Building a Better Virtual Raindrop

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A new way of mathematically modeling the formation of rain drops in clouds may improve our understanding of Earth's climate, cloud formation and movement, and the effect that small airborne particles have on rainfall. In a paper published online by Geophysical Research Letter the week of June 20, 2005, atmospheric physicist Yangang Liu and atmospheric chemists Peter Daum and Robert McGraw of the U.S. Department of Energy's Brookhaven National Laboratory present a new model, which, they say, helps to overcome some of the shortfalls of previous approaches.

In the first step in the formation of raindrops, small cloud droplets combine to form larger drops in a process known as autoconversion. The

mathematical representation of this process is used in simulating cloud activity and global climate patterns. But according to the Brookhaven team, the model used previously has been oversimplified and vague because some of the terms in the equation lacked a physical basis.

To address this problem, Liu and his colleagues developed a new model for autoconversion that takes into account the limited size range of droplets that interact to create raindrops. The new model also accounts for the amount of liquid water present and the concentration of droplets in a cloud. The authors assert that their model avoids guesswork by being more grounded in physics and is as easy to use as other models.

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Source: Brookhaven Lab