Sedimentary rocks

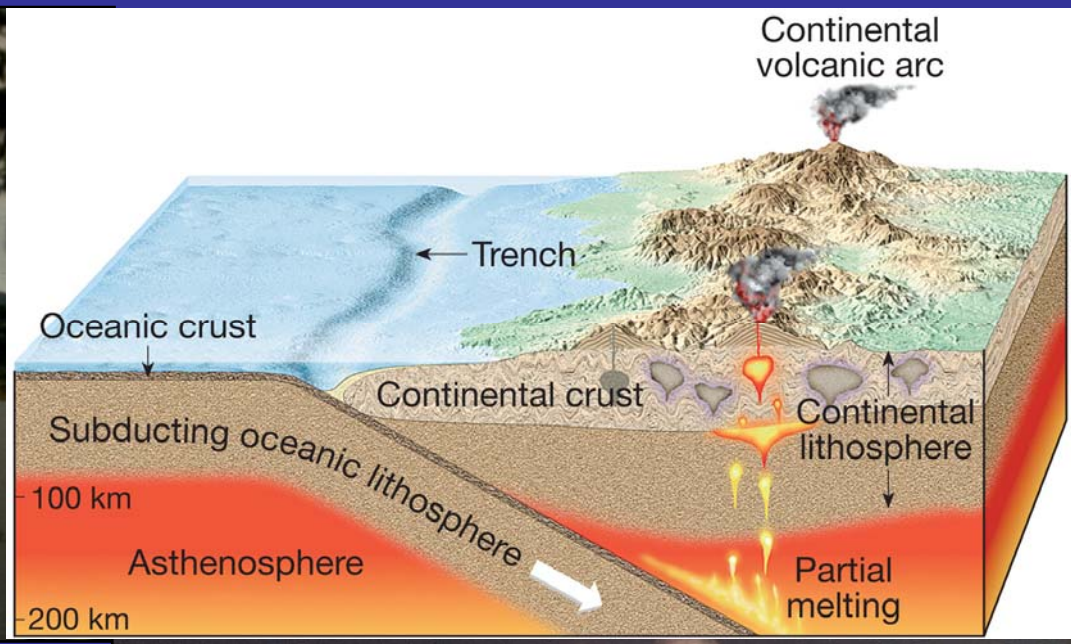


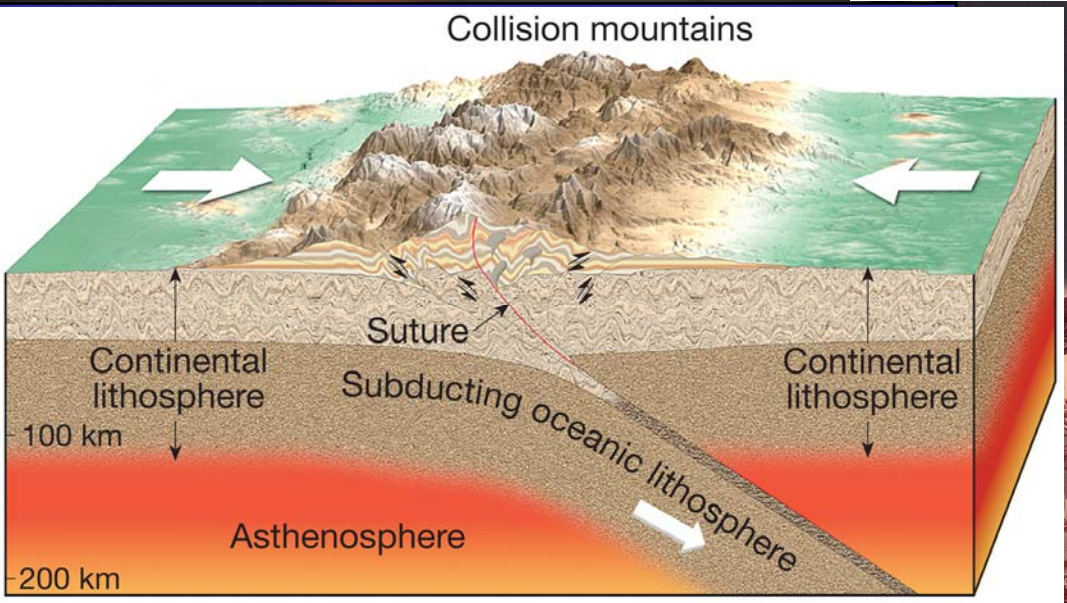
What processes cause mountain-building?








Continental volcanic arc
Trench
Oceanic crust
Continental crust
Continental lithosphere
Subducting oceanic lithosphere
100 km
Asthenosphere
Partial melting
200 km


Collision mountains
Suture
Continental lithosphere
Subducting oceanic lithosphere
Continental lithosphere
100 km
Asthenosphere
200 km











What processes cause mountain destruction?





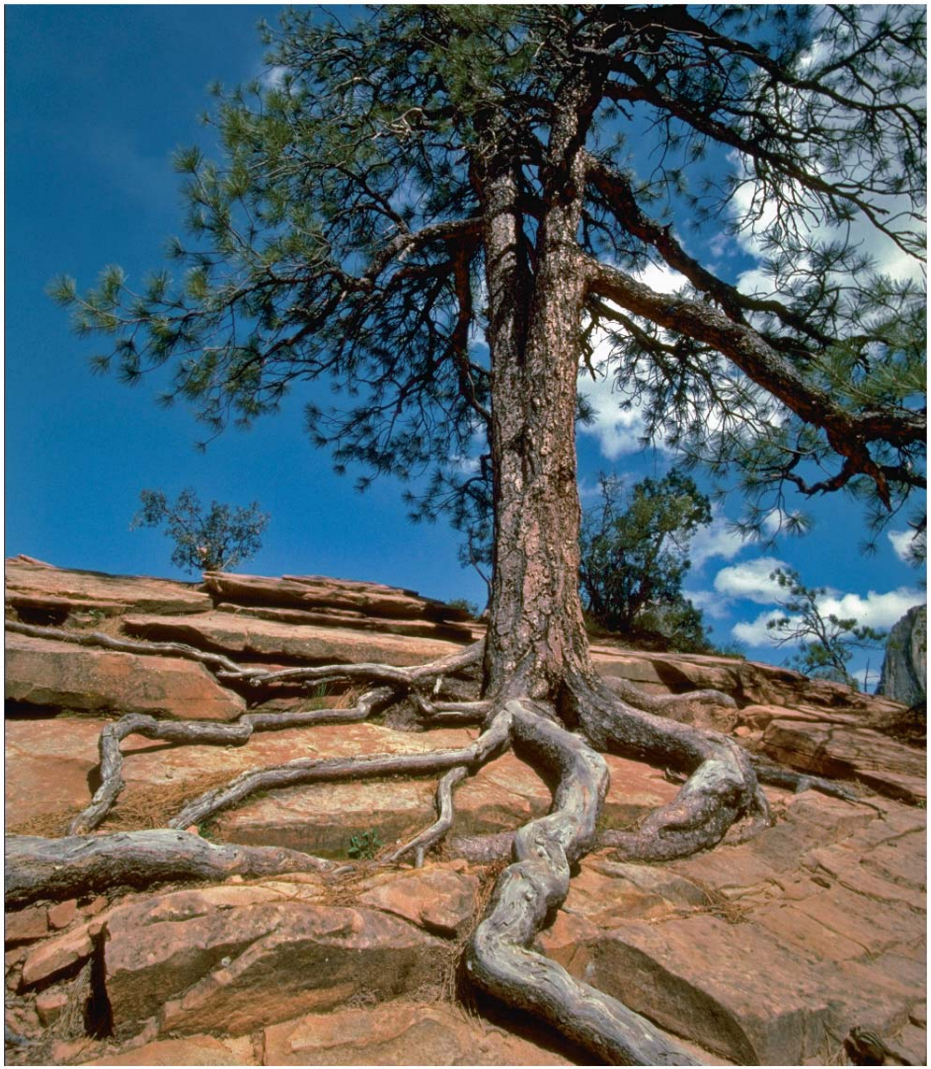


Weathering – **disintegration** and **decomposition** of rocks at or near Earth's surface

Mass Wasting – the transfer of rock and soil downslope under the influence of gravity

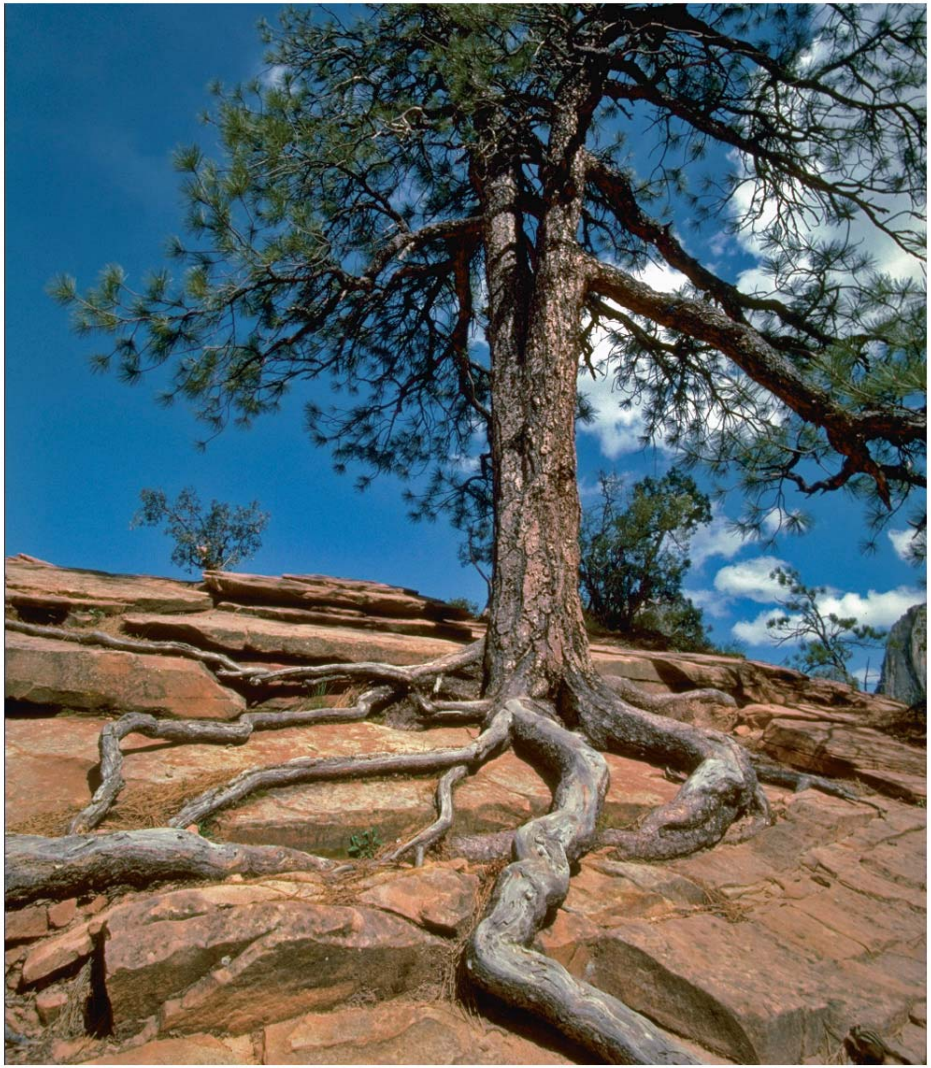
Erosion – the physical removal of material by mobile agents such as water, wind, or ice

physical breakdown **chemical alteration**





Mechanical
physical breakdown



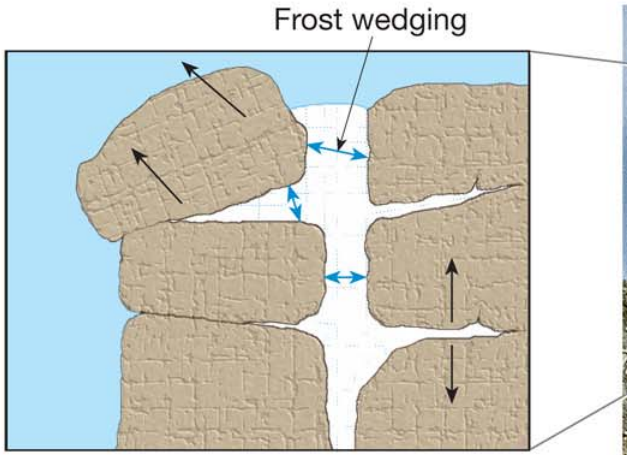
Chemical
chemical alteration

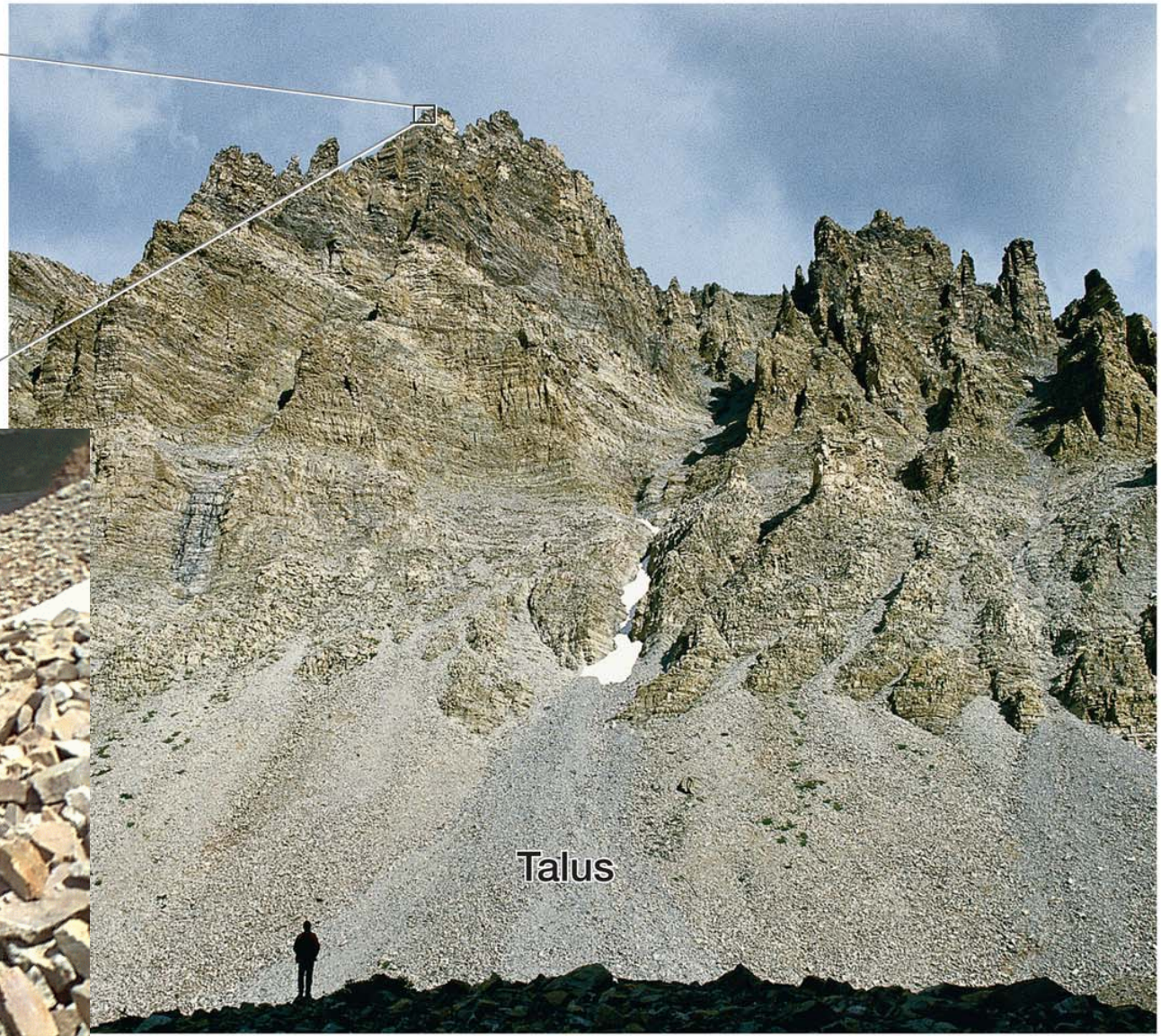



COKE

Antarctica





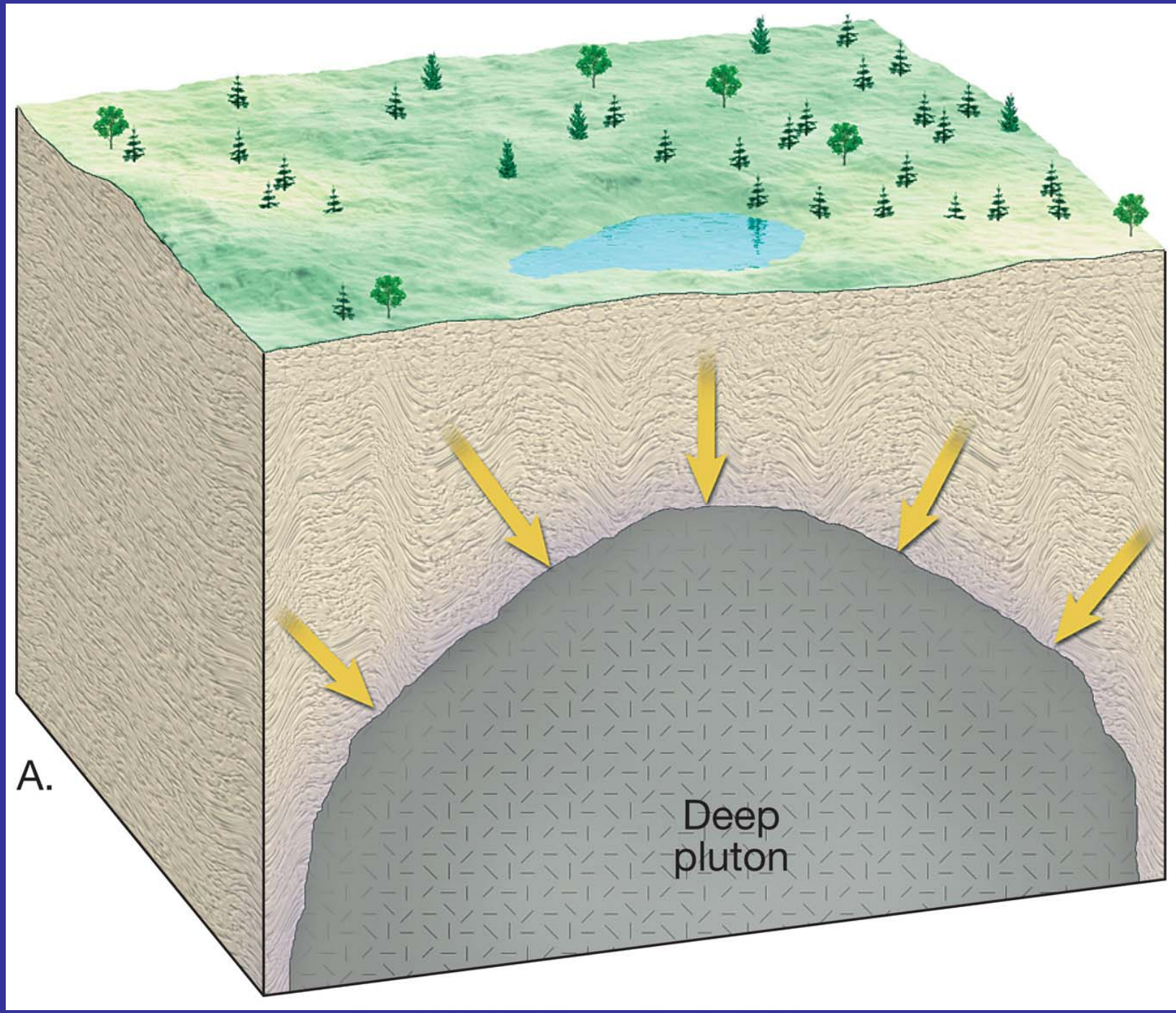




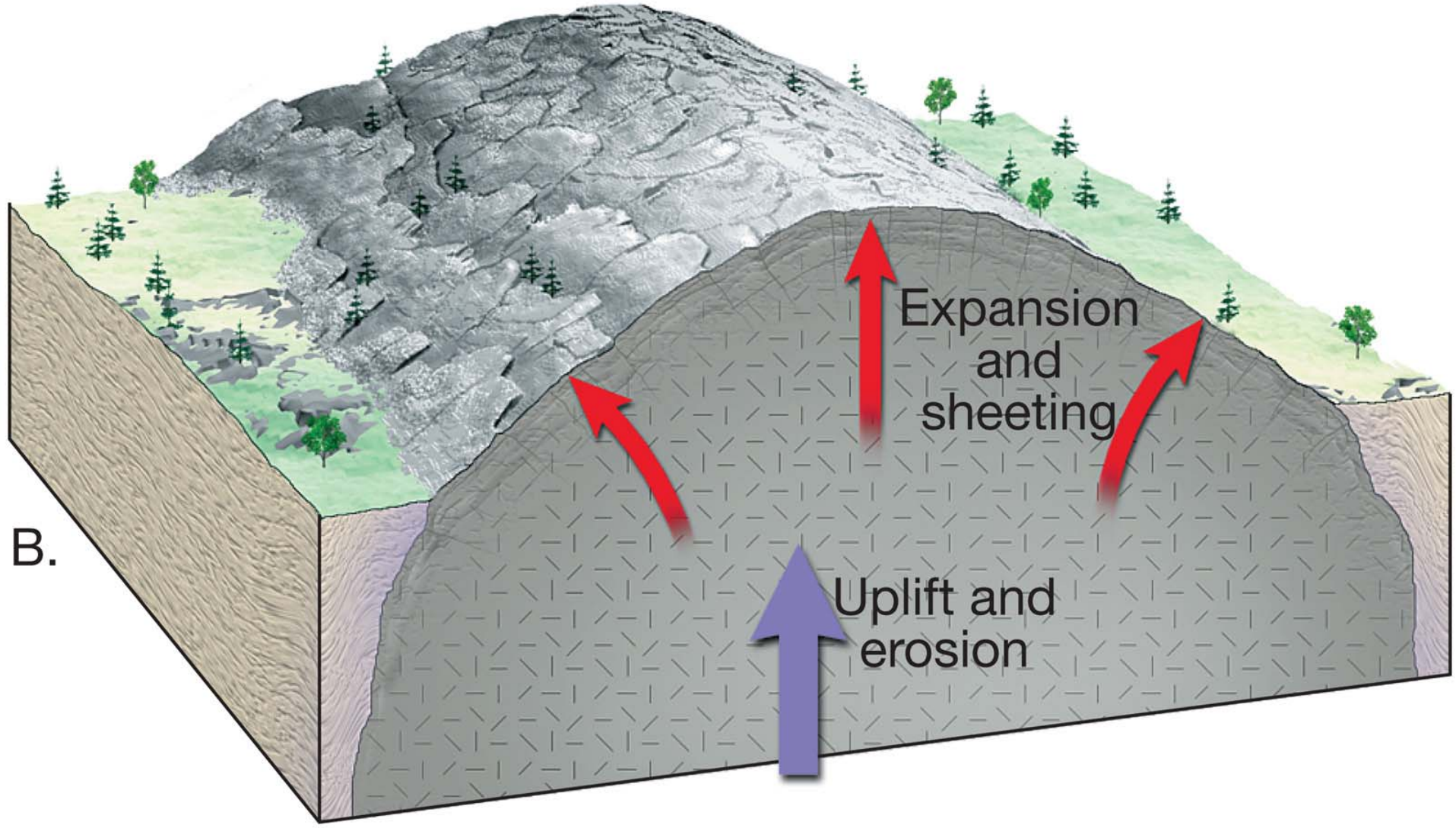
Frost wedging






A.
Deep
pluton

Unloading











Biological Activity

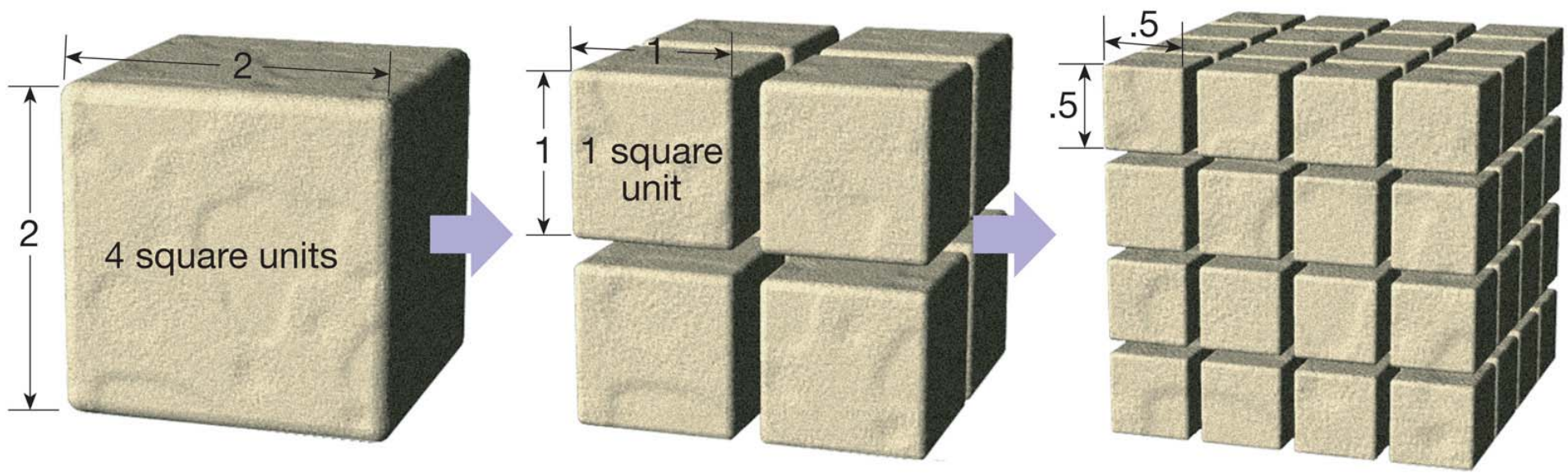


How is the rock's exposed surface area changing?









4 square units ×
6 sides ×
1 cube =

24 square units

1 square unit ×
6 sides ×
8 cubes =

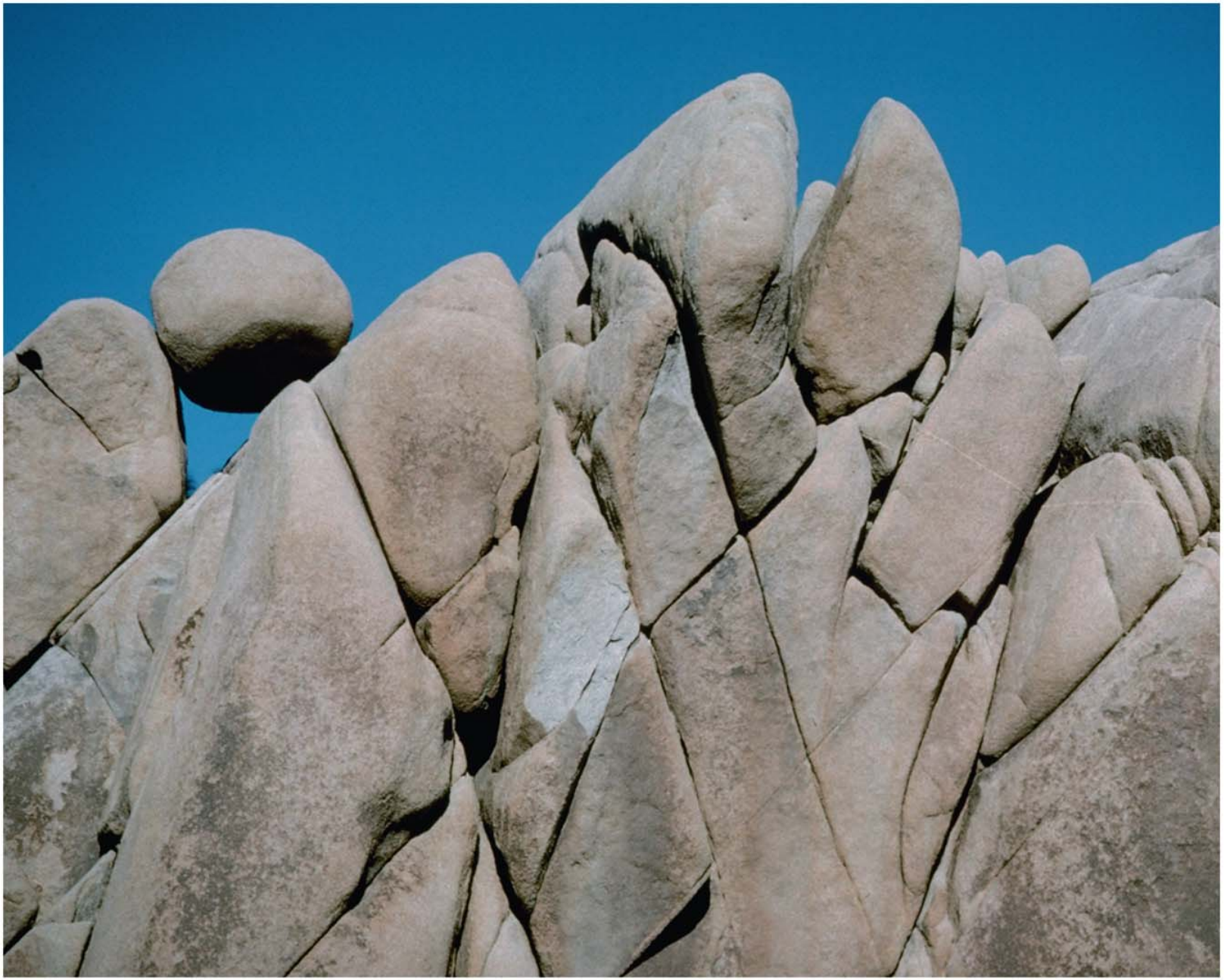
48 square units

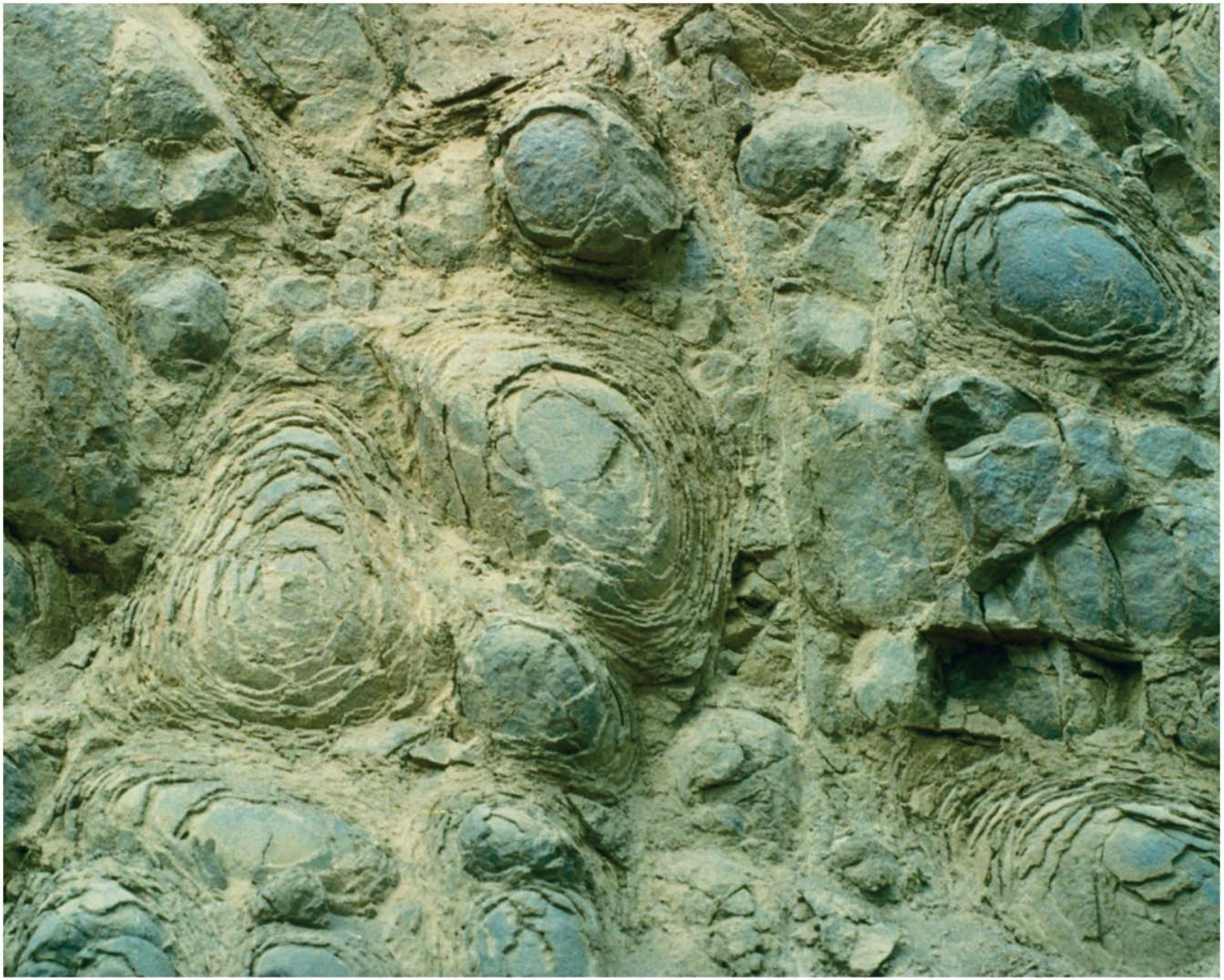
.25 square unit ×
6 sides ×
64 cubes =

96 square units

Surface area increased: ….x2……..x4

What part of cube is weakest?





Mechanical weathering (physical breakdown)

1. Frost wedging



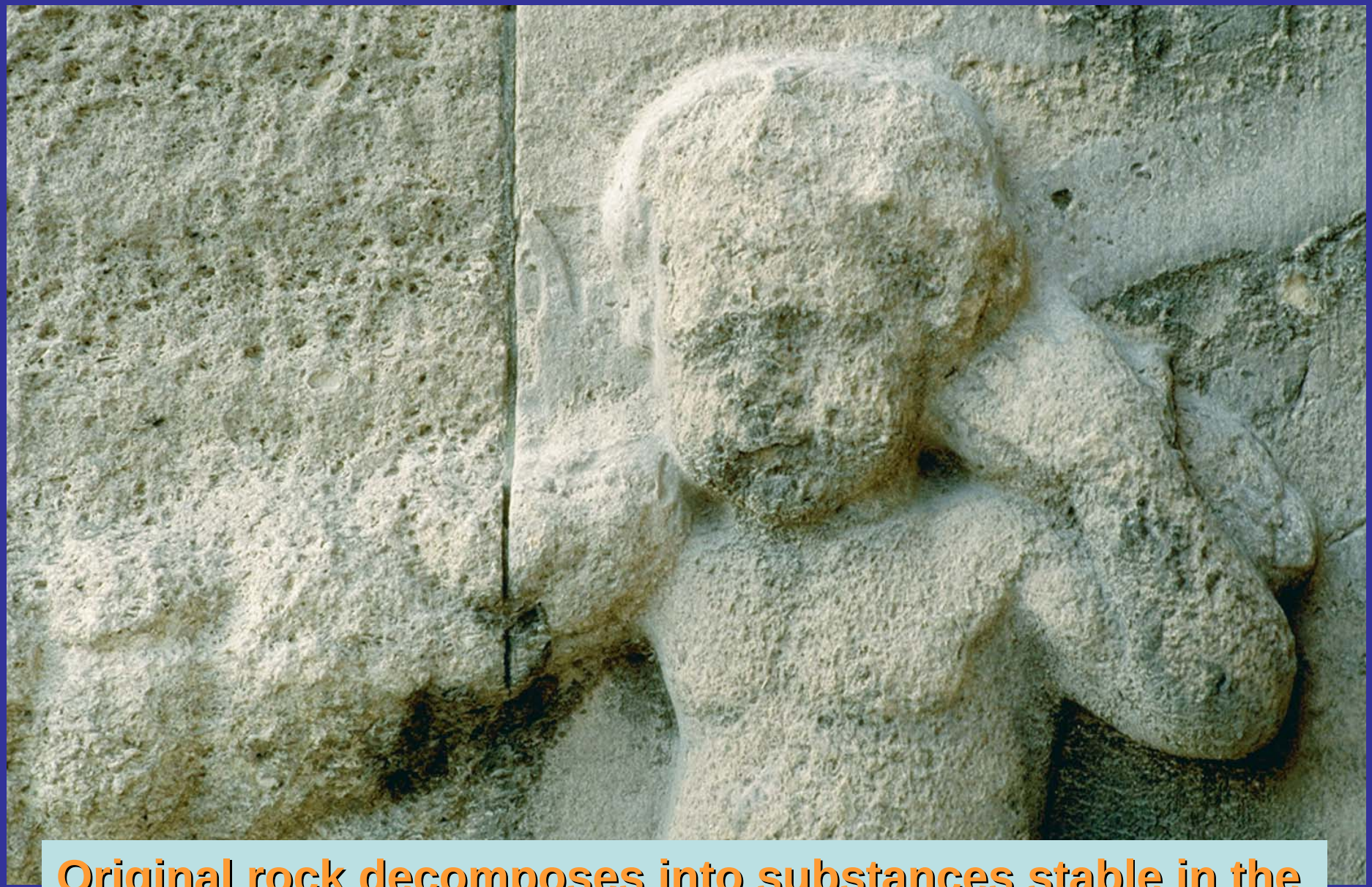
2. Unloading



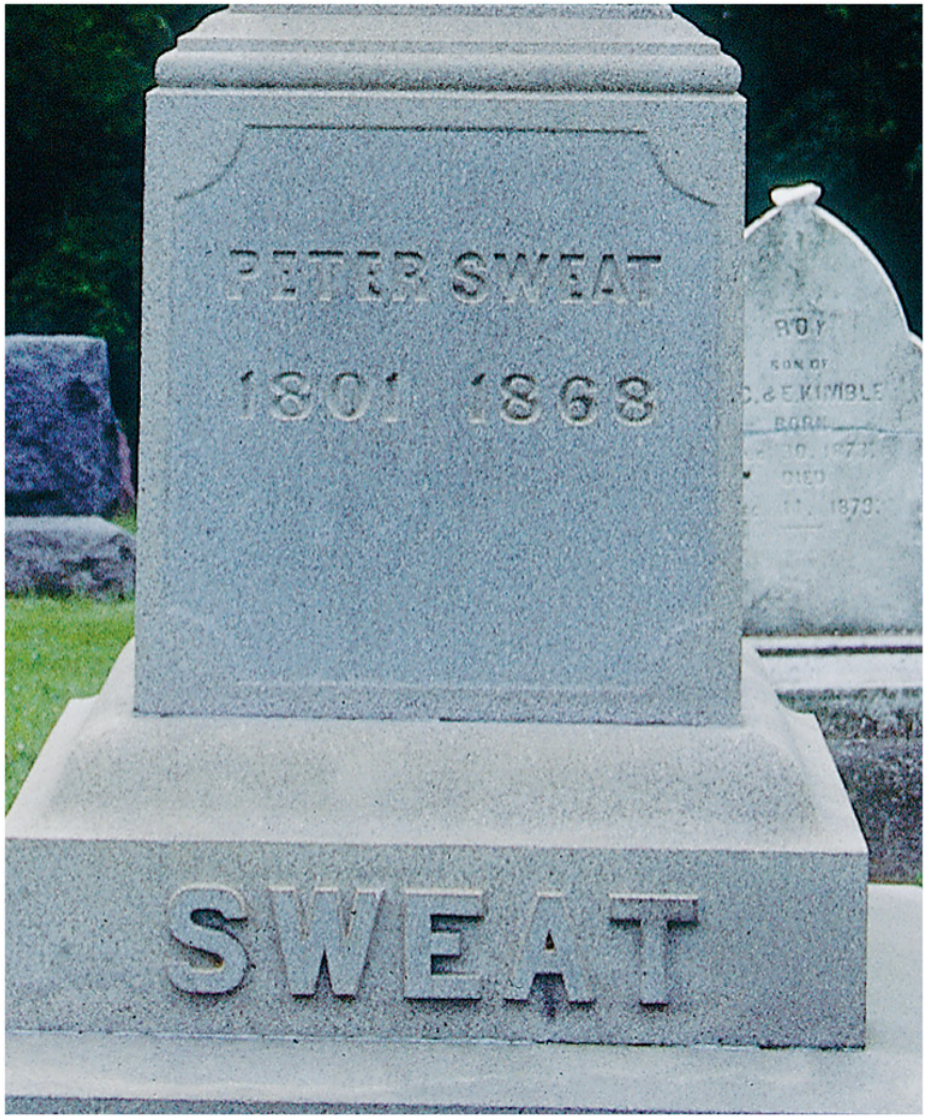
3. Biological Activity



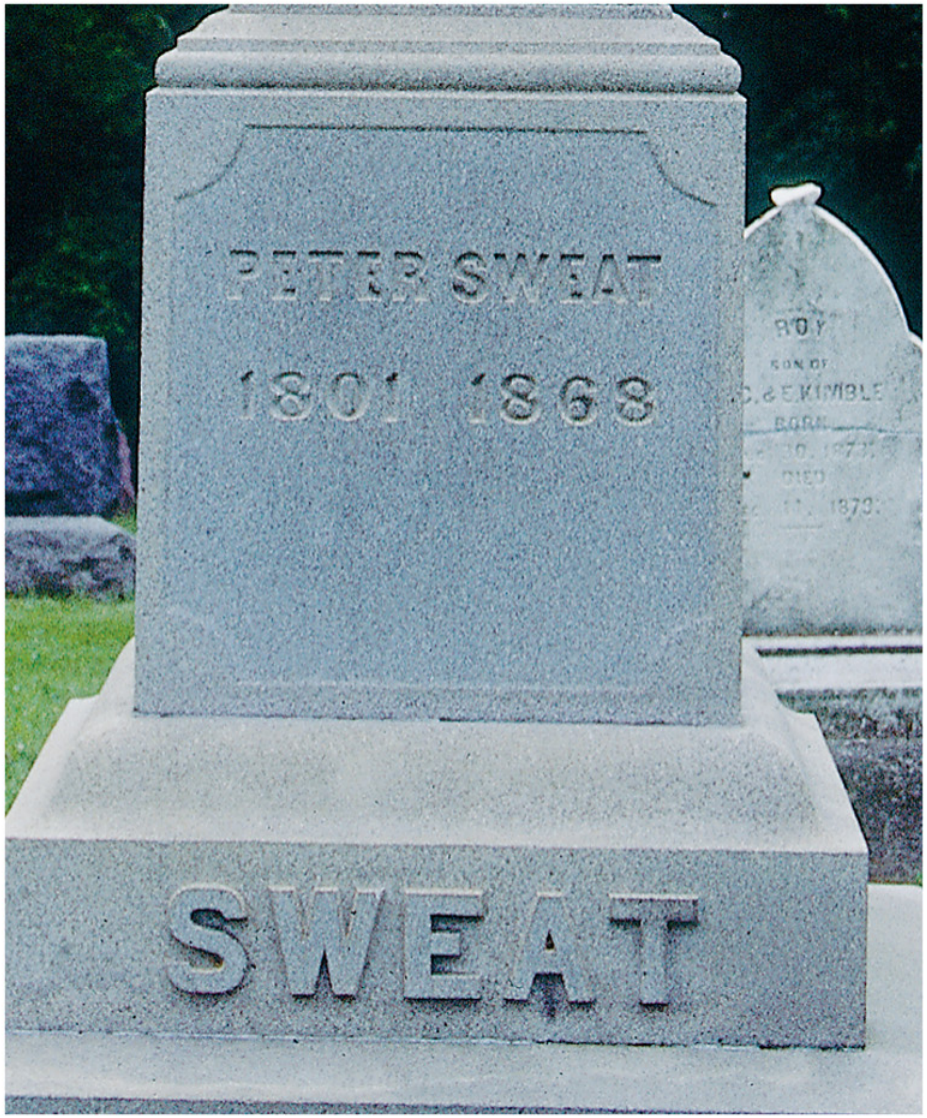
Chemical alteration



Original rock decomposes into substances stable in the surface environment.


PETER SWEAT
1801 1868
SWEAT







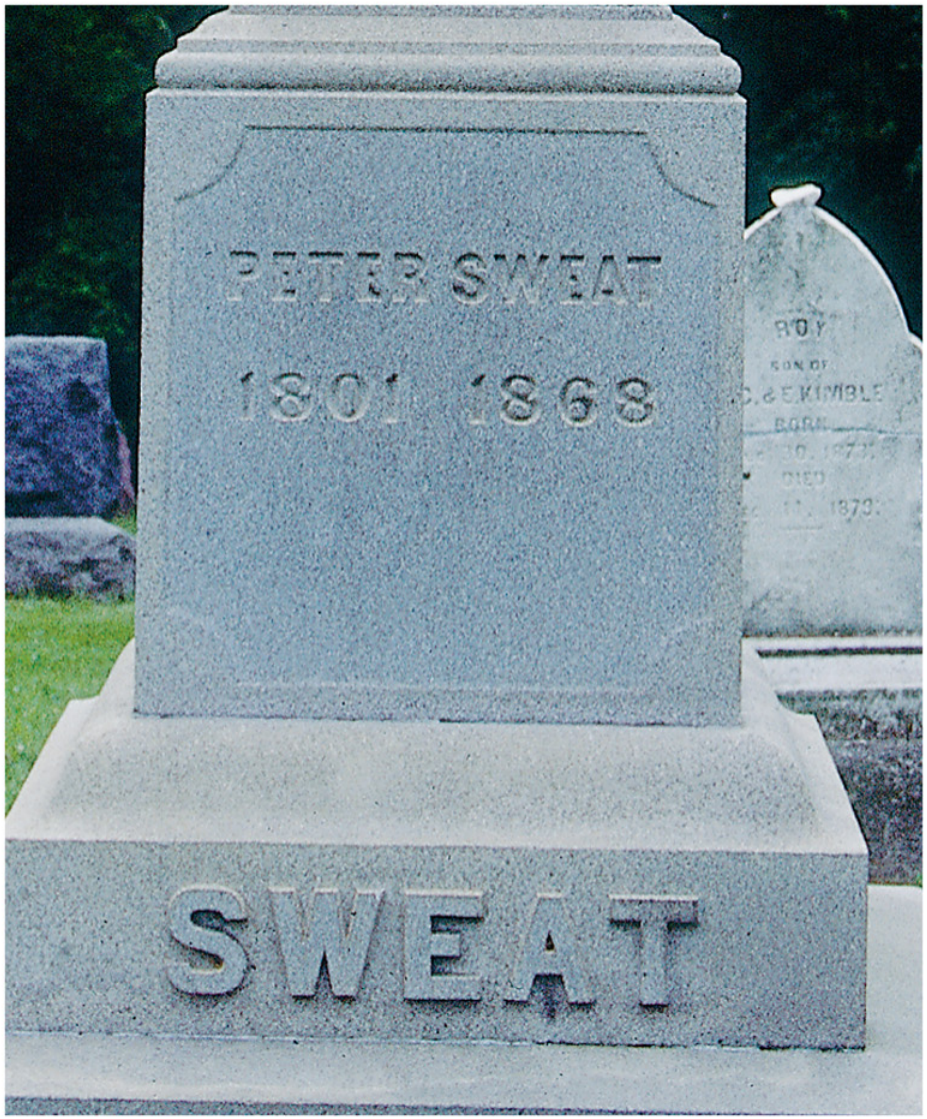
1868

1872



Monument Valley, Arizona

Different rocks weather at different rates





Granite

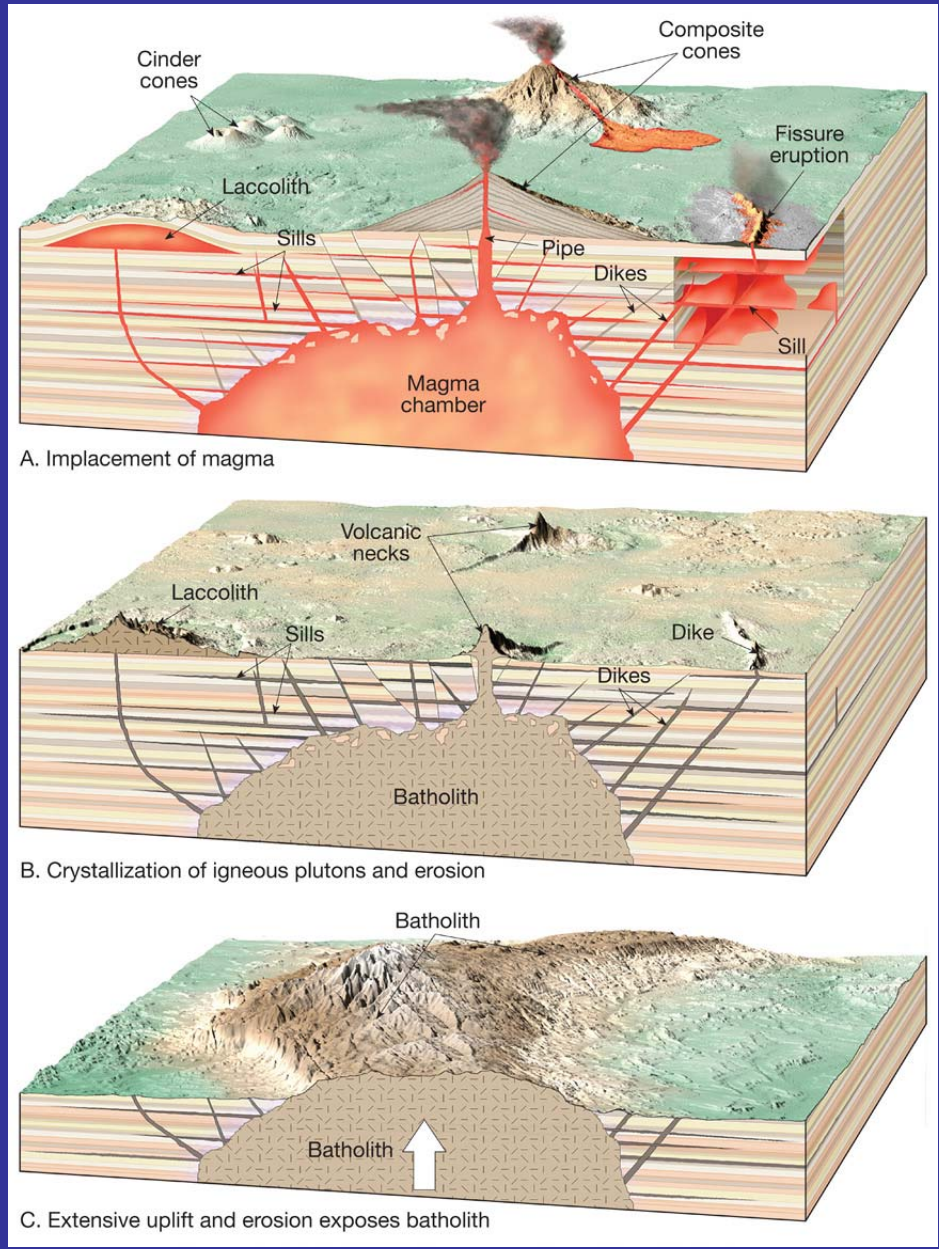
Marble

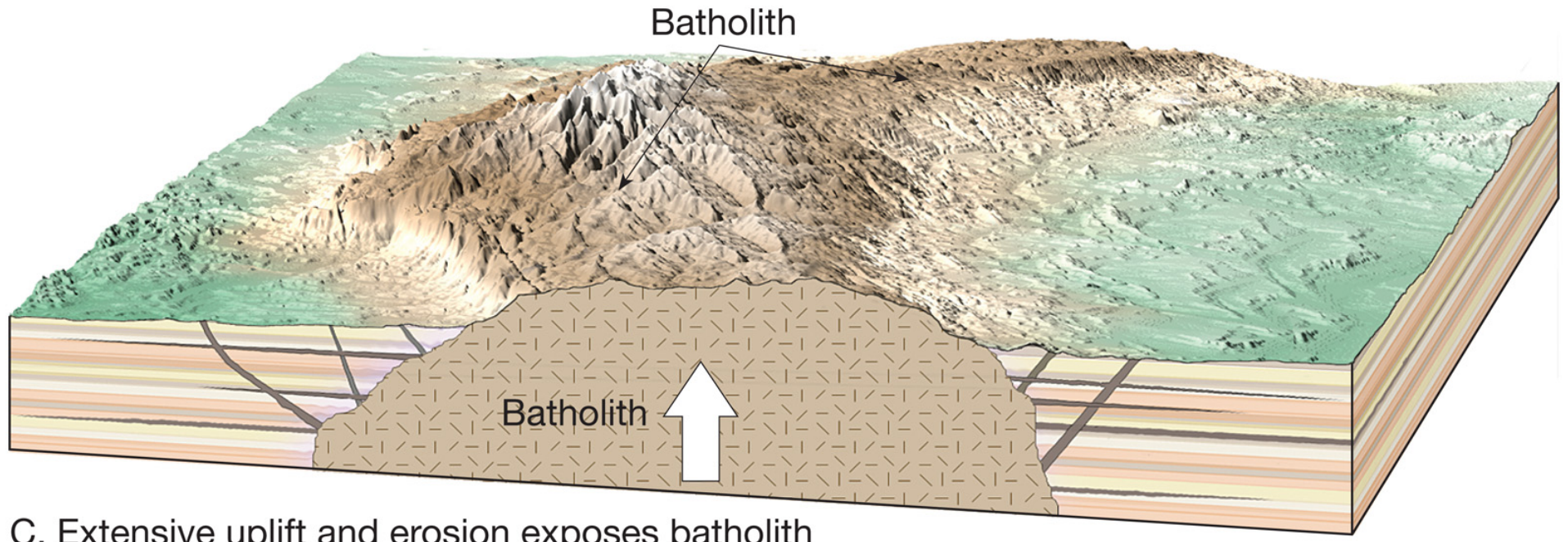
What is the most common continental rock type?



Locations of world's volcanoes (on land)

What is the most common continental rock type?

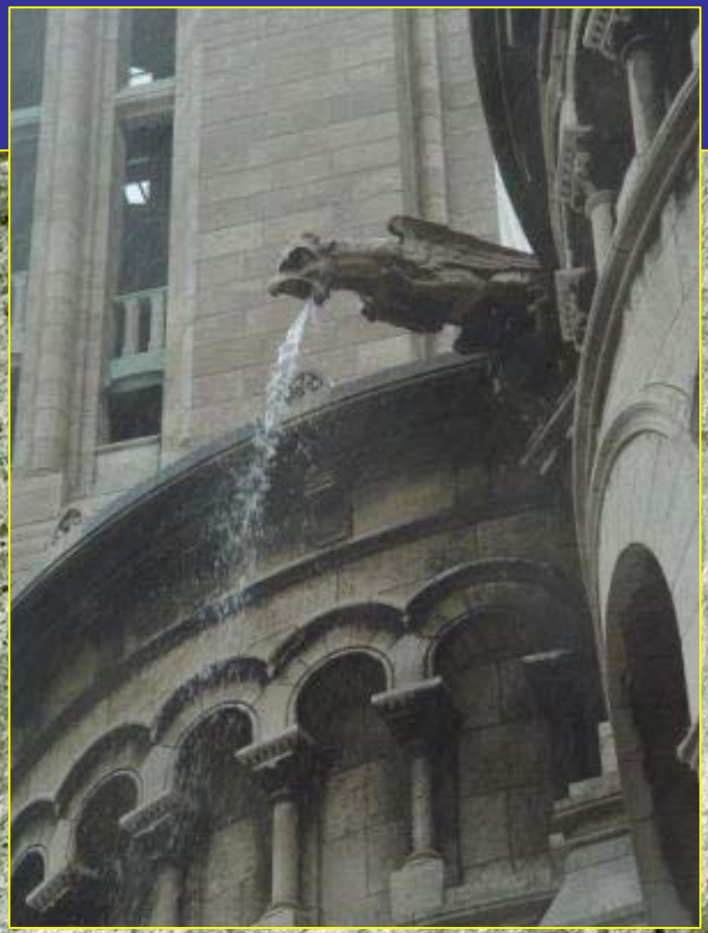




C. Extensive uplift and erosion exposes batholith



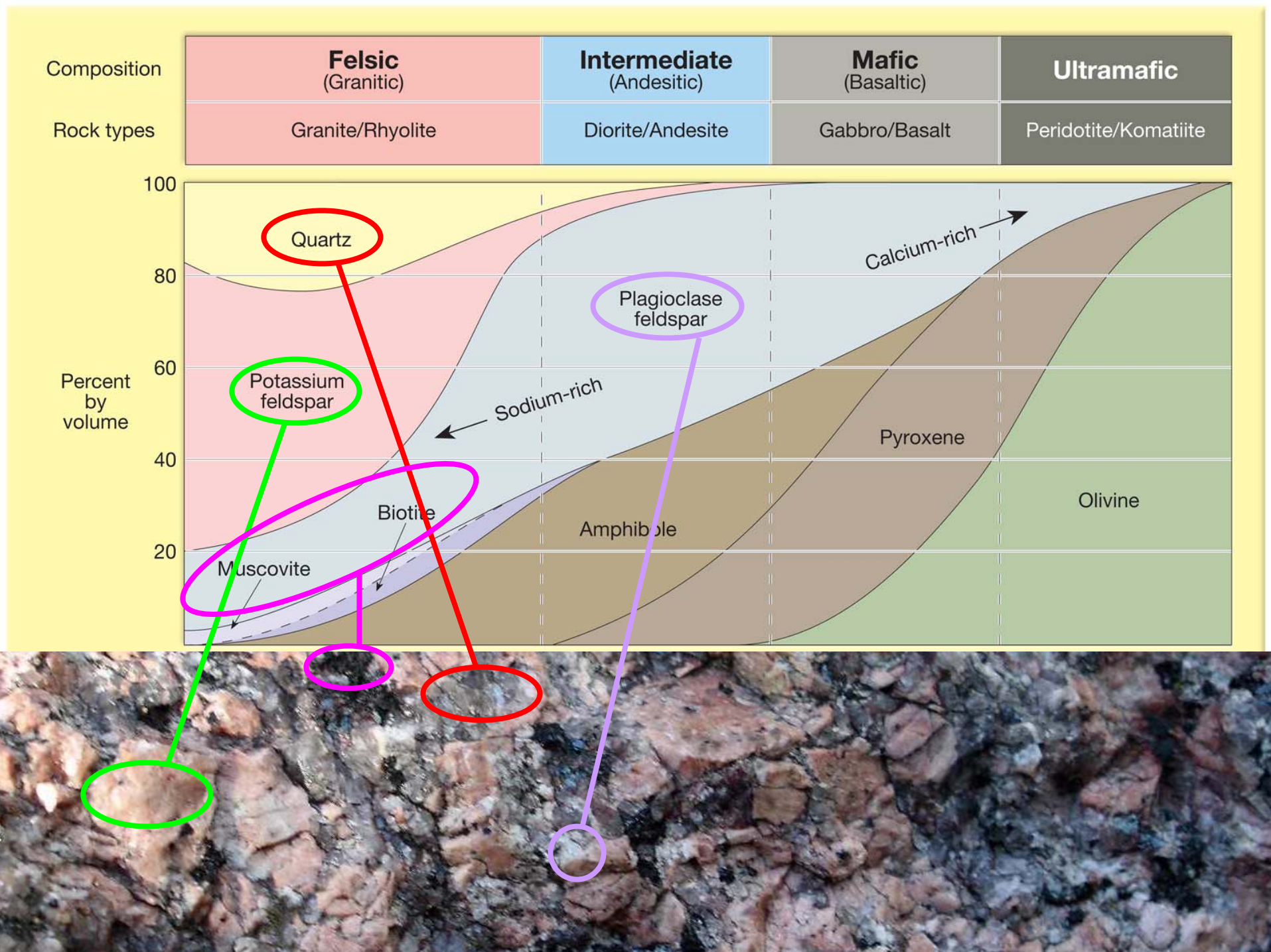
What is the eroding agent?





$$CO_2 + H_2O = H_2CO_3 \rightarrow H^+ + HC0_3^-$$

carbonic acid


Composition
Felsic
(Granitic)
Intermediate
(Andesitic)
Mafic
(Basaltic)
Ultramafic
Rock types
Granite/Rhyolite
Diorite/Andesite
Gabbro/Basalt
Peridotite/Komatiite
Percent by volume
100
80
60
40
20
Quartz
Potassium feldspar
Plagioclase feldspar
Sodium-rich
Calcium-rich
Biotite
Muscovite
Amphibole
Pyroxene
Olivine

$$2\ KAlSi_3O_8 + 2(H^+ + HCO_3^-) + H_20$$

potassium
feldspar

$$2\,KAlSi_3O_8 + 2(H^+ + HCO_3^-) + H_20$$

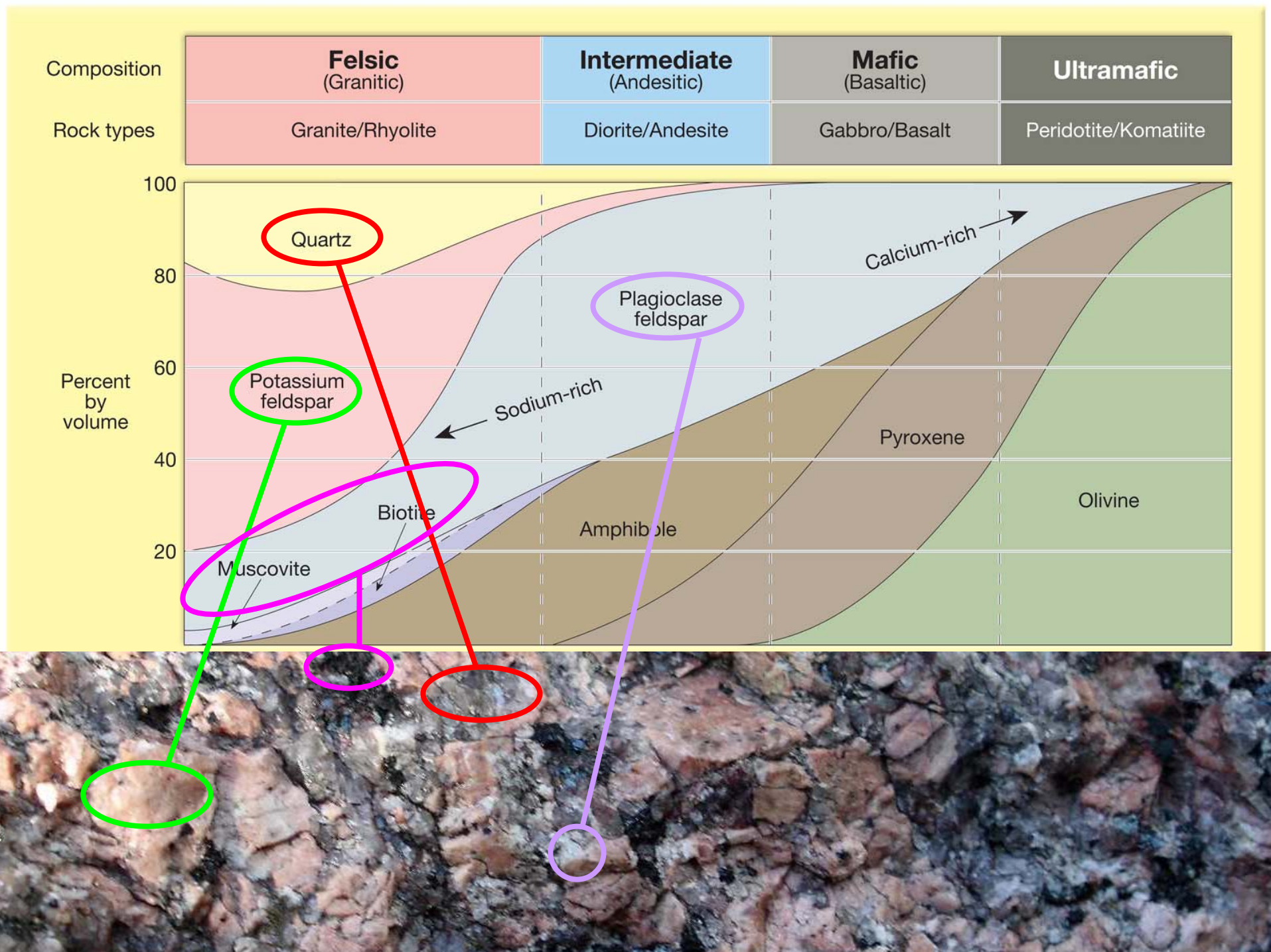
potassium feldspar | carbonic acid | water

$$Al_2Si_2O_5(OH)_4 + 2K^+ + 2HCO_3^- + 4SiO_2$$

clay mineral | potassium ion | bicarbonate ion | silica ion

in solution




Composition
Felsic
(Granitic)
Intermediate
(Andesitic)
Mafic
(Basaltic)
Ultramafic
Rock types
Granite/Rhyolite
Diorite/Andesite
Gabbro/Basalt
Peridotite/Komatiite
Percent by volume
100
80
60
40
20
Quartz
Potassium feldspar
Plagioclase feldspar
Sodium-rich
Calcium-rich
Biotite
Muscovite
Amphibole
Pyroxene
Olivine




GPSmap 76S
GARMIN

