

ENGG GEOLOGY

**PHYSIO GRAPHIC DIVISION OF
INDIA**

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INDIA



- India is bounded to the southwest by the Arabian Sea, to the southeast by the Bay of Bengal and the Indian Ocean to the south. Kanyakumari constitutes the southern tip of the Indian peninsula, which narrows before ending in the Indian Ocean. The southernmost part of India is Indira Point in the Andaman And Nicobar Islands. The Maldives, Sri Lanka and Indonesia are island nations to the south of India with Sri Lanka separated from India by a narrow channel of sea formed by Palk Strait and the Gulf of Mannar. The territorial waters of India extend into the sea to a distance of 12 nautical miles (13.8 mi; 22.2 km) measured from the appropriate baseline.

Geological Development

- India is entirely contained on the Indian plate, a major Tectonic Plate that was formed when it split off from the ancient continent Gondwana land. About 90 million years ago, during the late Cretaceous period, the Indian Plate began moving north at about 15 cm/year (6 in/yr). About 50 to 55 million years ago, in the Eocene Epoch of the Cenozoic Era, the plate collided with Asia after covering a distance of 2,000 to 3,000 km (1,243 to 1,864 mi), having moved faster than any other known plate. In 2007, German geologists determined that the Indian Plate was able to move so quickly because it is only half as thick as the other plates which formerly constituted Gondwanaland. The collision with the Eurasian Plate along the modern border between India and Nepal formed the orogenic belt that created the Tibetan Plateau and the Himalayas. As of 2009, the Indian Plate is moving northeast at 5 cm/yr (2 in/yr), while the Eurasian Plate is moving north at only 2 cm/yr (0.8 in/yr). India is thus referred to as the "fastest continent". This is causing the Eurasian Plate to deform, and the Indian Plate to compress at a rate of 4 mm/yr (0.15 in/yr).

Physiographic Divisions



India is divided into seven physiographic regions. They are:

- The northern mountains including the Himalayas, which includes the Kuen Lun and the Karakoram ranges and the northeast mountain ranges.
- Indo-Gangetic Plain
- Indian Desert
- Central Highlands and Deccan Plateau
- East Coast
- West Coast
- Islands

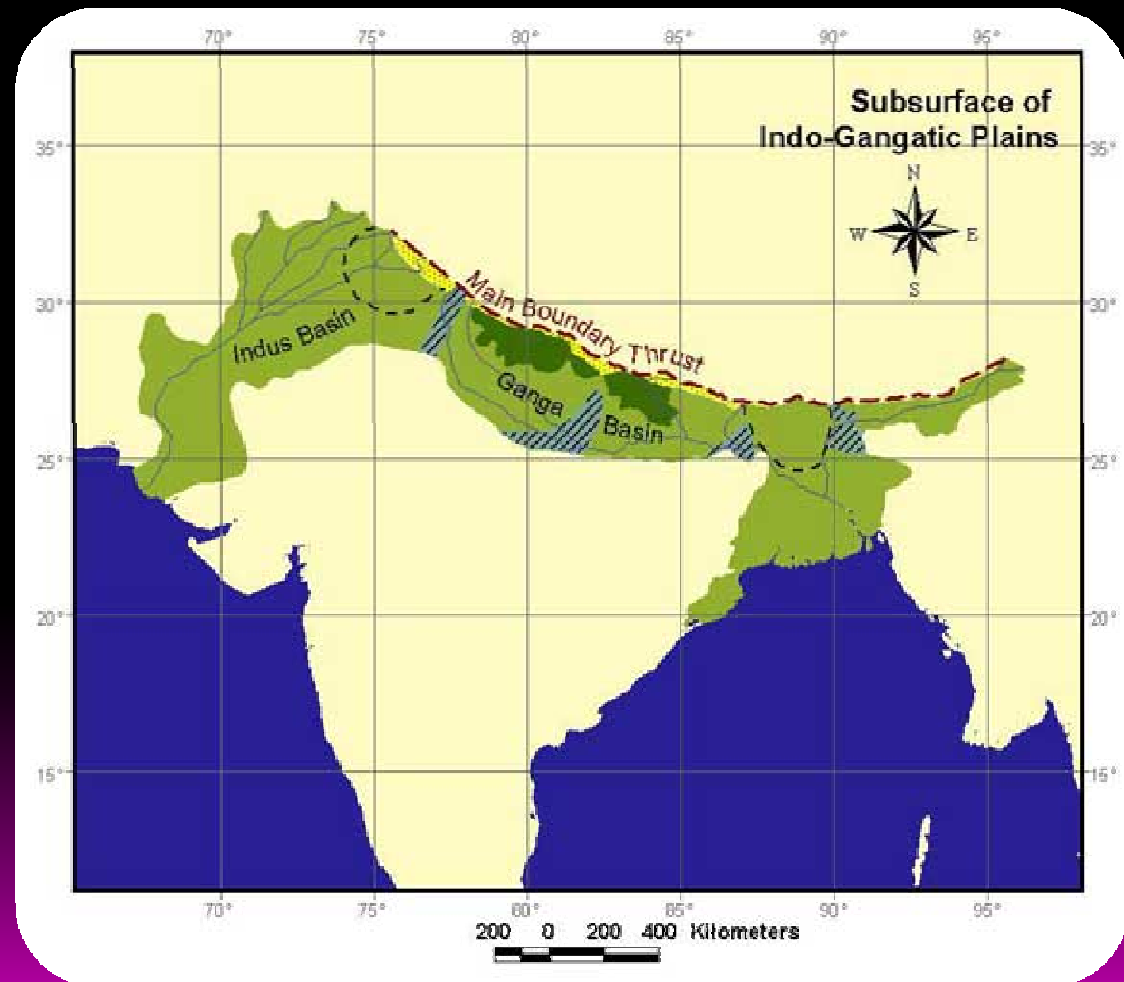
Mountains



- A great arc of mountains, consisting of the Himalayas, Hindu Kush, and Patkai ranges define the northern Indian subcontinent. These were formed by the ongoing of the Indian Plate with the Eurasian Plate that started around 50 million years ago. The mountains in these ranges include some of the world's tallest mountains which act as a natural barrier to cold polar winds. They also facilitate the monsoon winds which in turn influence the climate in India. Rivers originating in these mountains flow through the fertile Indo-Gangetic plains. These mountains are recognized by biogeography's as the boundary between two of the Earth's great ecozones: the temperate Palearctic that covers most of Eurasia and the tropical and subtropical Indomalaya ecozone which includes the Indian subcontinent, Southeast Asia and Indonesia.

Indo-Gangetic Plain

The Indo-Gangetic plains, also known as the Great Plains are large floodplains of the Indus and the Ganges-Brahmaputra river systems. They run parallel to the Himalaya mountains, from Jammu and Kashmir in the west to Assam in the east and draining most of northern and eastern India. The plains encompass an area of 700,000 square kilometers (270,272 sq mi). The major rivers in this region are the Ganges and the Indus along with their tributaries—Beas, Yamuna, Gomti, Ravi, Chambal, Sutlej and Chenab.



The great plains are sometimes classified into four divisions:

- **The Bhabar belt** — is adjacent to the foothills of the Himalayas and consists of boulders and pebbles which have been carried down by the river streams. As the porosity of this belt is very high, the streams flow underground. The bhabar is generally narrow with its width varying between 7 to 15 km.
- **The Terai belt** — lies next to the Bhabar region and is composed of newer alluvium. The underground streams reappear in this region. The region is excessively moist and thickly forested. It also receives heavy rainfall throughout the year and is populated with a variety of wildlife.
- **The Bangar belt** — consists of older alluvium and forms the alluvial terrace of the flood plains. In the Gangetic plains, it has a low upland covered by laterite deposits.
- **The Khadar belt** — lies in lowland areas after the Bangar belt. It is made up of fresh newer alluvium which is deposited by the rivers flowing down the plain.

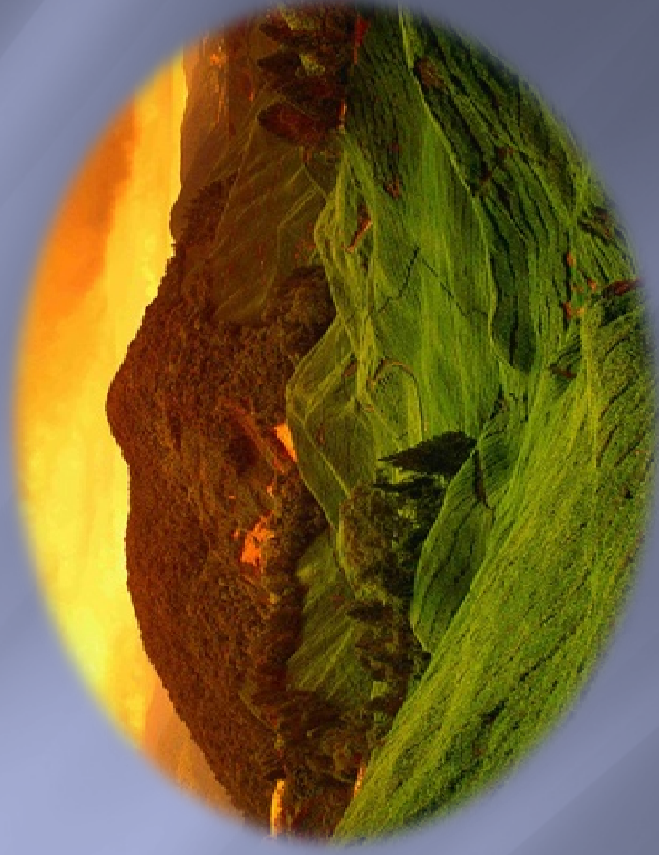
INDIAN DESERT



- ▶ *The Indian Desert (Thar Desert) lies towards the western margins of the Aravali Hills. It is an undulating sandy plain covered with sand dunes. This region receives very low rainfall below 150 mm per year. The Thar Desert (also known as the Great Indian Desert) is the world's seventh largest desert; it forms a significant portion of western India and covers an area of 238,700 km² (92,200 mile²). The desert continues into Pakistan as the Cholistan Desert. Most of the Thar Desert is situated in Rajasthan, covering 61% of its geographic area.*

Highlands

The central highlands comprises of three main plateaus- The Malwa Plateau in the west, the Deccan Plateau in the south (covering most of the Indian peninsula) and the Chota Nagpur Plateau in the east.



The Malwa Plateau



- The Malwa Plateau is spread across Rajasthan, Madhya Pradesh and Gujarat. The average elevation of the Malwa plateau is 500 metres, and the landscape generally slopes towards the north. Most of the region is drained by the Chambal River and its tributaries; the western part is drained by the upper reaches of the Mahi River. Ujjain was the political, economic, and cultural capital of the region in ancient times, and Indore is presently the largest city and commercial centre. Overall, agriculture is the main occupation of the people of Malwa. The region has been one of the important producers of opium in the world. Cotton and soybeans are other important cash crops, and textiles are a major industry.

The Deccan Plateau



The Deccan Plateau is a large triangular plateau, bounded by the Vindhya to the north and flanked by the Eastern and Western Ghats. The Deccan covers a total area of 1.9 million km^2 (735,000 mile^2). It is mostly flat, with elevations ranging from 300 to 600 m (1,000 to 2,000 ft). The average elevation of the plateau is 2,000 feet (600 m) above sea level. The surface slopes from 3,000 feet (900 m) in the west to 1,500 feet (450 m) in the east. It slopes gently from west to east and gives rise to several peninsular rivers such as the Godavari, the Krishna, the Kaveri and the Narmada, which drain into the Bay of Bengal. This region is mostly semi-arid as it lies on the leeward side of both Ghats. Much of the Deccan is covered by thorn scrub forest scattered with small regions of deciduous broadleaf forest. Climate in the Deccan ranges from hot summers to mild winters.

The Chota Nagpur Plateau

- The Chota Nagpur Plateau is situated in eastern India, covering much of Jharkhand and adjacent parts of Orissa, Bihar and Chhattisgarh. Its total area is approximately 65,000 km² (25,000 mile²) and is made up of three smaller plateaus — the Ranchi, Hazaribagh, and Kodarma plateaus. The Ranchi plateau is the largest, with an average elevation of 700 m (2,300 ft). Much of the plateau is forested, covered by the Chota Nagpur dry deciduous forests. Vast reserves of metal ores and coal have been found in the Chota Nagpur plateau. The Kathiawar peninsula in western Gujarat is bounded by the Gulf of Kutch and the Gulf of Khambat. The natural vegetation in most of the peninsula is xeric scrub, part of the Northwestern thorn scrub forests ecoregion.

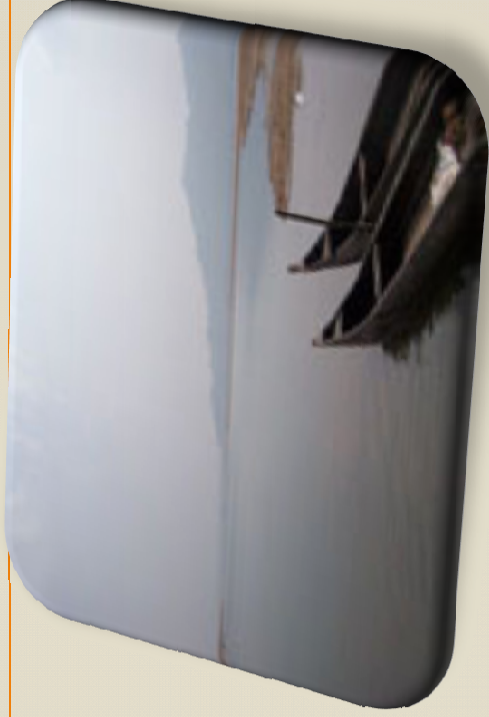
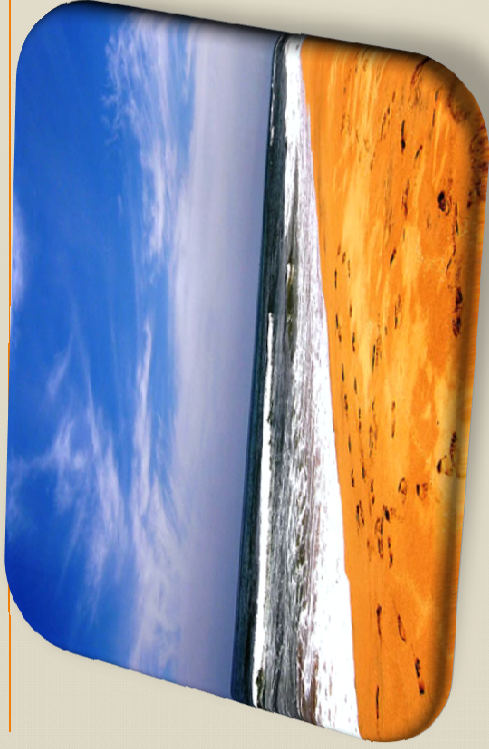


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Coasts



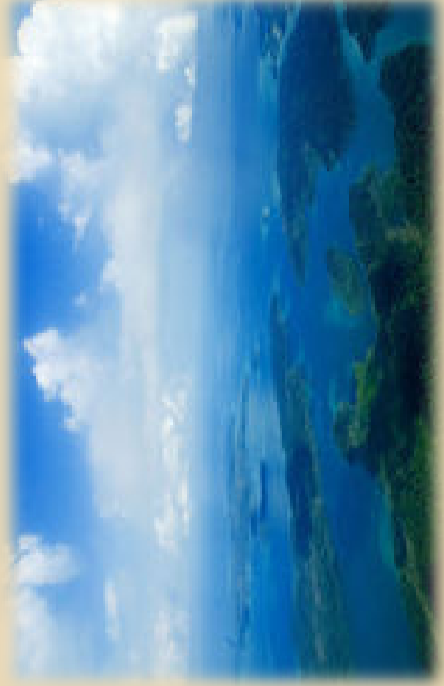
Eastern Coastal Plain



The Eastern Coastal Plain is a wide stretch of land lying between the Eastern Ghats and the Bay of Bengal. It stretches from Tamil Nadu in the south to West Bengal in the north.

The Mahanadi, Godavari, Kaveri and Krishna rivers drain these plains and their deltas occupy most of the area. The temperature in the coastal regions exceeds 30 °C (86 °F) coupled with high levels of humidity. The region receives both the northeast and southwest monsoon rains. The southwest monsoon splits into two branches, the Bay of Bengal branch and the Arabian Sea branch. The Bay of Bengal branch moves northwards crossing northeast India in early June. The Arabian Sea branch moves northwards and discharges much of its rain on the windward side of Western Ghats. Annual rainfall in this region averages between 1,000 mm (40 in) and 3,000 mm (120 in). The width of the plains varies between 100 and 130 km (62 to 80 miles). The plains are divided into six regions — the Mahanadi delta, the southern Andhra Pradesh plain, the Krishna-Godavari deltas, the Kanyakumari coast, the Coromandel Coast and sandy coastal.

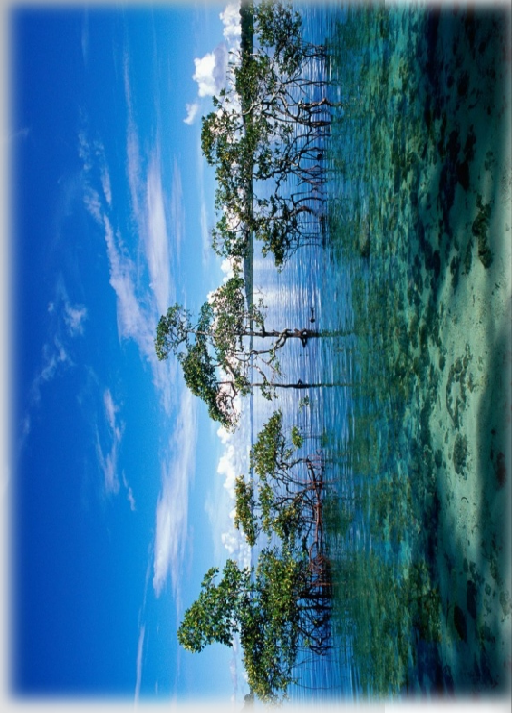
Western Coastal Plain



The Western Coastal Plain is a narrow strip of land sandwiched between the Western Ghats and the Arabian Sea, ranging from 50 to 100 km (30 to 60 miles) in width. It extends from Gujarat in the north and extends through Maharashtra, Goa, Karnataka and Kerala. Numerous rivers and backwaters inundate the region. Originating in the Western Ghats, the rivers are fast-flowing and mostly perennial, leading to the formation of estuaries. Major rivers flowing into the sea are the Tapi, Narmada, Mandovi and Zuari. The coast is divided into 3 parts namely, Konkan, which is situated in Maharashtra, Goa and northern parts of Karnataka; the Kanara in Karnataka and the Malabar Coast in Kerala. Vegetation is mostly deciduous, but the Malabar Coast moist forests constitute a unique ecoregion.



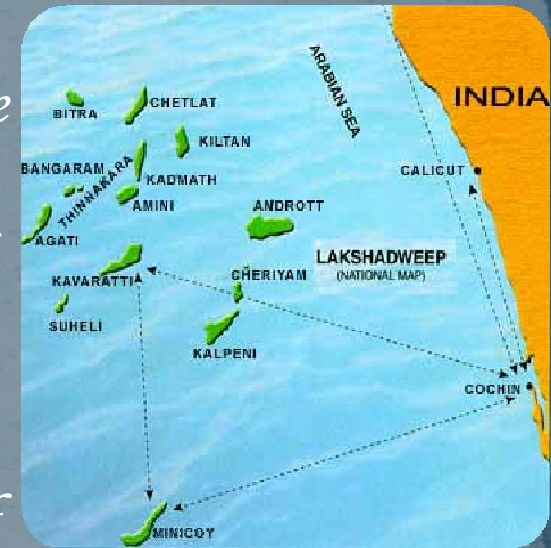
ISLANDS



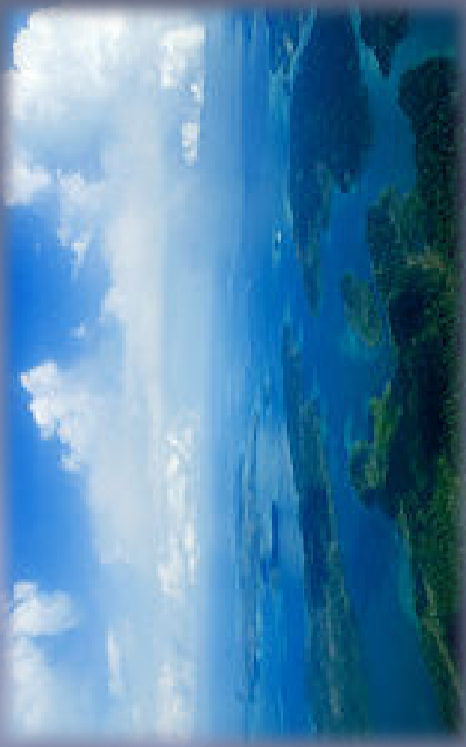
LAKSHADWEEP

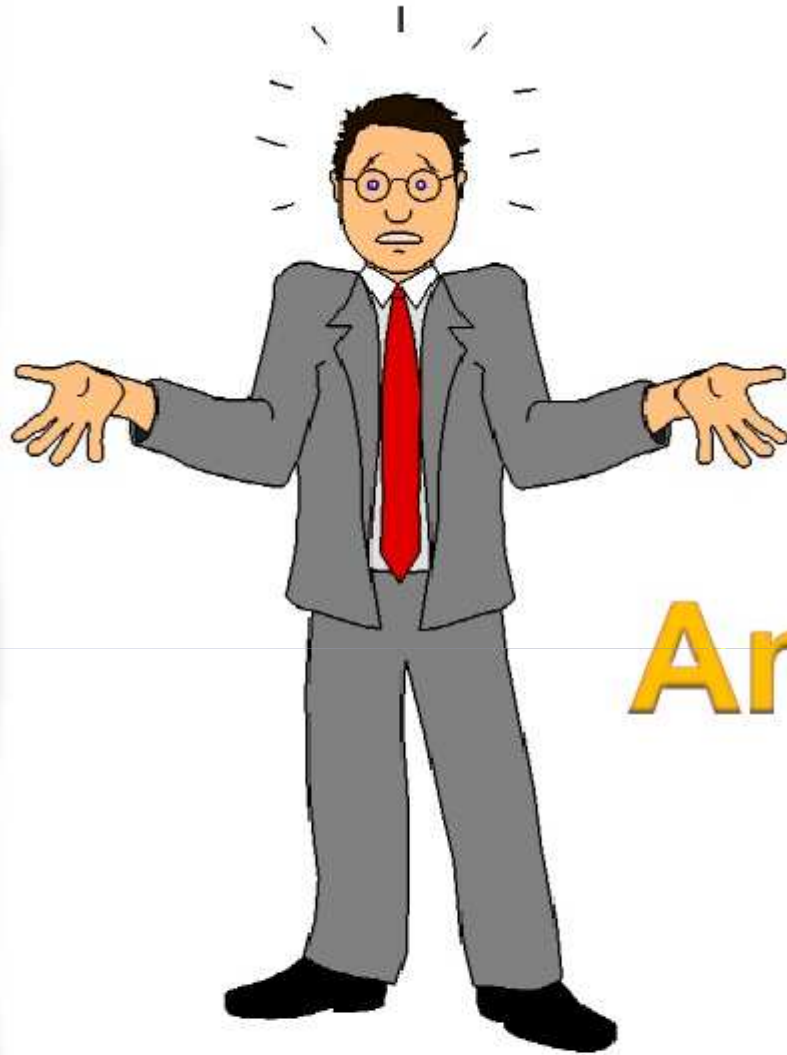


- The Lakshadweep and the Andaman and Nicobar Islands are India's two major island formations which are classified as union territories. Lakshadweep also known as the Laccadive Islands, is a group of islands in the Laccadive Sea, 200 to 440 km off the coast of the South West Indian state of Kerala. The islands form the smallest Union Territory of India. The total land area is 11 sq mi or 32 km². Ten of the islands are inhabited. Lakshadweep is the northern part of the erstwhile Lakshadweepa. The islands are the northernmost among the Lakshadweep-Maldives-Chagos group of islands, which are actually the tops of a vast undersea mountain range, in the Indian Ocean and the Arabian Sea.
- The land area is 32 km²; the lagoon area is about 4200 km², the territorial waters area is 20,000 km² and the economic zone area is 400,000 km².



ANDAMAN AND NICOBAR ISLANDS





Any Questions?