Cloud formation affected by human activity, study says

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University of Toronto researchers and their collaborators have discovered that solid ammonium sulphate aerosol – an airborne particle more prevalent in continental areas - can act as a catalyst to the formation of ice clouds, suggesting that cloud formation is another aspect of the global climate system that can be affected by human presence. The findings were published last week in *Science*.

With European climate scientists and cloud physicists, U of T atmospheric chemists Jon Abbatt and Zamin Kanji investigated whether ammonium sulphate aerosol in its crystal form could act as the ice nuclei to form cirrus clouds, the thin, wispy ice clouds that cover one quarter of the globe at any given time.

Cirrus clouds are important to the climate system because they scatter incoming sunlight, trap outgoing heat radiation and control the amount of water vapour in the upper troposphere. “Water vapour is a greenhouse gas, so any change in the ratio of ice cloud to water vapour affects the overall system,” says Abbatt. “So knowing how ice clouds form helps us better understand the system, and put together a better climate model.”

Studies of cirrus formation in different parts of the world have found that the clouds form more efficiently in the moderately polluted air of the Northern hemisphere than in the clean oceanic air of the Southern hemisphere. Abbatt’s team found a correlation between the amount of sulphate aerosol in the air and the efficiency of cloud formation in the regions. Because atmospheric ammonia now mainly comes from

livestock and nitrogen-based fertilizer, the study provides evidence that human agricultural practices impact how and what kind of clouds form in the sky.

Source: University of Toronto