

**Division of Geological & Geophysical Surveys**

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**DESCRIPTION OF SURFICIAL GEOLOGIC MAP UNITS: PHILIP SMITH  
MOUNTAINS C-3 AND C-4 QUADRANGLES**

by

Christopher F. Waythomas  
U.S. Geological Survey  
Box 25046, MS 413  
Denver Federal Center  
Denver, Colorado 80225

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794 University Avenue, Suite 200  
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# DESCRIPTION OF MAP UNITS

## UNCONSOLIDATED DEPOSITS

Unconsolidated deposits were mapped using 1:65,000 scale aerial photographs and 1:63,360 scale topographic maps. Deposits were identified in the field during the summer of 1992 by foot and helicopter traverses. Preliminary maps were prepared from field notes, mapping and aerial photo interpretation. Terminology for glacial deposits is from Hamilton (1978).

## GLACIAL DEPOSITS

**Qdl<sub>2</sub>, Qdl<sub>2a</sub>, Qdl<sub>2b</sub>, Qdl<sub>2c</sub>: DRIFT OF ITKILLIK II AGE** - Poorly sorted, nonstratified, boulder and cobble gravel, usually matrix supported. Clasts are typically sub-angular to rounded, striated, and faceted, but nonstriated clasts also present in varying amounts. Associated with well-defined, fresh appearing kettle and kame topography, ice-stagnation drift, and various types of moraines, including ground moraine, lateral moraine, and terminal moraine. May include outwash gravel and eolian silt. Lateral moraine limits often mantled by colluvial aprons, gelifluction lobes, talus, and alluvial fan sediment. In areas with steep topography may include colluviated and reworked drift. Different phases of the Itkillik II glaciation are denoted with subscripts 2a (oldest), 2b, and 2c (youngest).

**Qdl<sub>2b</sub>, Qdl<sub>2ab</sub>, Qdl<sub>2bb</sub>, Qdl<sub>2cb</sub>: DRIFT OF ITKILLIK II AGE MANTLING BEDROCK** - Same as above except consists of thin drift over ice-molded bedrock. May include varying amounts of frost-shattered bedrock, colluvium, and talus.

**Qdl<sub>1</sub>: DRIFT OF ITKILLIK I AGE** - Poorly sorted, nonstratified, boulder and cobble gravel, usually matrix supported. Associated with broad-crested partially subdued lateral and terminal moraine, ice-stagnation topography, and partially filled, or drained kettles. Drift limits are typically sharp and well-defined, but modified by gelifluction. Moraine footslopes are commonly mantled by gelifluction aprons, whereas moraine crests usually exhibit nonsorted circles, frost boils, and localized deflation pavements.

**Qds: DRIFT OF SAGAVANIRKTOK AGE** - Poorly sorted, non-stratified, cobble and boulder gravel, matrix supported, containing abundant rounded to subangular, striated and faceted clasts. Associated with very broad, even-crested, highly modified moraine ridges north of the mountain front. Hummocky morainal morphology is rarely preserved, and kettles tend to be absent or significantly enlarged due to thermal erosion of permafrost. Moraine ridges are typically featureless, with smooth, low-relief flanking slopes (<10 degrees), that have been significantly modified by gelifluction, formation of patterned ground, and secondary drainage development. Erratic boulders of Kanayut conglomerate common in drift sheets. Usually mantled by continuous tussock-tundra mat.

**Qdsb: DRIFT OF SAGAVANIRKTOK AGE MANTLING BEDROCK** - Same as above except consists of thin drift over ice-molded bedrock. May include varying amounts of frost-shattered bedrock, colluvium, and talus.

**Qdu: DRIFT, UNDIFFERENTIATED** - Isolated patches of moraine whose relation to major drift units unknown, or uncertain. Morphology and composition variable, depending on degree of preservation and origin of drift.

**Qdb: DRIFT MANTLING BEDROCK** - Thin veneers of drift overlying ice-molded bedrock hills and ridges mainly along valley bottoms inside the mountain front. Low bedrock summits typically capped by <50cm poorly-sorted, angular to subangular locally derived till. May include varying amounts of frost-shattered bedrock, colluvium, and talus.

▲ ▲ **ERRATIC BOULDERS** - Boulders and cobbles on ridge crests and high-level slopes, consisting of rock types foreign to the area where found. Such boulders are evidence of former extensive glaciation and are not usually associated with recognizable moraine or drift.

**Qdoi<sub>2</sub>, Qdoi<sub>2a</sub>, Qdoi<sub>2b</sub>, Qdoi<sub>2c</sub>: OUTWASH OF ITKILLIK II AGE** - Well-sorted, clast supported, massive to weakly stratified, rounded to subrounded cobble and pebble gravel. Forms level evenly sloping terraces accordant with terminal moraines, and extending downvalley for several kilometers. Locally, exhibit kettled, pitted surfaces, and may be mantled by colluvial aprons along valley margins. Different phases of the Itkillik II glaciation are denoted with subscripts 2a (oldest), 2b, and 2c (youngest).

**Qdol<sub>1</sub>: OUTWASH OF ITKILLIK I AGE** - Well-sorted, clast supported massive to weakly-stratified, rounded to subrounded cobble and pebble gravel. Typically form outwash heads along terminal moraines of Itkillik age, and locally dissect drift of Sagavanirktok age.

## FLUVIAL DEPOSITS

**Qaf: ALLUVIAL FAN DEPOSITS** - Moderately- to well-sorted, clast supported, cobble and pebble gravel. Typically form fan-shaped alluvial deposits at the base of mountain slopes and mouths of tributaries.

**Qat: ALLUVIAL TERRACE DEPOSITS** - Cobble and pebble gravel, silt and sand. Moderately to well-sorted, subrounded to rounded, clast supported massive to crudely stratified gravel, with minor sand and silt. Forms alluvial terraces along modern rivers and streams, typically 1-2 meters above active stream channels.

**Qam: MODERN STREAM DEPOSITS** - Deposits formed by modern rivers and streams. Consists of rounded to subrounded, locally stratified, cobble and pebble gravel, sand and silt, typically associated with braided river channels.

## LACUSTRINE DEPOSITS

**Qit: LACUSTRINE DEPOSITS** - Silt and fine sand deposited in proglacial lakes and kettles. Often associated with beach ridges and wave-cut benches near the margins of former lake basins.

## **COLLUVIAL DEPOSITS**

**Qcf: FINE-GRAINED COLLUVIAL DEPOSITS** - Reworked silt, with minor sand, pebbles and cobbles. Typically found along the base of gentle slopes, as apron-like features, or as blanketing mantle over low hills and ridges beyond the mountain front where it may comprise gelifluction lobes and sheets, and is gradational with other surficial deposits. Forms evenly-sloping surfaces where developed on low bedrock hills and old drift surfaces, and often exhibits horsetail drainage patterns, thaw lakes, patterned ground, and bogs. Typically covered by dense tussock tundra vegetation.

**Qcc: COARSE-GRAINED COLLUVIAL DEPOSITS** - Poorly-sorted, sub-angular to angular, bouldery gravel, with minor amounts of silt as matrix material. Typically occur along the distal portions of talus slopes, and usually comprise blocky lobate gelifluction aprons fringing areas of frost-shattered bedrock.

**Qct: TALUS, FROST-SHATTERED BEDROCK AND ROCK RUBBLE** - Blocky, angular, unsorted rock debris on steep slopes, greater than 25°. Includes minor bedrock outcrops, and forms relatively continuous sheets and mantles over bedrock. Also forms cones at the base of short, steep ephemeral tributaries and alpine gullies.

**Qcd: DEPOSITS OF ALPINE DEBRIS FANS** - Poorly-sorted, angular, clast-supported gravel, boulders, and blocky debris. Matrix content varies from 10-40 percent, and consists mainly of silt, sand and granules. Form steep-fronted fan-shaped features with hummocky surface morphology. Commonly found at the base of short, steep ephemeral tributaries and alpine gullies.

**Qca: MIXED COLLUVIAL AND ALLUVIAL DEPOSITS** - Fine-grained, well-sorted silt with minor sand, gravel and boulders. Form distal portions of colluvial aprons, or wash-out zones at base of colluvial slopes. Commonly associated with polygonal ground, and thaw lakes.

**Qcr: ROCK-GLACIER DEPOSITS** - Poorly-sorted, angular, blocky gravel, and talus, deformed by creep into looping, lobate, and tongue-like features along the base of talus slopes, or within cirque basins.

**Qcg: GELIFLUCTION DEPOSITS** - Poorly-sorted, angular to subangular gravel, sand and silt forming lobate sheets and tongues on most slopes in the foothills zone. Parent material is commonly composed of reworked drift, fine-grained alluvium, or colluvium.

**Qlt: THAW LAKE DEPOSITS** - Silt with minor sand and gravel in drained thaw lake basins. Common on drift surfaces of Sagavanirktok age. May be mantled by tundra mat or peaty deposits.

## REFERENCES CITED

Hamilton, T.D., 1978. Surficial geologic map of the Phillip Smith Mountains Quadrangle. U.S. Geological Survey Miscellaneous Field Studies Map MF-879-A, 1:250,000 scale.