Shrinking storm cloud zones revealed to be missing driver of Earth absorbing more sunlight

Climate change is driven by Earth absorbing more energy than it radiates out to space, and this 'energy imbalance' has increased faster than expected in recent years, puzzling the scientific community.

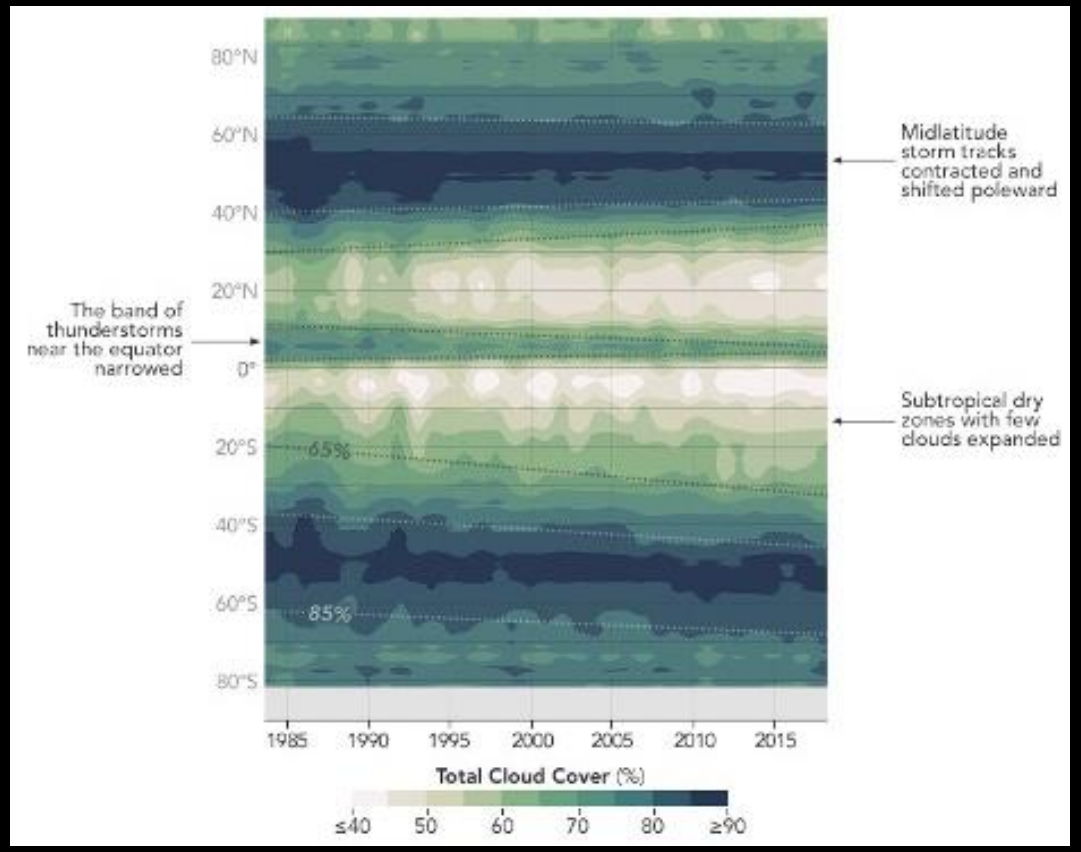
A new study from Tselioudis et al. using data from NASA's CERES and MODIS as well the International Satellite Cloud Climatology Project (ISCCP), finds the loss of reflective storm clouds is a key driver of the accelerating energy imbalance.

This study builds on recent work by Tselioudis et al. showing Earth's cloudiest zones over the oceans have shifted and contracted markedly over the past 35 years, meaning more of the Sun's energy is getting absorbed.

How clouds respond to and influence the changing climate is one of the largest sources of uncertainty in future climate projections and a key target of national science priorities like the Decadal Survey.

Detecting and attributing changes like these is only possible because of NASA's decades of continuous Earth Observations and subject matter expertise.

This study not only extends prior research to answer a high value question for the science community using NASA data, the findings provide a potential benchmark for future modeling efforts to be evaluated against.



Cloud cover (%) shown as light to dark green changing over time (horizontal axis) across different latitudinal bands (vertical axis), with clear contractions of dark areas over time.

Journal Article: Tselioudis, G., J. Rémillard, C. Jakob, and W. Rossow, 2025: Contraction of the world's storm-cloud zones the primary contributor to the 21st century increase in the Earth's sunlight absorption. *Geophys. Res. Lett., accepted.*

URL or DOI: https://doi.org/10.21203/rs.3.rs-5050391/v1 **[Image from forthcoming article by Earth Observatory]**