

Study: Cosmic rays do not explain global warming

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Sudden outbreaks of intense solar activity lead to a strong reduction of cosmic rays. Researchers have studied such events and their impact on cloud formation. Photo: Freefoto

(PhysOrg.com) -- A new study supports earlier findings by stating that changes in cosmic rays most likely do not contribute to climate change.

It is sometimes claimed that changes in radiation from space, so-called galactic cosmic rays, can be one of the causes of global warming. A new study, investigating the effect of cosmic rays on clouds, concludes that the likelihood of this is very small.

The study Cosmic rays, cloud condensation nuclei and clouds – a reassessment using MODIS data was recently published in the journal Atmospheric Chemistry and Physics. A group of researchers from the University of Oslo, Norwegian Institute for Air Research (NILU), CICERO Center for Climate and Environmental Research, and the University of Iceland, are behind the study.

Unlikely that cosmic rays affect warming

There are scientific uncertainties about cosmic rays and cloud formation. Some researchers have claimed that a reduction of cosmic rays during the last decades has contributed to the global temperature rise. The hypothesis is that fewer cosmic rays causes fewer cloud droplets and reduced droplet size, and that this again causes global warming, since reduced cloud droplets would reflect less energy from the sun back to space. However, the researchers who stick to this hypothesis find little support amongst colleagues.

“According to our research, it does not look like reduced cosmic rays leads to reduced cloud formation”, says Jon Egill Kristjansson, a professor at the University of Oslo.

This result is in line with most other research in the field. As far as Kristjansson knows, no studies have proved a correlation between reduced cosmic rays and reduced cloud formation.

Kristjansson also points out that most research shows no reduction in cosmic rays during the last decades, and that an astronomic explanation of today’s global warming therefore seems very unlikely.

Studied solar outbreaks

Kristjansson and his colleagues have used observations from so-called Forbush decrease events: Sudden outbreaks of intense solar activity that lead to a strong reduction of cosmic rays, lasting for a couple of days. The researchers have identified 22 such events between 2000 and 2005.

Based on data from the space-borne MODIS instrument, the researchers have investigated whether these events have affected cloud formation. While previous studies have mainly considered cloud cover, the high spatial and spectral resolution of the MODIS data also allows for a more thorough study of microphysical parameters such as cloud droplet size, cloud water content and cloud optical depth.

No statistically significant correlations were found between any of the four cloud parameters and galactic cosmic rays.

“Reduced cosmic rays did not lead to reduced cloud formation, either during the outbreaks or during the days that followed. Indeed, following some of the events we could see a reduction, but following others there was an increase in cloud formation. We did not find any patterns in the way the clouds changed”, Kristjansson explains.

By focusing on pristine Southern Hemisphere ocean regions, the researchers examined areas where a cosmic ray signal should be easier to detect than elsewhere.

Supporting other recent work

Joanna Haigh from Imperial College London has also studied possible links between solar variability and modern-day climate change.

“This is a careful piece of work by Jon Egill Kristjansson that appears to find no evidence for the reputed link between cosmic rays and clouds,” she commented to BBC.

“It's supporting other recent work that also found no relationship,” Haigh added.

Paper: www.atmos-chem-phys.net/8/7373...acp-8-7373-2008.html

Provided by CICERO Center for Climate and Environmental Research

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