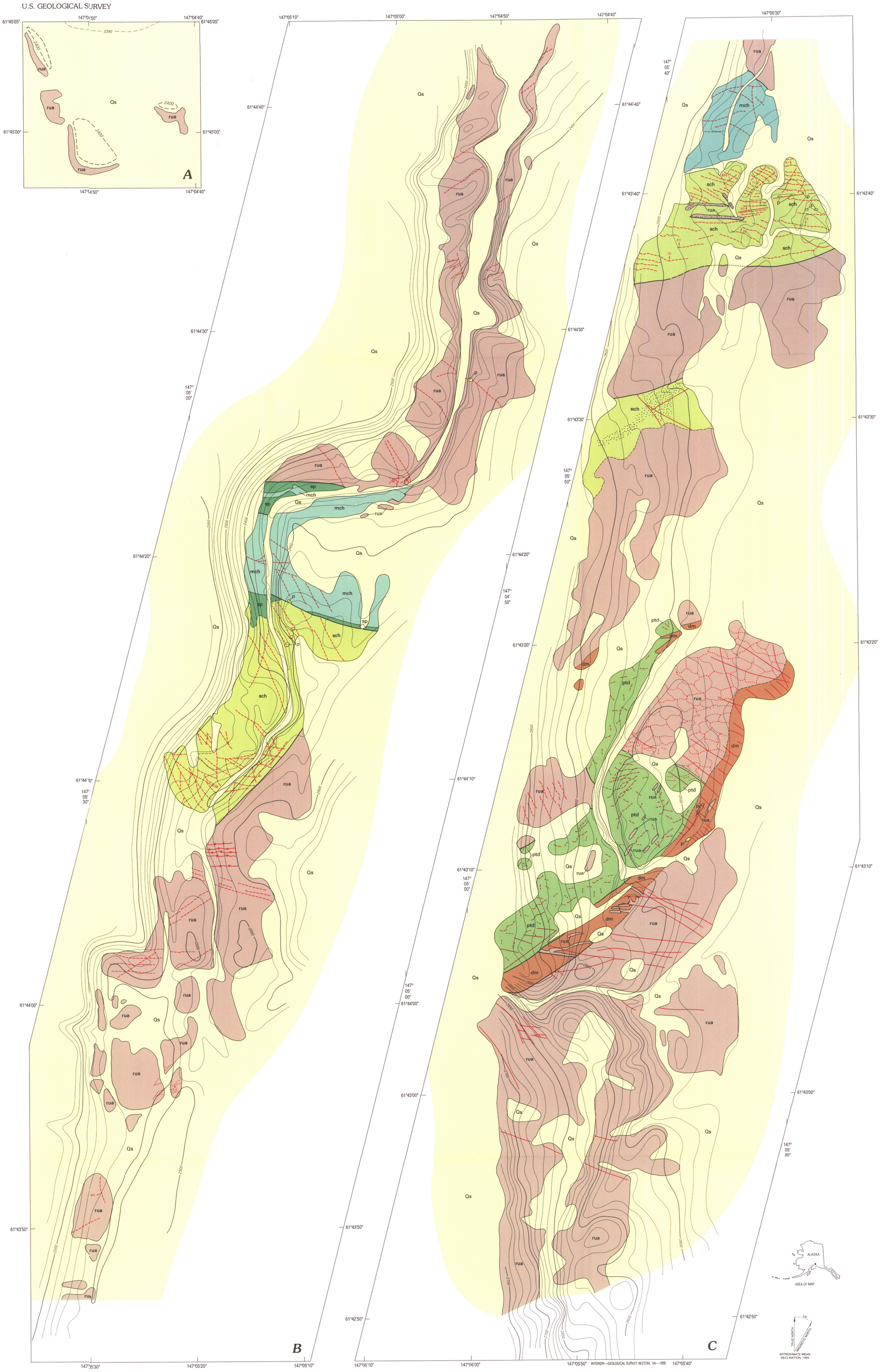


Topographic base for area south of 61°44'45" N. planetabled by G.H. Pessel; assisted by J. C. Pessel and K.S. Emmel, 1981; base for area north of 61°44'45" derived from U.S. Geological Survey 1:63,360 Anchorage C-1 and D-1 quadrangles, 1950, using photointerpretation, 1990

Alteration mapped in 1981

Alteration mapped in 1981

SCALE 1:2,400

100 0 100 200 300 400 500 600 700 FEET

50 0 50 100 150 METERS

CONTOUR INTERVAL 10 FEET
DASHED WHERE APPROXIMATE
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1995

EXPLANATION

[Patterns and linear symbols for all units are schematic representations only]

Qs — **Surficial deposits**

rua — **Relatively unchloritized and unaltered rocks**—Stipple pattern indicates areas where felsite is stained orange; source for coloration is minor amount of quartz-calcite-siderite-iron oxide veining

Major areas of intense alteration

dm — **Disseminated magnetite**—Dull-black-weathering alteration assemblage characterized by abundant, fine-grained magnetite; associated with chlorite, clinozoisite, calcite, quartz, albite(?), and fibrous amphibole

mch — **Moderate chloritization**—Green weathering; associated with epidote. In gabbroic rocks, chlorite has partly to completely replaced orthopyroxene and associated cummingtonite/anthophyllite, and epidote has partly to completely replaced clinozoisite. In quartz diorite, fine-grained epidote and lesser clinozoisite and white mica have formed from plagioclase; primary hornblende is slightly altered to chlorite

sch — **Strong chloritization**—Chlorite pervasive in body of rock and as vein filling. In gabbroic rocks; orthopyroxene (or cummingtonite/anthophyllite), clinopyroxene, hornblende, and magnetite are replaced by chlorite; plagioclase and clinozoisite are replaced by epidote and chlorite. Primary minerals (except for hornblende) are almost completely destroyed, but primary textures are retained. Gabbroic rocks are greenish black, particularly where fine grained. In quartz diorite; hornblende is almost completely replaced by chlorite; plagioclase has been extensively altered to clinozoisite, epidote and white mica. Stippled pattern is used where quartz diorite and (or) trondhjemite are bleached and stained orange from quartz-calcite-siderite-iron oxide veining and alteration of mafic minerals

sp — **Chloritization and minor serpentinization**

ptd — **Primary texture destroyed**—Intense deformation and variable amounts of secondary fibrous amphiboles and chlorite obscure primary textures and mineralogy. Probably altered isotropic gabbronorite (with or without hornblende) and possibly hornblende gabbro. Alteration assemblage largely consists of clinozoisite, chlorite, epidote, albite, hornblende, and fibrous amphiboles, commonly with minor amounts of magnetite, ilmenite, sphene, pyrite, and calcite

Veins

Calcite±siderite veins—Orange-red-weathering veins, generally accompanied by 1 to 10 percent pyrite and minor amounts of sphalerite. Crosscutting relations demonstrate that these veins represent youngest vein-filling or alteration event. Stippled pattern associated with veins indicates areas where quartz diorite and (or) trondhjemite are bleached and stained orange from quartz-calcite-siderite-iron oxide veining and alteration mafic minerals

p — **Pyrite**—Minor concentration of pyrite and limonite pseudomorphs after pyrite; locally includes sphalerite±galena

Bull quartz veins—Narrow veins that are continuous for at least 20 m; found only at B2 (location noted on index map)

Quartz-epidote veins—Minor veining present, 2 to 4 cm wide, throughout Nelchina transect. Three most densely veined areas (locations noted on index map) have characteristics as follows: B1—Quartz-epidote veins as 4-cm-thick, semicontinuous sheets that occupy faults; C1—Closely spaced quartz-epidote veins that are folded and faulted and make rock crudely resemble layered gneiss; and C2—Disrupted, cataclastic quartz-epidote veins

Quartzo-feldspathic veins—Generally stockwork. Textures are similar to agmatitic migmatites

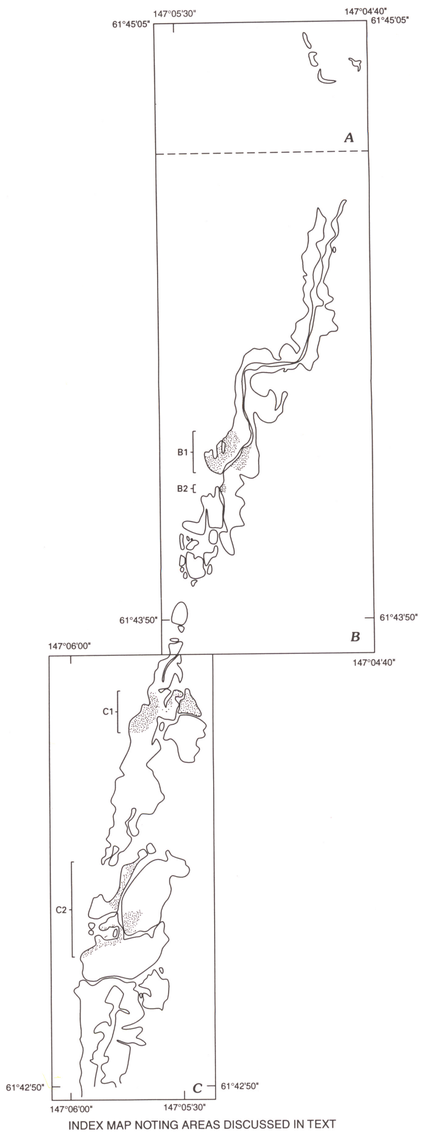
Contact between alteration units—Dashed where gradational

Fault forming contact between alteration units—Dotted where concealed, long-dashed where approximately located, queried where doubtful

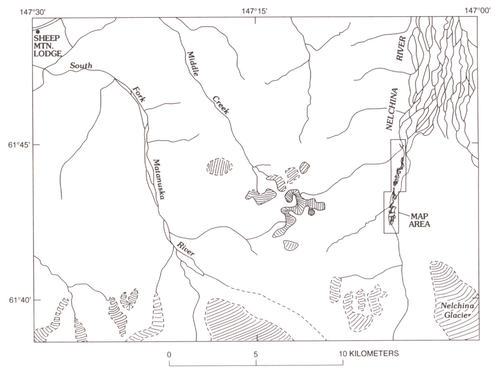
Strike and dip of vein

Inclined

Vertical



INDEX MAP NOTING AREAS DISCUSSED IN TEXT



LOCATION MAP

MAJOR ALTERATION OF THE GABBROIC ROCKS NEAR THE NELCHINA GLACIER, SOUTH-CENTRAL ALASKA

By
Laurel E. Burns

1995

Burns, Laurel E., 1995, Geology of part of the Nelchina River Gabbronorite and associated rocks, south-central Alaska: U.S. Geological Survey Bulletin 2058.