
जलवायु
Climate

- **Weather** is the temporary state of the atmosphere, while **climate** refers to the average of the weather conditions over a longer period of time.

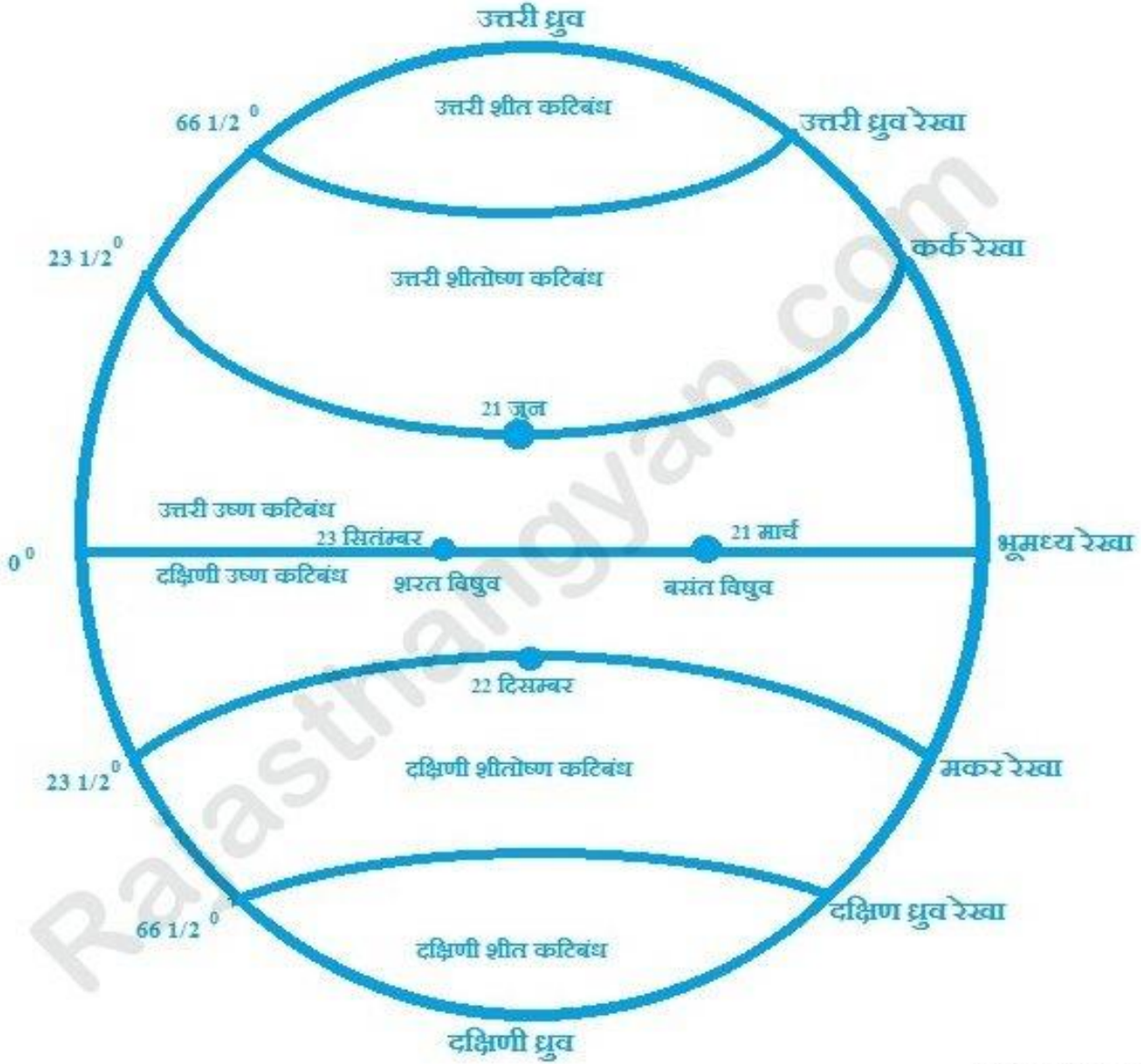
- Weather changes quickly, may be within a day or week, but climate changes in after 50, 100 years, or even more.

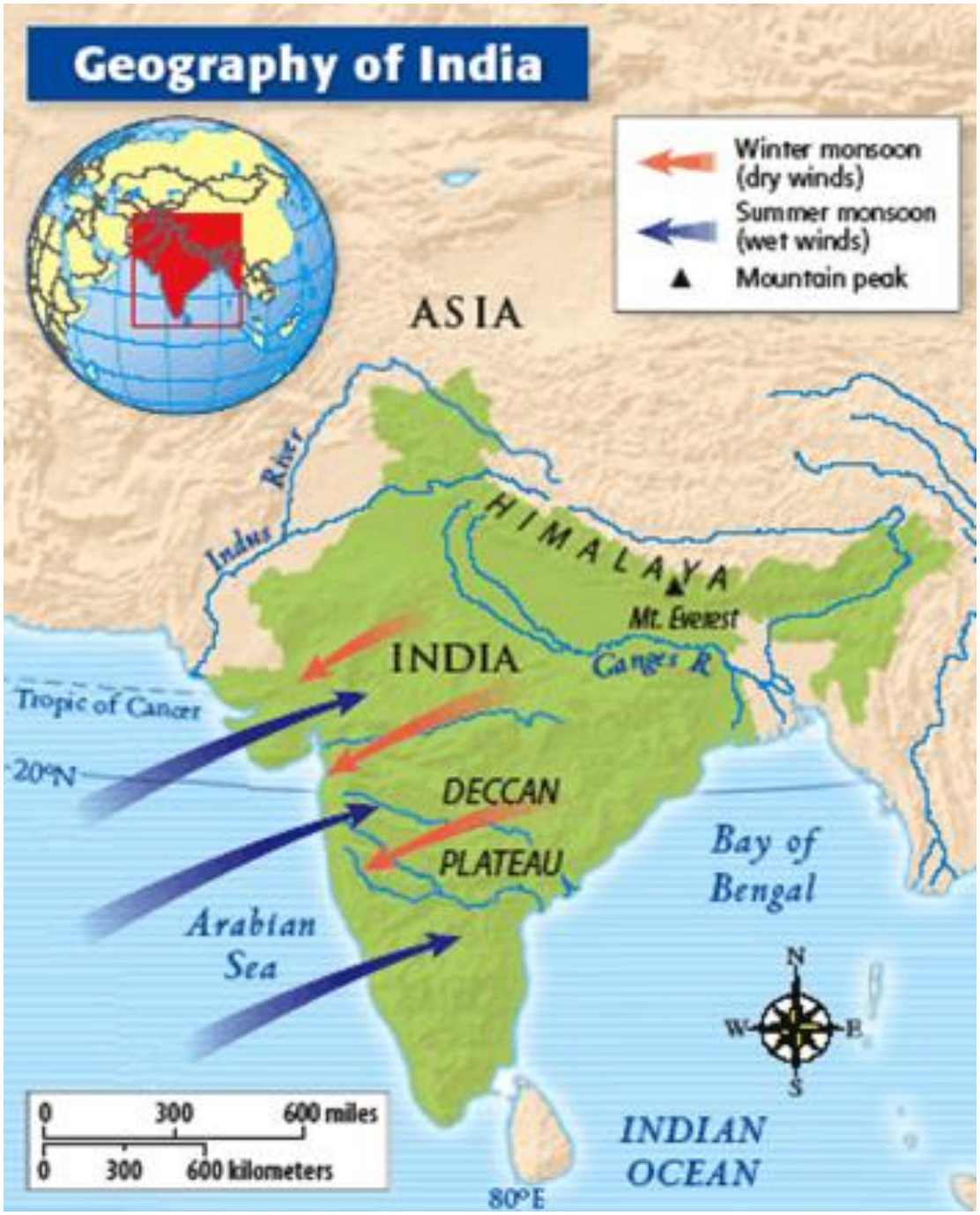
- The climate of India has distinct regional variations discernible by the pattern of winds, temperature, and rainfall; further, also in the form of rhythm of seasons and the degree of wetness or dryness.
- मौसम वायुमंडल की क्षणिक अवस्था है, जबकि जलवायु का तात्पर्य अपेक्षाकृत लंबे समय की मौसमी दशाओं के औसत से होता है।
- मौसम जल्दी–जल्दी बदलता है, जैसे कि एक दिन में या एक सप्ताह में, परंतु जलवायु में बदलाव 50 अथवा इससे भी अधिक वर्षों में आता है।
- मानसून से अभिप्राय ऐसी जलवायु से है, जिसमें ऋतु के अनुसार पवनों की दिशा में उत्क्रमण हो जाता है।
- भारत की जलवायु उष्ण मानसूनी है, जो दक्षिणी एवं दक्षिणी–पूर्वी एशिया में पायी जाती है।

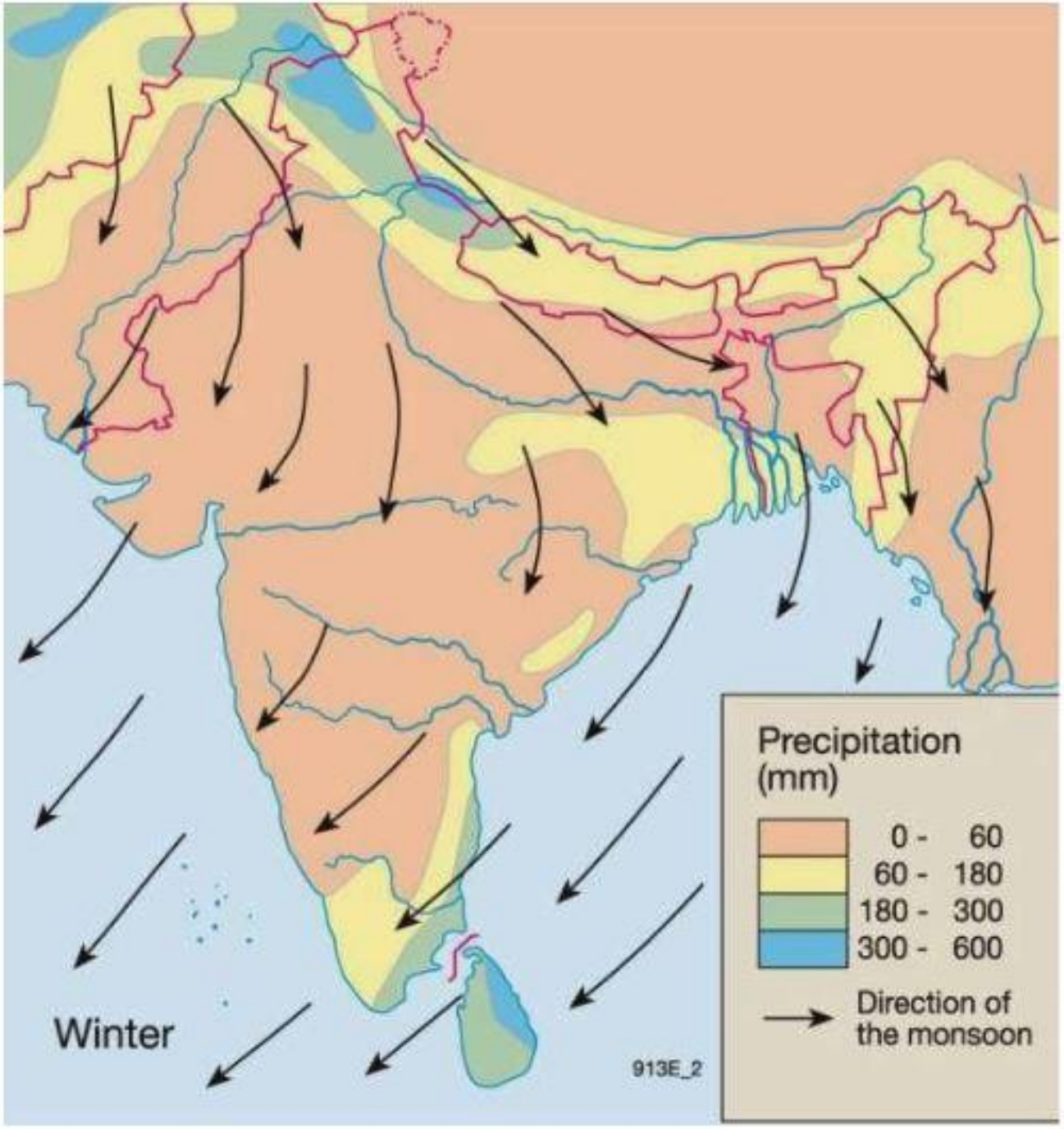
Factors Influencing Climate

Major factors that determine the climate of India are:

- Latitude
- The Himalayan Mountains
- Distribution of land and water
- Distance from the sea
- Altitude
- Relief



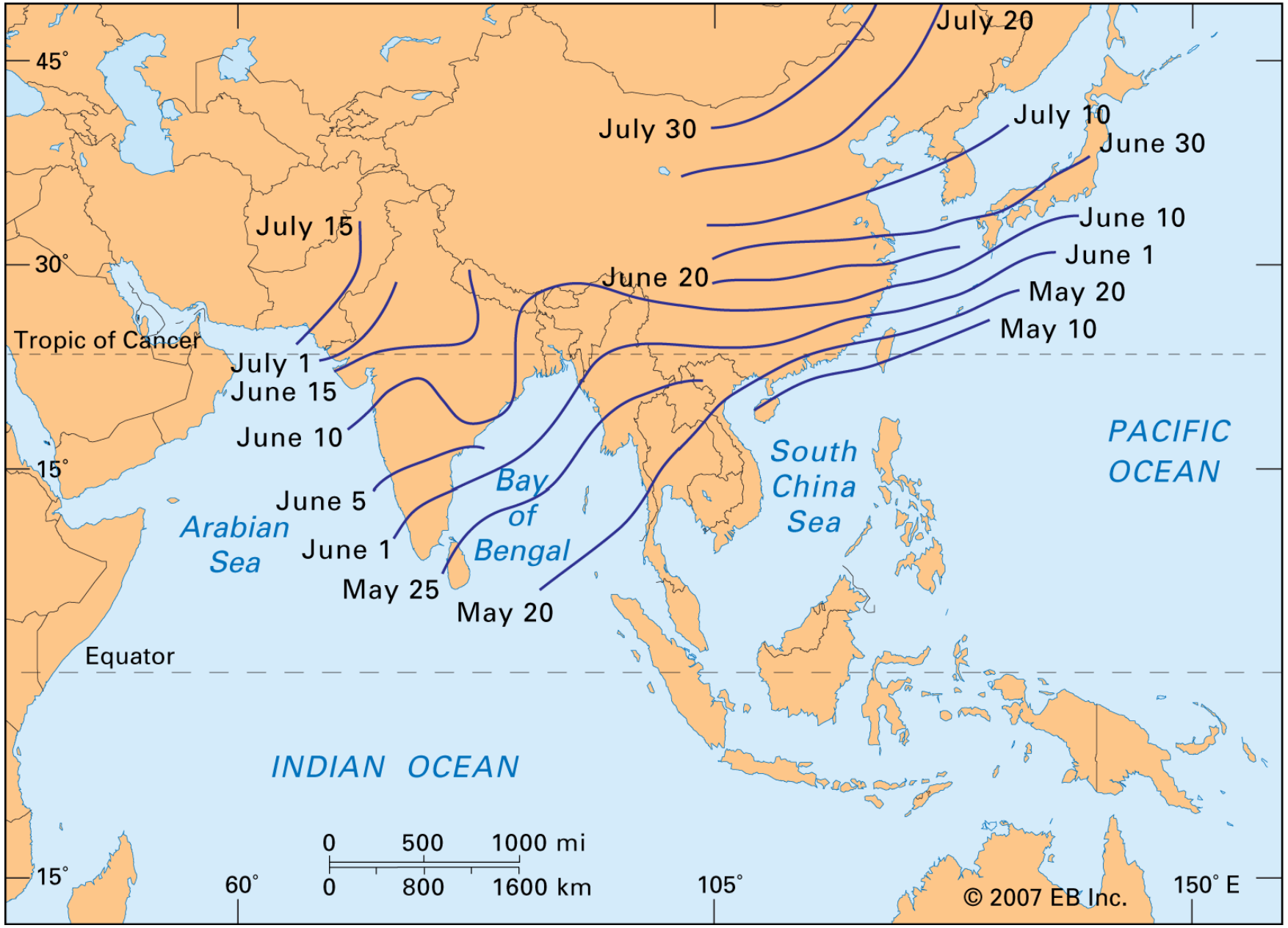

Geography of India
Winter monsoon (dry winds)
Summer monsoon (wet winds)
Mountain peak
ASIA
Indus River
HIMALAYA
Mt. Everest
Ganges R.
INDIA
Tropic of Cancer
20°N
DECCAN
PLATEAU
Bay of Bengal
Arabian Sea
N
W
E
S
0 300 600 miles
0 300 600 kilometers
INDIAN OCEAN
80°E


Winter
913E_2
Precipitation (mm)
0 - 60
60 - 180
180 - 300
300 - 600
Direction of the monsoon

Winter Monsoon

- During the **winter**, north of the Himalayas develops a high pressure center.
- This high pressure center gives rise to the flow of air at the low level from the north towards the Indian subcontinent (i.e. south of the mountain range).
- All of Western and Central Asia remains under the influence of westerly winds (known as **Jet Stream**) along the altitude of **9-13 km** from west to east.
- These winds blow across the Asian continent at the latitudes, north of the Himalayas, roughly parallel to the Tibetan highlands.

- However, Tibetan highlands act as a barrier in the path of these jet streams, as a result of this, the jet streams get bifurcated into two branches.
- One branch is located to the south of the Himalayas, while the second branch is positioned to the north of Tibetan Plateau.
- The western cyclonic disturbances, which enter the Indian subcontinent from the west and the northwest during the winter months, originate over the Mediterranean Sea and are brought into India by the westerly jet stream.


July 20
July 30
July 10
June 30
July 15
June 10
June 20
June 1
May 20
May 10
July 1
June 15
June 10
June 5
June 1
May 25
May 20
45°
30°
15°
Tropic of Cancer
Equator
Arabian Sea
Bay of Bengal
South China Sea
PACIFIC OCEAN
INDIAN OCEAN
0 500 1000 mi
0 800 1600 km
15°
60°
105°
150° E
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Summer Monsoon

During the **Summer**, the wind circulation over the subcontinent undergoes a complete reversal at both, the lower as well as at the upper levels.

By the middle of July, the low pressure belt nearer the surface [termed as **Inter Tropical Convergence Zone** (ITCZ)] moves northwards, roughly parallel to the Himalayas between 20° N and 25° N (as shown in the image given below).

The ITCZ is a zone of low pressure, attracts inflow of winds from different directions.

With the apparent northward movement of the Sun towards the Tropic of Cancer in March, temperatures start rising in north India, which is the sign of advent of Summer season.

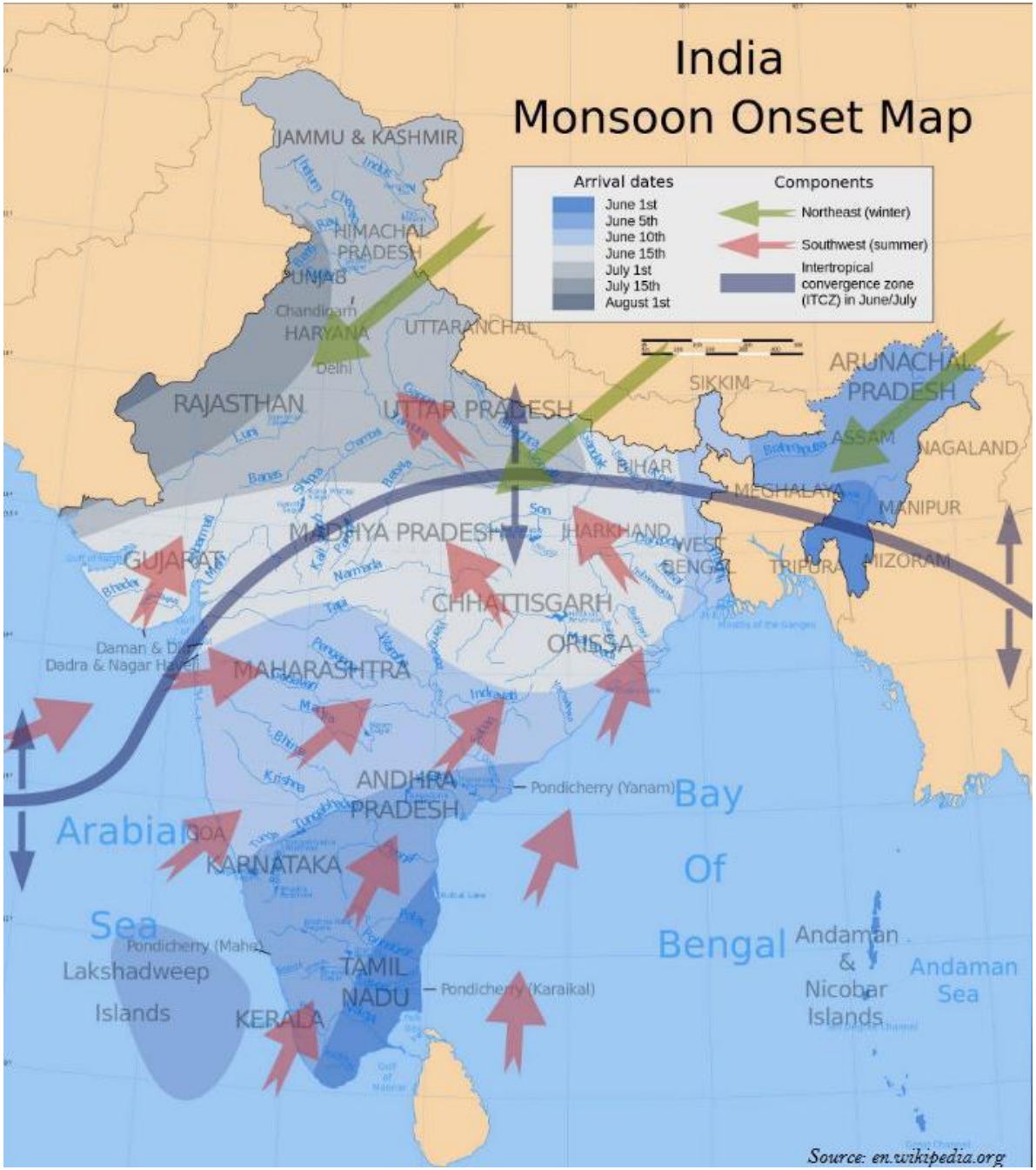
- April, May, and June are the months of summer in north India.
- In the heart of the ITCZ in the northwest, the dry and hot winds known as ***Loo***, blow in the afternoon, and very often, they continue to well into midnight.
- Towards the end of the summer, there are pre-monsoon showers, which are a common phenomenon in Kerala and coastal areas of Karnataka.
- This phenomenon is locally known as **mango showers,** as it helps in the early ripening of mangoes.

Monsoon

- The maritime tropical air mass (mT) from the southern hemisphere crosses the equator and rushes towards the low pressure area; in general, the southwesterly direction.
- This moist air current causing rainfall in India is popularly known as the **southwest monsoon**.
- **easterly jet stream** flows over the southern part of the Peninsula in June with a maximum speed of 90 km per hour.

- The easterly jet stream steers the tropical depressions into India and these depressions play a significant role in determining the distribution of monsoon rainfall over the Indian subcontinent.
- The tracks of these depressions are the areas of the highest rainfall in India.
- The southwest monsoon, which is a continuation of the southeast trades, get deflected towards the Indian subcontinent after crossing the Equator.
- The easterly jet stream is held responsible for the burst of the monsoon in India.
- The southwest monsoon sets first over the Kerala coast by 1st of June and then moves swiftly to reach Mumbai and Kolkata between 10th and 13th June. Further, by mid-July, southwest monsoon engulfs the entire subcontinent.
- Southwest monsoon gets divided into two branches — the **Arabian Sea,** causing rain in western coast of India and the **Bay of Bengal branch,** causing rain in eastern coast to India.

- Generally, the cold weather season sets in by mid-November in northern India.
- However, the Peninsular region of India does not have any well-defined cold weather season.
- There is hardly any seasonal change in the distribution pattern of the temperature in coastal areas because of the moderating influence of the sea and the proximity to the equator.
- Winter monsoons do not cause rainfall, as they move from land to the sea. Hence, primarily, they have little humidity; and secondly, due to anticyclonic circulation on land, the possibility of rainfall from them reduces.
- However, in northwestern India, some weak temperate cyclones coming from the Mediterranean Sea (with little moisture) cause rainfall in Punjab, Haryana, Delhi, and western Uttar Pradesh.
- On the other hand, during October and November, northeast monsoon while crossing over the Bay of Bengal, picks up moisture and causes torrential rainfall over the Tamil Nadu coast, southern Andhra Pradesh, southeast Karnataka, and southeast Kerala.


India
Monsoon Onset Map
Arrival dates
June 1st
June 5th
June 10th
June 15th
July 1st
July 15th
August 1st
Components
Northeast (winter)
Southwest (summer)
Intertropical convergence zone (ITCZ) in June/July
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
Chandigarh
HARYANA
Delhi
UTTARANCHAL
RAJASTHAN
UTTAR PRADESH
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
BIHAR
MEGHALAYA
MANIPUR
MADHYA PRADESH
JHARKHAND
WEST BENGAL
TRIPURA
MIZORAM
GUJARAT
CHHATTISGARH
ORISSA
Daman & Diu
Dadra & Nagar Haveli
MAHARASHTRA
ANDHRA PRADESH
Pondicherry (Yanam)
Arabian Sea
GOA
KARNATAKA
Bay Of Bengal
Pondicherry (Mahe)
Lakshadweep Islands
TAMIL NADU
Pondicherry (Karaikal)
KERALA
Andaman & Nicobar Islands
Andaman Sea
Source: en.wikipedia.org