The Behavior of Cloud Droplets in an Acoustic Field: A Numerical Investigation

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Abstract: The theory and practice of acoustic agglomeration have been evolving steadily including advances in fields such as pollution control using the principles of acoustic agglomeration. With respect to the field of meteorology, there have been attempts in the past to modify atmospheric fogs using intense acoustic energy. These efforts enjoyed only mixed success and were abandoned. However, the theory of acoustic agglomeration suggests that **cloud**s with higher liquid water contents and greater number concentrations than fogs may be more sensitive to acoustic waves and may undergo significant changes in their spectra when acoustic energy is propagated through them. Thus, the application of the principles of acoustic agglomeration to the study of atmospheric phenomena may provide insight to the effect of thunder on **cloud** and precipitation processes as well as providing the basis for a new technology in weather **modification**. In this thesis the theory of acoustic agglomeration is described and a one-droplet model is develped to study the effects of acoustic waves on **cloud** droplets. A stochastic model used to predict changes in **cloud** droplet spectra due to gravitational sedimentation is modified to simulate the application of acoustic energy to various **cloud** volumes. The results are discussed and suggestions are made for further study of the phenomenon.

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