FJORD LANDSLIDE - GEOGRAPHY

News: A massive landslide in a **remote fjord in Greenland** created a wave so powerful that it sent vibrations through the Earth for nine days. This unusual event took place last September and was detected by seismic sensors around the world, sparking an investigation by scientists to trace its origin.

What's in the news?

What happened?

- Unlike typical earthquake vibrations, this signal lasted for nine days and exhibited characteristics not caused by earthquakes, leading to a collaborative investigation by researchers across multiple countries.
- Scientists classified it as a **"USO"** — an unidentified seismic object.
- Eventually, the source of the signal was traced to a massive landslide in **Greenland's remote Dickson Fjord.**
- The landslide occurred when a mountainside collapsed, bringing with it a large chunk of glacial ice. The force of the collapse triggered a gigantic 200-meter-high wave in the narrow Dickson Fjord. This wave became "trapped" in the fjord and moved back and forth, creating seismic signals that puzzled researchers.

What caused it?

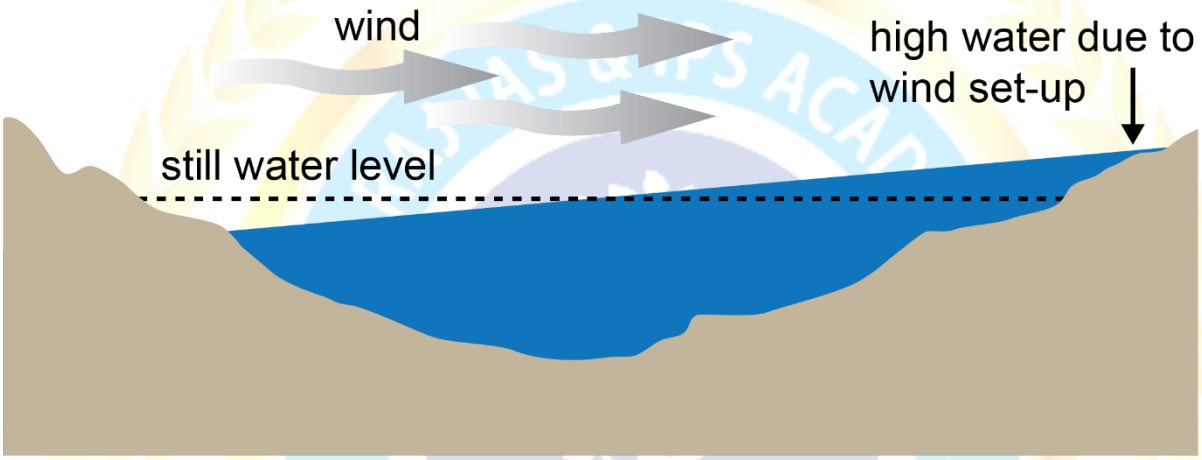
After investigation, researchers discovered that this unusual signal was caused by a **massive landslide** in Greenland.

- **Landslide Event**: A peak called **Hvide Støvhorn** This collapse created a huge avalanche of ice and rock, which then crashed into the nearby Dickson Fjord.
    - A huge amount of rock and ice, enough to fill 10,000 Olympic swimming pools, had plunged into the fjord. This caused a mega-tsunami with a wave 200 meters high.
    - The landslide also triggered a **seiche**, a back-and-forth wave in the fjord, which continued for nine days. The landslide's immense powerwas due to the thinning of the glacier, caused by global warming.
- **Tsunami Generation**: The force of the falling ice and rock displaced a large amount of water in the fjord, creating a **mega-tsunami**—a giant wave that reached about 200 meters high (almost three times the height of the Srirangam Temple).
- **Seismic Waves**: As the landslide occurred and the mega-tsunami formed, it generated seismic waves that traveled across the globe, ringing out like a bell. These waves were recorded by seismic stations all over the world.
    - The seismic waves produced by this landslide were distinct from typical earthquake signatures. They exhibited a single frequency, akin to a plucked violin string, rather than the complex patterns associated with tremors.

- These waves traveled globally, resonating for days, as the landslide's impact rang out like a gong, causing the Earth to vibrate.

The Seiche Effect

- Inside the **fjord**, the waves reflected off the **steep cliffs**, causing a phenomenon called a **seiche**. This is when water oscillates back and forth, creating **repeating waves**. The waves continued to bounce around the fjord for over nine days, which matched the long-lasting seismic signal recorded.
- **Geographical Importance:** The Dickson Fjord is a unique geographical feature—it's deep and U-shaped, which made the waves behave in this unusual way. Additionally, the warming climate is causing glaciers in the area to melt, which increases the risk of such landslides happening more frequently.



Wind setup is a local rise in water level caused by wind.

Source: https://www.thehindu.com/sci-tech/science/massive-greenland-landslide-sent-seismic-waves-around-earth-for-9-days/article68673331.ece