



Glacial Retreat

For Prelims: Glacial Retreat, Floods, Landslide, Pensilungpa Glacier (PG), Durung-Drung Glacier (DDG).

For Mains: Factors Influence Glacial Dynamics, Impact of Glacial Retreat

Why in News?

Recent studies on Himalayan glaciers show that the **variability in retreat rate and mass balance** in different sectors of the mountain range is primarily linked to [topography](#) and [climate](#).

- However, **variable retreat rates of glaciers** and inadequate supporting field data make it **challenging to develop a coherent picture of climate change impact**.

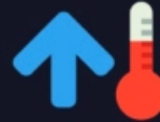
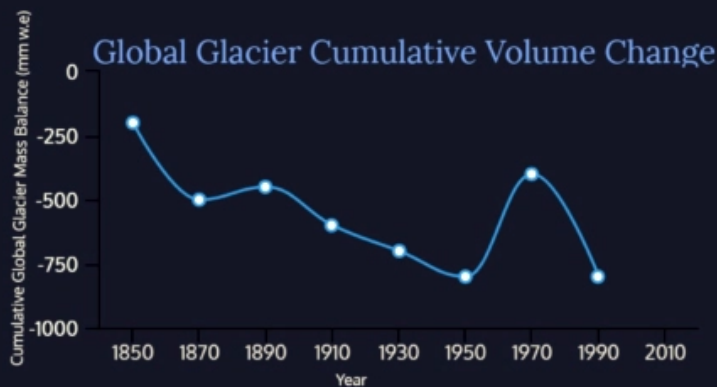
What are the Factors Influence Glacial Dynamics?

- A team from **Wadia Institute of Himalayan Geology** (Uttarakhand) studied two glaciers with different characteristics, the **Pensilungpa Glacier (Ladakh)** and the **Durung-Drung Glacier, (Ladakh)** for a comparative study of glacier fluctuations between **1971 and 2019**.
 - They quantitatively evaluated the influence of the **debris cover on the loss of ice mass** in summer and on the terminal recession of glaciers.
- Their study confirms that the **glacier retreat rate is controlled by climate change** and the **topographic setting and morphology of the glacier**.
 - They also found that the **thickness of the debris cover significantly alters the glacier response** to climate forcing.
- Other factors such as **snout geometry, glacier size, elevation range, slope, aspect, debris cover, as well as the presence of supra and proglacial lakes** also influence the heterogeneous glacial dynamics.

What is Glacial Retreat?

- **About:**
 - Glacial retreat refers to the **process of a glacier shrinking or receding in size** over time due to a decrease in ice accumulation or an increase in ice melt.
- **Causes:**
 - This can be caused by a number of factors, including **rising global temperatures, changes in precipitation patterns**, or changes in the geography of the surrounding landscape.
- **Impacts:**
 - As a glacier retreats, it can lead to a number of significant environmental impacts, including **changes in water availability, alterations to local ecosystems, and increased risk of natural disasters** such as [floods](#) and [landslides](#).
 - In addition, the **loss of glacial ice can contribute to rising sea levels**, which can have significant impacts on coastal communities and **ecosystems** around the world.

Glacier Retreat



Glaciers have retreated at exponential rates due to the increase in global temperatures

Global temperature increase negatively affects the atmosphere.



Located on the border of China in India

Earth Observatory February 28, 2016

Hazards on the Biosphere:

- Floods, landslides, avalanches have become more common, and kill about 100 people per year.

Earth Observatory February 28, 2016

- The global sea level has risen 4 to 8 inches in the past century due to glacier retreats.

NRDC February 28, 2016

- Without glacial water, water temperatures increase causing many aquatic species to disappear and the food chain to be disrupted.

USGS May 2013

- Many animals live on glaciers. Since glaciers are melting, they are losing their habitats.

USGS May 2013

- Melting Ice in the Arctic could disrupt Atlantic Ocean currents, which produces heat, and drop global temperatures by 10 to 20 degrees.

NASA Science March 5, 2004

Other facts:

-Over 110 glaciers have disappeared over the last 150 years at the Montana's Glacier National Park

Earth Observatory February 28 2016

- The total global ice mass lost from Greenland, Antarctica, etc. was about 4.3 trillion ton, which added 0.5 inches to the sea level. That is enough to cover the US in 1.5 feet deep in ice.

NASA Mission Takes Stock of Earth's Melting Land Ice February 8, 2012



UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q.1 With reference to the water on Earth, consider the following statements:

1. The amount of water in the rivers and lakes is more than the amount of groundwater.
2. The amount of water in polar ice caps and glaciers is more than the amount of groundwater.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (b)

Q2. Which of the following phenomena might have influenced the evolution of organisms? (2014)

1. Continental drift
2. Glacial cycles

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: c

Mains

Q.1 How do the melting of the Arctic ice and glaciers of the Antarctic differently affect the weather patterns and human activities on the Earth? Explain. **(2021)**

[Source: PIB](#)

PDF Reference URL: <https://www.drishtiias.com/printpdf/glacial-retreat>

