# Delta

Delta is a *depositional feature of a river formed at the mouth of the river.*

**Formation of Delta**

- A river moves more slowly as it nears its **mouth, or end.** This causes sediment, solid material carried downstream by currents, to fall to the river bottom.
- The slowing velocity of the river and the build-up of sediment allows the river to break from its single channel as it nears its mouth.

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**Factors Affecting Delta Formation**

- Climatic conditions
- Geologic setting
- Sediment sources in the drainage basin
- Tectonic stability
- River slope and flooding characteristics
- Intensities of depositional and erosional processes
- Tidal range and offshore energy conditions

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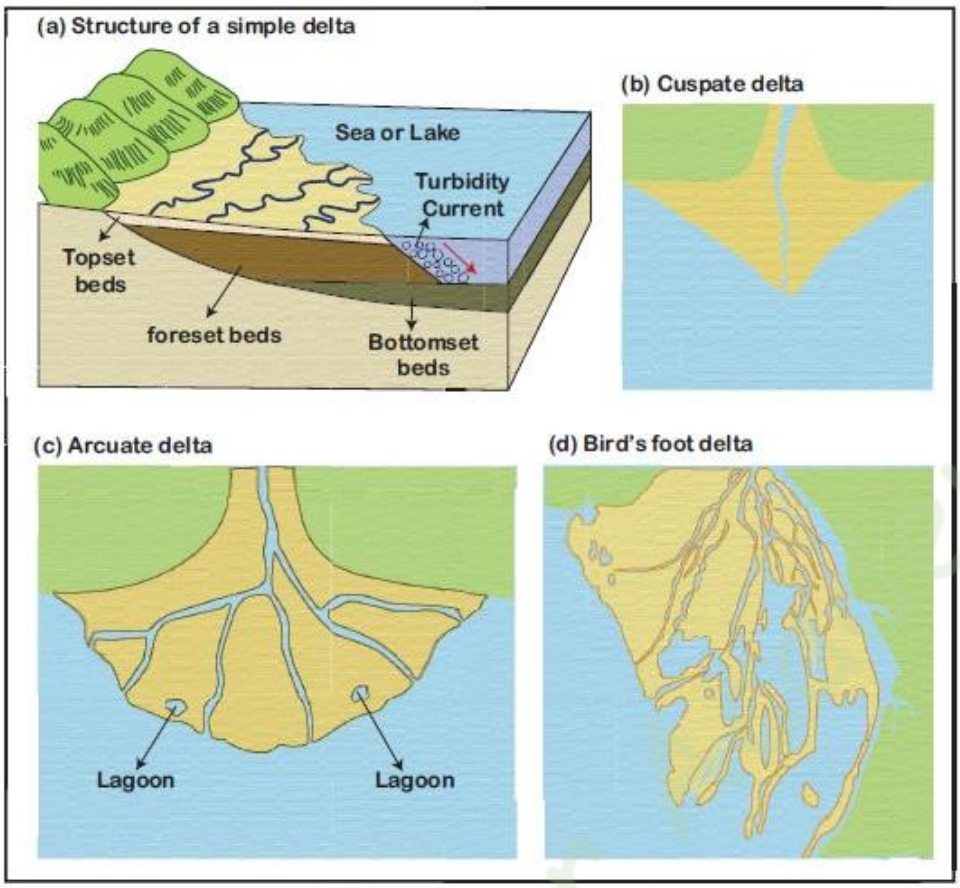
## Types of Deltas




Types of Delta

**• Arcuate Delta:**

It is fan-shaped Delta. A bowed or curved Delta with the convex margin facing the body of water.

***Example:*** **Nile, Ganges.**

**• Bird's foot Delta:**

Bird foot's claw. This shape is created when the waves are weak and the river flow is stronger. They are formed due to deposition of finer materials by river water.

***Example:*** **Mississippi, USA.**

**• Cuspate Delta:**

It is formed where sediments are deposited onto a straight shoreline with

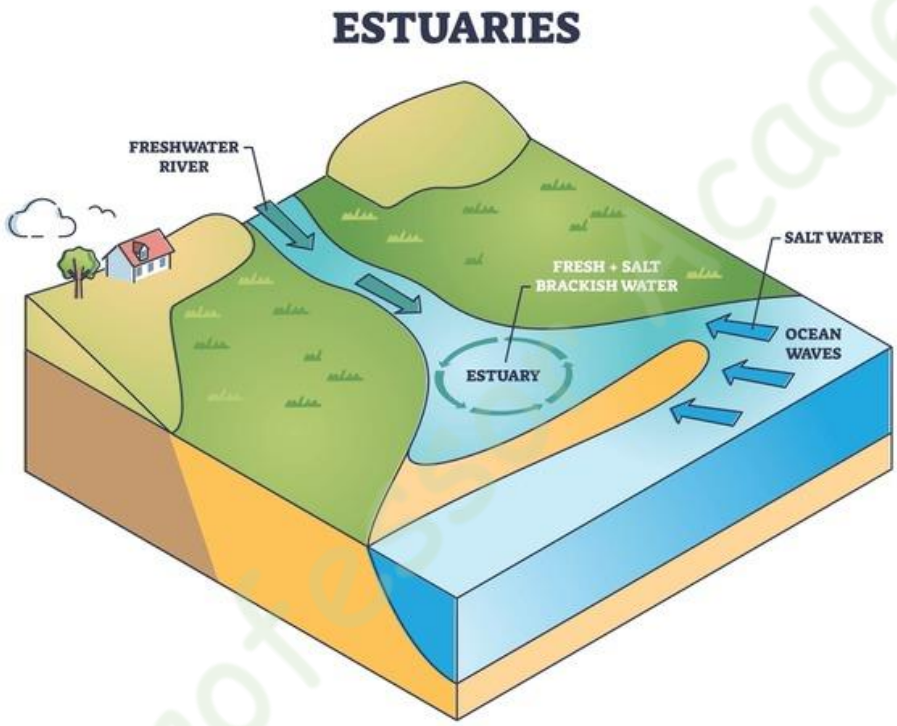
strong waves. The waves push the sediments to spread outwardly creating the tooth-like shape.

***Example:*** **Tiber River of Italy.**

**• Estuarine Delta:**

It is formed at the mouth of submerged rivers depositing down the sides of the estuary.

***Example:*** **Seine River of France, Deltas of Narmada and Tapi (Tapti) rivers of India.**




**• Lacustrine Delta:**

It is formed when a river flows into a lake.

***Example:*** **Lough Leanne river Delta, Ireland.**

**• Truncated Delta:**

Sea waves and ocean currents modify and even destroy Deltas deposited by the river through their erosional work. Thus, eroded and dissected Deltas are called truncated Deltas.

## Loess Deposits

- Loess is a fine-grained, wind-blown sediment mainly composed of silt-sized particles (0.002–0.05 mm) derived from **glacial and desert** regions.
- The **Chinese Loess Plateau** (Huangtu Plateau) is the **largest and thickest** loess deposit on Earth.


- Loess occurs as thin blankets and hill slopes along the **Thar Desert margins.**
- **Pleistocene loess** deposits found around **Srinagar, Karewa formations, and Jhelum valley.**
- **The Indus valley and Leh** region show **thick loessic silts** interbedded with glacial and fluvial materials.

## 🌾 According to Recent Economic Survey 2024–25

Following are the **top three states** in production of important crops

### I. Foodgrains

**Rice**

1. Telangana
2. Uttar Pradesh
3. West Bengal

**Wheat**

1. Uttar Pradesh
2. Madhya Pradesh
3. Punjab

**Maize**

1. Karnataka
2. Bihar
3. Madhya Pradesh

**Total Nutri / Coarse Cereals**

1. Rajasthan
2. Karnataka
3. Madhya Pradesh

**Tur**

1. Karnataka

2. Maharashtra
3. Uttar Pradesh

**Gram**

1. Madhya Pradesh
2. Maharashtra
3. Rajasthan

**Total Pulses**

1. Madhya Pradesh
2. Maharashtra
3. Rajasthan

**Total Foodgrains**

1. Uttar Pradesh
2. Madhya Pradesh
3. Punjab

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## II. Oilseeds

**Groundnut**

1. Gujarat
2. Rajasthan
3. Madhya Pradesh

**Rapeseed & Mustard**

1. Rajasthan
2. Uttar Pradesh
3. Madhya Pradesh

**Soyabean**

1. Madhya Pradesh
2. Maharashtra
3. Rajasthan

**Sunflower**

1. Karnataka
2. Haryana
3. Odisha

**Total Oilseeds**

1. Rajasthan
2. Madhya Pradesh
3. Gujarat

**Sugarcane**

1. Uttar Pradesh
2. Maharashtra
3. Karnataka

**Cotton**

1. Gujarat
2. Maharashtra
3. Telangana

**Jute & Mesta**

1. West Bengal
2. Bihar
3. Assam

# 🌍 Structure of the Atmosphere – Summary

### 1. General Features

- **50%** of atmospheric gases and pressure phenomena lie below **5.6 km, and 97%** within **29 km.**
- The atmosphere is divided into layers based on:
  **(i) Thermal characteristics**
  **(ii) Chemical composition**

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### 🌡 A. Thermal Characteristics

**Five main thermal layers (S. Pettersson):**

1. Troposphere
2. Stratosphere
3. Ozonosphere (included within Stratosphere)
4. Ionosphere
5. Exosphere

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### (1) Troposphere

- Lowest layer; extends up to **8 km at poles** and **17 km at equator**.
- Contains **75 %** of total atmospheric gases, including water vapour, dust, aerosols.
- Known as **the "turbulent" or "convective"** layer due to active mixing and weather processes.

- **All weather** phenomena (clouds, rainfall, storms, lightning, etc.) occur here.
- Temperature decreases with height at an average lapse rate of **6.5 °C/km**.
- The upper limit is the **tropopause.**

**Tropopause:**

- Boundary separating troposphere and stratosphere.
- Height: **~17 km at equator, 9–10 km at poles**.
- Temperature: **~–70 °C at equator, –60 °C at mid-latitudes, –58 °C at poles**.
- Pressure: **~100 mb (equator), 250 mb (poles).**
- Shows seasonal and latitudinal variation.
- Marks the level "**where mixing stops".**
- **Jet streams and tropical cyclones** can disturb its continuity.

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**(2) Stratosphere**

- Lies above the tropopause, extending from **17 km** to about **50 km**.
- **Temperature increases with height** due to ozone absorption of UV radiation.
- Lower part (15–35 km) is called the ozonosphere, with maximum ozone concentration at ~22 km.
- Stable air and absence of weather make it suitable for **aircraft flight**.

- Stratopause is the upper boundary (~50 km).
- Clouds**: "Mother-of-pearl" or nacreous clouds** occasionally form.

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**(3) Mesosphere**

- Extends from **50 km to 80 km.**
- **Temperature decreases with height** (as low as –100 °C to –135 °C**).**
- The **coldest layer** of the atmosphere.
- **Meteors burn** in this layer**.**
- The upper boundary is the mesopause (~80–90 km).
- **Noctilucent** clouds (formed by condensation of meteoric dust) occur here.

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**(4) Thermosphere**

- Above mesopause, extends **~80 km to 640 km.**
- **Temperature rises sharply with height** (up to ~1700 °C or more).
- **Air is extremely thin;** ordinary thermometers cannot measure temperature.

- **Divided into two sublayers:**
    1. **Ionosphere (80–640 km) –** contains ionized gases; reflects radio waves.

- **Layers: D, E, $F_1$, $F_2$** (Kennelly-Heaviside and Appleton layers).
- Responsible for **radio communication and auroras.**

2. **Exosphere (beyond 640 km) –** outermost layer; air extremely rarefied.
   - Temperature up to **5568 °C; gases escape into space.**
   - **Contains hydrogen and helium;**
   - Includes **Van Allen radiation belts and auroras (aurora borealis, aurora australis).**

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### 🔬 B. Chemical Characteristics

**1. Homosphere (0–90 km)**

- **Uniform chemical composition due to turbulence.**
- Main gases**: Nitrogen 78 %, Oxygen 21 %, Argon 0.93 %, $CO_2$ 0.04 %.**
- **Also contains ozone, neon, helium, methane, hydrogen in traces.**
- Includes troposphere, stratosphere, mesosphere.

**2. Heterosphere (90 km – 10,000 km)**

- Gases are arranged by **molecular weight** due to lack of mixing.
- **Divided into four sub-layers:**
  (i) Molecular nitrogen layer – 90–200 km
  (ii) Oxygen layer – 200–1100 km

(iii) Helium layer – up to 3500 km

(iv) Atomic hydrogen layer – extends to the outermost limit of atmosphere