

Scientists go to Antarctica to study melting ice



This is where scientists drilled into the ice of the Thwaites Glacier.
[Photos: International Thwaites Glacier Collaboration]

ZACHARY JOHN tells us more about their important and difficult mission.

As a scientist, getting to work is not always easy. Some scientists have to ride snowmobiles, specialist boats that can crack ice, and ski-fitted planes to reach their laboratory. A team of more than 40 scientists braved a journey across thousands of kilometers of the world's iciest continent, Antarctica. Their mission was to set up the base of a five-year expedition studying Thwaites Glacier — a glacier the size of Britain — in Western Antarctica. Some scientists call it the “Doomsday Glacier” because they believe the glacier will explain how climate change affects **polar** ice.

The expedition is part of the International Thwaites Glacier Collaboration (ITGC), a USD\$50m (about S\$71 million) project funded by the US, UK, Germany, Korea, and Sweden. The project is the largest, and most **thorough**, study of Antarctica ever attempted.

Herculean effort

In order to land in Antarctica, planes were fitted with giant skis that enabled them to touch down on snow or ice. The scientists had to bring tonnes of equipment with them, as well as camping gear, food,

and supplies. It took more than a dozen flights to get the teams and their equipment from McMurdo — the biggest US research station in Antarctica — to their staging site, halfway across Antarctica.

Smaller planes then ferried a small team ahead of the rest of the group. This team had to go first in order to build a half-way point for the planes to refuel. Britney Schmidt, one of the researchers on the journey, shared details of the journey in a blog post on the ITGC website. She described how the team that went ahead of the rest were “heroes”, braving storms to build runways and set up camp so that the rest of the team could arrive.

Meanwhile, the British Antarctic Survey was conducting a mission of their own, aiming to meet the rest of the scientists at Thwaites Glacier. Instead of flying over the ice, they started their journey by sea — using boats that were **sturdy** enough to crack ice. The team then dragged hundreds of tonnes of cargo and fuel across Antarctica using specialist snowmobiles. These snowmobiles were

built to endure the iciest of icy conditions. The terrain was so unforgiving that the highest speed the team managed to reach on their journey was 16km/h.

When the teams finally united at Thwaites Glacier, they immediately began work on the actual mission — studying the glacier. The team had to collect ice to melt and boil, so they could blast boiling water at the glacier to drill a 30cm wide hole (left). This hole allowed their Icefin robotic submarine (left) through the half mile of ice between the top of the glacier and the ocean water below it. The Icefin team managed to capture the first images ever seen of where the ice at the bottom



of Thwaites Glacier meets the warmer ocean water. These images confirmed how and why the glacier was melting at an **accelerating** rate.

Thwaites Glacier affects us all

Warm ocean water melts the glacier where the ice meets the ocean floor. This causes more of the “underbelly” of the glacier to be exposed to warm ocean water, making the glacier “recede” from the ocean floor, further exposing the glacier to ocean water. This vicious cycle accelerates the rate at which the glacier melts.

Changes in temperature and melting sea ice affect how the Earth’s atmosphere and ocean interact with each other. As a result, there are changes to the Earth’s climate and weather. Scientists predict that if Thwaites Glacier melts away completely, violent arctic storms could increase by up to ten times around the world.

The Earth’s polar ice caps help to reflect sunlight away from Earth, reducing the amount of heat absorbed into the Earth. Melting ice caps means smaller reflective surfaces, less sunlight reflected, and higher temperatures on Earth — causing a vicious cycle of higher temperatures, further melting, and rising sea levels.

Chunks of Antarctica melt and break away from the continent, forming massive icebergs. These icebergs float away, gradually melting and releasing cold fresh water. This leads to changes in ocean currents, even very far away from Antarctica. Icebergs also affect ocean life, by releasing millions of years of trapped nutrients.

One glacier melting in Antarctica might seem like a far-away problem, but melting polar ice affects us all. The ice in Antarctica is millions of years old, holding 90% of the Earth’s fresh water. If Thwaites Glacier alone were to melt completely, the sea level would rise half a meter. This would cause serious flooding in coastal areas.

VOCAB BUILDER

polar (say “po-lar”; adjective) = relating to the North or South Pole.

thorough (say “tha-reh”; adjective) = in-depth and complete.

sturdy (say “ster-dee”; adjective) = strong.

accelerating (say “ek-se-le-ray-ting”; verb) = increasing in rate, speeding up.