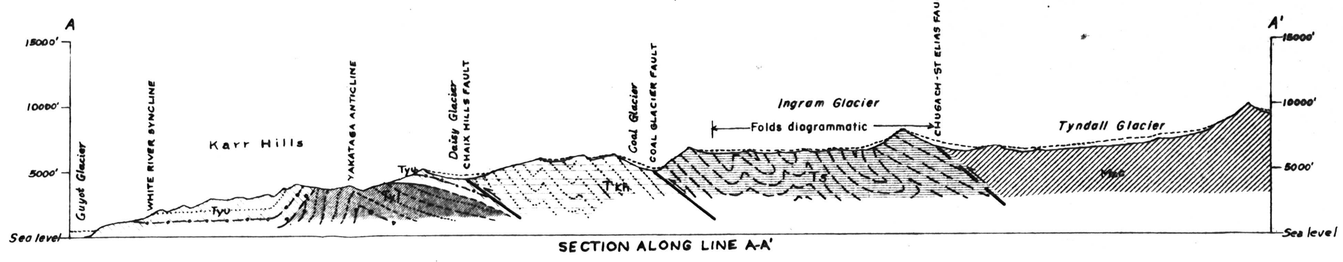
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY



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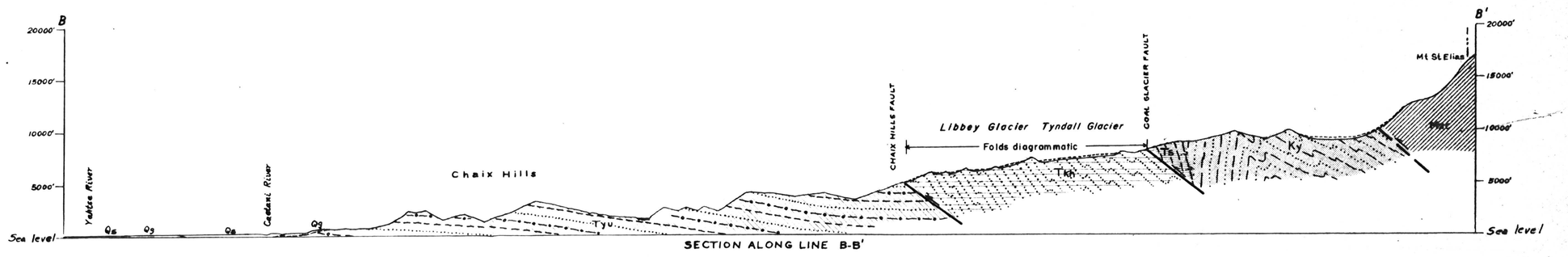

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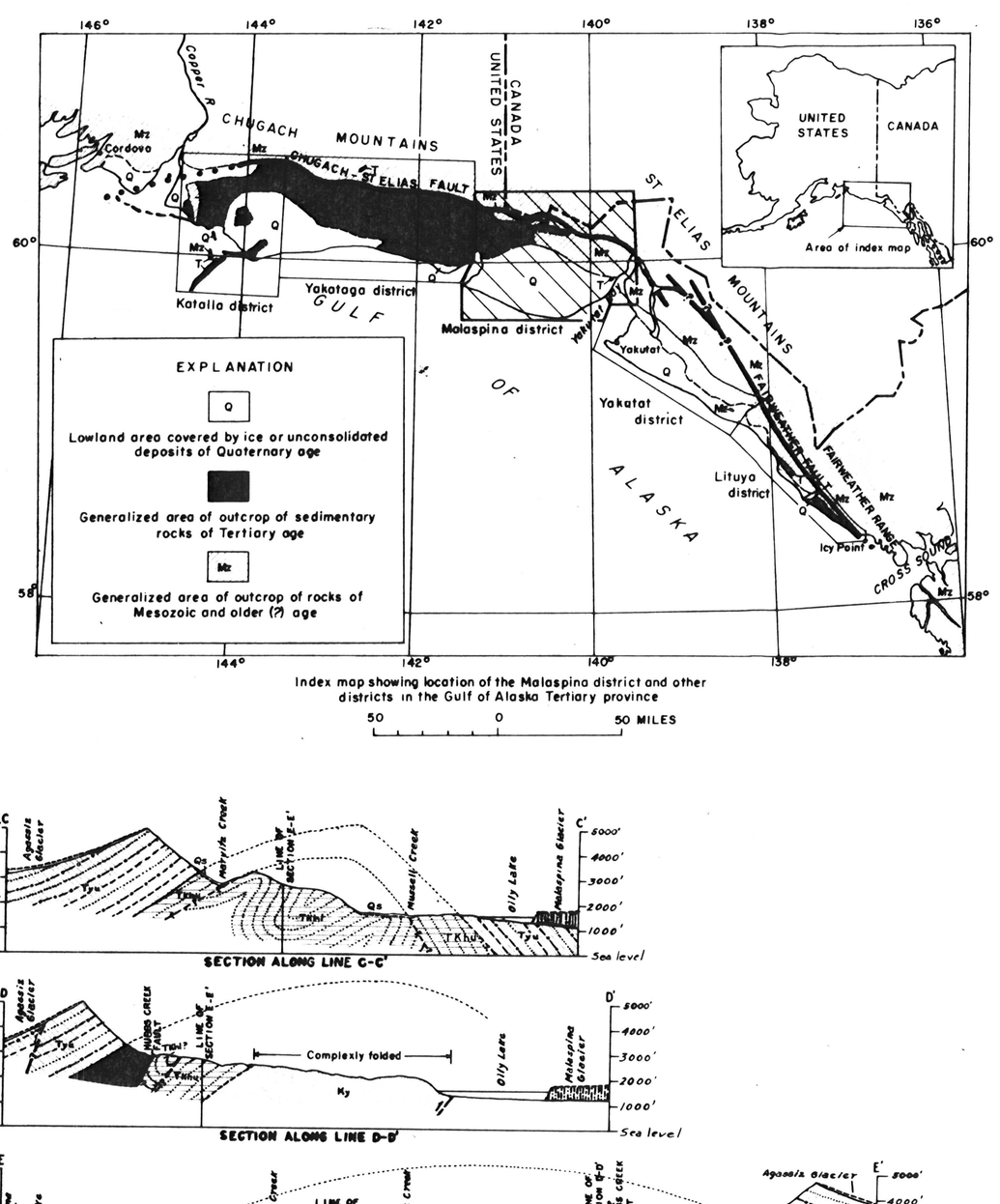
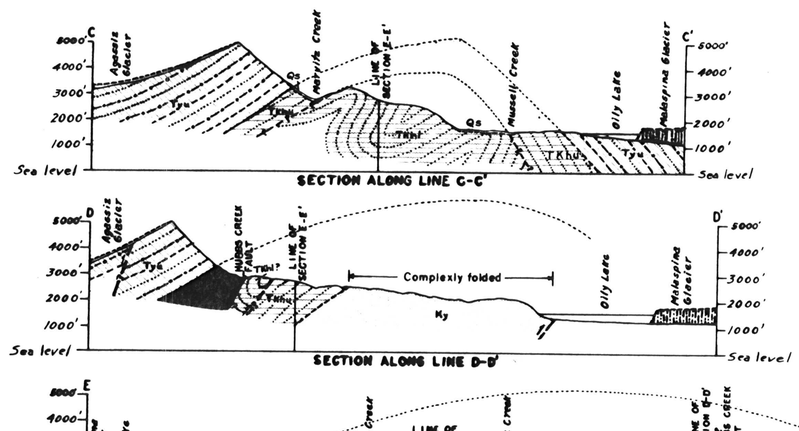
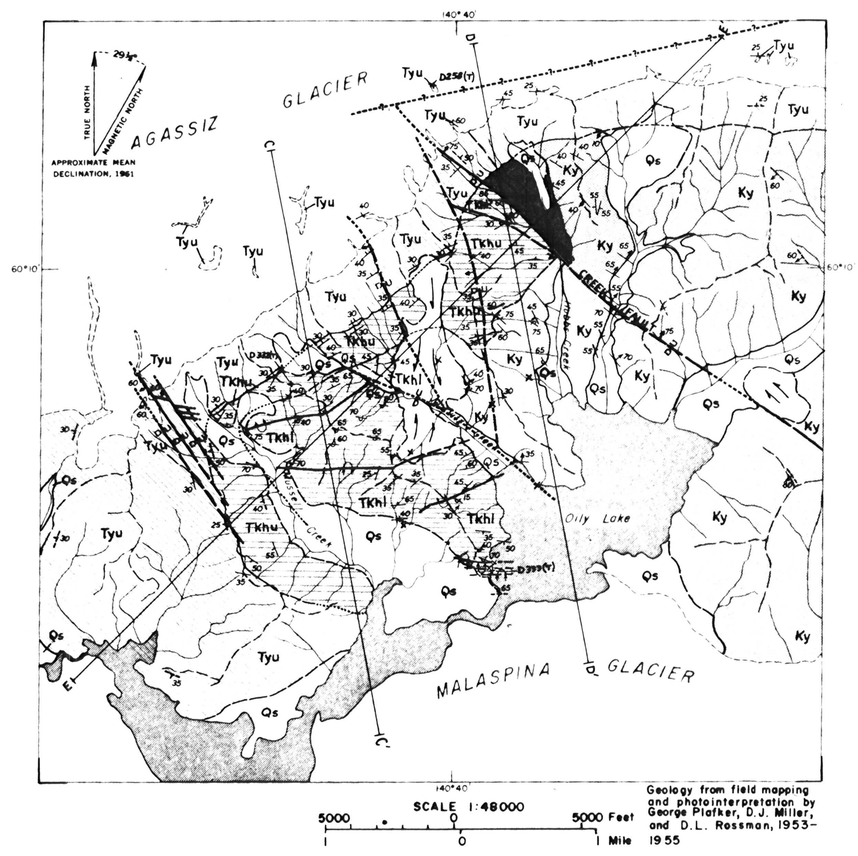


Index map showing location of the Malaspina district and other districts in the Gulf of Alaska Tertiary province

50 0 50 MILES





Geology from field mapping and photointerpretation by George Plafker, D.J. Miller, and D.L. Rossman, 1953–1955

DETAILED GEOLOGIC MAP AND STRUCTURE SECTIONS OF CENTRAL PART OF SAMOVAR HILLS, ALASKA

EXPLANATORY NOTES

This map of the Malaspina district is one of five maps at the same scale, showing the geology of the Gulf of Alaska Tertiary province (see index map). In this province, an arcuate belt more than 300 miles long and 2 to 40 miles wide, sedimentary rocks of Tertiary age are exposed or are inferred to underlie lowland areas covered by Quaternary deposits or ice (Miller, Payne, and Gryc, 1959, p. 37-47). Field studies were carried out in the province intermittently from 1944 to 1960, under the Geological Survey's program of petroleum investigations in southern Alaska.

The geology shown on two previously published maps of the Malaspina district (Plafker and Miller, 1957; 1958) has been combined, with some modifications, and plotted on a revised base. A geologically complex area in the central part of the Samovar Hills is shown also on an insert map at a larger scale. The previously published descriptions of the bedrock geology (Plafker and Miller, 1957) and the surficial deposits and recent glacial history of the Malaspina district (Plafker and Miller, 1958) apply also to the present map, with the exceptions noted in the following paragraph.

Rocks previously mapped and described as the crystalline complex in a small area of the Samovar Hills are here assigned to a volcanic unit (Mzv) that is recognized in adjoining districts of the Tertiary province and is considered to be Mesozoic, and probably older than Cretaceous. The crystalline complex (Mzc) north of the Chugach-St. Elias fault may include a more metamorphosed equivalent of the volcanic unit and is thought to be at least in part of Mesozoic age, but it may also include rocks of Paleozoic age. Fossils collected recently from the Yakutat group in the Yakataga district support the Late (?) Cretaceous age herein accepted and previously assigned to the group in the Malaspina district by Plafker and Miller (1957). Mainly from information obtained in the Yakataga district, the rocks previously mapped as the siltstone sequence of early Tertiary(?) age is here assigned to an undifferentiated sedimentary rock unit (Ts) of Paleocene(?) and Eocene age. The surficial deposits previously divided into 14 map units are combined under 4 units on the present map.

The petroleum possibilities and coal resources of the Malaspina district are discussed by Plafker and Miller (1957). No test wells for petroleum had been drilled in the district up to the end of 1960, but federal oil and gas leases had been granted for most of the lowland area, including part of the area covered by the Malaspina Glacier, and for parts of the Chaix Hills and Samovar Hills.

References cited

Miller, D. J., Payne, T. G., and Gryc, George, 1959, Geology of possible petroleum provinces in Alaska: U.S. Geol. Survey Bull. 1094, 131 p.

Plafker, George, and Miller, D. J., 1957, Reconnaissance geology of the Malaspina district, Alaska: U.S. Geol. Survey Oil and Gas Inv. Map OM-189.

_____, 1958, Glacial features and surficial deposits of the Malaspina district, Alaska: U.S. Geol. Survey Misc. Inv. Map I-271 (1959).

EXPLANATION

UNCONSOLIDATED SEDIMENTARY DEPOSITS

The units listed below overlap in age and therefore are not arranged in stratigraphic order

Qs — Undifferentiated surficial deposits

Mainly glaciofluvial gravel, sand, and mud. Includes lake deposits and till at places around margin of Malaspina Glacier, and lagoon and tidal-estuary deposits at present and former shorelines

Qg — Glacial moraine deposits

Undifferentiated deposits of one or more glacial advances; mainly till, but includes lake and glaciofluvial deposits in places. Arrow indicates direction of ice movement as inferred from trend of elongate ridges and trenches

Qsp / Qsf — Marine shoreline deposits

Mainly sand; gravel or mud in places
Qsp, beach and beach-ridge deposits associated with present shoreline
Qsf, beach, beach-ridge, spit, and lagoon deposits associated with former shorelines

Recent — QUATERNARY

BEDROCKS

Unconformity

Tyu / Tyl — Local unconformity — Yakataga formation

Tyu, siltstone and sandstone interbedded with massive conglomeratic sandy mudstone (tillite); marine
Tyl, mainly uniformly bedded siltstone and sandstone; marine

Miocene and Pliocene (?)

Unconformity

Tkh (Tkhu / Tkhl) — Local unconformity — Kulthieth formation

Tkh, sandstone, siltstone, and coal; nonmarine and marine
Tkhu, mainly massive arkosic sandstone and thin-bedded siltstone, with coal
Tkhl, interbedded arkosic sandstone and siltstone, with coal

Paleocene(?) and Eocene

Ts — Sedimentary rocks, undifferentiated

Mainly siltstone, with minor sandstone and conglomerate, and mainly or wholly marine east of Tyndall Glacier. Sandstone, possibly in part nonmarine, increasing in proportion to siltstone westward from Tyndall Glacier

TERTIARY

Unconformity

Upper (?) Cretaceous

Ky — Yakutat group

Graywacke, argillite, and slate with minor conglomerate; marine

CRETACEOUS

Unconformity

Volcanic unit

Interbedded volcanic and sedimentary rocks, and small bodies of intrusive igneous rocks

Unconformity ?

Mzc — Crystalline complex

Undifferentiated metamorphic and intrusive rocks

MESOZOIC AND OLDER(?)

GEOLOGIC SYMBOLS

Contact

Dashed where approximately located; dotted where concealed; queried where inferred

Fault, showing dip

Dashed where approximately located, dotted where concealed; queried where inferred. U, upthrown side; D, downthrown side

Anticline

Syncline

Overturned anticline

Overturned syncline

Folds

Showing trace of axial plane and direction of plunge of axis. Dashed where approximately located; queried where doubtful

Strike and dip of beds

Strike and dip of beds, up side not known

Strike and dip of overturned beds

Strike of vertical beds (90 is on up side, where known)

Strike and dip of foliation

Attitude of bedding or foliation

Dashed strike bar indicates attitude estimated from aerial or ground photographs or from distant views

Oil seep

Fossil locality, showing Geological Survey reference number (+ 17805)

GLACIERS AND LANDFORMS

Present margin of glacier or ice field. G indicates small ice mass bounded by water or unconsolidated deposits

Maximum stand of glaciers during youngest Recent advance; coincides with boundary of Qg deposit in places; dashed where approximately located, queried where inferred; not shown where coincident with present front of Malaspina Glacier. Projections are on side toward ice

Maximum stand of glaciers during older Recent advance; coincides with boundary of Qg deposit in places; dashed where approximately located; queried where inferred. Projections are on side toward ice.

Landslide

Ridge line

This map is preliminary and has not been edited or reviewed for conformity with U. S. Geological Survey standards and nomenclature.

GEOLOGY OF THE MALASPINA DISTRICT, GULF OF ALASKA TERTIARY PROVINCE, ALASKA

Compiled by
Don J. Miller

61-101
SHEET 2 OF 2