NATIONAL INSTITUTE OF POLAR RESEARCH

ANTARCTIC GEOLOGICAL MAP SERIES
SHEET 1 EAST ONGUL ISLAND

Explanatory Text of Geological Map of East Ongul Island, Antarctica

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On the Publication of the Antarctic Geological Map Series

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Since 1956 when the Japanese Antarctic Research Expedition (JARE) was started, several Japanese geologists among the members of the JARE summer and/or wintering parties have performed geological surveys in the Lützow-Holm Bay area and its environs, East Antarctica.

The Lützow-Holm Bay and neighboring areas are composed mainly of high-grade metamorphic rocks associated with plutonic rocks of Precambrian and lower Palaeozoic Periods known as the plutono-metamorphic age. Many contributions on the above areas' geology including petrology, mineralogy, palaeontology and sedimentology have been published in several kinds of academic periodicals and books. However, no detailed geological map except that of East Ongul Island has been published.

Table 1. Antarctic Geological Map Series.

Sheet No.	Region	Scale	Geologist(s) surveyed
Sheet 1	East Ongul Island	1:5,000	K. YANAI, T. TATSUMI, T. KIKUCHI and K. KIZAKI
Sheet 2	West Ongul Island	1:5,000	K. YANAI, T. TATSUMI and T. KIKUCHI
Sheet 3	Teöya	1:5,000	K. YANAI, T. TATSUMI and T. KIKUCHI
Sheet 4	Ongul Kalven Island	1:5,000	K. YANAI, T. TATSUMI and T. KIKUCHI
Sheet 5	Lang Hovde	1:25,000	T. ISHIKAWA, T. TATSUMI, T. KIKUCHI, K. KIZAKI, K. YANAI, M. YOSHIDA and T. ANDO
Sheet 6	Breidvågnipa	1:25,000	T. ISHIKAWA
Sheet 7	Skarvs Nes	1:25,000	K. KIZAKI, T. TATSUMI, T. KIKUCHI, T. ISHIKAWA and S. KOJIMA
Sheet 8	Kjuka and Telen	1:25,000	T. ISHIKAWA and K. YANAI
Sheet 9	Skallen	1:25,000	M. YOSHIDA, T. TATSUMI, T. KIKUCHI and T. ISHIKAWA
Sheet 10	Padda Island	1:25,000	T. ISHIKAWA
Sheet 11	Cape Hinode	1:25,000	T. ISHIKAWA and K. YANAI
Sheet 12	Lützow-Holm Bay	1:250,000	M. YOSHIDA, T. TATSUMI, T. KIKUCHI, K. KIZAKI, K. YANAI, T. ANDO, T. ISHIKAWA and S. KOJIMA
Sheet 13	Prince Olav Coast	1:250,000	M. YOSHIDA, T. ISHIKAWA, T. ANDO and K. YANAI
Sheet 14	Yamato Mountains	1:100,000	M. YOSHIDA, K. KIZAKI and T. ANDO

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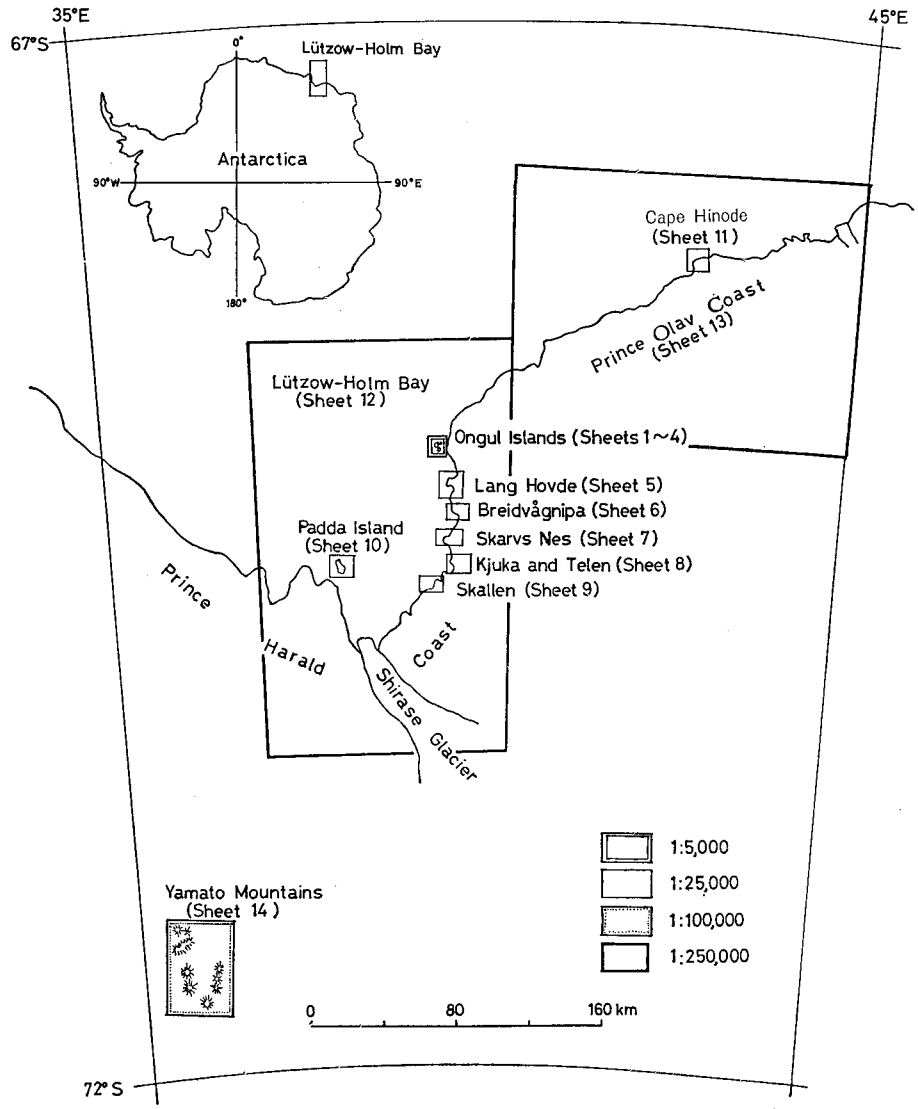

Fig. 1. Index map of Lützow-Holm Bay and its environs, East Antarctica.

On the occasion of the inauguration of the National Institute of Polar Research in Japan in September 1973, systematic publication of the Antarctic Geological Map Series was agreed upon. This is very welcome as it will benefit not only geological science but also all natural sciences including environmental science.

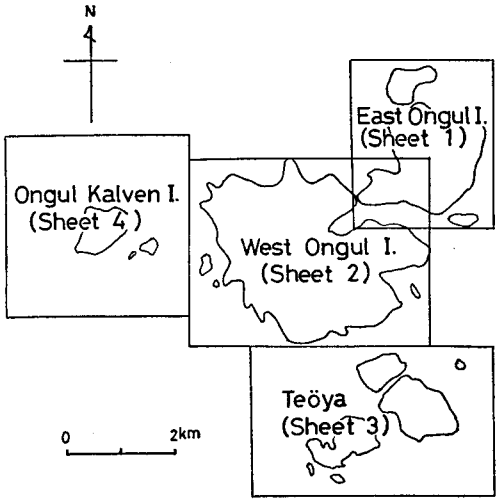

Fig. 2. Index map of the geological maps of the Ongul Islands, Lützow-Holm Bay, East Antarctica.

As Table 1 and Figs. 1 and 2 indicate, the Antarctic Geological Map Series consists of fourteen colored geological maps with detailed explanatory texts written in English. The scale of the maps ranges from 1 : 5,000 to 1 : 250,000.

On behalf of all the geologists concerned, I wish to take this opportunity to express my sincere appreciation to the members of the JARE parties, and the staffs of the National Institute of Polar Research, Geological Survey of Japan, and Geographical Survey Institute for kindly affording every convenience and help.

Explanatory Text of Geological Map of East Ongul Island

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1. The Ongul Islands

The Ongul Islands are situated in the northeast of Lützow-Holm Bay and are separated from Prince Olav Coast of the Antarctic continent by the Ongul Strait of 5 km wide. The Islands are composed of more than ten small islands, of which the largest is West Ongul Island with approximate diameter of 3.5 km. Syowa Station of the Japanese Antarctic Research Expedition (JARE) is located on the north coast of East Ongul Island (69°00′S, 39°35′E), northeast of West Ongul Island.

The coast of Lützow-Holm Bay was firstly photographed from air and christened by the Lars Christensen Expedition in 1937, and part of the Bay was again photographed by the U. S. Navy plane under the High Jump Operation of 1947. In 1956, the Ongul Islands and Prince Olav Coast were landed for the first time by the members of JARE, and then the permanent station was established.

The topographical map of the islands on a scale of 1 : 5,000 prepared by the Geographical Survey Institute is available for geological mapping.

Preliminary survey and investigation of the geology along the Lützow-Holm Bay coast including the Ongul Islands were carried out and reported by TATSUMI and KIKUCHI, members of the first wintering team of the JARE I in 1956–1958 (TATSUMI and KIKUCHI, 1959a, b). KIZAKI of the JARE IV in 1960–1961 studied the geology and petrography of East Ongul Island in detail (KIZAKI, 1962, 1964). In 1968, YANAI of the JARE IX carried out more detailed investigations of the whole Ongul Islands, including East and West Ongul, Ongul Kalven and Teöya Islands.

Many islands and outcrops along the east coast of Lützow-Holm Bay extend about 120 km north-south between the Ongul Islands and the Shirase Glacier at the head of the Bay. These islands and coastal outcrops consist of many kinds of metamorphic and granitic rocks which are collectively designated as the Lützow-Holm Bay System (TATSUMI, KIKUCHI and KIZAKI, 1964). Most of the metamorphic rocks are of the granulite facies (BANNO *et al.*, 1964a, b; SUWA, 1968). The

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trend of the gneissosity of these rocks varies from place to place, showing no definite direction. Fold structures are observed in some outcrops. The entire picture of the structure of the Lützow-Holm Bay System is still obscure because the outcrops are discontinuous and scattered.

2. East Ongul Island

East Ongul Island, 2.5 km north-south and 2 km east-west, is surrounded by a few small islands. Geomorphologically the island is a rather flat and smooth landmass about 30 m above sea level. The highest point is 43.3 m in the central part of the island. The geology and structure were studied and reported by KIZAKI (1962, 1964).

3. Geology of East Ongul Island

The island is structurally characterized by an isoclinal fold plunging to the south. The mantle of the fold is composed of charnockitic pyroxene gneiss, while the core is occupied mainly by garnet gneiss. Patches of pyroxene gneiss occur in some parts of the core. The pyroxene gneiss also contains some sheet-like bodies of garnet gneiss in the southwestern part of the island. The pyroxene gneiss alternates with hornblende gneiss in the western part of the island. The thickness of the alternating layers along the west coast is several tens of centimeters. Where the alternating hornblende and pyroxene gneisses are dominant, granitic sheets and microcline pegmatites are usually found. The small granitic sheets are concordantly emplaced in the hornblende gneiss along the frontal zone of the isoclinal fold. The hornblende gneiss seems to have been derived from pyroxene gneiss. Lenses or thin beds of metabasite occur in certain horizons and they are invaluable keys in structural analysis. The gneisses are intruded by numerous pegmatite dikes which are of two types: microcline pegmatite and hornblende pegmatite. Part of the pyroxene gneiss along the dikes of the microcline pegmatite is altered to hornblende gneiss.

The raised beach deposits are distributed along the present shoreline and the lowland of the island. Erratic boulders are scattered throughout the island. These deposits and boulders are of the Quaternary formation.

3.1. Basement

The rocks of the Lützow-Holm Bay System in East Ongul Island are classified petrographically into the following types:

1. Metabasite
2. Pyroxene gneiss
3. Hornblende gneiss
4. Garnet gneiss
5. Feldspathic band

6. Hornblende-biotite gneissose granite
7. Pegmatite

Age deteminations on the rocks consisting the Lützow-Holm Bay System have been carried out and are listed in Table 1.

Table 1. Radiometric ages of rocks from East Ongul Island.

Lithology	Material analysed	Method	Age (m. y.)	Ref.
Biotite-hornblende gneiss	Whole rock	K-Ar	387	1
〃	Bi+Hb	K-Ar	421	1
〃	Fel+Q	K-Ar	350	1
Hornblendite	Bi+Hb	K-Ar	533	2
Pyroxenite	Bi	K-Ar	517	2
Eclogite	Bi+Hb	K-Ar	467	2

1. KANEKO *et al.*, 1968.
2. YANAI and UEDA, 1974.

Bi=Biotite, Hb=Hornblende, Q=Quartz, Fel=Feldspar.

3.1.1. Metabasites (Bm)

Metabasites occur as thin beds, lenses or irregular-shaped inclusions of various sizes within all varieties of gneisses. They are generally massive, but sometimes show a gneissose structure. The rock is fine- to medium-grained and black or dark-bluish black in color. Metabasite is mainly pyroxene amphibolite, but can be divided into the following subspecies by their mineral assemblages: pyroxene amphibolite, pyroxenite, garnet-bearing pyroxene amphibolite, hornblende eclogite, hornblendite and anorthosite.

1) Pyroxene amphibolite: The pyroxene amphibolite is the most abundant metabasite of this area. It is composed mainly of hornblende, clinopyroxene, orthopyroxene and plagioclase, with minor amount of pale brown biotite.

2) Pyroxenite: A pyroxene-rich and plagioclase-free variety of pyroxene amphibolite occurs as basic ovoidal inclusions in the pyroxene gneiss zone of the eastern coast of the island. The rock is composed of orthopyroxene, clinopyroxene, hornblende, olivine and biotite. Chemical compositions of pyroxenite are shown in Table 2.

3) Garnet-bearing pyroxene amphibolite: The rock occurs only locally. Main constituents are hornblende and garnet in the garnet gneiss zone, but in the pyroxene gneiss zone pyroxene and garnet are predominant.

4) Hornblende eclogite: Metabasite with reddish to reddish-brown color is composed chiefly of garnet, and is seen only in the small island just north of the Fukushima cairn near the station. The minor constituents of the rock are orthopyroxene, clinopyroxene, hornblende, phlogopite and plagioclase (An 94–90). Rocks

Table 2. Chemical composition of rocks and minerals from East Ongul Island.

No.	1	2	3	4	5	6	7	8	9	10	11	12
SiO_2	48.66	44.49	44.20	40.14	53.20	52.41	51.53	50.44	44.49	54.48	52.61	56.82
TiO_2	0.17	0.24	0.42	0.56	0.22	0.25	0.08	0.52	1.19	tr	0.11	<0.01
Al_2O_3	23.57	13.69	15.38	20.79	2.70	0.76	4.48	18.00	12.26	27.98	0.90	27.43
Fe_2O_3	1.37	1.19	4.53	0.46	1.03	1.12	1.29	0.11	1.94	0.54	0.44	0.22
FeO	4.44	11.36	15.48	19.42	8.74	22.14	18.80	9.64	5.65	0.39	4.33	0.07
MnO	0.06	0.14	0.48	0.49	0.28	0.24	0.22	0.15	0.16	tr	0.23	<0.01
MgO	4.49	14.17	8.65	10.82	24.16	22.10	22.35	8.20	11.82	0.47	17.17	<0.01
CaO	9.56	9.38	6.96	6.00	6.78	0.18	1.27	8.00	17.31	9.66	22.91	9.00
Na_2O	3.88	1.87	1.93	0.56	0.33	0.53	0.34	2.68	1.42	5.03	0.00	6.29
K_2O	1.53	1.25	0.30	0.24	0.34	0.13	0.08	0.45	0.99	0.37	tr	0.44
H_2O^+	2.18	1.85	1.27	0.34	2.03	tr	tr	0.88	1.54	0.51	0.72	0.31
H_2O^-	0.21	0.16	0.20	0.11	0.10	0.19	0.06	0.21	0.45	0.13	0.09	0.19
P_2O_5	0.14	0.11	0.09	0.11	0.12	0.07	0.05	0.14	0.03	0.02	0.27	<0.01
Total	100.26	99.90	99.89	100.04	100.03	100.12	100.55	99.42	99.72	99.58	99.78	100.77

No. 1. 68012101 Amphibolite. Analyst, K. YANAI.
2. 68091201-2 Hornblendite. Analyst, K. YANAI.
3. 68032303 Hornblende eclogite. Analyst, K. YANAI.
4. 68091201-1 Hornblende eclogite. Analyst, K. YANAI.
5. 68032704 Pyroxenite. Analyst, K. YANAI.
6. 68032304 Pyroxenite. Analyst, K. YANAI.
7. 68032701 Pyroxenite. Analyst, K. YANAI.
8. 68032702 Pyroxenite. Analyst, K. YANAI.
9. 68032703 Pyroxenite. Analyst, K. YANAI.
10. 68032301 Anorthosite. Analyst, K. YANAI.
11. JARE57012501 Diopside from pyroxenite (BANNO *et al.*, 1964a)
12. JARE57012602 Plagioclase from pyroxene gneiss (SUWA, 1966)

of this type are found sporadically in the Ongul Islands though they are very few. Chemical compositions of hornblende eclogite are shown in Table 2.

5) Hornblendite: Metabasite composed of hornblende, forming hornblende eclogite, is found in the small island. The associated minerals are phlogopite, orthopyroxene and plagioclase (An 34–58), while garnet is entirely absent. Chemical composition of hornblendite is shown in Table 2.

6) Anorthosite: Anorthosite of leucocratic milky color is found in the rather large metabasite bed which is distributed around Syowa Station. The rock is variable in facies, such as pyroxene amphibolite, eclogite and so forth. The rock consists mostly of plagioclase (An50), associated with pale brown biotite of a very small amount. The anorthosite occurs as small patches within the metabasite bed, and no other occurrences are known. Chemical composition of anorthosite is shown in Table 2.

3.1.2. Pyroxene gneiss (Gp)

Pyroxene gneiss is exposed on the eastern and western sides of the island. It constitutes the mantle of the anticline. In the western half of the island, the gneiss alternates with hornblende gneiss, and the alternating layers are sometimes several tens of centimeters thick. In the area of garnet gneiss, the contact between the pyroxene gneiss and the garnet gneiss is generally transitional. The pyroxene gneiss has medium- to fine-grained granoblastic texture and shows weak gneissosity. The rock is characterized by a light brown color which is due to the presence of brown-colored feldspar and quartz crystals.

The pyroxene gneiss is divided into the following subspecies: basic enderbitic pyroxen gneiss, charnockitic pyroxene gneiss and garnet-bearing enderbitic pyroxene gneiss.

1) Basic enderbitic pyroxene gneiss: The rock is usually associated with amphibolites, so it could be a variety of metabasites. The rock is composed of plagioclase, orthopyroxene, biotite and hornblende. Plagioclase is low-temperature andesine (SUWA, 1966).

2) Charnockitic pyroxene gneiss: The rock is characterized by potash feldspar and quartz, besides having the mineral assemblage of the basic enderbitic pyroxene gneiss, though the mineral composition is somewhat variable.

3) Garnet-bearing enderbitic pyroxene gneiss: The rock is found near the boundary between the pyroxene gneiss and the garnet gneiss. The constituents are plagioclase, quartz, orthopyroxene, clinopyroxene and garnet, with minor amounts of hornblende, biotite and titanite.

In some places, plagioclase occurs as scattered porphyroblasts of 2-3 cm in diameter, otherwise as the principal constituent in the feldspathized pyroxene gneiss on the eastern side of the island. The brownish grey feldspathic rocks are composed mainly of potash feldspar, quartz and plagioclase. Potash feldspar with hairperthite shows partly microcline structure. Plagioclase with distinct twinning includes antiperthite patches. Aggregates of carbonate, sericite and biotite represent pseudomorphs of altered orthopyroxene. It is evident that the feldspathization is responsible for the formation of feldspar-rich bands.

3.1.3. Hornblende gneiss (Gh)

Hornblende gneiss occurs only in the western half of the island, particularly in the frontal zone of the recumbent anticline. The rock is intercalated with thin layers of pyroxene gneiss. The stratigraphic horizon of the hornblende gneiss in the frontal zone is the same as that of the pyroxene gneiss in the mantle zone. The gneiss is found also in the pyroxene gneiss along the boundary of pink microcline pegmatite. The hornblende gneiss, therefore, is granitized equivalent of the pyroxene gneiss which is converted into the hornblende gneiss *in situ*. The hornblende gneiss is medium-graind and brownish grey to pinkish grey in appearance, showing weak gneissosity and granular texture. The gneiss is subdivided into hornblende gneiss and scapolite-bearing hornblende gneiss. The hornblende

gneiss is composed of potash feldspar, plagioclase, quartz and hornblende. Biotite, sericite, carbonate, apatite, allanite, zoisite, chlorite, zircon and opaque minerals are accessories. Some of the hornblende are pseudomorphs after pyroxene which is occasionally observed as decomposed relicts. Scapolite occurs generally near the boundary between the pyroxene gneiss and the hornblende gneiss. It is typically anhedral and occurs as grains up to 1 mm in maximum diameter.

3.1.4. Garnet gneiss (Gg)

Garnet gneiss is found mainly in the core of the anticline. Thin layers of garnet gneiss also occur in the pyroxene gneiss along the eastern coast of the island and in the western peninsula. The rock is medium- to fine-grained and is usually white to grey in color. Gneissose structure is generally conspicuous, with occasional banded structure owing to the alternation of biotite-rich leucocratic layers. The garnet gneiss grades into pyroxene gneiss in a rather short distance. Irregular patches of pyroxene gneiss are found in the garnet gneiss, and elongated blocks up to 1 meter are randomly distributed also in the garnet gneiss. As seen in remarkable drag folds, the garnet gneiss is much more plastically deformed than the pyroxene gneiss and appears to be highly mobile. Consequently, the pyroxene gneiss included in the garnet gneiss is boudinaged, otherwise lensed out. It is probable that some of the garnet gneiss were metasomatically derived from the pyroxene gneiss.

The garnet gneiss has granoblastic equigranular texture, and is composed of potash feldspar, quartz, plagioclase, garnet and biotite. Accessory minerals are zircon, apatite and secondary zoisite, carbonate, sericite and chlorite.

3.1.5. Feldspathic band (Gf)

In the eastern part of the island, one or two narrow feldspar-rich bands are interbedded with the pyroxene gneiss parallel to the foliation. Agmatitic portions have been observed on the northern coast. Palaeosomes of pyroxene gneiss up to 20 cm in diameter are distributed in the feldspathized zones which are characterized by porphyritic plagioclase. The plagioclase of 3 mm in maximum size shows clear polysynthetic twinning as well as minor antiperthite texture. Its anorthite content ranges from 37 to 50%. Greenish brown hornblende, reddish brown biotite, carbonate, apatite and quartz are accessories. The hornblende crystals are occasionally pseudomorphous after orthopyroxene and/or clinopyroxene. The mineralogy of the narrow plagioclase-rich band is the same as the agmatitic portion. The rock is medium- to coarse-grained, white-colored and massive with porphyritic texture. Plagioclase of 5 mm in maximum is the principal constituent. Sometimes, leucocratic bands extremely rich in plagioclase are observed. The anorthite content of the plagioclase ranges from 42 to 64%. Accessory minerals such as hornblende, biotite, muscovite, carbonate and zoisite are very small in both amount and grain size. Pyroxene relicts which are altered to chlorite, zoisite, biotite and hornblende are occasionally observed.

3.1.6. Hornblende-biotite gneissose granite (Grh)

Granitic rocks are emplaced as small concordant sheets and lenses in the gneisses, particularly in the hornblende gneiss of the frontal zone of the anticline. Pink potash-feldspar porphyroblasts are developed in the hornblende gneiss at the contact with the granitic sheet, and alternation of the pink granitic and hornblende-rich layers forms banded gneisses which are gradationally homogenized into granitic rocks. Sometimes, the granite includes small lenses of the hornblende gneiss as palaeosomes.

The granite is pink-colored, medium-grained and usually massive, but occasionally it shows gneissose structure. The rock is composed of potash feldspar, quartz and plagioclase, and is subdivided by the characteristic minerals as follows: hornblende granite, garnet-bearing hornblende granite and biotite granite.

1) Hornblende granite: The rock occurs in the hornblende gneiss zone and is characterized by green hornblende.

2) Garnet-bearing hornblende granite: The rock occurs near the boundary between the granite and the hornblende gneiss within the area where the garnet gneiss occurs. The rock is medium grained and shows weak gneissosity.

3) Biotite granite: The rock is a variety of the granite described above and is characterized by the presence of reddish brown biotite.

3.1.7. Pegmatite

Two kinds of pegmatite, hornblende pegmatite and microcline pegmatite, are found in the island. The emplacement of these pegmatite dikes is structurally controlled by the joint system. The hornblende pegmatite varies in composition, as observed in several localities. Most of the hornblende pegmatite are composed mainly of potash feldspar (perthite), quartz, hornblende and plagioclase. Occasionally they contain clinopyroxene and/or orthopyroxene. Pegmatite in the metabasite is composed of clino- and orthopyroxene, hornblende and plagioclase without potash feldspar. The microcline crystals in microcline pegmatite are associated with plagioclase, biotite, quartz and magnetite. The assemblages of these pegmatites seem to be controlled by those of their country rocks.

3.1.8. Molybdenite

A zone of molybdenite impregnation was found in the central part of the island, where minor folds are developed in the frontal zone of the recumbent fold. The molybdenite occurs as crystals up to 5 mm in diameter in the pyroxene amphibolite, particularly in the somewhat acidified part of the rock.

3.1.9. Pyrrhotite

Several pyrrhotite veins parallel to the gneissosity of the garnet gneiss, occur only in the pyroxene gneiss on the southeastern coast of the island. Among these veins a twisted lens of 1.5 m thick and 2 m long is composed of large hexagonal crystals of pyrrhotite up to 10 cm in diameter. A minor amount of chalcopyrite is found in association with pyrrhotite (SHIBUYA and KIZAKI, 1967 b).

3.2. Quaternary Formation

3.2.1. Raised beach deposit

Near the present shoreline and lowland of the Ongul Islands, there are found fossil-bearing sand and gravel deposits of the raised beach. The deposits are composed of fragments of rocks that are exposed in the region, although erratic boulders are commingled. The deposits contain such fossils as *Adamussium colbecki* (E. A. SMITH) and *Laternula elliptica* (KING and BRODERIP). In addition, Foraminifera (MEGURO *et al.*, 1964) and other fossils are found. The distribution of the deposits is restricted to the low area generally 3 to 6 m high and a sand bed 15 m high above sea level. Glaciated flat surface, 30 to 40 m above sea level, is found in many places, but marine sediments are not observed there. The ages of fossils have been determined by ^{14}C as listed in Table 3.

Table 3. ^{14}C ages of fossils from raised beach deposits.

Location	Elevation (m)	Material	Age (yr. B. P.)	Ref.
East Ongul Island				
Kai-no-hama Beach	3-4	*Adamussium colbecki*	$3,840 \pm 110$	1
Kitami Beach	5-6	Fragments of mollusca	over 30,000	1
〃	7-8	〃	$25,400 \pm 1,200$	1
〃	12	〃	$34,000 +3,000 -2,000$	1
Kai-no-hama Beach	9-10	〃	$22,800 \pm 1,000$	1
〃	3-4	〃	$29,500 +2,400 -1,800$	1
〃	7-8	Tests of benthonic Foraminifera	$31,000 +2,500 -1,900$	1
Northern part	16	Fragments of mollusca	$5,850 \pm 100$	2
Mizukumi Stream	12	〃	$30,700 \pm 2,000$	2

1. MEGURO *et al.*, 1964.
2. YOSHIDA, 1970.

3.2.2. Erratic boulders

Erratic boulders are seen all over the island. The rock types are as follows: biotite-sillimanite garnet gneiss, anorthosite, amphibolite, hornblende-chlorite schist, biotite hornfels, garnet-muscovite hornfels, quartzose sandstone and ilmenite-augite basalt, as well as the same rocks as are exposed in the region.

3.3. Structure

The most characteristic structural feature of East Ongul Island is represented by the recumbent isoclinal fold in a zone about 1 km wide and 6 km long in the eastern part of the island. The northern part of the fold is hidden under the sea.

The general strike of the foliation and fold axes is approximately N20°W and

the dip of the foliation ranges from 10°E in the eastern limb of the fold to 40°E in the western limb.

The core of the anticline is generally composed of garnet gneiss which is locally intercalated with pyroxene gneiss. In the eastern and westernmost parts of the island, the pyroxene gneiss is found to constitute the outer mantle of the anticline where the dip of its foliation is very gentle. In the western limb of the fold is found a zone of small anticlines and synclines, being composed of garnet gneiss associated with metabasite bands. This zone, 500 m wide, extends from the north to the west through the median zone of the island.

A small thrust fault is observed near the western limit of the anticline. The fault dips 50°E, as defined by a shear zone. The amount of displacement is not clear.

The western half of the island is occupied by alternating hornblende gneiss and pyroxene gneiss which have a gentle easterly dip.

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