

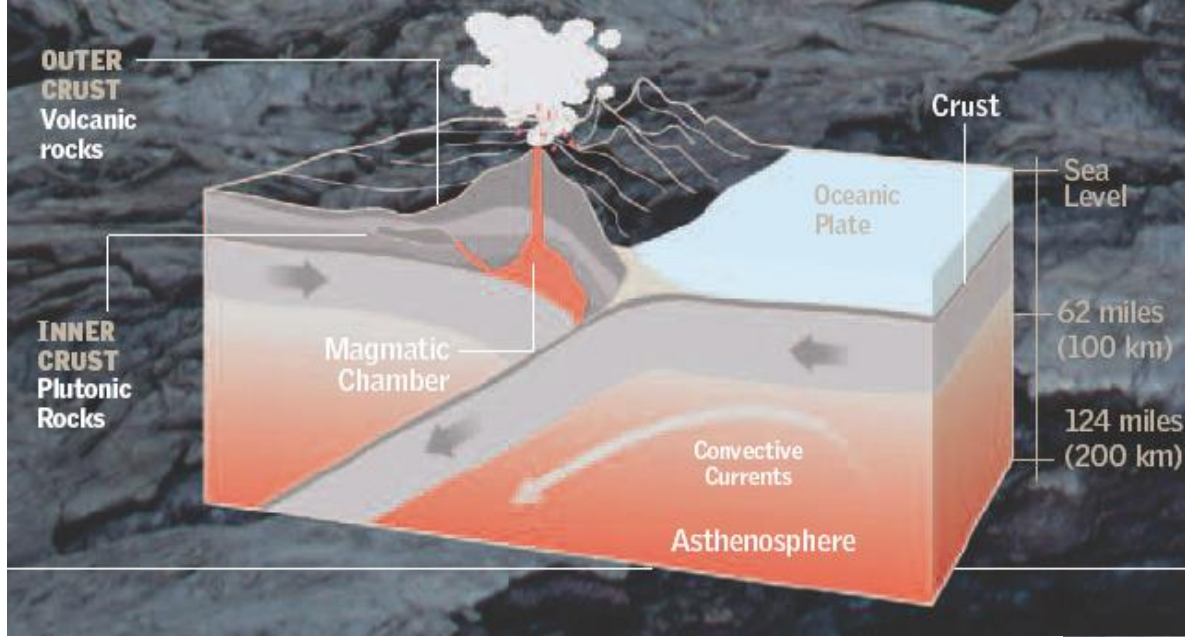
JFM319
Mühendislik Jeolojisi
Giriş

Dr.Koray ULAMIŞ

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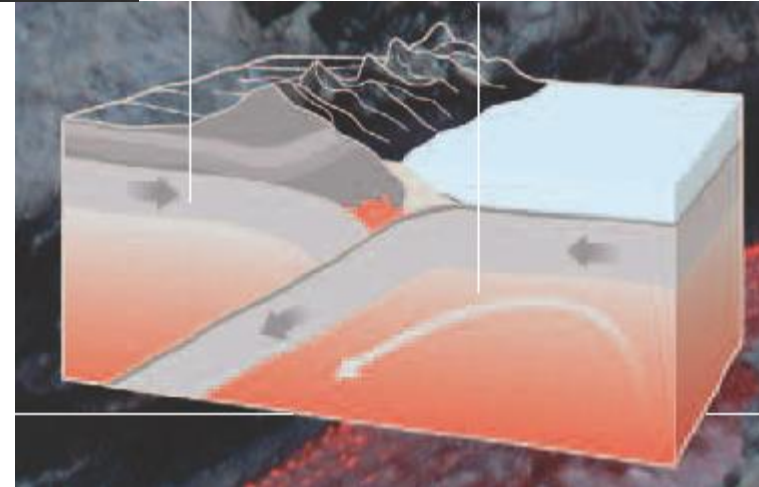
Mağmatizma

Manto veya kabuktaki en düşük füzyon noktasına sahip minerallerin ergime sıcaklığına erişildiğinde, çevredeki katı materyalden daha düşük yoğunluklu magma oluşur. Yoğunluk farkından dolayı yükselirken soğumaya ve kristalize olmaya başlar. Kabuk içinde bu sayede mağmatik kayalar oluşmaya başlar. Magma; herhangi bir kırık veya boşluktan yüzeye kadar ulaşırsa "Volkanik" kayalar oluşmaya başlar.



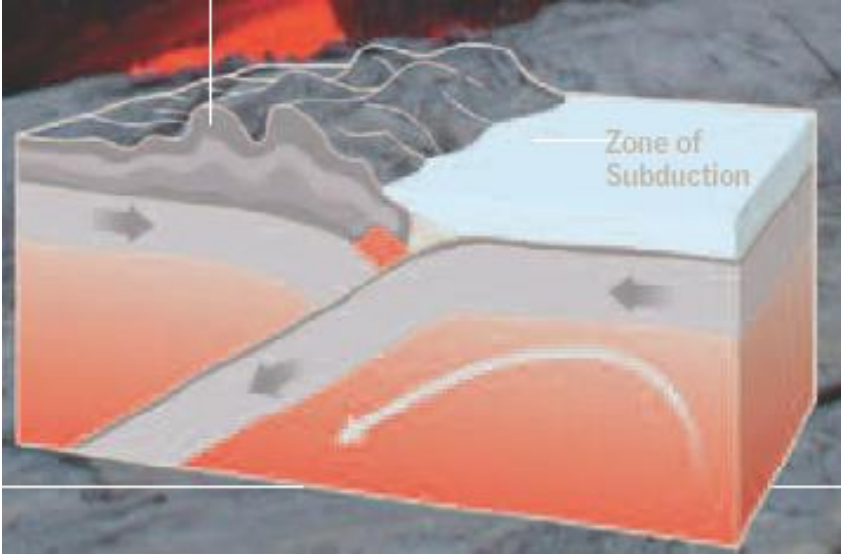
Metamorfizma

Basınç veya sıcaklıktaki değişiklikler kayaların plastik ve minerallerin duraysız olmasına neden olur. Bu sayede kökeni farklı kayalar yan kayalar ve sıvılar ile kimyasal reaksiyon oluşturabilir. Özellikle basınç sayesinde farklı derinliklerde farklı metamorfik süreçler gelişebilir.



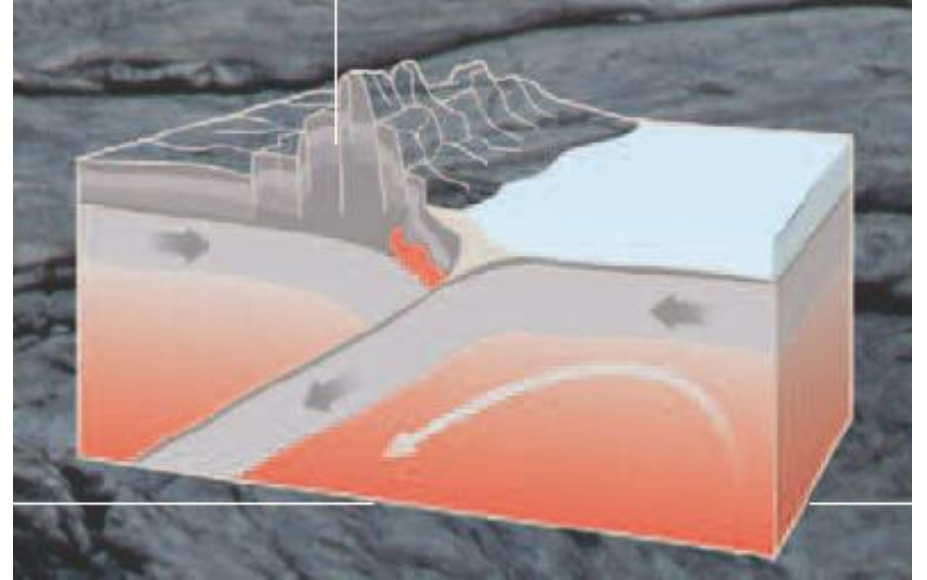
Kıvrımlanma

Katı olmasına rağmen kabuktaki kayalar belirli sınırlar içinde elastic ve plastic özellikler sergiler. Kabuktaki küresel hareketlere bağlı gerilmeler kayaların farklı yönlerde deforme olmasına neden olur. Oluşum ölçeğine göre dağların meydana gelmesinden tektonik hareketlerdeki kayaların kıvrımlanmasına kadar geniş aralıkta görülebilir.



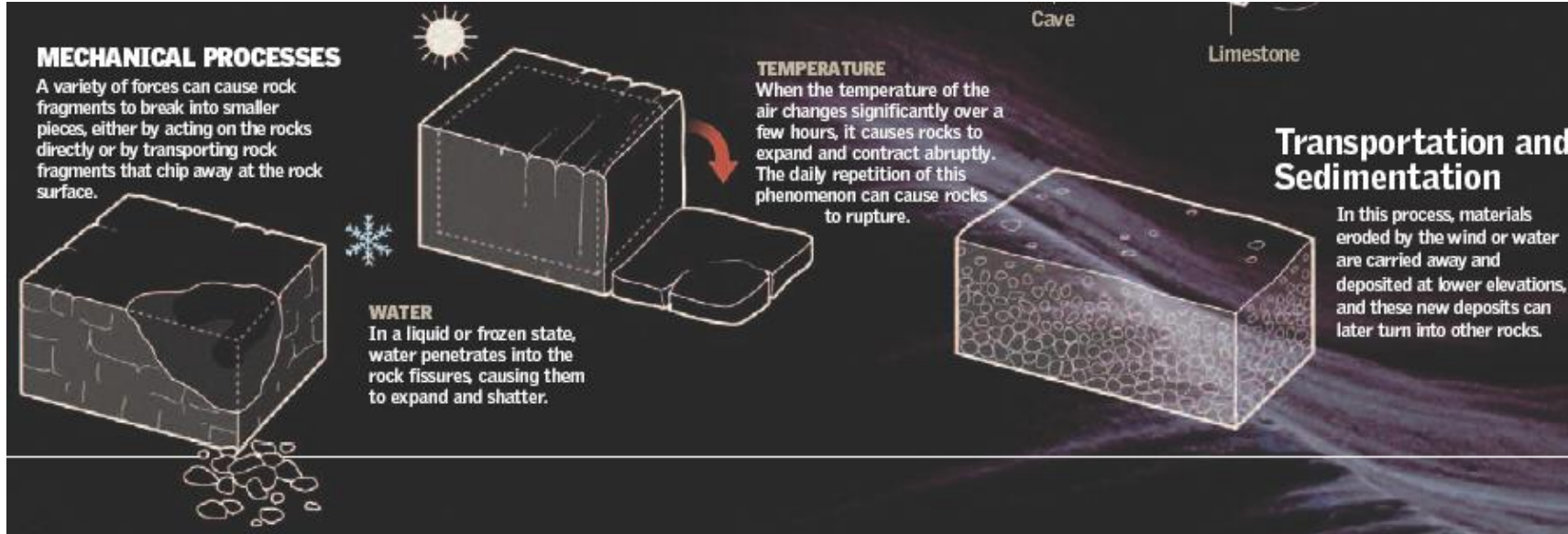
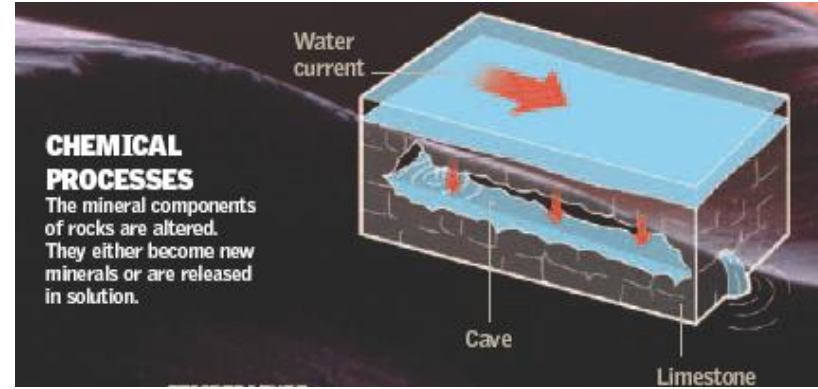
Kırık ve Çatlak Oluşumu

Kayaçlara etkiyen gerilmenin büyüklüğüne göre temelde fay ve kırık olmak üzere iki çeşit kırıklanmalar oluşur. Bu aşamada kayalar plastik deformasyona maruzdur. Gerilme yönü ve büyüklüğüne bağlı olarak depremler oluşmaya başlar.



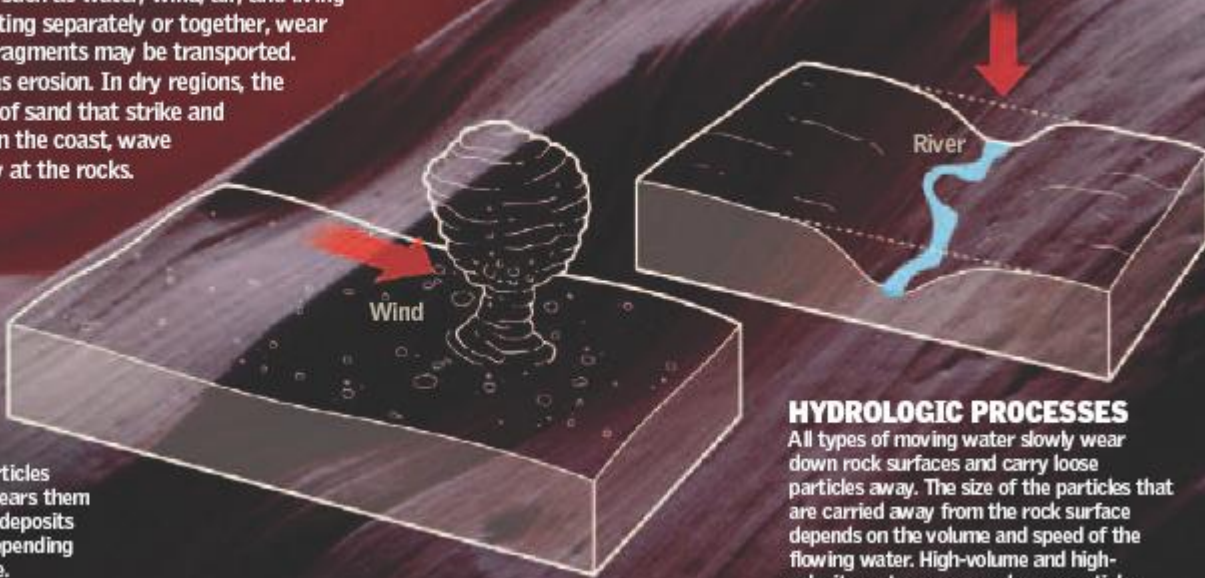
Günlenme ve Ayrışma

Mekanik etkiler ile kayalarda parçalanma sonucunda günlenme, kimyasal etkenler ile derinlikle azalan bozunma ve derinlikle artan/azalan ayrışma süreçleri başlar. Mekanik etkiler; rüzgar, kazı, erozyon vb iken Kimyasal etkiler hidrotermal sıvılar, su ve solüsyonlardır.



Erosion

External agents, such as water, wind, air, and living beings, either acting separately or together, wear down, and their loose fragments may be transported. This process is known as erosion. In dry regions, the wind transports grains of sand that strike and polish exposed rocks. On the coast, wave action slowly eats away at the rocks.

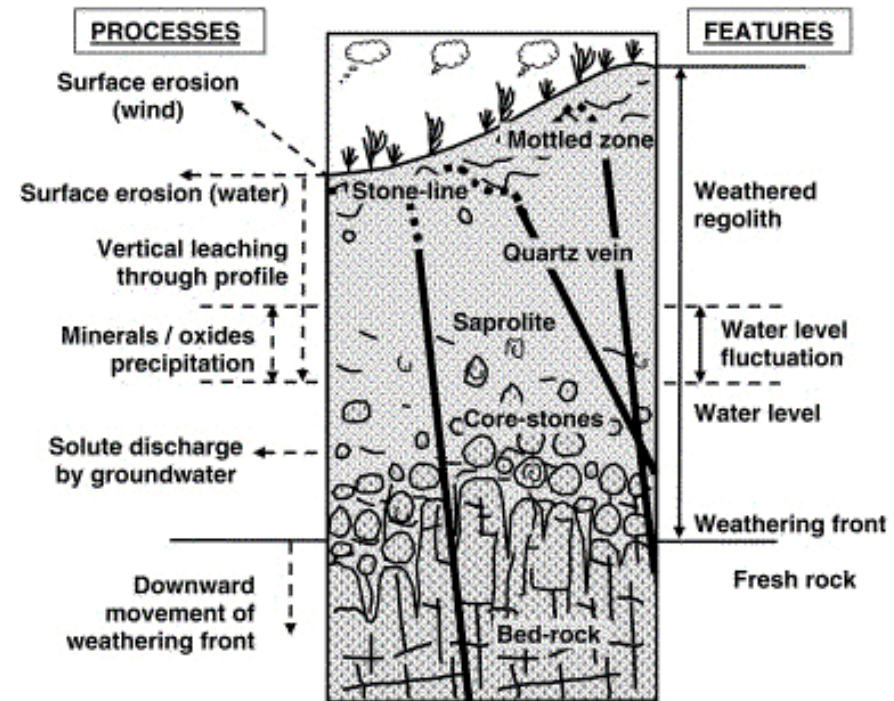


EOLIAN PROCESSES


The wind drags small particles against the rocks. This wears them down and produces new deposits of either loess or sand depending on the size of the particle.

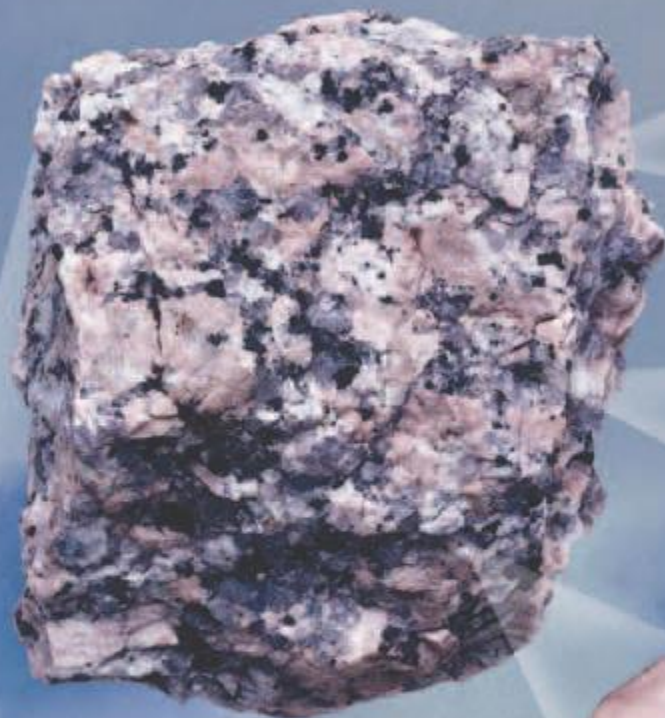
HYDROLOGIC PROCESSES

All types of moving water slowly wear down rock surfaces and carry loose particles away. The size of the particles that are carried away from the rock surface depends on the volume and speed of the flowing water. High-volume and high-velocity water can move larger particles.



From Minerals to Rocks

 From a chemical perspective, a mineral is a homogeneous substance. A rock, on the other hand, is composed of different chemical substances, which, in turn, are components of minerals. The mineral components of rocks are also those of mountains. Thus, according to this perspective, it is possible to distinguish between rocks and minerals.



QUARTZ

Composed of silica, quartz gives rock a white color.

MICA

Composed of thin, shiny sheets of silicon, aluminum, potassium, and other minerals, mica can be black or colorless.

GRANITE

Rock composed of feldspar, quartz, and mica

FELDSPAR

A light-colored silicate, feldspar makes up a large part of the crust.



TORRES DEL PAINE

Chilean Patagonia

Latitude 52° 20' S
Longitude 71° 55' W

Composition	Granite
Highest summit	Paine Grande (10,000 feet [3,050 m])
Surface	598 acres (242 ha)

Torres del Paine National Park is located in Chile between the massif of the Andes and the Patagonian steppes.

Mineral ve Kayaç Türlerinin Fiziksel Özellikleri

Color

➔ is one of the most striking properties of minerals. However, in determining the identity of a mineral, color is not always useful. Some minerals never change color; they are called idiochromatic. Others whose colors are variable are called allochromatic. A mineral's color changes can be related, among other things, to the presence of impurities or inclusions (solid bodies) inside of it.

INHERENT COLOR

Some minerals always have the same color; one example is malachite.



MALACHITE



SULFUR

ROCKS AND MIN

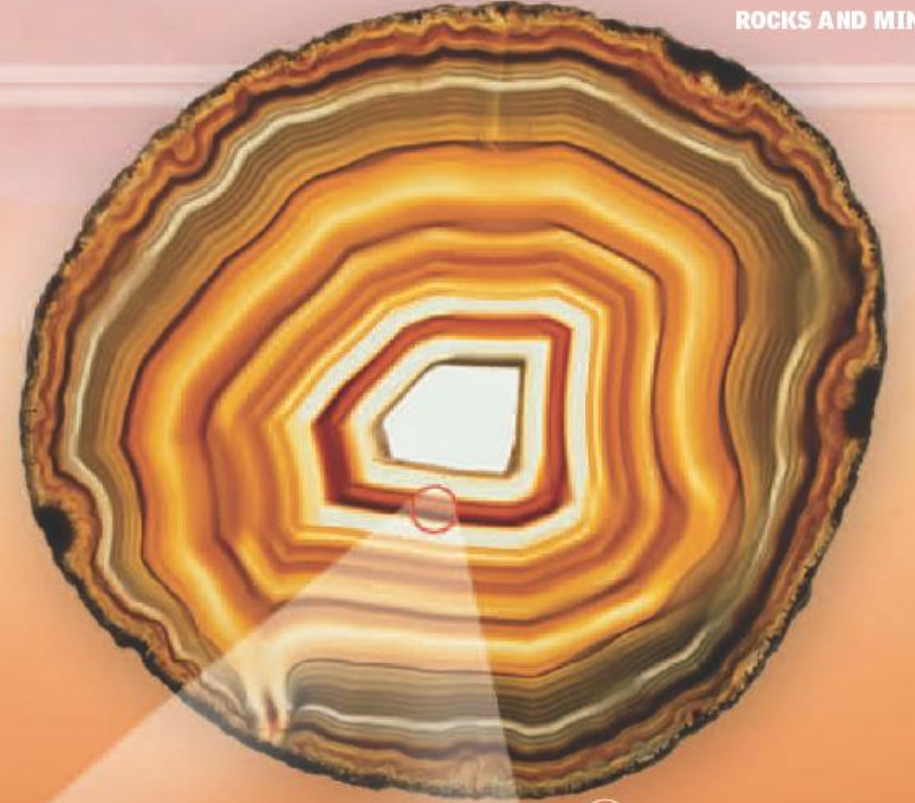
COLOR STREAK

More reliable than a mineral's color is its streak (the color of the fine powder left when the mineral is rubbed across a hard white surface).

HEMATITE
Color: Black



Streak Color:
Reddish Brown



EXOTIC COLOR

A mineral can have several shades, depending on its impurities or inclusions.

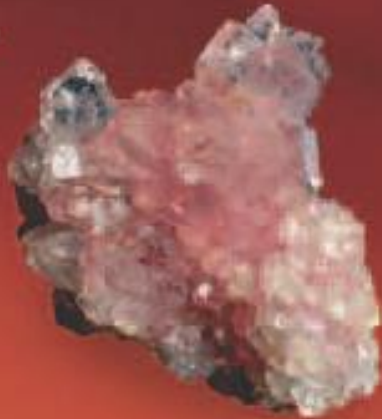
QUARTZ



ROCK CRYSTAL

Colorless; the purest state of quartz.

Other secondary minerals, known as exotic minerals, are responsible for giving quartz its color; when it lacks exotic minerals, quartz is colorless.



ROSE

The presence of manganese results in a pink color.



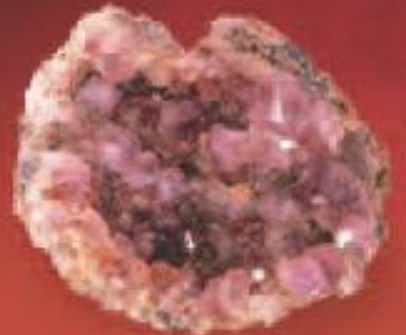
CITRINE

The presence of iron produces a very pale yellow color.



SMOKY

Dark brown, or gray minerals



AMETHYST

The presence of iron in a ferric state results in a purple color.

MOHS SCALE

ranks 10 minerals, from the softest to the hardest. Each mineral can be scratched by the one that ranks above it.



1. **TALC**
is the softest mineral.



2. **GYPSUM**
can be scratched by a fingernail.



3. **CALCITE**
is as hard as a bronze coin.



4. **FLUORITE**
can be scratched by a knife.



5. **APATITE**
can be scratched by a piece of glass.



6. **ORTHOCLASE**
can be scratched by a drill bit.



7. **QUARTZ**
can be scratched by tempered steel.



8. **TOPAZ**
can be scratched with a steel file.

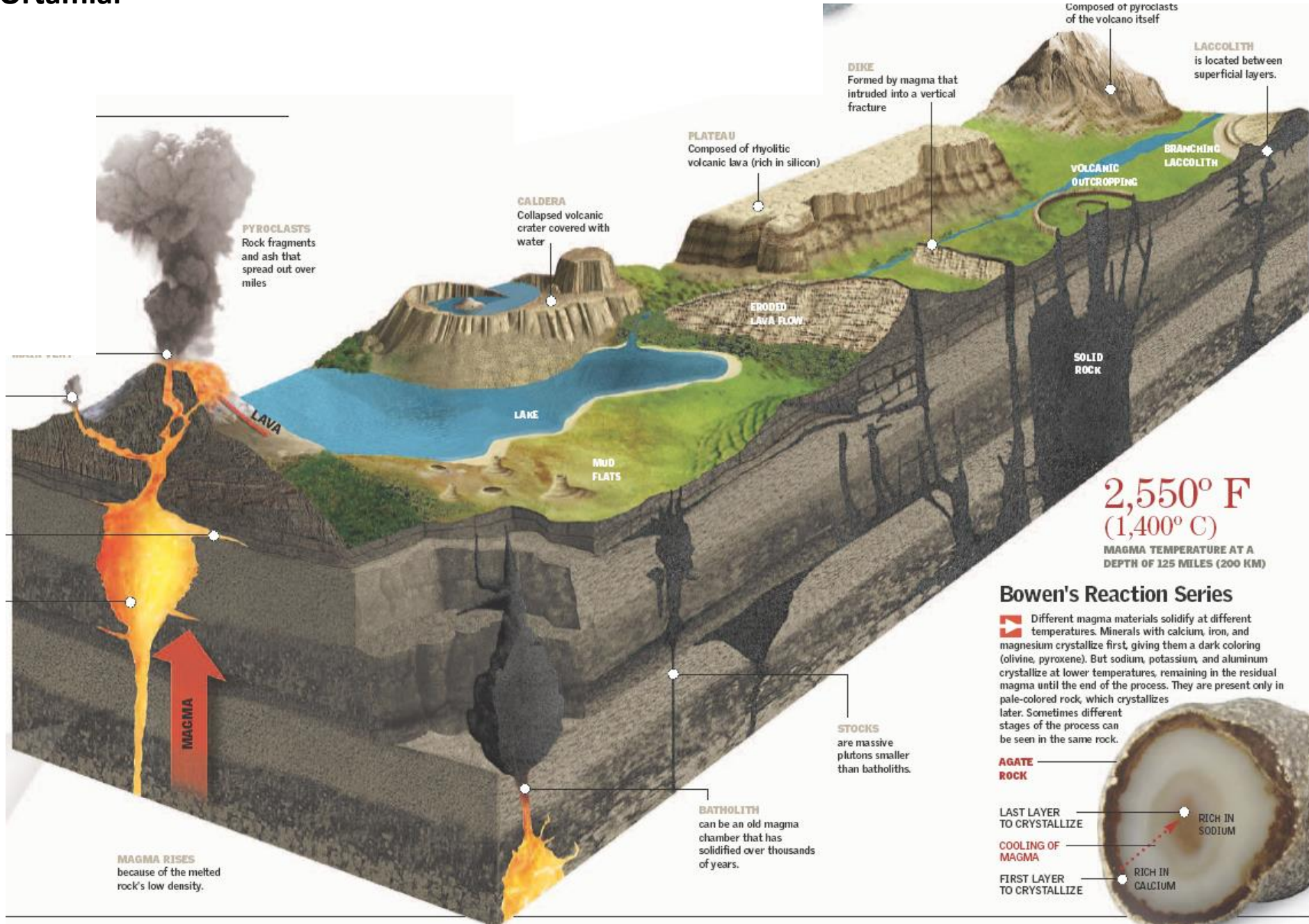


9. **CORUNDUM**
can be scratched only by diamond.



10. **DIAMOND**
is the hardest mineral.

Jeolojik Ortamlar



Doğada Kayaç Döngüsü

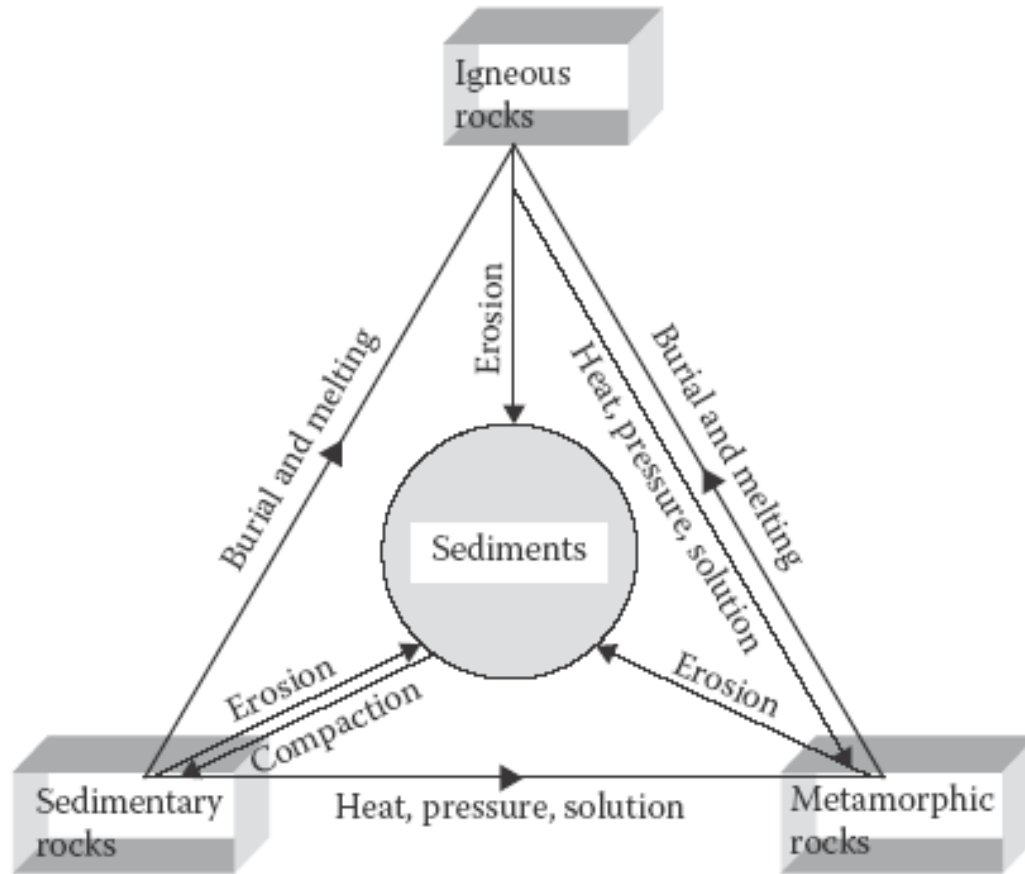


Figure 1.5 Rock cycle. (Adapted from Raymahashay, B.C., *Geochemistry for Hydrologists*, Allied Publishers Ltd., New Delhi, 1996.)

Kayaç-Kaya Kütlesi



Kayaç-Kaya Kütlesi ve Mühendislik Jeolojisi







