

DEGLACIATION OF MT. EVEREST

BY: SMAYAN

WHAT IS HAPPENING?

- Mt. Everest's highest glacier, South Col glacier, is melting at an alarming rate, causing it to retreat rapidly [2,3,4]
- The glacier's thick snowpack has melted, revealing the low albedo black ice that absorbs more radiation and accelerates melting [3,4]
- Increased melting is causing diminishing water availability, affecting agriculture, hydroelectric power generation, and mountain ecosystems. [1,4]

WHY RETREAT?

- Warming temperatures and an increase in incident shortwave radiation directly cause more melt (figure 1, 2) [3]
- Reduced precipitation and humidity prevents replenishment of glacier (figure 2) [1]
- Increased sublimation [3]

OBSERVATIONS

- South Col Glacier has lost more than 180ft of thickness in the last 2.5 decades [3]
- Thinning is 80 times faster than the 2000 years ice took to form [3]
- The Himalayan region and Everest has experienced 1-2 degrees Celsius of warming since 1951-2000 avg (Fig 1)
- Average incident shortwave radiation increased from 270 W/m² in 1940 to Avg. of 290 W/m² in 2020 (Fig 2)
- Precipitation (snow) over Mt. Everest decreased from 240 mm to 195 mm avg. since 1940. (Fig 2)
- Relative humidity decreased from approximately 70% in 1940 to an avg. of 62% in 2020 (Fig 2)

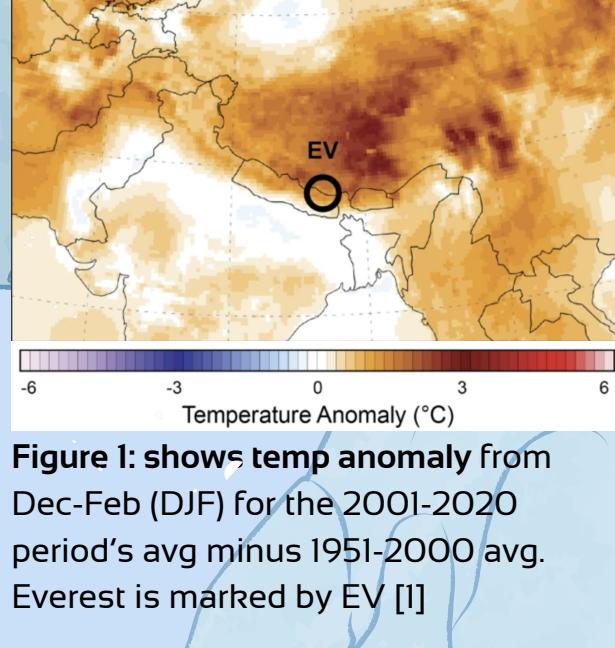


Figure 1: shows temp anomaly from Dec-Feb (DJF) for the 2001-2020 period's avg minus 1951-2000 avg. Everest is marked by EV [1]

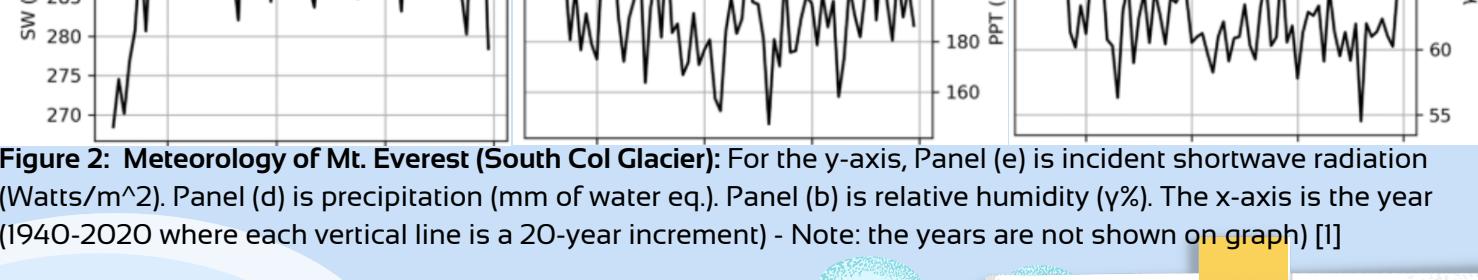


Figure 2: Meteorology of Mt. Everest (South Col Glacier): For the y-axis, Panel (e) is incident shortwave radiation (Watts/m²). Panel (d) is precipitation (mm of water eq.). Panel (b) is relative humidity (%). The x-axis is the year (1940-2020 where each vertical line is a 20-year increment) - Note: the years are not shown on graph [1]

WHO IS VULNERABLE?

- Communities relying on water from glacier-fed rivers [2,3,4]
- Farmers and agricultural industry near Everest [4]
- Hydroelectricity generation - which impacts jobs and cities' economy [4]
- Climbers, expedition teams, and thus, the tourist industry (along with local jobs) [2]

DETECTION METHODS

- Photographic and Satellite imagery to monitor changes in glacier extent over time [2, 3]
- Data from two Weather Stations on Everest. [3]
- Air samples from Ice Cores over 10m long [2, 4]

ADDRESSING ISSUES

- World leaders agreeing to meet and pledge cuts to CO₂ emissions in near future [4]
- Phasing down coal use and cutting fossil fuel subsidies [4]
- Plans to Increase monetary support to help poor countries cope with the effects of CC [4]

FUTURE PROJECTIONS

- Glacier melt to destabilize the Khumbu base camp in the future [2]
- More exposed bedrock which will make climbing Everest harder [3]
- Increased risk of avalanches [2]
- Glaciers like the South Col Glacier amongst others may continue to melt rapidly, potentially disappearing by the middle of this century [3,4]

Citations:

- Potocki, Mariusz, et al. "Mt. Everest's Highest Glacier Is a Sentinel for Accelerating Ice Loss." *Nature News*, Nature Publishing Group, 3 Feb. 2022, www.nature.com/articles/s41612-022-00230-0
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- "Highest Glacier on Mt Everest Is Melting at a Rapid Pace, a New Study Shows." The Kathmandu Post, The Kathmandu Post, kathmandupost.com/climate-environment/2022/02/06/highest-glacier-on-mt-everest-is-melting-at-a-rapid-pace-a-new-study-shows. Accessed 6 Mar. 2024.