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A program to increase rainfall in countries with Mountainous Areas

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Abstract
There are countries that need more rain, but have mountains. Here is a program for those countries to increase their rainfall during the rainy season. Clouds will be stimulated after being identified. This stems from a result in polymers solutions that has been extended to clouds. Possibly this method could help. The governing equation is from Jennings, 2014 [1], a result that applies to the limit of superheat of polymer solutions, Eq. (1). Then, in 2021 [2] Jennings extended Eq. (1) to Eq. (2) getting the dew point for a cloud, which is identified with onset of rain. An airplane can be fitted to measure certain salient quantities in the 2021 equation and the others will be calculated. The point is to calculate To, the dew point of the cloud, and see if T of the cloud is dipping down to To. If this is true, then cloud seeding can be done with AgI, dry ice or NaCl. This has to be done in the mountains of the countries that need more rain.

Keywords: Rainfall, Mountainous, Homogeneous Nucleation

1. Aims and Scope

The author is aware that cloud seeding has worked in mountain areas and is convinced that the rain process is by homogeneous nucleation. How can particles get all the way up to clouds? Here is Jennings' governing equation for homogeneous nucleation in polymer solutions [1].

$$T - To = 3\ k\ To^2\ w_2\ MW_o/\sigma_o\ a_o\ MW_2 \quad (1)$$

We envisage Eq. (1) "as applying in reverse by detailed balancing where the gaseous phase in the cloud is the mixture, species o, and the water is the solute, species 2" [2].

2. Results

We present the IAJER 2021 result and refer the reader to that article for details. The equation that emerges is the following [2].

$$T - To = (3\ k\ To^2\ /\sigma_o\ a_o)\ (P^*H_2O/Pair)\ RH \quad (2)$$

Nomenclature is omitted and can be found in [2]. Even though (2) is quadratic in To, that isn't the way to solve it. It takes a computer because σ_o and a_o are evaluated at To and P^*H_2O, Pair and RH are evaluated at T. An iterative method has to be employed, guessing To, and then getting a value for T.

This is cycled until it gives the value for T measured by the instrument. Once all inputs agree, then it is known whether T is near To, the temperature of onset of rain. If T is just above To, then the given cloud is ripe to seed with AgI, dry ice, NaCl or whatever. Possibly CH3-O- Na+ could be used.
The macromolecules 1985 article [3] had the original data for bubble nucleation in polymer solutions, so that kicked it off. The author thinks this idea can help in Cailfornia's Sierra-Nevada.

3. Acknowledgments

This paper is dedicated to the memory of John G. Forte, who was professor of Molecular and Cell Biology at UC Berkeley and the author went to delightful Christmas parties at the Forte home.

4. References

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