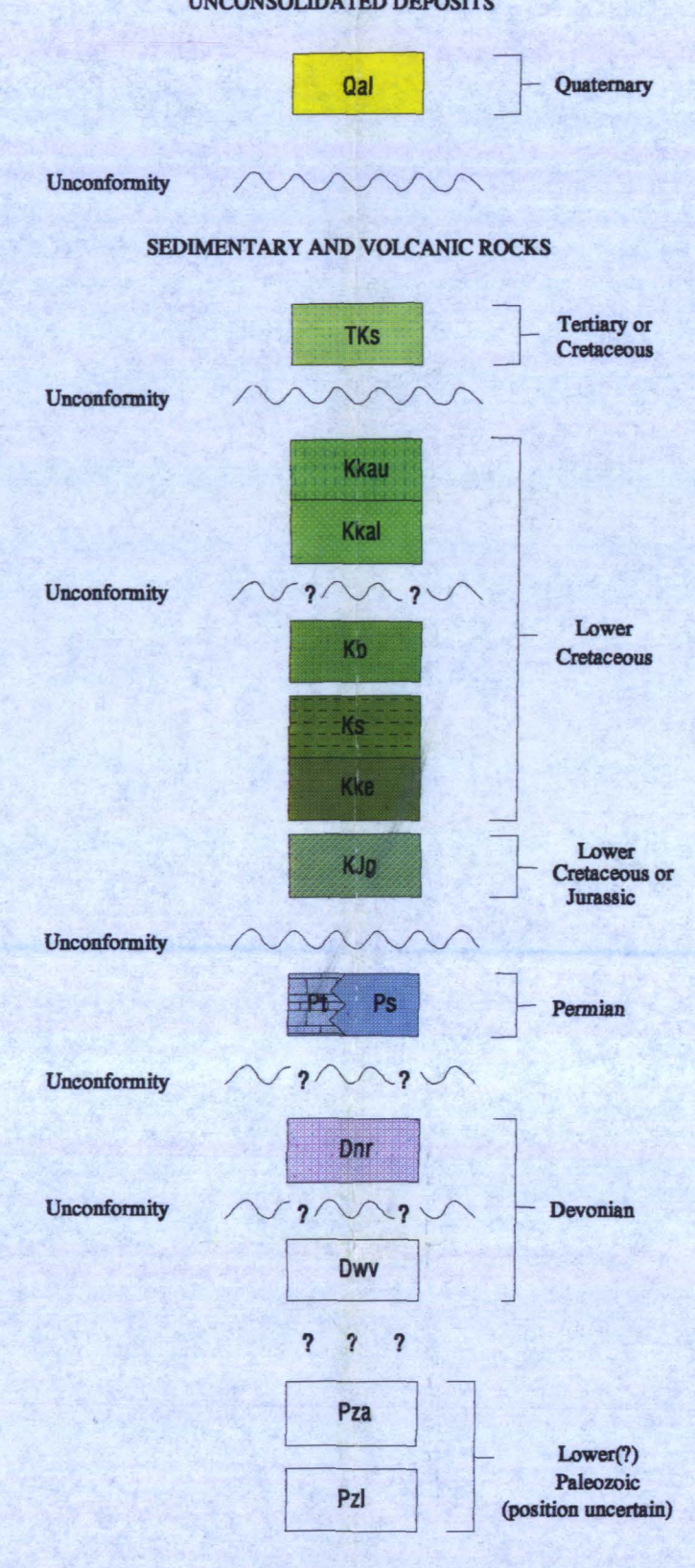
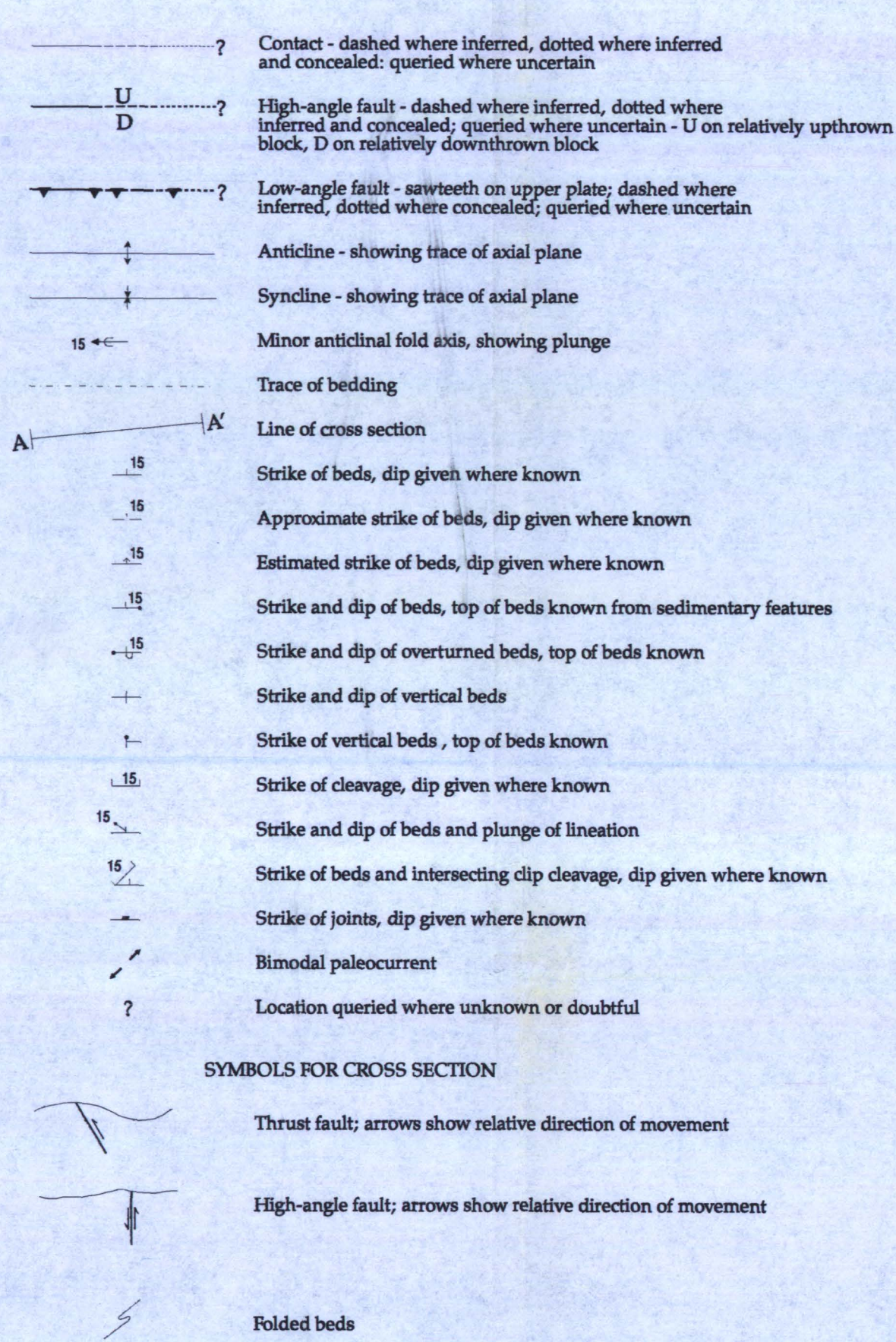


Based on field investigations in June 1995 and supplemented by interpretation of 1:63,360-scale false-color aerial photographs taken in 1982 and 1984 and 1:63,360-scale black and white aerial photographs taken in 1995. Bedrock geology by J.G. Clough, R.R. Reifensstuhl, C.G. Mull, S.A. Liss and G.M. Laird. Surficial geology by D.S. Pinney. Petrography by R.R. Reifensstuhl and J.G. Clough. Thermal alteration indices (TAI) by Michael S. Minsky and Hideo Hagi. Microprobe consultation. Digital cartography by L. Katherine Queen with assistance from Peggy J. Young. Digital topographic base edited by Gina R.C. Graham. We acknowledge the previous geologic mapping of Brabb and Churkin (1969, 1:250,000 scale), Dover and Miyazaki (1984, 1:250,000), and Dover (1992, 1:100,000 scale). Supported by the U.S. Geological Survey, Department of the Interior, under assistance Award No. 1434-9A-1221.

CORRELATION OF MAP UNITS

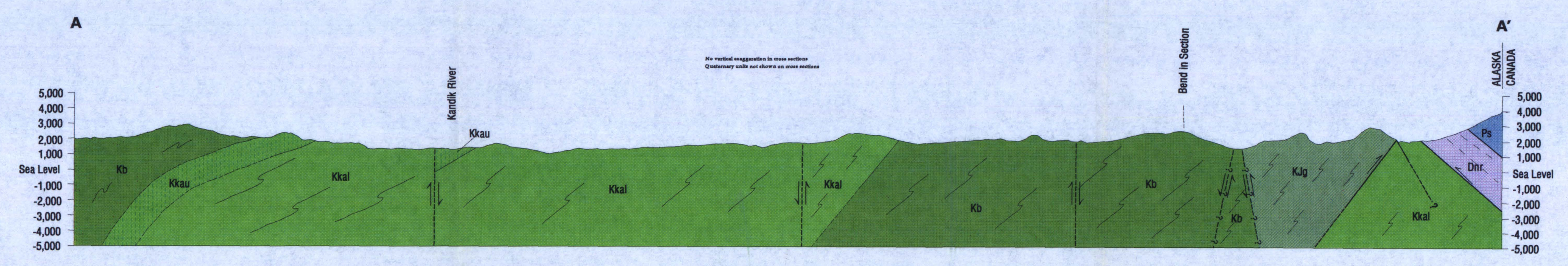


EXPLANATION OF MAP SYMBOLS



REFERENCES

Brabb, E.E., 1969, Six new Paleozoic and Mesozoic formations in east-central Alaska: U.S. Geological Survey Bulletin 1274-I, 26 p.
Brabb, E.E., and Churkin, Michael, Jr., 1969, Geologic map of the Charley River Quadrangle, east-central Alaska: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-573, 1:250,000 scale map.
Dover, J.H., 1992, Geologic Map and Fold and Thrust Belt Interpretation of the southeastern part of the Charley River Quadrangle, east-central Alaska: U.S. Geological Survey Miscellaneous Investigations Map I-1942, scale 1:100,000, 2 sheets.
Dover, J.H., and Miyazaki, R.T., 1988, Reinterpreted geologic map and fossil data, Charley River Quadrangle, east-central Alaska, U.S. Geological Survey Miscellaneous Field Studies Map 2004, scale 1:250,000, 2 sheets.



DESCRIPTION OF MAP UNITS

- Qal** QUATERNARY ALLUVIUM
Unconformity
- TKs** SEDIMENTARY ROCKS UNDIVIDED - Poorly consolidated lithic sandstone, carbonaceous shale, and conglomerate. In the southeast C-1 Quadrangle these rocks have iron-stained sand- to gravel-size matrix with subrounded rounded pebble-size clasts of dominantly Biederman Argillite, Keenan Quartzite, and Kathil Graywacke. Here, the rocks are only 1 m thick, overlain by about 30 cm of soil and tree roots with clay, silt, and sand, and unconformably underlain by highly fractured Biederman Argillite. Nonmarine(?) In the southeast D-1 Quadrangle this unit is mapped by aerial photogrammetry based on its similar topographic expression to undivided sedimentary rocks mapped in the Charley River B-1 Quadrangle. Thickness in the southeastern Charley River Quadrangle is 60 to at least 100 m (Brabb and Churkin, 1969).
Unconformity
- Kku** KATHIL GRAYWACKE, upper part (Lower Cretaceous)(Brabb, 1969) - Medium-gray to medium-greenish gray to dark grayish gray, fine, argillite and coarse-grained, calcite-cemented lithic graywacke, with interbedded black shale, mudstone, and conglomerate. Our informal upper part of the Kathil Graywacke is mapped based on the presence of volcanic lithic content relative to the lower part. The upper Kathil contains far less volcanic content (pyroxene, hornblende, plagioclase, and volcanic lithic). Sandstone beds are commonly rhythmically layered from 1 to 60 cm thick with common flute casts, ripple marks, and scour and channel erosion features. Calcite cementation is abundant. Shale is black, fissile, locally thin, lamy, or with chert nodules to 50 cm, with rare siltstone. Mudstone is dark gray, silty, weathering, contains local mud cracks, carbonates, and locally grades to silty limestone. Conglomerate is matrix-supported, and contains rounded pebbles to cobble-size clasts of shale, chert (white, black, and green). Locally conglomerate is 20 cm thick and 20 to 30 m wide with local pinch-and-swell of channelization. Folds include one meter- and smaller local folds (with local quartz and rare sulfides in fold cores) to kilometer-scale folds. Thickness of lower and upper units combined is about 100 m. Possibly correlative to nonmarine rocks with plants of probable Albian age (Brabb and Churkin, 1969).
- Kkl** KATHIL GRAYWACKE, lower part (Lower Cretaceous)(Brabb, 1969) - Dark-green to light green, fine to very coarse-grained, dominantly volcanic clast sandstone and conglomerate with minor interlayered shale. Our informal lower part of the Kathil Graywacke is mapped based on the greater amount of volcanic lithic content relative to the upper part. The lower Kathil contains far more clastic content (pyroxene, hornblende, plagioclase, and volcanic lithic) than the upper part. Petrographic estimates are: 3 to 10% pyroxene, 3 to 8% hornblende, 30% plagioclase, 15 to 30% volcanic lithic, and 20% quartz. Chert is 1 to 2 m thick; locally cross-bedded. Pebble sandstone includes clasts of white to light-green volcanic rocks, argillite, and to dark green to black chert, asphaltic volcanic rocks and shale to 4 cm. Cross-bedding, carbonized plant material, and pyrite locally. Conglomerate is dark-green, coarse to very coarse-grained matrix-supported, with subrounded to rounded cobbles to large boulders (1 to 2 m). Beds typically greater than 1 m thick or amalgamated. Shale is black and thin. Carbonate occurs on fracture surfaces and in veins to 25 cm thick. Lower part of Kathil includes rare fine-scale ripple marks. Locally well developed turbidity current deposits, sandstone to shale ratio > 100:1. Thickness of lower and upper units combined is about 100 m. Possibly correlative to nonmarine rocks with plants of probable Albian age (Brabb and Churkin, 1969).
- Kk** BIEDERMAN ARGILLITE (Lower Cretaceous)(Brabb, 1969) - Rhythmically interbedded argillite, siltstone and sandstone. Sandstone dark-gray to dark-greenish gray, weathers mottled light-brown, orange-brown to reddish brown, fine to medium-grained, hard, dense, silica and carbonate cemented, chert-quartz arenite. Beds are locally 1 to 40 cm thick and rarely to 80 cm, locally graded. Argillite dark gray to black, siliceous, hard, dense, with local carbonate veins and breccia. Change is typically well developed and pervasive. Petrographic estimates of clasts include monocrystalline quartz 50%, chert 20%, cherty argillite 15 to 30%, plagioclase 1%, and trace pyroxene, white mica and iron oxide (to 10%). On Kendall River in southern-most D-1 Quadrangle contains beds with abundant polytraps (Buchan?). Locally contains abundant *Buchia subarctica* of Miangman age (Brabb and Churkin, 1969). Thickness from 50 to 300 m. TAI = 10 and 100.
- Kp** INDIAN GRAVE SHALE (Lower Cretaceous) - Informal name for black to light-gray weathering shale and phyllitic shale with pervasive cleavage. Mapped 4 km northwest of Indian Grave Mountain where shale forms a dip slope. Two samples were barren of foraminifera; yielded no palynology or TAI results. Thickness is about 50 m. This unit is in the same stratigraphic position as the informal pebble shale unit of Hauterivian to Barremian age on Alaska's North Slope.
- Ks** KEENAN QUARTZITE (Lower Cretaceous)(Brabb, 1969) - Light-gray to white, fine to medium-grained quartz-arenite quartzite, with rare argillite and siltstone. Typically massive and resistant, forming prominent ridges, but local bedding ranges from 10 to 50 cm thick, typically 15 to 25 cm, with partial lamination, low-angle cross-bedding, biohermation (vertical and horizontal), amalgamation, and rare channelization. Petrographic estimates of clasts include monocrystalline quartz 80 to 90%, chert 5 to 20%, cherty argillite 0 to 8%, plagioclase 1%, glaucophane 0 to 5%, rare tricolored chert, and trace strom and white mica. Cement is silica with local carbonate, and iron oxide (to 10%). On Kendall River in southern-most D-1 Quadrangle contains beds with abundant polytraps (Buchan?). Locally contains abundant *Buchia subarctica* of Miangman age (Brabb and Churkin, 1969). Thickness from 50 to 300 m. TAI = 10 and 100.
- Kd** GLENN SHALE (Lower Cretaceous to Middle Tertiary)(Brabb, 1969) - Very dark gray to grayish-black carbonaceous phyllitic shale, slate, semischist, and very fine grained lithic sandstone; contains pyrite, and common clay. Sandstone to shale ratio is > 100:1. Weathers to orange-brown platy rubble and cleavage is the dominant rock fabric, particularly in the Indian Grave Mountain area. Conformably to unconformably underlies the Keenan Quartzite and unconformably overlies the Permian Step Conglomerate and Ishikami Limestone. Cleavage is pervasive. South of the map area contains Middle Tertiary to Early Cretaceous (Berriasian to Maastrichtian) fossils, however, within the Charley River C-1 and D-1 Quadrangles age of Glenn Shale is Jurassic to Early Cretaceous (Brabb and Churkin, 1969). The Glenn Shale is at least 1700 m thick in the map area. TAI analysis yielded no results.
Unconformity(?)
- Ps** STEP CONGLOMERATE (Permian)(Brabb, 1969) - Light-gray, very fine grained to pebbly chert-arenite sandstone, clay-supported, cherty, black to dark gray, and minor biotite limestone and siltstone. Facies equivalent of Ishikami Limestone. Chert clasts are subangular and rounded, medium gray (60%), dark gray (30%), and black (8%). Clasts include fossil debris (conchoidal, crinoidal, polytraps, bryozoa), and organic impurities to 4 cm long. Petrographic estimates include chert (80-95%), quartz (5-20%), and minor cherty argillite. Cement is dominantly carbonate, and locally siliceous. Thickness is 600 m.
- Pz** TANKANADIT LIMESTONE (Permian)(Brabb and Churkin, 1969) - Tan to light gray, fine to coarse-grained biotite limestone weathering to gray to dark gray. Core is with Step Conglomerate and occurs in map area in vicinity of Indian Grave Mountain, south-western C-1 and north-western B-1 Quadrangles. Contains abundant monocrystalline siliceous, conchoidal, and bryozoan fragments. Locally cryptocrystalline and indolent. Contains abundant rounded chert pebbles where interbedded with Step Conglomerate in southern C-1 Quadrangle. Thickness is about 115 m.
- Dtr** NATION RIVER FORMATION (Devonian)(Brabb and Churkin, 1967) - Yellow-brown to light brownish medium-gray, chert-arenite sandstone and chert pebbles to cobble conglomerate. Conglomerate is clay supported, rounded to subangular with gray dark gray, and black chert in a quartz and sand-size matrix. Locally with weathering tricolored chert clasts are common. Weathers brown to blocky lichen-covered silty. The Nation River Formation conglomerate is less sandy, has more rounded clasts, more chert clasts, is more siliceous, and is more clay-supported than Step Conglomerate. Petrographic estimates are: chert (70-85%), cherty argillite (10%), quartz (10-20%), tricolored chert (0-10%), with siliceous and light brown cement. Contains Devonian plant fragments and spores (Brabb and Churkin, 1969). Thickness up to 1200 m.
- Dvr** WOODCHOPPER(?) VOLCANICS (Lower or Middle Devonian)(Brabb and Churkin, 1969) - Dark green to very dark green, porphyritic mafic volcanic rock. Weathers very dark green and orange-brown. Phaeocryns comprise 50 percent of rock and consist of fine and medium-grained orthopyroxene and plagioclase, and lesser hornblende. Matrix includes carbonate, chlorite, and opaque minerals. Age uncertain. Similar to Woodchopper Volcanics interbedded with Lower Devonian limestone in vicinity of the mouth of Woodchopper Creek, Charley River B-5 Quadrangle. Thickness as much as 100 m.
Unconformity(?)
- Dvl** STRATIGRAPHIC POSITION UNCERTAIN
- Pza** PHYLLITIC ARGILLITE (Paleozoic?) - Black to dark gray argillite, weathering to dark gray and yellowish-tan to light gray to white bedded argillite. Banded argillite fabric is dominated by abundant cleavage surfaces and suggestive of turbidity current deposits. Unit occurs in northern D-1 Quadrangle adjacent to Woodchopper(?) Volcanics. Age uncertain but this unit contains late Paleozoic age ignitaries near intersection of Wood and Black Rivers (Brabb and Churkin, 1969). Thickness is at least 600 m.
- Pzi** LIMESTONE AND DOLOMITE (Paleozoic?) - White recrystallized limestone and dolomite weathering to very light gray. Petrographically consists of coarse mosaic of interlocking calcite and dolomite rhombs with abundant vugs, locally silicified. Unit occurs in northern D-1 Quadrangle associated with Paleozoic(?) argillite and adjacent to Woodchopper(?) Volcanics. Age uncertain but contains a few poorly preserved brachiopods and crinoids (Brabb and Churkin, 1969) and corals, bryozoa and brachiopods (Dover and Miyazaki, 1988). Thickness is at least 60 m.

*Map units and symbols are described for the Charley River D-1, C-1, and part of the B-1 quadrangles but may not be present on a given map of the group. Map units not present on the map sheet are shown without color in the explanation.

INTERPRETIVE BEDROCK GEOLOGIC MAP OF THE CHARLEY RIVER C-1 AND PART OF THE B-1 QUADRANGLES, EASTCENTRAL ALASKA

By
J.G. Clough, R.R. Reifensstuhl, C.G. Mull, S.A. Liss, G.M. Laird, and D.S. Pinney



Department of Natural Resources
Division of Geological and Geophysical Surveys
Geologic Data Modeling System