IVISHAK FORMATION MEASURED SECTIONS
ARCTIC NATIONAL WILDLIFE REFUGE, NORTHEASTERN ALASKA

BY

NINA T. HARUN

EAST FORK OF MARSH CREEK

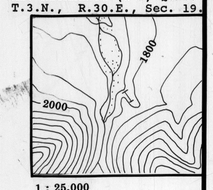
STRATIGRAPHIC SECTION 86NH17

LAT. 69° 41' 00" N. LONG. 144° 50' 10" W.

EXPLANATION

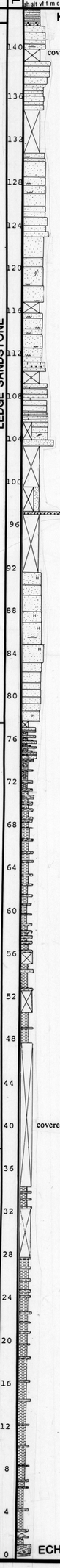
Rip up Clasts; Pebble Layer; Ripples; Low Angle Crossbeds; Erosional Scour; U Shaped Burrows; Parallel Laminations; Trough Crossbeds; High Angle Crossbeds; Hematite Stained; Bioturbated Tops; Hummocky Crossbeds; Fossils; Sandstone; Siltstone; Shale; Conglomerate

MT. MICHELSON (C-2) QUAD.
T.3.N., R.30.E., Sec. 19.



1 : 25,000

VERTICAL SCALE : 1 cm = 2 meters



SERIES	STAGE	FORMATION	MEMBER	Thickness (m.)	Lithologic Description	Interpretation
LK						
LOWER TRIASSIC	SMITHIAN	KEMIK			Fine-grained light gray quartz-arenite, thick-bedding with planar-laminations.	
				140	covered interval	
				136	Fine to medium-grained medium gray quartz arenite. Medium to thick-beds coarsen and thicken upwards.	
				132		
				128	Succession of light blue fine-medium-grained quartz arenite.	
				124	Irregular, large scale and interference ripples at base of bedding planes. High angle cross-beds.	Reworked inner shelf to nearshore.
				120	Very coarse sand-sized shale clasts within coarser poorly sorted bed at base of interval	
				116	Thickening upward thick beds, ripples and bioturbated bedding planes.	
				112		
				108	Interbedded highly weathered, dark gray, fine to medium-grained quartz-arenite and pyrite-rich Fe nodular shale. Quartz arenite thin to medium-bedded at base thickening to thick-bedded at top, shale intervals frequent and thin at base to medium-bedded near top of interval. Light-blue medium-grained quartz-arenite, thick-bedded with cross-bedding, poorly exposed.	
				104		
				100	Very coarse-grained to cobble-sized conglomerate with quartz, chert and shale clasts, 4 mm - 2 cm, clast supported with minor medium-grained quartz arenite matrix. Hematite stained, medium-bedded. Grades upward into medium to coarse-grained quartz arenite in rubblecrop.	
				96		
				92	Light blue very-fine grained to fine-grained massive quartz-arenite, hematite stained. Bedding fractured perpendicular to bedding planes, thick and thickening upward, 50-70 cm at base of interval thickening upward to 1 m bedding. Distinctive shale intervals between sandstone bedding planes, especially at base of interval, decreasing upward. Planar-laminations in center of interval.	Reworked inner shelf to nearshore.
				88		
				84	siltstone clasts contained within beds near top of interval.	
				80		
	? DIENERIAN ?	IVISHAK		76	Transition Interval Interbedded very fine-grained sandstone-siltstone and shale. Sandstone- dark gray very fine-grained to silt sized quartz-arenite, medium to thick-bedded with thin-bedded Fe nodular siltstone at base. Shaly interval, 40 cm thick with Fe nodules, 5 mm silt and 1 cm shale interbeds	
				72		
				68	Very coarse siltstone 30 cm beds.	Open marine- beneath storm weather wave base.
				64	Shale beds 1-3 cm with Fe nodules. Siltstone beds 3-30 cm with average 5 cm, high angle cross laminations. Thick-bedded, made up of very coarse silt at top of the interval. Siltstone and shale packages 80 cm to 1.2 m, thickest towards top of interval, defined by 10-30 cm siltstone beds.	
				60		
				56	Alternating siltstone and shales with siltstone beds in packages of 30-40 cm interrupted by thinner shale intervals that range from 2-4 cm. Siltstone beds dominated by Fe nodules. Within shale layers 4 mm siltstone beds every 1cm. Interbedded siltstone and shales very similar to 18-34 m below, siltstone beds thicker averaging 15 cm with beds up to 30 cm. Some siltstone beds show small cross-stratification possible trough or low angle cross-bedding. Shaly zones thicken up to 50 cm.	
				52		
				48		
				44		
				40	covered interval	
				36		
				32	Interbedded siltstone and shale define resistant and regressive units. Siltstone beds define 2 m rhythmically bedded packages with 10-30 cm subpackages. Packages defined by thin-bedded 2 mm-20 cm shale alternating with 1 - 20 cm siltstone intervals. Shale- purplish hue, weathering orange, gray, green-yellow with disseminated pyrite, becoming siltier up section. Average bed, 1 cm. Siltstone- dark purple, thinly-laminated forming 1-4 cm beds, with iron nodular hematite stained siltstone beds averaging 2 cm.	Open marine- beneath storm weather wave base.
				28		
				24		
				20	Interbedded siltstone and shale forming recessive and resistant zones. Recessive zones 5-10 cm, 1-2 cm shale and silty-shale beds with some thin-bedded shaly siltstone. Resistant zones defined by Fe-stained nodular siltstone spaced 10-20 cm apart, dark siltstone with thin white laminations. Recessive zones become thinner and resistant zones dominate up section.	
				16		
				12		
				8		
				4		
GRIESBACHIAN				0	Echooka Formation -dark gray siltstone to sandstone weathering yellow-green, with fissile bedding.	

WEST FORK OF MARSH CREEK

STTRATIGRAPHIC SECTION 86NH18

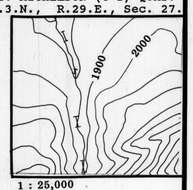
COMPOSITE SECTION

LAT. 69° 40' 15' N. LONG. 144° 57' 00" W.

EXPLANATION

Rip up Clasts; Pebble Layer; Ripples; Low Angle Crossbeds; Erosional Scour; U Shaped Burrows; Parallel Laminations; Trough Crossbeds; High Angle Crossbeds; Hematite Stained; Bioturbated Tops; Hummocky Crossbeds; Fossils; Sandstone; Siltstone; Shale; Conglomerate

MT. MICHELSON (C-2) QUAD.
T.3.N., R.29.E., Sec. 27.



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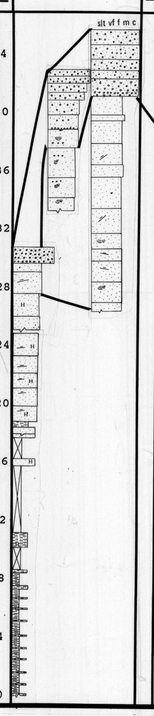
VERTICAL SCALE : 1 cm = 2 meters



SERIES	STAGE	FORMATION	MEMBER	Thickness (m.)	Lithologic Description	Interpretation
LOWER TRIASSIC	SMITHIAN	IVISHAK	LEDGE SANDSTONE	44	Channelized interval	
					Medium to very coarse grained light-blue gray quartz arenite, very poorly sorted, coarsening upward.	
				40	Thick-bedded. Channelized bed 50 cm thick cuts underlying bed. Channel 5 m wide.	
				36	Fine-grained light-blue gray quartz arenite with abundant pyrite. Increasingly coarser grained and poorly sorted upward. Thick-bedded, thickening upward. Abundant crossbeds including low angle, hummocky, and trough crossbeds. Thin coarse-grained discontinuous interbeds	Reworked inner shelf to nearshore.
				32		
				28		
				24	Very fine-grained, dark gray quartz arenite hematite stained with punctuated shaly siltstone intervals. Base of unit contains 50 cm channelized bed overlain by dark gray shaly siltstone. Beds thicken towards top of interval and contain low angle cross beds. Upper part of interval contains thin 1 to 2 cm discontinuous coarse-grained interbeds.	
				20		
				16		
	? DIENERIAN ?		KAVIK	12	Interbedded siltstone and silty shale forming recessive and resistant intervals. Siltstone- orange nodular and dark thinly-laminated siltstone. Silty shale- black, increasing silt content up section into shaly siltstone. Coarsening upward- 2 cm thinly laminated siltstone beds alternate with 2 cm silty shale to shaly siltstone beds. Beds punctuated every 10-20 m by thin-bedded nodular siltstone.	Open marine- beneath storm weather wave base.
				8		
				4		
GRIESBACHIAN				0		

FIRE CREEK SHUBLIK MTS.

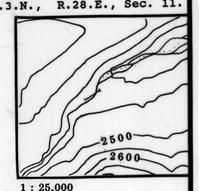
STRATIGRAPHIC SECTION 86NH08

LAT. 69° 32' 20" N. LONG. 145° 12' 00" W.

EXPLANATION

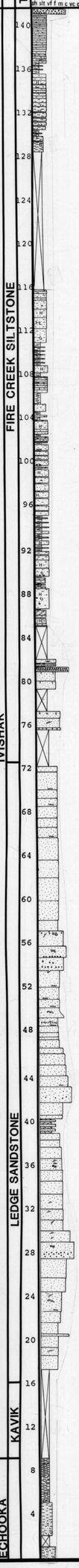
Rip up Clasts; Pebble Layer; Ripples; Low Angle Crossbeds; Erosional Scour; U Shaped Burrows; Parallel Laminations; Trough Crossbeds; High Angle Crossbeds; Tool marks; Hematite Stained; Bioturbated Tops; Hummocky Crossbeds; Fossils; Sandstone; Siltstone; Shale; Conglomerate

MT. MICHELSON (C-2) QUAD.
T.3.N., R.28.E., Sec. 11.



1 : 25,000

VERTICAL SCALE : 1 cm = 2 meters



SERIES	STAGE	FORMATION	MEMBER	Thickness (m.)	Lithologic Description	Interpretation
LOWER TRIASSIC	SMITHIAN	IVISHAK	FIRE CREEK SILTSTONE	140	Sandstone- very fine-grained to silty gray quartz arenite, hematite stained. Thick-beds thinning to medium-beds up section, some ripple marks, bioturbated surfaces and rare crossbeds. Some sandstone beds defined by thin shale beds. Thin shale intervals decrease in frequency up section. Thin siltstone bed within shale intervals.	Inner to middle shelf.
				136		
				132		
				128	covered interval	
				124		
				120		
				116	Thick succession of interbedded sandstone, siltstone, and shale.	
				112	Interbedded massive silty sandstone dominated intervals alternating with and fining into shale intervals with thin siltstone and sandstone beds.	
				108		
				104	Silty to very fine-grained, medium gray quartz arenite- thick to extremely-thick bedded, hematite stained, spheroidal weathering, abundant shale and siltstone rip up clasts, ripple and bioturbated surfaces, tool marks.	
				100		
				96	Thick sandstone beds are usually defined by thin shale beds. Series of fining up packages- thick sandstone beds fine up as shale intervals become thicker and more frequent into shale dominated interval. Shale dominated interval- alternating shales and thin bedded sandstone and siltstone.	Inner to middle shelf.
				92		
				88		
				84	Medium-bedded, light gray chert conglomerate, very coarse sand to pebble-sized with very fine to fine-grained matrix, clast supported.	
				80		
				76	Bioturbated interval- Very fine to fine-grained, light gray quartz arenite. Thick to medium-bedded, bioturbated bedding surface, vertical U-shaped burrows, low to medium angle crossbeds. Fire Creek Member- Shaly cover	
				72		Reworked inner shelf to nearshore.
				68	Thick sucession of very fine-grained to very-coarse grained light blue quartz arenite with abundant pyrite and chert.	
				64	Thick to extremly thick-bedded.	
				60	Abundant ripple marks in upper portion of interval.	
				56	Beds generally thicken and coarsen, then thin and fine upward.	
				52	Beds form three discrete thickening-coarsening then thinning-fining subintervals 8 to 23 m thick.	
				48	Beds thicken to extremly thick-bedded and can fine to thin to medium-bedded.	
				44	Very fine-grained beds coarsen up to poorly sorted beds dominated by coarse-grained to pebble-sized sand and chert with very fine-grained matrix.	
				40	Beds fine to very fine-grained to silt-sized deposits.	
				36	Coarse-grained intervals contain abundant discontinuous coarse grained interbeds. Coarser-grained deposits lense laterally and can appear channelized.	
				32	Abundant low angle and trough crossbeds. Some hummocky and higher angle tangential cross beds. Crossbeds defined by pyrite and coarser grained material.	
				28		
				24		
				20		
				16		
				12		
GRIESBACHIAN				8	Black, weathering green and yellow, silty shale to siltstone. Possible Echooka-Kavik transitional zone.	
ECHOOKA				4	Echooka Formation-Black to gray weathering green and yellow sandy siltstone to very fine-grained sandstone, abundant pyrite. Thick to medium-bedded beds thinning up.	