Vesuvius – AD 79

• Reading: Francis (pp.63-73)

Events

• Precursors
• Phase I - plinian fall
• Phase II - surge and flow
• Geologic record
• Volcanic cycles
• Current risk

Precursors

• Major earthquake
  – February 5, 62 AD
• Little other evidence
• Inhabitants did not know this was a volcano
• Revolt of the slaves
  – Encampment in the caldera area

Phase I - Plinian Fall

• Local fine crystal-rich ash
• Large black cloud, 1:00 PM Aug. 24
  – rose to 20 km
• Initial composition highly-evolved (white)
• Later composition more basic (grey)
• ~ 3.0 km³ erupted (mostly grey)
Phase II - Surge and Flow

- Column begins to collapse
- Surges begin to arrive ~1:00 am Aug. 24
- Surges continue to arrive until ~ 8:00 am
- Surges increase in intensity with time
- Many accretionary lapilli horizons
- Most people killed by the surges and flows

Archeological Record

- Pompeii
- Herculaneum
- Other sites
  - Oplontis
  - Bosco Reale
Geologic Record

- Basal fine ash
- Pumice fall
  - white pumice
  - gray pumice
- Surge and flow deposits
- Lahars?
Interpretations

- Initial small hydromagmatic event
- Major plinian column
- Emptying of zoned magma chamber
  - 3 to 5 km deep
- Major hydromagmatic event
  - Implosion of chamber walls
- Collapse of summit (caldera formation)

Volcanic cycles

- Definition of a cycle
- Cycles at Vesuvius
- Short term activity
- Medium term activity
- Long term activity
- Significance for prediction

Current risk

- Currently in a state of repose since 1944
- Recent earthquakes detected
- Forecast of next event
  - Intermediate (100s of years repose)
  - Catastrophic (1000s of years repose)
- Risk (500,000 to 2,000,000 people)
- Mitigation ?????