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INDIAN GEOGRAPHY

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INDIAN GEOGRAPHY

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Location & Geological History

1

Chapter

Location

India is surrounded by the sea on three sides, separated from the rest of Asia by a high mountain chain. Along with Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka, India forms a well defined realm of South Asian landmass referred as Indian Sub-continent.

India alone covers about three fourths of the area of this sub-continent and has a common frontier with each one of them. The north-central part of India is broad while the southern part tapers down towards the Indian Ocean in the south.

India's deep peninsular configuration places India in a unique commanding position in the Indian Ocean. This is the only ocean named after a country.

The western part of the northern Indian Ocean is called the Arabian Sea while the eastern part is called the Bay of Bengal. The total length of the coastline of India, including the island groups is about 7,516.6 km. The land frontiers of India measure 15,106.7 km. Pakistan, Afghanistan, China, Nepal, Bhutan, Myanmar and Bangladesh share common boundaries with India.

India borders with Nepal, China and Bhutan in North, Pakistan in West, Bangladesh and Myanmar in East. India does not share any land boundary with Sri Lanka but is separated by Palk Strait and Gulf of Mannar. India shares some extent of land border with Afghanistan also along with Northern Kashmir region.

Neighbour Countries and Bordering Indian States/UTs		
Country	Indian States/UTs	Border Length
Bangladesh	West Bengal, Tripura, Meghalaya, Assam, Mizoram	4096.7 km
China	Ladakh, Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttarakhand	3488 km
Pakistan	J&K, Ladakh, Rajasthan, Punjab, Gujarat	3323 km
Nepal	Bihar, Uttarakhand, Uttar Pradesh, Sikkim, West Bengal	1751 km
Myanmar	Arunachal Pradesh, Nagaland, Manipur, Mizoram	1643 km
Bhutan	West Bengal, Sikkim, Arunachal Pradesh, Assam	699 km
Afghanistan	Ladakh	106 km

Important International Boundaries

Radcliffe Line – India and Pakistan

McMahon Line – India and China

Durand Line – India and Afghanistan/Pakistan and Afghanistan

Size and Extent

In size, India is the seventh largest country in the world and account for approximately 2.4% of the surface area of the world. It covers an area of 3.287 million km² and measures about 3,214 km from north to south and about 2,933 km from east to west.

Extreme Points of India		
Direction	Point	State or Union Territory
North	Indira Col, Siachen Glacier	Ladakh
South	Indira Point/Pygmalion Point, Nicobar Islands	Andaman and Nicobar Islands
East	Kibithu	Arunachal Pradesh
West	Guhar Moti, Sir Creek	Gujarat

India lies entirely in the northern and eastern hemisphere and extends between 8°4' N to 37°6'N latitude and 68°7'E to 97°25'E longitude. The Southern tip of the peninsula just misses the Equator only by a few degrees.

The Tropic of Cancer (23.5 °N) passes through the middle of the country. Thus, half of the country to the south of the Tropic of Cancer is situated in the Tropical region and the other half lying north of the Tropic of Cancer falls in the subtropical region.

The longitudinal extent of India is around 29°, hence the time difference in India between its eastern and western extremities is roughly about two hours. India has chosen the standard meridian of 82°30'E for Indian Standard Time.

Why 82°30'E?

Standard meridian of any country is generally selected in multiples of 7°30' of longitude. The meridian passing through Allahabad at 82.5° east longitude has been selected as the central meridian for India, corresponding to a single time zone for the country at 5 hours and 30 minutes in advance of GMT.

Geological History and Structure of India

Origin of India

India entirely lies on the Indo-Australian Plate, a major tectonic plate that was formed when it split off from the ancient continent called the Gondwanaland.

Gondwanaland was the ancient landmass, consisting of the southern part of the supercontinent of Pangea.

The Indo-Australian plate is subdivided into the Indian and Australian plates. Indian plate was to the south of the equator and the Tethys Sea, separated it from the Asian continent till about 225 million years ago.

Around 200 million years ago India started drifting towards north when Pangea broke. India collided with Asia about 40-50 million years ago, causing the rapid uplift of the Himalayas.

A major event that occurred during the movement of the Indian plate towards the Eurasian plate was outpouring of lava and formation of the Deccan Traps. This started around

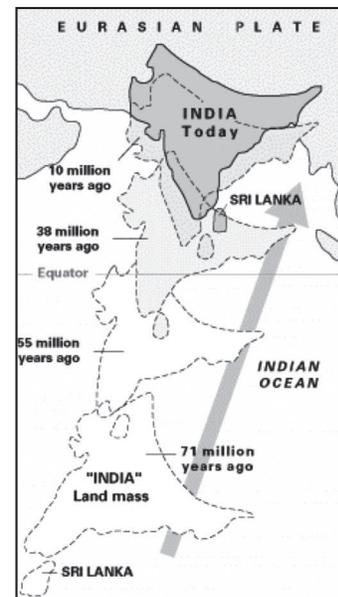


Fig: Movement of Indian Plate and its Collision with Eurasian plate



60 million years ago and continued for a long period of time. Movement of Indian plate and its collision with the Eurasian plate is shown in the figure.

Major Events in Geological History of India

- Peninsular India was part of the ancient landmass of Gondwanaland. It later broke apart and collided with the Eurasian plate.
- The collision led to the upheaval of the Himalayas in three different phases.
- The north Indian plains resulted due to infilling of the foredeep formed in the later phases of Himalayas formation.

Geological Structure

Rocks of different geological periods are found in different regions of the country.

India has its own geological eras and periods that correspond to the standard geological eras of Pre-Cambrian (over 570 million years old), Paleozoic (245-570 million years old), Mesozoic (65-245 million years old) and Cenozoic (65 million years old to the present).

Indian Rock Classification and Corresponding Standard Time Period

Indian Classification	Standard Geological Era
Archaean	Pre-Cambrian
Purana	Paleozoic
Dravidian	Mesozoic
Aryan	Cenozoic

The rock system of India has been classified into four major divisions:

- Archaean Rock System (Early Pre-Cambrian)
- Purana Rock System (Late Pre-Cambrian).
- Dravidian Rock System (600-400 million years old).
- Aryan Rock System (400 million years old to present).

Archaean Rock System

The Archaean rock system includes two rock groups:

Archaean Gneisses and Schists

These are the oldest rocks to be formed on the Earth's surface. They form the 'Basement Complex' and often underlie the strata formed subsequently. Gneisses cover about two third parts of the peninsula, including central and southern part.

Dharwar Sedimentary

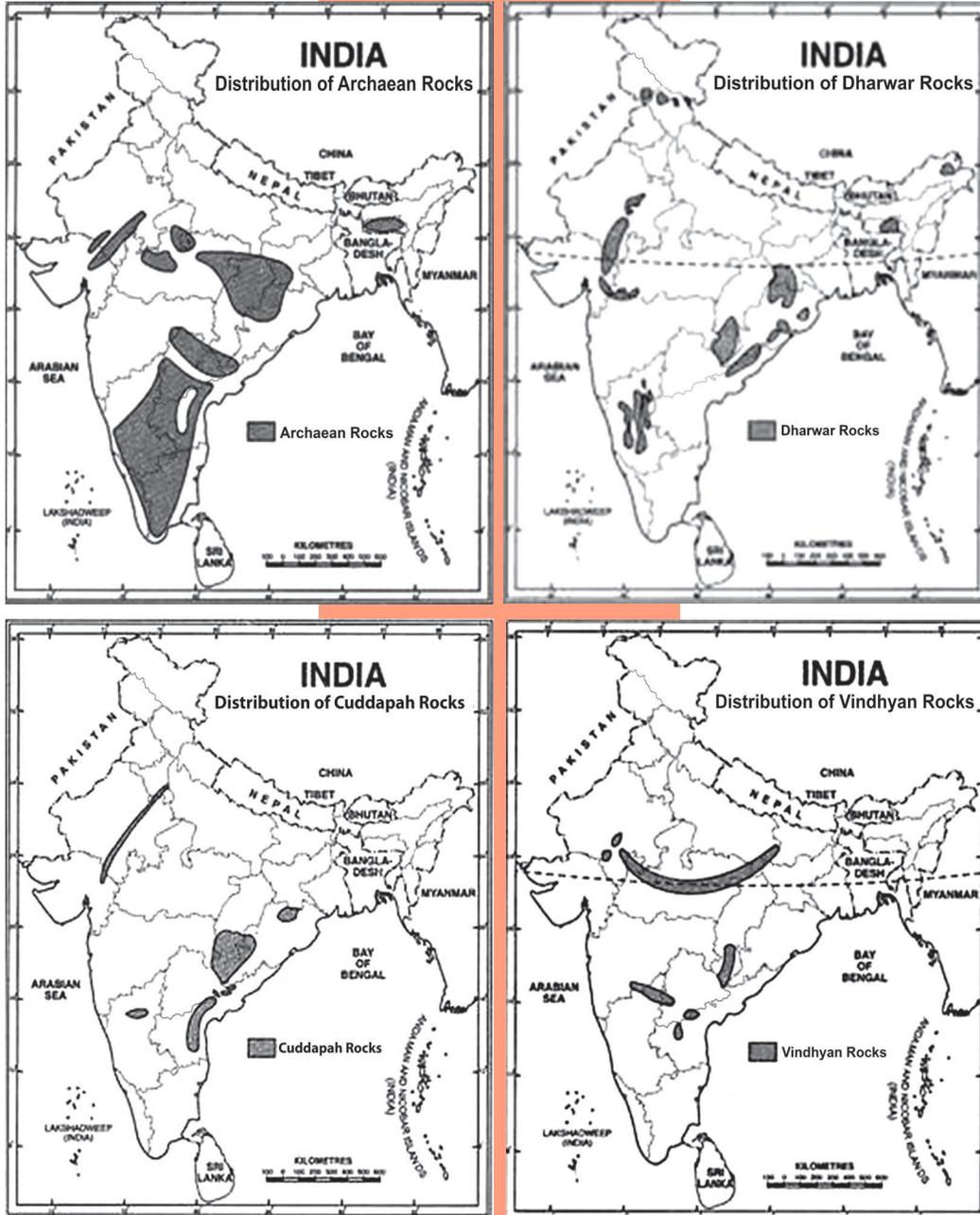
These are the most ancient metamorphosed sedimentary rock system of India and were formed due to weathering of the Archaean gneisses and schists. It is well developed in Dharwar-Bellary-Mysore belt of Karnataka. Due to the deposits of valuable minerals, these rocks are economically the most important rocks.

Purana Rock System

This rock system has been further divided into Cuddapah and Vindhyan Systems.

Cuddapah System

These formations, named after Cuddapah district in Andhra Pradesh, are sedimentary metamorphic formations. These are unfossiliferous clay, slate, quartzites, sandstones and limestones deposited in the great synclinal basin.



It is most extensive in Cuddapah and Kurnool districts of Andhra Pradesh. It is also found in the southern part of Chhattisgarh and along the main axis of the Aravalli range. It has rich deposits of iron, manganese, copper, cobalt, nickel, etc. Cement grade limestone is also not uncommon in these formations.



Vindhyan System

This system comprises mostly unfossiliferous ancient sedimentary rocks superimposed on the Archaean basement complex. Except its absence in Bundelkhand region, it is found in a stretch extending between Sasaram and Rohtas in Bihar to Chittorgarh in Rajasthan.

Deccan trap has superimposed large part of this stretch. Vindhyan system is devoid of any metalliferous minerals. Deposits of limestone, ornamental stones, and pure glass making sand are found in large quantities.

Dravidian Rock System

These rocks are mainly found in the extra-peninsula region except a few patches in the peninsula. These rocks are fossiliferous. The rocks of Cambrian, Ordovician, Silurian, Devonian and Carboniferous periods fall under Dravidian system. Carboniferous rocks under this system are the most important as coal formation started during this period.

Aryan Rock System

The rocks from Upper Carboniferous to recent are included under this rock system. These rocks are found in both peninsular Indian and Himalayan region. Important subsystems of these rocks are discussed below.

Gondwana System

This is regarded as the last massive formation of the stratified sedimentary rocks in the trough basin of the peninsula. Luxuriant vegetation that developed under favourable condition got buried under the debris to yield coal seams. These rocks are found in four main areas:

- Damodar Valley region of Chhotanagpur
- Mahanadi Valley
- Godavari, Wainganga and Wardha valley
- Kachchh, Kathiawar, Western Rajasthan, Kashmir and Sikkim

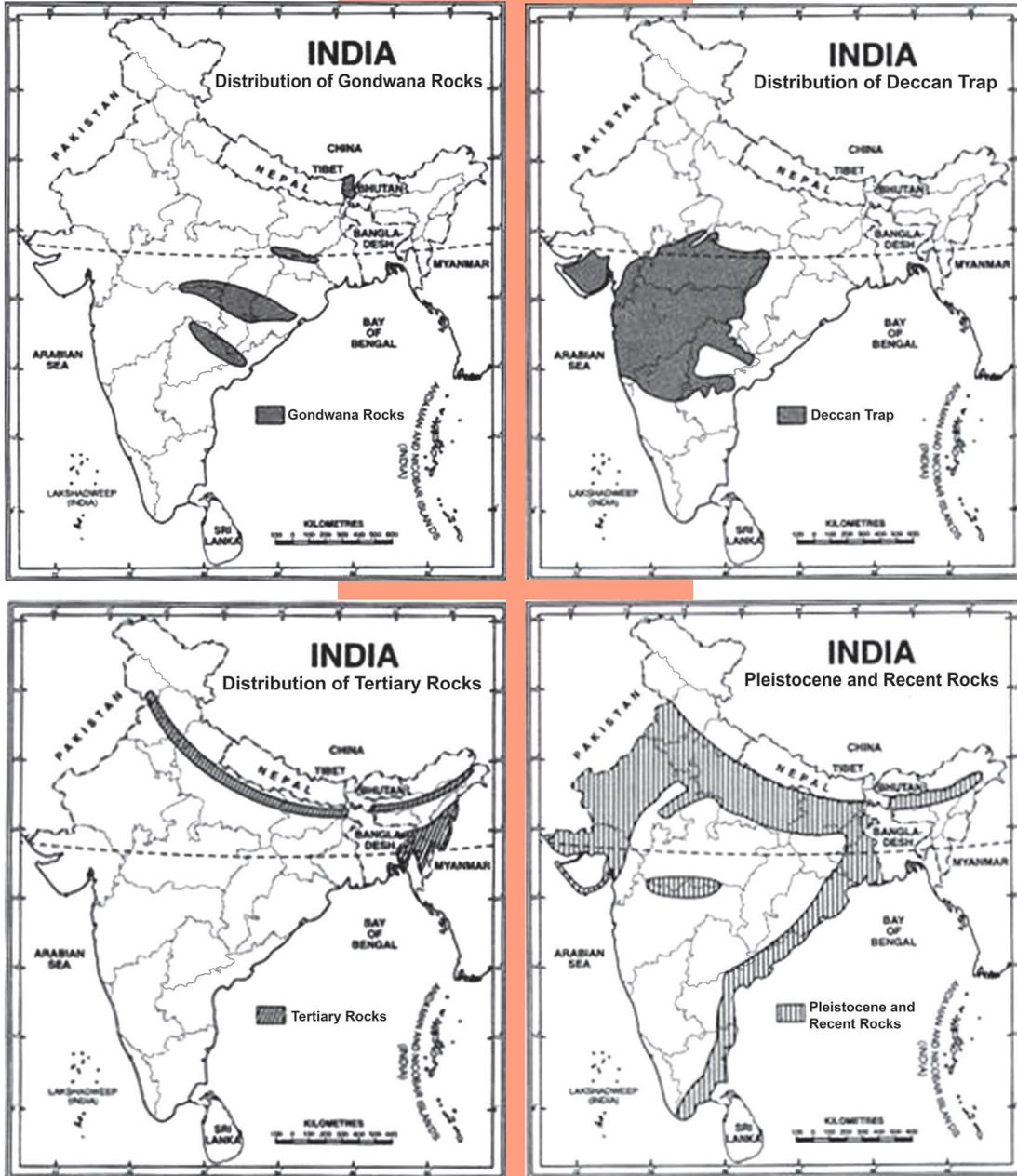
Economically, these are the most important rocks in India containing about 98% of the total coal reserves. They also have rich deposits of iron, copper, uranium and antimony.

Deccan Trap

This part resulted from intense volcanic activity towards the end of the Mesozoic era (from the late Cretaceous till beginning of Eocene) that flooded large parts of the peninsula. The trap thus formed covers an area of around 5 lakh sq km mainly in the parts of Kuchchh, Saurashtra, Maharashtra, the Malwa plateau and northern Karnataka. Weathering of these rocks has resulted in the formation of black cotton soil or Regur.

Tertiary System

It is one of the most important periods because the formation of Himalayas took place during this time and India took its present form. These rocks were formed from Eocene to Pliocene, about 60 to 7 million years ago.



Pleistocene and recent formations (Quaternary Period)

Quaternary is the name given to the most recent formations, which contains fossils of species with living representatives. This age has been divided into 4 glacial and inter-glacial periods. Important deposits during this period include Karewas of Kashmir, alluvial deposits in the valleys of Tapi, Godavari and Krishna, and extensive deposits of the Indo-Gangetic alluviums.



Physiography

2

Chapter

Physiography deals with the study of physical features of the earth's surface. The structure, process and stages of development are key determinants of the physiography of an area. India is characterised by the huge diversity of physical features. It has rugged Himalayan topography in the north, interspersed with picturesque valleys and deep gorges, while south India has stable land with dissected plateaus and denuded rocks. The North Indian plains with relatively level relief lie between the Himalayas and the plateau system. India is a land of physical diversities, which can be divided into five parts:

- The Northern Mountain Ranges
- The Coastal Plains
- The Great North Indian Plains
- The Islands of India
- The Peninsular Plateaus

The Northern Mountain Ranges

They are divided into three groups:

- The Himalayas
- The Trans-Himalayas
- The Purvanchal or the hills of the North-East

The Himalayas

The Himalayas consists of the youngest and loftiest mountain chains in the world. The central axis of the Himalayas stretches for almost 2400 km from west to east in the shape of an arc between the Indus gorge in the west to Brahmaputra gorge in the east. The breadth of the Himalayan ranges lie between 400 km in the western part to 150 km in the eastern part. It has three major parallel ranges separated by deep valleys and gorges. Most outstanding valleys in the Himalayan region are the Valley of Kashmir, the Kangra and the Kullu valleys, the Dun Valley, the Bhagirathi valley etc.

The Himalayas, not just act as a physical barrier between the Indian Subcontinent and the Central and East Asian countries, but also acts as climatic, drainage and cultural divide. The southern slopes of Himalayas facing India are steeper and those facing the Tibetan side are generally gentler. In the east, the Himalayas rise almost abruptly from the plains of West Bengal and Assam. On the other hand, the western part of the Himalayas rises rather gradually from the plains. There are three parallel ranges in the Himalayas:

- The **Himadri** or Greater Himalayas or Inner Himalayas
- The **Himachal** or Lesser Himalayas or Middle Himalayas
- The **Shivaliks** or Outer Himalayas

The Greater Himalayas or Himadri

This is the northern most and the highest range of the Himalayas. With an average elevation of around 6000 m above the sea level, this is the loftiest and most continuous