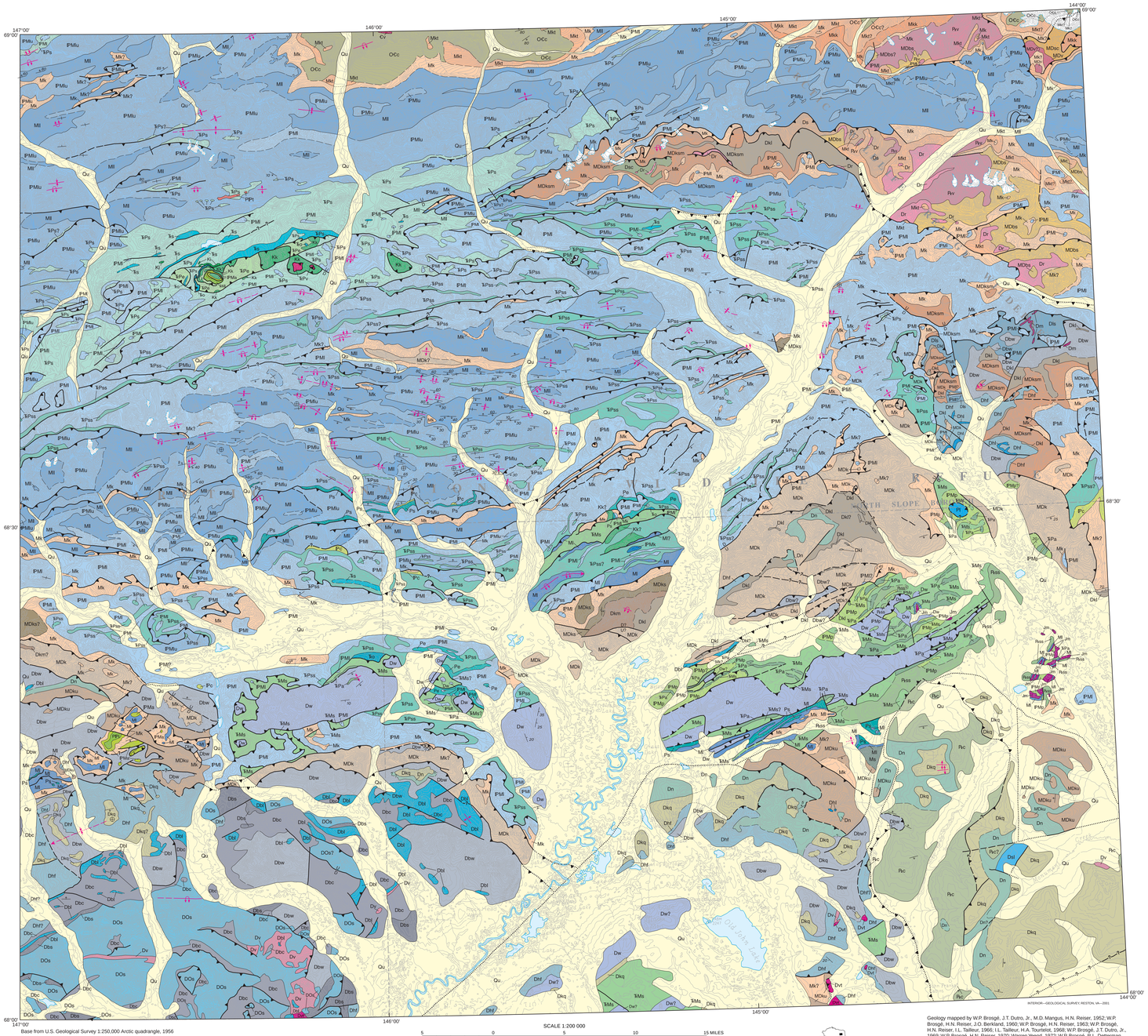
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



Base from U.S. Geological Survey 1:250,000 Arctic quadrangle, 1956

Federal reservation boundaries, established by the Alaska National Interest Lands Conservation Act, PL 96–487, Dec. 2, 1980, are shown as compiled by the administering agencies

Universal Transverse Mercator projection

Some shorelines and glacier outlines shown on this base map may not coincide with map-unit boundaries, which were captured from scanned and vectorized linework

SCALE 1:200 000

5 0 5 10 15 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 200 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology mapped by W.P. Brosgé, J.T. Dutro, Jr., M.D. Mangus, H.N. Reiser, 1952; W.P. Brosgé, H.N. Reiser, J.O. Berkland, 1960; W.P. Brosgé, H.N. Reiser, 1963; W.P. Brosgé, H.N. Reiser, I.L. Tailleur, 1966; I.L. Tailleur, H.A. Tourtelot, 1968; W.P. Brosgé, J.T. Dutro, Jr., 1969; W.P. Brosgé, H.N. Reiser, 1970; Warren Yeend, 1972; W.P. Brosgé, R.L. Detterman, J.T. Dutro, Jr., H.N. Reiser, 1972 and 1975; W.P. Brosgé, J.T. Dutro, Jr., T.E. Moore, T.H. Nilsen, H.N. Reiser, 1978; W.P. Brosgé, R.L. Detterman, J.T. Dutro, Jr., T.E. Moore, T.H. Nilsen, H.N. Reiser, 1979; W.P. Brosgé, M.D. Mangus, I.L. Tailleur, 1982. Fossils collected by N.J. Silberling, 1983; T.E. Moore, Michael Churkin, Jr. (ARCO Alaska), 1983; T.A. Harris, D.L. Jones, 1984; I.L. Tailleur, 1987

Edited by Jan L. Zigler; digital cartography by Taryn A. Lindquist, with assistance from Richard Koch, Susan Mayfield, and David Lanford

Manuscript approved for publication November 23, 1998

GEOLOGIC MAP OF THE ARCTIC QUADRANGLE, ALASKA

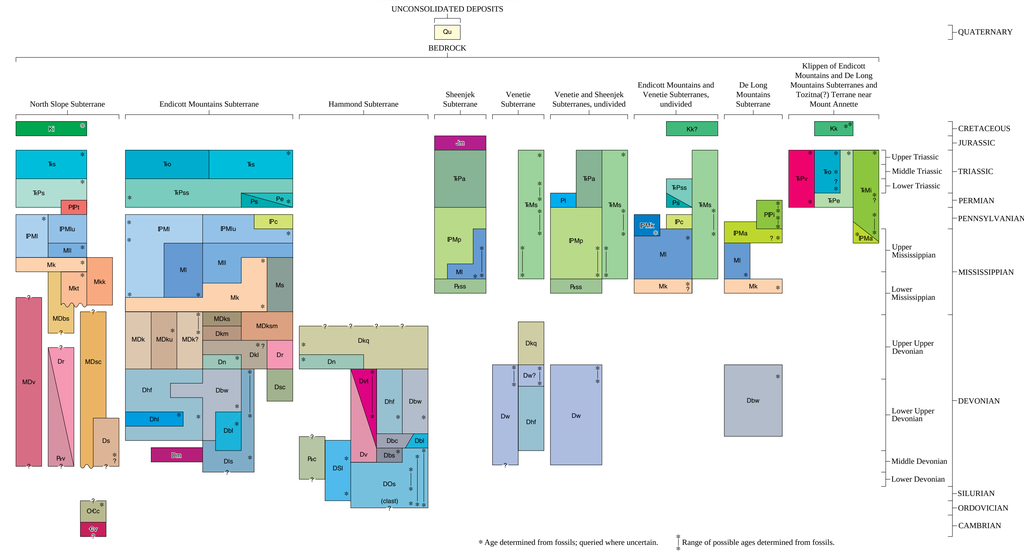
By

W.P. Brosgé, H.N. Reiser, J.T. Dutro, Jr., R.L. Detterman, and I.L. Tailleur

2001

Printed on recycled paper

CORRELATION OF MAP UNITS



LIST OF MAP UNITS

UNCONSOLIDATED DEPOSITS

Qu — **Surficial deposits, undivided (Holocene and Pleistocene)**—Mostly alluvial and glacial sand and gravel

BEDROCK

North Slope Subterrane

K — **Ipewik unit (Lower Cretaceous)**—Brown pelecypod coquina and shale

Ꞧs — **Shublik Formation (Upper and Middle Triassic)**—Black, carbonaceous, partly calcareous shale and thin-bedded limestone

ꞦPs — **Sadlerochit Group, undivided (Lower Triassic and Permian)**—Consists of Lower Triassic Ivishak Formation, not separately mapped, and Permian Echooka Formation

PPt — **Unnamed tuff (Permian or Pennsylvanian)**—Green pyritic tuff, intermediate to basic in composition

IPMl — **Lisburne Group (Pennsylvanian and Mississippian)**—Gray limestone and dolomite and nodular chert

IPMlu — **Lisburne Group, upper unit (Middle? Pennsylvanian to Upper Mississippian)**—Medium- to light-gray limestone; gray to white nodular chert; top beds locally replaced by chert

Ml — **Lisburne Group, lower unit (Upper Mississippian)**—Dark-gray limestone and dolomite; black nodular chert

Mk — **Kayak Shale (Upper? Mississippian)**—Black shale with limestone in upper part, sandstone in lower part

Mkk — **Kayak Shale and Kekiktuk Conglomerate, undivided (Mississippian)**—Black shale, quartzite, and coal

Mkt — **Kekiktuk Conglomerate (Lower Mississippian)**—Fluvial quartzite and conglomerate; local coal

MDbs — **Unnamed brown sandstone (Mississippian or Devonian)**—Ferruginous sandstone and conglomerate

MDv — **Unnamed volcanic rocks (Mississippian or Devonian)**—Sheared andesitic tuff and volcanic breccia

MDsc — **Unnamed sheared conglomerate (Mississippian or Devonian)**—Sheared chert pebble conglomerate and schistose sandstone

Dr — **Unnamed rhyolite (Devonian?)**—Metamorphosed rhyolite tuff, volcanic breccia, and porphyry

Pzv — **Unnamed volcanic rocks (Devonian? or older)**—Metamorphosed purple and green volcaniclastic and extrusive rocks of intermediate composition

Ds — **Unnamed shale and sandstone (Devonian?)**—Black shale and sandstone

OCc — **Unnamed chert and phyllite (Ordovician and Cambrian?)**—Gray and black chert in black and green phyllite and argillite

Ꞓbr — **Unnamed volcanic rocks (Cambrian)**—Mafic flows, tuff, and volcanic breccia

Endicott Mountains Subterrane

Ꞧo — **Otuk Formation (Upper and Middle Triassic)**—Black shale; black and gray thin-bedded limestone; and creamy-weathering, fine-grained limestone

Ꞧs — **Shublik Formation (Triassic)**—Black, partly manganiferous shale and black to gray, shaley to dense limestone

ꞦPss — **Sadlerochit Group and Siksikpuk Formation?, undifferentiated (Lower Triassic and Permian)**—Consists of three units, Lower Triassic Ivishak Formation, Permian Echooka Formation, and Permian Siksikpuk(?) Formation

Pe — **Echooka Formation (Permian)**—Black, brown, and green pyritic slate; yellow-weathering calcareous shale; and minor limestone

Ps — **Siksikpuk Formation (Permian)**—Black, brown, and olive shale, siltstone, and argillite; black chert; and green and red argillite

IPMl — **Lisburne Group (Middle Pennsylvanian to Lower Mississippian)**—Gray limestone and nodular chert

IPMlu — **Lisburne Group, upper part (Pennsylvanian and Upper Mississippian)**—Medium-gray limestone and silicified limestone; black nodular chert; top beds commonly replaced by chert

IPc — **Unnamed chert (Pennsylvanian)**—Black, massive to brecciated, replacement chert at top of Lisburne Group

Ml — **Lisburne Group, undivided (Mississippian)**—Gray limestone, dolomite, and silicified limestone; black chert and white nodular chert

Mll — **Lisburne Group, lower part (Upper and Lower Mississippian)**—Dark-gray limestone and silicified limestone; black nodular chert

Mk — **Kayak Shale (Upper and Lower Mississippian)**—Black shale and slate; yellow-weathering crinoidal limestone; basal sandstone

Mś — **Unnamed siltstone (Mississippian)**—Black chert; black silicified to calcareous siltstone

MDk — **Kanayut Conglomerate (Lower Mississippian? and Upper Devonian)**—Fluvial sandstone, conglomerate, and shale

MDku — **Kanayut Conglomerate, undivided (Mississippian? and Devonian)**—Mostly quartzite and sandstone

MDks — **Kanayut Conglomerate, Stuver Member (Lower Mississippian? and Upper Devonian)**—Conglomerate, sandstone, and shale in fining upward cycles

MDksm — **Kanayut Conglomerate, Stuver Member and middle part, undivided (Lower Mississippian? and Upper Devonian)**

Dkm — **Kanayut Conglomerate, middle part (Upper Devonian)**—Conglomerate and sandstone couplets

Dkl — **Kanayut Conglomerate, lower part (Upper Devonian)**—Red shale and lithic wacke

Dr — **Unnamed rhyolite (Devonian?)**—Metamorphosed rhyolite tuff and volcanic breccia

Dn — **Noatak Sandstone (Upper Devonian)**—Dark-gray wacke, brown calcareous sandstone, coquina lenses

Dhf — **Hunt Fork Shale, shale member (Upper Devonian)**—Black shale and brown-weathering, commonly thin bedded sandstone

Dbw — **Beaucoup Formation, wacke member (Upper Devonian)**—Gray limonitic wacke; black to olive shale and siltstone; calcareous shale and sandstone

Dls — **Unnamed limestone, shale, and conglomerate (Upper and Middle Devonian)**—Ferruginous and silty limestone, black shale, and pebbly quartzite

Dsc — **Unnamed sheared conglomerate (Devonian?)**—Sheared chert pebble conglomerate and schistose sandstone

Dhl — **Hunt Fork Shale, limestone member (Upper Devonian)**—Gray- to orange-weathering argillaceous limestone

Dbl — **Beaucoup Formation, limestone member (Upper or Middle Devonian)**—Gray limestone and chert similar to Lisburne Group

Ꞓdu — **Unnamed mafic rocks (Devonian?)**—Thin sills of altered diabase

Hammond Subterrane

Dkq — **Kanayut Conglomerate, quartzite member (Upper Devonian)**—Gray and brown quartzite and shale, fluvial and marine

Dn — **Noatak Sandstone (Upper Devonian)**—Bioturbated gray, green, and yellow sandstone; shale; and worm-bored siltstone

DvK — **Unnamed volcanic rocks and tuff (Upper Devonian)**—Metamorphosed andesite and basalt flows; breccia, tuff, and conglomerate interbedded with slate

Dv — **Unnamed volcanic rocks (Devonian)**—Metamorphosed sills, dikes, and flows of andesite to rhyolite composition

Dhf — **Hunt Fork Shale, shale member (Upper Devonian)**—Black shale and slate; gray quartzite and sandstone, generally thin bedded

Dbw — **Beaucoup Formation, wacke member (Upper Devonian)**—Gray and green, thin-bedded wacke; brown and gray sandstone and quartzite; siltstone, shale; calcareous sandstone and shale; coquina lenses

Dbc — **Beaucoup Formation, conglomerate and shale member (Upper Devonian)**—Sheared conglomerate; schistose quartz wacke; black, purple, red and green shale, slate and phyllite

Dbl — **Beaucoup Formation, limestone member (Upper Devonian)**—Gray to black, fine-grained limestone, commonly thin bedded. Abundant corals

Pzc — **Unnamed sheared conglomerate (Devonian?)**—White and yellow-weathering, sheared chert pebble meta-conglomerate

DSl — **Unnamed fossiliferous limestone (Upper and Middle? Devonian and Upper? Silurian)**—Dark-gray coralline mudstone and gray birds-eye limestone

Dbs — **Beaucoup Formation, siltstone member (Upper Devonian)**—Pink- and brown-weathering, partly calcareous siltstone; black and green slate; platey limestone; brown conglomerate

DOs — **Skajit Limestone (Devonian, Silurian, and Ordovician)**—Gray-weathering, light- to dark-gray limestone and marble, generally massive

Sheenjek Subterrane

Ꞓdu — **Unnamed mafic rocks (Jurassic?)**—Sills of slightly metamorphosed basalt

ꞦPa — **Unnamed red and green argillite (Triassic through Permian)**

IPMp — **Unnamed chert and slate (Pennsylvanian? through Mississippian?)**—Gray argillite and chert

Ml — **Lisburne Group (Mississippian)**—Gray, recrystallized, silicified limestone; black radiolarian chert

Pzss — **Unnamed slate and siltstone (Upper Paleozoic)**—Black slate and siltstone; minor quartzite

Venetie Subterrane

ꞦMs — **Unnamed slate and chert (Triassic? through Mississippian)**—Red and green argillite; black and green chert

Dkq — **Kanayut Conglomerate, quartzite member (Devonian)**—Gray quartzite and shale

Dw — **Unnamed wacke (Devonian?)**—Limonitic lithic wacke; black shale. Plant fragments common

Dhf — **Hunt Fork Shale, shale member (Upper Devonian)**—Black shale and slate, gray sandstone and quartzite

Venetie and Sheenjek Subterranes, undivided

ꞦPa — **Unnamed red and green argillite and chert (Triassic? to Permian?)**—Differentiated east of Chandalar River

ꞦMs — **Unnamed slate and chert (Triassic? through Mississippian)**—Black slate, chert, and siltstone; subordinate red and green argillite is mapped separately as member ꞦPa east of Chandalar River

Pl — **Unnamed limestone (Permian?)**—Brown-weathering, sandy limestone and calcareous sandstone

IPMp — **Unnamed phyllite and chert (Pennsylvanian? and Mississippian)**—Black, partly silicified phyllite, slate, and siltstone; gray and black chert

Pzss — **Unnamed slate and siltstone (Upper Paleozoic)**—Black slate and siltstone; minor fine-grained sandstone

Dw — **Unnamed wacke (Devonian)**—Limonitic lithic wacke, quartz wacke, and siltstone; black shale; minor calcareous sandstone. Plant fragments common

Endicott Mountains and Venetie Subterranes, undivided

Kk? — **Kongakut Formation? (Lower Cretaceous?)**—Black, manganiferous shale and siltstone

ꞦPss — **Sadlerochit Group and Siksikpuk Formation?, undifferentiated (Lower Triassic and Permian)**

ꞦMs — **Unnamed slate and chert (Triassic? to Mississippian)**—Black slate and chert; red and green slate and argillite

Ps — **Siksikpuk Formation (Permian)**—Olive-gray silificied siltstone

IPMk — **Kuna Formation (Pennsylvanian? and Mississippian)**—Black shale and limestone

IPc — **Unnamed chert (Pennsylvanian?)**—Black chert replacing limestone at top of Lisburne Group

Ml — **Lisburne Group (Mississippian)**—Limestone and silicified limestone; black nodular chert

Mk — **Kayak Shale (Mississippian)**—Black shale and slate, yellow crinoidal limestone

De Long Mountains Subterrane

IPPt — **Innaitchiak Chert (Permian and Pennsylvanian)**—Green and red bedded chert and argillite

IPMa — **Akmalik Chert (Pennsylvanian and Mississippian)**—Black, pyritic, bedded chert; minor limestone

Ml — **Lisburne Group (Mississippian)**—Gray crinoidal limestone, mostly replaced by gray chert

Mk — **Kayak Shale (Lower Mississippian)**—Black shale, yellow crinoidal limestone; basal quartzite

Dbw — **Beaucoup Formation, wacke member (Upper Devonian)**—Gray quartzite and calcareous sandstone; dark-gray, thin-bedded wacke, black shale, and siltstone

Klippen of Endicott Mountains and De Long Mountains Subterranes and Tozitna(?) Terrane near Mount Annette

[Nearly all faults mapped in klippen are thrust faults, although level of detail on map precludes addition of sawteeth]

Kk — **Kongakut Formation (Lower Cretaceous)**—Black manganiferous silty shale and fine-grained wacke

ꞦPv — **Unnamed volcanic rocks (Triassic and Permian)**—Basalt and andesite with minor fossiliferous limestone and chert

Ꞧo — **Otuk Formation (Triassic)**—Black shale and siltstone; black chert; creamy-weathering, very fine grained limestone

ꞦPe — **Etivluk Group (Triassic through Permian?)**—Black chert and shale; gray-green chert and siltstone; minor limestone

ꞦMl — **Innaitchiak Chert (Triassic through Mississippian)**—Gray-green siltstone and chert; minor calcilutite

IPMa — **Akmalik Chert (Pennsylvanian and Mississippian)**—Black, pyritic, bedded chert; rare limestone; and dolomite

Contact—Dashed where approximately located; dotted where concealed; queried where doubtful. Probably includes some faults

Fault—Dashed where approximately located; dotted where concealed; queried where doubtful. U, upthrown side; D, downthrown side

Thrust fault—Dashed where approximately located; dotted where concealed; queried where doubtful. Sawteeth on upper plate. Some sawteeth omitted in Klippen of Endicott Mountains and De Long Mountains Subterranes and Tozitna(?) Terrane near Mount Annette

Fold—Dashed where approximately located; dotted where concealed. Showing direction of limbs and plunge where appropriate

Anticline

Overturned anticline

Syncline

Overturned syncline

Strike and dips of beds—Showing dip where known or estimated

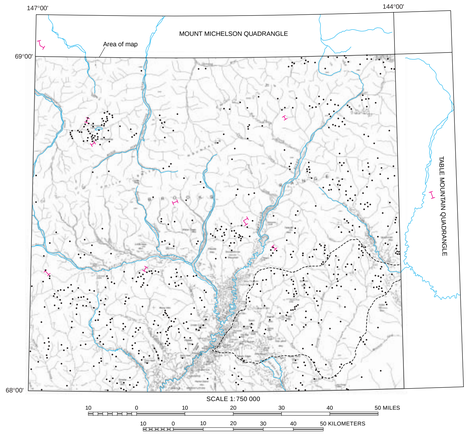
Inclined

Horizontal

Vertical

Estimated strike and dip of inclined beds

Estimated strike and dip of overturned beds



INDEX MAP OF ARCTIC QUADRANGLE SHOWING LOCATION OF FIELD OBSERVATION STATIONS (DOTS), MEASURED SECTIONS (✎), TRAVERSE BY MERTIE IN 1927 (DASHED LINE), AND NEARBY MEASURED SECTIONS IN THE MOUNT MICHELSON AND TABLE MOUNTAIN QUADRANGLES. GEOLOGY EXTENDED BEYOND FIELD STATIONS BY AERIAL OBSERVATION FROM HELICOPTER AND BY INTERPRETATION OF AERIAL PHOTOS. SURFICIAL DEPOSITS MAPPED ENTIRELY FROM AERIAL PHOTOS.

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