Chapter 28

Gravel Spread Far North of the Alaska Range

The long distance transport of cobbles and boulders seems to be a common theme around many mountains ranges of the Earth. In this chapter, I will document the long distance spread of gravel north of the Alaska Range into central Alaska. [1]

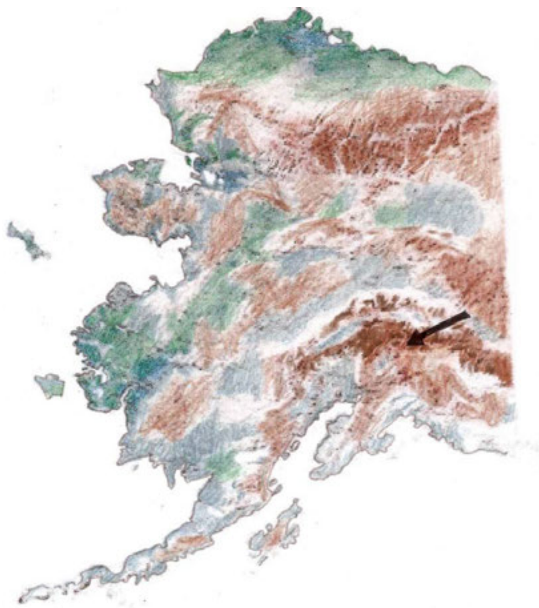

Figure 28.1. Map of Alaska showing mountain ranges (red). The Alaska Range (arrow) is the arc-shaped mountain range that extends from southwest Cook Inlet to near the Alaska, Canadian border (drawn by Mrs. Melanie Richard).

The Alaska Range

The Alaska Range (Figure 28.1) is an arc-shaped, generally east-west mountain range 600 miles (965 km) long in southern Alaska that merges with the Wrangell and St. Elias Mountains on the southeast and the Aleutian Range on the southwest.[2] The Denali fault system runs parallel to the mountains and is 750 miles (1,200 km) long. The mountains are believed to have started uplifting from a land of low relief in the late Cenozoic about 5 to 6 million years ago, based mainly on "geologic constraints" from basins to the north (the Nenana Basin) and to the south (Cook Inlet).[3] So, the Alaska Range is "young" within the uniformitarian paradigm.

The highest mountain in North America, Denali (formerly Mount McKinley) at 20,315 feet (6,194 m) msl, lies within the western Alaska Range. Most mountains in the Alaska Range are much lower with their crests averaging between 7,000 to 9,000 feet (2,135 and 2,745 m) msl.

The lowlands north and south of the range are relatively low. The Tanana River Basin to the north is a broad, swampy lowland with average elevation between 395 to 820 feet (120 and 250 m) msl.[4] The city of Fairbanks is along the Tanana River. The basins in southern and central Alaska likely were caused by subsidence as the Alaska Range rose.[5]

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1 Oard, M.J., 2008. Long-distance Flood transport of the Nenana Gravel of Alaska – similar to other gravels in the United States. *Creation Research Society Quarterly* 44(4):264–278.

2 Wahrhaftig, C., 1958. The Alaska Range. In, Williams H. (editor), *Landscapes of Alaska: Their Geological Evolution*, University of California Press, Los Angeles, CA.

3 Fitzgerald, P.G., R.B. Sorkhabi, T.F. Redfield, and E. Strump, 1995. Uplift and denudation of the central Alaska Range: a case study in the use of apatite fission track thermochronology to determine absolute uplift parameters. *Journal of Geophysical Research* 100 (B10):20,175–20,191.

4 Bemis, S.P., 2004. *Neotectonic Framework of the North-Central Alaska Range Foothills*. M.S. thesis, University of Alaska, Fairbanks AK

5 Thom, E.E., 2000. Late Cenozoic Unroofing Sequence and Foreland Basin Development of the Central Alaska Range: Implications from the Nenana Gravel. M.S. thesis, University of Alaska, Fairbanks, AK.

The Nenana Gravel Spread North of Alaska Range

Before the Alaska Range uplifted, the Usibelli Group, made up of five poorly cemented formations, was deposited within the Oligocene and Miocene (mid to late Cenozoic) according to the uniformitarian timescale (see Figure 5.3). The Usibelli Group is about 1,965 feet (600 m) thick and consists of pebbly sandstone interbedded with coal and mudstone. Paleocurrent directions can be determined, especially from cross-beds in sandstones and imbrication of oblong rocks in the gravel. They show a paleocurrent direction toward the *south to southwest*.[4,6] Based on the fossils in the Usibelli Group, the deduced paleotemperatures were about 15°F (9°C), much warmer than those in the area today.[6,7]

Figure 28.2. Bedded Nenana Gravel in road cut about 10 miles (16 km) north of Healy, Alaska.

Figure 28.3. Nenana Gravel about 3 miles (5 km) north of Healy, Alaska. Note the rounded rocks (Hank Giesecke for scale).

The Nenana Gravel was deposited on top of the Usibelli Group on an apparent paraconformity, an assumed time gap with no erosional evidence, over an area of 5,400 mi^2 (14,000 km^2) in basins north of the crest of the Alaska Range.[5] Paleocurrent directions are predominantly towards the north. The gravel is massive to thick-bedded and poorly cemented[4] (Figure 28.2). It is up to about 3,935 feet (1,200 m) thick just east of Healy, Alaska, which is on the main highway linking Anchorage to Fairbanks. The gravel thins northward to about 1,640 feet (500 m) just north of the mountain front.

The gravel consists of a wide variety of rocks. The lower part of the Nenana Gravel is dominated by sandstone, conglomerate, and volcanic rocks, while higher in the gravel, plutonic igneous and greenstone (a metamorphic basalt) predominate. These rocks reflect a sedimentary and igneous rock source mainly from *south* of the Alaska Range for the

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6 Ridgeway, K.D., J.M. Trop, and D.E. Jones, 1999. Petrology and provenance of the Neogene Usibelli Group and Nenana Gravel: implications for the denudation history of the central Alaska Range. *Journal of Sedimentary Research 69* (6):1,262–1,275.

7 Fitzgerald *et al*., Ref. 3, p. 20,183.

lower Nenana Gravel, while the upper gravel is mainly from the erosion of the igneous rocks in the Alaska Range as the range uplifted. Based on paleocurrent indicators, there was a water drainage reversal from the Usebelli Group heading south to the Nenana Gravel going north.[3]

The rocks in the gravel become larger toward the top and smaller going northward.[8] They are also rounded to well-rounded,[9] indicating the action of water (Figure 28.3). The average size of the gravel is 0.5 to 3 inches (1 to 8 cm)[10] in diameter with the maximum size around 19 inches (0.5 m).[11] The Nenana Gravel contains interbeds of sand and silt, and the rocks are commonly coated with an iron patina, similar to other areas in the lower 48 states. The gravel is dated as "Pliocene" (late Cenozoic) within the uniformitarian geological column (see Figure 5.3).

The gravel is found north up to 60 miles (95 km) from the crest of the Alaska Range.[12] As one drives north from Healy to Nenana, the flat surface of the Nenana Gravel becomes covered with silt, considered loess or wind-blown silt. But the gravel continues in the subsurface, as indicated by 2,460 feet (750 m) of Nenana Gravel found in a well drilled about 15 miles (25 km) west of the town of Nenana.[12] The gravel is assumed to be widespread and underlie much of the silt of the Tanana River basin in the lowlands of central Alaska, north of the Alaska Range. After deposition, the gravel in the foothills of the Alaska Range was dissected by generally north-south valleys in which rivers now flow through water gaps,[13] which will be analyzed in Volume III.

The Uniformitarian Wild Guess

The Nenana Gravels are interpreted within the uniformitarian paradigm as coalescing alluvial fans and braided stream deposits.[5,14] This paleoenvironmental designation seems to be a rubberstamp answer for uniformitarians attempting to explain generally sheet-like gravels that were transported far from their mountain source. At least in this case they have mostly moved from calling all of it a "fluvial" deposit, one from a river. A braided stream, by the way, is a unique example of a river depositing sediment and gravel with multiple channels. Alluvial fans have a distinctive fan-shaped geomorphology and much of the sedimentation takes place by debris flows. These contain rocks of various shapes and sizes floating in a fine-grained matrix.[15] Braided streams that flow on top of alluvial fans generally have a cut and fill texture.[16] Accordingly, alluvial fans with braided stream deposits should have rapid changes in rock sizes and types laterally and vertically. They should be intermingled with sand, silt, and clay as observed on top of the Trollheim alluvial fan in Death Valley.[17] Figure 28.4 shows a picture of typical huge alluvial fan gravel with fine-grained interbeds in Death Valley. There also should be a wide variety of

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[8] Thom, Ref. 5, p. 34.

[9] Ridgeway *et al*., Ref. 6, p. 1,268.

[10] Bemis, Ref. 4, p. 12.

[11] Wahrhaftig, C. and R.F. Black, 1958. Quaternary and engineering geology in the central part of the Alaska Range. *United States Geological Survey Professional Paper 293*, Washington D.C., p. 11.

[12] Thom, Ref. 5, p. 17.

[13] Bemis, Ref. 4, pp. 79–87.

[14] Ridgeway *et al.*, Ref. 6, p. 1,263.

[15] Miall, A.D., 1996. *The Geology of Fluvial Deposits: Sedimentary Facies, Basin Analysis, and Petroleum Geology*. Springer-Verlag, New York, NY, p. 31.

[16] Miall, Ref. 15, p. 30.

[17] Miall, Ref. 15, p. 206.

Figure 28.4. Close up alluvial fan gravel in southern Death Valley showing angular to rounded rocks with finer-grained interbeds.

angular to rounded rocks within the gravel as also shown in Figure 28.4. Rocks in the Nenana Gravel are rounded to well-rounded and do not change much with distance, inconsistent with the braided stream, debris flow, and alluvial fan interpretations.

When alluvial fans coalesce, the deposit is called a bajada. But even yet, one would expect that there would still be thicker deposits in front of valleys and thinner deposits between valleys in bajadas. In order to fill up the area between alluvial fans with debris, there must be a downhill lateral flow, the downhill slope of which should still exist to some degree. In other words, the top of coalesced alluvial fans would *not* be flat but should be gently undulating in a transect parallel to the mountains. However, the upper surface of the Nenana Gravel is flat.[18] This is unexpected in an alluvial fan and bajada environment, but is more indicative of *watery sheet flows*. Even where it is dissected, the Nenana Gravel forms *flat* or gently northward dipping plateaus and buttes.[19] These features are opposed to the uniformitarian paleoenvironmental interpretation.

[18] Bemis, Ref. 4, p. 20.
[19] Thom, Ref. 5, pp. 26–27.