Note: you **only** need to examine/describe the same type of data you used during the previous class period using the “Unit 6 Prework Student Worksheet” provided. If you missed class, you will be assigned a data type — be sure you get this information and complete the assignment using Data Set 2 before it is due!

The Geologic Hazards Map and USGS Eruption Alert Levels are the last two pages of this document.

Note: Data included in the following handouts are from the USGS. References for specific figures and information can be obtained from your instructor.
EARTHQUAKES:

Seismograms of explosions from volcano’s crater. Time marks are 60 sec apart.

Section of station CAB drum records between June 12-14, 1991. Time markers represent 1-min intervals.

Section of station CAB drum June 12 -14. Time markers represent 1-min intervals.

Map from Lockhart et al., 1996
Data from Harlow et al., 1996
EARTHQUAKES

MAP VIEW

CROSS SECTION
A side view of earthquake locations under the volcano
(note location of line A-A’ on map above)

MAP VIEW

CROSS SECTION
A side view of earthquake locations under the volcano
(note location of line A-A’ on map above)

MAP VIEW

CROSS SECTION
A side view of earthquake locations under the volcano
(note location of line A-A’ on map above)

May 6-31

June 1-7

June 8-12

Figures from Mori et al., 1996
RSAM data: recall that RSAM (Real-time seismic amplitude measurement) represents an average of absolute seismic amplitudes for seismic stations. RSAM does not discriminate between types of earthquakes, but all seismic signals are averaged and recorded.

Number of seismic events per 4-hour intervals between June 1 and June 12 from (A) the entire volcano network, (B) the cluster of seismic activity 5 km northwest of the summit, and from (C) beneath the summit.

Figures from Harlow et al., 1996
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On April 2, people in the vicinity smelled hydrogen sulfide (H$_2$S). On April 4, 1991, a volcanology team flew over the volcano and found a chain of vigorously steaming vents across the north face of the volcano (see images attached). The team judged that the activity was of hydrothermal origin. Vents at the northeastern side were short-lived; by the time COSPEC surveys were started, only five vents nearer to the summit were actively steaming.

Plot of SO$_2$ volumes from May 10 to June 12, estimated from COSPEC measurements

SO$_2$ emission from May 13 to June 12

Map from Lockhart et al., 1996
Figures from Harlow et al., 1996
TILT DATA SET 2
(THROUGH JUNE 12)

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PPO tiltmeter, north side of volcano. Tiltmeters are sensitive to even slight changes in temperature, so burial 1 to 2 m deep is necessary in order to isolate the instrument from diurnal temperature changes.

UBO tiltmeter east side of Mount Pinatubo. No signs of ground cracking or faulting were observed in the rift area or the summit region during helicopter inspections between June 7 and 12.
Because of its elevation (4,392 m), relief, hydrothermal alteration, ice cap, glacier-fed radial valleys, and proximity to suburbs of the Seattle-Tacoma area, Mount Rainier is the most threatening volcano in the Cascades. Its next eruption could produce volcanic ash, lava flows, and avalanches of intensely hot rock and volcanic gases, called pyroclastic flows. Some of these events swiftly melt snow and ice and could produce torrents of meltwater that erode loose rock and become rapidly flowing slurries of mud and boulders known as lahars, which is the greatest risk at the volcano, rather than from an eruption itself.

http://volcanoes.usgs.gov/volcanoes/mount_rainier/mount_rainier_hazard_49.html

"We call it low probability, high consequence," says Steven Bailey, Pierce County, Washington's director of emergency management. "It's a low probability it's going to occur in our lifetime. But if and when it does, the consequences are going to be huge."

www.geographyalltheway.com/igcse_geography/natural_environments/plate_tectonics/igcse_volcanoes_manage.htm

The USGS has established an alert level system to communicate the likelihood of increasing or decreasing volcanic activity. Keep these alert levels in mind as you look through the geologic activity data attached.

### ALERT LEVELS

<table>
<thead>
<tr>
<th>ALERT LEVEL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NORMAL</strong></td>
<td>Volcano is in typical background, non-eruptive state or, if changing from a higher level: The activity has ceased and volcano has returned to non-eruptive background state.</td>
</tr>
<tr>
<td><strong>ADVISORY</strong></td>
<td>Volcano is exhibiting signs of elevated unrest above known background level; or, if changing from a higher level: Volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.</td>
</tr>
<tr>
<td><strong>WATCH</strong></td>
<td>Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR eruption is underway but poses limited hazards.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Hazardous eruption is imminent, underway, or suspected.</td>
</tr>
</tbody>
</table>


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