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Phytoplankton and DMS: A Study of Environmental Alteration

The CLAW Hypothesis (R. Charlson, J. Lovelock, M. Andreae, and S. Warren (1987. Oceanic phytoplankton, atmospheric sulphur, cloud albedo and climate. , 326, 655-661) predicts a growth in the phytoplankton population with an increase in temperature, while the Anti-CLAW Hypothesis (R. Charlson, J. Lovelock, M. Andreae and S. Warren (Ibid.) states that increased temperatures will limit phytoplankton numbers. Verifying one of these two hypotheses was the goal of this experiment as well as the effect of varying quantities of dimethyl sulfide, or DMS, on flora to begin predicting the environmental implications of using DMS for cloud enhancement. DMS, through last year's experimental data from cloud nucleation, showed signs of increasing cloud nuclei, increasing cloud density, and boosting reflective properties when DMS was introduced to the cloud formation process. This agreed with both Hypotheses addressing DMS in cloud nucleation and development. Phytoplankton, the largest natural producer of DMS thrives in different locations around the world. To experiment with temperature optimization for phytoplankton populations, a sterile apparatus with controlled nutrients and varied temperatures was set up. The nitrate levels and light spectrometry absorbance of the varied tanks were inspected to determine phytoplankton populations over time. These experiments were designed to help predict the effects of global climate change with temperatures increasing and population patterns of ocean phytoplankton changing as a direct result of temperature variance. Combined experimental data from this year and last year are aimed at providing a more complete evaluation of the CLAW and Anti-CLAW Hypotheses.