DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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77-382

SHEET 1 OF 2

Geologic Map of the Northwest Side of the Kodiak Islands, Alaska

by
William Connelly and J. Casey Moore
1977

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS: Consist of glacial and stream deposits inland and beach sediments along coast; undifferentiated; Quaternary.

KODIAK FORMATION: Medium to thickly bedded arkosic wacke and shale with occasional beds of pebbly conglomerate (Moore, 1969); flute casts and complete Bouma sequences indicate deposition by turbidity currents below wave base; strikes northeast and dips steeply northwest; generally deformed into tight large-scale folds and locally into broken formation; contains sparse Upper Cretaceous (Maastrichtian) pelecypods Inoceramus kusiroensis (Jones and Clark, 1973); metamorphism reaches zeolite facies; juxtaposed beneath the Uyak Complex along the Uganik thrust; tectonically bound bodies of Kodiak Formation lithology locally are included in Uyak Complex near Uganik thrust -- Inoceramus prisms are contained in one such body (fossil locality M5); correlates with Shumagin Formation to southwest on Shumagin and Sanak Islands (Burk, 1965; Moore, 1973) and with Valdez Group to northeast on Kenai Peninsula (Clark, 1973; Budnik, 1974).

TERRANE OF CAPE CURRENT: Informally named unit consisting principally of medium- to thick-bedded arkosic and lithic sandstone dipping steeply northwest (Connelly, 1976); contains occasional sections of vesicular pillow lava and pillow breccia; slightly metamorphosed and moderately deformed; includes two bodies of red pelagic limestone containing coccoliths of indeterminate age and Upper Cretaceous (Turonian-Santonian?) foraminifera (locality F4).

TERTIARY (?) PLUTON: Fine-grained biotite quartz monzonite; probably related to the Kodiak batholith; age uncertain, but probably Paleocene.

UYAK COMPLEX OF MOORE AND CONNELLY (1977): Lithologically chaotic assemblage of gray chert and argillite, arkosic wacke, pillowed and massive tholeiitic greenstone (Hill and Gill, 1976), radiolarian chert, and minor limestone (Moore, 1969; Connelly, 1976); most is tectonic melange with cataclastic foliation dipping steeply northwest (see summary of structural data on Sheet II); metamorphosed to prehnite-pumpellyite facies; fossils recovered include mid-Permian (pre-upper Guadalupian) fusulinids of Tethyan affinities (localities F7 and F9), upper Valanginian to upper Aptian radiolaria Thanarla conica and Archaeodictyomitra sp. (locality F8), Upper Triassic hydrozoan Spongiomorpha (locality F10), Upper Jurassic or Lower Cretaceous radiolaria Archaedictyomitra sp. (locality F6), upper Valanginian radiolaria Parvicingula boesi, Thanarala conica, and Archaeodictyomitra cf. A. vulgaris (locality F11), Paleozoic radiolaria (locality F12), and upper Valanginian to Aptian Thanarla conica, Parvicingula?, and Pseudodictyomitra? (locality F13); probably correlates with McHugh Complex near Anchorage and unnamed units on southern Kenai Peninsula (Clark, 1973; Moore and Connelly, 1976, 1977; Martin, 1915).

Gabbroic and ultramafic rocks: Includes layered gabbro, clinopyroxenite, dunite, and plagioclase peridotite (Hill, 1975, 1976); no harzburgite or sheeted-dike complexes have been observed; generally occur as tectonically bound slabs along northwest side of Uyak Complex.

SCHIST TERRANE OF KODIAK ISLANDS: Informally named unit consisting of thinly layered and complexly folded quartz-mica schist, greenschist, crossite-epidote schist (blueschist), and epidote amphibolite, but also includes calc-silicate rock and amphibolite adjacent to Afognak pluton (Carden and others, in press; Connelly, 1976); K-Ar ages from white mica and crossite extracted from schist at Malina Bay are respectively 187.6 ± 5.6 and 170.6 ± 5.1 m.y.B.P., and white mica from schist at east Raspberry Strait is 192.1 ± 5.8 m.y.B.P.; this schist terrane correlates with a similar blueschist terrane on southern Kenai Peninsula (Forbes and Lanphere, 1973).

AFOGNAK PLUTON: Hornblende diorite and hornblende quartz diorite; generally occurs between the schist terrane or Uyak Complex and the structurally overlying Shuyak Formation; migmatite, aplitic dikes, and high-temperature metamorphism locally well-developed along contact with the schist terrane and Shuyak Formation; yields K-Ar hornblende ages of 183.7 ± 5.5 and 188.4 ± 5.7 m.y.B.P. from Raspberry Island, 192.7 ± 5.8 m.y.B.P. from east Foul Bay (Carden and others, in press), and 187 ± 14 m.y.B.P. from Barren Islands (Cowan and Boss, in press).

MAFIC DIKES AND SILLS: Petrographically appear to have diabasic composition; intrude sedimentary member of Shuyak Formation; no obvious thermal metamorphic aureoles at margins; age uncertain, but younger than, or in part contemporaneous with, Shuyak Formation.

SHUYAK FORMATION OF MOORE AND CONNELLY (1977)

Sedimentary member: Volcaniclastic sequence consisting of thin- to medium-bedded lithic sandstone with less conglomerate, argillite, and siliceous tuff (Connelly, 1976); rich in primary andesitic material; flute casts and complete Bouma sequences indicate deposition by turbidity currents below wave base; either broadly folded or homoclinally dipping southeast; metamorphism reaches prehnite-pumpellyite facies; in fault contact with, but inferred to overlie, the volcanic member; contains Upper Triassic (Norian) pelecypods Halobia cf. H. halorica (localities F1, F2, F3); correlates to northeast with lithologically similar rocks on southern Kenai Peninsula (Martin, 1915) and to the northwest with rocks on the Alaska Peninsula at Puale Bay and in the Lake Iliamna-Kamishak Bay area (Burk, 1965; Detterman and Hartsock, 1966).

Volcanic member: Consists mainly of vesicular pillowed greenstone, but locally contains beds of pillow breccia, agglomerate, tuff, and argillite; unfossiliferous; greenstone is tholeiitic in composition (Hill and Gill, 1976); structurally overlies the Kodiak schist terrane and Uyak Complex but is generally separated from them by Afognak pluton.

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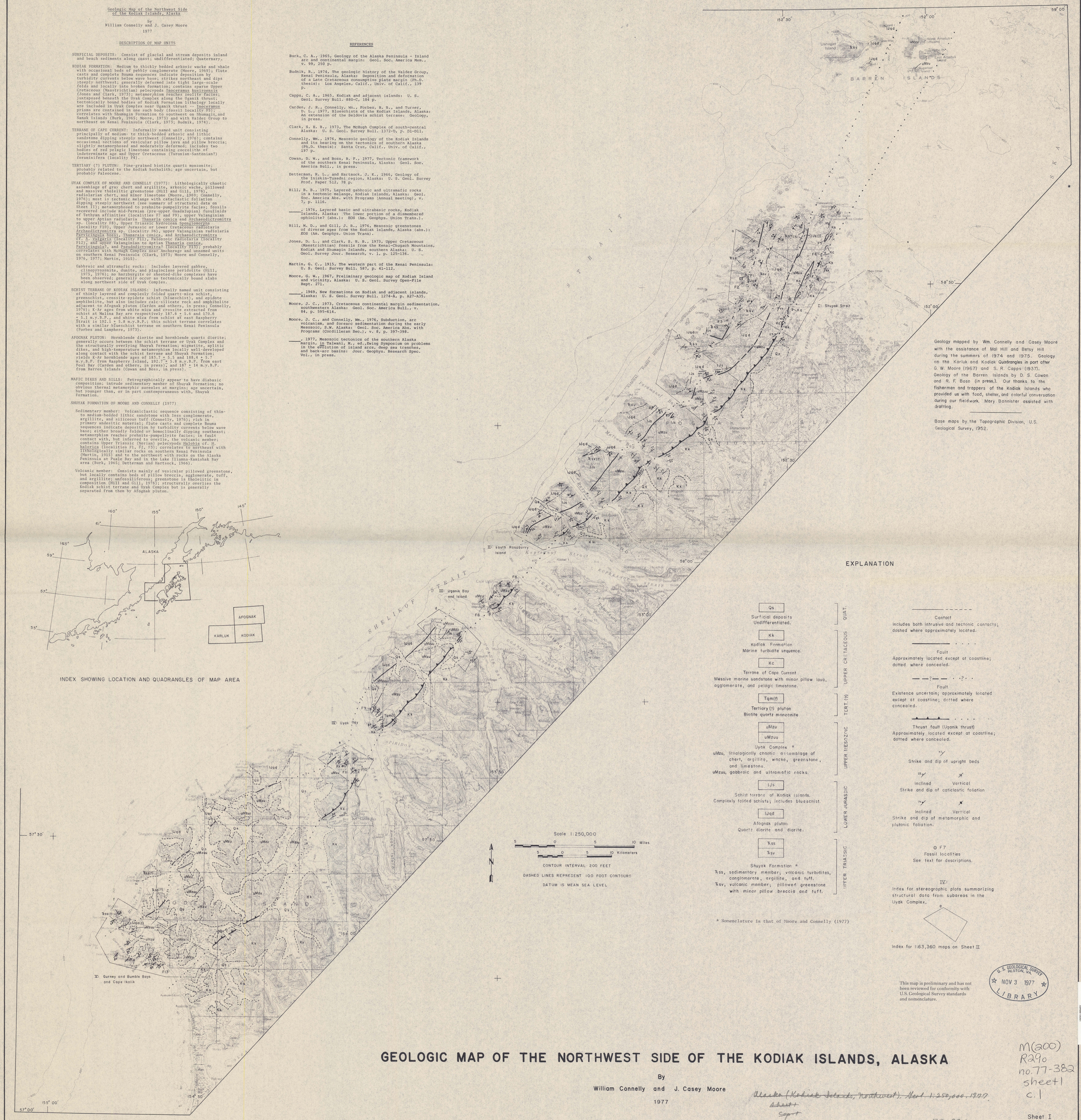
INDEX SHOWING LOCATION AND QUADRANGLES OF MAP AREA



Scale 1:250,000

5 0 5 10 Miles

5 0 5 10 Kilometers

CONTOUR INTERVAL 200 FEET

DASHED LINES REPRESENT 100 FOOT CONTOURS

DATUM IS MEAN SEA LEVEL

N

Geology mapped by Wm. Connelly and Casey Moore with the assistance of Mal Hill and Betsy Hill during the summers of 1974 and 1975. Geology on the Karluk and Kodiak Quadrangles in part after G. W. Moore (1967) and S. R. Capps (1937). Geology of the Barren Islands by D. S. Cowan and R. F. Boss (in press.). Our thanks to the fishermen and trappers of the Kodiak Islands who provided us with food, shelter, and colorful conversation during our fieldwork. Mary Bannister assisted with drafting.

Base maps by the Topographic Division, U.S. Geological Survey, 1952.

EXPLANATION

QUAT.
Qs — Surficial deposits
Undifferentiated.

UPPER CRETACEOUS
Kk — Kodiak Formation
Marine turbidite sequence.

Kc — Terrane of Cape Current
Massive marine sandstone with minor pillow lava, agglomerate, and pelagic limestone.

TERT.(?)
Tqm(?) — Tertiary (?) pluton
Biotite quartz monzonite

UPPER MESOZOIC
uMzu — Uyak Complex *
uMzuu
uMzu, lithologically chaotic assemblage of chert, argillite, wacke, greenstone, and limestone.
uMzuu, gabbroic and ultramafic rocks.

LOWER JURASSIC
IJs — Schist terrane of Kodiak Islands.
Complexly folded schists; includes blueschist.

IJqd — Afognak pluton
Quartz diorite and diorite.

UPPER TRIASSIC
Trss — Shuyak Formation *
Trsv
Trss, sedimentary member; volcanic turbidites, conglomerate, argillite, and tuff.
Trsv, volcanic member; pillowed greenstone with minor pillow breccia and tuff.

* Nomenclature is that of Moore and Connelly (1977)

Contact
Includes both intrusive and tectonic contacts; dashed where approximately located.

Fault
Approximately located except at coastline; dotted where concealed.

Fault
Existence uncertain; approximately located except at coastline; dotted where concealed.

Thrust fault (Uganik thrust)
Approximately located except at coastline; dotted where concealed.

Strike and dip of upright beds

Inclined / Vertical
Strike and dip of cataclastic foliation

Inclined / Vertical
Strike and dip of metamorphic and plutonic foliation.

⊙ F7
Fossil localities
See text for descriptions.

IV:
Index for stereographic plots summarizing structural data from subareas in the Uyak Complex.

Index for 1:63,360 maps on Sheet II

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

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GEOLOGIC MAP OF THE NORTHWEST SIDE OF THE KODIAK ISLANDS, ALASKA

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1977

Alaska (Kodiak Islands, Northwest), Geol. 1:250,000, 1977.
Sheet 1
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