

Sea-level changes

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Introduction:

- The sea-level continues to fluctuate through time.
- it changes according to tide on day to day basis but it also changes on a large time scale too.
- Ice ages and other climatic events cause sea level change for grander time scale.
- The variety of reasons that cause sea-level change can be categorized into these two-
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On the basis of effect of sea level change-

Types of
sea level
change

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graph LR; A[Types of sea level change] --- B[1. Eustatic]; A --- C[2. Isostatic]
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1. Eustatic

2. Isostatic

1. Eustatic change:

- It occurs when the sea-level changes due to increase or decrease in volume of water or change in shape of an ocean basin and hence a change in the water-holding capacity of sea.
- It is always associated with global change i.e. it shows global-effect.
- It takes place during and after ice-age.
- During ice-age, the temperature falls and water is frozen and stored in glaciers, this reduces the sea-level and as soon as ice-age ends the temperature starts rising which lead to re-entering of glacial water into sea , increasing the sea-level .

- The shape of ocean basin may change due to tectonic earth movement. If there is enlargement of ocean basin then volume of ocean basin increases and overall sea-level decline, because of presence of same volume of water in the sea.

Causes of Eustatic change

1. Natural change in climate-

Glaciation of water due to natural decrease in temperature for prolonged period of time.

Eg: Ice-age

2. Tectonic Plate movement-

Expansion of sea floor at divergent plate boundary

Eg: Atlantic Sea floor expanded due to Se floor Spreading

2. Isostatic change

- Isostatic sea-level change is the result of an increase or decrease in the height of land.
- When the height of land increases, the sea-level falls and when the height of land decreases the sea-level rises.
- It is a local sea level change whereas eustatic change is a global level change.

Causes of Isostatic change

(i) Tectonic uplift or depression

- This takes place only along plate boundaries so this change takes place in certain areas of the world.

(ii) Build up of Ice on land

- During glaciation water is stored in the form of ice on land which makes the land sink and depress slightly leading to increase in sea-level.
- Again, at the end of ice age the land rebounds or moves upward leading to decrease in sea-level as occurring to this day

Factors affecting sea-level

- Rotation of the Earth-tides cause day to day change in sea-level
- Solar variability-more sunrays means more evaporation
- Volcanic eruption- it causes change in temperature, if rise in temperature then deglaciation, if decrease in temperature then glaciation
- Atmospheric Aerosol-
 - more amount of Co2 → increase in temperature →
 - global warming → climate change →
 - Sea-level change

- Tectonic Movements- Uplift or depression of land as well as increase and decrease in ocean basin area.

Conclusion:

- Sea-level is constantly changing and reason may be anthropogenic factors or may be due to rebound of land after ice age but as per recent data, it is rising rapidly due to global warming.
- Rise in sea-level is serious threat to coastal settlements.