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Earth's Stratosphere Is Shrinking Because of Greenhouse Gas Emissions, Scientists Say

By Jan Wesner Childs · 5 days ago

A view of Earth's atmosphere.

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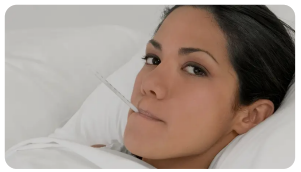

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(NASA)

At a Glance

- **New research shows that the stratosphere is nearly a quarter of a mile smaller than it was in 1980.**
- **The stratosphere is the second layer in Earth's atmosphere.**
- **It keeps storms from rising too high into the air, where they can become stronger.**

Earth's stratosphere - the layer where commercial airlines cruise and the ozone layer lives - is shrinking because of greenhouse gas emissions, according to a new study.

The research, published May 5 in the journal Environmental Research Letters, shows that the stratosphere is nearly a quarter of a mile smaller than it was in 1980.

The second layer of our atmosphere, the stratosphere extends from about 6 miles to 30 miles above Earth. It lies on top of the troposphere, which has already been shown to be heating and expanding because of climate change.

That causes the troposphere to push the lower part of the stratosphere outward. At the same time, more carbon dioxide is entering the stratosphere, where it actually cools down and causes the layer to contract, the researchers said.

"For the first time we show that this is true: that the Earth's stratosphere has contracted at a rate of more than 100 meters (.06 mile) per decade since 1980 and also show that the cause of this phenomenon are greenhouse gas emissions," study author Juan Antonio Añel, a physicist at Spain's University of Vigo, said in a news release.

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The researchers based their conclusion on satellite data and climate models.

The findings have many potential implications, including for weather.

Nearly all of our weather forms in the troposphere closer to ground level. Temperatures usually cool with increasing height in the troposphere, which allows thunderstorms to grow. The taller a thunderstorm is, the stronger it is.

In contrast, warming temperatures with increasing height in the stratosphere keep a lid on storms from puncturing too high into the stratosphere, according to weather.com meteorologist Jonathan Belles.

"A thinned stratosphere may mean that thunderstorms may be able to get taller than currently," Belles said.

The same could be true for hurricanes, he said.

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Changes to the stratosphere can also affect satellite operations, the GPS navigation system and radio communications, according to the study.

Añel and his fellow researchers say the stratosphere could shrink even more in the coming decades unless there are major cuts to greenhouse gas emissions.

“It is shocking,” he told The Guardian. “This proves we are messing with the atmosphere up to 60 kilometers (about 37 miles).”

It's previously been thought that the stratosphere was getting smaller because of the decline of the ozone layer.

"Some scientists have started calling the upper atmosphere the 'ignorosphere' because it is so poorly studied," Paul Williams, a professor of atmospheric science at the University of Reading in the UK who was not involved in the new research, told Yale Environment 360. "This new paper will strengthen the case for better observations of this distant but critically important part of the atmosphere. It is remarkable that we are still discovering new aspects of climate change after decades of research."

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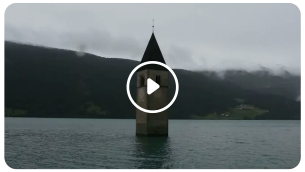

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