Chapter 18

Uniformitarian Speculation on Gravel Transport Southeast of Central Idaho

As I already mentioned in Chapters 16 and 17, the gravels in southwest Montana, northwest Wyoming, and adjacent Idaho very likely originated from central Idaho. It has been difficult for uniformitarian scientists to account for the distance of transport, especially considering the obstacles they had to traverse. Because of this, four alternative hypotheses have been proposed:[1,2] (1) derivation from local quartzite sources, (2) transport by tectonic uplift in eastern Idaho, (3) transport on thrust sheets that have moved east for a long distance,[3,4] and (4) spreading by rivers with progressive eastward recycling.[1,5,6,7]

Local Sources Eliminated

Local sources can easily be eliminated because the amount of quartzite in local mountains is either zero or far too small. Moreover, paleocurrent directions in the quartzite gravel indicate currents flowed from the west.[1] Although there is a small amount of quartzite outcropping in the Beaverhead Range on the border of southwest Montana west of the Big Hole Valley, this source is excluded because the light-tan quartzite in that range is different from the multi-colored quartzite rocks in southwest Montana, northwest Wyoming, and adjacent Idaho.[8] Furthermore, there are only three sandstone formations in the area and they have only a slight bit of quartzite, and this quartzite is not high-grade (see in-depth section at the end of Chapter 13). David Love, a uniformitarian expert on Wyoming geology, concluded:

---

[1] Lindsey, D.A., 1972. Sedimentary petrology and paleocurrents of the Harebell Formation, Pinyon Conglomerate, and Associated Coarse Clastic Deposits, Northwestern Wyoming, *U.S. Geological Survey Professional Paper 734-B*, U.S. Government Printing Office, Washington, D.C.

[2] Oard, M.J., J. Hergenrather, and P. Klevberg, 2006. Flood transported quartzites: part 3—failure of uniformitarian interpretations. *Journal of Creation* 20 (3): 78–86.

[3] Schmitt, J.G. and J.R. Steidtmann, 1990. Interior ramp-supported uplifts: implications for sediment provenance in foreland basins, *GSA Bulletin* 102:494–501.

[4] Lawton, T.F., S.E. Boyer, and J.G. Schmitt, 1994. Influence of inherited taper on structural variability and conglomerate distribution, Cordilleran fold and thrust belt, western United States. *Geology* 28:339–342.

[5] Janecke, S.U., C.J. VanDenburg, J.J. Blankenau, and J.W. M'Gonigle, 2000. Long-distance longitudinal transport of gravel across the Cordilleran thrust belt of Montana and Idaho. *Geology* 28:439–442.

[6] Kraus, M.J., 1984. Sedimentology and tectonic setting of early Tertiary quartzite conglomerates, northwest Wyoming; in, Koster, E.H. and R.J. Steel, (editors), Sedimentology of Gravels and Conglomerates, *Canadian Society of Petroleum Geologists Memoir* 10, Calgary, Alberta, pp. 203–216.

[7] Kraus, M.J., 1985. Early Tertiary quartzite conglomerates of the Bighorn Basin and their significance for paleogeographic reconstruction of Northwest Wyoming; In, Flores, R.M. and S.S. Kaplan, (editors), *Cenozoic Paleogeography of West-Central United States*, Rocky Mountain Section of S.E.P.M., Denver, Colorado, pp. 71–91.

[8] Ryder, R.T., 1967. Lithosomes in the Beaverhead Formation, Montana-Idaho: a preliminary report; in, Henderson, L.B. (editor), Montana *Geological Society guidebook: 18th annual Field Conference August 9-12, 1967—Centennial Basin of Southwest Montana*, Montana geological Society, p. 69.

> Immediately eliminated are the Paleozoic and Mesozoic rocks in mountains adjacent to Jackson Hole. The Flathead (Cambrian) and Tensleep (Pennsylvanian) Sandstones and the Quadrant (Pennsylvanian) Formation are the only ones in the Paleozoic sequence that are even moderately quartzitic, and this only in localized areas. These sandstones do not resemble, in physical appearance, variety of color, or degree of metamorphism, the quartzites in the conglomerates. No widespread quartzitic sandstones of consequence are in the Mesozoic sequence. … There is no 500-sq-mi or larger area of Precambrian quartzite in the cores of the Wind River, Gros Ventre, Teton, Centennial, Madison, Gallatin, Beartooth, or Washakie uplifts … In fact, quartzite is an uncommon lithology.[9]

No Evidence for Tectonic Uplift to the West

The quartzite rocks that made it as far as the southwest Powder River basin have been postulated to have come from the Targhee uplift, the second possibility. This uplift was in eastern Idaho around the location of the eastern Snake River basalt plain. This idea was championed by Love,[9] because he believed rivers unable to transport quartzites very far, and I agree with him. So, he reasoned the source had to be just a short distance away, just to the west in eastern Idaho. The Targhee uplift was claimed to have the same grade of quartzite as the Belt/Purcell rocks farther north in central Idaho. Erosion spread the quartzites from the Targhee uplift into the Jackson Hole area, just east of the Teton Mountains. Then the Targhee uplift somehow subsided or eroded and was covered by the Snake River basalts.

Unfortunately for Love, Lindsey concluded there is *no evidence for the Targhee uplift*. It has not been detected by geophysical studies underneath the eastern Snake River basalt plain.[1] Moreover, a hypothetical Targhee uplift cannot account for the more than 15,000 feet (4,570 m) depth of the Divide quartzite in Idaho. Especially problematic are the paleocurrent directions in these quartzite gravels. They indicate transport from the west or southwest, not from the south as would be required for Love's hypothesis. Janecke and colleagues also dismiss the Targhee uplift hypothesis.[5] This hypothesis does show the length uniformitarian scientists will go to explain an anomaly.

Thrust Sheet Transport Does Not Work

The third hypothesis is thrust sheets moved east to transport the quartzites. This idea fares no better than Love's Targhee uplift. Janecke and colleagues believe that quartzites in what they believe are thrust faults in southwest Wyoming and adjacent southeast Idaho were covered by sediments at the time the quartzite gravel was deposited.[5] If the quartzite layers were covered, then they could not have been eroded and transported east. Besides, the thrust sheets are too far south, especially for the Divide quartzite in northeast Idaho. Lindsey is likewise skeptical of the overthrust mechanism.[1]

---

[9] Love, J.D., 1973. Harebell Formation (Upper Cretaceous) and Pinyon Conglomerate (Uppermost Cretaceous and Paleocene), Northwestern Wyoming, *U.S. Geological Survey Professional Paper* 734-A, U.S. Government Printing Office, Washington, D.C., p. A29.

Does River Transport Work?

The elimination of the above mechanisms leaves only the fourth mechanism: transport by rivers with the possible help of alluvial fans from the west. This seems to be the only hypothesis currently entertained by uniformitarian scientists.[5] It does seem to be the most plausible. After all, rivers transport gravel downstream today. But, there are a number of problems with this hypothesis as well.

Quartzite Must Be Transported 400 Miles Southeast

All investigators admit the nearest source for the quartzites is central Idaho in the southern Belt rocks, but this is about 125 to 220 miles (200 to 350 km) from the Jackson, Wyoming, area.[5,10,11] Lindsey estimated that the total transport of the quartzites was 280 miles (450 km) away from the west or northwest.[1] But the quartzites were transported even farther east into the Bighorn Basin and the southwest Powder River Basins, a total distance of about 400 miles (640 km). Kraus had the creative idea that once the quartzite reach Jackson Hole, they could spread into the western Bighorn as a wide braidplain, similar to the idea of Leckie and Cheel[12] for the High Plains just east of the Rocky Moun-

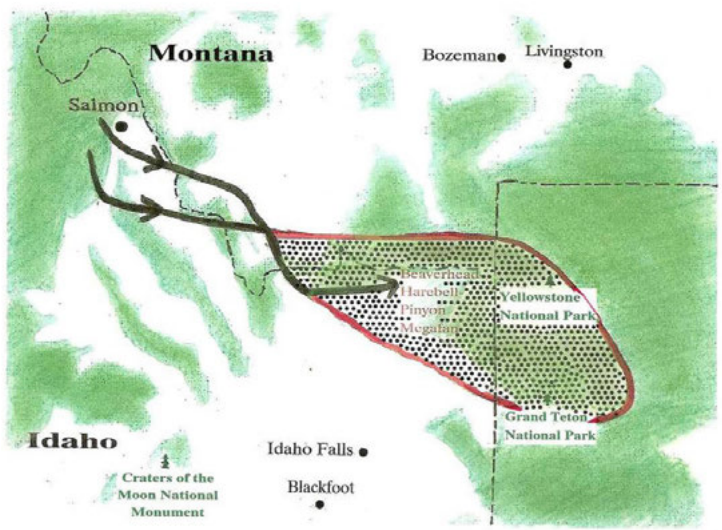

Figure 18.1. Postulated paleovalleys from near Salmon, Idaho, into southwest Montana merging to form the "Beaverhead-Harebell-Pinyon megafan" that spread thick quartzite gravels into northwest Wyoming (modified from Janecke et al., p. 439, by Mrs. Melanie Richard).

tains (see Chapter 15).[6,7] But Kraus needs to account for the quartzites even farther east in the eastern bighorn basin and southwest Powder River basin as well.

The Paleoriver Transport Hypothesis Problematic

Recently, Janecke and colleagues have postulated the quartzite gravel was transported from west of Salmon, Idaho, by two large "Eocene paleorivers."[5] Two paleorivers merged

---

[10] Ryder, R.T. and R. Scholten, 1973. Syntectonic conglomerates in Southwestern Montana: their nature, origin, and tectonic significance. *GSA Bulletin* 84:773–796.

[11] Ryder, R.T. and R. Scholten, 1986. Syntectonic conglomerates in Southwestern Montana: their nature, origin and tectonic significance (with an update); in: Peterson, J.A. (editor), *American Association of Petroleum Geologists Memoir* 41, Tulsa, OK, pp. 131–157.

[12] Leckie, D.A. and R.J. Cheel, 1989. The Cypress Hills Formation (upper Eocene to Miocene): a semi-arid braidplain deposit resulting from intrusive uplift. *Canadian Journal of Earth Sciences* 26:1,918–1,931.

in southwest Montana and spread quartzites east and southeastward, forming what they call the Beaverhead-Harebell-Pinyon megafan that stretches from southwest Montana and adjacent Idaho into northwest Wyoming (Figure 18.1). The paleovalleys are not necessarily valleys today but are mainly *defined by quartzite outcrops*. Some of these quartzite gravels are on or near mountain ridges today. Uniformitarian scientists think these ridge top gravels were tectonically uplifted after deposition in the paleoriver. Thus, these paleovalleys are more a result of circular reasoning, by assuming the quartzites define the path of two large ancient rivers. Figure 18.2 shows a large distinctive quartzite boulder just west of Lemhi Pass, which is along the continental divide and is one of Janecke and colleague's paleovalley locations. The paleorivers are supposed to have transported about a thousand cubic miles of quartzite rocks through southwest Montana and into northwest Wyoming from 200 to 350 kilometers away!

Figure 18.2. Large blue-banded quartzite from west of Lemhi Pass, which is on the continental divide between southwest Montana and Idaho. This location is one of the paleovalley locations of Janecke et al., 2000. Note that the boulder is subrounded (not quite rounded), since it is closer to the source.

John Hergenrather and I have examined a number of outcrop locations mentioned by Janecke and colleagues and found boulders up to almost 3 feet (1 m) in length. We also noted the quartzites are less rounded toward the west, as would be expected if the source were generally west of Salmon, Idaho. We noticed well-rounded quartzite gravel in several locations south and west of the postulated paleovalleys, such as near and south of the Morgan Creek/Panther Creek divide, around 50 kilometers southwest of Salmon, Idaho. Some of these quartzite gravels were reworked by local mountain glaciers during the Ice Age. One boulder outcrop was in the headwaters of Morgan Creek about 19 miles (30 km) north of Challis, Idaho, but significantly south of the paleorivers. The idea of two paleorivers is undoubtedly a simplification, or the quartzites could have spread in a wide sheet flow before the mountains uplifted. The largest boulder at this locale was about 2 feet (0.7 m) in diameter, and interestingly, some had numerous percussion marks (Figure 18.3) which we know is a sign of very fast, turbulent flow. Since modern rivers rarely form percussion marks on quartzite, it is doubtful that is was by any river we would recognize today.

Why Didn't the Paleorivers Incorporate Limestone Gravel?

As mentioned in Chapter 16, the limestone conglomerate and quartzite gravels are usually separated in southwest Montana and adjacent Idaho. Ryder laments the fact that the quartzites rarely picked up limestone when traversing over *mostly* limestone terrain:

> It still remains enigmatic how a mono-lithologic quartzite conglomerate could be transported across a predominately limestone terrain without becoming

partially contaminated.[13]

The limestone conglomerate probably represents catastrophic local erosion as the mountains of southwest Montana and east-central Idaho rose upward (see Appendix 11). This is deduced from the abundance of angular rocks. Water was also involved since some of the rocks are rounded. Therefore, one would certainly expect that there would be plenty of limestone rocks mixed into the quartzites, if these quartzite gravels were spread east by paleorivers over millions of years. The lack of limestone rocks is a mystery indeed and suggests a more energetic flow that would pulverize softer limestone and transport the quartzites.

Figure 18.3. Boulder with percussion marks at Morgan Creek, about 19 miles (30 km) north of Challis, Idaho.

Lack of a River Transport Mechanism

The last problem is whether rivers really can transport large quartzites from central Idaho to east of Jackson, Wyoming, not to speak of the Bighorn and Powder River Basins farther east? Janecke and colleagues do not provide any quantitative evaluation of their paleoriver hypothesis.[5] Their paper simply tries to trace out, based on the location of the quartzite gravels, the supposed routes of transport, while the rivers were *assumed* capable of transport.

Lindsey did attempt to quantify the river transport hypothesis. To provide the surface slope required for transport of quartzite gravel up to 10 inches (25 cm) in diameter, Lindsey calculated what the height the mountains in central Idaho would have to be. For a 1º slope (Lindsey's minimum slope estimate), the mountains needed to be up to 14,750 feet (4,500 m) above the level of the quartzites in northwest Wyoming![1] Since the Jackson, Wyoming, area is around 6,000 feet (1,800 m) msl, the mountains in central Idaho would have to have been 20,650 feet (6,300 m) above sea level, just for Lindsey's minimum slope estimate. The heights of the mountains in Idaho would have to be much higher with slopes higher than 1°. The idea of transport is of doubtful validity. Moreover, many large boulders are greater than 10 inches (25 cm) in diameter.

Presently, there is little difference in elevation between the source of the quartzites in central Idaho and the current locations of the quartzite gravels to the east and southeast. Actually, the gravels in northwest Wyoming are at a *higher* elevation than their source, so the paleoriver would have to go uphill, unless sometime in the past there *was* a huge mountain range in central Idaho, as Lindsey postulated. If this huge mountain range once existed, providing the altitude for quartzite gravel transport, the northern and central

[13] Ryder, Ref. 8, pp. 69–70.

Rocky Mountains would have had to subside or erode about 10,000 to 15,000 feet (3,050 to 4,570 m) after paleoriver transport. Lindsey's calculation of the requirements for quartzite transport show that the paleoriver mechanism is not viable.

Summary

There really is no logical uniformitarian mechanism for the transport of the quartzite rocks from central Idaho clear to the southwest Powder River basin. The four suggestions analyzed above show how desperate uniformitarians are to explain long distance transport of so much quartzite. It is typical in geomorphology, as well as other areas of science, for uniformitarian scientists to devise unreasonable, subsidiary hypotheses to prop up their paradigms of uniformitarianism and deep time.