



19-08-2022

Arctic Amplification

Why in Newspapers?

Some recently published research on Arctic amplification suggested that the region is changing rapidly and that the best climate models may not be able to capture and accurately predict the rate of change.

Quick Issue?

- The Arctic is warming four times faster than the rest of the planet.
- Warming is more concentrated in the Eurasian part of the Arctic, where the Barents Sea, north of Russia and Norway, is warming at a rate seven times faster than the global average.

Historical Background?

- According to the 'Special Report on Climate Change in the Ocean and the Cryosphere' in 2019

by the Intergovernmental Panel on Climate Change (IPCC), Arctic surface air temperatures have more than doubled the global average over the past two decades. has increased.

- In May 2021, the Arctic Monitoring and Assessment Program (AMAP) warned that the Arctic is warming three times faster than our planet, and if the planet warms by more than two degrees Celsius above pre-industrial levels, So the chances of sea ice completely disappearing in the summer are 10 times higher.
- The report also states that the average annual temperature in this region has increased by 3.1 °C, while for the planet this increase is of 1 °C.
- Mean Arctic amplification saw a drastic change in 1986 and 1999, when the ratio reached 4.0, meaning a warming four times faster than the rest of the planet.
- Polar amplification occurs when changes in the Earth's atmosphere cause a greater difference in temperature between the North and South poles than in the rest of the world.
- This phenomenon is measured relative to the average temperature change of the planet. These changes are more pronounced at northern latitudes and are known as arctic amplification.

Other Key Facts?

Arctic Amplification Process

- The albedo reaction of ice, the rate of loss, the rate of water vapour (change in water vapour, increase or decrease in temperature) and ocean temperature are the primary causes of transport.
- Albedo, that part of the heat received by the Earth from the Sun, which is reflected without heating the Earth and the atmosphere.
- Ice has a high albedo, which means that they are able to reflect most of the solar radiation, unlike water and land.
- As sea ice melts, the Arctic Ocean will be more able to absorb solar radiation, thereby promoting amplification.
- The normal rate of loss of temperature is the decrease in temperature in proportion to the increase in altitude.
- Several studies suggest that ice's albedo response and loss rate are responsible for 40% and 15% of polar amplification, respectively.



- It occurs when the net radiation balance of the atmosphere is affected by an increase in greenhouse gases.
- **Consequences of Arctic Warming: Thinning of Greenland's ice layer:** Greenland's ice sheet is melting at an alarming rate and the rate of sea ice accumulation has been decreasing significantly since the year 2000, due to older and thicker ice sheets. The place is new and marked by a thin layer of snow.
- Abnormal summer temperatures result in the melting of 6 billion tons of ice per day, enough to cover West Virginia with a foot of water totalling 18 billion tons over a three-day period.
- **Sea level rise:** Greenland's ice layer holds the second largest amount of ice after Antarctica, and is therefore important for maintaining sea level. In the year 2019, it was the single biggest reason for the rise in sea level of about 1.5 meters.
- If this layer melts completely, sea levels will rise by as much as seven metres, which could submerge island countries and major coastal cities.
- **Impact on Biodiversity:-** Warming of oceans, acidification of waters, changes in salinity levels in the Arctic Ocean and region are affecting biodiversity including marine species and dependent species.
- Rising global temperature is also increasing rainfall, which is affecting the availability and accessibility of lichens for reindeer.
- Expansion of the Arctic is causing widespread starvation and death among Arctic fauna.
- **Melting of permafrost:-** The permafrost is melting in the Arctic and in turn is emitting carbon and methane which are among the major greenhouse gases responsible for global warming. Experts fear that thawing and thawing will also free long-dormant bacteria and viruses that have frozen in permafrost and could potentially lead to diseases. The most famous example of this was an anthrax outbreak in Siberia in 2016 due to the melting of permafrost where about 200,000 reindeer died.

Likely Question Asked In Preliminary Exam

Que. Which of the following statements are correct regarding deposits of 'methane hydrate'?

1. The release of methane gas from these deposits may have been induced due to global warming.
2. Huge deposits of 'methane hydrate' are found in the north polar tundra and under the ocean floor.
3. Methane in the atmosphere gets oxidised to carbon dioxide after a decade or two.

Select the correct answer using the code given below:

- | | |
|------------------|------------------|
| (a) 1 and 2 only | (b) 2 and 3 only |
| (c) 1 and 3 only | (d) 1, 2 and 3 |

Answer: (d) 1, 2 and 3



World's Highest Bridge

Why in Newspapers?

The overarch work of the world's highest Chenab railway bridge being built in Jammu and Kashmir has been completed. On August 13, the golden joint of the bridge, the last joint, was installed. On this occasion, the engineers and workers working there hoisted the tricolor and also used fireworks.

Quick Issue?

- The world's highest single-arch railway bridge has been built between Bakkal and Kauri in Reasi district of Jammu and Kashmir.
- This bridge built on the Chenab river has a place called Bakkal on one side and a place called Kauri on the other side.
- The bridge has been constructed under the Konkan Railway Udhampur-Srinagar-Baramulla Rail Link (USBRL) project. The cost of this project is about Rs 28,000 crore.

Other Key Facts?

Chenab River

- Now let us also know about the Chenab river on which this bridge is built. The Chenab River is formed by the confluence of the Chandra and Bhaga rivers at Tandi in the Upper Himalayas of Lahaul and Spiti district of Himachal Pradesh, India. Its origin is the Badalacha Pass. In its upper part it is also known as Chandrabhaga. It is a tributary of the Indus River. It flows through the Jammu region of Jammu and Kashmir into the plains of Punjab, Pakistan. The waters of the Chenab are shared by India and Pakistan as per the terms of the Indus Water Treaty.

Historical Background?

- It was started in the year 2002, but was closed in 2008 due to security reasons, which was started again in 2010.
- Arch bridge means a bridge that is built on such a semi-circular structure.
- Talking about the features of this world's highest single-arch railway bridge, this 1.3 km long **Rail Bridge is 359 meters above the river level.**
- It is also 35 meters higher than the 324 meter high Eiffel Tower. This bridge, higher than Qutub Minar, rests on 17 cables and its life is estimated at 120 years.
- How difficult is it to build any such structure in hilly areas. Engineers have to keep in mind that even after construction; all kinds of difficult conditions can arise in hilly areas such as earthquake and strong winds etc.
- All these things have been taken care of in the construction of this bridge. It will not be affected by an earthquake measuring 8 on the Richter scale. Please note that the intensity of this earthquake is very high. Also, it can withstand wind speed up to 260 kmph. Sensors have been installed in it to detect the speed of the wind.
- Blast load technology has also been used in this bridge. That is, any explosion and pressure will not affect the bridge. Trains can run on this bridge at a speed of 100 km per hour, although the average speed of trains will be kept at 30 km per hour.



- A special type of paint has been used for the painting of the bridge, which will last for about 15 years and will protect the bridge from rusting.
- Steel has been used in this, so that it can withstand temperatures up to minus 40 ° C. There is a separate track for pedestrians and cyclists.
- The goal of building this bridge is to boost connectivity in the Jammu and Kashmir Valley. It is worth mentioning that at present there is a train between Banihal and Baramulla, but not between Katra-Banihal. But with the construction of a rail bridge on this 111 km long Katra and Banihal route, Kashmir will be connected to the country through rail. It is expected that it will be handed over to the public by December this year.

Likely Question Asked In Preliminary Exam

Que. Which one of the following statements is false regarding the world's highest single-arch railway bridge, which was in news recently?

- (a) It is built between Bakkal and Kauri in the Reasi district of Jammu and Kashmir.
- (b) It is being constructed under the Konkan Railway Udhampur-Srinagar-Baramulla Rail Link Project.
- (c) The height of this rail bridge is 259 meters above the river level.
- (d) The goal of building this bridge is to boost connectivity in the Jammu and Kashmir Valley.

Answer: (c) The height of this rail bridge is 259 meters above the river level.

