## SHEETS 9 and 10, LÜTZOW-HOLM BAY REGION AND 'YAMATO MOUNTAINS'

# Geology of the Lützow-Holm Bay Region and the 'Yamato Mountains' (Queen Fabiola Mountains)

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the 'Yamato Mountains' (Queen Fabiola Mountains) here as the 'Lützow-Holm Bay System.' was investigated for the first time by the first and fourth wintering teams of the Japanese Antarctic Re- been correlated with the basement complex of East search Expedition in 1957-1958 and 1960-1961, re- Antarctica purely on petrographical grounds, and they spectively (Tatsumi et al., 1959, 1964). The rocks of have been considered Precambrian in age. However, the region, mainly metamorphic and plutonic, are recent age measurements on biotites and euxenite by classified on the basis of petrography and mode of Rb-Sr and U-Pb methods suggest that regional metaoccurrence as follows: (1) pyroxene gneiss, (2) morphism in this area occurred late in the Cambrian pyroxene syenite, (3) marble and quartzite, (4) (Nicolayson et al., 1961; Saito et al., 1961; Picciotto metabasite, (5) biotite gneiss, (6) garnet gneiss, (7) and Coppez, 1964). Radiometric age determinations hornblende gneiss, (8) migmatitic gneiss, (9) granitic made on both minerals show good agreement and yield gneiss, (10) biotite- or microcline-granite, (11) peg- ages of about 500 m.y. (Table 1). matites, (12) fossil-bearing beach sands and gravels, and (13) glacial moraines.

The Lützow-Holm Bay area is composed mainly of various kinds of gneisses, metabasites, and granites, together with thin beds of marble and quartzite. Most of these are metamorphic rocks of the granulite facies (Banno, Tatsumi, Kuno, and Katsura, 1964; Banno, Tatsumi, Ogura, and Katsura, 1964). Along the farther inland. eastern coast of the bay, the foliation and banding generally strike north-south and dip eastward at 30° to 60°, but local fluctuations and gentle folds are found in some places. The geologic structure of East Ongul Island in Lützow-Holm Bay is characterized by isoclinal folds (Kizaki, 1964). The mantle of the major anticline consists of pyroxene gneiss, but the inner core is garnet gneiss. Some granite masses have intruded both gneisses, mainly in the neighborhood of their contact.

The 'Yamato Mountains' are also composed of various gneisses and granitic rocks. These mountains are characterized by extensive migmatite, granite, and syenite, in contrast to the Lützow-Holm coast where gneisses predominate (Kizaki, 1965; Ohta and Kizaki, 1966). The rock formations are arranged zonally parallel to the mountain arc. The western zone consists of pyroxene gneiss; migmatite and granitic gneiss constitute the central zone; and the eastern zone is composed of pyroxene syenite. From both tectonic and petrographic evidence the pyroxene gneiss and pyroxene syenite are considered an older charnockitic complex formed by the metamorphism of preexistent rocks. Foliation in this terrane shows an inclination of more than 60°. The migmatitic gneiss, granitic gneiss, and microcline granite form a younger group of rocks resulting from later plutonic activity. The gently inclined foliation in these gneisses defines folds whose axes trend northeastward in the north and generally northward in the south. The entire younger central complex has been thrust upward and eastward with shearing and slight dislocation. Metabasites present are classified into two kinds. The first type occurs as lenticular or sheetlike bodies paralleling the foliation and containing hypersthene. The other type is biotite amphibolite occurring as an oblique dike in the gneisses and granites.

The geology from Mt. Botnnuten through the 'Yamato Mountains' is so similar to that of the Lützow-Holm Bay coast that the whole area may be considered a single structural unit. Therefore, the gneisses and

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The geology of the Lützow-Holm Bay region and associated rocks found in the region are designated

In the past, metamorphic rocks in the region have

Glacial erratics include, beside the rocks exposed locally, garnet-sillimanite gneiss, anorthosite, amphibolite, epidote amphibolite, hornblende-chlorite schist, biotite hornfels, garnet-muscovite hornfels, quartzose sandstone, and ilmenite-augite basalt. The last four types of rocks were probably derived from the Beacon Sandstone and dolerite intrusives, thought to occur

Carbon-14 age determinations have been carried out on fossils from beach gravel beds (Meguro et al., 1964) and are summarized in Table 2.

#### References

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Nicolaysen, L. O., Burger, A. J., Tatsumi, T., and Ahrens, L. H. (1961) Age measurements on pegmatites and a basic charnockite lens occurring near Lützow-Holm Bay, Antarctica, Geochim. Cosmochim. Acta, 22, 94-98.

Ohta, Y., and Kizaki, K. (1966) Petrographic studies of potash feldspar from the Yamato Sanmyaku, East Antarctica, JARE Sci. Rept., Ser. C, No. 5, 40 pp.

Picciotto, E., and Coppez, A. (1964) Bibliographie des mesures d'âges absolus en Antarctique (addendum, août 1963), Ann. Soc. Géol. Belgique, 87, 115-128.

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cal and geological studies of the wintering team (1957-58) of the first Japanese Antarctic Research Expedition, Pt. 1, Antarctic Record, No. 7, pp. 373-388; Pt. 2, Antarctic Record, No. 8, pp. 443-463, (in Japanese with English abstract). Tatsumi, T., Kikuchi, T., and Kizaki, K. (1964) Geology of the region around Lützow-Holmbukta and the "Yamato Mountains" (Dronning Fabiolafjella), in Antarctic Geology,

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arctic Geology, Cape Town, 16-21 September 1963, edited

by R. J. Adie, pp. 293-303, North-Holland, Amsterdam.



(Queen Fabiola Mountains)

INDEX MAPS

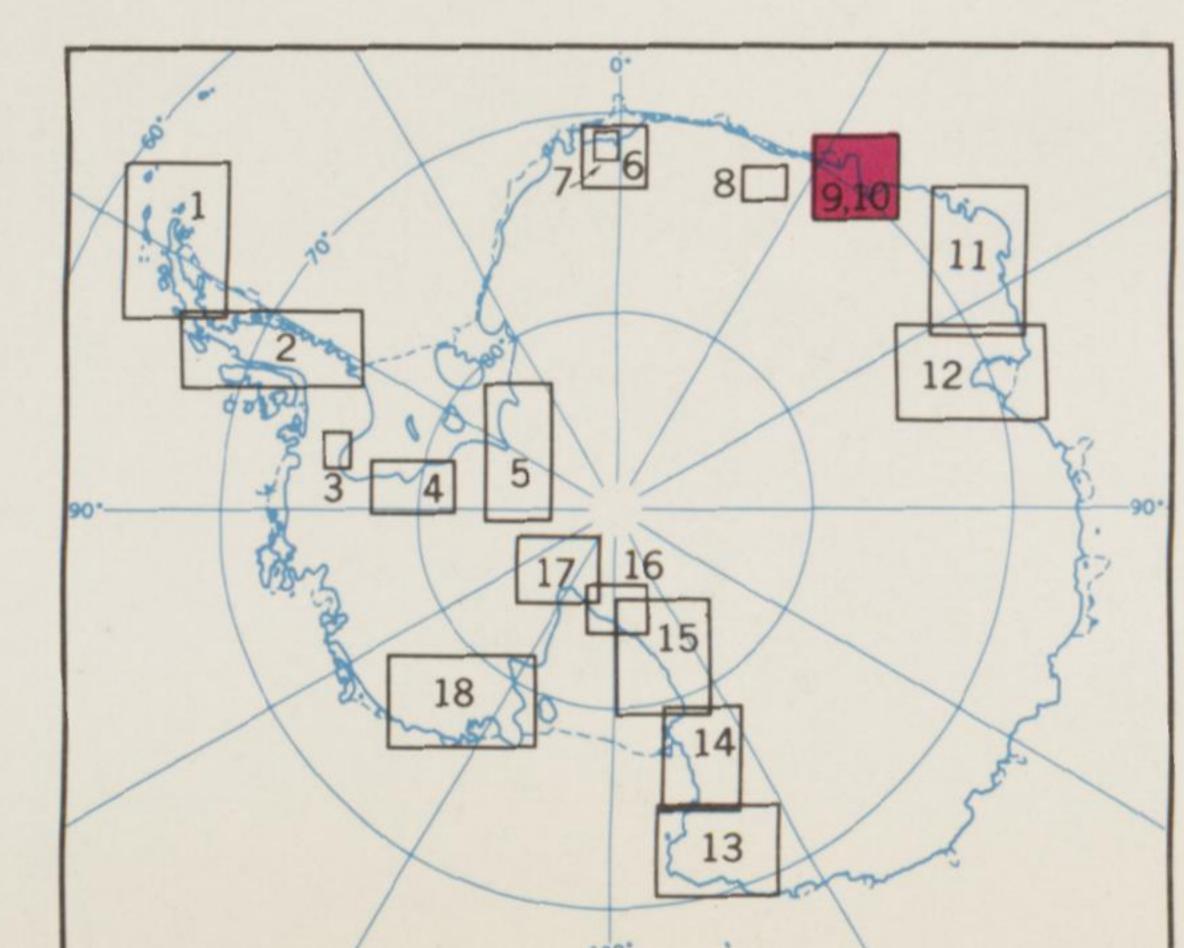


TABLE 1. RADIOMETRIC AGE DETERMINATIONS OF MINERALS

Location	Lithology	Method and Material	Age (m.y.)	Ref.
Skallen Hills 69°38'S, 39°23'E	Granitic pegmatite in pyroxene gneiss	Rb-Sr Biotite	530±16	1
		U-Pb Euxenite	470	2
Langhovde Hills 69°13'S, 39°38'E	Granitic pegmatite in granitic gneiss			1
Skarvsnes Foreland 69°26'S, 39°34'E	Granitic pegmatite in pyroxene gneiss	Rb-Sr Biotite	510±30	1
Ongul Island 69°01'S, 39°32'E	A small biotite- rich mass in a basic charnockite lens, occurring in garnet gneiss	Rb-Sr Biotite	500±30	1
Yamato Mountains 71°22'S, 35°29'E	Granitic gneiss	Rb-Sr Biotite	457	3

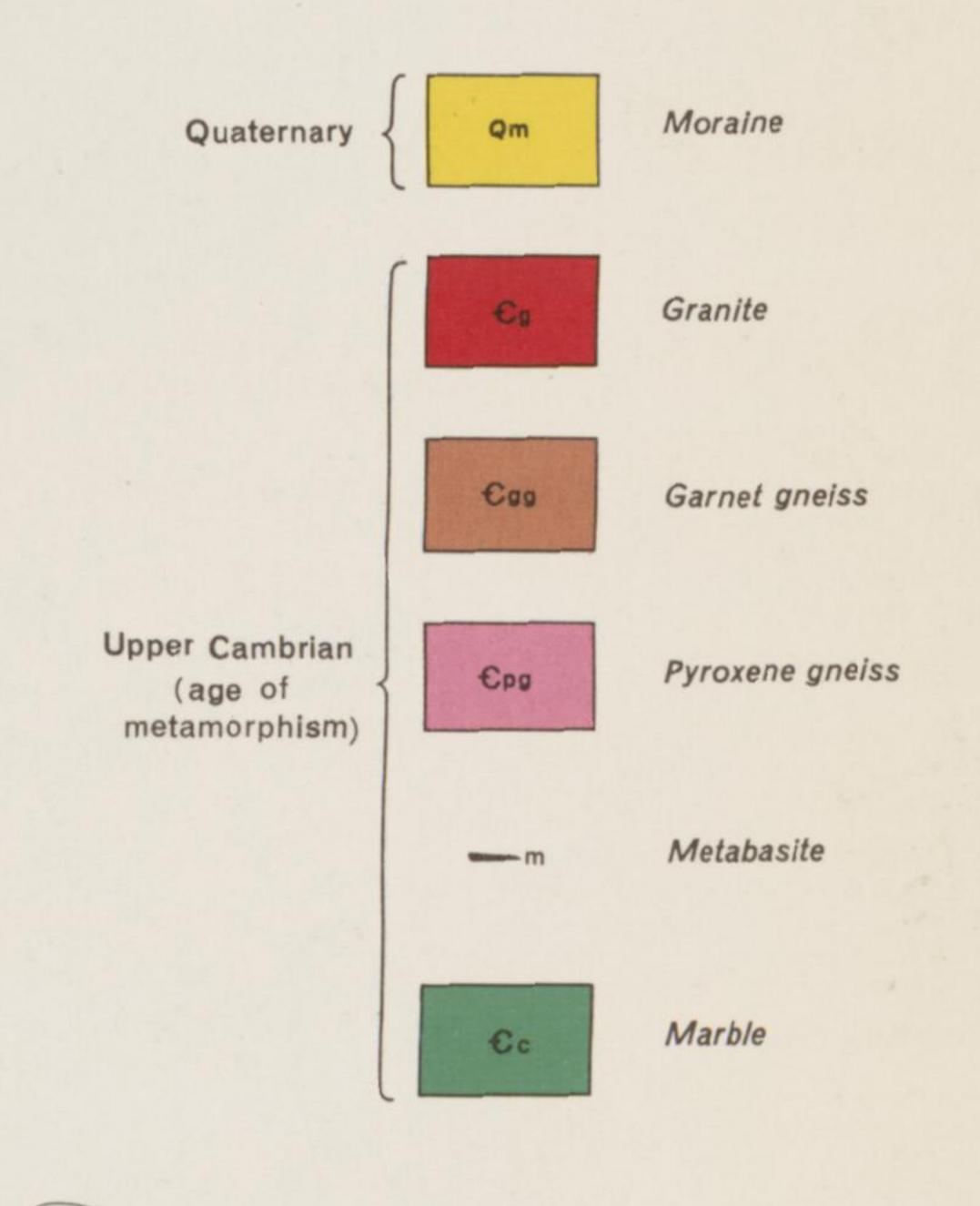
- 1. Nicolayson et al., 1961
- 2. Saito et al., 1961
- 3. Picciotto and Coppez, 1964

TABLE 2. CARBON-14 AGE DETERMINATIONS OF FOSSILS FROM RAISED BEACH GRAVEL BEDS

Location	Beach elevation (meters)	Material	Age	Ref
East Ongul Island	7 to 8	Fragments of mollusca	25,400±1,200	1
"	12	"	34,400+3,000 -2,000	1
"	9 to 10	"	22,800±1,000	1
"	3 to 4	"	29,500+2,400 -1,800	1
,	7 to 8	Tests of benthonic foraminifera	31,200+2,500 -1,900	1

1. Meguro et al., 1964

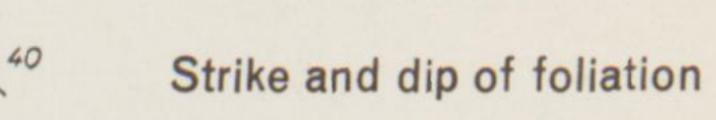
### EXPLANATION - SHEET 10

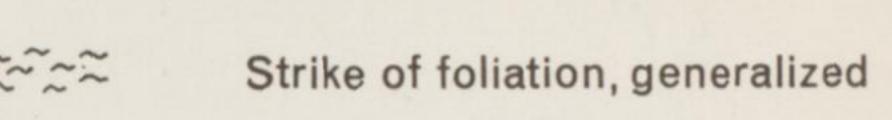




Geologic contact

Limits of landforms rising above the surface of the surrounding ice with varying amounts of rock exposure



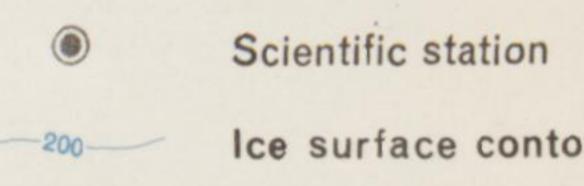


Anticline with direction of plunge

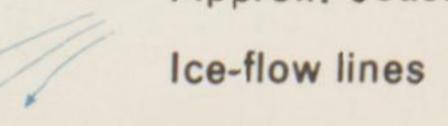
Overturned anticline

Syncline

Radiometric age determination showing age in m.y., method (R=Rb-Sr, U=U-Pb), and material (b=biotite, e=euxenite)

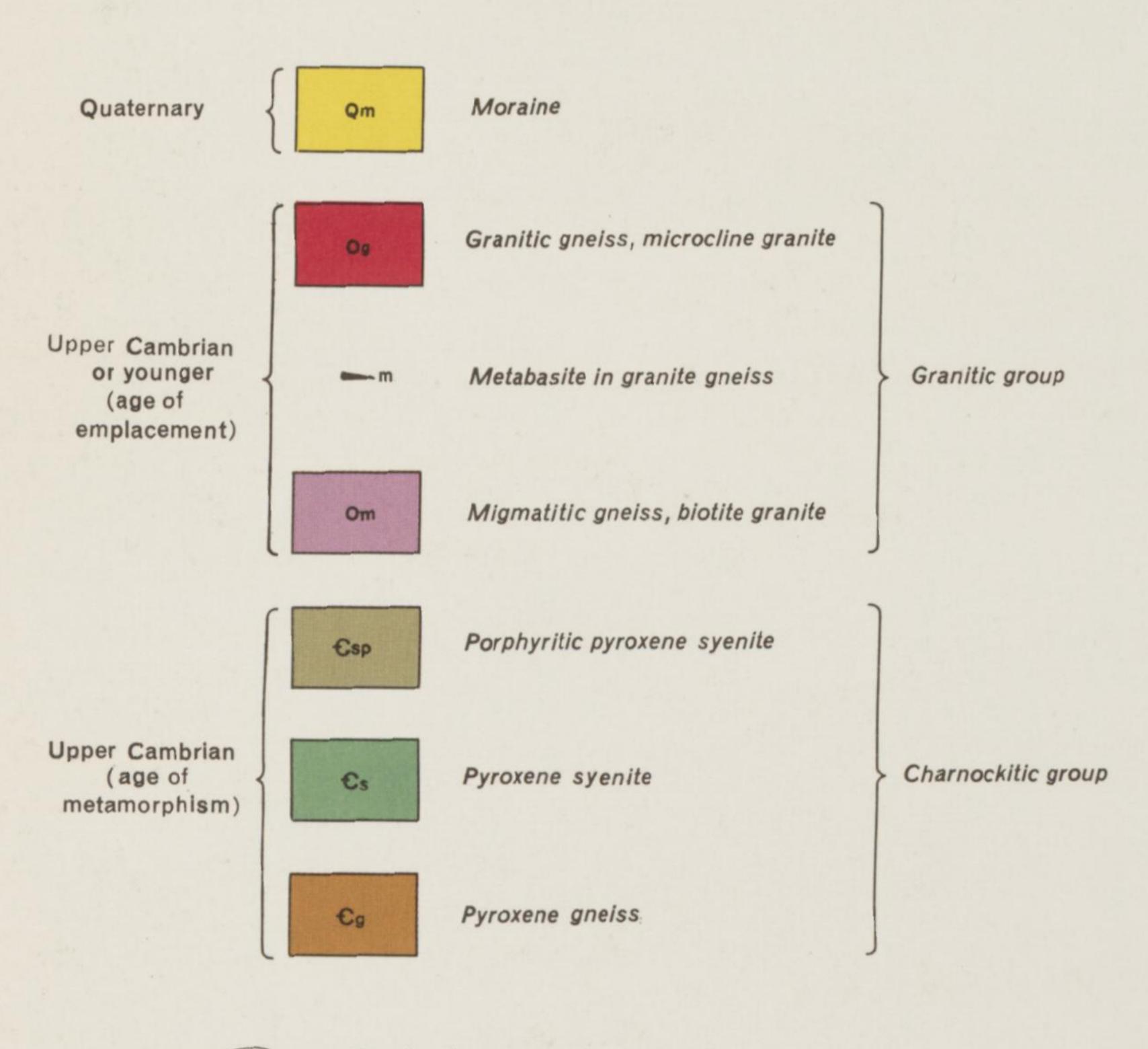


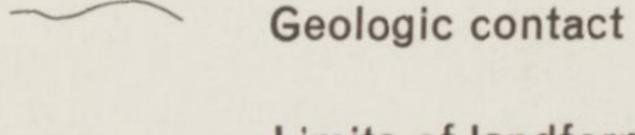
Ice surface contours (m) Approx. coastline



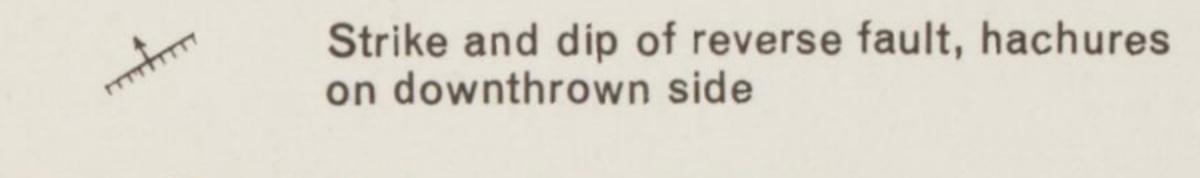
Edge of ice tongue

#### EXPLANATION-SHEET 9



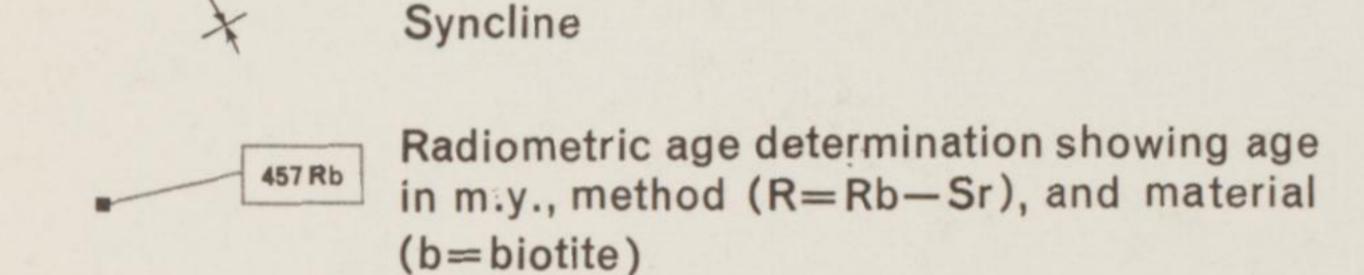


Limits of landforms rising above the surface of the surrounding ice with varying amounts of rock exposure

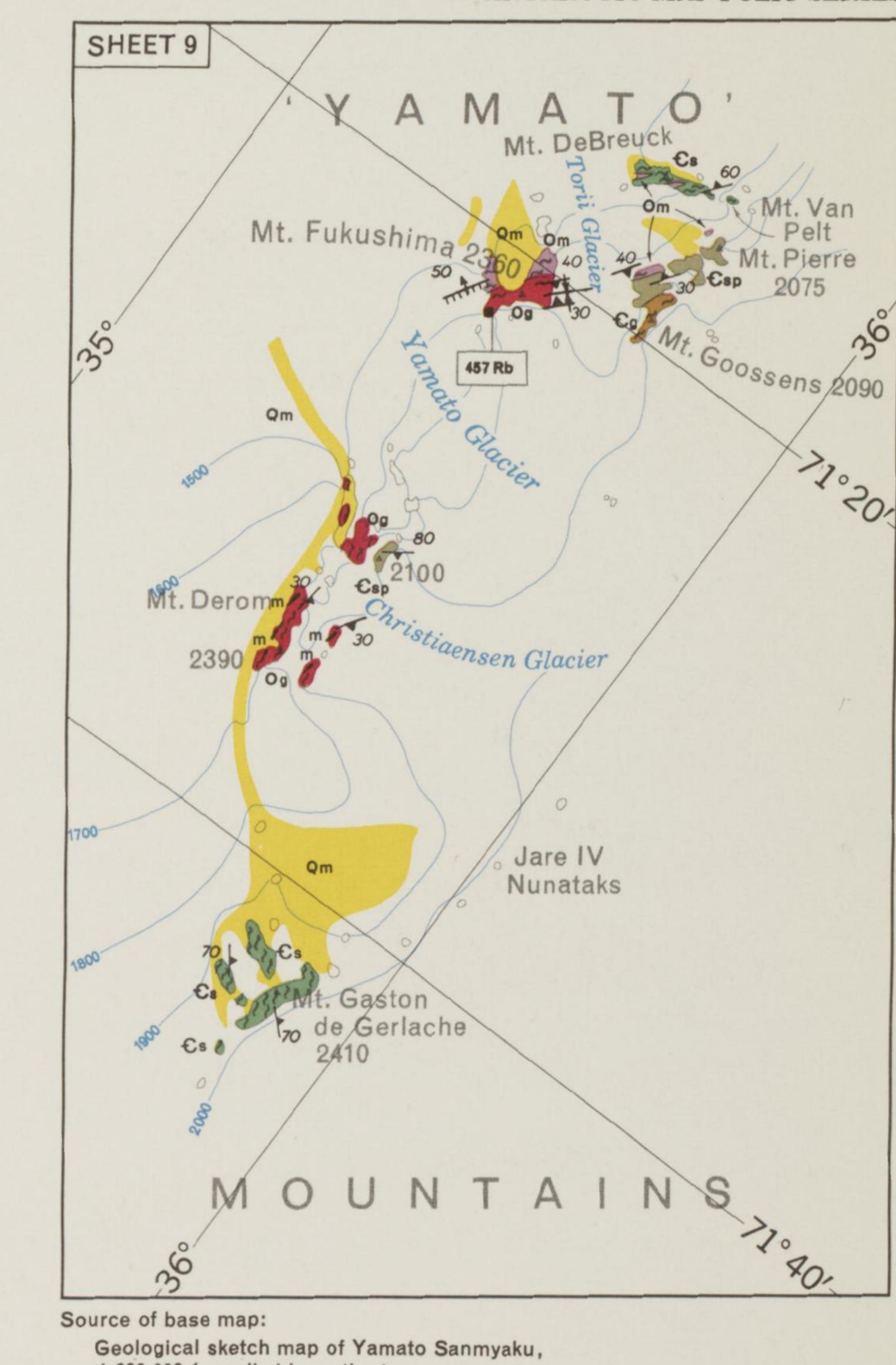


Strike and dip of foliation

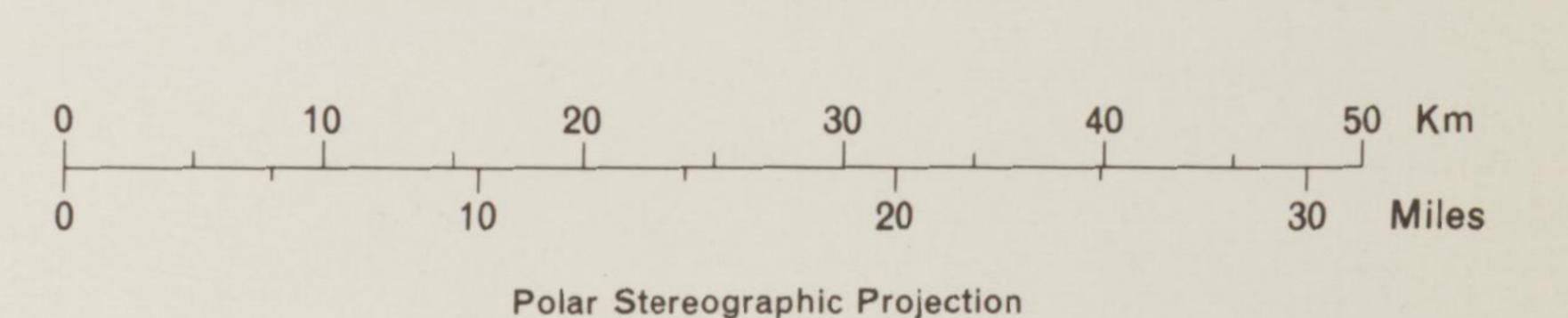
Strike of foliation, generalized



Ice surface contours (m)



1:200,000 (supplied by author)



Scale 1:500,000 (for both sheets)

Names used are those approved by the United States Board on Geographic Names

Elevations in meters

