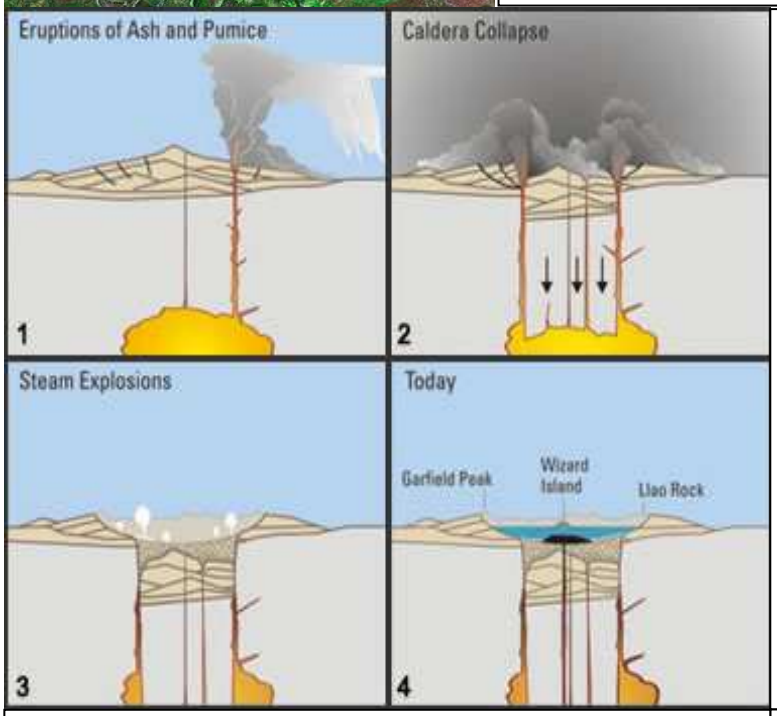
# CRATERS, CALDERAS AND GEYSERS

**Location:** Wyoming and Montana
**Latitude:** 44.615° N
**Longitude:** 110.6° W
**Elevation:** 2,805 (m) 9,203 (f)
**Volcano type:** Caldera
**Composition:** basalt to rhyolite


A satellite view of Crater Lake, one of the world's most famous calderas. Crater Lake formed about 7700 years ago when a massive volcanic eruption of Mount Mazama emptied a large magma chamber below the mountain. The fractured rock above the magma chamber collapsed to produce a massive crater over six miles across. Centuries of rain and snow filled the caldera creating Crater Lake. With a depth of 589 metres



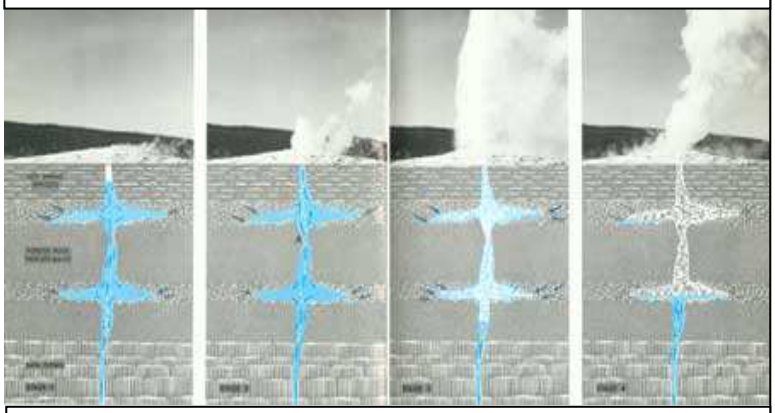

**Eruptions of ash and pumice:** The cataclysmic eruption started from a vent on the northeast side of the volcano as a towering column of ash, with pyroclastic flows spreading to the northeast.

**Caldera collapse:** As more magma was erupted, cracks opened up around the summit, which began to collapse. Fountains of pumice and ash surrounded the collapsing summit, and pyroclastic flows raced down all sides of the volcano.

**Steam explosions:** When the dust had settled, the new caldera was 5 miles (8 km) in diameter and 1 mile (1.6 km) deep. Ground water interacted with hot deposits causing explosions of steam and ash.

**Today:** In the first few hundred years after the cataclysmic eruption, renewed eruptions built Wizard Island, Merriam Cone, and the central platform. Water filled the new caldera to form the deepest lake in the United States.

## GEYSERS -OLD FAITHFUL - YELLOWSTONE NATIONAL PARK



- Geysers occur in volcanic areas where the hot rocks are near the surface.
- Water in tubes and chambers is heated to boiling point
- A narrow neck allows pressure to build up.
- The water flashes into steam and surges into an eruption of steam and hot water.
- The water cools and seeps back down into the empty chambers to be heated again.

**Stage 1 (Recovery or recharge stage)**. After an eruption, the partly emptied geyser tubes and chambers fill again with water. Hot water enters from below, and cooler water percolates in from side channels nearer the surface. Steam bubbles (with some other gases such as carbon dioxide and hydrogen sulfide) start to form in upflowing currents, as a decrease in pressure causes a corresponding decrease in boiling temperature.
**Stage 2 (Preliminary eruption stage).** As the rising gas bubbles grow in size and number, they tend to clog certain parts of the geyser tube, perhaps at some narrow or constricted point such as at A.
**Stage 3 (Full eruption stage**). Finally, larger amounts of water in the side chambers and pore spaces begin to flash into steam, and the geyser rapidly surges into full eruption.
**Stage 4 (Steam stage).** When most of the extra energy is spent, and the geyser tubes and chambers are nearly empty, the eruption ceases. Thereafter the system begins to fill again, and the eruptive cycle starts anew.