

# Lower part of Earth's atmosphere is warming, data review concludes

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(PhysOrg.com) -- The troposphere, the lower part of the atmosphere closest to the Earth, is warming in ways that are broadly consistent with both theoretical expectations and climate models, according to a new scientific study from the National Oceanic and Atmospheric Administration (NOAA) and the NOAA-North Carolina State University Cooperative Institute for Climate and Satellites (CICS).

Since the development of the first climate models in the 1960s, the [troposphere](#) has been projected to warm along with the [earth](#)'s surface because of the increasing amounts of greenhouse gases in the [atmosphere](#). This expectation has not significantly changed even with major advances in climate models.

In the 1990s, however, observations did not show the troposphere to be [warming](#) even though surface temperatures were rapidly warming. This lack of tropospheric warming was used by some to question both the reality of the surface warming trend and the reliability of [climate models](#) as tools. The NOAA study, entitled "Tropospheric Temperature Trends: History of an Ongoing Controversy," extensively reviews the relevant scientific analyses and finds that there is no longer evidence for a fundamental discrepancy and that the troposphere is warming.

"Looking at observed changes in tropospheric temperature and climate model expectations over time, the current evidence indicates that no fundamental discrepancy exists, after accounting for uncertainties in both the models and observations," said Peter Thorne, a senior scientist

at CICS in Asheville, N.C., and a senior researcher at NC State.

The paper, which is co-authored by researchers from NOAA, the NOAA-NCSU Cooperative Institute for Climate and Satellites, the United Kingdom Met Office, and the University of Reading in the United Kingdom, appears in *Climate Change*. And while this was the first comprehensive review of the scientific literature on this topic, it is not the last word on the tropospheric temperature trend.

“Looking to the future, it is only through robust and varied observations and data analyses can we hope to adequately understand the tropospheric temperature trend,” said Dian Seidel, a NOAA scientist at the Air Resources Laboratory, in Silver Spring, Md.

Provided by North Carolina State University

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