Mount St. Helens
May, 1980 Eruption

Reference:
Francis, pp. 92-101

Precursors

- March 21: 4.2 earthquake
- March 27: first eruption of ash
- Early April: harmonic tremor begins
- Mid April: seismic activity decreases
- Late April: large bulge grows on N flank

Main Event, May 18

- Large earthquake
- Volcanic debris avalanche
- Blast
- Plinian eruption

The Products

- Avalanche
- Blast
- Pyroclastic flow
- Pyroclastic fall
- Lahars

Avalanche

- Runout of 20 km
- Thickness of as much as 100 m
- Velocity of 75 m/s
- Formed by slumping of bulge
- Hummocky topography
- Heterogeneous components
Blast

- Supersonic velocities (>200 m/s)
- Runout to 25 km
- Destroyed everything
- Only about 1 m thick
- Mixture of juvenile and existing materials
- Cause of about 60 deaths
Pyroclastic Fall

- Plinian column more than 20 km high
- Cloud slowly spread across the USA
- Characteristic fallout deposits
  - Secondary concentration in Ritzville
- Circled the globe
  - Mild atmospheric effects

Mount St. Helens Umbrella

- 10 minutes for full umbrella to develop
- Reached 25 km high in 7 minutes
- Diameter: 20 km (base) to 70 km (top)
- Vertical rise of ~110 m/s
- Horizontal spread of ~55 m/s

Pyroclastic Flows

- Swept down northern flank
- Occupied the pumice plain < 10 km length
- Thickness of more than 40 m
- Original temperatures > 700°C
- Moved like fluidized systems
- Velocities of 70 m/s

Lahars

- Flowed down most major valleys
- Runout of more than 60 km
- Dammed and flowed rivers
- Caused much damage but few deaths
- Low velocity, highly fluid, and cold