

ALASKA GEOLOGY

Newsletter of the
Alaska Geological Society



Late Cretaceous through Oligocene magmatic and tectonic evolution of the western Alaska Range

James V. Jones

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New U-Pb zircon ages together with geochemistry and radiogenic isotopes for Late Cretaceous to Oligocene igneous rocks in the western Alaska Range constrain the spatial distribution, petrogenesis, and tectonic setting of magmatism through time. These igneous rocks were emplaced across multiple basement domains that include Neoproterozoic to Jurassic carbonate and siliciclastic strata of the Farewell terrane, Mesozoic plutonic and volcanic rocks of the Peninsular terrane, and Cretaceous turbiditic strata of the Kahiltna basin. They also host multiple types of mineralization including intrusion-related Au, porphyry Cu-Mo-Au, polymetallic veins and skarns, and peralkaline intrusion-related REE. The oldest intrusive suite is ca. 104 to 78 Ma; the youngest plutons of this relatively localized suite were intruded during folding of the Kahiltna succession. This deformation is interpreted to represent closure of the retroarc Kahiltna basin and a transition to transpression-dominated tectonics along the southern Alaska margin. More widespread magmatism ca. 75–55 Ma occurred in two general pulses, each with contrasting geochemistry. The first pulse was dominantly magnesian ca. 75–67 Ma, and the second pulse was dominantly ferroan ca. 63–55 Ma. (continued)...

AGS Luncheon

Date & Time:	January 15 th , 11:30 am – 1:00 pm	
Program:	Late Cretaceous through Oligocene magmatic and tectonic evolution of the western Alaska Range	
Speaker:	James V. Jones, U.S. Geological Survey Alaska Science Center	
Place:	BP Energy Center, 1014 Energy Court, Anchorage, AK	
Reservations:	Make your reservation before noon Tuesday, January 13 th , 2015	
Cost:	Seminar only, no meal:	Free
	Lunch with reservation:	\$15
	Lunch with no reservation:	On an “as-available” basis only

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The latter pulse is associated with widespread andesitic to rhyolitic volcanic rocks and was coeval with dextral transpressional deformation. Emplacement of widespread and voluminous intermediate to mafic dikes ca. 59–51 Ma overlaps the final phase of the second pulse. Magmatism waned during inferred late Paleocene to early Eocene ridge subduction along the southern Alaska margin but then resumed ca. 45 Ma, around the same time as the initiation of the Aleutian/Meshik arc. In the western Alaska Range, this dominantly subalkaline Eocene magmatism included emplacement of the elongate N–S Merrill Pass pluton and large volumes of associated ca. 44–37 Ma andesitic flows, tuffs, and lahar deposits. Finally, an Oligocene magmatic pulse involved emplacement of a compositionally variable suite of subduction-related magmas ranging from gabbro to peralkaline granite ca. 31–25 Ma, followed by waning magmatism that coincided with initiation of Yakutat slab subduction.

About the Speaker:

Jamey Jones is a Research Geologist with the U.S. Geological Survey Alaska Science Center. Originally from northern Louisiana, Jones received a B.S. in Geology from the University of the South in Tennessee, an M.S. from the University of Wyoming working on a metamorphic core complex in northeastern Nevada, and a Ph.D. from the University of Texas at Austin working on the Proterozoic tectonic evolution of western North America. His research interests and expertise include regional tectonics, structural geology, hard-rock petrology and geochronology. He held tenure-track positions for three years each at University of Minnesota Morris and University of Arkansas at Little Rock prior to joining the USGS Alaska Science Center, where he has been working since 2011. His work at the USGS is primarily funded by the Mineral Resources Program, and is focused on framework geology, tectonic evolution, and mineral resources of Alaska and the northern North American Cordillera.

From the President's Desk:

Happy New Year! 2015 marks the 200th anniversary of the publication of the first geological map of Great Britain and the first true regional geological map. Its author was William Smith who was greatly helped in his endeavor by the ongoing construction of a network of canals in England as the industrial revolution began to take hold. These excavations provided a continuous exposure of the underlying bedrock. Smith's genius was to recognize that individual lithologies and fossils could be used to correlate strata over long distances, which he colored on his map creating the patterns that are familiar to us all.

It is interesting to speculate how William Smith would have fared in Alaska, had the cradle of the industrial revolution been in Anchorage instead of England. Instead of the gently dipping sedimentary sequences of chinks and clays that form the rounded scenery of the Kent downs, what would he have made of Alaska's accreted terranes with their faulted meta-sediments? He could be forgiven for concluding that the earth below our feet was devoid of order and consigning his map to the trash.

The task of mapping the geology of Alaska and interpreting its tectonic evolution is far from complete and will keep us all busy for generations. Sadly, it took a long time for William Smith to get the recognition that he deserved in part because he was an ordinary working man at a time when most scientists were "gentlemen". His attempts to sell his geological map ended in failure and a stretch in the debtor's prison. Hopefully the geologists working on mapping Alaska won't share Smith's fate but get the recognition that they deserve!

~ Keith

ALASKA FOSSILS OF THE MONTH

CHEENEETNUKIA – MIDDLE DEVONIAN GASTROPOD FROM ALASKA

Robert B. Blodgett, Blodgett & Associates LLC, 2821 Kingfisher Drive, Anchorage, AK 99502, USA

This month's selection for the Alaska Fossil of the Month is the Early Middle Devonian (Eifelian) age gastropod genus, *Cheeneetnukia* Blodgett and Cook, 2002 (see Fig. 1). It is one of the largest known gastropods known the Devonian and was established by myself and Alex Cook in 2002 from the Cheeneetnuk Limestone (named by Blodgett and Gilbert, 1983) in the McGrath A-5 1:63,360 scale quadrangle.

The type species of the genus was named *Cheeneetnukia frydai*, the species being in honor of my friend, Jiří Frda, a geologist with the Czech Geological Survey and one of the World's leading authorities on Paleozoic Gastropoda.

The Cheeneetnuk Limestone, host of this species, was named by Blodgett and Gilbert (1983) for a distinctive limestone succession (457 m thick) in the McGrath quadrangle, west-central Alaska (see Fig. 2) which they assigned an Early? to Early Middle Devonian (Eifelian) age. The upper part of the formation is especially rich in silicified fossils, only part of which have been described. Much of the fauna of the Cheeneetnuk Limestone is also recognized in the informally named Cascaden Ridge unit (Blodgett, 1992) in the Livengood quadrangle (Livengood terrane) and from the Wadleigh Limestone exposed on a small island off the west coast of Prince of Wales Island (Alexander terrane), Southeast Alaska (Blodgett and others, 2003).

As noted above, it is one of the largest Devonian gastropods known, and the largest specimen known is represented by the holotype specimen (illustrated in Fig. 1), which measures 58.0 mm in height (incomplete) and has a width of 40.0 mm (incomplete).

At the time the genus *Cheeneetnukia* was established, the authors also established a new family of gastropods, Cheeneetnukiidae, to receive it. The family was characterized as a distinctive group within the Murchisonioidea, characterized by a squared-off (rectangular) whorl profile. In other murchisonioids, the whorl profile is typically V-shaped or rounded. In addition to the Alaskan type species, an Australian representative from the Late Middle Devonian (Givetian) was also established at the same time, *Cheeneetnukia australis* Blodgett and Cook, 2002, from the Givetian age Dosey Limestone, north Queensland, Australia. In the same paper (Blodgett and Cook, 2002) suggested a third undescribed species from the Givetian Ertang Formation of Guangxi, China and a fourth, formally unnamed species from the Givetian Thye On beds near Kampar, Perak, Malaysia, as possibly belonging to the genus. Thus, the distribution of this distinctive and easily recognizable genus appears restricted as far as we know to the Middle Devonian of the Panthalassic (the ancestral Pacific) Ocean.

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- Blodgett, R. B., 1992, Taxonomy and paleobiogeographic affinities of an early Middle Devonian (Eifelian) gastropod faunule from the Livengood quadrangle, east-central Alaska: *Palaeontographica Abteilung A*, v. 221, p. 125-168.
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- Blodgett, R. B., Rohr, D. M., Karl, S. M., and Baichtal, J. F., 2003, Early Middle Devonian (Eifelian) gastropods from the Wadleigh Limestone in the Alexander terrane of southeastern Alaska demonstrate biogeographic affinities with central Alaskan terranes (Farewell and Livengood) and Eurasia, in Galloway, J. P., ed., *Studies in Alaska by the U.S. Geological Survey, 2001: U.S. Geological Survey Professional Paper 1678*, p. 105-115.

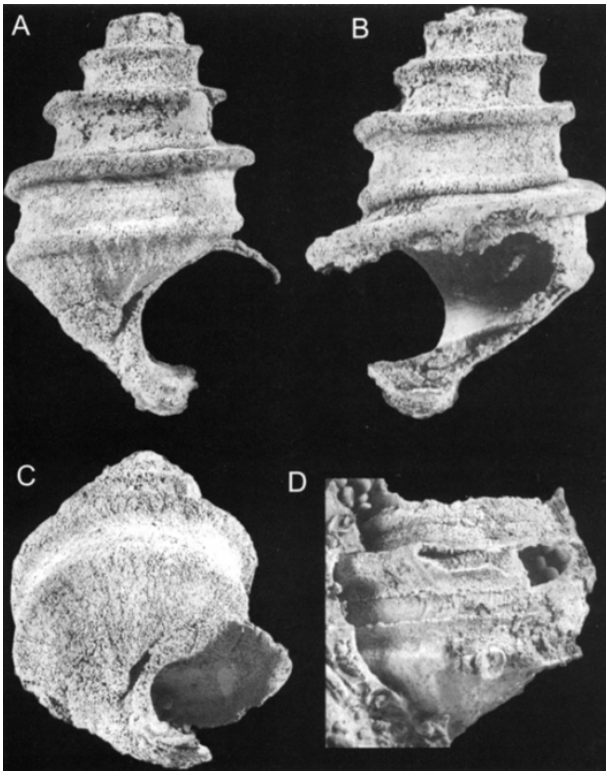


Figure 1. *Cheeneetnukia frydai* Blodgett and Cook, 2002 from the Cheeneetnuk Limestone of west-central Alaska (Farewell terrane). This species is common in early Middle Devonian (Eifelian) strata of the Farewell and Alexander terranes. The genus was named for the Cheeneetnuk Limestone of Alaska and is also present in northeastern Australia, and possibly Malaysia and China. Figures A-C is of the holotype specimen and

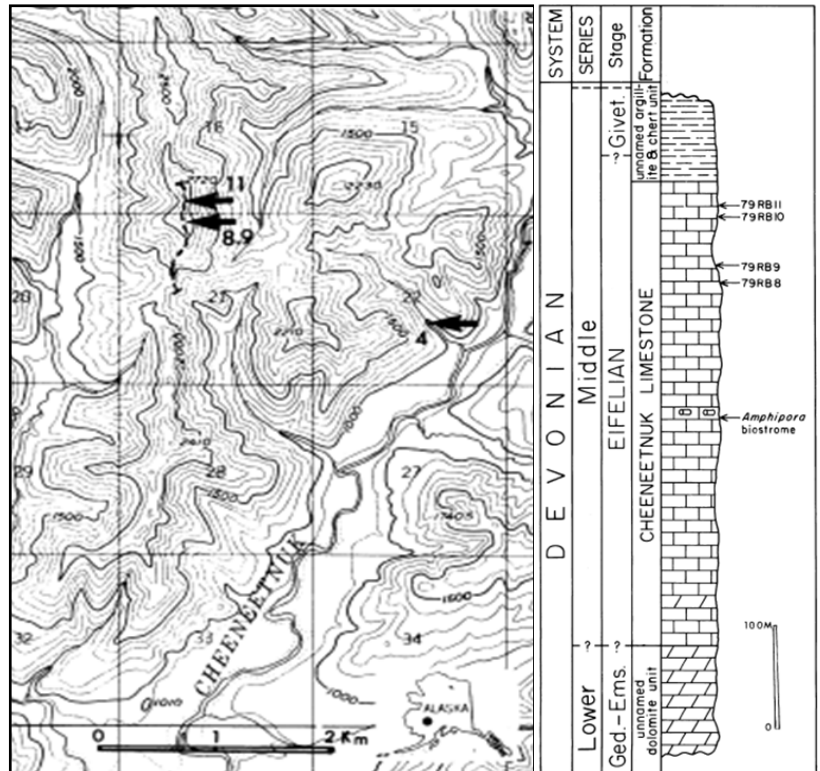


Figure 2. Locality map showing the location and columnar stratigraphic section for the type section of the Cheeneetnuk Limestone, McGrath quadrangle. The formation is also present in the Medfra quadrangle to the north, but still has not yet been distinguished as such in the scant literature available for the Medfra quadrangle.

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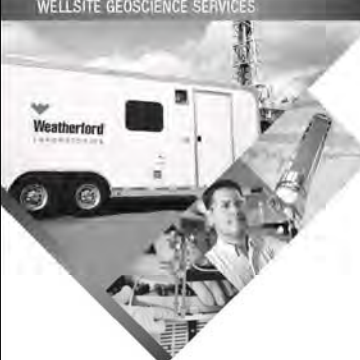
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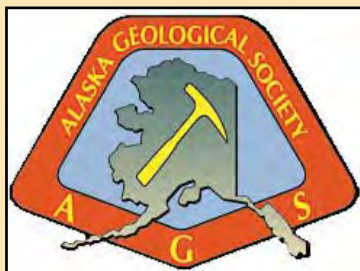
In May, 2015 the Alaska Geological Society will cease to print and mail out the monthly newsletter and all future newsletters will go out as electronic (pdf) files attached to e-mails. The AGS Board of Director's decision to distribute newsletters in solely an electronic format was reached because the preparation and mail-out of printed newsletters is one of the largest costs borne by the Society and is not offset by revenues from dues, thus eroding the reserve scholarship funds. At present our membership roster lists 263 past and present members, most receiving printed newsletters, with 97 active members (dues paid through November 2015).

To continue to receive the AGS newsletters after May 2015, you will need: 1) to be an active member (annual dues paid up); and 2) to provide the Society with a functional e-mail address. Membership renewals or submissions of updated e-mail addresses can be done through the AGS web page at <http://www.alaskageology.org/membershipSUBMIT.htm> or by e-mail to membership@alaskageology.org, respectively. If you want to find out your membership status please contact the AGS at membership@alaskageology.org and we will be happy to reply with a check of our records. The AGS membership dues cycle starts on November 1st of each year.

Thank you for becoming an active member (if not already!) and supporting your local geoscience society!

Calendar of Events

Date	Time	Organization	Event	Location
Dec 18 th	11:30am – 1:00pm	Alaska Geological Society/ GSA	Esther Babcock “Detecting Oil In and Under Ice and Snow: Ground Penetrating Radar (GPR) - Theory and Applications”	BP Energy Centre Anchorage
Jan 14 th	11:30am – 1:00pm	Alaska Miners Association	Ken Papp Geological Materials Center Update	Sourdough Mining Company
Jan 15 th	11:30am – 1:00pm	Alaska Geological Society	Jamey Jones (USGS) - Late Cretaceous through Oligocene Magmatic and Tectonic Evolution of the Western Alaska Range	BP Energy Centre Anchorage
Jan 19 th – Jan 23 rd			Alaska Marine Science Symposium	Hotel Captain Cook Anchorage
Feb 9 – Feb 13 th		Alaska Forum Inc.	Alaska Forum on the Environment	Dena’Ina Centre, Anchorage
Feb 11 th	11:30am – 1:00pm	Alaska Miners Association	AMA Luncheon	Sourdough Mining Company
Feb 19 th	11:30am – 1:00pm	Alaska Geological Society	Peter Flaig (Bureau of Economic Geology/UT-Austin) - Delta Facies and Depositional Architecture Controls on Reservoir Performance	BP Energy Centre Anchorage
March 11 th	11:30am – 1:00pm	Alaska Miners Association	AMA Luncheon	Sourdough Mining Company
March 19 th	11:30am – 1:00pm	Alaska Geological Society	Phil Manning (Univ. of Manchester - AAPG Distinguished Lecturer) - Arctic Dinosaur Evolution	BP Energy Centre Anchorage
April 2 nd	11:30am – 1:00pm	SPE	Joseph H. Frantz Shale Plays- How Technology, Governments, Regulators, Academia, and the Public Have Changed the World’s Energy Supply & Demand Equation	BP Building Conference rooms A, B, C
April 8 th	11:30am – 1:00pm	Alaska Miners Association	AMA Luncheon	Sourdough Mining Company
April 16 th	11:30am – 1:00pm	Alaska Geological Society	To be announced	BP Energy Centre Anchorage
11 th – 15 th May 2015		GSA	Geological Society of America - Cordilleran Section Meeting	UAA campus, Anchorage
Sept 19 – 22 nd 2015		AIPG	American Association of Professional Geologists – Annual Meeting	Hilton Hotel, Anchorage



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The Alaska Geological Society is an organization which seeks to promote interest in and understanding of Geology and the related Earth Sciences, and to provide a common organization for those individuals interested in geology and the related Earth Sciences.

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Contact membership coordinator Ken Helmold with changes or updates (e-mail: ken.helmold@alaska.gov; phone: 907-269-8673)

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