Cosmologists spends month searching for meteorites in Anarctica

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Every austral summer, a group of volunteers heads off to a remote region of Antarctica to set up a field camp on the ice. For the next month, they search the ice and nearby debris piles left by glaciers for dark rocks that might be extraterrestrial in origin. The program is called

the Antarctic Search for Meteorites (ANSMET).

ANSMET has been led for the past 20 years by geologist Ralph Harvey of Case Western Reserve University in Cleveland. The National Science Foundation (NSF) supports field operations, NASA curates the recovered meteorites, and the Smithsonian Institution provides long-term curation facilities for the collection.

Over the years many Washington University in St. Louis geologists, physicists and astrophysicists have volunteered to help. This year it was the turn of Christine Floss, a research professor of physics in Arts & Sciences,

Why do scientists look for meteorites in Antarctica?

Meteorites don't fall more often in Antarctica than in other parts of the world, but in Antarctica those falling on high-altitude ice fields are carried by flowing ice toward the ocean. Some of the ice streams run up against barriers such as the Transantarctic Mountains and are blocked. Wind erosion then slowly brings stones embedded in the ice—sometimes for hundreds of thousands of years—to the surface. It is this concentration mechanism that makes Antarctica a great place to look for meteorites.

It is also true that the dark stones show up well against the blue ice, the heavily compressed glacial ice that looks blue because there are no bubbles in it. But this year we found more meteorites in moraines than we did on the ice, even though they're much harder to find there.

When did the search for meteorites in Antarctica begin?

In the 1970s a Japanese team picked up 10 or 20 meteorites at random, and when they were examined, they turned out to be of many different types—not just many fragments of a few meteorites.

Bill Cassidy, a professor at the University of Pittsburgh, realized that this meant some kind of concentration mechanism was at work. He began to write proposals to the NSF asking the foundation to fund systematic searches. It took him three years, but he got funding in the end and the program has now been running for 38 years.

ANSMET is basically a service project. Scientists help find the meteorites but the stones are then shipped to NASA's Johnson Space Center, which makes them available to scientists who want to study them, and, eventually, to the Smithsonian Institution.

How important has the annual hunt been for science?

It has totally revolutionized the way people think about meteorites and what can be learned from them.

For example, the first lunar meteorites were found in Antarctica and that discovery was pivotal in convincing people that, yes, meteorites could be ejected from a large body—not just the little asteroids but also a large planet—and launched on a trajectory that will bring them to Earth.

People had found meteorites elsewhere that they thought were Martian, but the orbital dynamics folks said there's no way you can get a meteorite from Mars to land on Earth. The fact that rocks could make it from the moon to Antarctica meant that the orbital dynamics models needed to be revised.

So what's important is not that we collect lots of meteorites but that we find more of the rare and interesting ones.

What was a day like?

All eight of us had Ski-Doos, and we'd line them up, evenly spaced, on the ice, and sweep an area. If anyone saw something that looked like a meteorite, they stopped, waved, and everyone walked over to document and collect the stone. Then we returned to our Ski-Doos and kept driving.

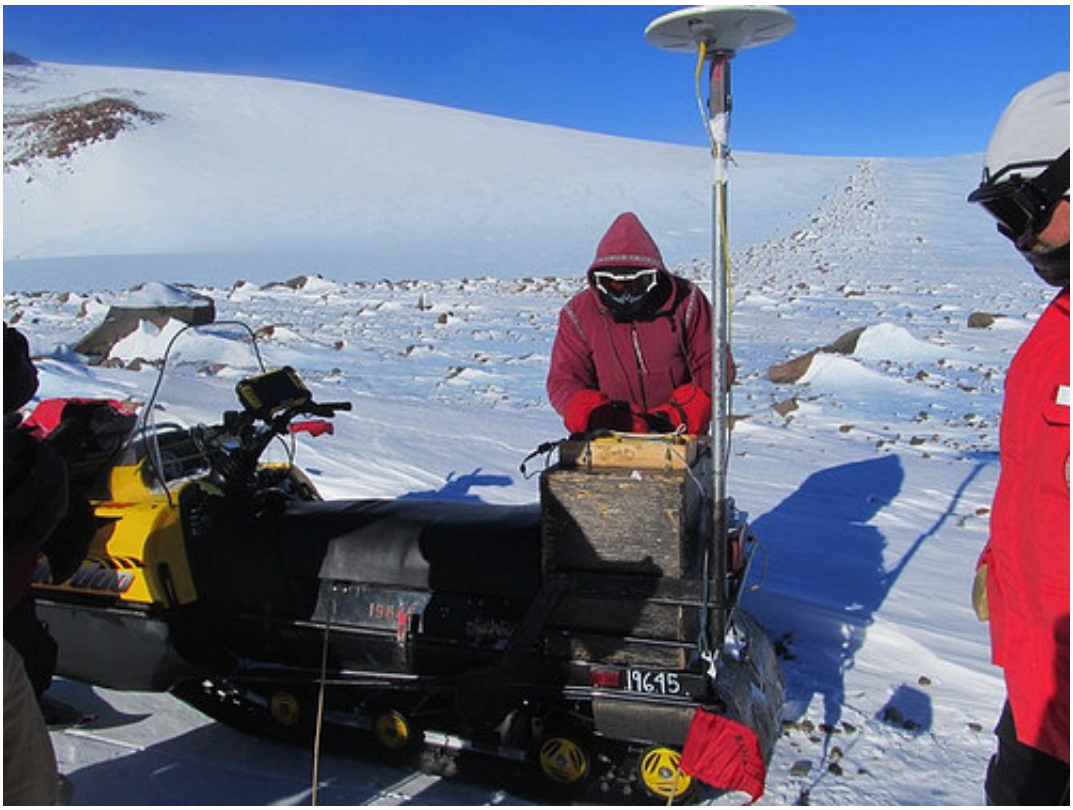
Other days we'd drive over to a moraine and walk around the moraine looking. We'd plant a flag whenever we found a meteorite and then come back to collect them all.

What were you looking for?

A shiny fusion crust—a thin, glassy coating that forms when a meteoroid entering Earth's atmosphere gets hot enough that its surface melts and refreezes.

I found some meteorites, but nowhere nearly as many as our mountaineer Johnny Schutt, who's been doing this since 1980. He spotted one after another.

Why do you need mountaineers?



To stop us from doing anything stupid like falling in crevasses, but they were also the ones who did all of the organizational work for our month-long camping expedition.

I had very little camping experience before going on this trip; basically two weeks at a KOA. I didn't mention that to Ralph Harvey, the principal investigator, when I applied for the program. I told him when we met in the Dallas airport on the outbound leg.

Apparently he told absolutely everyone else on the team, because they all knew.

I hear you set a collection record.

One member of the team was Ryan Zeigler, who earned his master's and doctorate in geology at Washington University and is now the lunar sample curator at the Johnson Space Center. He wanted to break the record for the number of meteorites collected in one day.

Nobody knew exactly what the record was but we thought it was about 100. One moraine was amazing; you couldn't turn around without finding a meteorite. And Ryan was a man with a mission. We found 172 stones that day.

How many did the team find in all?

We found 562 in total, which may sound like a lot, but an earlier search of the same area had found 900 or so. On the other hand, we had a lot of bad weather days when white-outs or strong winds kept us holed up in our tents.

Would you do it again?

I loved it. It was so beautiful there and I had such a good time.

Provided by Washington University in St. Louis