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[International Cooperation][Geoscience] Study on Atmosphere of Venus Verifies the Existence of Sulfate, a Likely Substance to Regulate Climate Change

[International Cooperation][Geoscience] Study on Atmosphere of Venus Verifies the Existence of Sulfate, a Likely Substance to Regulate Climate Change (Chinese Version)

Academia Sinica Newsletter (2010/11/05) Dr. Mao-Chang LIANG, Associate Research Fellow of the Center for Environmental Changes at Academia Sinica, recently took part in a scientific investigation of sulfur cycle in the upper atmosphere of Venus. Sulfur is of interest as it may be able to mitigate global warming on Earth. The investigation was conducted by a team of scientists from California Institute of Technology, Université de Versailles Saint-Quentin, Université Pierre et Marie Curie, the University of Michigan, and Academia Sinica. The study was published on October 31, 2010 in Nature Geoscience, a leading journal in the field.

Geo-engineering of the stratospheric sulfate layer by injecting sulfate particles into the stratosphere is proposed by the Nobel prize winner Paul CRUTZEN as an affordable and effective method for regulating global warming, which is caused primarily by the release of greenhouse gases. However, the approach could also delay the recovery of the ozone hole. Scientific investigations of the proposal have thus focused on the potential consequences of such use. The atmosphere of Venus contains more than a thousand times the sulfur dioxide found in the terrestrial atmosphere, and therefore can be used for testing the limits of the photochemistry of sulfur species and their impact on climate.

In their study, Dr. Mao-Chang LIANG and colleagues found, for the first time, an unexpected sulfur dioxide (SO_2) layer in the Venus mesosphere (~100 km) using both ground-based measurements and Venus Express, a Venus exploration mission launched by the European Space Agency. With this milestone discovery, the team proposed a theory that the source of the sulfur oxides is the photolysis of sulfuric acid (H_2SO_4) vapor released from aerosols. This fundamentally changes the previous paradigm of atmospheric chemistry in the upper atmosphere of Venus, and has implications for the aerosol microphysics and atmospheric circulation, that were previously less explored.

The full article entitled “Photolysis of sulphuric acid as the source of sulphur oxides in the mesosphere of Venus” is available on the Nature Geoscience website at:
http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo989.html.

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Further Information:
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