ABC News

CLIMATE CHANGE

Scientists use giant laser to measure cloud temperature

By Felicity Ogilvie

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The Australian Antarctic Division will use a giant laser to measure climate change in the atmosphere.

The laser will be pointed into the sky above Davis Station in Antarctica and will take the temperature of clouds that form almost 100 kilometres above the earth's surface.

Scientists say those clouds are more easily seen as the world warms up.

Jeff Cumpston operates one of the lasers at Davis Station.

"Our atmospheric dynamics are such that as we've got a warming troposphere - which is where we live - as that warms that in fact is interlinked with a phenomenon called global cooling up in the mesosphere above 50 kilometres," he said.

"And so we expect that with a cooler mesosphere we'll see an increased occurrence of these clouds."

The laser will be pointed into the sky above Davis Station in Antarctica. (Adelaide University)

- ***Audio:*** *Giant laser measuring Antarctic climate (AM)*

The clouds are a bright blue colour and their common name is luminous clouds.

Ray Morris from the Antarctic Division is studying them.

"Noctilucent Clouds, or luminous clouds, they're visible when the sun's below six degrees below the horizon, between 55 degrees latitude to the pole," he said.

"Now, these things have been observed predominantly in the Northern Hemisphere by ground observers - there's a lot of mass there - and what's been happening is there's been an increase in the latitude coverage of these clouds and their brightness, or intensity."

He says the brightness of the clouds is an indication that the earth's surface is warming up because of climate change.

Borrowed laser

Mr Morris is borrowing a more powerful laser from Germany so that he can take a closer look at the clouds and see how bright and cold they are.

The Europeans have built their own laser to look at luminous clouds in the Northern Hemisphere, and Mr Morris wants to compare that with the clouds above Antarctica.

"And what we've already found from Davis is that these ice clouds occur one kilometre higher than they do in the Northern Hemisphere and they're dimmer and they're less frequent," he said.

"So these ice layers not only give us an indicator that climate may be changing long-term as they get brighter and more intense, but also they can tell us that if things are changing, atmospheric processes that heat this region, we can see processes that heat this region; we can see processes occurring which we can't otherwise see in the Northern Hemisphere."

When asked why climate change may be affecting that level of the atmosphere differently in the North Pole than the South Pole, he gave two reasons.

"Firstly, there's orbital eccentricity; that is in the summer the earth is closer to the sun in the Southern Hemisphere than the summer in the Northern Hemisphere," he said.

"Now, that contributes about a 1K to 2K in temperature difference.

"And the second thing is what we call atmospheric gravity waves.

"What these are waves which are launched when the wind blows over mountains and there are important in the transfer of energy momentum, and that's important in the climate process."

It may have a powerful reach, but the laser comes in a modest package.

It is fairly small and is housed in a shipping container, which makes it easy to transport to Antarctica.

Tags: environment, climate-change, antarctica, australia

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