

Scientists are racing to collect ice cores as the earth's warming melts large areas of ice known as glaciers and ice sheets.

Some scientists say there is very little time left. And, in some cases, it is already too late.

Late last year, chemist Margit Schwikowski and a team of international scientists attempted to gather ice cores from the Grand Combin glacier.

In 2018, they had visited the area and took a small test core.

The core was in good shape, said Schwikowski, head of a chemistry group at the Paul Scherrer Institute in Villigen, Switzerland.

The core had well-preserved atmospheric gases and chemical evidence of past climates.

But, in the two years it took for the scientists to return with a full drilling set-up, some of the information that had been trapped in the ice had disappeared.

The sudden change "tells us exactly how sensitive these glaciers are," said Schwikowski. "We were just two years too late."

The mission on Grand Combin shows the major difficulty scientists face today in collecting ice cores.

Some glaciers are disappearing faster than expected, leading scientists to do missions sooner, rethink where to target next, and plan about increased storage.

The United Nations says almost all of the world's glaciers are becoming smaller.

In its most complete climate report to date, published in August, the UN said that human actions are "very likely the main driver of the near-universal retreat of glaciers globally since the 1990s."

About 10 percent of the land area on earth is currently covered with glacial ice, says the National Snow and Ice Data Center in Boulder, Colorado.

If a glacier is melting, it means it also is not storing atmospheric gases from today for scientists to study in the future.

Beyond gases, scientists say they may be able to use ice cores to study the DNA of ancient bacteria and viruses that could come back as the world warms.

Frozen insects and plant material could also reveal histories of the world's forests.

Another team of scientists, whose findings were published in July in *Microbiome*, found viruses nearly 15,000 years old in two ice core samples taken from the Tibetan Plateau in China.

The findings identified genetic codes for 33 viruses. At least 28 of them were new to scientists.

That team of scientists included U.S.-based ice core experts Lonnie Thompson and Ellen Mosley-Thompson, who are husband and wife.

Lonnie Thompson said he plans to increase his ice core storage facilities at Ohio State University.

Some of the cores Thompson and his team have collected are the only remaining ice from some glaciers.

Thompson used the term archive—meaning a place where records or materials are kept—to talk about ice.

"Ice has a wonderful archive of not only the climate, but also the forcings of climate," the major causes of climate change, Thompson said.

"Those histories are at risk as the earth warms and the glaciers retreat."

I'm John Russell.

随着地球变暖，被称为冰川和冰原的大面积冰层融化，科学家们正在竞相收集冰芯。

一些科学家说时间所剩无几了。而且，在某些情况下，已经太晚了。

去年年底，化学家马尔吉特·施维科夫斯基和一组国际科学家试图从大孔班冰川收集冰芯。

2018年，他们参观了该地区并取得了一个小型测试冰芯。

瑞士菲利普根保罗谢勒研究所化学小组负责人施维科夫斯基表示，冰芯状态良好。

冰芯有保存完好的大气气体和过去气候的化学证据。

但是，在科学家们带着全套钻井设备回来的两年里，一些被困在冰里的信息已经消失了。

施维科夫斯基说，这种突然的变化“确切地告诉我们这些冰川有多敏感。”“我们只是晚了两年。”

大孔班山的任务表明了科学家们目前在收集冰芯时面临的主要困难。

一些冰川消失的速度比预期的要快，这促使科学家们更快地执行任务，重新考虑下一个目标并计划增加储量。

联合国表示，世界上几乎所有的冰川都在变小。

在8月发布的迄今为止最完整的气候报告中，联合国表示，人类活动“很可能是20世纪90年代以来全球冰川几乎普遍退缩的主要驱动因素”。

位于科罗拉多州博尔德的美国国家冰雪数据中心表示，目前地球上大约10%的陆地面积被冰川覆盖。

如果冰川正在融化，这意味着它也没有储存今天的大气气体来供科学家在未来进行研究。

除了气体，科学家们表示，他们可能会利用冰芯来研究古代细菌和病毒的 DNA，随着世界变暖，这些细菌和病毒可能会卷土重来。

冰冻的昆虫和植物材料也可以揭示世界森林的历史。

另一组科学家在中国青藏高原的两个冰芯样本中发现了近 1.5 万年前的病毒，他们的研究结果发表在 7 月份的《微生物》杂志上。

这些研究结果确定了 33 种病毒的遗传密码。其中至少有 28 种对科学家来说是新的。

这组科学家包括来自美国的冰芯专家郎尼·汤姆森和艾伦·莫斯利-汤姆森夫妇。

郎尼·汤姆森说，他计划在俄亥俄州立大学增加冰芯存储设施。

汤姆森和他的团队收集到的一些冰芯是一些冰川仅存的冰。

汤姆森用“档案馆”这个词来谈论冰，“档案馆”指的是保存记录或材料的地方。

汤姆森说：“冰不仅记录了气候，还记录了气候的强迫作用。”气候变化的主要原因。

“随着地球变暖和冰川退缩，这些历史正面临危险。”

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