

Indian Rock System

Geologically India is divided into multiple rock strata which were formed at different stages of India's geological history.

Rock System of India

The rock system of India is broadly divided into the systems mentioned below:

- Archean rock system
- Dharwar rock system
- Cuddapah rock system
- Vindhyan rock system
- Dravidian rock system
- Aryan rock system
- Carboniferous rock system
- Jurassic rock system
- Cretaceous rock system
- Tertiary rock system
- Quarternary rock system

Archean rock system

- This is the oldest rock system of Indian subcontinent dating back to about 4 billion years. (pre-Cambrian rocks)
- They serve as the basement complex or the foundation rocks for other rock systems.
- They are found in the Aravalli hills, Deccan plateau and the northeast of India.
- They mostly contain gneisses (granite, gabbro etc.) and schists (crystalline rocks such as mica, chlorite, talc etc.)
- These rocks are formed when magma underneath the earth's surface solidified and hence they are devoid of any fossils (Azoic)
- Because of their volcanic origin, they are crystalline and consist of sheet-like layers (foliated).

- These rocks are abundant in metallic as well as non-metallic minerals such as iron, manganese, copper, bauxite, gold, lead, mica, graphite etc.

Dharwar rock system

These rocks have been formed as a result of the erosion and sedimentation of the rocks of the Archaean system.

- These are the oldest sedimentary rocks.
- No fossil is found here. It is so because either there was no origin of species during their formation or the forms of the fossils got destroyed with the passage of time.
- The Aravali mountain range which is the oldest fold mountain of the world has been made with these rocks.
- The rocks of this system are found in the districts of Dharwar and Shimoga in Karnataka.
- The rocks of this system are found in the southern Deccan region from Karnataka to the Kaveri valley, districts of Bellary, Shimoga, Sasar mountain range in Jabalpur and Nagpur and the Champaner mountain range in Gujarat.
- In north India the rocks of this system are found in the Himalayan ranges of Ladakh, Zaskar, Garhwal and Kumaon, and the long range of Assam plateau.
- The rocks of this system are economically very important. All prominent metallic minerals (iron, gold, manganese etc) are found in these rocks.

Cuddapah rock system

- Mainly found in the Cuddapah region of Andhra Pradesh, they are also found in Delhi, Rajasthan, Chhattisgarh, the lesser Himalayas etc.
- They were formed when sedimentary rocks like sandstone, limestone etc., and clay were deposited in synclinal folds (between two mountain ranges)
- They are rich in metamorphic rocks such as shale, slate, quartzite etc. Even though metallic minerals like iron ore were found, they were of poor quality.

Vindhyan rock system

- These have been formed after the Cuddapah rocks by the deposition of silt of river valleys and shallow oceans. Thus, these rocks are also sedimentary rocks.
- The evidences of fossils of micro-organisms are found in this structure.
- These rocks are found in the Vindhyas, e.g. the Malwa plateau, the Semari range in the Son valley, Bundelkhand etc.
- This structure is famous for house-building rocks. The Sanchi Stupa, the Red Fort, the Jama Masjid etc are built with the red sandstone of this structure. Besides, limestone, china clay, dolomite etc are also found in this structure.
- The diamond mines of Golconda in Karnataka and Panna in Madhya Pradesh are found in this structure.

Dravidian rock system

- It was formed during the Paleozoic era i.e., 600-300 million years ago. Also known as the Carboniferous rocks, these are found in the extra-Peninsular regions of the Himalayas and the Gangetic plain
- They are abundant in fossils, and this period saw the beginning of coal formation.
- Carboniferous coal is of a higher quality, though it is not found abundantly in India.

Aryan rock system

- They began to be formed since the Carboniferous period. From the Gondwana rock system, Jurassic system, Deccan trap and Tertiary period, this rock system is made up of diverse kinds of rocks.

Gondwana rock system

- This system is named after the huge carbon deposits contained within them. This makes them the largest source of coal in India, containing up to 98 percent of our coal deposits.
- The Gondwana rocks are mainly found in Ranigunj, Jharia regions of Jharkhand, Damodar valley, Pench valley in Chhattisgarh and Madhya Pradesh, Godavari valley in Telangana and the Rajmahal hills of West Bengal.
- They are divided into two main series of rocks viz., Damuda and Panchet.

- Apart from coal, they are also a source of metallic minerals such as iron, manganese, antimony, uranium etc.
- They are named after the Gond tribe (indigenous people mainly found in the Telangana and Andhra Pradesh regions).
- These are sedimentary deposits which were accumulated in the synclinal troughs on an older plateau surface.
- The process began during the Permian period i.e., 250 million years ago

Jurassic rock system

- This period witnessed marine transgressions on both west and east coasts. This led to shallow water deposits in Rajasthan and the Kutch region on the west and Guntur and Rajahmundry areas of Andhra Pradesh.
- Prominent deposits in this rock system include limestone, shale, sandstone etc.

Cretaceous rock system

- This was formed when the Indian plate came over the Reunion hotspot in the Indian Ocean while travelling north towards the Eurasian plate, after breaking up from the Gondwana plate.
- The continuous outpouring of magma, from the fissures over the Indian plate led to the formation of a layered structure called the Deccan Traps. These are formed by the flow of magma over the solidified rock systems/cooled magma in layers.
- Basaltic lava covered an area of 5 lakh sq.km. encompassing the regions like Kutch, Saurashtra, Maharashtra, Malwa plateau and north Karnataka.
- The thickness of the Deccan traps decreases from west to east, with around 3000m in the west to just 150m in the east, and around 800m in the south.
- Due to the forces of weathering and erosion, this rock system gave birth to a new soil variety known as the Black Cotton soil or Regur.

Tertiary rock system

- These rocks belong to the Cenozoic era, formed around 60 million years ago
- The Himalayan uplift took place at around the same time
- Important rock systems include Karewas of Kashmir, Bhangra and Khadar of the Gangetic plains etc.

Quaternary rock system

- They were formed during the Pleistocene and the process continued in the Eocene.

- Since they are of recent origin, they have good organic content (fossils)
- These are largely found in the plains of north India (Satluj-Ganga-Brahmaputra plains) and also in the Karewas of Kashmir valley.