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## Climate Debate Gets Its Icon: Mt. Kilimanjaro

**By ANDREW C. REVKIN** 

ilimanjaro, the storied mountain that rises nearly four miles above the shimmering plains of Tanzania, is beginning to resemble the spotted owl — at least in the way it has become a two-sided icon in an environmental debate.

The owl first entered the spotlight 15 years ago, in fierce debate over clear-cutting of ancient Pacific forests. Millions of acres were placed off-limits to logging when the bird was listed as threatened under the federal endangered-species law. Soon afterward, effigies of it began showing up on the grilles of logging trucks.

Kilimanjaro's majestic glacial cap of 11,000-year-old ice has long captured imaginations the world over, so it was not surprising that environmentalists focused their attention on it when scientists reported in 2001 that glaciers around the world were retreating, partly as a result of global warming caused by emissions of heat-trapping "greenhouse" gases from smokestacks and tailpipes.

Campaigners from Greenpeace, the environmental group, scaled the mountain in November 2002 and held a news conference via satellite with reporters at climate-treaty talks in Morocco. Last October, Senator John McCain, the Arizona Republican who is co-author of a bill to curb greenhouse gases, displayed before-and-after photographs of Kilimanjaro during a Senate debate. A British scientist proposed hanging white fabric over the glacier's ragged 10-story-tall edges to block sunlight and stem the erosion.

But now the pendulum has swung. This month, the mountain was taken up as a symbol of eco-alarmism by a cluster of scientists and anti-regulation groups. "Snow Fooling!: Mount Kilimanjaro's glacier retreat is not related to global warming," read a newsletter distributed on March 9 by the Greening Earth Society, a private group financed by industries dealing in fossil fuels, the dominant source of the heat-trapping gases. "Media and scientists blame human activity, but a 120-year-old natural climate shift is the cause."

The group cited a paper in the current International Journal of Climatology asserting that Kilimanjaro's ice was shrinking because East Africa's climate is drying, a process that began more than a century ago, long before humans could have been an influence.

The authors wrote that the dry weather both limited the snows that help sustain tropical glaciers and, by reducing cloud cover, allowed more solar energy to bathe the glacier. In dry, cold conditions, the ice vaporized without melting first, a process called sublimation. There was no evidence that rising temperatures had caused the melting, the researchers said.

So what do these researchers and the ones who first warned of glacial retreat have to say about the clashing public portrayals of their work on Africa's highest peak?

Almost unanimously, they agreed in interviews that the two depictions were wrong, turning what is still a complicated scientific puzzle into a simplistic caricature.

The authors of the new paper said their goal was to challenge what had become orthodoxy about the mountain — that rising temperatures were eating away at the ice — and to present an argument for a different mechanism. But their paper was hardly conclusive, they said. It was mainly a call for more study.

"We are entirely against the black-and-white picture that says it is either global warming or not global warming," said Prof. Georg Kaser, the paper's lead author and a glaciologist at the Institute for Geography of the University of Innsbruck, in Austria. "As a scientist I'm happy it's more complex, because otherwise it's boring."

Other authors of the new study said they were particularly dismayed that the industrysupported group had portrayed their paper as a definitive refutation of the idea that melting from warming was involved.

"We have a mere 2.5 years of actual field measurements from Kilimanjaro glaciers, unlike many other regions, so our understanding of their relationship with climate and the volcano is just beginning to develop," Dr. Douglas R. Hardy, a geologist at the University of Massachusetts and an author of the paper, wrote by e-mail. "Using these preliminary findings to refute or even question global warming borders on the absurd."

In short, Kilimanjaro may be a photogenic spokesmountain — no matter what the climatic agenda — but it is far from ideal as a laboratory for detecting human-driven warming. The debate over it obscures the nearly universal agreement among glacier and climate experts that glaciers are retreating all over the world, probably as a result of the greenhouse-gas buildup.

"These climate skeptics are making generalizations not only to the rest of the tropics but the rest of the world," Dr. Hardy said. "And, in fact, global warming may be part of the whole picture on Kilimanjaro, too."

Most experts in the Kilimanjaro debate accept three things: for more than a century, its ice has been in a retreat that is almost assuredly unstoppable and was not caused by humans; so far, there is scant data on conditions there; and the main scientific question now is how, and how much, climate shifts driven by heat-trapping emissions are accelerating that trend.

Dr. Lonnie G. Thompson, the Ohio State University glaciologist whose work first focused

attention on Kilimanjaro's fading ice, said he saw ample evidence that melting was eating away at what remained.

His specialty is extracting cylinders of layered, ancient ice from tropical glaciers, and when his team drilled into one of the mountain's ice fields in 2000, water flooded out of the hole. In the resulting cores, shallow layers contained elongated bubbles — strong evidence of melting and refreezing — while deeper layers had none.

More jarring was the violent collapse of a 10-story-tall clifflike face of one of Kilimanjaro's ice fields in January 2003, witnessed and photographed by trekkers. The collapse sent a huge cascade of ice and water gushing across the flanks of the ancient crater.

"This all suggests that what we are seeing at least in the last 20 years or so is different," Dr. Thompson said. He believes the mountain may be close to a threshold at which melting will become the dominant force eroding the ice. "The balance of evidence says something bigger is going on in the system," he said.

Dr. Thompson said that while the new paper selectively described evidence that drying of African air was the culprit, it did not test that hypothesis.

Perhaps the long-term drop in humidity is to blame, he went on. "But show me. Give me something I can see. Otherwise you raise important issues that need to be studied, and we need data on, but how do you know whether you're right?"

Several independent glacier experts who have followed the Kilimanjaro research said the new paper and Dr. Thompson's earlier assertions about melting were probably both right to some extent.

But some experts see signs that something different has been happening in the region in recent decades. A bit to the north, for example, on the flanks of Mount Kenya, other scientists have been able to measure shifts in patterns of ice loss that show solar radiation — the long-term influence on the ice — is no longer dominating.

Unlike Kilimanjaro, whose ice is mostly oriented toward the sun, Mount Kenya has ice in shadow and sunlight. From 1899 to 1962, those ice fields more exposed to direct solar radiation "wasted drastically" while those in narrow, shaded grooves changed very little, said Dr. Stefan L. Hastenrath, a professor emeritus at the University of Wisconsin, who is a longstanding expert on African glaciology.

This implied that changes in cloudiness and sunlight were the dominant force determining the fate of ice. "But since the 1960's the mountain has seen more even loss of ice in shaded and sun-exposed ice," he said.

The editor of the Greening Earth newsletter, Dr. Patrick J. Michaels, a University of Virginia climatologist, said he did not doubt that humans were altering climate. He just feels, he says, there is no sign that humans are pushing matters beyond the natural variability that already

exists — and already must be adapted to.

"I've written a bunch of papers saying human beings are warming the planetary surface temperature," he said. "It wouldn't surprise me that you'd see midlatitude glacier recession. The question is, Why is this alarming? Aside from the initial shock value of the notion that human beings can change the climate, why is this such a story?"

But Dr. Thompson sharply criticized the newsletter's interpretation of the Kilimanjaro research. "These people get paid to muddy the waters," he said. "At least we're going out and trying to get the data, which is hard work. If you're going to sit in your office and send out your e-mails with no basis, I'm sorry, but that just doesn't carry the day."