

Arctic flights to shed light on sea ice and storms link

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Scientists are flying research aircraft through the heart of Arctic storms this summer to better understand how weather systems are affecting polar sea ice.

Arctic cyclones are the main type of hazardous weather that affect the polar environment during summer. They can impact sea ice movement and trigger rapid ice loss, effects which themselves influence the development of cyclones.

Two aircraft are flying around 60 missions this month from the Norwegian Arctic, to study Arctic summer cyclones for the first time. This will create the most detailed physical picture yet of how the ice and ocean interact with the atmosphere above, in order to better simulate this in weather and climate prediction models.

As a result of global warming, sea ice is becoming thinner across large areas of the Arctic Ocean in summer, year on year. This means that winds can move the ice more easily, which in turn can influence [weather systems](#). This makes predicting changes to the Arctic environment difficult in both the short and long term.

The dramatic changes in Arctic ice are expected to become increasingly important for [global climate](#), making it an urgent problem for study.

Professor John Methven, an atmospheric dynamics researcher at the University of Reading and project lead, said: "Arctic cyclones are understood far less than those in [temperate regions](#), making them even harder to predict.

"This project will examine Arctic summertime cyclones from above, below and right in their midst. It will shed light on the relationship between sea ice and the atmosphere above, which will provide invaluable data to improve understanding of how [climate change](#) is affecting this globally important region."

Temperatures in the Arctic are rising faster than anywhere else on Earth. Climate change has changed sea ice dramatically, making ice thinner and

breaking it up, making it more susceptible to winds and storms.

Arctic summertime cyclones can measure thousands of kilometres in diameter and can persist for several days or weeks, often moving south outside the Arctic circle.

Flights are taking place from 27 July to 24 August. Strong northerly winds during the first week temporarily slowed sea ice retreat due to recent heat waves in the region. This and a forecast for an Arctic cyclone to track across Svalbard over the weekend have provided ideal conditions for the first flights.

A team of UK scientists are flying in the British Antarctic (BAS) Survey Twin Otter plane based from Longyearbyen in Svalbard, the most northerly town on Earth. The Natural Environment Research Council is funding the project team from the University of Reading, University of East Anglia, British Antarctic Survey, National Centre for Atmospheric Science (NCAS) and the Centre for Polar Observation and Modelling.

These low-level flights are taking place over the ocean and sea ice, and particularly over areas where sea ice is breaking up. They are simultaneously monitoring turbulence, heat and moisture in the lower atmosphere and taking detailed measurements of physical properties of the sea ice such as surface height, roughness and temperature.

Rod Arnold, Head of the Air Unit at British Antarctic Survey, said:
"British Antarctic Survey are proud to support this important research with our scientific and logistics expertise. It is essential that we provide the capability for researchers to study weather systems up close to understand our changing climate and the effect that it is having on the environment.

"Our Twin Otter aircraft and the experience of the crews in conducting

flights supporting polar airborne science and logistics enable us to do this as safely and efficiently as possible in these missions."

Professor Ian Renfrew, Professor of Meteorology at the University of East Anglia, said: "From our base in Svalbard, we will be investigating summertime Arctic Cyclones and how these weather systems interact with the sea ice.

"Recent decades have seen a dramatic fall in Arctic sea ice area and cyclones appear to both slow down and speed up the ice decline, depending on the time of the year. The [physical processes](#) are unclear and one of our aims is to investigate the effect of the cyclones on the sea ice and the effect of the sea ice distribution on the cyclones."

Scientists from France and the U.S. are conducting additional flights in the SAFIRE ATR42 plane, which is equipped with radar and infrared sensors. These will take 3D measurements of the movement of clouds and the droplets within them from above during [cyclone](#) conditions.

Provided by University of Reading

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