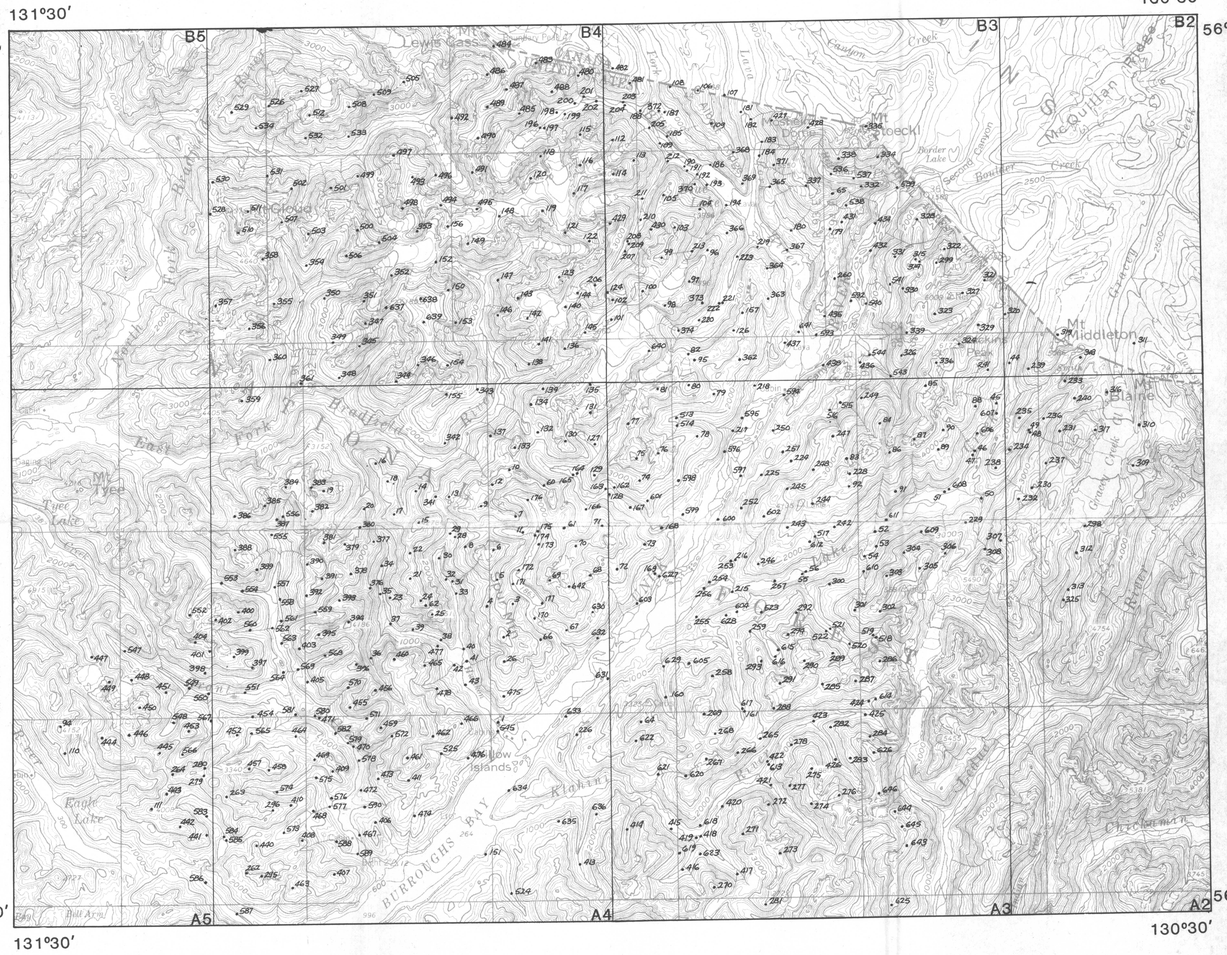
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

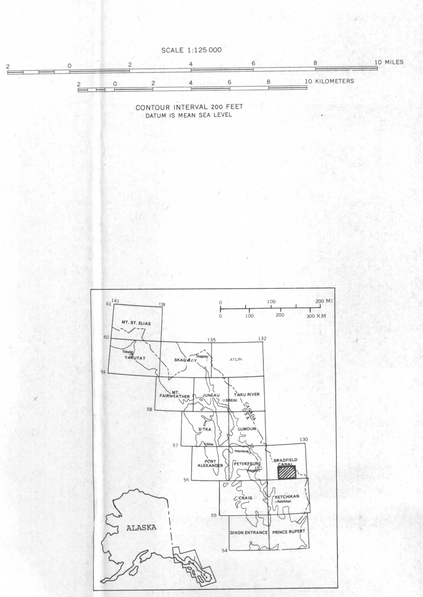
OPEN-FILE REPORT
81-840
SHEET 1 OF 2

GAMMA-RAY READINGS



Base from USGS 1:250,000 topo series: Bradfield Canal, 1955, ALASKA-CANADA.

LOCATIONS OF GAMMA-RAY READING SITES



Discussion

Introduction

A survey of total gamma radiation intensities at ground sites throughout the central portion of the Bradfield Canal quadrangle was conducted during June and July of 1979. This sheet contains a list of the data collected and a map showing the locations of sites where readings were made. The accompanying sheet contains maps showing the distribution of relatively high gamma-ray intensity readings.

The study area is underlain by a variety of calc-alkaline granitic plutons, and medium- and high-grade schists and gneisses characteristic of the Coast Plutonic Complex. The rugged, mountainous terrain consists of jagged peaks to 2100 m elevation and steep-walled canyons carved by roaring rivers and still-active alpine glaciers. Because of current and recent glaciation, and rapid stream erosion, many rock outcrops and much stream-sediment is little affected by chemical weathering. High levels of precipitation fall year-round.

Procedure

Gamma-ray intensities were measured with a portable scintillometer, GeoMetrics model GR-101A, serial number 04035. This unit has a 38mm by 38mm (43 cubic cm) NaI crystal detector and measures the total count for gamma radiation with energy levels above 0.05 MeV. The scintillometer was placed in the center of the front floor area of a Hughes 500C helicopter, where it was approximately 0.8m above ground level when the helicopter rested on a smooth site. At this height, the area of main influence on the reading lies within a circle of radius about 5 to 10 m (see Lovborg, 1973, and Hanson, 1975). The detector location was about 50 cm forward of the helicopter's fuel tank.

Readings of gamma radiation intensity were made at most helicopter landing sites during the course of geologic mapping and stream-sediment sampling of the area. After landing at a site, the station number, instrument scale range, radiation reading, and site type (see below) were recorded, usually by the helicopter pilot (Rossiter). The first reading for each day was made at the helicopter landing site in our base camp, a flat area of dense, tall grass in the center of the Eu Lachon River valley (site number 1). Repeated readings at this site provided a crude check for long-term instrumental variation.

Data

Data for 620 sites, plus 22 readings made at the base station, are contained in the data table. A sequence number, from 1 to 646, indicates the order in which readings were made. The data, including base station readings, are listed chronologically to permit inspection for instrumental drift or other time-dependent variation. Four sequence numbers (159, 333, 433, and 542) have no data and are omitted from the table. Two readings (sequence numbers 58 and 59) were made while reoccupying stations first visited during 1978. Data for these two sites are included in the table but they lie outside the area of the maps in this report and are not plotted.

The 7-character station numbers correspond to those used to identify collection locations for geochemically analyzed samples (Koch and others, 1980a,b,c, Koch, O'Leary, and Risoli, 1980). For base station readings, the station number is replaced in the table by a date composed of numbers indicating the year, month, and day on which that reading was made. Latitude and longitude coordinates are given as degrees, minutes, and seconds. Quadrangle designations refer to the 1:63,360 scale quadrangles.

Gamma radiation intensity readings are listed exactly as recorded in the field. All measurements were made with the scintillometer range selector at 0.1k. The meter was not checked or calibrated with a radiation source of known intensity but multiplication of the readings by 100 will give an approximate value of counts per second. No attempt was made to compensate for instrumental drift because it, as estimated from repeated base station readings, appears insignificant. The data were not corrected for diurnal variations, weather fluctuations, or atmospheric radon or cosmic radiation as their effects probably have little influence on most readings (see section on snow and ice sites on sheet 2).

Histograms of the readings (see sheet 2) have a markedly uneven, saw-tooth character, with adjacent bars commonly being significantly different in height. This pattern resulted from the way values were read and recorded. The scintillometer readout scale is marked only with even numbered divisions (.02, .04, .06, etc.). In the field, people tended to record the value of the nearest marked scale division more often than they recorded the number associated with an unmarked value. The difference between values rounded to the nearest marked scale division, and those not so rounded, is insignificant compared to the total range of values and the effects of other sources of variation.

Location Map

Locations of sites where scintillometer readings were made are indicated by dots on the location map on this sheet. The dots are labelled with the sequence number for that reading. The base station location is labelled number 1. The outline of each 1:63,360 scale quadrangle is indicated, along with its quadrangle designation (A3, B4, etc.).

Factors Affecting Gamma-Ray Readings

Cosmic rays probably exerted little influence on measurements made in this study because the detector was close to the ground while measurements were being made. Other atmospheric sources of gamma rays (mainly radon gas) were probably homogenized by the strong breezes common to this mountainous region, and flushed from the air by frequent rain. During the 24 days between the first and last days on which gamma-ray measurements were made, only 9 days had no appreciable rain during the day, with a maximum of 3 such days in a row. Even when it didn't rain during the day, there was often rain at night. Rock and gravel areas were usually wet and vegetated areas (soil areas actually consist largely of decayed vegetation) never dried out.

Site Type

At the time each reading was made, the site was classified as rock, gravel, vegetated, or snow and ice to indicate the dominant type of ground surface close to the detector. Sites vary in the type and amount of cover material and the amount of gamma-ray absorption occurring in that cover material. Essentially all gamma radiation is absorbed by a layer of rock about 30 cm thick, of soil about 45 to 60 cm thick, or about 100 cm of water. This means that readings at rock outcrop sites are influenced by rock only to a depth of about 30 cm. Radiation from unconsolidated sediment may reflect the bedrock under that site if the sediment cover is thin or if the sediment was locally derived. Most gravel sites are stream beds where the sediment cover exceeds 60 cm and thus the sediment constitutes the only significant contributing factor influencing the reading. The majority of these readings in which readings were made are short and the sediment was derived from an area extending no more than 1 to 2 km upstream. Vegetated sites have cover usually consisting of dense moss, lichen, and heather mats, or are thick, swampy muskegs composed mainly of living and decaying plant material. These areas often are nearly water-saturated and, depending on thickness, may effectively absorb gamma radiation from underlying sediment or rock. Snow absorbs gamma rays more effectively as its water content (density) increases. Thin snow cover is reported to act as a radon gas trap in some cases, increasing gamma-ray intensity. This effect was not noted in the study area. Gamma-ray readings for snow-covered areas are conspicuously lower than those from other site types.

Selected References

Faul, Henry, ed., 1954, Nuclear geology, a symposium on nuclear phenomena in the Earth sciences: John Wiley and Sons, New York, 414 p.

Forbes, R. B., 1980, Uranium-thorium concentrations in representative rocks from Alaskan crystalline terranes: U.S. Department of Energy, Grand Junction Office, Colo., Report GJBX-178(80), 306 p.

GeoMetrics, Inc., 1977, Field surveys using a portable gamma ray spectrometer: Sunnyvale, CA, GeoMetrics Inc., Technical Report No. 13, 15 p.

Hansen, D. A., 1975, Geological applications manual for portable gamma ray spectrometers: Sunnyvale, CA, GeoMetrics Inc., unpublished manual, 79 p. and appendix.

Koch, R. D., Elliott, R. L., O'Leary, R. M., and Risoli, D. A., 1980a, Trace element data for rock samples from the Bradfield Canal quadrangle, southeastern Alaska: U.S. Geological Survey Open-File Report 80-910A, 256 p.

_____1980b, Trace element data for stream-sediment samples from the Bradfield Canal quadrangle, southeastern Alaska: U.S. Geological Survey Open-File Report 80-910B 172 p.

_____1980c, Trace element data for stream-sediment heavy mineral concentrate samples from the Bradfield Canal quadrangle, southeastern Alaska: U.S. Geological Survey Open-File Report 80-910C 68 p.

Koch, R. D., O'Leary, R. M., and Risoli, D. A., 1980, Magnetic tape containing trace element data for rock, stream-sediment, and stream-sediment heavy-mineral concentrate samples from the Bradfield Canal quadrangle, southeastern Alaska: Menlo Park, California, U.S. Geological Survey Report, 23 p., computer tape. Available from the U.S. Department of Commerce, National Technical Information Service, Springfield VA 22151, as report USGS-GD-80-004 or NTIS-PB81-108641.

LKB Resources, Inc., 1979, NURE areal gamma-ray and magnetic reconnaissance survey, southeastern area, Alaska: U.S. Department of Energy, Grand Junction Office, Colo., Report GJBX-48(79), 2 v.

Lovborg, L., 1973, Future development in the use of gamma ray spectrometry for uranium prospecting on the ground: in International Atomic Energy Agency, Uranium Exploration Methods: International Atomic Energy Agency, p. 141-153.

McDermott, M. M., 1977, Field surveys using a portable gamma ray scintillometer: GeoMetrics Inc., Sunnyvale, CA, Technical Report No. 12, 11 p.

Gamma-Ray Readings

Sequence	Station	Latitude	Longitude	Quad	Reading	Site Type
1	79-6-22	56 05 37	131 05 45	A4	0.18	Vegetation
2	79RK002	56 07 57	131 05 15	A4	0.07	Snow or Ice
3	79GJ001	56 08 52	131 04 52	A4	0.05	Snow or Ice
4	79MH001	56 08 48	131 06 09	A4	0.06	Snow or Ice
5	79GJ002	56 09 33	131 05 38	A4	0.05	Rock
6	79DM001	56 10 22	131 05 48	A4	0.12	Snow or Ice
7	79MH002	56 11 18	131 04 39	A4	0.05	Snow or Ice
8	79GJ003	56 10 29	131 07 12	A4	0.06	Snow or Ice
9	79GJ004	56 11 36	131 06 23	A4	0.04	Snow or Ice
10	79GJ005	56 12 37	131 04 56	A4	0.20	Snow or Ice
11	79RK003	56 10 52	131 04 19	A4	0.03	Snow or Ice
12	79GJ006	56 12 12	131 05 48	A4	0.07	Snow or Ice
13	79DM002	56 11 53	131 07 59	A4	0.06	Snow or Ice
14	79GJ007	56 11 03	131 09 40	A4	0.06	Snow or Ice
15	79MH003	56 11 10	131 09 31	A4	0.13	Rock
16	79GJ008	56 12 50	131 11 41	A4	0.12	Snow or Ice
17	79RK004	56 11 25	131 10 46	A4	0.03	Snow or Ice
18	79GJ009	56 12 20	131 11 05	A4	0.03	Snow or Ice
19	79DM003	56 12 05	131 11 21	A4	0.09	Snow or Ice
20	79ER002	56 11 35	131 12 19	A4	0.10	Vegetation
21	79MH004	56 09 37	131 09 59	A4	0.06	Snow or Ice
22	79GJ010	56 10 19	131 09 59	A4	0.05	Snow or Ice
23	79DM004	56 09 05	131 11 00	A4	0.14	Vegetation
24	79ER003	56 08 59	131 09 29	A4	0.08	Snow or Ice
25	79RK005	56 08 37	131 08 55	A4	0.08	Snow or Ice
26	79RK006	56 07 17	131 05 20	A4	0.13	Vegetation
27	79-6-23	56 05 37	131 05 45	A4	0.18	Vegetation
28	79RK007	56 07 10	131 07 45	A4	0.02	Snow or Ice
29	79RK801	56 10 51	131 07 58	A4	0.03	Snow or Ice
30	79RK802	56 10 10	131 08 52	A4	0.30	Sand or Gravel
31	79RK804	56 09 31	131 07 52	A4	0.30	Sand or Gravel
32	79RK805	56 09 35	131 08 11	A4	0.28	Sand or Gravel
33	79RK806	56 09 12	131 07 42	A4	0.20	Vegetation
34	79RM801	56 09 58	131 08 57	A4	0.30	Vegetation
35	79MH503	56 09 11	131 11 30	A4	0.18	Vegetation
36	79MH506	56 07 24	131 12 00	A4	0.24	Vegetation
37	79MH507	56 08 21	131 11 01	A4	0.25	Sand or Gravel
38	79MH510	56 07 53	131 08 30	A4	0.32	Sand or Gravel
39	79MH511	56 08 26	131 09 53	A4	0.40	Sand or Gravel
40	79MH511	56 07 38	131 07 20	A4	0.20	Sand or Gravel
41	79MH512	56 07 18	131 07 13	A4	0.07	Vegetation
42	79MH513	56 07 11	131 07 50	A4	0.08	Vegetation
43	79RK808	56 06 38	131 07 17	A4	0.21	Sand or Gravel
44	79RK808	56 15 22	130 39 38	B2	0.31	Sand or Gravel
45	79RK809	56 14 15	130 40 20	A3	0.06	Vegetation
46	79RK810	56 12 56	130 41 29	A3	0.08	Vegetation
47	79RK811	56 12 50	130 41 35	A3	0.08	Vegetation
48	79RK812	56 13 27	130 42 38	A2	0.05	Vegetation
49	79RK813	56 13 30	130 38 44	A2	0.05	Vegetation
50	79RK816	56 11 37	130 41 10	A3	0.08	Vegetation
51	79RK817	56 11 49	130 43 00	A3	0.34	Sand or Gravel
52	79GJ501	56 10 43	130 46 39	A3	0.26	Sand or Gravel
53	79GJ503	56 10 19	130 46 35	A3	0.25	Vegetation
54	79GJ504	56 10 03	130 47 11	A3	0.26	Snow or Ice
55	79GJ505	55 09 35	130 50 20	A3	0.20	Sand or Gravel
56	79GJ506	56 09 39	130 50 10	A3	0.32	Sand or Gravel
57	79-6-25	56 05 37	131 05 45	A4	0.18	Vegetation
58	78ER152	56 01 59	131 31 31	A5	0.05	Snow or Ice
59	78ER154	56 01 18	131 33 29	A5	0.03	Snow or Ice
60	79RK009	56 12 09	131 03 14	A4	0.04	Snow or Ice
61	79RK010	56 10 58	131 02 14	A4	0.04	Snow or Ice
62	79GJ013	56 08 51	131 09 13	A4	0.03	Snow or Ice
63	79-6-26	56 05 37	131 05 45	A4	0.19	Vegetation
64	79JD802	56 05 32	130 58 28	A3	0.24	Vegetation
65	79GJ014	56 20 10	130 48 31	A3	0.12	Snow or Ice
66	79MH010	56 07 52	131 03 27	A4	0.10	Vegetation
67	79RK011	56 08 06	131 02 09	A4	0.17	Vegetation
68	79MH013	56 09 38	131 00 55	A4	0.04	Snow or Ice
69	79MH012	56 09 31	131 02 57	A4	0.07	Snow or Ice
70	79MH012	56 10 27	131 01 38	A4	0.04	Snow or Ice
71	79RK013	56 11 01	131 00 18	A4	0.13	Rock
72	79MH013	56 09 48	130 59 34	A3	0.05	Snow or Ice
73	79RK014	56 10 29	130 58 10	A3	0.08	Vegetation
74	79MH014	56 10 16	130 58 23	A3	0.06	Snow or Ice
75	79MH015	56 12 53	130 58 32	A3	0.22	Rock
76	79RK015	56 13 01	130 57 25	A3	0.05	Snow or Ice
77	79MH016	56 13 03	130 55 45	A3	0.04	Snow or Ice
78	79JD805	56 13 28	130 55 31	A3	0.06	Snow or Ice
79	79MH017	56 14 38	130 54 38	A3	0.27	Rock
80	79MH018	56 14 54	130 55 52	A3	0.16	Snow or Ice
81	79JD806	56 14 49	130 57 25	A3	0.03	Snow or Ice
82	79RK016	56 15 44	130 55 53	B3	0.26	Rock
83	79JD807	56 12 48	130 48 02	A3	0.46	Snow or Ice
84	79MH019	56 13 46	130 46 20	A3	0.24	Rock
85	79RK017	56 14 46	130 43 54	A3	0.10	Snow or Ice
86	79JD808	56 12 57	130 45 48	A3	0.20	Rock
87	79MH020	56 13 17	130 44 30	A3	0.24	Rock
88	79RK018	56 14 11	130 41 25	A3	0.13	Vegetation
89	79JD809	56 12 00	130 38 18	A3	0.27	Vegetation
90	79MH021	56 13 32	130 43 04	A3	0.16	Rock
91	79JD810	56 11 51	130 45 31	A3	0.21	Vegetation
92	79RK019	56 12 01	130 47 55	A3	0.16	Rock
93	79-6-27	56 05 37	131 05 45	A4	0.19	Vegetation
94	79JD811	55 05 34	131 27 38	A5	0.22	Rock
95	79DM017	56 15 36	130 55 35	B3	0.26	Rock
96	79MH022	56 18 39	130 54 48	B3	0.16	Rock
97	79ER004	56 17 47	130 55 46	B3	0.18	Rock
98	79RK020	56 17 08	130 57 00	B3	0.20	Rock
99	79MH023	56 18 27	130 57 08	B3	0.24	Rock
100	79ER005	56 17 32	130 58 08	B3	0.15	Rock
101	79RK021	56 16 46	130 59 43	B3	0.10	Rock
102	79ER006	56 17 19	130 59 38	B3	0.20	Rock
103	79RK022	56 19 18	130 56 28	B3	0.16	Rock
104	79MH024	56 19 47	130 55 11	B3	0.22	Rock
105	79ER007	56 20 12	130 57 00	B3	0.22	Rock
106	79RK023	56 23 07	130 55 13	B3	0.26	Rock
107	79MH025	56 22 58	130 53 52	B3	0.38	Rock
108	79ER008	56 23 13	130 56 37	B3	0.16	Vegetation
109	79RK024	56 22 11	130 54 13	B3	0.30	Vegetation
110	79JD814	56 04 49	131 27 25	A5	0.09	Vegetation
111	79JD815	55 03 15	131 23 04	A5	0.14	Rock
112	79ER009	56 21 45	130 59 32	B3	0.18	Rock
113	79RK025	56 21 11	130 58 28	B3	0.16	Rock
114	79RK025	56 20 49	130 59 31	B3	0.20	Rock
115	79ER010	56 21 55	131 01 10	B4	0.08	Rock
116	79MH027	56 21 04	131 01 10	B4	0.10	Rock
117	79RK026	56 20 17	131 01 31	B4	0.24	Rock
118	79ER011	56 21 03	131 03 09	B4	0.26	Rock
119	79RK027	56 19 48	131 03 07	B4	0.27	Rock
120	79MH028	56 20 43	131 03 40	B4	0.21	Rock
121	79ER012	56 19 11	131 01 59	B4	0.25	Rock
122	79ER028	56 18 57	131 00 46	B4	0.20	Rock
123	79ER013	56 17 57	131 02 17	B4	0.13	Rock
124	79RK029	56 17 30	130 59 55	B3	0.17	Rock
125	79-6-28	56 05 37	131 05 45	A4	0.17	Vegetation
126	79GJ020	56 16 24	130 53 35	B3	0.15	Rock
127	79JD816	56 13 18	131 00 37	A4	0.23	Rock
128	79ER015	56 11 53	130 59 55	A3	0.12	Vegetation
129	79MH030	56 12 59	131 00 38	A4	0.08	Rock
130	79RK030	56 13 23	131 02 06	A4	0.16	Rock
131	79JD820	56 14 11	131 00 49	A4	0.21	Rock
132	79ER016	56 13 39	131 03 29	A4	0.21	Rock
133	79ER017	56 13 14	131 04 35	A4	0.13	Rock
134	79RK031	56 14 26	131 03 47	A4	0.21	Vegetation
135	79JD821	56 14 58	131 00 49	A4	0.17	Rock
136	79ER018	56 15 58	131 02 04	A4	0.16	Vegetation
137	79MH032	56 13 34	131 05 52	A4	0.15	Vegetation
138	79ER019	56 15 33	131 03 51	A4	0.15	Vegetation
139	79JD822	56 14 52	131 03 12	A4	0.17	Rock
140	79ER017	56 17 08	131 02 00	B4	0.19	Rock
141	79MH033	56 16 06	131 03 22	B4	0.19	Rock
142	79MH034	56 16 50	131 03 56	B4	0.04	Rock
143	79RK033	56 17 24	131 04 23	B4	0.11	Rock
144	79JD823	56 17 31	131 01 23	B4	0.22	Rock
145	79ER018	56 16 25	131 01 02	B4	0.16	Rock
146	79MH035	56 16 56	131 05 25	B4	0.10	Vegetation
147	79RK034	56 17 54	131 05 23	B4	0.21	Rock
148	79ER019	56 19 41	131 05 17	B4	0.25	Rock
149	79RK035	56 18 57	131 05 53	B4	0.30	Rock
150	79RK035	56 17 39	131 07 56	B4	0.20	Rock
151	79JD824	56 01 54	131 06 21	B4	0.30	Rock
152	79ER020	56 18 25	131 08 31	B4	0.20	Rock
153	79MH036	56 44 17	131 07 34	B4	0.04	Rock
154	79MH037	56 15 32	131 08 00	B4	0.30	Rock
155	79ER021	56 14 45	131 08 05	B4	0.12	Rock
156	79JD825	56 19 25	131 07 55	B4	0.19	Rock
157	79MH020	56 16 54	130 53 08	B3	0.10	Rock
158	79-6-30	56 05 37	131 05 45	A4	0.16	Vegetation
160	79MH041	56 06 13	130 57 13	A3	0.05	Vegetation
161	79MH003	56 05 49	130 53 21	A3	0.08	Vegetation
162	79MH005	56 12 05	130 59 40	A3	0.20	Vegetation
163	79MH006	56 12 02	131 00 03	A3	0.33	Vegetation
164	79MH007	56 12 28	131 01 33	A4	0.28	Sand or Gravel
165	79MH008	56 12 27	131 01 43	A4	0.12	Vegetation
166	79MH009	56 11 29	131 01 05	A4	0.26	Sand or Gravel
167	79DM030	56 11 31	130 58 53	A3	0.24	Sand or Gravel
168	79MH011	56 10 55	130 57 20	A3	0.27	Sand or Gravel
169	79DM032	56 09 39	130 57 40	A3	0.12	Vegetation
170	79RK029	56 08 27	131 01 45	A4	0.16	Vegetation
171	79RK020	56 09 26	131 04 51	A4	0.14	Snow or Ice
172	79RK021	56 09 49	131 04 32	A4	0.13	Vegetation
173	79RK022	56 10 31	131 03 31	A4	0.16	Vegetation
174	79RK023	56 10 47	131 03 41	A4	0.11	Vegetation
175	79RK024	56 10 53	131 03 33	A4	0.13	Vegetation
176	79DM013	56 11 46	131 04 01	A4	0.13	Rock
177	79DM014	56 08 52	131 03 22	A4	0.15	Vegetation
178	79-6-30	56 05 37	131 05 45	A4	0.17	Vegetation
179	79JD826	56 19 11	130 48 39	B3	0.07	Vegetation
180	79GJ028	56 19 10	130 50 37	B3	0.21	Vegetation
181	79GJ010	56 22 29	130 53 04	B3	0.21	Rock
182	79GJ011	56 22 17	130 52 35	B3	0.19	Rock
183	79GJ013	56 21 39	130 52 02	B3	0.40	Sand or Gravel
184	79GJ014	56 21 15	130 52 11	B3	0.50	Sand or Gravel
185	79GJ015	56 21 01	130 54 40	B3	0.32	Sand or Gravel
186	79GJ015	56 21 50	130 56 47	B3	0.32	Sand or Gravel
187	79DM016	56 22 32	130 56 53	B3	0.18	Vegetation
188	79DM017	56 22 34	130 58 08	B3	0.36	Sand or Gravel
189	79DM018	56 21 38	130 57 10	B3	0.34	Sand or Gravel
190	79DM019	56 20 59	130 56 00	B3	0.26	Sand or Gravel
191	79DM020	56 20 53	130 55 48	B3	0.25	Sand or Gravel
192	79DM021	56 20 46	130 55 19	B3	0.25	Sand or Gravel
193	79DM022	56 20 28	130 54 49	B3	0.35	Sand or Gravel
194	79DM023	56 19 54	130 53 52	B3	0.36	Sand or Gravel
195	79-7401	56 05 37	131 05 45	A4	0.17	Vegetation
196	79RB025	56 22 08	131 03 10	B4	0.30	Sand or Gravel
197	79RB026	56 22 08	131 03 00	B4	0.35	Sand or Gravel
198	79RB027	56 22 33	131 02 20	B4	0.26	Sand or Gravel
199	79RB028	56 22 30	131 01 54	B4	0.27	Sand or Gravel
200	79RB029	56 22 48	131 01 25	B4	0.27	Sand or Gravel
201	79RB030	56 22 58	131 00 57	B4	0.32	Sand or Gravel
202	79RK031	56 22 51	131 00 19	B4	0.31	Sand or Gravel
203	79RK030	56 22 49	130 59 00	B3	0.32	Sand or Gravel
204	79RK033	56 22 44	130 58 53	B3	0.39	Sand or Gravel
205	79RK034	56 22 05	130 57 40	B3	0.34	Sand or Gravel
206	79RK035	56 17 43	131 00 31	B4	0.29	Sand or Gravel
207	79RK037	56 18 39	130 58 59	B3	0.26	Rock
208	79RK038	56 18 55	130 58 51	B3	0.33	Sand or Gravel
209	79RK039	56 18 52	130 58 48	B3	0.31	Sand or Gravel
210	79RK040	56 19 33	130 58 11	B3	0.33	Sand or Gravel
211	79RK041	56 20 06	130 58 05	B3	0.44	Sand or Gravel
212	79RK042	56 21 08	130 56 45	B3	0.40	Sand or Gravel
213	79RK043	56 18 37	130 55 35	B3	0.30	Sand or Gravel
214	79-7-02	56 06 37	131 05 45	A4	0.16	Vegetation
215	79GJ516	56 09 07	130 53 52	A3	0.25	Sand or Gravel
216	79MH516	56 10 00	130 53 41	A3	0.14	Vegetation
217	79MH517	56 13 37	130 53 44	A3	0.25	Sand or Gravel
218	79MH518	56 14 52	130 52 34	A3	0.18	Rock
219	79MH519	56 18 43	130 52 19	B3	0.34	Sand or Gravel
220	79MH520	56 16 42	130 55 19	B3	0.20	Sand or Gravel
221	79MH521	56 17 11	130 54 08	B3	0.25	Sand or Gravel
222	79MH522	56 17 10	130 54 15	B3	0.28	Sand or Gravel
223	79GJ517	56 18 27	130 53 21	B3	0.34	Sand or Gravel
224	79GJ518	56 12 45	130 50 49	A3	0.28	Sand or Gravel
225	79GJ519	56 12 22	130 52 18	A3	0.30	Vegetation
226	79GJ520	56 05 12	131 01 42	A4	0.10	Sand or Gravel
227	79-7-03	56 05 37	131 05 45	A4	0.15	Vegetation
228	79GJ027	56 12 22	130 47 53	A3	0.18	Rock
229	79MH538	56 10 57	130 41 57	A3	0.27	Vegetation
230	79ER027	56 11 53	130 38 38	A2	0.18	Vegetation
231	79RK042	56 13 27	130 37 12	A2	0.26	Rock
232	79MH039	56 11 35	130 39 19	A2	0.13	Rock
233	79RK043	56 14 51	130 36 52	A2	0.20	Rock
234	79ER028	56 12 58	130 39 44	A2	0.12	Vegetation
235	79MH541	56 13 50	130 39 12	A2	0.32	Rock
236	79RK044	56 13 49	130 38 00	A2	0.23	Vegetation
237	79ER029	56 12 34	130 37 55	A2	0.17	Rock
238	79MH540	56 12 27	130 40 25	A3	0.22	Vegetation
239	79MH542	56 15 12	130 38 42	B2	0.25	Rock
240	79RK045	56 14 21	130 36 25	A2	0.31	Rock
241	79ER030	56 15 12	130 40 45	A3	0.18	Vegetation
242	79MH043	56 10 52	130 48 40	A3	0.42	Vegetation
243	79RK046	56 10 53	130 51 02	A3	0.18	Vegetation
244	79ER031	56 11 32	130 49 46	A3	0.22	Rock
245	79MH044	56 11 58	130 51 01	A3	0.14	Vegetation
246	79RK047	56 09 53	130 52 33	A3	0.08	Vegetation
247	79ER032	56 13 25	130 48 42	A3	0.15	Vegetation
248	79RK048	56 12 29	130 49 43	A3	0.12	Vegetation
249	79MH045	56 14 27	130 47 13	A3	0.12	Vegetation
250	79ER033	56 13 36	130 51 41	A3	0.08	Vegetation
251	79RK049	56 12 59	130 51 14	A3	0.10	Vegetation
252	79MH046	56 11 26	130 53 20	A3	0.20	Vegetation
253	79ER034	56 09 58	130 53 54	A3	0.26	Vegetation
254	79MH047	56 09 24	130 55 00	A3	0.30	Vegetation
255	79RK050	56 08 26	130 55 40	A3	0.08	Vegetation
256	79MH048	56 09 13	130 55 17	A3	0.35	Sand or Gravel
257	79ER035	56 09 24	130 51 45	A3	0.13	Vegetation
258	79RK051	56 06 47	130 54 54	A3	0.10	Vegetation
259	79MH049	56 08 00	130 53 00	A3	0.14	Vegetation
260	79JD843	56 17 48	130 49 29	A3	0.20	Rock