

# Weathering





# Mechanical



# Chemical



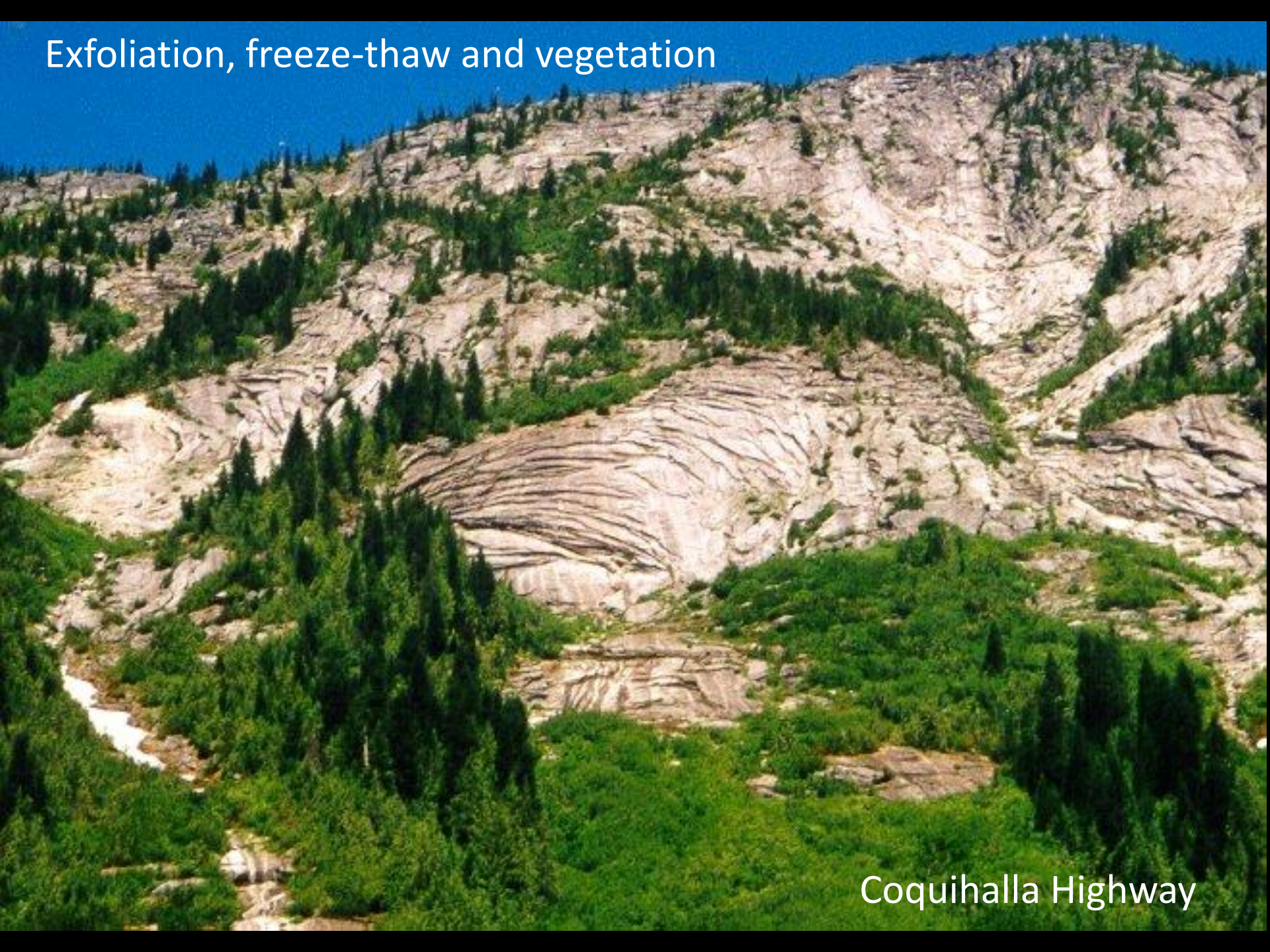
Types of mechanical weathering?



# **Mechanical weathering**


- 1) Freeze-thaw
- 2) Insolation (heating and cooling)
- 3) Pressure release (exfoliation)
- 4) Plants and animals
- 5) Abrasion (water, ice, wind)
- 6) Crystallization pressure

Exfoliation, freeze-thaw and vegetation



Coquihalla Highway



An aerial photograph of a massive landslide on a mountain slope. The upper portion of the image shows a steep, rocky cliff face with distinct horizontal geological layers. Below the cliff, a vast area of the slope is covered in a thick layer of dark, greyish-brown debris, likely composed of rock fragments and soil. This debris field extends down the slope, interspersed with patches of green vegetation. In the lower right, there are more prominent, lighter-colored rock outcrops. The overall scene illustrates the scale of the landslide and the geological features involved.

Exfoliation |(leading to major  
slope failure) and freeze-thaw

Hope Slide



## Freeze-thaw and vegetation



The Barrier, Hwy. 99



# Freeze-thaw and vegetation



Mt. St. Helens



# Vegetation



Ohia tree, Big Island, Hawaii









Water and wind abrasion and freeze-thaw



Colorado River, Page, Arizona



Wind abrasion and freeze-thaw



Page, Arizona



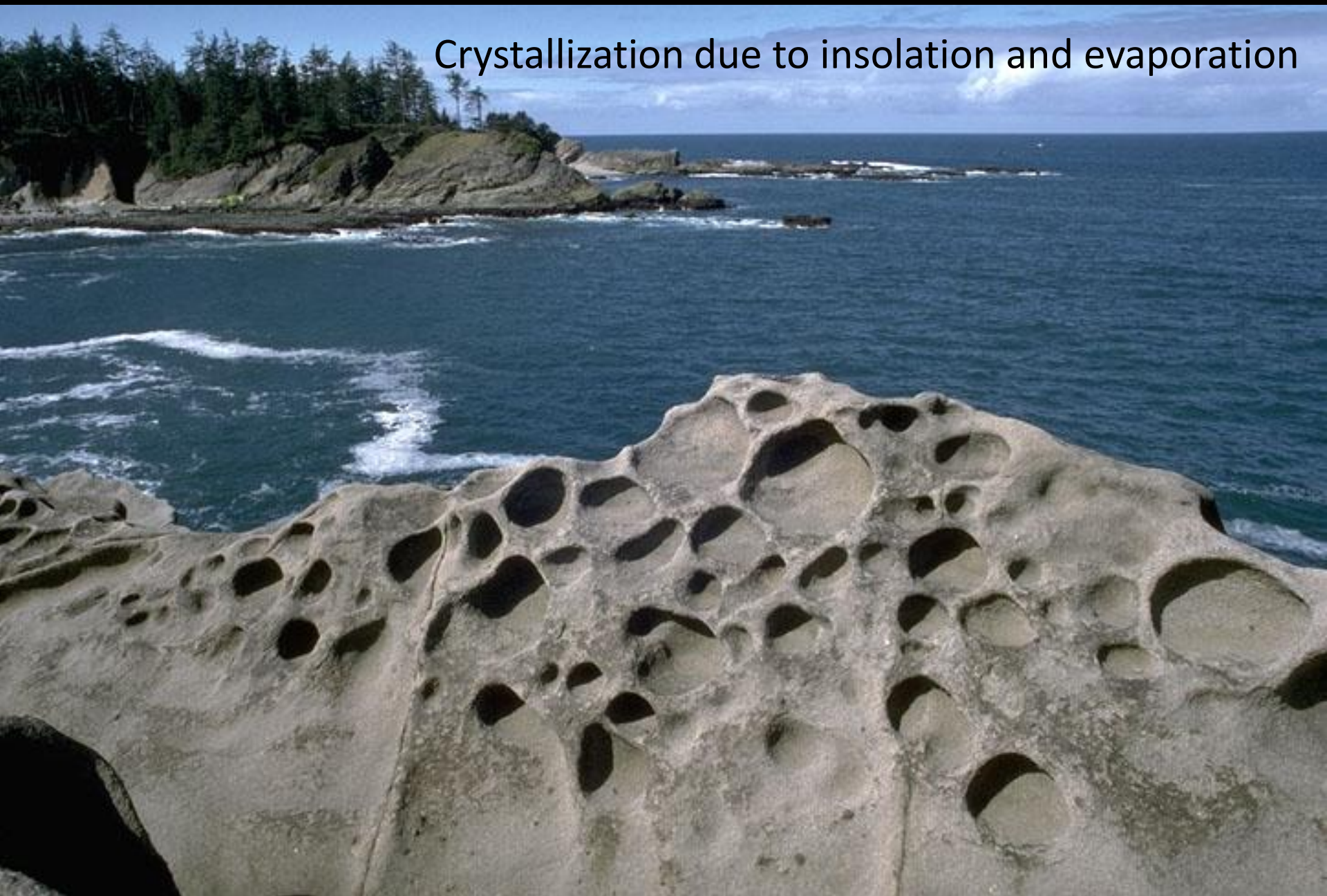
Ice abrasion and wave action



Victoria



Crystallization due to insolation and evaporation







Insolation,  
evaporation and  
crystallization

Moenkopi Fm.,  
Arizona



# **Chemical weathering**

1) Dissolution

2) Hydration

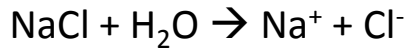
2) Hydrolysis

3) Oxidation

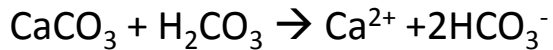


# Four main processes of chemical weathering

## Dissolution



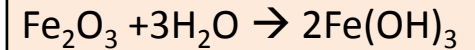
Halite



Calcite



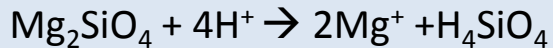
## Hydration



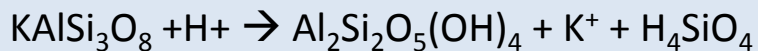
Hematite

Limonite

## Hydrolysis

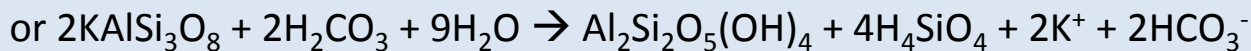


Olivine

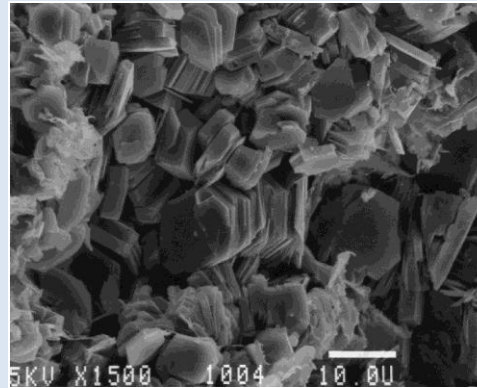


K-feldspar

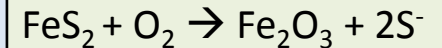
Kaolinite



Carbonic acid ( $\text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{H}_2\text{CO}_3$ )



## Oxidation



Pyrite

Hematite





Kaolinite

Illite-smectite

4FM

20KV

17

026

S



**What are the factors that control the rate of weathering at any one location or during a period of geological time?**