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News / Explained / Explained Sci-Tech / Why has NASA launched a tiny satellite to measure heat lost from Earth's poles?

# Why has NASA launched a tiny satellite to measure heat lost from Earth's poles?

The satellite is one of two climate satellites that will measure far-infrared radiation from the poles. This is the need to know about the mission.

EXPRESS OPINION X



Will Hindi belt continue to be enchanted by Hindutva despite 'Modi fatigue'?

Written by [Alind Chauhan](#)

New Delhi | Updated: May 28, 2024 05:21 IST





This artist's concept depicts one of two PREFIRE CubeSats in orbit around Earth. (Credit: NASA/JPL-Caltech)

On May 25, the National Aeronautics and Space Administration (NASA) launched one of the two climate satellites, which would study heat emissions at Earth's poles, sitting atop Rocket Lab's Electron rocket from Māhia, New Zealand. The second satellite will be launched in the following days.

The two shoebox-sized cube satellites, or CubeSats, will measure how much heat the Arctic and Antarctica — two of the coldest regions on the Earth — radiate into space and how this influences the planet's climate. The mission has been named PREFIRE (Polar Radiant Energy in the Far-Infrared Experiment) and was jointly developed by NASA and the University of Wisconsin-Madison (US).

Here is a look at the mission and why researchers are interested in heat loss at Earth's poles.

### But first, what are CubeSats?

CubeSats are essentially miniature satellites whose basic design is a 10 cm x 10 cm x 10 cm (which makes up for "one unit" or "1U") cube — just a little bigger than a Rubik's cube — and weight not more than 1.33 kg. Depending on the CubeSat's mission, the number of units can be 1.5, 2, 3, 6, and 12U, according to [NASA](#).

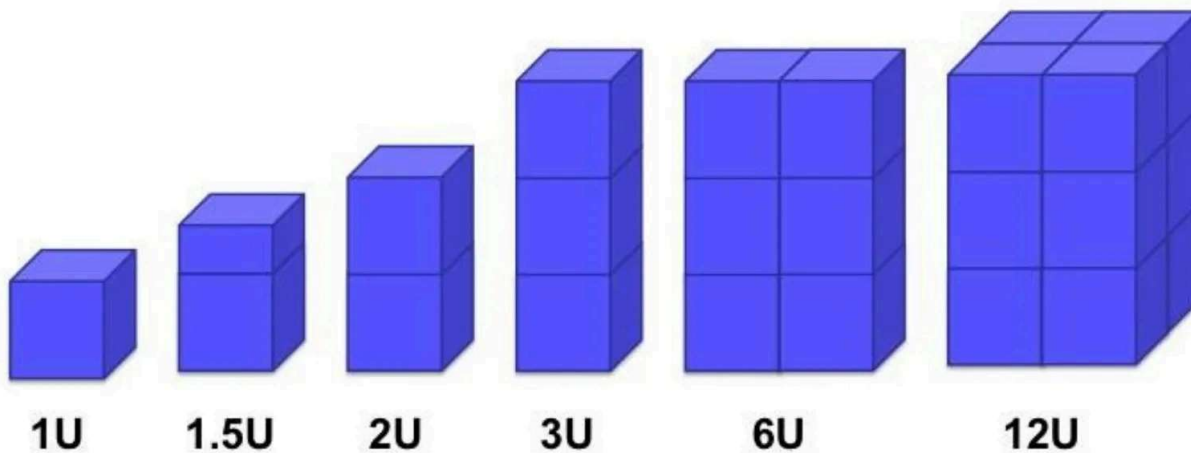
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tools. However, owing to their low cost and less mass in comparison to traditional satellites, they began to be put in orbit for technology demonstrations, scientific research, and commercial purposes.

Each of the PREFIRE satellites is a 6U CubeSat. They measure around 90 cm in height and nearly 120 cm in width when the solar panels, which will power the satellite, are deployed. The two satellites will be placed in a near-polar orbit (a type of low Earth orbit) at an altitude of about 525 kilometres.



CubeSats are a class of nano- and microsatellites. Credit: NASA

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### Why do researchers want to measure heat emissions at Earth's poles?

It has to do with the Earth's energy budget, which is the balance between the amount of heat incoming to Earth from the Sun and the amount of heat outgoing

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A large amount of the heat radiated from the Arctic and Antarctica is emitted as far-infrared radiation — wavelengths of 3  $\mu\text{m}$  to 1,000  $\mu\text{m}$  within the infrared range of electromagnetic radiation. However, there is currently no way to measure this type of energy. As a result, there is a gap in knowledge about the planet's energy budget.

### What is the PREFIRE mission?

The PREFIRE mission will change that. Its two CubeSats can study far-infrared radiation from the Earth's pole and the data collected by them would help scientists better understand the energy budget of the planet.

"Their observations will help us understand the fundamentals of Earth's heat balance, allowing us to better predict how our ice the face of global warming," Laurie Leshin, director of the Laboratory, said in a statement.

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Each of the PREFIRE CubeSat is equipped with a thermal infrared spectrometer — known as Thermal Infrared Spectrometer (TIRS) — to measure the amount of infrared and far-infrared radiation from the Arctic and Antarctica. The spectrometer features specially shaped-mirrors and detectors for splitting and measuring infrared light, according to NASA.

greenhouse effect in the region.

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Entertainment May 27, 2024 18:48 IST

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