Thoughts on the 27th Anniversary of Catastrophic Eruption of Mount St. Helens and Ongoing Activity

May 2007 Talking Points
Mount St. Helens Then and Now
The Ongoing Lava-Dome Eruption
Effect of the Eruption on Crater Glacier

Mount St. Helens Then and Now

- Approximately 3.5 billion cubic yards of the mountain were lost during the landslide on the morning of May 18th, 1980. Lava dome eruptions have emplaced about 200 million cubic yards in the crater during the 1980 to 1986 eruptions and the current eruption. Thus, about 7% of the volume has been replaced.

- At the current rate of eruption (0.6 cubic yards per second), it will take 178 years for the volcano to rebuild itself to its former volume.

- Only 11% of the present horseshoe-shaped crater has been refilled to date.

- Many volcano observers draw comparisons between Mount St. Helens and Bezymianny volcano in Russia, which share striking resemblances in appearance and eruptive style. A 1956 collapse of the summit and associated lateral blast and eruption at Bezymianny produced a large horseshoe-shaped crater similar to the one observed at Mount St. Helens. Since that time, numerous episodes of lava-dome growth and intermittent explosive activity have largely refilled the crater. To date, the resemblances continue, as Mount St. Helens rebuilds its cone by episodic lava-dome growth.

The Ongoing Lava-Dome Eruption

- The lava-dome building eruption of Mount St. Helens continues. Over the past year, the rate of lava extrusion has remained constant at 0.6 cubic yards per second. This volume of extrusion is equivalent to emplacement of one-third of a small pickup truck per second or to the size of a standard office 5-drawer filing cabinet emplaced per second. Putting this growth rate in perspective, this rate is down from 7.8 cubic yards per second for a short time during the early months of the eruption 2004. However, the current extrusion rate is greater than the average growth rate of Mount St. Helens over the last 4,000 years.

- During the ongoing eruption that began during 2004, there has been no change in rock chemistry or gas emissions, which suggests little to no change in eruptive style. Rock silica content ranged 62-64 weight % between 1980 and 1986. Rocks from the current eruption have had constant silica content of 65 weight %. This observation is consistent with the concept that the current eruption consists largely of magma left in the ground from magma intrusions during the 1980s.

- The low volcanic gas fluxes, slowing deformation, constant rock chemistry, low seismicity and constant extrusion rate all suggest little to no change in eruptive style in the foreseeable future. The risks posed by the hazards are relatively low. However, eruptions are inherently unstable situations and the USGS and the University of Washington's Pacific Northwest Seismic Network continue to monitor the situation closely.

Dome Dimensions

- From aerial photographs taken December 6, 2006: Volume of lava dome erupted since October 2004 is 118 million cubic yards, which would fill about 158 Rose Garden Arenas (Portland, Oregon). The high point of the lava dome is currently 7,618 feet above sea level. The dome is 3,412 feet by 1,722 feet with an area is 0.18 square miles, or 5.0 million square feet.

- The high point of the present lava dome is 1,155 feet above the 1986 crater floor. This dome height is similar to that of the Empire State Building in New York (1,250 feet), and shorter than the Sears Tower in Chicago (1,454 feet). The lava dome reached its highest elevation (7,772 feet) during the eruption in late summer 2006, but lost more than 150 feet in subsequent rockfalls.

- As of May, 2007, the vertical distance between the top of the lava dome (7,618 feet) and the Shoestring Notch (7,780 feet and lowest point on the crater rim) is 162 feet.

- While volume of new dome exceeds only slightly that of the 1980-86 lava dome, the 1980-86 dome appears much smaller because much of it is enveloped by ice.

Crater Glacier

- The glacier has taken center stage during 2007 for scientists and JRO visitors alike. Soon after formation of the crater in 1980, the glacier began to form and fill the void between the 1980-86 lava dome and the south, east, and west crater walls. At present, the growing lava dome is squeezing the glacier against the crater walls, causing it to thicken and flow more quickly out of the crater. Two well-defined arms of the glacier, east and west, are easily visible from visitor facilities at Johnston Ridge Observatory (JRO). The two arms are moving

obliquely towards one another, and their termini, currently about 400 feet apart, could merge before the end of 2007.

- The width of Crater Glacier's east arm is approximately 790 feet, but is highly variable; length is approximately 4,900 feet. The east arm advanced approximately 1,017 feet since 2003. The east arm advanced approximately 510 feet between December, 2005 and December, 2006.

- The west arm of Crater Glacier is about 1,050 feet wide and approximately 8,530 feet in length. Its terminus advanced approximately 82 feet north and 344 feet northeast during the past year. Between December 2005 and December 2006, the west arm advanced approximately 328 feet northeast and approximately 200 feet north. Glacier thickness in the upper section of the east arm exceeds 500 feet. Ice thickness at the terminus of each arm is approximately 60 to 130 feet.

- The movement of west Crater Glacier is of particular interest to scientists because of concerns that it might overrun Yellow Rock seismic station (established September, 1981), which is currently 200 feet from its terminus. USGS scientists placed a GPS unit on the glacier in early May 2007 to estimate how rapidly the glacier terminus is moving. Preliminary measurements indicate a velocity of approximately three feet per day. Seismic station "Vault" was established in 2006 at a greater distance from the glacier to augment the network and to replace any potentially lost instrumentation at Yellow Rock.

- The eruption of lava through a glacier is a unique situation on Earth. While lava intrudes through glacier ice in Iceland and elsewhere, Mount St. Helens is the only confirmed location where silica-rich lava extrudes through ice and forms a lava dome.

- The area of Crater Glacier is approximately one-fifth the area of glaciated terrain that existed on Mount St. Helens prior to the catastrophic eruption of May 18th, 1980.

- Crater Glacier is approximately .33 square miles in area, which is more than twice the area of White River Glacier on the south side of Oregon's Mount Hood. Crater Glacier is the newest glacier to form in North America. It is one of the most rapidly growing, and one of the lowest glaciers in the lower 48 states.

• • •