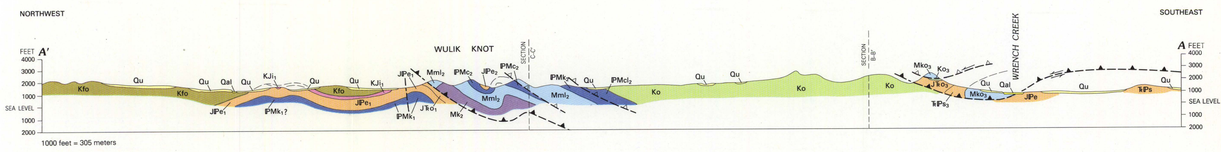
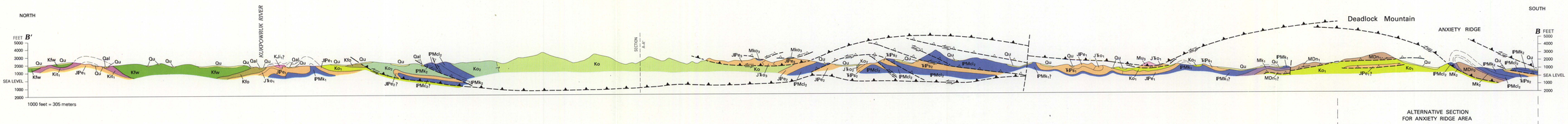
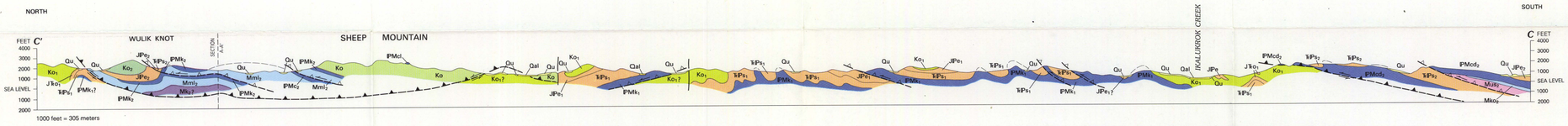
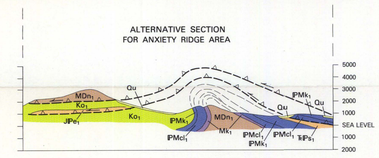








SCALE 1:63 360

1 ½ 0 1 2 3 4 5 MILES

1 .5 0 1 2 3 4 5 6 7 KILOMETERS

Cross sections are intended to show the generalized relations between allochthons. Detailed relations between rock units are largely schematic. In a few areas, folds or faults are shown on the cross sections in order to rationalize the apparent structure, but they are not included on the map. Rock units have not been extrapolated beneath the color on the sections, although thrust faults are schematically illustrated below the color.

See sheet 1 for explanation of map symbols.

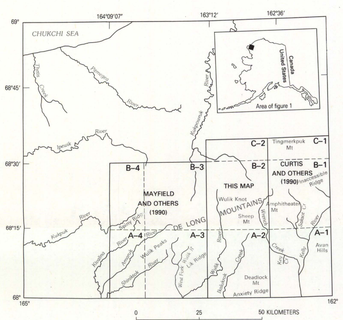


Figure 1.—The De Long Mountains 1:250,000-scale quadrangle showing location of this map, two adjacent maps in this series, and 1:63,360-scale quadrangles in area of these reports.

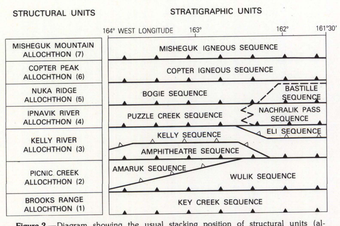
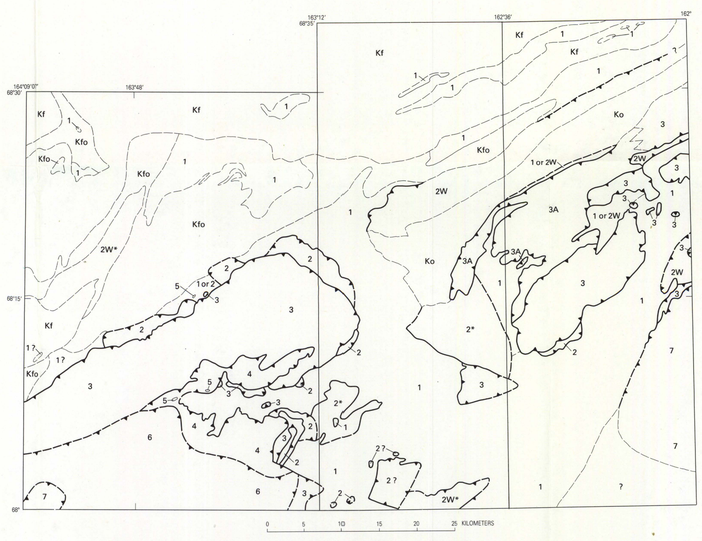


Figure 2.—Diagram showing the usual stacking position of structural units (allochthons) and stratigraphic units (sequences) in the southern part of the De Long Mountains quadrangle and the southwestern part of the Misheguk Mountain quadrangle (Curtis and others, 1984). Allochthons are numbered from structurally lowest (1) to structurally highest (7). Although the lowest thrust sheets of the Brooks Range allochthon are not exposed in the quadrangle, field relations from other areas indicate that the base is in fault contact with relatively autochthonous rocks (Mull and others, 1976; Mull and Tailleur, 1977). Lateral and vertical positions of stratigraphic sequences are shown as a schematic cross section from west to east. Thrust faults that separate allochthons shown with solid teeth; thrust faults that separate sequences within an allochthon shown with open teeth. Facies changes or uncertain relations between sequences shown with dashed lines.



EXPLANATION

Kf	Fortress Mountain Formation (autochthonous)	3	Kelly River allochthon, Kelly sequence
Kfo	Fortress Mountain Formation (autochthonous) and Okpikruak Formation (allochthonous), undivided	3A	Kelly River allochthon, Amphitheatre sequence
Ko	Okpikruak Formation, allochthon unknown	4	Ipnavik River allochthon, Puzzle Creek sequence
1	Brooks Range allochthon, Key Creek sequence	5	Nuka Ridge allochthon, Bogie sequence and (or) olistoliths of Bogie sequence within other allochthons
2	Picnic Creek allochthon, Amaruk sequence	6	Copter Peak allochthon, Copter igneous sequence
2W	Picnic Creek allochthon, Wulik sequence	7	Misheguk Mountain allochthon, Misheguk igneous sequence

Figure 3.—Generalized allochthon and sequence map of south-central and southeastern De Long Mountains 1:250,000-scale quadrangle. Sawteeth on upper side of intersequence thrust faults. Dashed lines indicate boundaries with uncertain locations. Parts of Picnic Creek allochthon shown with an asterisk may belong to Wolverine Creek allochthon of Moore and others (1986), which is correlative with Ivotuk sequence of Brooks Range allochthon (Mayfield and others, 1988).

TABLE 1.—*Comparison of allochthons in this report with equivalent structural units of other authors*

This report	Curtis and others, 1984; Ellersieck and others, 1984; Mayfield and others, 1984	Ellersieck and others, 1979	Mull, 1979	Churkin and others, 1979	Mayfield and others, 1978a	Martin, 1970	Tailleur, 1968; Tailleur and Brosgé, 1970	Tailleur and others, 1966
Misheguk Mountain allochthon	Misheguk Mountain allochthon	Misheguk Mountain thrust sequence	Misheguk sequence	Not distinguished	Misheguk Mountain thrust sequence	Ultrabasic pluton sequence	Misheguk thrust tectonic unit	Not distinguished
Copter Peak allochthon	Copter Peak allochthon	Copter Peak thrust sequence	- - -do- - - -	- - -do- - - -	- - -do- - - -	- - -do- - - -	- - -do- - - -	Do.
Nuka Ridge allochthon	Nuka Ridge allochthon	Nuka Ridge thrust sequence	Nuka sequence	- - -do- - - -	Nuka Ridge thrust sequence	Nuka Ridge sequence	Nuka Ridge thrust tectonic unit	Nuka Ridge sequence
Ipnavik River allochthon	Ipnavik River allochthon	Ipnavik River thrust sequence	Ipnavik sequence	- - -do- - - -	Ipnavik River thrust sequence	Ipnavik sequence	Ipnavik thrust tectonic unit	Ipnavik sequence
Kelly River allochthon	Kelly River allochthon	Kelly River thrust sequence	Kelly sequence	- - -do- - - -	Kelly River thrust sequence	De Long sequence	Kelly thrust tectonic unit	Not distinguished
Picnic Creek allochthon	Picnic Creek allochthon	Picnic Creek thrust sequence	Not distinguished	- - -do- - - -	Northwestern Brooks Range thrust sequence	Not distinguished	Wulik thrust tectonic unit	Sequence at Kiligwa River (eastern facies)
Brooks Range allochthon	Brooks Range allochthon	Brooks Range thrust sequence	Endicott sequence (eastern facies)	Kagvik structural sequence	Northwestern Brooks Range thrust sequences	Brooks Range sequence		Foothills sequence
					North-central Brooks Range thrust sequence (eastern facies)	Ivotuk Hills sequence (eastern facies)	Foothills thrust tectonic unit	Assemblages on Drenchwater Creek; Sequence at Mount Bupto (eastern facies)

TABLE 2.—*Important criteria used to distinguish sequences*

Sequence	Approximate age of diagnostic lithologies	Description of diagnostic lithologies in the sequence
Misheguk igneous sequence	Jurassic(?)	Only sequence composed of gabbro and peridotite
Copter igneous sequence	Jurassic(?) and Triassic	Only sequence that contains extensive pillow basalt
Bogie sequence	Carboniferous	Only sequence that contains the Nuka Formation
Puzzle Creek sequence	Early Pennsylvanian(?) to mid-Mississippian	Relatively thick black chert and (or) black chert and limestone or dolomite (thickness generally greater than 100 m). Underlain by:
	Middle and Early Mississippian	Kayak Shale and Utukok Formation
	Late and Middle Devonian	Base of section is limestone unit of the Baird Group
Kelly sequence	Late and mid-Mississippian	Thick section of Kogruk Formation (thickness greater than 300 m). Underlain by:
	Middle and Early Mississippian	Thick section of Utukok Formation (thickness generally greater than 500 m).
	Late Devonian	Base of section is limestone unit of the Baird Group
Amphitheatre sequence	Late Mississippian	Thick section of Kogruk Formation (thickness generally greater than 500 m). Underlain by:
	Late and Early Mississippian	Thick section of micritic limestone (thickness generally greater than 200 m).
Amaruk sequence	Early Pennsylvanian(?) to mid-Mississippian	Relatively thick black chert and (or) black chert and carbonate rocks (thickness as much as 200 m). Underlain by:
	Middle Mississippian	Relatively thin and discontinuous Kogruk Formation (thickness less than 20 m). Underlain by:
	Middle and Early Mississippian	Base of section is Kayak Shale and (or) Utukok Formation
Wulik sequence	Early Pennsylvanian(?) to mid-Mississippian	Relatively thick black chert and (or) black chert and limestone units (thickness generally greater than 75 m). Underlain by:
	Late and middle Mississippian	Thin and discontinuous Kuna Formation (thickness generally less than 30 m). Underlain by:
	Middle Mississippian	Thin to thick section of micritic limestone unit (thickness up to 80 m)
Key Creek sequence	Early Pennsylvanian to middle Mississippian	Relatively thick shaly Kuna Formation (thickness approx. 60 m). Bedded black chert unit on top of Kuna Formation is generally less than 15 m thick. Unit underlain by:
	Middle Mississippian	Relatively thin and discontinuous Kogruk Formation (thickness less than 30 m), or micritic limestone unit (thickness less than 30 m).
	Early Mississippian(?) and Late Devonian	Base is thick section of Upper Devonian sandstone and shale of the Kanayut Conglomerate, Noatak Sandstone, and Hunt Fork Shale (thickness at least 600 m).

TABLE 3.—*Selected fossils from De Long Mountains A–2 and B–2 quadrangles and part of the C–2 quadrangle, Alaska*

[Most fossils collected in 1979 during fieldwork for this mapping project, but includes previously unpublished fossil collections. Some collections by geologists from private industry and dated by USGS paleontologists.]

Map locality	Field number	Latitude north	Longitude west	USGS collection number	Fossil age	Map unit	Fossil type	Identified by
1	68ATr156.1	68°00′24″	162°51′30″	—	Mississippian(?)	Mk_2	Corals	[4]A.K. Armstrong
2	65ATr38	68°26′30″	162°42′11″	M2938	Early Cretaceous (Valanginian)	Ko_1	Pelecypods	[4]D.L. Jones
3	65ATr40.1	68°26′00″	162°48′20″	M2940	Early Cretaceous (Valanginian)	Ko_1	Pelecypods	[4]D.L. Jones
4	65ATr39	68°23′42″	162°41′30″	M2939	Early Cretaceous (Valanginian)	Ko_2	Pelecypods	[4]D.L. Jones
5	73ATr134A–D	68°13′35″	163°04′24″	M1123	Mississippian	Mko_3	Corals, foraminifers	[4]A.K. Armstrong
6	79Ek196J	68°12′06″	163°03′45″	—	Probably Early Mississippian	Mk_1	Crinoids, bryozoans	[4]J.T. Dutro, Jr.
7	68ATr164	68°01′36″	163°11′48″	8319–SD	Late Devonian	Db_3	Brachiopods	[4]J.T. Dutro, Jr.
8	55ATr84	68°02′30″	163°08′30″	—	Mississippian	Mul_1	Corals, Brachiopods	[4]J.T. Dutro, Jr.
9	[1]2692-2	68°14′00″	163°01′48″	M1110	Mississippian (probably Late Mississippian)	(?)	Corals	[4]A.K. Armstrong
10	276RD1886	68°04′12″	162°50′10″	M1306	Mississippian	$IPMk_1$	Algae, crinoids	[4]A.K. Armstrong
11	79Cx119A	68°08′51″	163°05′25″	—	Early Mississippian [3]CAI = 3–4	Mu_2	Conodonts, ostracodes	[4]A.G. Harris, [4]I.G. Sohn
12	79Ek264B	68°18′01″	163°10′28″	—	Early Triassic (probably Smithian to Spathian) [3]CAI = 2	JPe_2	Conodonts	[4]B.R. Wardlaw
13	79Ek184B	68°21′24″	162°56′33″	27554–PC	Early Mississippian (middle Osagean) [3]CAI = 2½–3	$IPMk_2$	Conodonts	[4]A.G. Harris
14	79Ek196F	68°12′54″	163°04′40″	—	Latest Devonian (late Famennian) to Early Mississippian (middle Osagean) [3]CAI = 2½–3	Mus_2	Conodonts	[4]A.G. Harris
14	79Ek196F	68°12′54″	163°04′40″	—	Late Devonian to Early Mississippian (not younger than Mamet zone 8)	Mus_2	Foraminifers	[5]B.L. Mamet
15	79Tr74E	68°21′35″	162°56′00″	27569–PC	Mississippian (probably late Osagean to early Chesterian) [3]CAI = 2–3	Mml_2	Conodonts	[4]A.G. Harris
16	79Ek15B2	68°03′30″	163°08′06″	27505–PC	Probably Late Mississippian (late Meramecian to Chesterian) [3]CAI = 2½–3	$IPMk_1$	Conodonts	[4]A.G. Harris
17	78Ek119C	68°22′12″	162°58′00″	—	Pennsylvanian to Permian	JPe_2	Radiolarians	[6]B.K. Holdsworth
18	68ATr188	68°06′48″	163°08′36″	—	Late Mississippian (Meramecian)	$IPMcl_2$	Foraminifers, corals	[4]A.K. Armstrong
19	73ATr131.1–.8	68°20′58″	163°00′35″	M1140	Late Mississippian (Meramecian)	Mml_2	Foraminifers, algae	[4]A.K. Armstrong
20	[1]2686–2	68°14′00″	163°18′34″	M1109	Late Mississippian Mamet zones 14–16	Mko_3	Foraminifers, corals	[4]A.K. Armstrong
21	65ATr25	68°29′18″	162°43′00″	—	Late Cretaceous to Jurassic	Kfw	Palynomorphs	[4]R.A. Scott
22	79Md11E	68°03′24″	162°47′09″	—	Pennsylvanian to Early Permian	$\text{¥}Ps_1$	Radiolarians	[4]B.L. Murchey
23	79Cx194G	68°13′50″	163°11′20″	—	Late Mississippian to Permian	JPe_3	Radiolarians	[4]B.L. Murchey
24	79Md63A	68°15′06″	162°41′45″	—	Late Mississippian to Permian	JPe_2	Radiolarians	[4]B.L. Murchey
25	79Cx11B	68°05′42″	162°54′12″	—	Mesozoic	JPe_1	Radiolarians	[4]B.L. Murchey
26	79Cx77C	68°19′57″	162°38′18″	—	Mesozoic	JPe	Radiolarians	[4]B.L. Murchey
27	79Md9C	68°03′58″	162°43′20″	—	Mesozoic	$\text{¥}Ps_1$	Radiolarians	[4]B.L. Murchey
28	79Md11B	68°03′27″	162°47′00″	—	Mesozoic	JKo_1	Radiolarians	[4]B.L. Murchey
29	79Md11F	68°03′24″	162°47′25″	—	Mesozoic	$\text{¥}Ps_1$	Radiolarians	[4]B.L. Murchey
30	79Md61E	68°18′06″	162°37′36″	—	Mesozoic	JPe	Radiolarians	[4]B.L. Murchey
31	79Ex7B	68°07′24″	162°48′11″	—	Mesozoic	JPe_1	Radiolarians	[4]B.L. Murchey
32	79Ek182C	68°18′15″	163°02′06″	—	Mesozoic	JPe_1	Radiolarians	[4]B.L. Murchey
33	79Ex262E	68°15′48″	163°06′00″	—	Mesozoic	JKo_2	Radiolarians	[4]B.L. Murchey
34	79Ek119B	68°22′00″	162°57′40″	—	Middle Triassic (Ladinian)	JPe_2	Radiolarians	[4]C.D. Blome
35	79Ek119E	68°22′05″	162°59′10″	—	Late Triassic (Karnian(?) to Norian)	JPe_1	Radiolarians	[4]C.D. Blome
36	79Cx195A	68°13′58″	163°08′10″	—	Late Mississippian (Visean) probably Mamet zone 12 or 13	Mko_3	Foraminifers	[5]B.L. Mamet
37	79Cx195E	68°13′36″	163°07′55″	—	Late Mississippian (Visean) probably Mamet zone 11 or younger	Mu_3	Foraminifers	[5]B.L. Mamet
38	79Cx215C	68°15′06″	163°07′54″	—	Late Mississippian (Visean) approximately Mamet zone 11 or 14	Mko_3	Foraminifers	[5]B.L. Mamet
39	79Ek169A	68°13′20″	163°05′00″	—	Late Mississippian (Visean) Mamet zone 12 or younger	Mko_3	Foraminifers	[5]B.L. Mamet
40	79Ek198A	68°11′10″	163°11′24″	—	Late Mississippian (Visean) approximately Mamet zone 12	Mko_3	Foraminifers	[5]B.L. Mamet
41	79Tr53A 79Tr53B	68°08′09″	162°45′24″	—	Early Mississippian (latest Tournaisian) Mamet zone 9	Mu_3	Foraminifers	[5]B.L. Mamet
42	79Tr61B	68°03′54″	163°04′18″	—	Late Mississippian (Visean) Mamet zone 11 or younger	Mul_1	Foraminifers	[5]B.L. Mamet
43	79Tr90D	68°11′24″	163°08′48″	—	Late Mississippian (middle Visean) boundary of Mamet zones 12 and 13	Mko_3	Foraminifers	[5]B.L. Mamet
44	79Tr120B1	68°12′55″	163°07′24″	—	Late Mississippian (Visean) Mamet zone 11 or younger	Mu_3	Foraminifers	[5]B.L. Mamet
45	79Tr120C2	68°12′59″	163°07′24″	—	Late Mississippian (Visean) Mamet zone 12	Mko_3	Foraminifers	[5]B.L. Mamet
46	79Md110C	68°12′26″	163°09′35″	—	Late Mississippian (Visean) Mamet zone 12 or younger	Mko_3	Foraminifers	[5]B.L. Mamet
47	79Md110E	68°12′18″	163°08′06″	—	Late Mississippian (Visean) approximately Mamet zone 11	Mu_3	Foraminifers	[5]B.L. Mamet
48	79Md110G	68°12′15″	163°07′40″	—	Mississippian zone 9 or slightly younger	Mu_3	Foraminifers	[5]B.L. Mamet
49	79Tr151D	68°17′30″	162°42′24″	—	Late Mississippian (Visean) Mamet zones 12–13	Mko_3	Foraminifers	[5]B.L. Mamet
50	79Tr50D	68°12′21″	162°46′36″	28273–PC	Probably Pennsylvanian or Permian	$IPMcd_2$	Brachiopods	[4]J.T. Dutro, Jr.
51	79Cx214B	68°15′48″	163°10′00″	28390–PC	Late Mississippian (probably Meramecian)	Mu_3	Pelecypods	[4]J.T. Dutro, Jr.

[1]Collected by geologists from Standard Oil Company of California.
[2]Collected by geologists from Resource Associates of Alaska, Inc.
[3]Conodont color alteration index (CAI) - estimated maximum temperatures reached during diagenesis: CAI = 2 (60°–140°C); CAI2–3 (80°–150°C); CAI2½–3 (100°–160°C); CAI = 3–4 (120°–200°C).
[4]USGS [5]University of Montreal [6]University of Keele

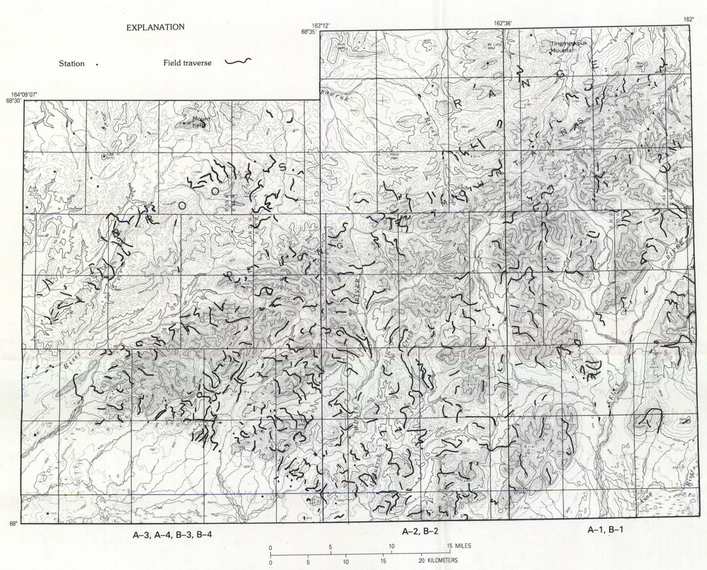


Figure 4 — Location of stations and field traverses used in compilation of this map and the two other maps in this series.

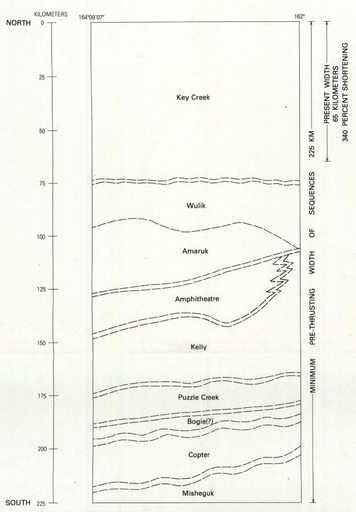


Figure 5.—Generalized palinspastic map of sequences exposed in the south-central and southeastern De Long Mountains quadrangle, prior to late Mesozoic thrust faulting. Inferred direction of thrust transport is along a north-south line. The north-south depositional width of sequences is based on outcrops within the map area only and does not take into account the extent of some of the sequences south of the De Long Mountains quadrangle. Double-dashed lines between sequences indicate an unknown geographical separation between different coeval facies. Some parts of the Amaruk and Wulik sequences shown on this map may have been deposited to the north of the Key Creek sequence. See text for more complete explanation.

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CROSS SECTIONS TO ACCOMPANY

RECONNAISSANCE GEOLOGIC MAP OF THE DE LONG MOUNTAINS A–2 AND B–2 QUADRANGLES AND PART OF THE C–2 QUADRANGLE, ALASKA

By
Inyo Ellersieck, S.M. Curtis, C.F. Mayfield, and I.L. Tailleur

1990