CHAPTER: II

I. Identification methods of igneous rocks

1. Descriptive methods:

Descriptive methods are based on:

- The identification of minerals in rocks;
- The determination of the proportion of minerals in rocks;
- The determination of the structure and texture of rocks.

The structure of a rock refers to the appearance or shape that the rock takes as it can be observed with the naked eye on a rock outcrop (macroscopic scale). Example: bedded, massive, banded structure.

The texture of a rock refers to the arrangement, grain size and geometric shape of minerals as they can be observed under a polarizing microscope (microscopic scale).

Petrography is based on the examination of thin sections of rocks under a polarizing microscope to accurately determine the minerals and their proportions in the rocks.

The polarizing microscope (also called a petrographic microscope) is the basic tool of petrography. It is a specialized microscope designed to determine the optical properties of minerals. Its magnification allows the identification of very small mineral grains.

2. Geochemical methods:

Geochemical methods consist of determining the chemical composition of the rock using different analytical instruments.

This chemical composition will be used to classify rocks according to international criteria. Geochemical methods are more reliable than descriptive methods. On the other hand, they are more expensive and do not allow instant identification of rocks in the field; samples must be brought back to the laboratory. Example of measuring equipment used by geochemical methods:

X-ray fluorescence spectrometer, plasma emission spectrometer, electron microprobe.

II. Le cycle des roches:

- In the rock cycle, magma occupies a central position: it is the starting point and the end point of the cycle.
- The first phase of the cycle is constituted by the crystallization of magma, a process that leads to the formation of igneous rocks. Magma can crystallize on the surface, and the igneous rocks formed are called: volcanic. Volcanic rocks are therefore exposed on the surface of the Earth. If the magma crystallizes in depth, it will give plutonic rocks. Plutonic rocks are brought to the surface during the uplift and erosion of land by the dynamic processes of plate tectonics, during the formation of mountain ranges for example.
- At the surface, igneous rocks undergo processes associated with solar energy - heating, cooling, wind, rain - and the circulation of meteoric water. These rocks weather and break down into individual grains that are transported by water, ice and wind to form a loose deposit, a sediment (gravel, sand, mud). This process is called sedimentation. Then this

sediment gradually transforms into sedimentary rock according to a set of processes called diagenesis. Sedimentary rocks are the most common on the Earth's surface because they form a thin layer above the Earth's crust.

- The burial of this sedimentary rock (in mountain ranges for example) involves changes in ambient temperature and pressure. Sedimentary rocks then transform into metamorphic rocks. Metamorphism is the process of transformation of a rock under the effect of high temperatures and pressures. Magmatic rocks can also be subjected to the processes of metamorphism and produce metamorphic rocks.
- The erosion of metamorphic rocks and sedimentary rocks will also produce sediments and eventually sedimentary rocks.
- The return to magma through the fusion of rocks completes the cycle.