



Modeling studying on ice formation by bacteria in warm-based convective cloud

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Bacteria have been recognized as cloud condensation nuclei (CCN), and certain bacteria, commonly found in plants, have exhibited capacity to act as ice nuclei (IN) at temperatures as warm as -2°C . These ice nucleating bacteria are readily disseminated into the atmosphere and have been observed in clouds at altitudes of several kilometres. It is noteworthy that over 20 years ago, one assumed the possibility of bacterial transport and their importance into cloud formation process, rain and precipitation, as well as causing disease in plants and animal kingdom. We used a 1.5-D cumulus cloud model with the CCOPE 19th July 1981 case and the observed field profile of bacterial concentration, to simulate the significance of bacteria as IN through condensation freezing and immersion freezing mechanisms. Based on the concentration of ice active bacteria between -3°C and -8°C , ice active bacteria should have a great influence on the ice crystal multiplication process. This may have significant implication in understanding of climate. In this paper, we will present our results on the role of bacteria as active ice nuclei in the developing stage of cumulus clouds, and their potential significance in atmospheric sciences.