Formation and the thinly bedded, fine grained, black shale of the late Precambrian Fermeuse Formation which forms part of the St. John's Group (King, *in preparation*). A detailed discussion of the geology of the area is presented by Dean and Meyer (1983) and Meyer et al. (1983).

The area is of low to moderate relief with forested and bog-covered areas near Ocean Pond and rocky barrens near Victoria. Both stream sediment and stream water samples were collected at most sites. Stream sediment sampling proved impossible at many sites due to poor stream development and the lack of sediment accumulation; at these sites, only water samples were taken. A total of 67 sediment samples and 85 water samples were collected.

The results of the water analyses were of little value. In most cases, neither Zn nor Cu was detected in the samples, whereas Mn and Fe were detected, but with no apparent trend.

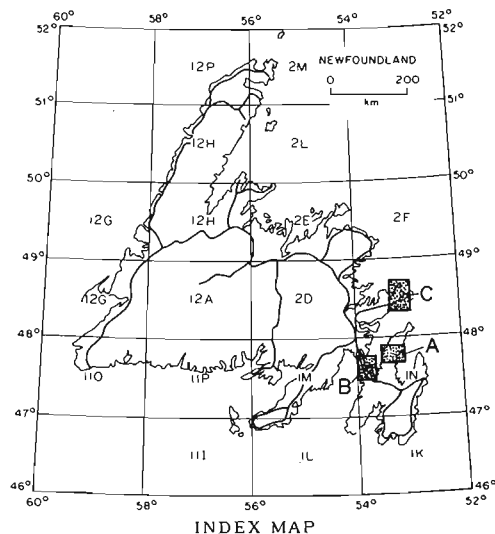
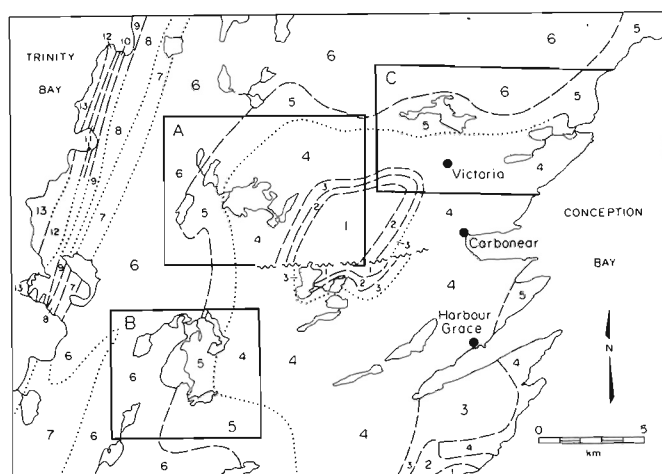


Figure 1: Field study areas during 1983 season (A) Harbour Grace area; (B) Bellevue-Fair Haven area; and (C) Bonavista area.

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LEGEND

MIDDLE CAMBRIAN

- 13 Chamberlains Brook and Manuels River Formations

LOWER CAMBRIAN

- 12 Bonavista, Smith Point and Brigus Formations
11 Random Group

PRECAMBRIAN

- 10 New Perlican Formation
9 Heart's Content Formation
8 Heart's Desire Formation
7 Quidi Vidi Formation

Signal Hill Group

- 6 Gibbett Hill Formation

St. John's Group

- 5 Renews Head Formation
4 Fermeuse Formation
3 Trepassey Formation

Conception Group

- 2 Mistaken Point Formation
1 Drook Formation

Figure 2: Generalized geology map of Harbour Grace area showing areas of detailed work.

The intermediate range pH paper was not sensitive enough to detect the very small changes in pH between samples and the results were not comparable to the pH values determined by pH meter at the department's laboratory.

The results of the stream sediment analyses will be compiled with those already published in Meyer et al. (1983) to provide more complete information on the Harbour Grace area. These data will be released in 1984.

Bellevue - Fair Haven Area

The main interest in the Bellevue - Fair Haven area was a lake sediment Cu anomaly outlined by a reconnaissance lake sediment geochemical survey of the western Avalon Peninsula (Davenport et al., 1975). The anomaly is located immediately east of the village of Fair Haven (Figure 3), and is underlain by mafic volcanic rocks of the late Precambrian Bull Arm Group (King, *in preparation*). As in the Harbour Grace area, 40 km to the east, this area is generally of low to moderate relief and covered with rocky barrens and forest, with poor stream development. A total of 145 stream sediment samples and 178 stream water samples were collected.

Here, as in the Harbour Grace area, the Zn and Cu concentrations in water samples were below the detection limit. The stream sediment sample analyses will be released in conjunction with the Mineral Deposits Section report on the same area (Howse, *this volume*).

Bonavista Area

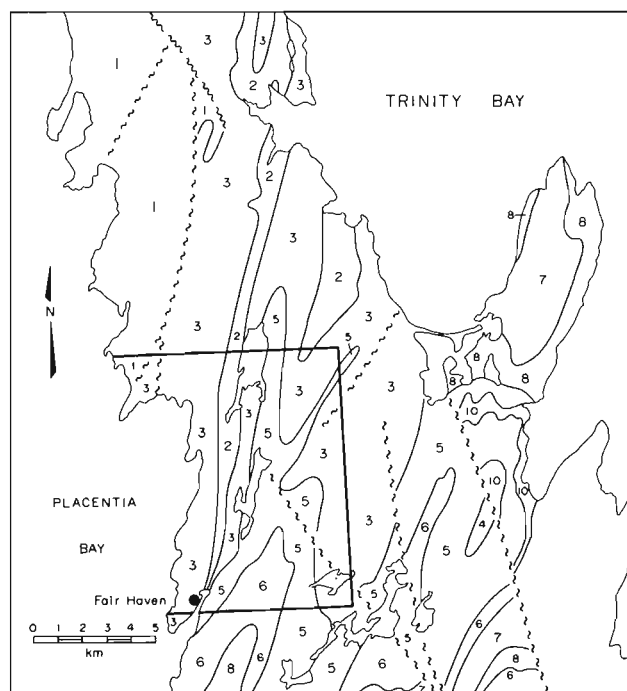
The Bonavista area (Figure 4) was included in the study because of a large multipoint Co anomaly and a less intense Pb anomaly indicated by a regional lake sediment geochemical survey (Butler and Davenport, 1981). The area was divided into two parts based on the distribution of the Co and Pb anomalies, Area A near Bonavista and Area B near Port Rexton (Figure 4).

The relief of the area is generally low and the area is covered with bog and, in places, dense forest. Stream development is relatively good. This area is underlain by sedimentary rocks of the late Precambrian Musgravetown Group, consisting mainly of red, green and gray conglomerate, sandstone and shale (Jenness, 1963).

A total of 460 stream sediment samples were collected from both areas. The analyses of these samples will be released in 1984.

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LEGEND

LOWER CAMBRIAN

- 11 Bonavista, Smith Point and Brigus Formations
- 10 Random Group

PRECAMBRIAN

- 9 New Perlican Formation
- 8 Heart's Content Formation
- 7 Heart's Desire Formation
- 6 Quidi Vidi Formation

Signal Hill Group

- 5 Gibbett Hill Formation

Bull Arm Group

- 4 undivided
- 3 basaltic flows, etc.
- 2 silicic tuff, etc.

- 1 Connecting Point Group

Figure 3: Generalized geology map of Bellevue - Fair Haven area. Area of detailed work is outlined.

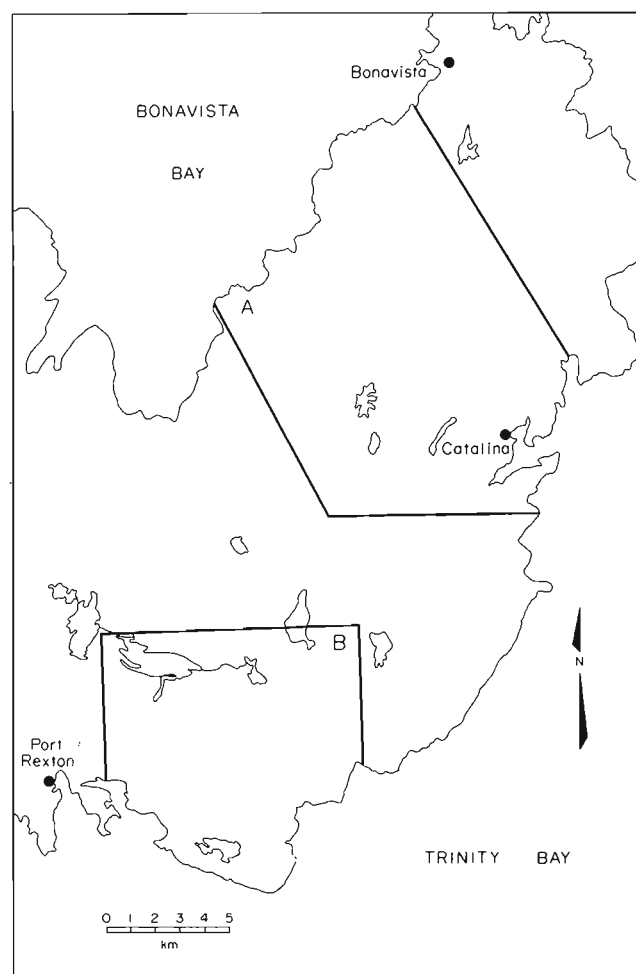


Figure 4: Detailed area location map, Bonavista. Entire area is underlain by Musgravetown Group sedimentary rocks.

conomic delights. Wayne Ryder, Sidney Parsons and Dave Warren assisted with the logistics of the field party.

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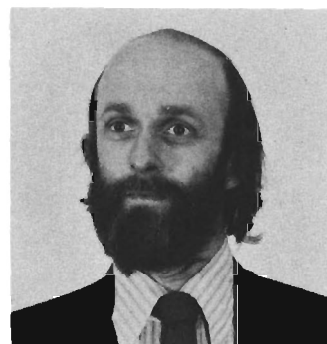
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