

## **2. Slovakia – Geological and Geomorphological patterns**

### **Geological evolution**

The Carpathians together with the Pannonian basin (in the south) make up the entire territory of Slovakia. The Carpathians folded in the same geological period like the Himalayas (Quaternary).

In Palaeozoic era, metamorphic rocks deposited at the bottom (*gneiss and wart schists*). During long periods of Caledonian folding, various granitic rocks (*granite*) were created while volcanism accompanied such great movements of the land mass. These rocks form the base of the Slovak Western Carpathians called crystalline rocks (rocky cores).

Mesozoic era resulted into vast flooding of this area which was covered by a large sea => sedimentary rocks, e.g. *limestone, dolomite, sandstone*. Due to *Hercynian folding*, these sedimentary layers were pushed northwards when forming the central part of the Western Carpathians. The same geological period enabled gravel and sand to deposit onto the sea floor that later created the so-called „flysch“ rocks formation = altering layers of *sandstones, claystones* and *conglomerates*.

Limestones, risen by the *Alpine folding* which lasted until the Cenozoic era, stand at the flysch margins as they are more resistant to water (*klippens*). Volcanoes, formed at inner Carpathian faults, are made up of *basalt* or *andesite*.

Quaternary Ages formed the Slovakian hollow basins with their *gravels, sands* and *clays*. This is the time of the present-day river (drainage) network and huge glaciers formed the deep valleys in mountainous areas.

### **Geological structure**

- Ø The “Flysch” Zone: altering (changing) layers of permeable *sandstones* with impermeable *claystones*
  - lack of raw materials, sandstone quarrying only
  - Biele Karpaty (mountains), Myjavská pahorkatina (uplands), Javorníky, Kysuce, Orava, Spiš, Šariš, the northern part of eastern Slovakia
- Ø The Klippen Belt: narrow *limestone* belt
  - limestone quarries only
  - from the Malé Karpaty Mountains and the Považie region – Biele Karpaty – along the Váh river towards Žilina to the Orava region, the Pieniny, Humenné to Ukraine
  - many castles built upon klippens, e.g. Čachtice, Beckov, Trenčín, Oravský castles
- Ø The Crystalline Mountains: *cores* of the mountain ranges are made of *granites, gneiss, wart* together with ferrous and *non-ferrous metals*, e.g. *Fe, Cu, Sb, magnesite*.
  - various *limestones, schists, dolomites* and *sandstones* layered upon the cores
  - Malé Karpaty, Strážovské vrchy, Malá Fatra, Veľká Fatra, Nízke Tatry a Slovenské rudohorie
- Ø The Volcanic Mountains: volcanic rocks like *andesite, basalt, non-ferrous* and *precious metals*, e.g. *Au, Ag, Cu*
  - Slanské vrchy, Vihorlat, Poľana, Trábeč, Vtáčnik
- Ø The Neogene Hollow Basins: southern rim of the Carpathians.
  - oil, black coal, lignite, rock-salt, clays and gravel
  - Besides the Záhorská Lowland, the Podunajská and the Východoslovenská are the largest lowlands in the country.

### **Keywords**

Pannonian Basin, the Carpathians, Palaeozoic/Mesozoic/Cenozoic/Quaternary eras, *gneiss, wart, schist, granite, core, Hercynian/Alpine folding, limestone, dolomite, sandstone, claystone, flysch structure, klippen, basalt, andesite, crystalline and conglomerate rocks, hollow basin, the Neogene, gravel, sand, clay, (non-)ferrous metals, the Slovak mountains, concentration, patience*