

Chapter 66

No viable Uniformitarian Hypothesis

Presently, there are three main hypotheses explaining the origin of pediments, all *fatally flawed*. A deeper analysis of them is found in Appendix 21. A fourth idea is C.H. Crickmay's "superflood" hypothesis. It has a few uncanny similarities to a global Flood account (see Chapter 67) largely because it is primarily based on observations. Unfortunately, he too eventually runs aground. His assumption of uniformitarianism keeps him from seeing the larger picture.

Crickmay's Superflood Hypothesis

Crickmay was one of the most perceptive geomorphologists of the last century. He was not afraid to follow the data wherever it led and fearlessly challenged mainstream hypotheses. As a result, he was considered a maverick. Most of his ideas are summarized in his thought-provoking book, *The Work of the River*.¹ As indicated by the title, he concluded *water* not only shaped pediments, but also was responsible for global geomorphology. He wrote the rounded rocks found on planation surfaces are evidence of water action since rocks are nearly always rounded by water.



Figure 66.1. Coarse gravel veneer capping a pediment on vertical strata on the east limb of an anticline at Sheep Mountain water gap, Bighorn Basin, north of Greybull, Wyoming. A minor proportion of the rocks on this dissected pediment are exotic quartzites, some with percussion marks, from at least 312 miles (500 km) away to the west in central Idaho.

¹ Crickmay, C.H., 1974. *The Work of the River: A Critical Study of the Central Aspects of Geomorphology*, American Elsevier Publishing Co., New York, NY.



Figure 66.2. Dissected pediment along Grand Mesa, Colorado.

One of Crickmay's most perceptive observations came from noticing exotic rocks on some of the pediments.^{2,3} Exotic rocks by definition do not outcrop in the surrounding mountains. They really are not that difficult to find, since I too have found them on many pediments. These include those in the Ruby Valley of southwest Montana (Figures 64.6 and 64.7); pediments just east of the Sheep Mountain anticline in the northeast Bighorn Basin (Figure 66.1), the edge of Grand Mesa, near Grand Junction, Colorado (Figure 66.2),⁴ and on the pediment east of Albuquerque, New Mexico (Figure 66.3).

Finding so many exotic rocks caused Crickmay to conclude the pediments must have been formed by water that flowed *parallel* to the mountain front and not from the mountains and down the pediment slope. This contradicted all other theories of pediment formation. (see Appendix 21). Crickmay wrote:

Many pediments of this type [short but laterally extensive pediments] are carpeted with thin gravel deposits that include among their pebbles a greater variety of rock types that is represented in the bed-rock of the immediate vicinity. These facts, together with the peculiarly continuous, linear form of the pediplains, suggest that perhaps one should look in an entirely different direction for the mode of origin of the features. Rather than looking to the small streams (including, of course, their sheet-flood counterparts) that **now run down the slope** of the pediplain as the possible agent of its making, one should

² Crickmay, Ref. 1, p. 213.

³ Twidale, C. R., 1992. King of the plains: Lester King's contribution to geomorphology. *Geomorphology* 5:497.

⁴ Oard, M.J., 2004. Pediments formed by the Flood: evidence for the Flood/post-Flood boundary in the Late Cenozoic. *Journal of Creation* 18(2):15-27.

perhaps visualize a stream that formerly ran the **lateral length** of the pediplain—its greater dimension (emphasis his).²



Figure 66.3. The Sandia Mountains (left background) with a pediment to the west (arrow).

Crickmay's conclusion is reasonable and based upon his observations. The three major hypotheses today depend upon water flowing towards the lowest point from the adjacent mountains, hills, or ridges (see Appendix 21). Geomorphologists undoubtedly must have known about the exotic rocks, but as far as I know, no one except Crickmay and Twidale published this fact. Exotic rocks should have led to the rejection of the three main hypotheses. It is possible the implications were unthinkable, since it implied a huge, flood, which is what Crickmay postulated, which was a "superflood" that ran *parallel* to the mountains. He suggested this was no ordinary flood, but was possibly a 900-year event. Maybe he chose 900 years to sidestep a global flood and its implications. Problematically, a flood at 900 year intervals has not been observed by anyone. The edges of these large floods were to have planed the sides of the valley or bounding mountains leaving behind a carpet of local and exotic rocks.

It is my contention that Crickmay was close to the truth, but his uniformitarian bias prevented him from taking the next step. However, Crickmay made an important conceptual leap by postulating that the current direction had to be parallel to the mountain front instead of perpendicular to it. This can at least account for the exotic rocks found on pediments. Although Crickmay's hypothesis was based on plentiful observational data, it was not considered

significant.⁵ This was partly based on other problems with his proposed “superflood.” First, *many* rare superfloods would be needed to form the vast number of pediments, too many even with the advantage of millions of years. Second, it is doubtful that even multiple local superfloods could smoothly erode the hard rock edges of a mountain front, and the mountains themselves, nor can it account for the valley fill that abuts the mountains. Third, multiple superfloods would likely erode and deposit sediment as *cut and fill structures, terraces, and floodplains on the side of a mountain or within the valley*. They could not result in a large-scale *smooth* structure. So, although Crickmay made a significant breakthrough, but he still could not explain all of the observations.



Figure 66.4. Another view of the dissected pediment on near vertical strata at Sheep Mountain water gap, Wyoming

Two Fatal Problems for All Uniformitarian Hypotheses

All of the hypotheses used to explain pediment formation have difficult, if not fatal problems. Two observations are especially challenging to the uniformitarian hypothesis.

Far-Travelled Exotic Rocks

The first fatal flaw we have already made note of: the presence of exotic, rounded rocks in the gravels deposited on the pediments. Crickmay hypothesis had the right idea of the direction of water flow,⁶ but it is not considered viable by geomorphologists.

⁵ Twidale, C.R., 1993. C.H. Crickmay, a Canadian rebel. *Geomorphology* 6:357-372.

⁶ Crickmay, C.H., 1975. The hypothesis of unequal activity. In, Melhorn, W.N. and R.C. Flemel (editors), *Theories of Landform Development*, George Allen and Unwin, London, U.K., pp. 103-109.

The pediment just northwest of Grand Mesa, Colorado (Figure 66.2) is capped by rounded cobbles that include quartzite that came from many tens of miles upstream of the Colorado River.⁷ The sedimentary rocks below this mesa are not quartzite and the mesa is capped by basalt lava so there is no possibility this quartzite weathered from the sedimentary rock below the pediment or was transported from nearby Grand Mesa.



Figure 66.5. Percussion marks on a quartzite cobble on the Sheep Mountain pediment east of the Sheep Mountain water gap, northeastern Bighorn Basin, Wyoming.

The dissected pediment on the eastern flank of the Sheep Mountain anticline is even more informative (Figures 66.1 and 66.4). It contains quartzite cobbles with percussion marks⁸ (Figure 66.5). Percussion marks indicate there once was a strong, turbulent flow, consistent with the mechanism of a global Flood.⁹ The nearest “upstream” outcrops of quartzite layers are at least 300 miles (500 km) to the west in central Idaho (see Chapters 17 and 18).^{10,11,12,13} These gravels

⁷ Michael Shaver, 2002, personal communication.

⁸ Oard, M.J., 2000. Antiquity of landforms: Objective evidence that dating methods are wrong. *Journal of Creation* 14(1):35-39.

⁹ Klevberg, P. and M.J. Oard, 1998. Paleohydrology of the Cypress Hills Formation and Flaxville gravel. In, Walsh, R.E. (editor), *Proceedings of the Fourth International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 361-378.

¹⁰ 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*, Washington, D.C.

¹¹ 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*, Washington, D.C.

¹² 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, Canada, pp. 203-216.

did not originate in the local mountain ranges since the textures of the quartzites do not match the local rock. The quartzites on the pediment are high grade and similar to the Belt quartzites that outcrops in central Idaho. The quartzite gravels in the eastern Bighorn Basin, including around Sheep Mountain, are similar to those found in northwest Wyoming. The presence of these exotic clasts is fatal to all three main pediment formation hypotheses. It is also fatal to Crickmay's superflood hypothesis because even superfloods could not transport rocks from central Idaho to the eastern Bighorn Basin.

Pediments Passes and Domes

Second, pediments from the opposite sides of a mountain range sometimes *merge with each other at the top of the range*.^{14,15} The area of merging is called a pediment pass. The top of the pediment on one side of the mountain range can be *higher* than the one on the other side!



Figure 66.6. Cima Dome, eastern Mojave Desert with a few monadnocks.

¹³ 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, S.S. (editors), *Cenozoic Paleogeography of West-Central United States*, Rocky Mountain Section of S.E.P.M., Denver, CO, pp. 71-91.

¹⁴ Howard, A.D., 1942. Pediment passes and the pediment problem (Part I). *Journal of Geomorphology* 5(1):3-31.

¹⁵ Howard, A.D., 1942. Pediment passes and the pediment problem (Part II). *Journal of Geomorphology* 5(2):95-136.

An extreme example of the convergence of pediments is when the topographic crest forms domes that are flanked by pediments on *all* sides. An example of domes considered merging pediments is in the eastern Mojave Desert. They are formed on granite, with Cima Dome being the most studied example (Figure 66.6).^{16,17,18} Pediment passes and domes are common in the southwest United States.¹⁹

Pediment passes and domes are fatal to the lateral planation hypothesis (see Appendix 21). How can a lateral planation surface develop from wide stream migration when the planation surface is near the top of the pediment pass or dome, which is also the *divide*? There are little or no drainage basins near the top of the mountain for a stream to grow to a significant size. And, why would the point where the pediments merge at the top of pediment passes be at different altitudes? Pediment passes and domes are contrary to Crickmay's superflood hypothesis as well as the three main hypothesis.

No Viable Uniformitarian Hypothesis

There is little, if any, observational support for any of these speculative uniformitarian hypotheses.²⁰ Ritter concluded that all three of the main hypotheses are untested, with little observational data to support any of them:

It is ironic that in spite of the singular attention devoted to pediments, a multitude of untested hypotheses exist concerning the processes of pedimentation, but an amazingly skimpy pool of reliable data to support them. After a century of study, there is still confusion and lingering disagreement about every aspect of pedimentation. Cooke and Warren (1973, p. 188) express this succinctly in their description of the topic as “a subject dominated by almost unbridled imagination.”²¹

As a result of the failure to observe pediments forming today and the failure to explain their unique characteristics, it is clear that the origin of pediments is really *unknown*.^{22,23} Dohrenwend exclaims:

Pediments have long been the subject of geomorphological scrutiny. Unfortunately, the net result of this long history of study is not altogether clear or cogent and has not produced a clear understanding of the processes responsible for pediment development.²⁴ Since I was a weather forecaster for about 30 years, I commonly used “weasel words” in my forecasts, such as it may rain today or it may not. I became a master at weasel words. So, I can recognize weasel word from others. The above quote is full of weasel words. Simply translated, uniformitarian geologists are clueless as to the origin of pediments. It continues to be called the

¹⁶ Sharp, R.P., 1957. Geomorphology of Cima Dome, Mojave Desert, California. *GSA Bulletin* 68:273-290.

¹⁷ Mammerickx, J., 1964. Quantitative observations on pediments in the Mojave and Sonoran Deserts (Southwestern United States). *American Journal of Science* 262:417-435.

¹⁸ Oberlander, T.M., 1972. Morphogenesis of granitic boulder slopes in the Mojave Desert, California. *Journal of Geology* 80(1):1-20.

¹⁹ Strudley, M.W., A.B. Murray, and P.K. Haff., 2006. Emergence of pediments, tors, and piedmont junctions from a bedrock weathering—regolith thickness feedback. *Geology* 34:805-808.

²⁰ Denny, C.S., 1967. Fans and pediments. *American Journal of Science* 265:81-105.

²¹ Ritter, D.F., 1978. Pediments. In, *Process Geomorphology*, Wm. C. Brown, Dubuque, IA, p. 291.

²² Oberlander, T.M. 1989. Slope and pediment systems. In, Thomas, D.S.G. (editor), *Arid zone Geomorphology*, Halsted Press, New York, NY, pp. 56-84.

²³ Dohrenwend, J.C., 1994. Pediments in arid environments. In, Abrahams, A.D. and A.J. Parsons (editors), *Geomorphology of Desert Environments*, Chapman & Hall, London, U.K., pp. 321-353.

²⁴ Dohrenwend, Ref. 23, p. 321.

“pediment problem”²⁵ after 125 years of research. Creationists claim that uniformitarianism is an impediment to science seems vindicated by these interesting landforms.

But what about actualism, the idea that an unobserved, plausible natural process created pediments in the past? Could this new replacement doctrine for uniformitarianism explain pediments by either processes not observed today or by a process observed today but with higher magnitude? I am waiting for one to be named. So far, actualism has not shed any light on the origin of pediments.

²⁵ Oberlander, T.M., 1974. Landscape inheritance and the pediment problem in the Mojave Desert of Southern California. *American Journal of Science* 274:849-875.