

### **SURFICIAL GEOLOGY AUSTRALIA MOUNTAIN**

YUKON TERRITORY Scale 1:50 000/Échelle 1/50 000 Universal Transverse Mercator Projection Projection transverse universelle de Mercator North American Datum 1983 Système de référence géodésique nord-américain, 1983 © Sa Majesté la Reine du chef du Canada 2005 © Her Majesty the Queen in Right of Canada 2005

OF4593	OF4592	OF4591	OF4590	OF4580	OF4579
115-0/9	115-0/10	115-0/11	115-0/12	115 N/9	115 N/10
OF4586	OF4587	OF4588	OF4589	OF4577	OF4578
115-0/8	115-0/7	115-0/6	115-0/5	115 N/8	115 N/7
OF4585	OF4584	OF4583	OF4582	OF4576	OF4575
115-0/1	115-0/2	115-0/3	115-0/4	115 N/1	115 N/2
OF4347	OF4348	OF4349	OF4581	OF4573	OF4574
115 J/16	115 J/15	115 J/14	115 J/13	115 K/16	115 K/15
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NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

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# Canada

#### LEGEND

Note: Map units listed below occur within one metre of the surface. Where organic or eolian sediments < 1 m thick overlie these, a pattern is overlaid upon the map unit. Along some valleys, colluvial or alluvial sediments > 1 m thick overlie older alluvial gravels that could contain placer gold. In order to accentuate these potentially exploitable deposits, a compound map unit is presented, e.g., Cx/AtT. This means that colluvial complex sediments overlie alluvial terrace sediments thought to be late Tertiary in age. This legend is part of a larger regional study hence coloured boxes indicate units that appear on this map. In addition, not all symbols in the legend are represented on this map.

CENOZOIC QUATERNARY HOLOCENE

Made Land: placer mines, roads, and airstrip

ORGANIC DEPOSITS: peat and organic silt formed predominantly by the accumulation of vegetative material in bogs, fens, and swamps situated on valley bottoms; permafrost is commonly encountered within 1 m of the surface. Thermokarst collapse is common.

Organic Blanket: undivided; thickness > 1 m to 5 m

Organic Veneer: blanket bog generally < 1 m thick

HOLOCENE AND PLEISTOCENE (UNDIVIDED)

ALLUVIAL DEPOSITS: gravel to silt size sediments, well stratified, deposited by

Floodplain Sediments: gravel, cobble to pebble; massive to well stratified, capped by sand and silt; flat lying; includes lacustrine and organic deposits in abandoned

channels and backswamp areas; subject to periodic inundation and reworking by floods; thickness 1 to 5 m Alluvial Fan Sediments: gravel, sand, silt, and diamicton, massive to well stratified; sediments form fan-shaped landforms or complexes of coalesced fan-shape landform

at the confluence of tributary streams; may be subject to flooding accompanied by sudden stream migration and inundation; thickness up to 10 m

Alluvial Sediments Complex: sediments forming floodplains, fans, and terraces that cannot be subdivided at this map scale

COLLUVIAL DEPOSITS: stony diamicton resulting from the physical and chemical breakdown of bedrock and subsequent reworking and transportation by creep, solifluction, and landsliding; colluvial deposits may contain reworked glaciofluvial and morainal sediments within the limits of pre-Reid ice-cover and reworked eolian sediments; colluvial deposits are products of formation and reworking over a significant part of the Pleistocene and Holocene epochs; surface is commonly hummocky or undulating

Colluvial Blanket and Veneer Sediments: diamicton, stony with a sandy matrix; massive to poorly stratified; colluviated blankets generally conform to underlying bedrock and exceed 1 m in thickness; veneers are < 1 m in thickness and are commonly discontinuous over bedrock

Colluvial Apron Sediments: bouldery diamicton and bouldery sandy gravel, poorly sorted; massive; sediments form a wedge-like slope-toe complex of small steep debris flow and solifluction deposits; thickness is < 1 m at the upper and lower slope limit to up to 5 m or more in the thickest part of the apron

Landslide Sediments: silt loam to boulders, poorly sorted to unsorted; massive; clasts are subangular to angular and are locally derived; thickness varies greatly

segregated bodies of ice and buried ice wedges

limits of glaciation; the unit commonly occurs along the lower slopes of valley margins Colluvial/Eolian Apron (muck): primary deposits of eolian fine sand and silt resedimented and interstratified with organic silt, and detritus, alluvial fan gravel and sand and variable amounts of stony colluvial diamicton; forms aprons along valley bottoms through resedimentation of eolian sediments from valley sides to valley floor, commonly preserved on north-facing slopes; thickness 1 to 20 m; commonly contains

Colluvial Complex Sediments: areas of intergrading colluvial and alluvial sediments which are too complex to subdivide at the scale of mapping; unit may include colluvial and alluvial fan, colluvial blanket, landslide sediments and colluviated drift within the

MIDDLE TO LATE PLEISTOCENE (UNDIVIDED) ALLUVIAL DEPOSITS: gravel and sand deposited by streams that were not fed by glacial meltwater; sediments may have experienced several cycles of alluviation and erosion, but are now inactive due to burial or fluvial incision; basal gravels within these sediments commonly contain placer gold

Alluvial Terrace Sediments: gravel, cobble to pebble with a sandy matrix; massive to well stratified; capped by sand and silt; sediments are of flood plain origin now isolated from flooding by stream incision; thickness 1 m to 10 m

sand, poorly to moderately sorted, now isolated from water and debris floods due to fluvial incision; sediments disturbed by cryoturbation; thickness up to 10 m Alluvial/Colluvial Complex Sediments: silt, sand and gravel, poorly to moderately

sorted; thin to thick bedded, interstratified with colluvial diamicton; sediments underlie the floors and margins of narrow upland valleys and grade laterally up slope into colluvial blankets; sediments may represent several depositional cycles; thickness may exceed 10 m in mid-valley locations EOLIAN DEPOSITS: well sorted medium sand to silt initially transported and deposited

Alluvial Fan Sediments: single fans or aprons of coalesced fans formed of gravel and

colluvial processes; deposits of very fine sand and coarse silt < 1 m thick are distributed discontinuously throughout low lying areas Eolian Blanket: fine sand and silt, well sorted; massive; may form crescent-shape and linear dunes and featureless or gently undulating inter-dune eolian plains; thickness 1

by wind action during glaciations and commonly resedimented through fluvial and

Eolian Veneer: thin deposits of very fine sand and coarse silt distributed discontinuously throughout low lying areas, thickness < 1 m

> LATE PLEISTOCENE - McCONNELL GLACIATION GLACIOFLUVIAL DEPOSITS: gravel and sand deposited by streams flowing away from glacial ice; deposits display poor soil development with rare cryoturbation

Glaciofluvial Terrace Sediments: gravel and sand, unweathered, forming one or more MIDDLE PLEISTOCENE - REID GLACIATION

GLACIOFLUVIAL DEPOSITS: gravel and sand deposited by streams flowing away from glacial ice; deposits display moderate soil development with signs of cryoturbation; soil thickness < 0.5 m

Glaciofluvial Terrace Sediments: gravel and sand, moderately weathered, forming one LATE PLIOCENE TO MIDDLE PLEISTOCENE - pre-Reid GLACIATIONS (UNDIVIDED)

GLACIOLACUSTRINE DEPOSITS: well stratified sand, silt, clay, deposited in lakes ponded by glacial ice Glaciolacustrine Undivided: sand, silt, and clay; undifferentiated at this scale of

GLACIOFLUVIAL DEPOSITS: gravel and sand deposited by streams flowing away from glacial ice in meltwater channels and outwash plains; massive to well stratified. Surface soils may extend to 2 m depth with well developed clay skins on clasts, frequent signs of cryoturbation (ice wedge pseudomorph and sand wedges), and strong chemical weathering

Glaciofluvial Terrace Sediments: gravel and sand, deeply weathered; incised into flights of terraces; thickness 1 to > 5 m

## Geology by D.G. Froese and L.E. Jackson, Jr. (1999 - 2002)

Co-ordinated through the auspices of the Ancient Pacific Margin NATMAP

Digital cartography K. Shimamura, Terrain Sciences Division

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital base map from data compiled by Geomatics Canada, modified by Parm Dhesi, Earth Sciences Sector Information Division (ESS Info)

Magnetic declination 2005, 26°49' E, decreasing 19.3' annually Elevations in feet above mean sea level

Contour interval 100 feet

MORAINAL DEPOSITS (TILL): glacial diamicton, mainly till, generally consisting of a matrix ranging from sand to clay that supports clasts ranging from boulders to pebbles in size; deposited either directly from glacial ice or by gravity flow from glacial ice; surface soils may extend to 2 m depth with well developed clay skins on clasts, frequent signs of cryoturbation (ice wedge pseudomorph and sand wedges), and strong chemical weathering

Till Blanket: diamicton, stony, silty-sand matrix; massive; conforms to underlying topography, thickness > 1 m; extensively colluviated on slopes

Till Veneer: diamicton, stony, silty-sand matrix; massive; discontinuous and may contain extensive areas of thin (< 1 m) colluvium

ALLUVIAL DEPOSITS: Gravel and sand deposited by streams that were not fed by glacial meltwater; sediments may have experienced several cycles of alluviation and erosion, but are now inactive due to burial or fluvial incision; basal gravels within these

Alluvial Terrace Sediments: sandy pebble and cobble gravel deposited by streams having a fluvial source but graded to the margins of pre-Reid glaciers or glacial

sediments commonly contain placer gold

UNDIFFERENTIATED DRIFT: diamicton, gravel, sand, silt and clay deposited from glacial ice, glacial streams, and glacially damned lakes; extensive weathering, poor exposure and permafrost make differentiation into component glacial sediments difficult; thicknesses commonly exceed 10 m and mask underlying bedrock topography; commonly colluviated and intergraded with colluvium; surface soils may extend to 2 m depth with well developed clay skins on clasts, frequent signs of cryoturbation (ice wedge pseudomorph and sand wedges), and strong chemical

Drift: flat to gently sloping

and sub parallel scarps

weathering

Drift Modified by Landsliding: drift translated along failure plains into irregular steps

Fluvially Incised Drift: formerly extensive areas of drift incised by closely spaced stream

Basalt: columnar alkaline olivine basalt and flow breccia; erosional remnants of formerly valley filling flows underlying terraces along lower Rosebud Creek; thickness

PLIOCENE AND LATE MIOCENE

ALLUVIAL DEPOSITS: preglacial gravel and sand; highly dissected and deeply Pediment and Bajada Sediments: inclined fluvial surfaces which are found at a midslope position in unglaciated drainage systems; usually thinner than 5 m; formed

as a result of limited agradation of stream gravel and significant colluviation; composed of thin, poorly sorted gravel that contains both locally derived subangular stream gravel deposits and angular bedrock fragments High Level Terrace Sediments (includes White Channel Gravel and equivalent

sediments): weathered pebble to cobble gravel > 1 m thick; surface soils may extend to 2 m depth with well developed clay skins on clasts, frequent signs of cryoturbation (ice wedge pseudomorph and sand wedges), and strong chemical weathering; within the Yukon River valley, terraces above the 500 m contour may be remnant features from the southward-flowing paleo-Yukon River drainage system

PALEOZOIC AND MESOZOIC Bedrock: schist, gneiss, ultramafics, granodiorite, monzonite, marble, and basalt; includes areas of thin colluvial cover, blockfields, and sorted stone polygons in alpine

	SYMBOLS
(	Geologic contact; defined, approximate, inferred
(	Open system pingo, collapsed open system pingo
	Thermokarst collapse activity
	andslide movement direction in bedrock and colluvium
	Scarps created by widespread landslide movement in drift
	Terrace scarp (ticks on sloped side)
Į	Degraded Cirque: active during pre-Reid Glaciations
	Degraded Arête: active during pre-Reid Glaciations
	Meltwater channel: flow direction, unknown flow direction
	Large meltwater channel
	All time (pre-Reid) glacial limit; defined, inferred
	Cryoplanation terrace
	Tor
	andform Streamlined by glacial ice
	Vertebrate fossil locality
	Stratigraphic section
	Fault trace
L	Lineaments (fault, fracture, joint system) defined by linear drainage courses, aligned gaps in ridges, or aligned breaks in bedrock slopes
-	Abandoned valley: paleoflow defined
,	Abandoned valley: paleoflow undefined
1	Paleoflow, suspected buried valley
ı	Rock glacier

### DESCRIPTIVE NOTES

The Australia Mountain map area lies within the Klondike Plateau, an incised rolling upland predominantly underlain by Paleozoic schist and gneiss (Bostock 1942). Valleys predominantly trend northeast-southwest likely reflecting underlying structural discontinuities with this orientation. The low terrain in the extreme northeast corner of the map area is part of the Tintina Trench which is the surface expression of a major right lateral strike-slip fault system that crosses Yukon and part of Alaska. Parts of the Australia Mountain map area were glaciated during the most extensive of the late Pliocene and early Pleistocene pre-Reid glaciations and likely during subsequent pre-Reid glaciations of lesser extent: the deposits of these glaciations are extensively eroded to the point that only erratic pebbles of the most resistant lithologies, such as chert and quartzite, survive on slopes. Consequently, the most extensive ice cover can be outlined but the limits of less extensive subsequent glaciations cannot be differentiated. During the maximum glaciation, part of the Cordilleran ic sheet in Tintina Trench pressed up the basins of Gravel and Independence creeks along the northeast side of the Australia Mountain Massif (AMM). Another margin of the Cordilleran ice sheet advanced north from the Stewart River creeks from the Stewart River basin to the south. Meltwaters from the ice sheet poured across this ridge through a large meltwater channel that is located in southwest corner of the map area (Bostock 1965; Duk-Rodkin et al. 2001). his deposited an extensive valley train along reaches of Australia Creek down-stream from this meltwater channel Another, minor meltwater channel lies to the south of AMM along the divide between Independence Creek and Australia Creek. AMM falls within the elevation range within which cirque glaciers developed during the pre-Reid glaciations elsewhere in the region (Nelson and Jackson 2003); cirque-like features around AMM likely had this origin. Dense vegetation covers much of the area. Permanently frozen ground is often only a few tens of centimeters below the surface making digging with hand tools difficult. Consequently, surficial sediments have been largely mapped from the interpretation of airphotographs. Colluvium covers slopes and ridges and is the dominant sediment. It is formed by the breakdown of bedrock into regolith that is transported down-slope by gravitational processes such as seasonal creep, solifluction and landsliding. The oldest fluvial deposits (P<sup>T</sup>, At<sup>ria</sup>) are confined to terraces. and valley bottoms. They consist of gravel and sand deposited as alluvial fans or pediments and terraces along major streams in the area. Meltwater deposited thick valley train gravel (Gt<sup>FA</sup>). Following the deposition of outwash gravel, streams in the area have progressively incised the sedimentary fill and underlying bedrock and concentrated placer gold in younger fluvial sediments that underlie low terraces, flood plains and narrow valleys cut in bedrock. Organic deposits in bogs and fens are extensive in valley bottom settings as is resedimented aeolian silt know as muck. These overlie placer gravel in many areas. They commonly also contain massive lenses of ice.

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> > 2005

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