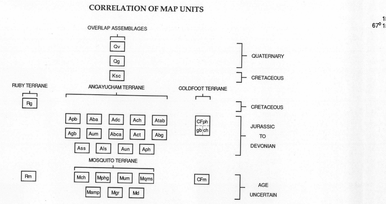
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1993

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

OVERLAP ASSEMBLAGES

- **Qv** — **Valley-fill deposits (Quaternary)**
- **Qg** — **Glacial deposits (Quaternary)**
- **Ksc** — **Sandstone and conglomerate (Cretaceous)**

RUBY TERRANE

- **Rg** — **Granitic rocks**
- **Rm** — **Metamorphosed sedimentary and igneous rocks**--Includes amphibolite, quartz-mica schist, metaquartzite, and minor phyllite

ANGAYUCHAM TERRANE

- **Apb** — **Predominately pillowed basalt and minor massive basalt flows and diabase**--May also include minor chert, graywacke, argillite, tuff, and limestone layers or pods
- **Aba** — **Massive basalt and basaltic breccia including minor pillowed flows and red argillite**
- **Adc** — **Diabase, basalt, and minor gabbro containing lenses and pods of thin chert and argillite**
- **Ach** — **Radiolarian chert**--May include interlayered argillite and (or) minor diabase intrusions
- **Atab** — **Fine-grained cherty tuff and gray argillite containing minor pillow basalt lenses**
- **Agb** — **Gabbro and layered gabbro**
- **Aum** — **Ultramafic and serpentinized ultramafic rocks**
- **Abca** — **Chert and argillite including interlayered basalt sills or massive flows**
- **Act** — **Coarse-grained, siliceous, bedded tuff breccia**
- **Alg** — **Basaltic graywacke and tuff breccia**
- **Ass** — **Sandstone, siltstone, and argillite**
- **Als** — **Discontinuous limestone layers and lenses**
- **Aun** — **Undivided mafic igneous rocks and associated chert and argillite**
- **Aph** — **Phyllite, amphibolite, and quartz-mica schist associated with basal contact of Angayucham terrane**

COLDFOOT TERRANE

- **CFph / gb/ch** — **Phyllite, quartzose graywacke, and slaty siltstone**--Commonly folded; includes numerous small bodies of diabase and gabbro (gb) and blocks of radiolarian chert (ch), many of which are unmapped
- **CFm** — **Metamorphic and polydeformed upper greenschist- to lower amphibolite-facies rocks**

MOSQUITO TERRANE

- **Mch** — **White to light-blue-gray, very fine grained nearly purely quartzose metachert**--Some samples contain stretched radiolarians, but most are completely recrystallized. Commonly strongly foliated and lineated and intrafolidally isoclinally folded
- **Mphg** — **Heterogeneous, green to gray-green phyllite, quartzose phyllite, and phyllitic graywacke**--Characteristically foliated and locally textonized. Unit commonly includes chert, chert-clast graywacke, and greenstone
- **Mum** — **Ultramafic rocks**--Small, discontinuous massive dunite and pyroxenite-serpentinite bodies
- **Mqms** — **Medium-grained quartz-mica schist**--Biotite and muscovite bearing, commonly very siliceous, in part garnetiferous. Unit may include amphibolite lenses
- **Mamp** — **Fine- to medium-grained, dark-green or black amphibolite**--Commonly schistose and lineated; in places foliation is tightly to isoclinally folded
- **Mgr** — **Medium-grained biotite-muscovite granite**--Muscovite occurs as prominent small books. Some exposures show a well-developed, strongly lineated mylonitic fabric
- **Md** — **Dark-gray, medium-grained diorite**

- **Depositional or intrusive contact**--Dashed where approximately located; dotted where concealed
- **Fault**--Dashed where approximately located; dotted where concealed. Arrows show inferred sense of displacement
- **Thrust fault**--Dashed where approximately located; dotted where concealed. Sawteeth on upper plate
- A | T — **Sense of displacement on high-angle faults in cross section**--A, away; T, toward
- 20 — **Strike and dip of foliation**
- 70 — **Strike and dip of beds**
- 75 — **Strike and dip of overturned beds**
- 10 — **Lineation or minor fold axis**--Showing direction and degree of plunge. May be combined with foliation or bedding symbols
- • — **Field station**--Unsampled geochemically or paleontologically
- ◇ m-159944 — **Geochemical sample site**--Showing sample number; see Barker and others (in press)
- + 29242-Pc — **Conodont sample site**--Undated at time of publication
- **Radiolarian-chert sample sites by age and sample number**
- 4050 — **Triassic to Early Jurassic**
- 3275 — **Early Permian**
- 5990 — **Middle Pennsylvanian to Early Permian**
- 3996 — **Late Mississippian(?) to Early Pennsylvanian**
- 6006 — **Mississippian**
- 5940 — **Late Devonian to Early Mississippian (?)**
- 5932 — **Late Devonian**

STRUCTURAL NOTES

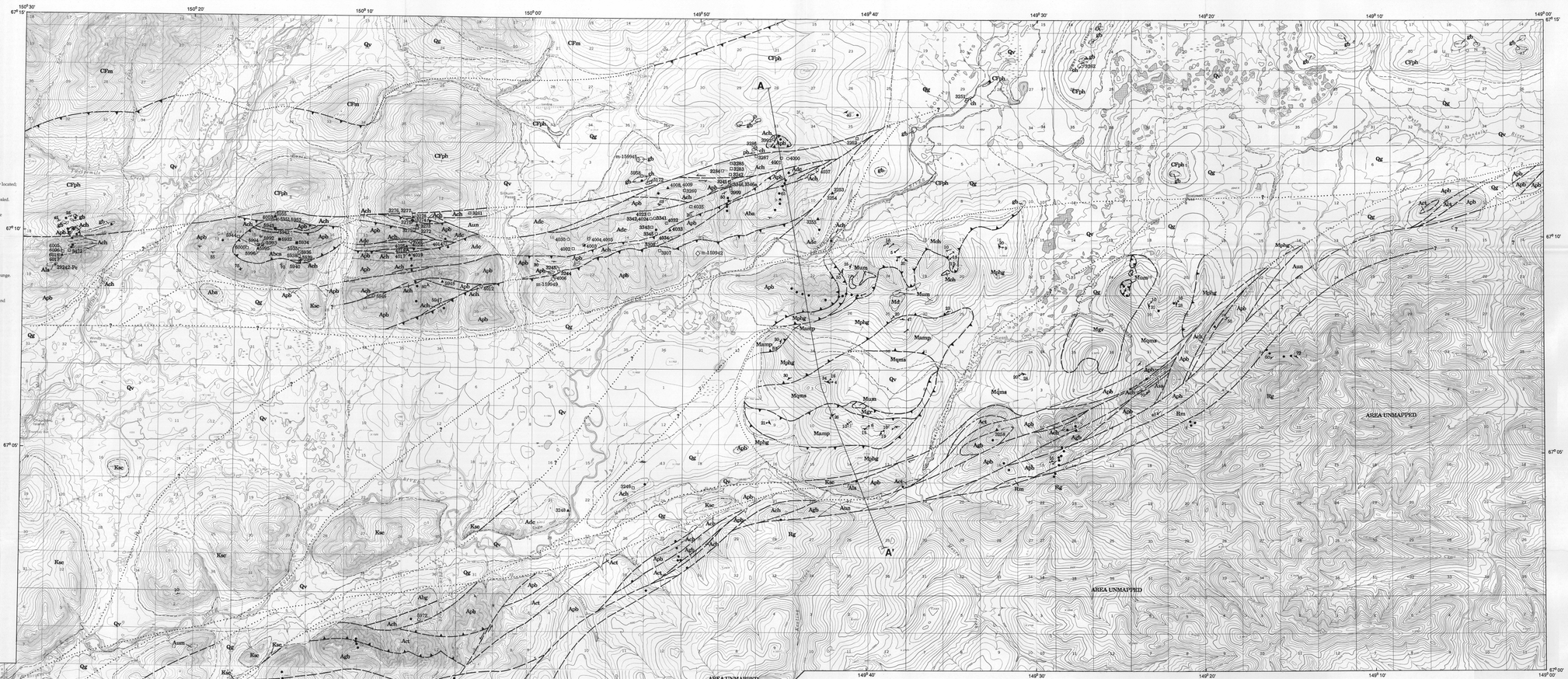
The Angayucham and other terranes in the map area occur as large nappes that have terrane boundaries which occur along major, moderately dipping layer-parallel and high-angle faults. Terrane boundaries are not commonly observed in outcrop but are inferred to be faults on the basis of (1) abrupt changes in metamorphic grade (Mosquito and Ruby terranes), (2) juxtaposition of contrasting degree and history of deformation (Angayucham and Mosquito terranes), and (3) localized mylonitization of granitoid rocks (Mosquito and Ruby terranes). Original terrane contacts probably were established by thrust faulting but have since been modified by strike-slip and possible low-angle normal faulting. Strike-slip faults are represented by a complex anastomosing set of through-going, nearly parallel high-angle faults that truncate lithologic units and extend across the map area. We interpret the map pattern to suggest right-lateral displacement on these faults. Amount of displacement along the faults is unknown.

The structure of the Angayucham terrane is characterized by complex tectonic intermixing of thin horses of chert, argillite, pillowed and massive basalt, gabbro, and other oceanic lithologies. Contacts within the Angayucham are rarely observable, however, most are closely constrained by outcrop distribution. Thrust faults have been mapped where strike-slip-fault contacts are largely responsible for rock distribution within the Angayucham terrane. These have been mapped on the basis of (1) abrupt changes in juxtapositions as determined from radiolarian dating of chert, (2) disharmony of structures (primarily folding in bedded chert), and (3) along-strike truncation of units. Thrust faults have been identified with assurance only on the north flank of the Koyukuk basin, where bedding and structures dip at moderate angles to the south. On the south flank of the basin, both faults and lithologic units are nearly vertical and parallel the regional trend of strike-slip faults. Lack of datable material in this region precludes recognition of older-over-younger juxtapositions and contributes to the indeterminate character of faults in the area.

REFERENCES

Patton, W.W., Jr., and Miller, T.P., 1973, Bedrock geologic map of Bettles and southern part of Wiseman quadrangles, Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF-492, scale 1:250,000.

Barker, F., Jones, D.L., Budahn, J.R., and Coney, P.J., in press, Ocean plateau-seamount origin of basaltic rocks, Angayucham terrane, central Alaska: Journal of Geology.



Geology mapped by D.L. Jones, P.J. Coney, and J.T. Dillon, 1982-1984; T.A. Harms, 1983-1984; N.J. Silberling, 1982-83; J. Grant, Arthur Cozzens, 1983; George Parker, 1984. Geology in southern half of Bettles D-1 and D-2 quadrangles modified from Patton and Miller (1973).

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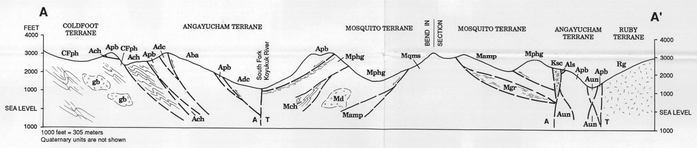
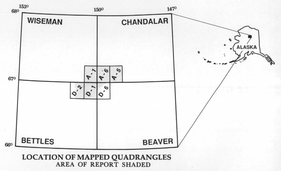
SCALE 1:63 360

1 ½ 0 1 2 3 4 5 MILES

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 AND 100 FEET
DOTTED LINES REPRESENT 25- AND 50-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929





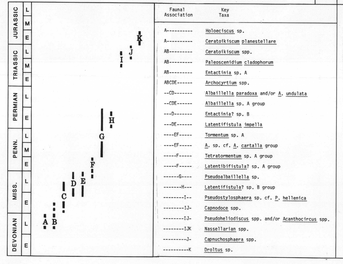
LOCATION OF MAPPED QUADRANGLES
AREA OF REPORT SHADED

TABLE 1.

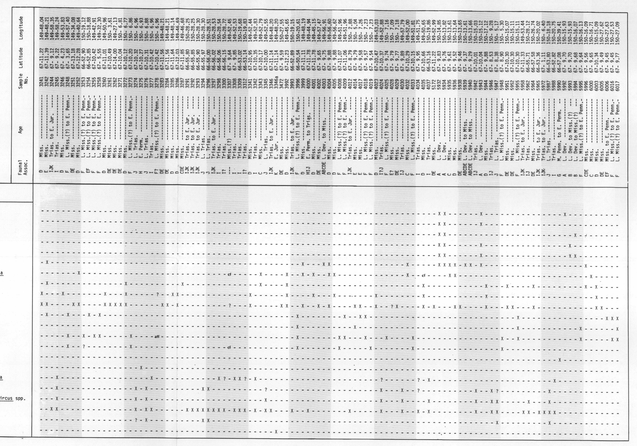
Age determination of radiolarian samples
[Latitude and longitude in degrees, minutes. E, early; L, late]

By
Benita Murchey, David L. Jones, and Paula Noble

Sample No.	Latitude	Longitude	Age	Fauna1 Assoc.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



Fauna1 Association	Key Taxa
A----------	Holmeisicus sp.
A----------	Ceratoikiscum planestellare
AB---------	Ceratoikiscum spp.
AD---------	Palaeoscenidium cladophorum
AE---------	Entactinia sp. A
ABCDE------	Archocyrtium spp.
--C3-------	Albaillella paradoxa and/or A. undulata
--C3E------	Albaillella sp. A group
----D------	Pseudoistiera sp. B
----DE-----	Latentifistula hapella
----Ef-----	Torneuma sp. A
----Ef-----	A. sp. cf. A. cartalla group
----f------	Tetratemnum sp. A group
----f------	Latentibifistula? sp. A group
------G----	Pseudoalbaillella sp.
------G----	Latentifistula? sp. B group
----------I-	Pseudohsuchamura sp. cf. P. hellenica
----------J-	Capnodoce spp.
----------J-	Pseudohelioficus spp. and/or Acanthocircus spp.
----------JK	Nassellarian spp.
----------J-	Capnochiaphora spp.
----------K	Orsiten sp.



INTERPRETIVE GEOLOGIC MAP AND SUPPORTING RADIOLARIAN DATA FROM THE ANGAYUCHAM TERRANE, COLDFOOT AREA, SOUTHERN BROOKS RANGE, ALASKA

By

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1988

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