



**University of Calgary**

**PRISM: University of Calgary's Digital Repository**

---

Graduate Studies

Legacy Theses

---

1983

## A Study of the mineralogy and petrology of the Ice River complex, Yoho National Park

Peterson, Tony D.

---

Peterson, T. D. (1983). A Study of the mineralogy and petrology of the Ice River complex, Yoho National Park (Unpublished master's thesis). University of Calgary, Calgary, AB.

doi:10.11575/PRISM/12926

<http://hdl.handle.net/1880/47236>

master thesis

---

University of Calgary graduate students retain copyright ownership and moral rights for their thesis. You may use this material in any way that is permitted by the Copyright Act or through licensing that has been assigned to the document. For uses that are not allowable under copyright legislation or licensing, you are required to seek permission.

*Downloaded from PRISM: <https://prism.ucalgary.ca>*

## List of Figures

Page	Figure	Description
71	1 .....	Location of the Ice River Complex
72	2 .....	Traverse Locations
73	3 .....	Geology
74	4 .....	Sample locations: Sodalite Creek
75	5 .....	Sample locations: Aquila Ridge, 1981
76	6 .....	Sample locations: Aquila Ridge, 1982
77	7 .....	Sample locations: Aquila Ridge, 1983
78	8 .....	Sample locations: Moose Creek
79	9 .....	Aquila Ridge
80	10 .....	Tabular ijolite body
81	11 .....	Cyclic layering in ijolite dikes
82	12 .....	Pegmatitic pyroxene in ijolite
83	13 .....	Pegmatitic nepheline in ijolite
84	14 .....	Crescumulate layering in ijolite
85	15 .....	Melanite-zeolite layering
86	16 .....	Isotropic ijolite
87	17 .....	Diopside inclusions in titanaugite
88	18 .....	Immiscibility textures in melteigite
89	19 .....	Basic residua vug in melteigite
90	20 .....	Melanite "wetting" textures
90	21 .....	Interstitial melanite
91	22 .....	Basic residua globule in nepheline
92	23 .....	Calcite/cancrinite in urtite
93	24 .....	Silicocarbonatite dikes
94	25 .....	Red and buff carbonatites
95	26 .....	Carbon/tetranatrolite flow banding in silicocarbonatite

## List of Figures continued

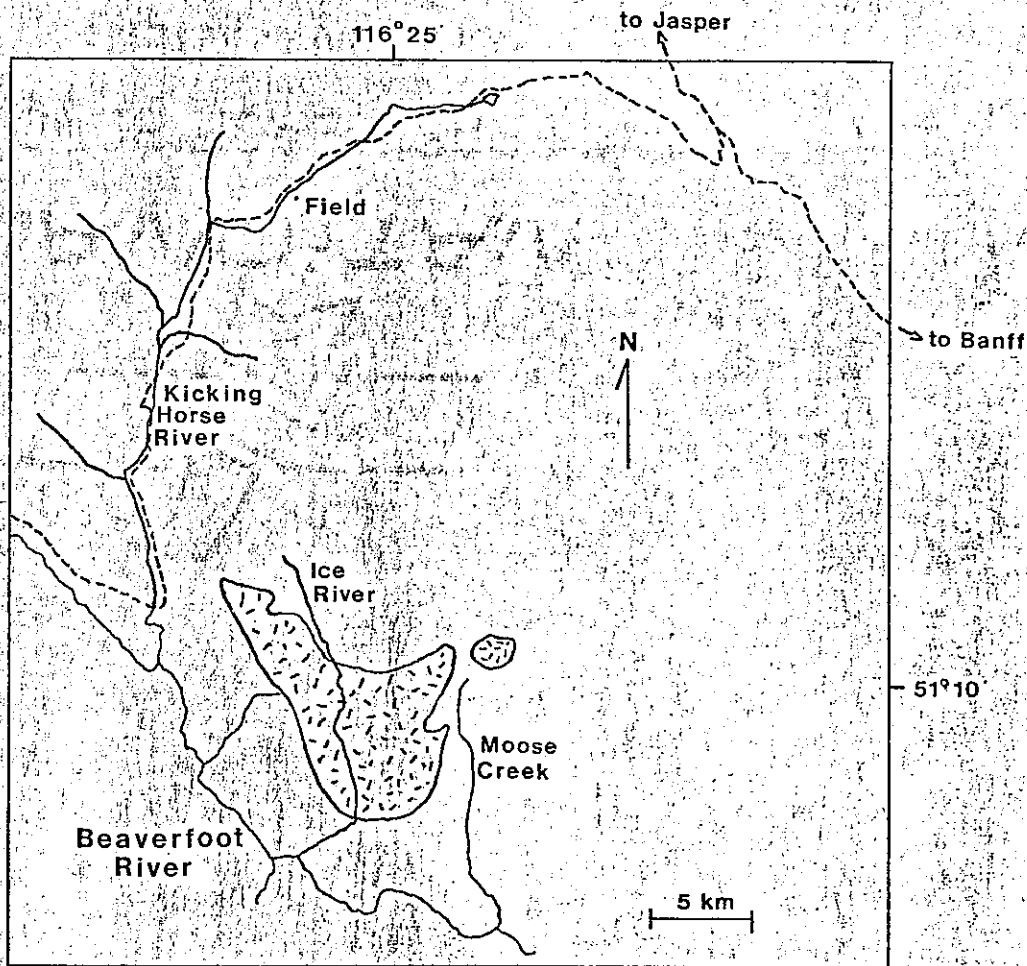
Page	Figure	Description
96	27 .....	Berthierine globules in calcite
97	28 .....	Berthierine globules (interstitial)
98	29 .....	Natrolite in silicocarbonatite
99	30 .....	Jacupirangite breccia
100	31 .....	Idiomorphism in jacupirangite
101	32 .....	Syenite breccia, Buttress Peak
102	33 .....	Syenite breccia, Buttress Peak
103	34 .....	Syenite breccia, Aquila Ridge
104	35 .....	Ocellar amphibole jacupirangite
105	36 .....	Lamprophyre dike
106	37 .....	Euhedral perovskite in phlogopite
107	38 .....	Melanite in nepheline syenite
108	39 .....	Variations in Si, Ti, Al, and Fe in oscillatorily zoned melanite
109	40 .....	Pyroxene composition trends: Ca, Fe, Mg
110	41 .....	Pyroxene composition trends: Na, Al, Ti

## List of Tables

Page	Table	Description
111-112	1 .....	Sample list
113	2 .....	Magnetite analyses
114	3 .....	Magnetite analyses corrected for $\text{Fe}_2\text{O}_3$
115-116	4 .....	Perovskite analyses
117-118	5 .....	Garnet analyses
119-120	6 .....	Melanite and schorlomite structural formulae
121	7 .....	Biotite analyses
122-125	8 .....	Pyroxene analyses
126-129	9 .....	Pyroxene formulae
130	10 .....	Amphibole analyses
131	11 .....	Nepheline analyses
132	12 .....	Miscellaneous analyses
133	13 .....	Densities of selected samples

Figure 1

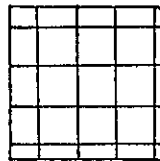
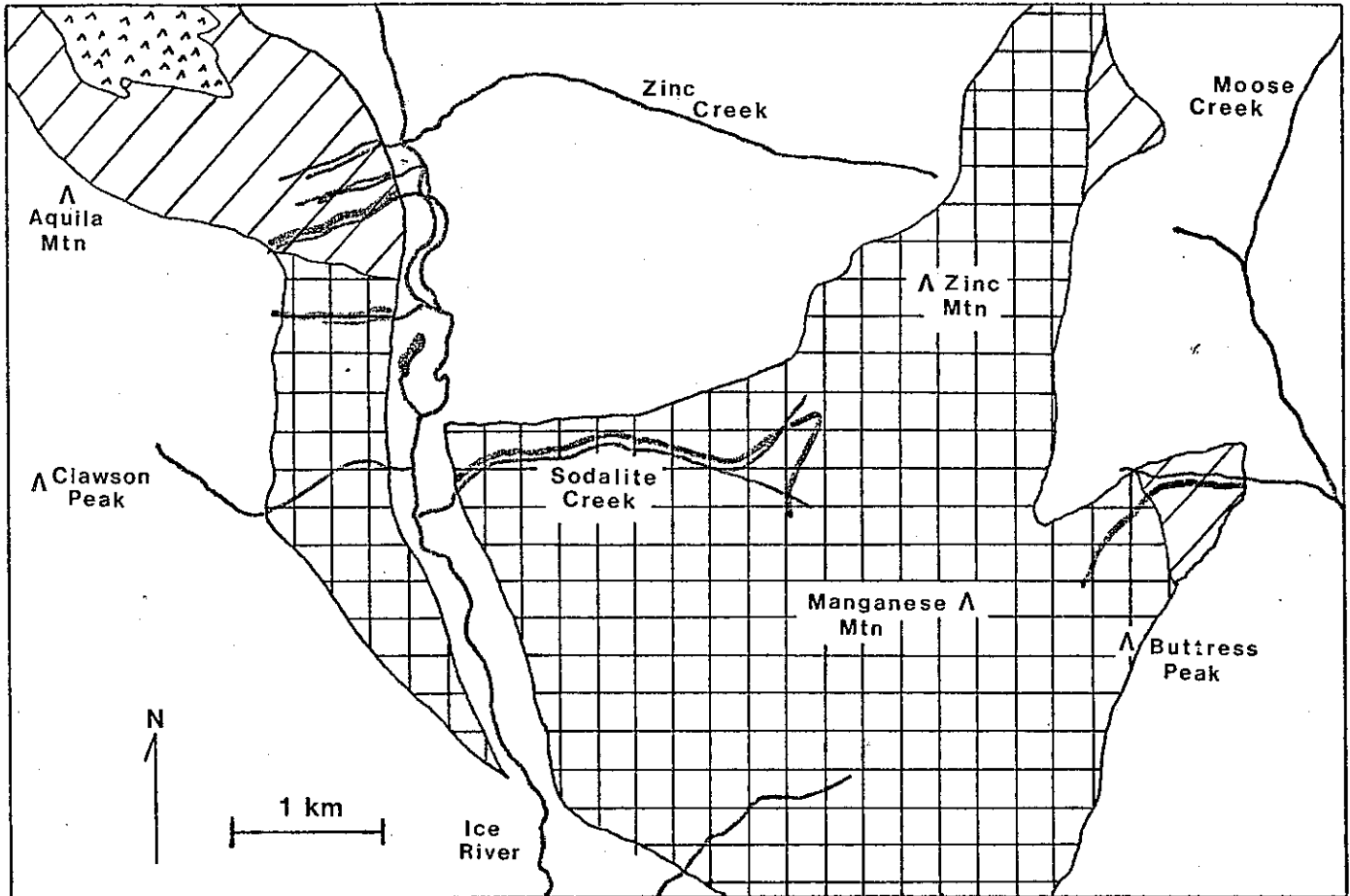
Location of the Ice River Complex



Extent of igneous rock

Figure 2

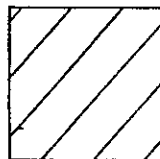
Traverse Locations



Syenitic Rocks



Traverse

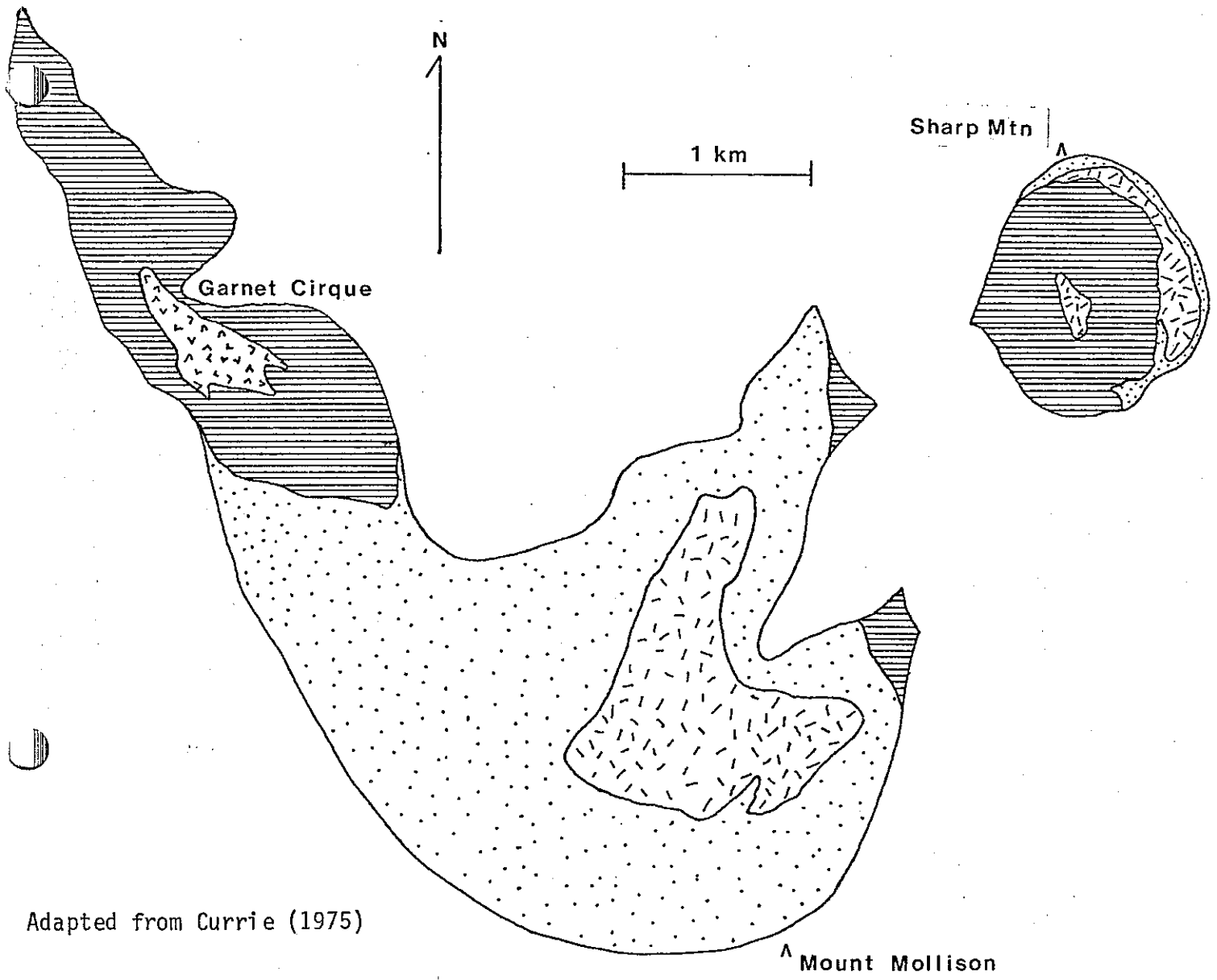


Ultramafic Rocks



Carbonatite

Geology adapted from Currie (1975) with simplifications.



Adapted from Currie (1975)

Figure 2A

Geology of the Ice River Complex



ULTRAMAFIC ROCKS  
Pyroxenite, ijolite,  
and urtite



SYENITE BRECCIA  
Mafic syenite inclusions  
in leucocratic syenite



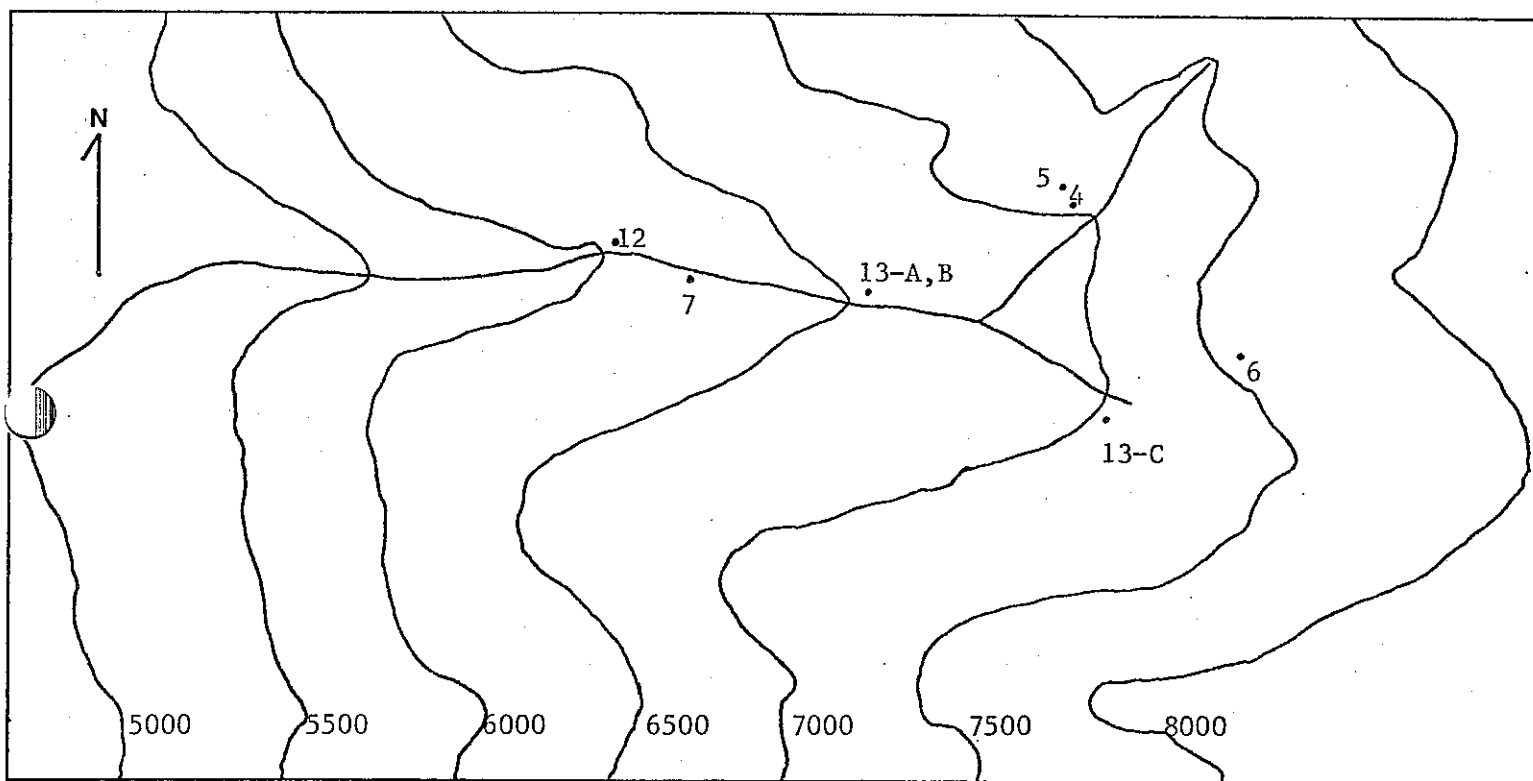
Carbonatite



LEUCOCRATIC SYENITE  
Nepheline and sodalite syenite

Figure 4

Sample Locations: Sodalite Creek



1 cm = 100 m

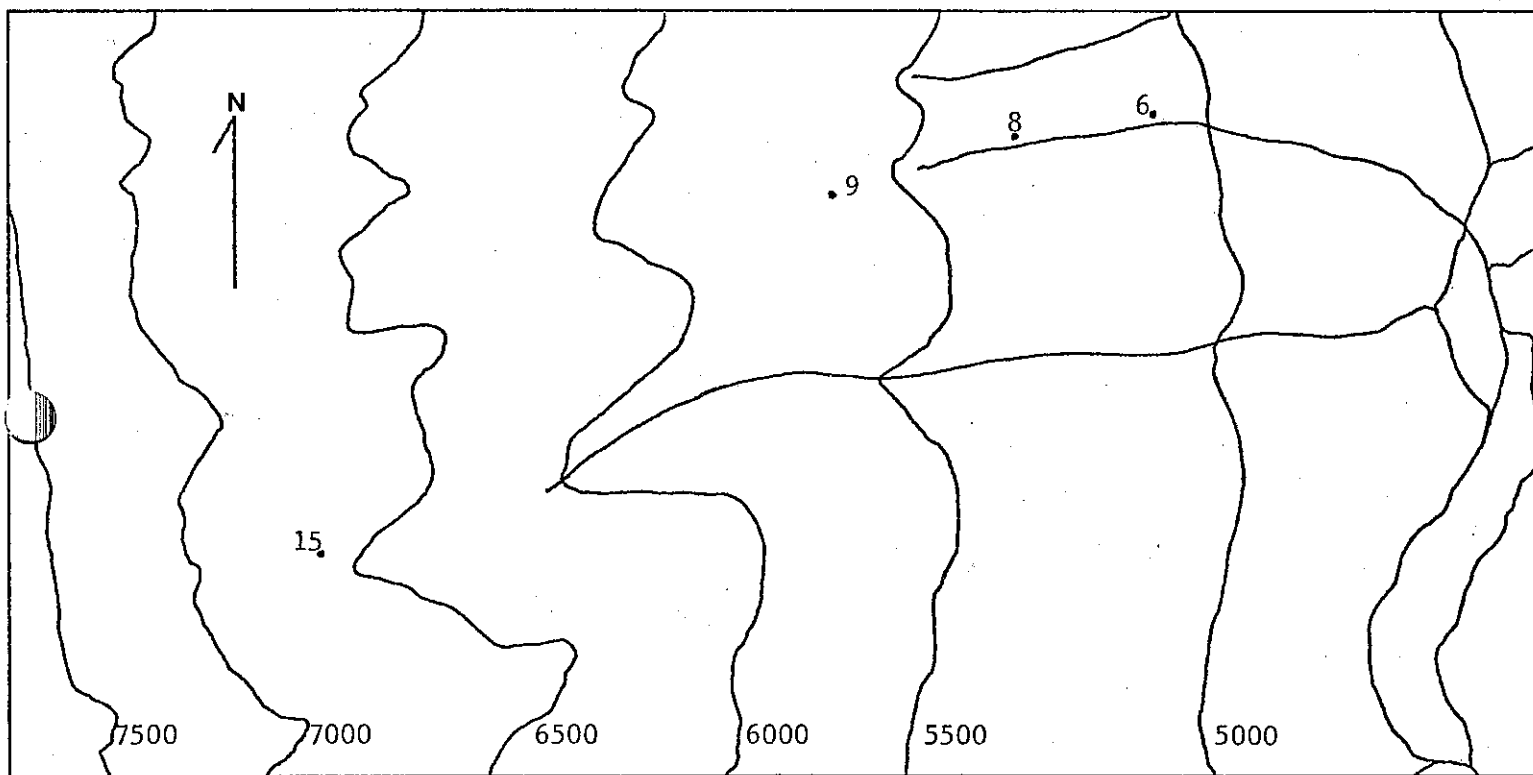
Altitudes are in feet

Samples 6 and 7 collected in 1983. All others  
are 81-IR.



Figure 5

Sample Locations: Aquila Ridge, 1981



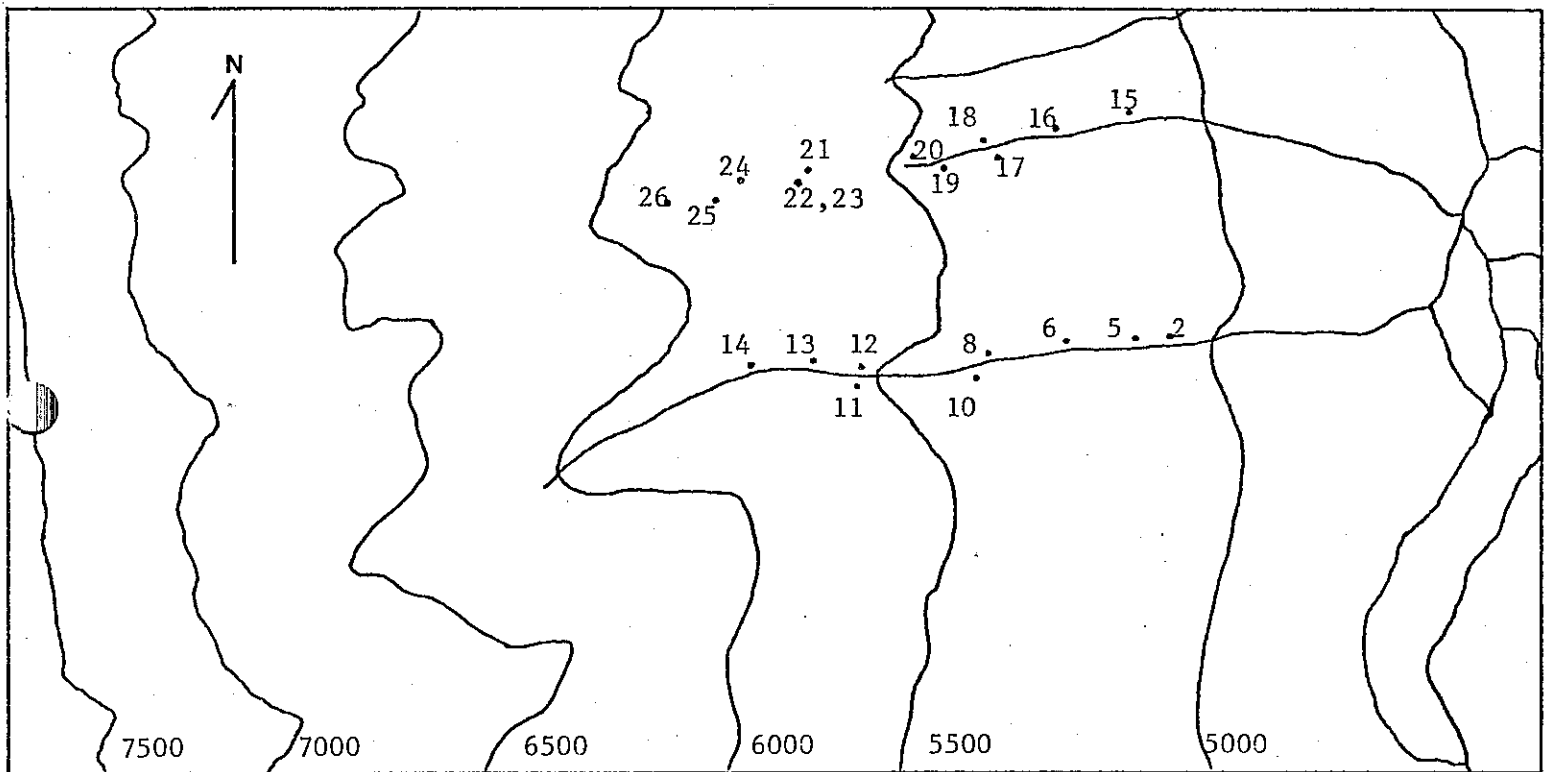
1 cm = 100 m

Altitudes are in feet

All samples are 81-IR

Figure 6

Sample Locations: Aquila Ridge, 1982

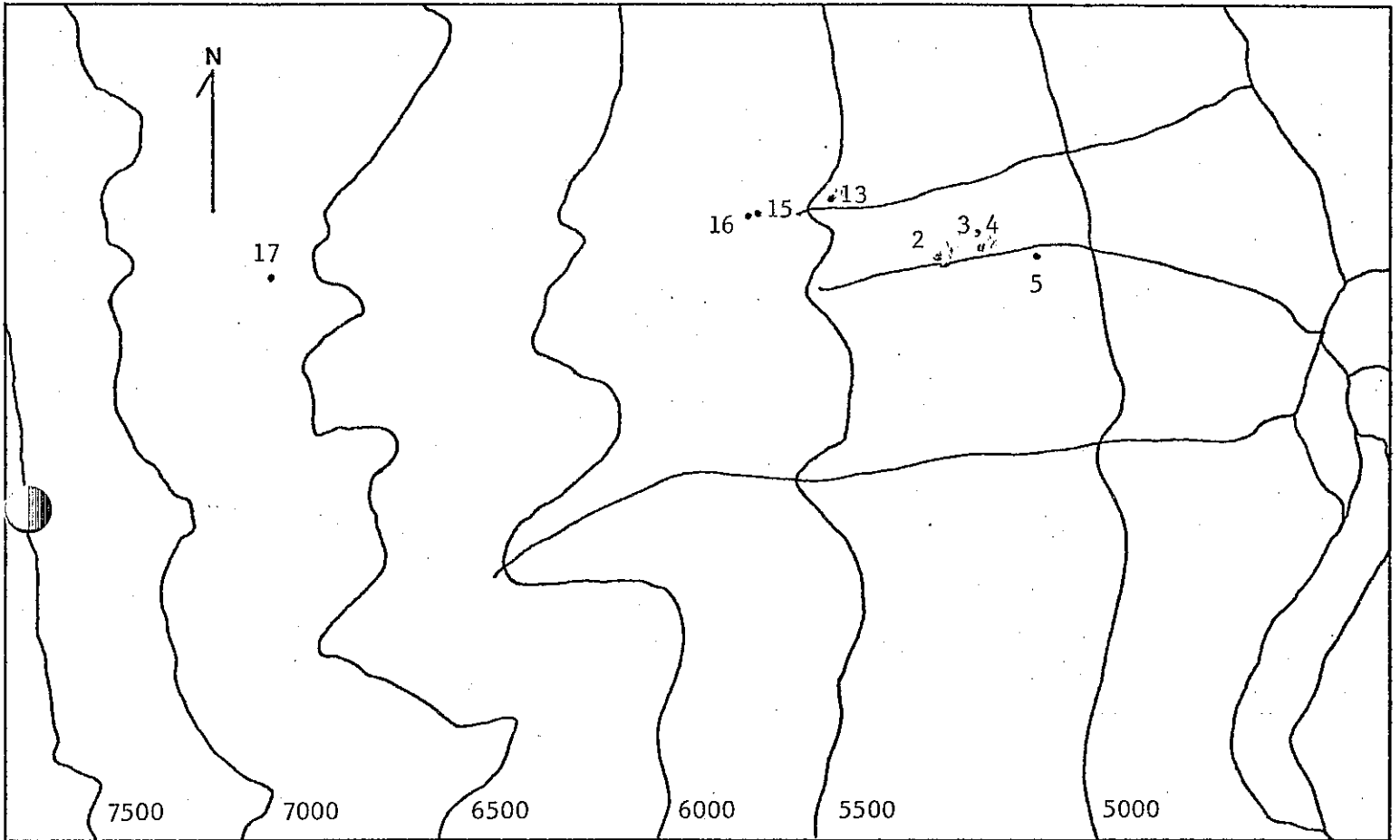
1 cm  $\approx$  100 m

Altitudes are in feet

All samples are 82-IR.

Figure 7

Sample Locations: Aquila Ridge, 1983



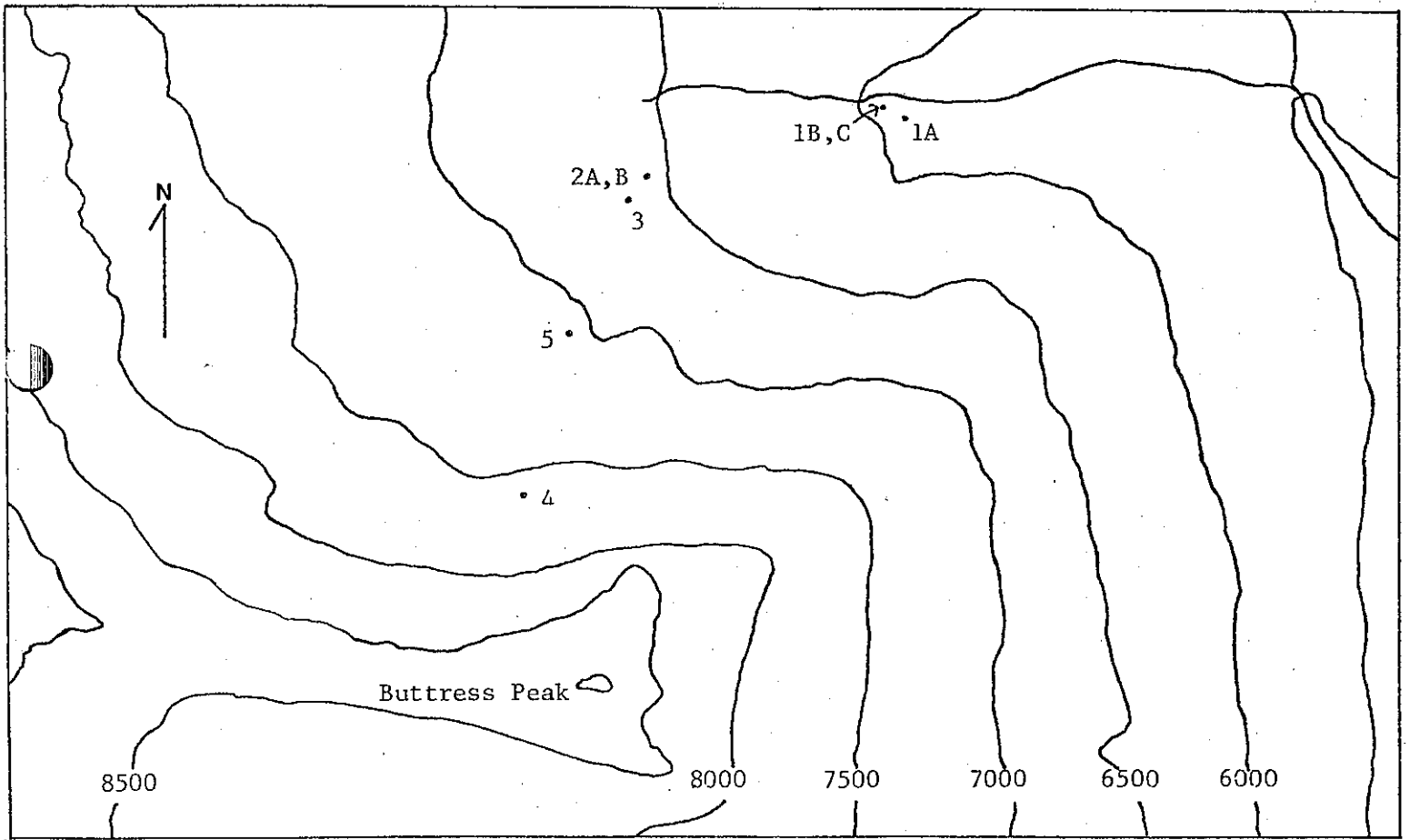
1 cm = 100 m

Altitudes are in feet

All samples are 83-IR.

Figure 6

Sample Locations: Moose Creek



1 cm = 125 m

Altitudes are in feet

All samples are 82-MC.

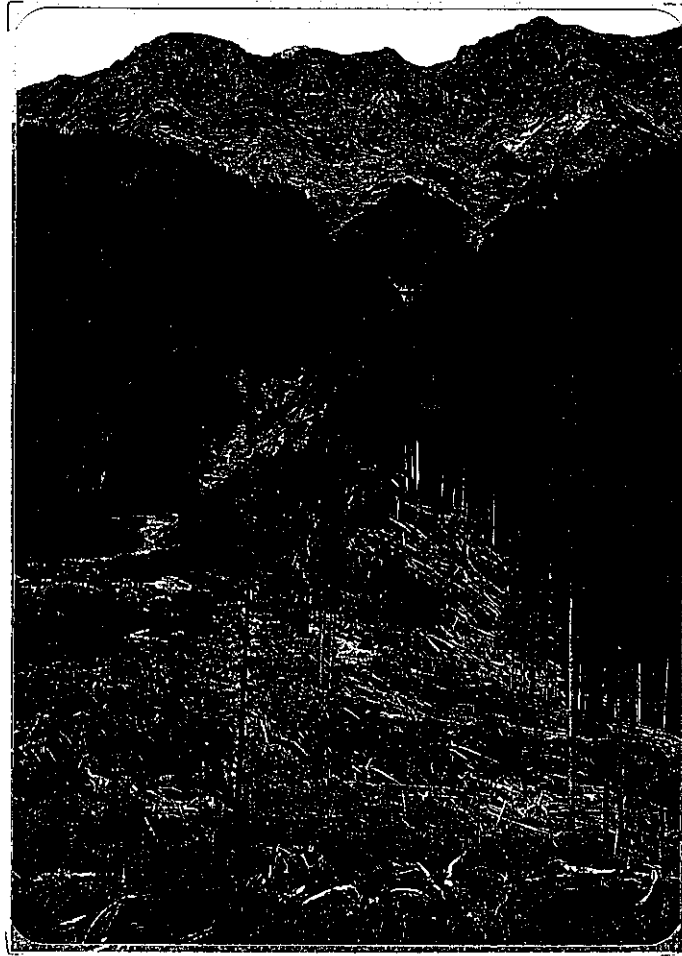


Figure 9

Aquila Ridge. The Ottertail Formation forms a cliff band above the roof of the complex along the ridge; the approximate locations of this contact and that between ijolitic rocks and the syenite breccia are drawn in. Further north (to the right) the syenite pinches out and ultramafic rocks are in direct contact with the limestone.