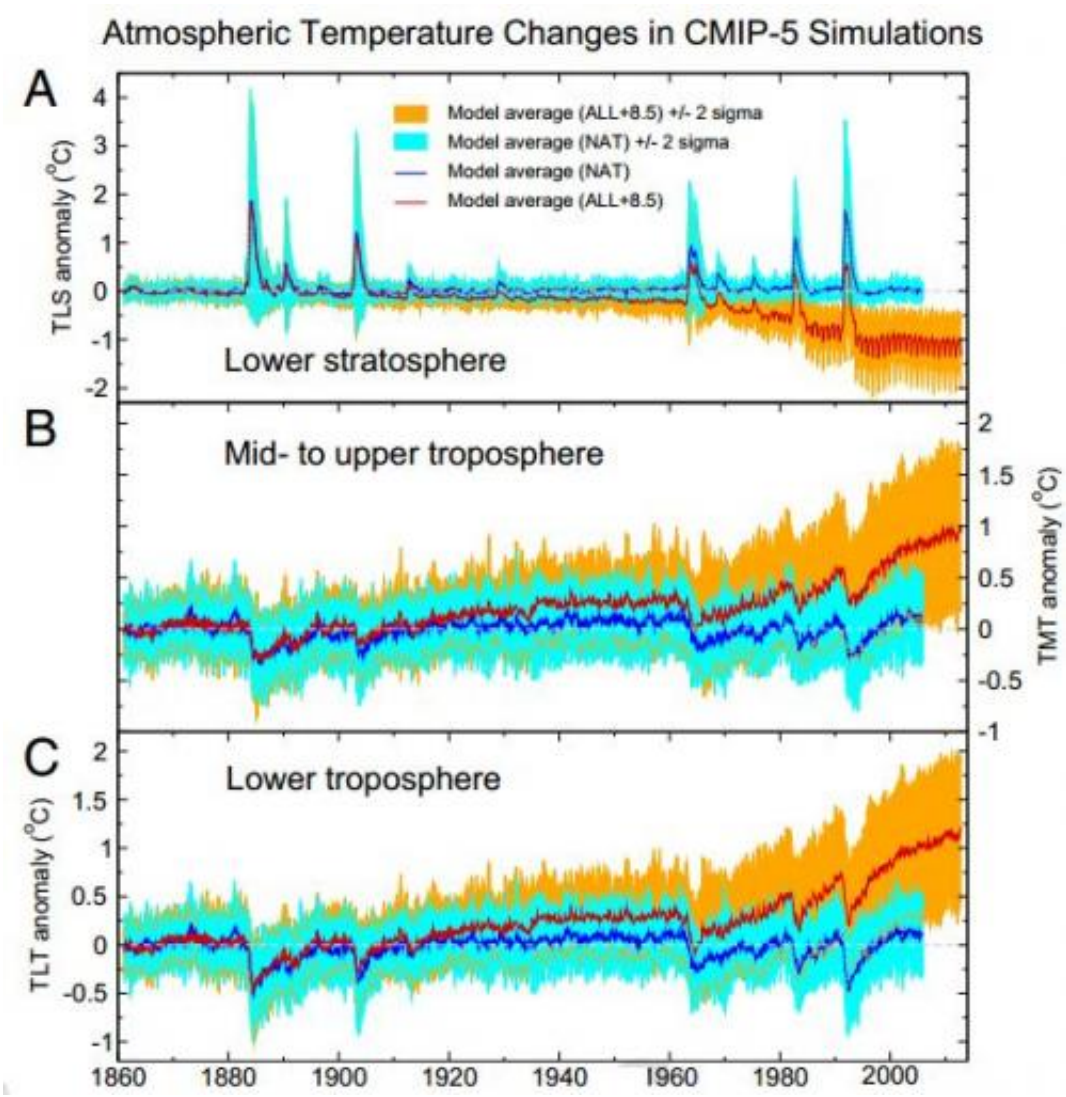
Researchers claim satellite data proves global warming caused by humans

September 17 2013, by Bob Yirka



Time series of simulated monthly mean near-global anomalies in the temperature of the lower stratosphere (TLS), the mid- to upper troposphere (TMT), and the lower troposphere (TLT) (A–C). Model results are from spliced

historical/RCP8.5 simulations with combined anthropogenic and natural external forcing (ALL+8.5) and from simulations with natural external forcing only (NAT). The bold lines denote the ALL+8.5 and NAT multimodel averages, calculated with 20 and 16 CMIP-5 models (respectively). Temperatures are averaged over 82.5°N–82.5°S for TLS and TMT, and over 82.5°N–70°S for TLT. Anomalies are defined with respect to climatological monthly means over 1861–1870. The shaded envelopes are the multimodel averages ±2 x s(t), where s(t) is the "between model" SD of the 20 (ALL+8.5) and 16 (NAT) ensemble-mean anomaly time series. To aid visual discrimination of the overlapping ALL+8.5 and NAT envelopes, the boundaries of the ALL+8.5 envelope are indicated by dotted orange lines. Credit: (c) *PNAS*, doi: 10.1073/pnas.1305332110

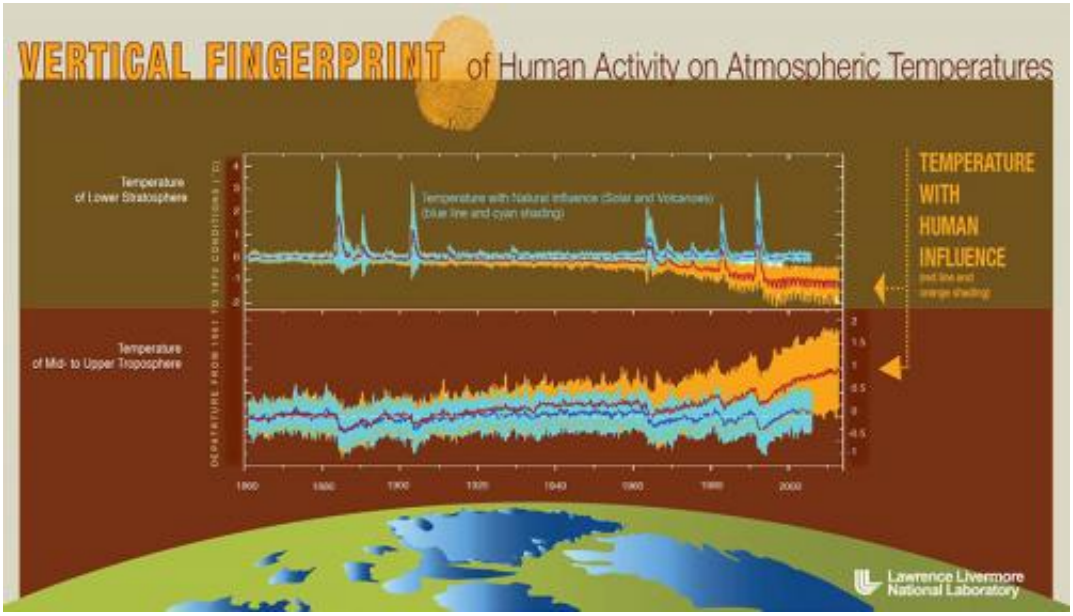
(Phys.org) —A team of climatologists with members from the U.S., Australia, Canada and Norway is claiming in a paper they've had published in the journal *Proceedings of the National Academy of Sciences*, that they have found proof that global warming is being caused by human influences. They are basing their claims on computer simulations they've run and data obtained from three decades' worth of satellite observations.

Most of the world's scientists agree that our planet is experiencing global warming. Most also generally support the theory that the cause of global warming is due to an increase in greenhouse gasses, primarily carbon dioxide. And while many also support the notion that the increase in greenhouse gasses in the atmosphere is likely due to human emissions, few are willing to go on record claiming that global warming is due directly to human activities. The researchers in this new effort are one such group and they claim they have proof.

Satellites, as most everyone knows, have been hovering over or circling our planet for over half a century. Over that time period they have grown

progressively more sophisticated, measuring virtually every conceivable aspect of the planet below—from gas levels in the atmosphere to temperature readings on an averaged global scale, to the impact of natural events such as volcanic eruptions. It's this data the researchers used in their attempt to root out the true source of global warming.

The research team conducted a two stage study. The first involved creating computer models that simulated climate evolution over the past several decades under three different scenarios: a world without human influence, a world with only human influence and a world without human emissions or naturally occurring incidents such as volcanic eruptions. The second stage involved gathering data from satellites and comparing it with what the team had found in creating their simulations. They say patterns emerged that prove that human influence is the cause behind global warming. One example they cite is data that shows that the troposphere (the part of the atmosphere closest to us) has seen a steady rise in temperature over the past several decades, even as the layer just above it, the stratosphere, has cooled slightly.



A graphic representation of the fingerprints, both manmade and natural, on the vertical structure of the atmosphere. Manmade changes such as the increased production of greenhouse gases causes the stratosphere to cool while the mid- to upper troposphere heats up. A new study shows that natural influences alone would not cause these temperature changes.

But what has the team really convinced that humans are the true source behind global warming, is that they were unable to produce the type of warming we've seen with just natural events—it's only when human emissions are added to models that such a trend can be realistically simulated. That, they say, proves that human practices over the past several decades are responsible for global warming.

More information: Human and natural influences on the changing thermal structure of the atmosphere, *PNAS*, Published online before print September 16, 2013, DOI: 10.1073/pnas.1305332110

Abstract
Since the late 1970s, satellite-based instruments have monitored global changes in atmospheric temperature. These measurements reveal multidecadal tropospheric warming and stratospheric cooling, punctuated by short-term volcanic signals of reverse sign. Similar long- and short-term temperature signals occur in model simulations driven by human-caused changes in atmospheric composition and natural variations in volcanic aerosols. Most previous comparisons of modeled and observed atmospheric temperature changes have used results from individual models and individual observational records. In contrast, we rely on a large multimodel archive and multiple observational datasets. We show that a human-caused latitude/altitude pattern of atmospheric temperature change can be identified with high statistical confidence in satellite data. Results are robust to current uncertainties in models and

observations. Virtually all previous research in this area has attempted to discriminate an anthropogenic signal from internal variability. Here, we present evidence that a human-caused signal can also be identified relative to the larger "total" natural variability arising from sources internal to the climate system, solar irradiance changes, and volcanic forcing. Consistent signal identification occurs because both internal and total natural variability (as simulated by state-of-the-art models) cannot produce sustained global-scale tropospheric warming and stratospheric cooling. Our results provide clear evidence for a discernible human influence on the thermal structure of the atmosphere.

Press release 1
Press release 2