

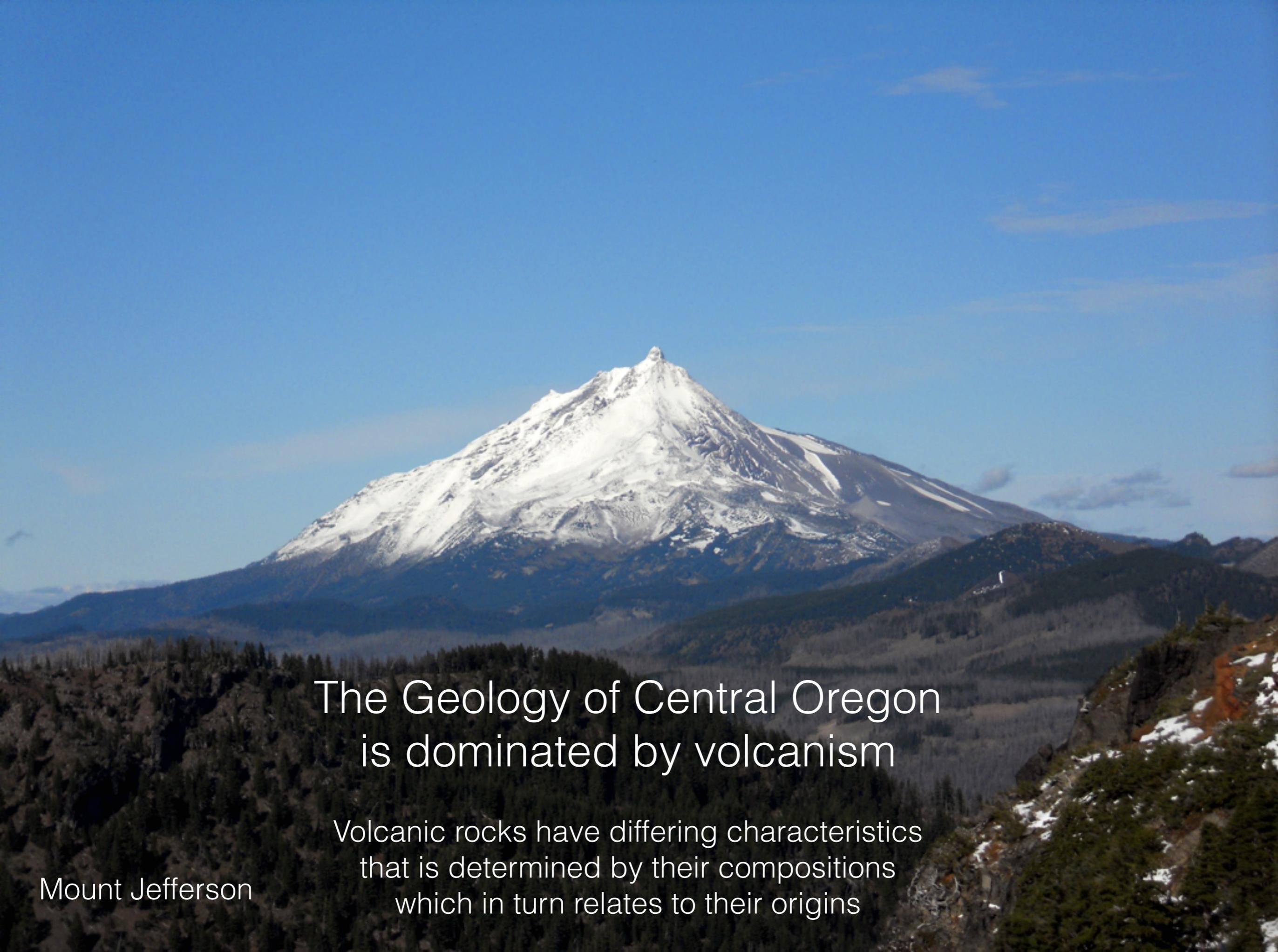
Common Rocks

of Central Oregon

PART I

and Their Origins





The Geology of Central Oregon is dominated by volcanism

Volcanic rocks have differing characteristics
that is determined by their compositions
which in turn relates to their origins

Mount Jefferson

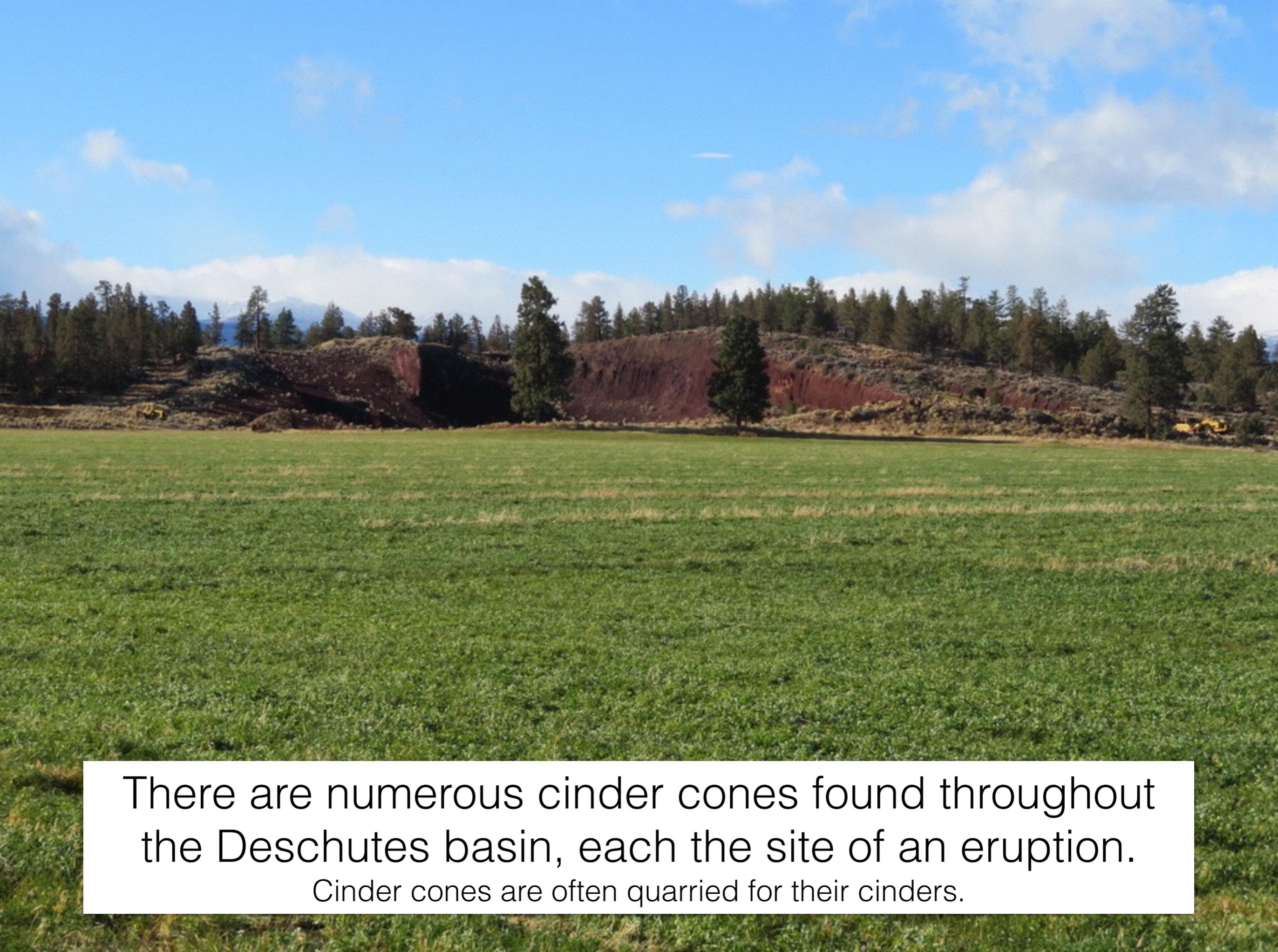


The Three Sisters
are majestic peaks, as are many of the Cascade volcanos.

Their form is due to the characteristics of the andesite lava that formed them.



The more subtle but none-the-less majestic Newberry Volcano with numerous cinder cones is a shield volcano composed of basalt lava flows.



There are numerous cinder cones found throughout the Deschutes basin, each the site of an eruption.

Cinder cones are often quarried for their cinders.



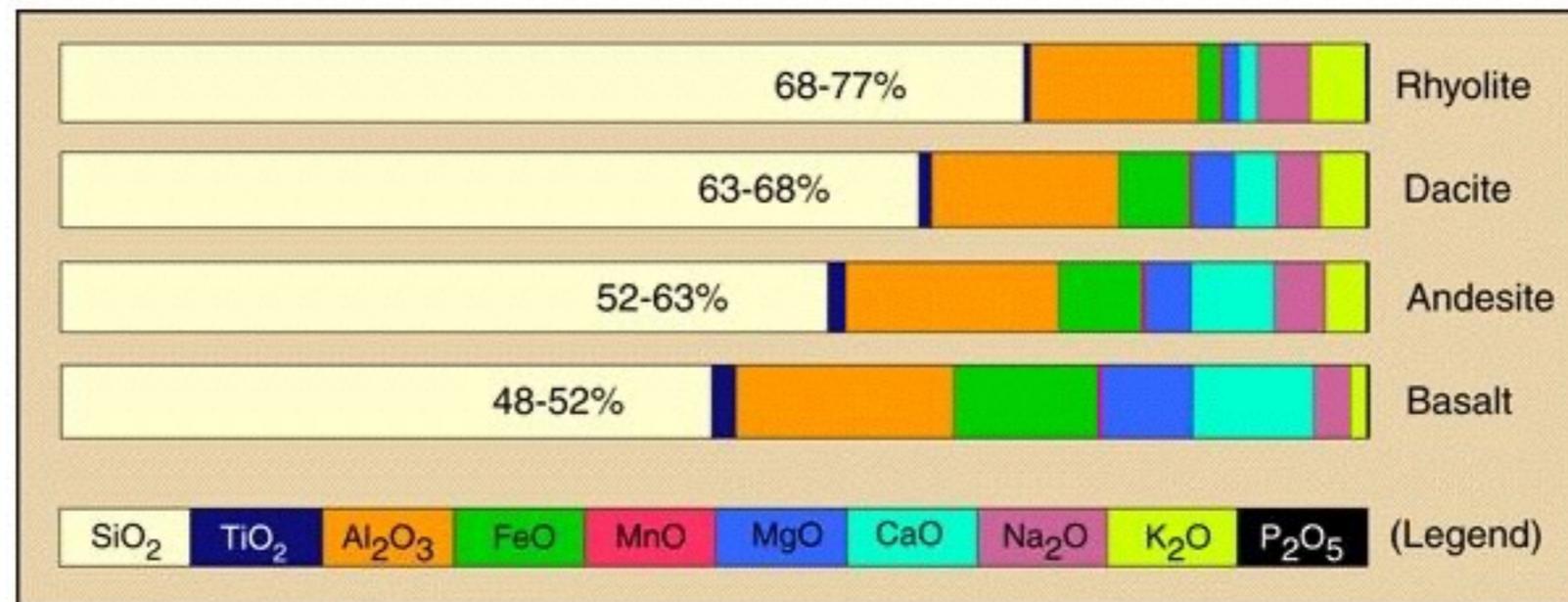
Smith Rock with Gray Butte in the background, along with Juniper Butte, Haystack Butte, Powell Butte, and Cline Buttes have volcanic origins distinctly different from that of the Cascades or Newberry. They are composed of rhyolite.



Volcanic activity produced the material that has filled
the Deschutes Basin.

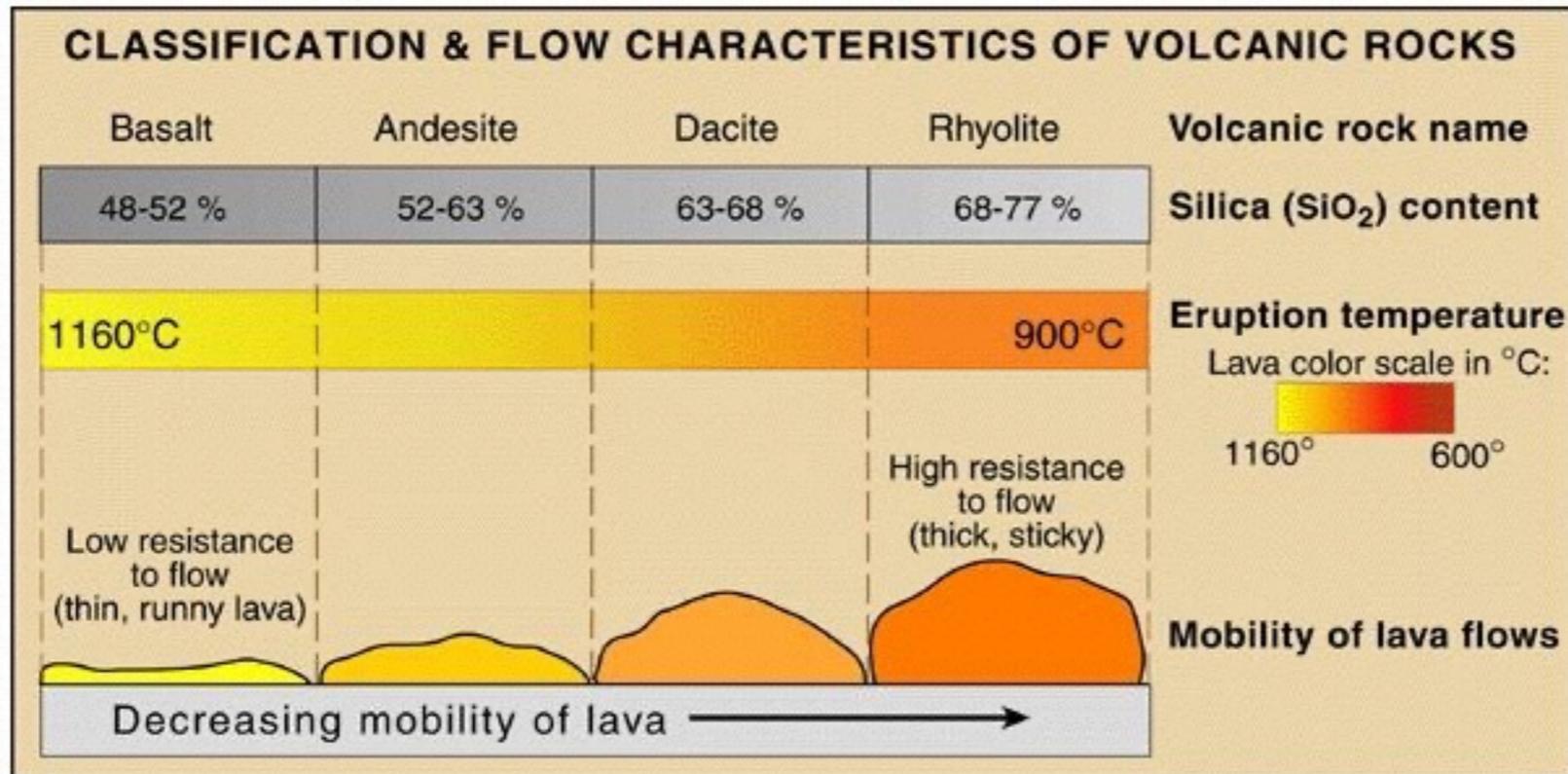
The sediments interbedded with the volcanics are derived directly from volcanic material that
has been eroded and redeposited by the Crooked and Deschutes Rivers.

The character and behavior of volcanic rocks is determined by their chemical composition.



Silica content is directly related to viscosity. Greater silica content relates to higher viscosity.

Iron and Magnesium content relates to color.

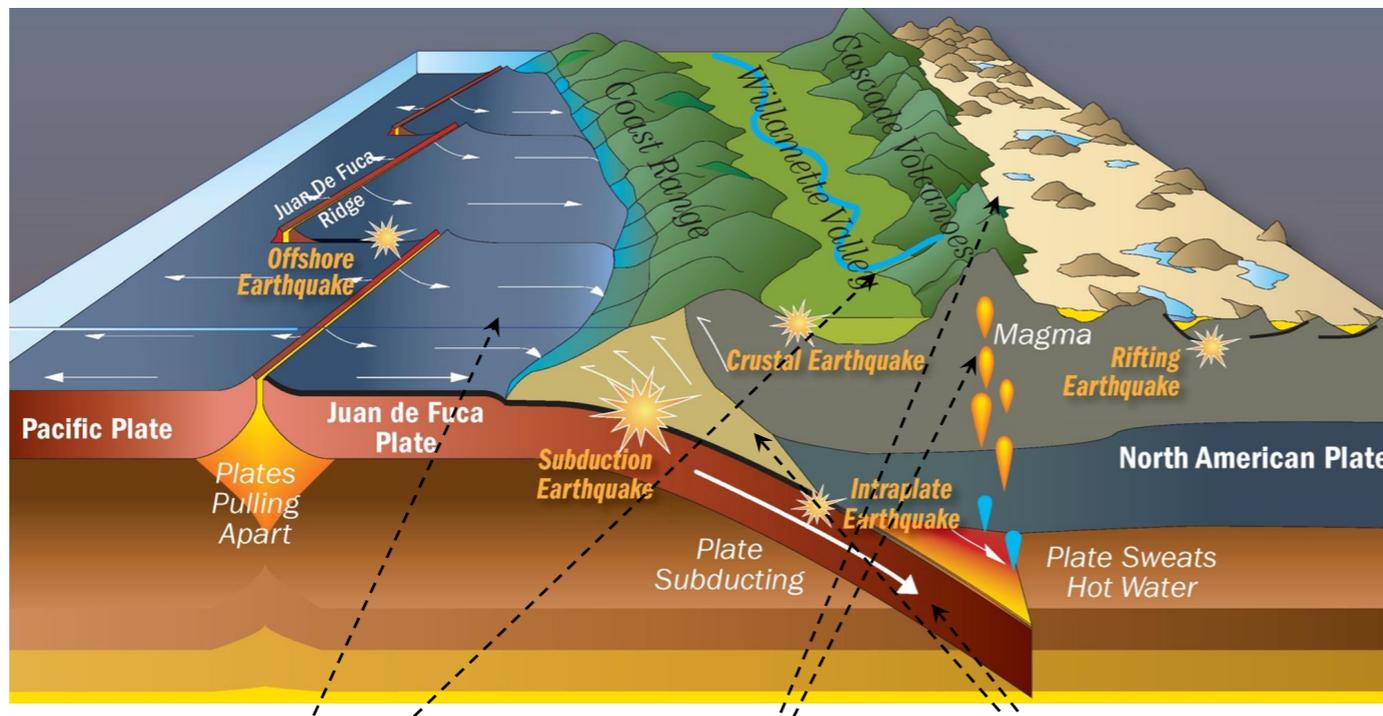


2120 F

1650 F

Lavas with lower silica content erupt at higher temperatures.

Tectonic diagram of the Pacific Northwest



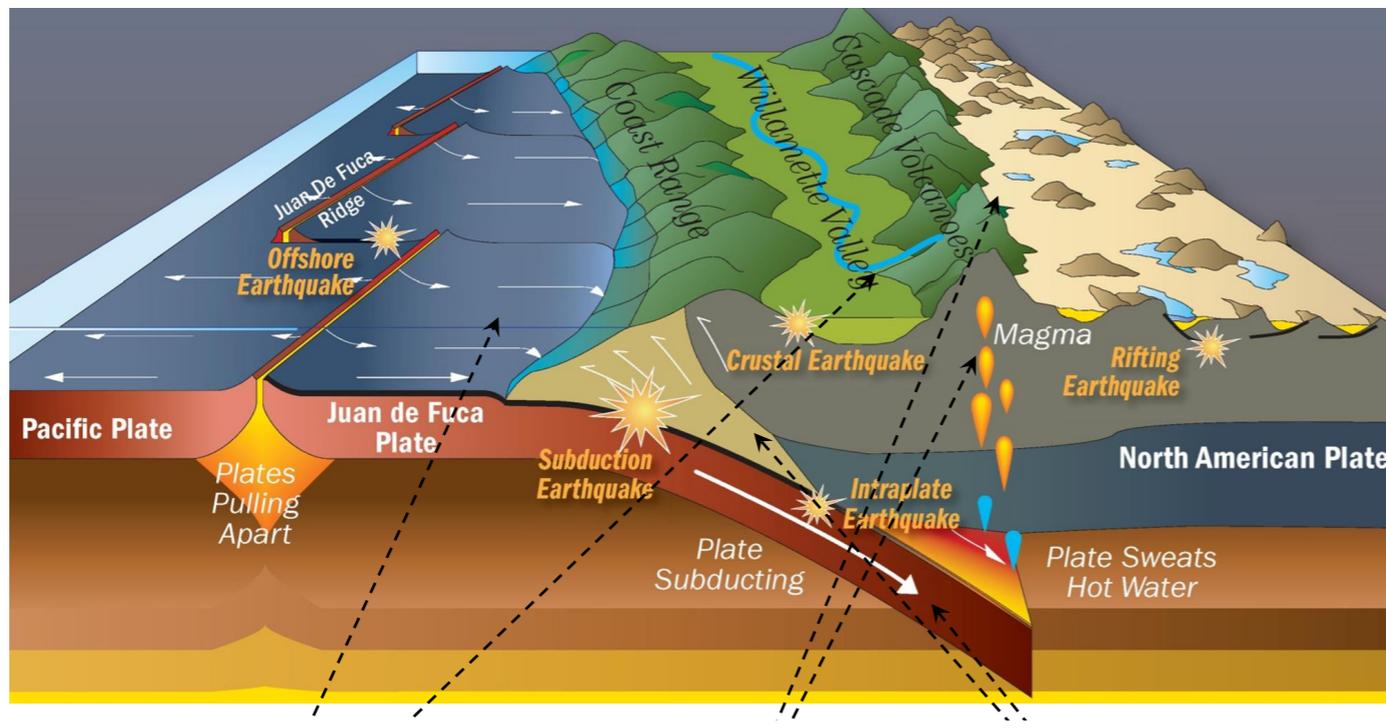
The Juan De Fuca Plate is subducting beneath the North American Plate.

As the oceanic plate descends, it heats and partially melts.

The molten material rises to the overlying continental plate.

The magma interacts with the crustal material as it moves toward the surface.

The resulting eruptions are predominantly andesite.



While we are here, let's have a look at the spreading center.

The Juan De Fuca and the Pacific Plates are forming at the spreading center.

As the Pacific Plate and the Juan De Fuca Plate move away from each other, magma rises from the mantle to fill the space.

The magma is basalt. The take away here is that basalt is derived from deep crustal and mantle sources.



Other important forces
at play in our region

Steens Mountain and Mann Lake

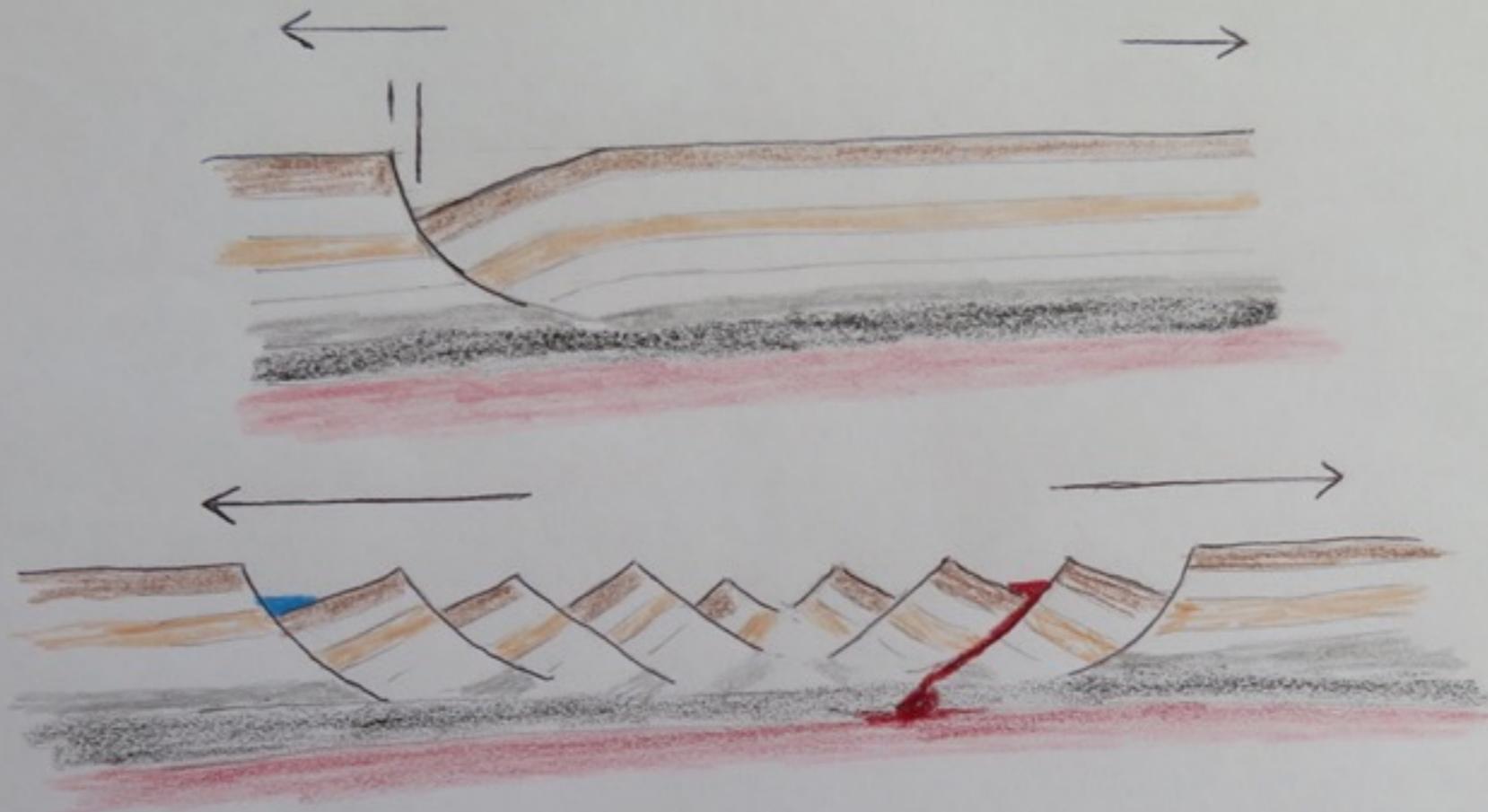
BLM photo

The Basin and Range as seen from space



NASA photo

The Basin and Range which lies to our south and east is characterized by generally north-south oriented mountain ranges with intervening basins. Extension of the crust in this region has resulted in these landforms.



Crustal Extension

Brittle rocks fracture when extended.

Further extension results in additional fracturing and faulting.

The resulting sawtooth topography forms basins and ranges.

Lakes may occupy the basins in areas with sufficient water e.g.

Klamath Lake, Goose Lake, Summer Lake, the Warner Lakes.

Fractures provide potential avenues for magma to reach the surface.



Crustal Extension

Extension effectively thins the crust.

Thinning brings the hot mantle closer to the surface.

The continuation of this process heats the crust, magma chambers form and crustal material melts bringing intense heat closer to the surface.

This process produces the most energetic and violent volcanic eruptions.

