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SHEET 1 OF 2

GAMMA-RAY VALUES IN THE MISHEGUK MOUNTAIN REGION, NORTHWESTERN ALASKA

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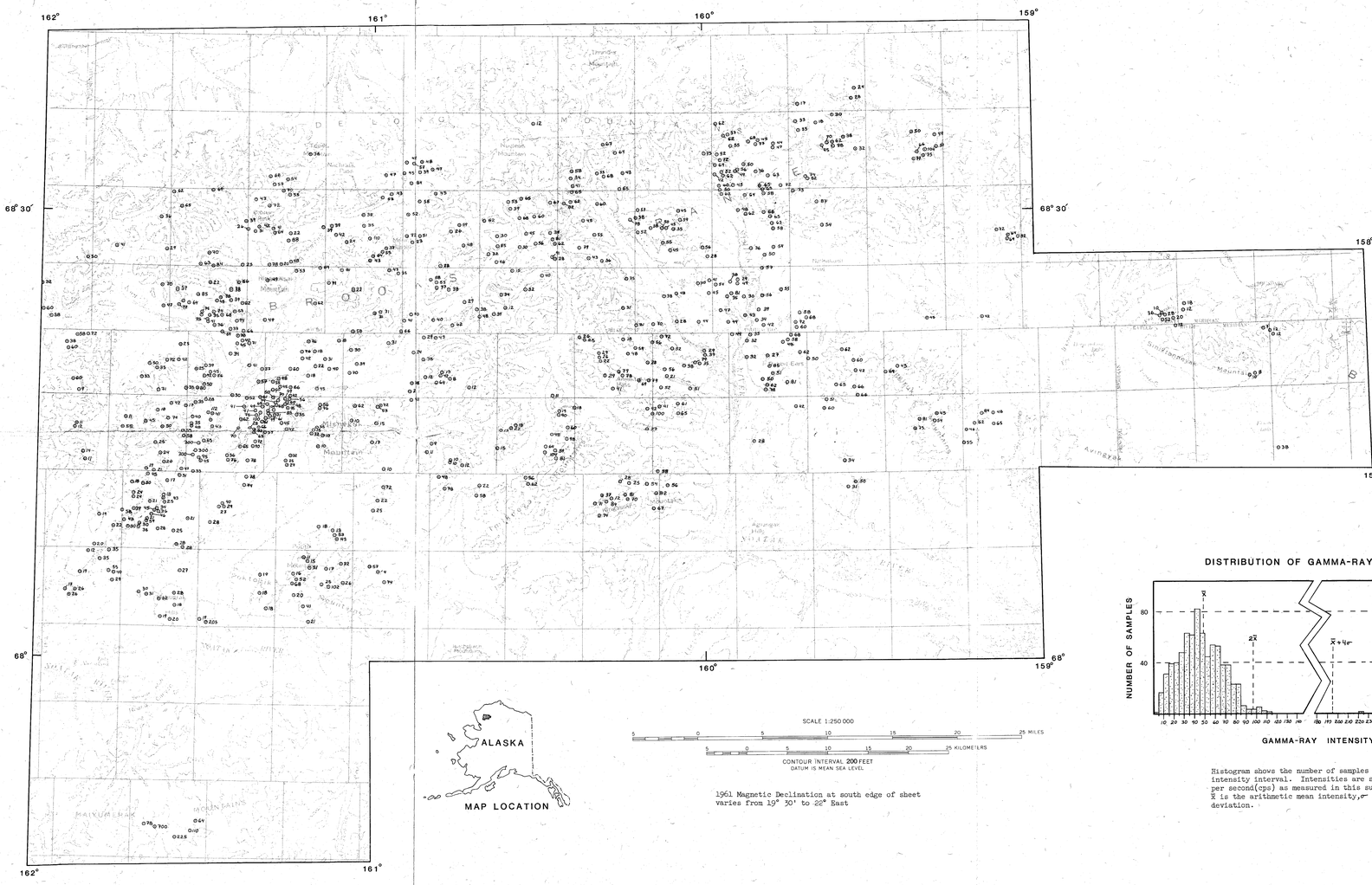

1961 Magnetic Declination at south edge of sheet varies from 19° 30' to 22° East

DISTRIBUTION OF GAMMA-RAY INTENSITIES

Histogram shows the number of samples within each intensity interval. Intensities are shown in counts per second(cps) as measured in this survey(see text). $\bar{X}$ is the arithmetic mean intensity, σ is the standard deviation.

MAP SHOWING GAMMA-RAY INTENSITIES AT GROUND STATIONS

MAP SHOWS INTENSITIES IN COUNTS PER SECOND (SEE TEXT)

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

Base from U.S.G.S. 1:250,000 TOPO SERIES Misheguk Mountain, 1956; Baird Mountains, 1956; Howard Pass, 1956; ALASKA

Introduction

During the summer of 1978, to augment a bedrock geologic mapping project, gamma-ray intensities at scattered localities in the southern part of Misheguk Mountain, and portions of the adjacent Baird Mountains and Howard Pass quadrangles were measured with a portable scintillometer carried aboard a Bell 206B helicopter. Rossiter (helicopter pilot) recorded the gamma-ray intensity, location, and time of day at landing sites. Curtis compiled and analyzed the data after the field season. Because of the relatively shorter time needed for compilation, these data are being released before completion of the bedrock geologic maps which would make the information more meaningful.

The field area lies in the western Brooks Range 100-150 km northnortheast of Kotzebue, and is transected by the Noatak River. The area is mountainous, with steep, vegetation-free slopes rising to an average of 500 m above broad, relatively flat drainage basins where most bedrock is obscured by tundra. Total bedrock exposure in the area is estimated to be about 60 percent.

Instrumentation

Two different instruments were used for the survey. The primary instrument was a Mt. Sopris Instrument Co. model SC-132 scintillometer; the secondary instrument, used for only 20 stations, was a GeoMetrics model GR-101A scintillometer. Our data show that the GeoMetrics scintillometer consistently reads about 40 percent lower than the Mt. Sopris scintillometer. The intensity measurements at stations taken with the GeoMetrics scintillometer were therefore increased by 40 percent to correct them to what the Mt. Sopris scintillometer would have read at the same stations.

The scintillometer rested on the floor of the helicopter with the detector crystal at a height of about 75 cm above the ground. At this height, the effective area of ground being sampled for gamma-rays at each station lies within a circle of radius 5-10 m, assuming a relatively flat landing site (McDermott, 1977).

Data

Scintillometer stations were made at 666 locations. No correction of the data was made for radiation contributed by cosmic rays or atmospheric radon. Less than 0.5 m of soil cover can drastically reduce the radiation from underlying bedrock measurable at the surface (Crawford and Paone, 1956). Although no notation was made of which stations were located on outcrop and which on cover, it is estimated that about 80 percent were on outcrop because most landings were made in locations affording the best geologic exposure.

The majority of the gamma-ray intensities are approximately normally distributed about an arithmetic mean of 48 counts per second (cps) with a standard deviation of 36, and are considered to be background. Five samples lie more than four standard deviations above the mean and are considered anomalous.

Background values below about 15 cps occur almost exclusively over coarse-grained gabbro, peridotite, and dunite. Those above 15 cps occur over basalt and diabase, a wide variety of sedimentary rocks which include chert, shale, sandstone, and limestone, and most soils. Several localities had values which lie at the top of the background range, above 95 cps or twice the mean. These may be sites of enrichment in radioactive materials, and are discussed individually, as are those localities with anomalous values.