

# **GEOLOGICAL HISTORY OF INDIA**

- **Geographically speaking, India can be divided into different divisions on the basis of relief and topography**
- **Geologically speaking , not based only on relief but on geological history, structure and physiography of each division**

**Each division exhibit marked contrast in Physical features, Stratigraphy and Structure**

- **Peninsula or Peninsular Shield**
- **Indo-Gangetic alluvial plain**
- **Extra-peninsula**

- **Peninsula or Peninsular Shield – Triangular plateau lying to the south of the plains of the Indus and Gangetic river systems**
- **Indo-Gangetic alluvial plain – The vast and extensive tract that lies in between the peninsula and extra-peninsula; Stretching from Assam and Bengal on the east through Bihar and Uttar Pradesh to the Punjab and Sindh (Pakistan) on the west**
- **Extra-peninsula, the mountaineous region of the mighty Himalayan ranges and their extension into Bluchistan on the one hand and Burma and Arakan on the other**

**All the three divisions exhibit marked contrast in Physical features, stratigraphy and structure**

# Physiographic Contrast

- **The Peninsula is an ancient Plateau exposed for long ages to denudation. Its mountains are of relict type i.e they represent the survival of harder masses of rock, which have escaped weathering and removal; their topographical expression may not therefore be directly attributed to their structure. Its rivers traverse, for the most part, a comparatively flat country with low gradients and produce waterfalls and have built up shallow and broad valleys.**
- **The Extra- Peninsula, on the other hand is a region of folded and overthrust mountain chains, of geologically recent origin. Its rivers are youthful and are actively eroding their beds in their precipitous courses and carving out deep and steep sided gorges. Numerous waterfalls are also seen in this region.**
- **The Indo-Gangetic plains free from mountains are broad, monotonous, level expanses built up of recent alluvium through which the rivers flow sluggishly towards the sea.**

# Stratigraphic Contrast

- **The Peninsula is a “Shield area” composed of geologically ancient rocks of diverse origin, most of which have undergone much crushing and metamorphism. Over these ancient rocks lie a few areas of Pre-Cambrian and later sediments and extensive sheets of horizontally bedded lavas of the Deccan Trap formation. Some Mesozoic and Tertiary sediments are found mainly along the coastal regions.**
- **The Extra-Peninsula remained beneath the sea for a considerable period, so there is a pile of sedimentary rocks in age from cambrian to recent. Due to earth movement these sedimentary rocks were compressed, overthrust and elevated into folded mountains. The core of mountains is composed of granitic intrusives of presumably tertiary age. The southern fringe bordering plains consist of fresh water and estuarine deposits of Mio Pliocene age derived largely from erosion of the rising Himalaya**
- **The Indo-Gangetic plain is built up of layers of sands, clay and occasional organic debris of geologically very recent age (Pleistocene and Recent) filling up a deep depression between two other units**

# Structural Contrast

- **The Peninsula represents a stable block of the earth's crust which has remained unaffected by mountain building movement since pre-cambrian era. It has suffered from faulting but all the faults are of gravity type. Along the coast there have been marine transgression which have laid down sedimentary beds of Upper Gondwana, Cretaceous or Tertiary age.**
- **The extra-peninsula has recently undergone earth movements of stupendous magnitude. Its strata are marked by complex folds, reverse faults, over thrusts and nappes of great dimension. There is reason to believe that these movements have not completely died down, for this region is still unstable and is frequently visited by earthquakes of varying intensity**
- **The Indo-gangetic plain is a depression or sag in the crust probably formed contemporaneously with the uplift of Himalaya. This sag or depression has since been filled with sediments derived from both sides and especially from the lofty chain of Himalaya which are actively being eroded by many rivers traversing them**

## **Peninsula rivers**

- **Damodar , Krishna, Mahanadi, Godavari, Cauvery**

**Flow into Bay of Bengal**

**Narmada and Tapi flow into Arabian sea**

**Banas, Luni, Chambal, Sindh, Sothern Tons and Sone are Peninsula rivers of Northern India belonging to Ganges while few others rising in Central India and the Aravalis and flow into Rann of Kutch or Gulf of Cambay**

## **Extra-peninsula rivers**

**Himalaya gave rise to 20 important rivers. They rise from great Himalaya, Karakoram, Ladakh, Zanskar, Kailash and Trans Himalayan ranges and ultimately join together to form three great river systems**

- **Indus**
- **Ganga**
- **Brahmaputra**

# **Peninsula Mountains**

**The chief mountains of Peninsula India are the Western and Eastern Ghats, Vindhya, Satpuras, the Aravallis and those forming Assam Plateau**

**Western Ghats: 1600 km long; elevation 1000 to 1300m but some peaks rise to over 2400m (Nilgiri, Anamalai and in Palni hills situated close to Arabian sea, from the watershed of Peninsula)**

**Eastern Ghats: Composed of charnokites ; elevation 750m but some points rise to 1500m**

**Vindhyan Mountains: Separates South from Northern India; elevation 450 to 600m. Majority of ranges composed of sandstone and quartzite of Vindhyan system**

**Satpura Mountains: Hills of Madhya Pradesh which separates Narmada and Tapi river. In eastern part Satpura are composed of Gondwana and Archean gneisses**

**Rajmahal Hills: At the head of the Ganges Delta were once regarded as part of the Vindhyan or the Satpuras. Composed of lava flows**

**Aravali Mountains: These are remnants of once great mountain range of tectonic origin. They cross Rajasthan from south-west to north east separating arid semi deserts of Bikaner, Jodhpur and Jaisalmer area. Composed of rocks of Aravali, Delhi and Vindhyan system**

## **Extra-Peninsula ranges**

**The mountains surrounding Indo-pakistan on the north, NW and NE are tectonic ranges formed during the Tertiary. They consist mainly of circular arc which are convex towards the Peninsula**

**Tibet: The Tibetan Plateau has an average altitude of 4200m. To its NW is the Pamir Plateau. Tibetan Plateau is covered to a large extent by alluvium and loess.**

**Karakoram: The Karakoram range forms the backbone of the Tibetan region and is continuous with the Hindukush range to its west.**

**Peaks of Karakoram are K<sup>2</sup> (8640m), Gasherbrum (8068m), Masherbrum (7821m) etc. It forms the chief water parting between Central Asia and South Asia. South of Karakoram in Tibet is a range of snow-clad mountains named Aling Kangri. Between Aling Kangri and the Kailash range lies another range called Trans Himalaya**

**Kailash and Ladakh range: South of Trans Himalaya is the Kailash range, the latter being parallel to and some 80 km north of the Ladakh range**

**The Zaskar range: Lying between the Ladakh range on the north and the Great Himalaya on the south. Peak is Kamet (7766m)**

**The Pir Panjal: Forms the southern boundary of the Kashmir valley**

# **Himalaya**

**The Himalaya can be divide longitudinally into four zones parallel to each other**

**Siwaliks: 10 to 50 km wide, altitude exceeds 900m. Rainfall varies between 120 cm in the west to 250 cm in the east**

**Lesser Himalayan Zone: 60 to 80 km wide, an average altitude of 3000m. The zone between 1500 and 2400 m is covered by evergreen and oak forest and between 2400 to 3000 m by coniferous forests. In the lower slopes are found chir, deodar, blue pine, oak and magnolias and above 2500 m are birch, silver, fir, spruce etc.**

**Great Himalaya: Zone of snow capped peaks. Shows sedimentary and metamorphosed rocks which have intruded by large mass of granite, altitude ranges from 3000 to 5000 m.- alpine zone**

**Trans Himalayan Zone: about 40 km in width containing the valleys of rivers rising behind the Great Himalaya. These river basins are at an altitude of 3600 to 4200 m and consist of rocks of geosynclinals or Tibetan facies. Best known ranges are Nag Tibba, The Mahabharat and Dhauladhar ranges in Nepal and UP and The Pir Panjal in Punjab and Kashmir**