The Proceedings of the International Conference on Creationism

Volume 1
Print Reference: Volume 1:I, Page 3-10

Article 5

1986

Mount St. Helens and Catastrophism

Steven Austin
Institute for Creation Research

Follow this and additional works at: https://digitalcommons.cedarville.edu/icc_proceedings

DigitalCommons@Cedarville provides a publication platform for fully open access journals, which means that all articles are available on the Internet to all users immediately upon publication. However, the opinions and sentiments expressed by the authors of articles published in our journals do not necessarily indicate the endorsement or reflect the views of DigitalCommons@Cedarville, the Centennial Library, or Cedarville University and its employees. The authors are solely responsible for the content of their work. Please address questions to dc@cedarville.edu.

Browse the contents of this volume of *The Proceedings of the International Conference on Creationism*.

Recommended Citation
Austin, Steven (1986) "Mount St. Helens and Catastrophism," *The Proceedings of the International Conference on Creationism*: Vol. 1 , Article 5.
Available at: https://digitalcommons.cedarville.edu/icc_proceedings/vol1/iss1/5

CENTENNIAL LIBRARY
CEDARVILLE UNIVERSITY

MOUNT ST. HELENS AND CATASTROPHISM

Steven A. Austin, Ph.D.
Institute for Creation Research
P.O. Box 2667
El Cajon, CA 92021

INTRODUCTION

The explosion of Mount St. Helens in Washington State on May 18, 1980 was initiated by an earthquake and rockslide involving one half cubic mile of rock. As the summit and north slope slid off the volcano that morning, pressure was released inside the volcano where super-hot liquid water immediately flashed to steam. The northward-directed steam explosion released energy equivalent to 20 million tons of TNT which toppled 150 square miles of forest in six minutes. In Spirit Lake north of the volcano, an enormous water wave initiated by one eighth cubic mile of rockslide debris stripped trees from slopes as much as 850 feet above the pre-eruption water level. The total energy output on May 18 was equivalent to 400 million tons TNT, approximately 20,000 Hiroshima-size atomic bombs.

On May 18 and also during later eruptions critical energy thresholds were exceeded by potent geologic processes which were able to accomplish significant changes in short order. These processes challenge our way of thinking about how the earth works and serve as a miniature laboratory for catastrophism.

RAPID EROSION

Erosion during volcanic eruptions at Mount St. Helens was by scour from steam blasts, landslides, water waves, hot pumice ash flows (pyroclastic flows), and mudflows. After the eruptions the erosion process has been dominated by sheet flooding and channelized flow of water with occasional mudflows. About 23 square miles of the North Fork of the Toutle River Valley was obstructed by two-thirds cubic mile of landslide and pyroclastic debris which has been rapidly eroded since 1980. Jetting steam from buried water and ice under hot pumice reamed steam explosion pits with associated mass-wasting processes at the margins of pits producing rills and gullies over 125 feet deep. Figure 1 shows the largest steam explosion pit on June 18, 1980, but the very pronounced rills and gullies had formed before May 23, less than five days after the pumice was deposited! The rills

FIGURE 1. Largest steam explosion pit viewed from the east on June 18, 1980. The pit is 2300 feet long and has a flat floor of pumice deposited by the volcano's June 12 eruption. The dendritic pattern of gullies and rills forms 100 feet of relief at the margin of the pit. The pit was later breached by a mudflow on March 19, 1982, and forms the new canyon in the left side of Figure 2. (Photograph courtesy of the Washington State Department of Natural Resources.)

and gullies resemble the badlands topography which geologists have usually assumed required many hundreds or even thousands of years to form.

A mudflow on March 19, 1982, eroded a canyon system over 100 feet deep in the headwaters of the North Fork of the Toutle River Valley, establishing the new dendritic pattern of drainage. Figure 2 shows part of the new drainage pattern in what can be called the "Grand Canyon" of the Toutle River breached by the mudflow of March 19, 1982. This canyon system is a one-fortieth scale model of the real Grand Canyon. The canyon in Figure 3 might be assumed to have been eroded slowly by the creek flowing through it today, except for the fact that the erosion was observed to have occurred rapidly. Geologists should learn that the long time scale they have been trained to attach to landform development may be misleading.

RAPIDLY FORMED STRATIFICATION

Up to 600 feet thickness of strata have formed since 1980 at Mount St. Helens. These deposits accumulated from primary air blast, landslide, wave on the lake, pyroclastic flows, mudflows, air fall, and stream water. Perhaps the most surprising accumulations are the pyroclastic flow deposits ammassed from ground-hugging, fluidized, turbulent slurries of fine volcanic debris which moved at high velocities off the flank of the volcano. These deposits include fine pumice ash laminae and beds from one millimeter thick to greater than one meter thick, each representing just a few seconds to several minutes of accumulation. Conventionally, sedimentary laminae and beds are assumed to represent longer seasonal variations, or annual changes, as the layers accumulated very slowly. Mount St. Helens teaches us that stratification does form rapidly by flow processes.

Figure 4 (top of photo) shows twenty five feet of the stratified deposit of June 12, 1980, which formed in less than one day. It was deposited from pyroclastic flows generated by the collapse of the eruption plume of debris over the volcano. The strata are very extensive and even contain thin laminae and cross-bedding. Such features have been quickly formed underwater in laboratory sedimentation tanks, and it should not surprise us to see them form in a natural catastrophe.

UPRIGHT DEPOSITED LOGS

The landslide-generated waves on Spirit Lake stripped the forests from the slopes adjacent to the lake and created an enormous log mat with millions of prone floating trunks that occupy about two square miles of the lake surface. These logs float freely as the wind blows them (Figure 5) and the decreasing size of the log mat indicates that the trees are being deposited on the lake floor. Careful observation of the floating log mat indicates that many trees float in upright position with a root ball submerging the root end of the trunk while the opposite end floats out of the water. Figure 6 shows several upright floated and deposited logs which have been grounded in shallow water along the shore. These trees, if buried in sediment, would appear to have been a forest which grew in place over hundreds of years, a popular interpretation for the petrified upright forests at Yellowstone National Park.

In order to get more information on the upright deposited logs in Spirit Lake, members of our research team worked with Dr. Harold Coffin of Geoscience Research Institute to survey the lake bottom using sonar and scuba. Hundreds of upright, fully submerged logs were located by sidescan sonar, and scuba divers verified that they were indeed trunks of trees which the sonar detected. An example of the excellent sonar record is shown in Figure 7. Extrapolating from the small area of lake floor surveyed to the entire lake bottom, we estimate more than 15,000 upright stumps existed on the floor of the lake in August 1985. The average height of an upright deposited stump is 20 feet. Sonar records and scuba investigations verified that many of the upright deposited trees have root masses radiating away from the bases of the trunks.

Scuba investigation of the upright deposited trunks shows that some are already solidly buried by sedimentation with more than three feet of sediment around their bases, while others have no sediment around their bases. This proves that the upright trees were deposited at different times with their roots buried at different levels. If found buried in the stratigraphic record, these trees might be interpreted as multiple forests which grew on different levels over periods of thousands of years. The Spirit Lake upright deposited stumps, therefore, have considerable implications for interpreting "petrified forests" in the stratigraphic record.

FIGURE 2. Westward view looking down the North Fork of the Toutle River in August 1984. The rockslide and pumice deposited in the region of the headwaters of the river have been eroded to a depth of more than 100 feet forming a new dendritic drainage pattern. The deep canyon on the left includes the breached remnant of the large steam explosion pit (Figure 1). The canyon on the right is shown in detail in Figure 3. Significant canyon erosion by mudflow which established the dendritic drainage pattern occurred on March 19, 1982.

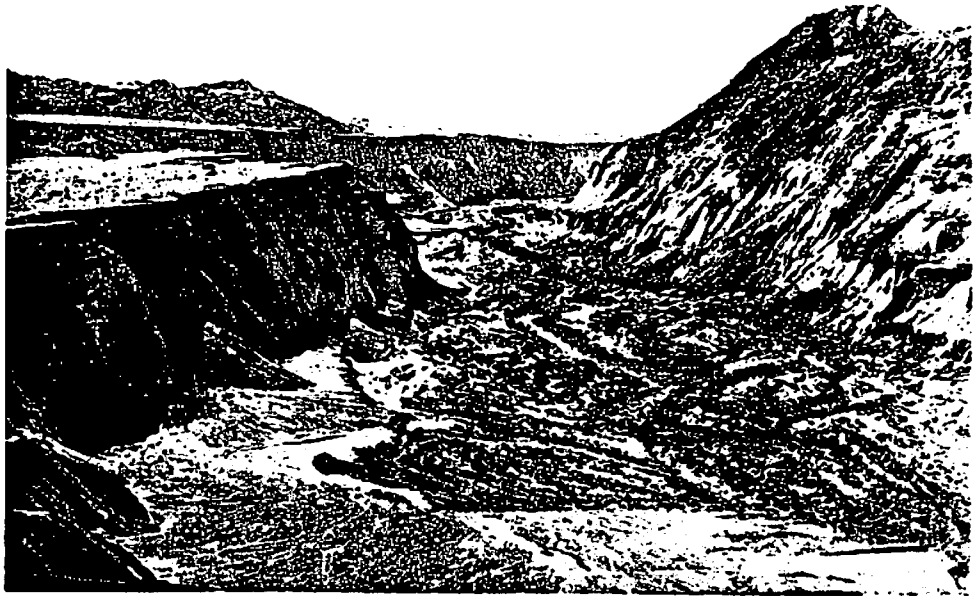

FIGURE 3. Detailed view of deep canyon on the right side of Figure 2. The flat plain of pumice deposited on May 18, 1980, was eroded to a depth of more than 100 feet by August 1984. The small creek did <u>not</u> erode this canyon.

FIGURE 4. Twenty five foot thickness of stratified pyroclastic flow deposit which accumulated in less than one day on June 12, 1980. The stratified flow deposit forms the floor of the pit in Figure 1 which was later eroded by mudflows to make the cliff exposure here.

FIGURE 5. Small portion of the floating log mat in Spirit Lake. Mount St. Helens is in the background.

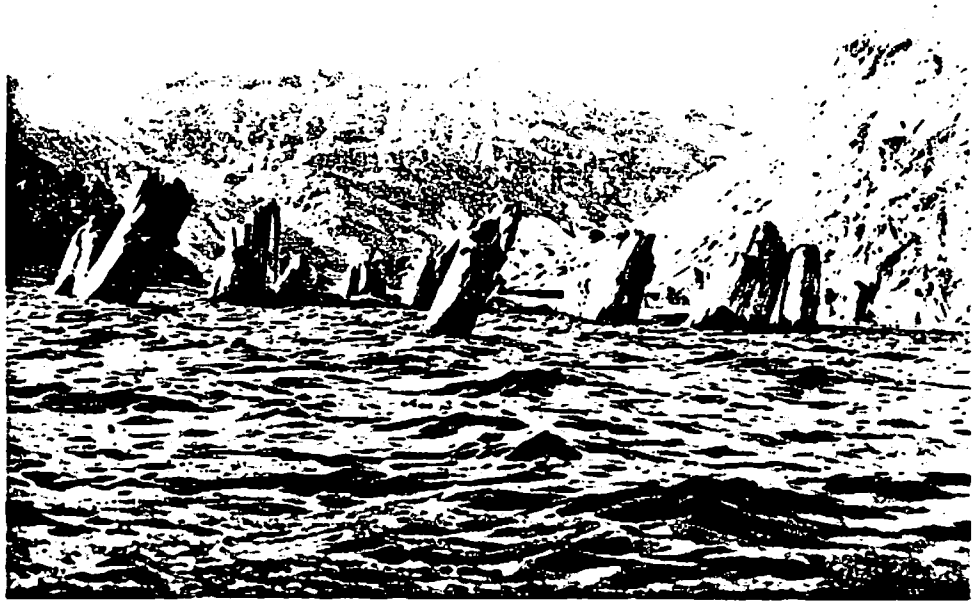

FIGURE 6. Upright trunks of trees deposited on the north shore of Spirit Lake. The trunks are slightly inclined due to manmade lowering of the level of the lake.

FIGURE 8. Underwater photograph of large section of tree bark lying on finer texture peat on the bottom of Spirit Lake.

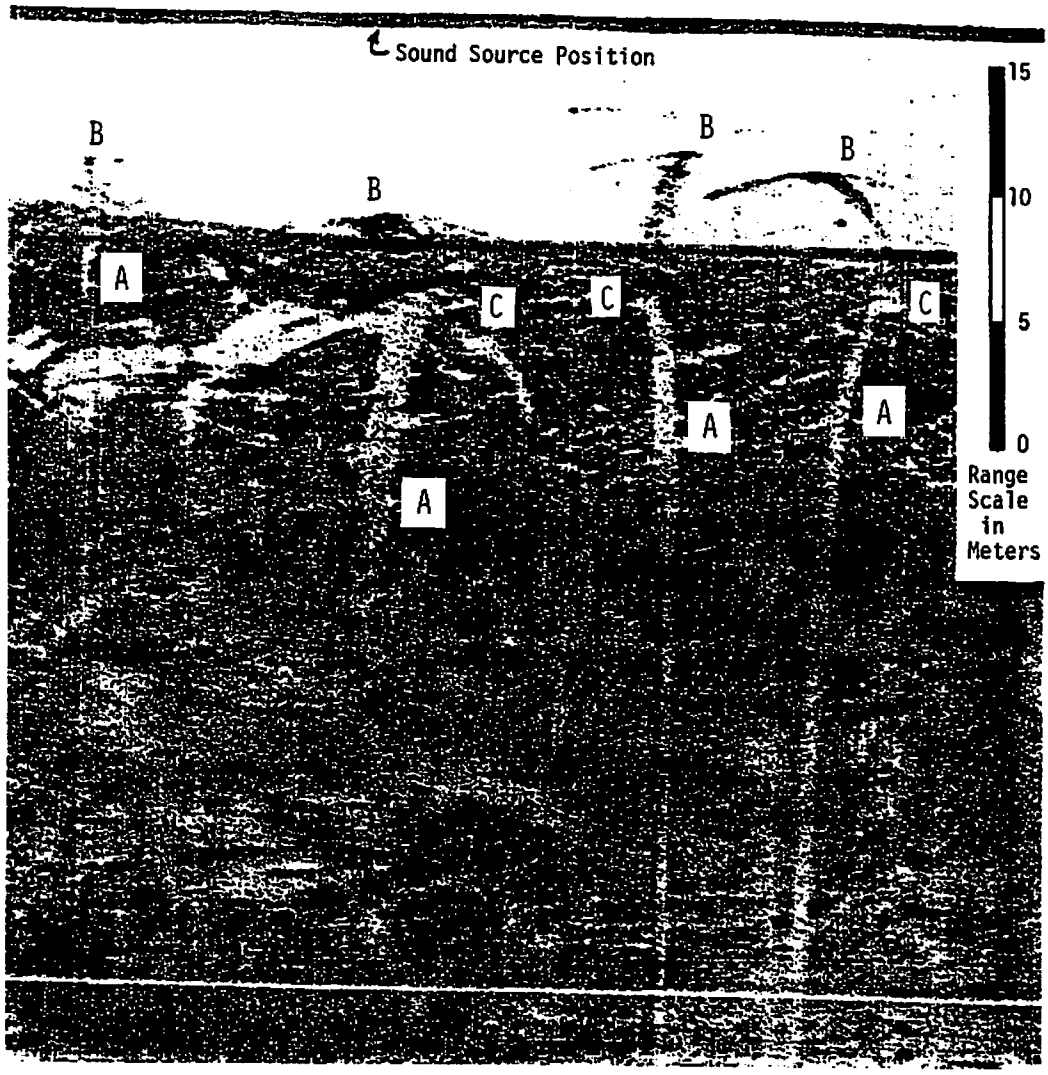

FIGURE 7. Sidescan sonar record showing several erect and prostrate trees and scattered debris on the bottom of Spirit Lake. The long light streaks (label A) are sonar shadows of upright trees. This record shows four upright trees almost directly below the sound-releasing towfish. Each upright tree produces a direct reflection seen in the water column along the top of the figure (label B). Three of the trees show evidence of outspreading root masses in shadows cast at the bases of the trunks (label C).

PEAT LAYER IN SPIRIT LAKE

The enormous log mat floating on Spirit Lake has lost its bark and branches by the abrasive action of wind and waves. Scuba investigations of the lake bottom showed that water-saturated sheets of tree bark are especially abundant on the bottom of the lake where, in areas removed from volcanic sediment added from the lake shore, a layer of peat several inches thick has accumulated. Figure 8 shows the peat layer on the floor of the lake. The Spirit Lake peat resembles, both compositionally and texturally, certain coal beds of the eastern United States which also are dominated by tree bark and appear to have accumulated beneath floating log mats. Coal is supposed conventionally to have accumulated from organic material accumulated in swamps by growth in place of plants and burial. Because the accumulation of peat in swamps is a slow process, geologists have supposed that coal beds required about one thousand years to form each inch of coal. The peat layer in Spirit Lake argues that peat can accumulate rapidly. Swamp peats, however, have only very rare bark sheet material because the intrusive action of tree roots disintegrates and homogenizes the peat. The Spirit Lake peat in contrast is texturally very similar to coal. All that is needed is burial and slight heating to transform the Spirit Lake peat into coal. Thus, at Spirit Lake we may have seen the first stage in the formation of coal.

CONCLUSION

Mount St. Helens provides a rare opportunity to study transient geologic processes which produced within a few months changes which geologists might otherwise assume required many thousands of years. The volcano, therefore, challenges our way of thinking about how the earth works, how it changes, and the time scale we are accustomed to attaching to its formations. These processes and their effects allow Mount St. Helens to serve as a miniature laboratory for catastrophism. Mount St. Helens helps us to imagine what Noah's Flood was like.

BIBLIOGRAPHY

S. A. Austin, 1979, Depositional environment of the Kentucky No. 12 coal bed (Middle Pennsylvanian) of Western Kentucky, with special reference to the origin of coal lithotypes: Pennsylvania State University, unpublished Ph.D. dissertation, 411 p.

S.A. Austin, 1984, Rapid erosion at Mount St. Helens: Origins, vol. 11, no. 2, pp. 90-98.

S.A. Austin, 1984, Catastrophes in earth history: a source book of geologic evidence, speculation and theory: El Cajon, Calif., Institute for Creation Research, monograph no. 13, 318 p.

H.G. Coffin, 1983, Mount St. Helens and Spirit Lake: Origins, vol. 10, pp. 9-17.

H.G. Coffin, 1983, Erect floating stumps in Spirit Lake, Washington: Geology, vol. 11, pp. 298-299.

W.J. Fritz, 1980, Reinterpretation of the depositional environment of the Yellowstone "fossil forests:" Geology, vol. 8, pp. 309-313.

P.W. Lipman, and D.R. Mullineaux, eds., 1981, The 1980 eruptions of Mount St. Helens, Washington: U.S. Geological Survey Professional Paper 1250, 844 p.

C.L. Rosenfeld, and G.L. Beach, 1983, Evolution of a drainage network: remote sensing analysis of the North Fork Toutle River, Mount St. Helens, Washington: Corvallis, Oregon State University Water Resources Research Institute, WRRI-88, 100 p.

P.D. Rowley, et al., 1985, Proximal bedded deposits related to pyroclastic flows of May 18, 1980, Mount St. Helens, Washington: Geol. Soc., Amer. Bull., vol. 96, pp. 1373-1383.

R.B. Waitt, Jr., et al., 1983, Eruption-triggered avalanche, flood, and lahar at Mount St. Helens -- effects of winter snowpack: Science, vol. 221, pp. 1394-1397.