Warming triggers `alarming' retreat of Himalayan glaciers

by Tim Johnson via rialator - McClatchy Washington Bureau *Saturday, May 12 2007, 10:53pm*
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> KAROLA PASS, Tibet - The glaciers of the Himalayas store more ice than anywhere on Earth except for the polar regions and Alaska, and the steady flow of water from their melting icepacks fills seven of the mightiest rivers of Asia.

Now, due to global warming and related changes in the monsoons and trade winds, the glaciers are retreating at a startling rate, and scientists say the ancient icepacks could nearly disappear within one or two generations.

Curiously, there's little sense of crisis in some of the mountainous areas. Indeed, global warming is making the lives of some high-altitude dwellers a little less severe.

Here at the foot of the towering Nojin Gangsang mountain, an ice-covered 23,700-foot peak, herders notice the retreat of the glaciers but say they feel grateful for the milder winters and increasing vegetation on mountain slopes in summers.

But for people living in the watershed of the Himalayas and other nearby mountain ranges along the Tibetan Plateau, glacial melt could have catastrophic consequences.

Himalayan glaciers release water steadily throughout the year, most critically during the hot, dry, sunny periods when water is most needed. Once they vanish, major lifeline rivers such as the Ganges and Indus could become more seasonal, and large tributaries may dry up completely during non-monsoon periods.

"The presence of glaciers is very vital to the Himalayan river systems," said Anil Kulkarni of the Indian Space Research Organization, who has used satellite data to measure the glacial retreat. "It is really alarming. We have to be really concerned."

The pace of glacial retreat around the Himalayas varies. Smaller glaciers fragment and melt faster than bigger ones, and those facing south are also receding more quickly.

In a stark forecast, the United Nations body studying global warming, the Intergovernmental Panel on Climate Change, warned in early May that the glaciers in the world's highest mountain range could vanish within three decades.

"Glaciers in the Himalayas are receding faster than in any other part of the world and, if the present rate continues, the likelihood of them disappearing by the year 2035 and perhaps sooner is very high if the Earth keeps getting warmer at the current rate," the report said. The total area of glaciers in the Himalayas likely will shrink from 193,051 square miles to 38,600 square miles by that year, the report said.

While some scientists dispute the assessments of the U.N. body and the rate of retreat is highly variable, experts on glaciers in China, India and Nepal already see the short-term impact of glacial melting.

As the glaciers recede, lakes on the Tibetan Plateau are rising steadily, and experts foresee floods, landslides and mudflows from mountain lakes overrunning their banks.

"They can cause tremendous loss of property, or even lives. They can destroy bridges, villages and roads," said Yao Tandong, one of China's premier glacier scientists and director of the Institute of Tibetan Plateau Research, in China's capital, Beijing.

Yao said that from 1960 to 2000, China's 46,298 glaciers retreated by 7 percent, not a hugely significant loss. But the pace of retreat is picking up.

"It's accelerating. The retreat is more rapid now. We see it from satellite photos and in situ observation," Yao said. "All scientists agree now that it is from warming."

In India, a team led by Kulkarni recently completed a study of satellite images that determined some glaciated areas had retreated 21 percent from 1962 to 2004. It described potentially catastrophic effects on cities and towns relying on fresh water from melting ice for irrigation, drinking and hydroelectric power.

Glacial runoff in the Himalayas is the largest source of freshwater for northern India, and provides more than half the water to its most important river, the Ganges.

Glacial runoff also is the source of the headwaters for the Indus River in Pakistan, the Brahmaputra that flows through Bangladesh, the Mekong that descends through Southeast Asia, the Irrawaddy in Burma, and the Yellow and Yangtze rivers of China.

Scientists say 1.3 billion people reside in areas affected by glacial retreat, either in flood-prone areas or in locales that rely on year-round supplies of fresh water from glaciers rather than from the monsoon rainfall of only three or four months.

The retreating glaciers are occurring across an area that's the largest high-altitude land mass on the planet, bordered by the Himalayas to the south, the Tian Shan range to the north, and the Pamirs and the Karakorum mountains to the west.

Throughout the area, experts say, dwindling glaciers may lead to unstable mountainsides, greater sedimentation in rivers and disrupted irrigation systems, in addition to threatening water supplies to large populations.

China issued its first ever report on climate change in late December, saying average temperatures will rise two to three degrees Fahrenheit by 2020 and up to 6.4 degrees by the end of the century, unleashing more frequent "extreme weather events."

Scientists say glacial retreat will bring a feast-or-famine cycle to the Himalayas.

In the near term, accelerated glacial melting will bring a bonanza of water flow, perhaps even intense flooding, with great impact on biodiversity.

"The flooding events will scour the species that live in the river areas," said Dr. Lara Hansen, chief scientist for the global climate change program at the World Wildlife Fund. High-altitude plants and animals that are highly dependent on the glacial melt during the non-rainy season also will be affected, she added.

As climate change intensifies, she said, humans growing desperate for year-round water are likely to pay less attention to the needs of protecting biodiversity.

Small villages in Nepal, Bhutan, India and Pakistan that rely on glacier-fed water "are already feeling the pinch of this," Kulkarni said.

Far from the highest peaks in Tibet, large lakes fed by glacial runoff are rising by as much as 30 feet, experts said, submerging new areas and displacing some nomads. Experts say permafrost, or perennially frozen ground, is also beginning to melt.

"Sometimes when we camp out, we see water seeping up from the tent floor," said Bendo, a senior engineer with Remote Sensing Application Research Center of the Tibet Autonomous Region, who goes by only one name.

The Himalayas, with 17 percent glacial cover, have far more extensive glaciers than other ranges, such as the Alps, which have only a 2 percent cap of glacier and icepack.

The rocky debris that often covers Himalayan glaciers can bring an earlier demise - or a reprieve, said professor Jeff Kargel, of the University of Arizona, who heads the 28-nation consortium that monitors glaciers around the world. If it's thick enough, the rock insulates the glacier and slows the melting, but a thin cover absorbs more heat and speeds up the melting.

Glacial retreat in the Himalayas may have a surprising impact in extremely arid areas far from the mountains.

Yao said oases in China's far western deserts, such as the Taklimakan, get their underground water from glacial runoff. Towns are usually built around the oases.

"If the glaciers disappear, then the oases will also disappear," Yao said.

McClatchy Newspapers special correspondent Fan Linjun contributed to this report.

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