Current Research (1996) Newfoundland Department of Natural Resources, Geological Survey, Report 96-1, pages 175-180

VOLCANIC ROCK GEOCHEMICAL DATABASE–VERSION 2.0

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INTRODUCTION

The Volcanic Rock Geochemical Database was initially released in May of 1994 and contained data for over 2500 rock samples from the island portion of the province. The first update (version 2.0) was released in October 1995 and replaces rather than augments version 1.0. It contains data for 5099 rock samples from both the island and Labrador. The database was compiled using R:base 4.0 and is released on floppy disk with accompanying user manual and browse and retrieve application. A brief description of the general features of the application was given in Saunders (1994) and remains unchanged. This report provides an overview of the data included in the update.

HARDWARE REQUIREMENTS

Version 2.0, together with the application and runtime module, requires about 18 megabytes of memory. There is one version of the application, but the runtime module that runs is available in two versions that differ in the way they access memory. A version for users of 386DX or better requires two megabytes of extended memory and 200K of free conventional memory. A version for users of 286 or 386SX computers requires 470K of free conventional memory and does not require any extra extended memory. Users will find the application runs much faster on more advanced computers.

DATA INCLUDED IN VERSION 2.0

The database now contains data for 5099 samples from more than sixty sources. Information includes sample location, unit names and rock type for each sample. The sample distribution of the database by unit is shown in Table 1. The samples are grouped by major unit or, where they have not been assigned to a major unit, by minor unit. Minor units are not listed for samples that belong to a major unit.

Figures 1 and 2 show the geographical distribution of samples on the island and in Labrador.

Figure 3 shows the number of samples compiled from several different source categories. Most of the data are from theses and Newfoundland Department of Natural Resources unpublished collections.

Rock samples have been classified based on anhydrous SiO_2 content following, in part, the usage of Carmichael *et al.* (1974). Volcanic flows are coded accordingly as either basalt (BSLT), basaltic andesite (BAND), andesite (ANDS), dacite (DACT) or rhyolite (RYLT). Flows with a SiO_2 content of less than 45 percent have been coded LSMF–low silica mafic flow. Tuffs have been subdivided into basaltic tuff (BTUF), intermediate tuff (ITUF) and silicic tuff (STUF) as it was felt that a more rigorous division is not warranted for such variable rocks. Hypabyssal rocks, which include ophiolitic dykes and subvolcanic felsic rocks, have been simplified even more and are classified as either diabase (DIAB) if SiO_2 is less than 63 percent or felsite (FLST) if SiO_2 is greater than or equal to 63 percent. Version 2.0 also includes some gabbroic and ultramafic rocks, which have been coded based on field description rather than SiO_2 content. Ultramafic flows and high-level sills have been coded UMFC[1] and gabbros have been coded GBRO.

The distribution of rock samples by anhydrous SiO_2 content and lithology is shown in Figures 4 and 5.

USES OF THE DATABASE

It is anticipated that the database will have a number of uses. Academic users and researchers will be able to easily access earlier data for comparison with their own studies, either of a regional or localized nature. Exploration geologists may use the data to augment or prevent the need for their own lithogeochemical surveys. In many cases, especially in

[1] Rocks coded as low-silica mafic flows generally have levels of other oxides (e.g., Al_2O_3, CaO and MgO) comparable to basalts. Rocks coded as ultramafic have low Al_2O_3 and CaO, high MgO and may have SiO_2 greater than 50 percent.

Table 1: Distribution of samples by major or minor unit

Major Unit	Number of Occurrences
Adeyton Group	9
Advocate Complex	1
Annieopsquotch Complex	44
Baie d'Espoir Group	107
Bay du Nord Group	102
Bay of Islands Complex	20
Betts Cove Complex	663
Boones Point Complex	4
Botwood Group	3
Bruce River Group	69
Buchans Group	405
Burin Group	25
Cape Brule Porphyry	18
Cape St. John Group	77
Catchers Pond Group	3
Chanceport Group	11
Connaigre Bay Group	15
Connecting Point Group	3
Cotrells Cove Group	45
Coy Pond Complex	10
Cutwell Group	15
Diversion Lake group	15
Exploits Group	3
Flatwater Pond Group	13
Florence Lake Group	274
Flowers River Igneous Suite	197
Gander Group	1
Gander River Complex	8
Grand Beach Porphyry	40
Grand Lake Complex	5
Great Bend Complex	1
Harbour Main Group	64
Harcourt Group	21
Hunt River Group	20
Jagged Edge assemblage	25
King George IV Lake Complex	13
Kings Point Complex	169
Knob Lake Group	48
Letitia Lake Group	21
Little Port Complex	20
Long Harbour Group	26
Love Cove Group	75
Lushs Bight Group	186

Major Unit	Number of Occurrences
Marystown Group	9
Micmac Lake Group	5
Montagnais Group	95
Moran Lake Group	19
Moretons Harbour Group	6
Mortier Bay Group	16
Mugford Group	27
Musgravetown Group	254
New World Island complex	6
Otter Neck Group	5
Pacquet Harbour Group	83
Paradise metasedimentary gneiss belt	2
Pipestone Pond Complex	16
Point Rousse Complex	1
Roberts Arm Group	251
Seal Lake Group	5
Simmons Brook Complex	1
Sleepy Cove Group	13
Snooks Arm Group	54
Springdale Group	99
Topsails Intrusive Suite	101
Upper Aillik Group	249
Victoria Lake Group	324
Western Arm Group	2
Wild Bight Group	112

Minor Unit	Number of Occurrences
Caribou Lake fm.	1
Carter Lake volcanics	5
Cold Spring Pond Fm	27
Glover Fm.	8
Harbour Round basalts	9
Kaegudeck diabase	2
Lake Douglas basalts	4
Lemotte's Ridge basalts	6
Pine Falls fm.	10
Skidder basalt	193
Skinner Cove Fm.	54
Stony Lake volcanics	109

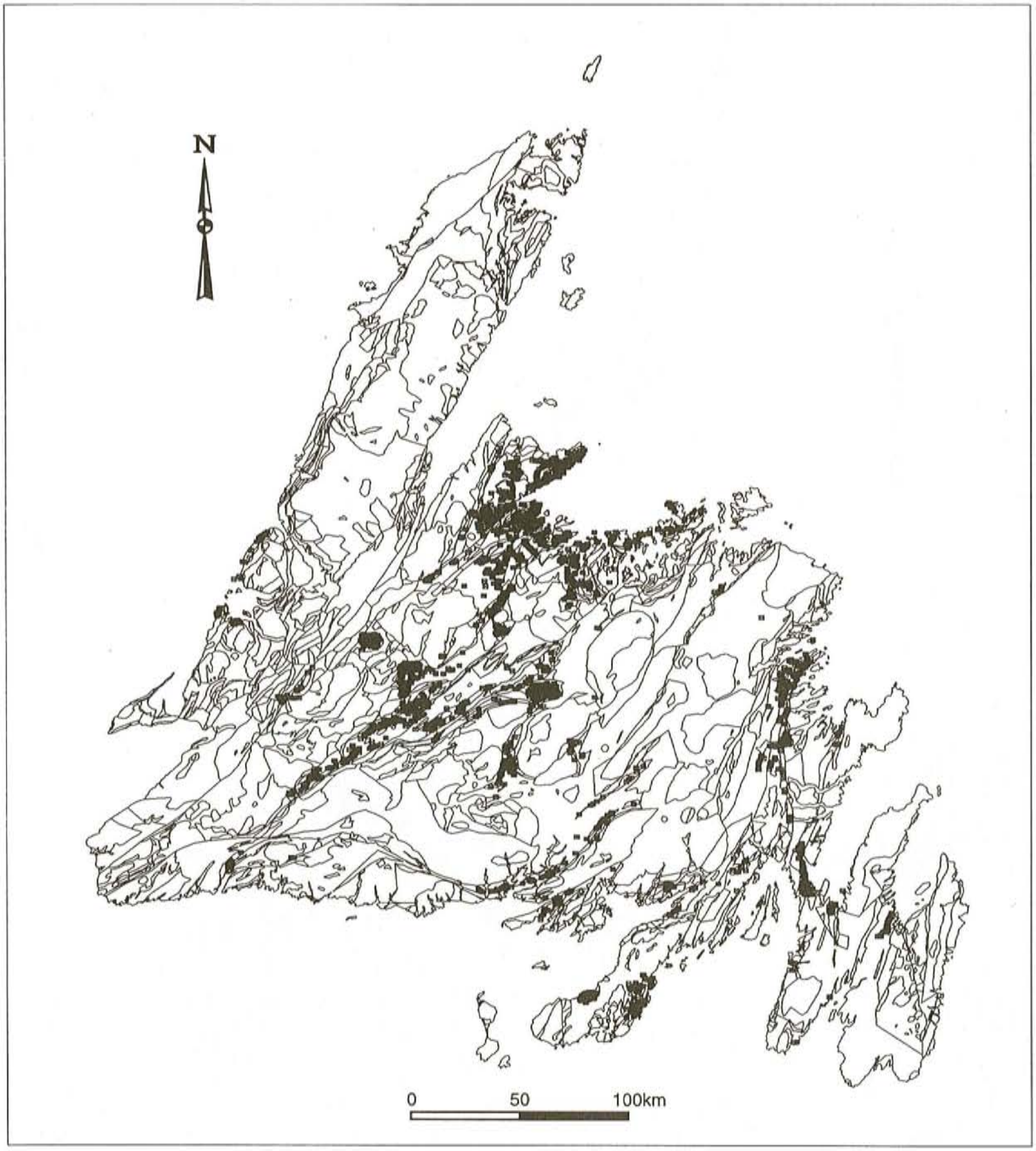

Figure 1. *Distribution of samples from the island portion of the province; geology from Colman-Sadd* et al. *(1990).*

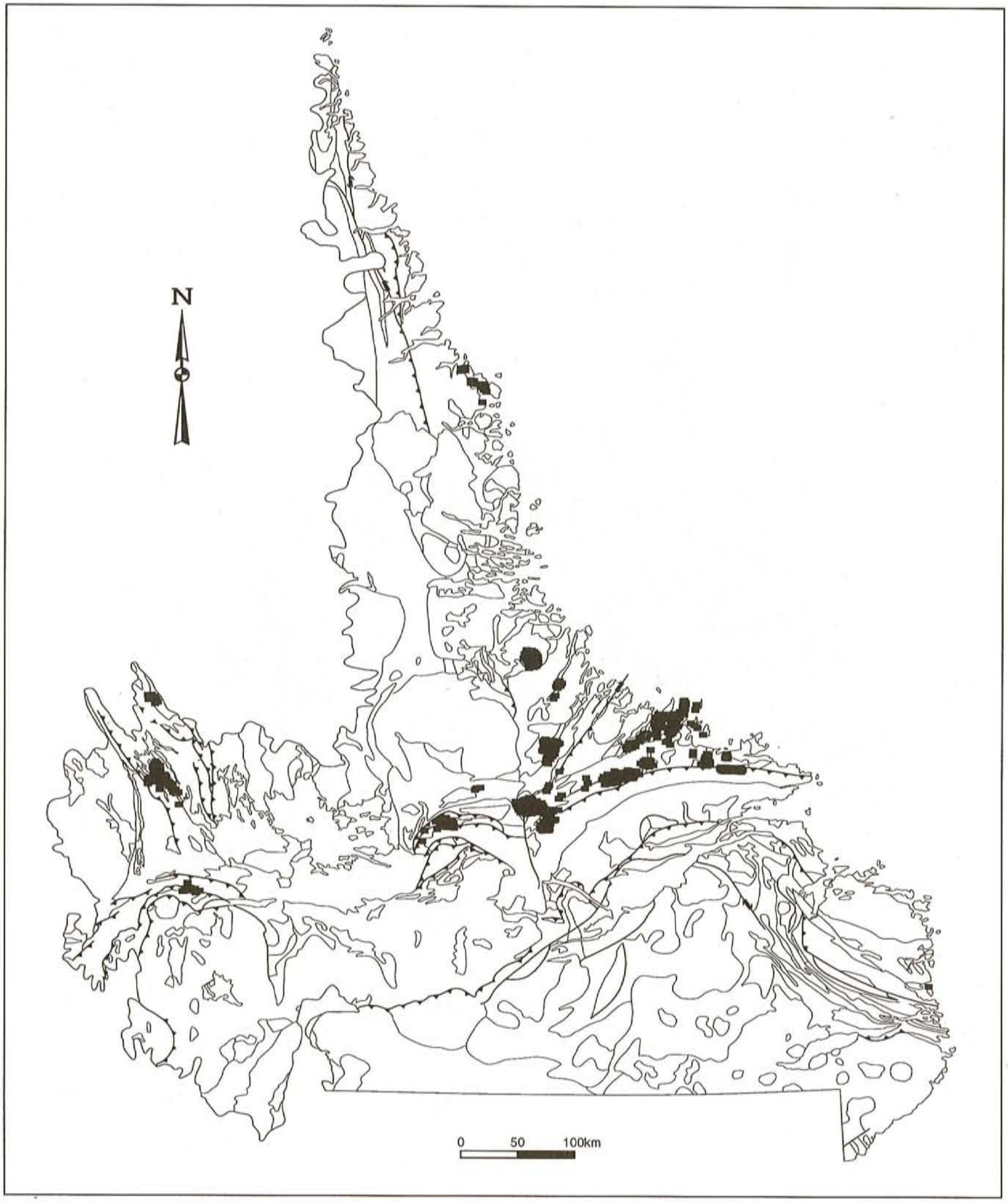

Figure 2. *Distribution of samples from Labrador; geology from Wardle (1995).*

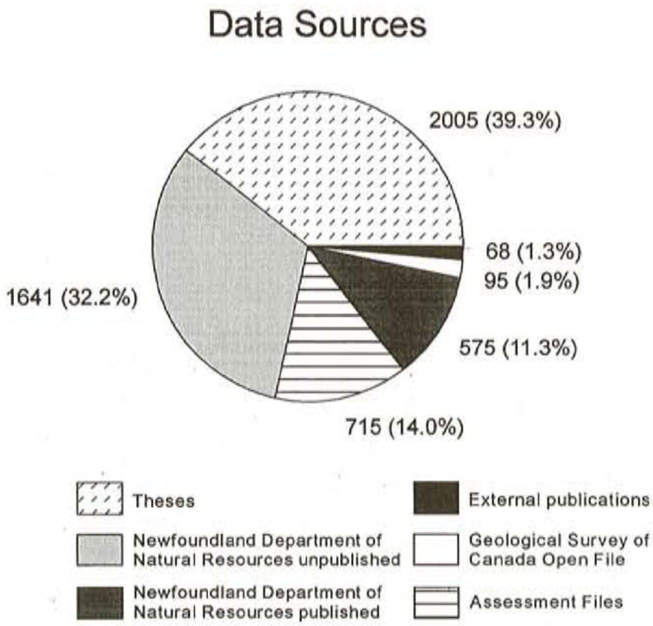

Figure 3. *Sources of data included in Version 2.0 of the Volcanic Rock Geochemical Database.*

structurally complex areas, lithogeochemical data is necessary to distinguish between rock units that would otherwise appear similar in the field. Data may also be of use for environmental surveys where it is necessary to know the background level of certain elements.

ACKNOWLEDGMENTS

Tim van Nostrand compiled the data for Labrador. Keith Parsons wrote the installation program for the application, provided advice about hardware requirements for users and gave instructions in the use of the run-time module. Jim Patterson provided assistance with the design of the database. Keith Parsons, Jim Patterson and Joe Atkinson helped solve various hardware/software problems of which there were many. Jim Butler and Chris Finch assisted with assignment of laboratory numbers for external data. Scott Swinden provided guidance throughout the project and made suggestions for improvement of the application. This project was initiated by the Geological Survey of the Newfoundland Department of Natural Resources under contract to the Geological Survey of Canada, funded by the Canada – Newfoundland Cooperation Agreement on Mineral Development, 1990-1994.

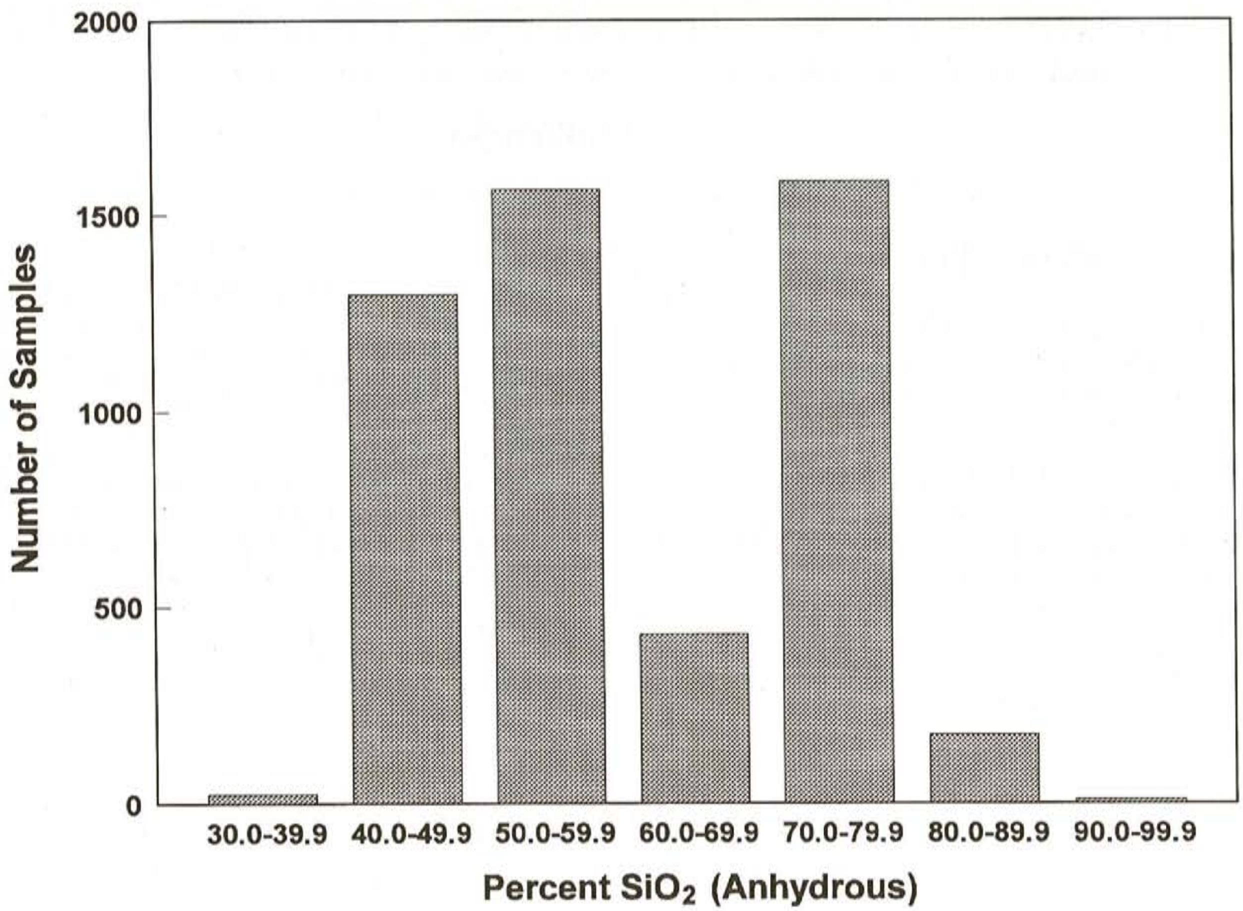

Figure 4. *Histogram of anhydrous SiO_2 content for samples in the database.*

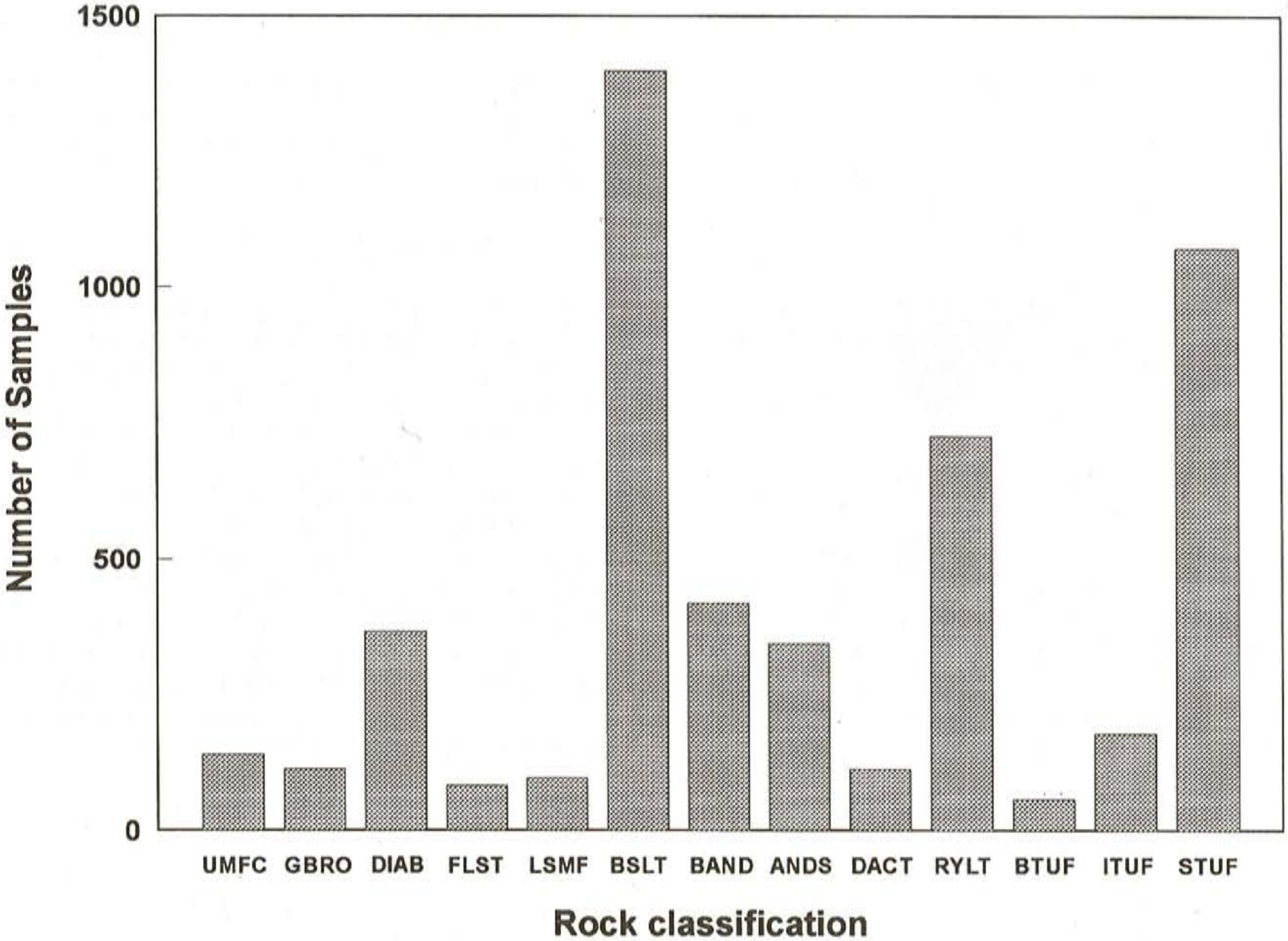

Figure 5. *Histogram showing distribution of rock samples by type.*

REFERENCES

Carmichael, I.S.E., Turner, F.J. and Verhoogen, J.
1974: Igneous Petrology. McGraw-Hill Book Company, New York, 739 pages.

Colman-Sadd, S.P., Hayes, J.P, Knight, I.
1990: Geology of the Island of Newfoundland. Newfoundland Department of Mines and Energy, Geological Survey Branch, Map 90-01.

Saunders, C.M.
1994: Volcanic Metallogenic Database: An overview of its application and data. *In* Current Research. Newfoundland Department of Mines and Energy, Geological Survey Branch, Report 94-1, pages 247-252.

Wardle, R.J.
1995: Simplified geological map of Labrador. Newfoundland Department of Natural Resources, Geological Survey, Map 95-23, Open File LAB/1133, Version 1.0.