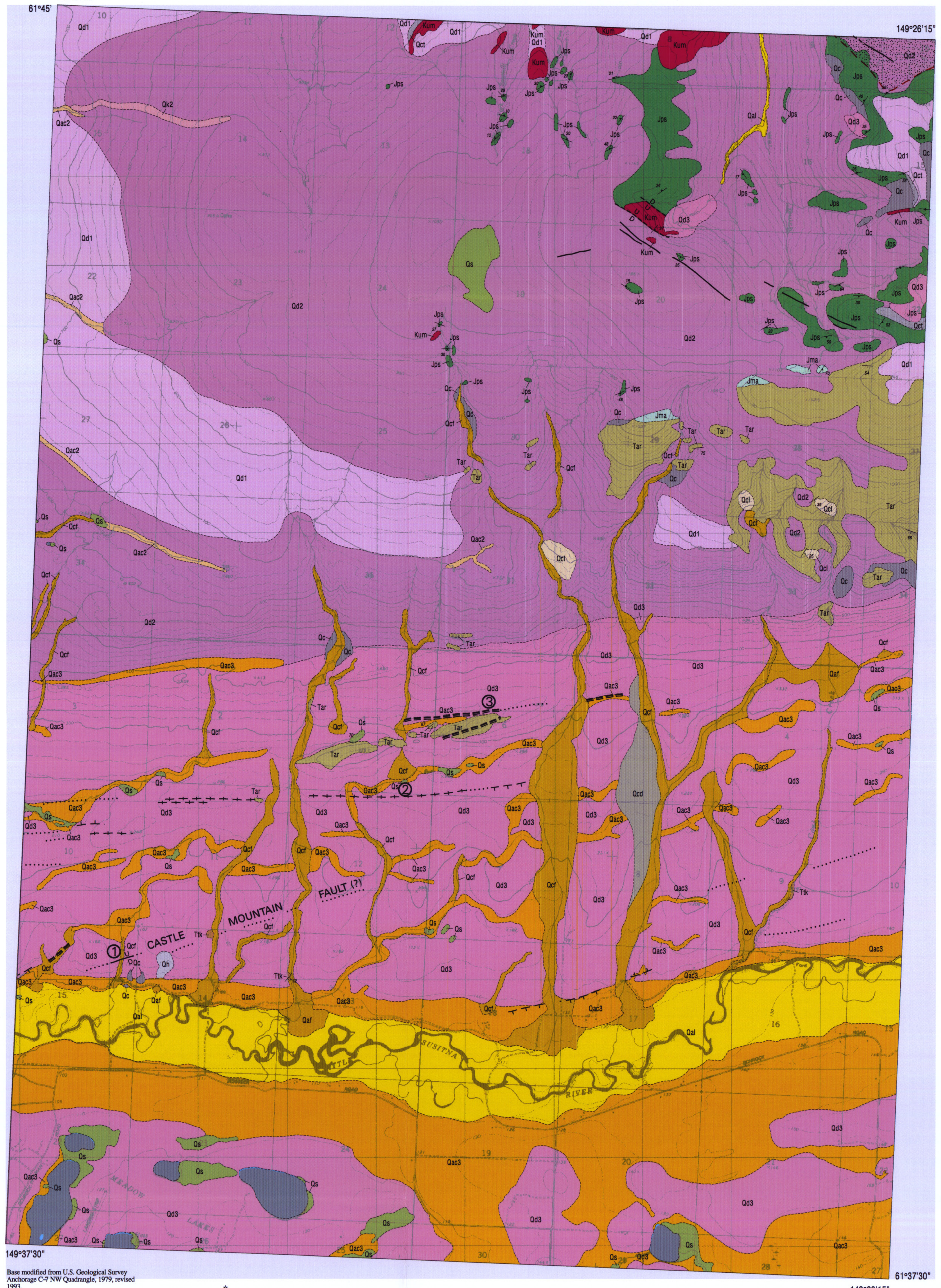
ALASKA DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS



Base modified from U.S. Geological Survey Anchorage C-7 NW Quadrangle, 1979, revised 1993.

UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF MAP DIAGRAM IS APPROXIMATE

SCALE 1:25,000

QUADRANGLE LOCATION

Based on field investigations in 1980, 1981, 1988, 1993, and 1994 supplemented by interpretation of 1:12,000-, 1:18,000-, and 1:24,000-scale color aerial photographs taken in 1973, 1981, 1982, and 1986 and 1:63,360-scale false-color infrared aerial photographs taken in 1984 and 1993. Field assistance provided by Cheri Daniels, Kristin Kline, and Gina Cruse. Reviewed by Jim Clough and Jeff Kline.

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

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GEOLOGIC MAP OF THE ANCHORAGE C-7 NW QUADRANGLE, ALASKA

By
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DESCRIPTION OF MAP UNITS[1]

UNCONSOLIDATED DEPOSITS

Fluvial Deposits

Qal FLOODPLAIN ALLUVIUM---Elongate deposits of pebble-cobble gravel and sand with few to numerous boulders beneath modern floodplains and associated low terraces; well sorted and medium to thick bedded, locally crossbedded; surface smooth, except for local low scarps

Qaf ALLUVIAL-FAN DEPOSITS---Fan-shaped, heterogeneous mixtures of pebble-cobble gravel with some sand and silt[2] and few to numerous, subangular to rounded boulders, especially in proximal areas, which may include debris-flow deposits; thick to thin bedded; surface smooth, except for numerous shallow, interconnected channels

Qam ALLUVIUM OF SMALL MEANDERING STREAMS---Complex mixtures of sand, silt, and organic material accumulated beneath floodplains of small meandering streams; moderately to well sorted; laminated to medium bedded, locally crossbedded; surface smooth, except for local low scarps

Colluvial Deposits

Qc UNDIFFERENTIATED COLLUVIUM---Irregular, heterogeneous blankets, aprons, and fans of angular to subangular rock fragments, gravel, sand, and silt up to estimated 3 m thick that are left on slopes, slope bases, or high-level surfaces by residual weathering and complex mass-movement processes, including rolling, sliding, flowing, gelifluction, and frost action; includes greatly modified drift of ancient glaciations; locally washed by meltwater and slope runoff; medium to thick bedded; surface smooth, lobed, or terraced and generally reflects configuration of underlying bedrock surface

Qca SNOW-AVALANCHE DEPOSIT---Tongue-, fan-, and cone-shaped heterogeneous mixtures of angular rock fragments, gravel, sand, and silt deposited at the mouths of bedrock couloirs and gullies and on lower steep slopes by snow avalanches; surface typically covered by numerous boulders

Qcd DEBRIS-FLOW DEPOSITS---Tongue-shaped, heterogeneous mixtures of sand and silt with some gravel and few to numerous angular rock fragments and organic debris deposited at the mouths of gullies and on lower slopes by debris flows; surface lobed, discontinuously channelled, and covered by numerous subangular to subrounded boulders

Qcf UNDIFFERENTIATED COLLUVIUM AND ALLUVIUM---Fan- and tongue-shaped and elongate heterogeneous mixtures of subangular rock fragments and pebble-cobble gravel with some sand and silt deposited in upper stream courses primarily by debris flows and brief, intense summer stream flows; surface smooth, except for local low scarps

Qcg ROCK-GLACIER DEPOSIT---Tongue- and bench-shaped heterogeneous mixture of angular to subangular blocks of local bedrock and ice with trace to some gravel, sand, and silt at depth that accumulates on floors and lower walls of cirques by flow of rock glaciers derived from shrinking of former glaciers (ice cored) or from deposition and cementation of precipitation-derived ground ice (ice cemented); perennially frozen where active; surface furrowed, ridged concentrically, and pitted; covered with angular to subangular blocks

Qcl LANDSLIDE DEPOSIT---Oval to tongue-shaped heterogeneous mixtures of fractured bedrock, pebble-cobble gravel with trace to some sand and silt deposited by near-surface to deep flowing and sliding due to instability of failed bedrock and unconsolidated surficial deposits; surface slightly irregular and broken by arcuate ground cracks and low ridges

Qcp PROTALUS-RAMPART DEPOSIT---Arcuate, steep-sided ridge of angular rock fragments of local bedrock with trace to some sand and silt deposited by bouncing, rolling, and sliding of individual large clasts across surface of perennial snowbank

Qcr ROCK-FALL DEPOSIT---Irregular accumulation of large angular blocks of local bedrock derived by collapse of higher outcrop

Qct TALUS---Cone- and apron-shaped heterogeneous mixtures of angular rock fragments with trace to some gravel, sand, and silt deposited on steep bedrock slopes and at the mouths of steep bedrock couloirs by snow avalanches, free fall, tumbling, rolling, and sliding; surface steep, slightly irregular, and covered with numerous angular rock fragments, especially in distal zones

Glacial Deposits

Qd4 UNMODIFIED DRIFT OF POST-NAPTOWNE GLACIATION---Heterogeneous blanket of pebble-cobble gravel with some sand and trace to some silt and few to numerous subangular to subrounded boulders deposited directly from glacial ice; generally massively bedded; surface slightly irregular to irregular (knob and kettle topography)

Qd3 UNMODIFIED DRIFT OF ELMENDORF ADVANCE (NAPTOWNE GLACIATION)---Heterogeneous blanket of pebble-cobble gravel with some sand and trace to some silt and few to numerous subangular to subrounded boulders deposited directly from glacial ice; generally massively bedded; surface slightly irregular to irregular (knob and kettle topography)

Qd2 UNMODIFIED DRIFT OF PRE-ELMENDORF ADVANCES (NAPTOWNE GLACIATION)---Heterogeneous blanket of pebble-cobble gravel with some sand and trace to some silt and few to numerous subangular to subrounded boulders deposited directly from glacial ice; generally massively bedded; surface slightly irregular to irregular (knob and kettle topography)

Qd1 MODIFIED DRIFT OF PRE-NAPTOWNE GLACIATION---Heterogeneous blanket of pebble-cobble gravel with some sand and trace to some silt and few to numerous subangular to subrounded boulders deposited directly from glacial ice and slightly reworked by mass-movement processes; generally massively bedded; surface slightly irregular

Glaciofluvial Deposits

Qac3 ABANDONED-CHANNEL DEPOSITS OF ELMENDORF ADVANCE (NAPTOWNE GLACIATION)---Elongate variable deposits in channels of former meltwater streams and subsequent underfit streams; composition ranges from slightly washed drift and colluviated alluvium in upland areas to well-sorted, clean pebble-cobble gravel and gravelly medium to coarse sand with rare to numerous boulders deposited in lowland; may include eolian sand in lowland; medium to thick bedded, locally crossbedded; surface smooth, except for low local scarps, to deeply pitted where large masses of stagnant glacial ice were buried

Qac2 ABANDONED-CHANNEL DEPOSITS OF PRE-ELMENDORF ADVANCES (NAPTOWNE GLACIATION)---Elongate variable deposits in channels of former meltwater streams and subsequent underfit drainages; composition ranges from slightly washed drift and colluviated alluvium in upland areas to well-sorted, clean pebble-cobble gravel and gravelly medium to coarse sand with rare to numerous boulders deposited in lowland; in lowland north of Deception Creek may include ice-marginal deposits, including fine-grained lacustrine deposits; thin to thick bedded, locally crossbedded; surface smooth, except for low local scarps

Qk3 KAME-ESKER-CREVASSE FILL DEPOSITS OF ELMENDORF ADVANCE (NAPTOWNE GLACIATION)---Complex mixtures of sandy alluvium and heterogeneous till deposited in holes, tunnels, and open crevasses by debris-charged meltwater streams in stagnant glacial ice; well to poorly sorted; thin to thick bedded, locally crossbedded; surface is characterized by discontinuous, sinuous, bifurcated, steep-sided ridges (eskers) that are often associated with small, steep-sided hills (kames) and flat-topped ridges (crevasse fills)

Qk2 KAME-ESKER DEPOSITS OF PRE-ELMENDORF ADVANCES (NAPTOWNE GLACIATION)---Complex mixtures of sandy alluvium and heterogeneous till deposited by debris-charged meltwater streams in holes and tunnels in stagnant glacial ice; well to poorly sorted; thin to thick bedded, locally crossbedded; surface is characterized by discontinuous, sinuous, bifurcated, steep-sided ridges (eskers) that are often associated with small, steep-sided hills (kames)

Paludal Deposits

Qs UNDIFFERENTIATED SWAMP DEPOSITS---Elongate to blanket deposits of peat, organic silt, and organic sand accumulated as surface deposits in local basins, in former stream channels, and downslope from springs and seeps; saturated and locally frozen, locally ice rich; complexly bedded; surface smooth

Man-made Deposits

Qh ARTIFICIAL FILL---Pebble-cobble gravel with trace to some sand and silt forming bases for major roads, railroads, and construction pads and piled in active or former gravel pits and open-pit mines; well to poorly sorted; surface smooth to irregular

[1]Map units and symbols are described for the Anchorage C-7 NE, C-7 NW, C-8 NE, and C-8 NW quadrangles but may not be present on a given map of the group.

[2]Estimated content of sand and silt, based on field observations, is indicated by the terms "some" and "trace." "Some" implies a general composition of 12 to 30 percent. "Trace" implies a general composition of 4 to 12 percent. Estimated compositions less than 4 percent were not recorded in the field.

BEDROCK

Bedded Rocks

Ttk TYONEK FORMATION (Miocene)---Fluvial carbonaceous sandstone, siltstone, shale, and claystone (Magoon and others, 1976; Clardy, 1984)

Tar ARKOSE RIDGE FORMATION (Paleocene and Eocene)---Fluvial feldspathic and biotitic sandstone, conglomerate, siltstone, and shale, locally containing abundant plant fossils; contains interlayered basalt flows in lower part of section; cobbles and pebbles are polymictic but rich in granitic lithologies in lower part of unit (Magoon and others, 1976; Clardy, 1984) and dominated by polymictic lithologies in upper part of section, which may correlate with Wishbone Formation (Winkler, 1992); pervasively and intensely sheared close to lower contact with underlying unit Jma, forming massive, fine-grained, chloritic rock with rare, highly sheared granitic clasts on Government Peak

Intrusive Rocks

Kum SERPENTINIZED ULTRAMAFIC ROCKS (Late Cretaceous)---Intensely sheared medium greenish-gray to black serpentine-talc-chlorite serpentinite (Csejtey and others, 1978; Csejtey and Evarts, 1979; Silberman and others, 1978)

Jga GABBRO (Middle Jurassic?)---Very coarse crystalline hornblende gabbro intruding pelitic schist on northeast ridge of Government Peak

Jqd QUARTZ DIORITE (Middle Jurassic?)---Medium- to coarse-crystalline hornblende (+/-biotite) quartz diorite (Winkler, 1992)

Metamorphic Rocks

Jma AMPHIBOLITE (Early and Middle Jurassic?)---Structurally complex amphibolite with lesser foliated quartz diorite and biotite-quartz-feldspar gneiss (Winkler, 1992)

Jps PELITIC SCHIST (Jurassic?)---Medium-grained quartz-muscovite-albite-chlorite (+/- garnet-biotite +/- serpentine-actinolite) greenschist-facies pelitic schist probably retrograded from amphibolite-facies rocks; numerous quartz veins and stringers (Ray, 1954; Csejtey and Smith, 1975; Csejtey and others, 1978; Madden and others, 1987)

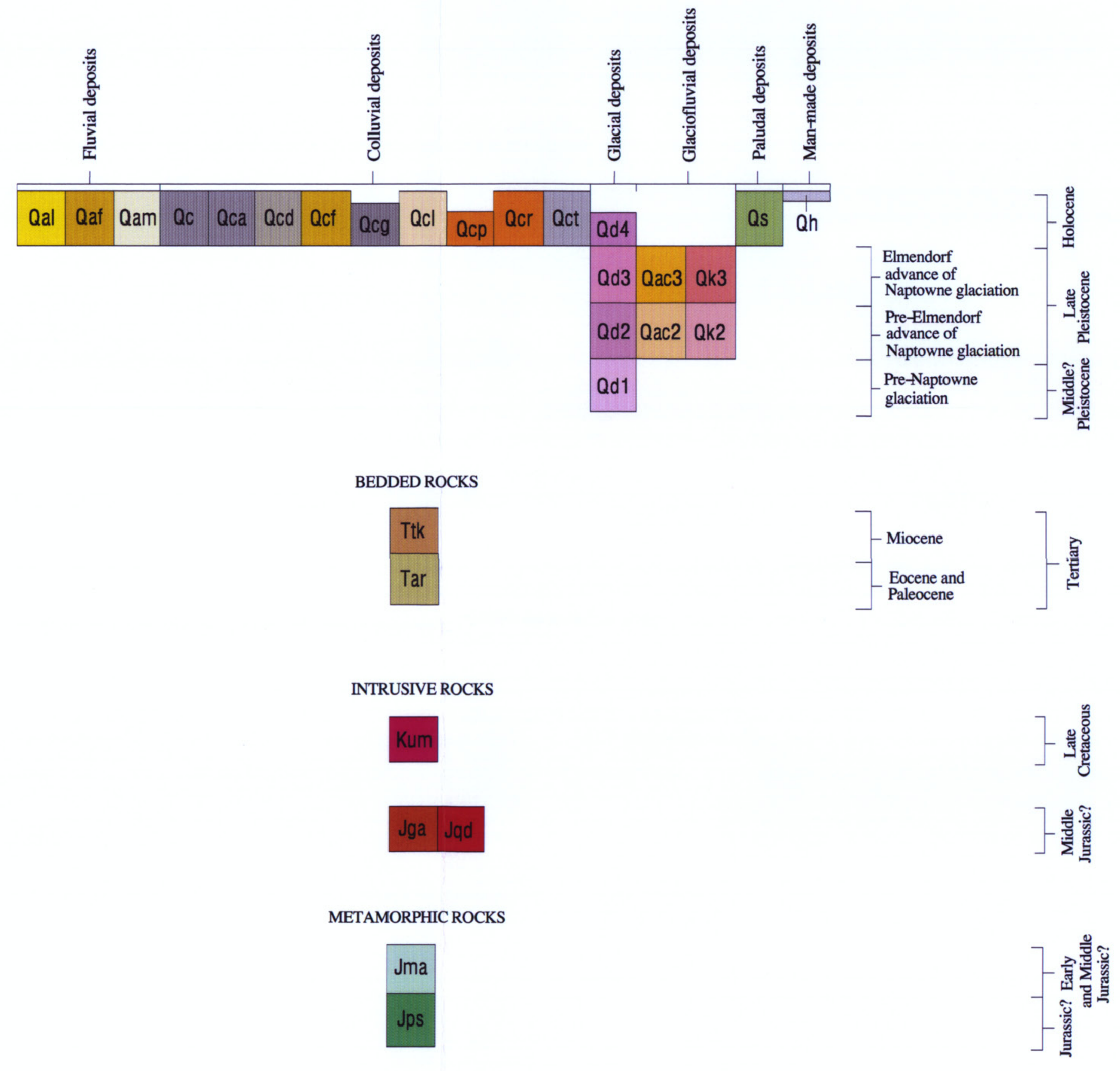
Notes on Map Features

① 30-ft-wide fault zone located and described by Barnes and Sokol (1959, p. 136)

② Photolineament is associated with a topographic break that is variously expressed as a narrow ridge 2-8 m high or a south-facing scarp 3-5 m high. Along the extended alignment of the lineament about 2 km west of the numbered location, an outcrop in an 8-m-high ridge indicates that the ridge is composed of plant-fossil-bearing conglomerate of the Arkose Ridge Formation (Tar). When extended farther westward, the lineament aligns with numerous parallel low ridges in the eastern Anchorage C-8 NE Quadrangle that appear to be resistant, glacially scoured bedrock mantled with Elmendorf-age drift (Qd3). These linear ridges are parallel to the ice-flow direction. The lineament at '2' may be a fault-bounded wedge of conglomerate or the surface expression of a glacially scoured, steeply dipping, resistant bed that is standing in relief and mantled with drift.

③ Photolineament is a deep trough on the north (uphill) side of a prominent ridge of Arkose Ridge Formation. Like photolineament at '2', this feature appears fault-related but may be a result of glacial processes. If extended westward, this lineament aligns with stream deflections that may be interpreted as fault offsets. However, these deflections are more likely controlled by ice-marginal channels, some of which are filled with abandoned-channel deposits of Elmendorf age (Qac3).

CORRELATION OF MAP UNITS



EXPLANATION OF MAP SYMBOLS

Strike and dip of beds

Strike and dip of foliation

Contact, dashed where approximate

Faults

Fault, location and displacement sense verified by field inspection or documented in literature. Dashed where approximate. U on relatively upthrown block, D on relatively downthrown block.

Photolineaments

Scarp, barb on lower side

Ridge, may be fault wedge or glacially scoured ridge of resistant bedrock

Trough, may be ice-marginal channel at lower elevations

Photolineament with no topographic expression evident in aerial photographs. Generally visible as a color or density contrast in vegetation.

Sackung failure in bedrock. Arrow indicates general direction of downslope movement.

Lake

? Location queried where questionable or uncertain

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This DGGS Report of Investigations is a final report of scientific research. It has received technical review and may be cited as an agency publication.