Novel Method to Determine the Total Lasting Albedo Effect of Aerosol-Seeded Clouds based on Aerosol Particle Type
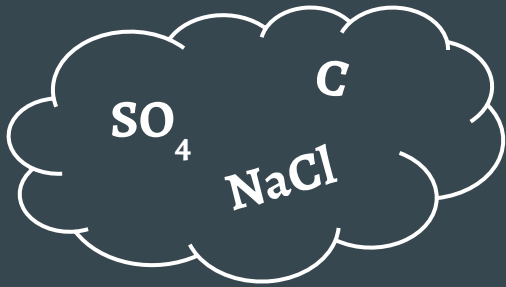
● ● ●

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Mount Pinatubo
(1992 eruption)

vs.

Global Warming

- 0.5ºC*
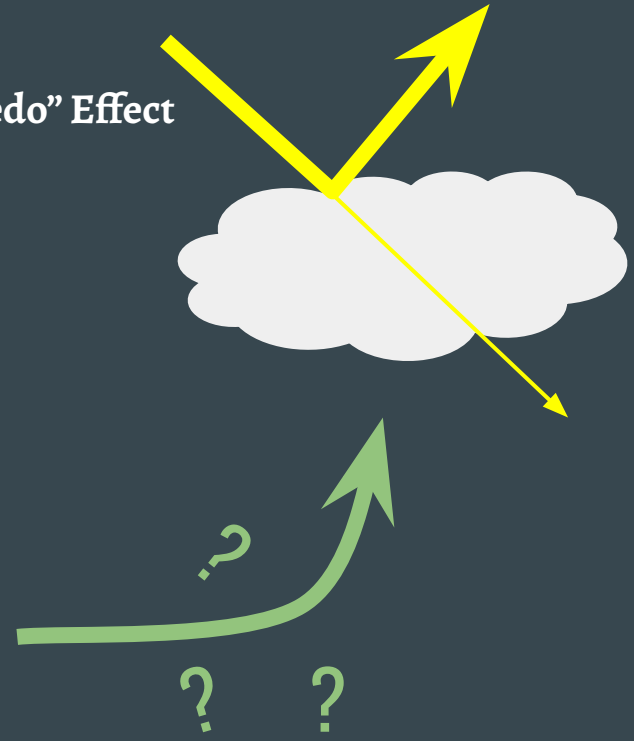20 Mtons SO_2
A few weeks

+ 0.82ºC**
30 years

* estimated temperature change in the northern hemisphere
** estimated global temperature change according to the IPCC
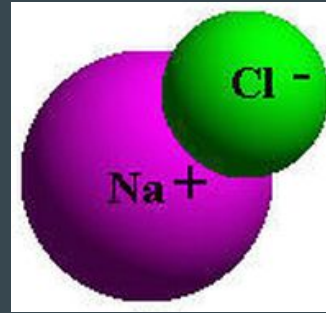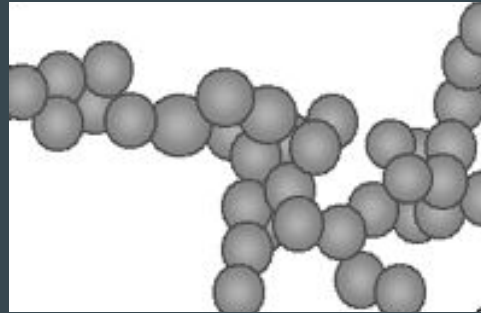
Rationale

"Albedo" Effect
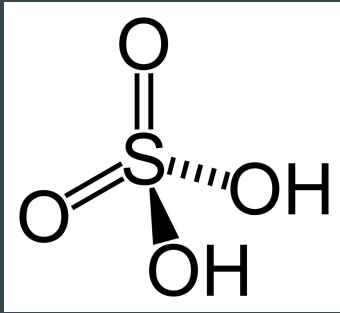
Aerosols and Cloud Condensation Nuclei (CCN)

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MCB: Marine Cloud Brightening Model
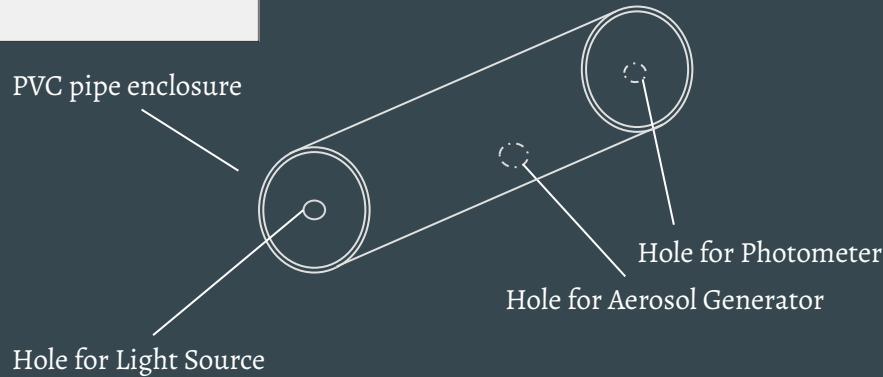

Advantages:
- Cost
- Unlimited source of aerosol
- Harmless aerosol

Hypothesis & Question

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Experimental Design

Average rain drop size - 2 millimeters

Average cloud droplet size - 0.02 millimeters

Average condensation nucleus size - 0.0002 millimeters

BOTTLE CAPS
HUMIDIFIER

PVC pipe enclosure

Hole for Photometer

Hole for Aerosol Generator

Hole for Light Source

Data Analysis
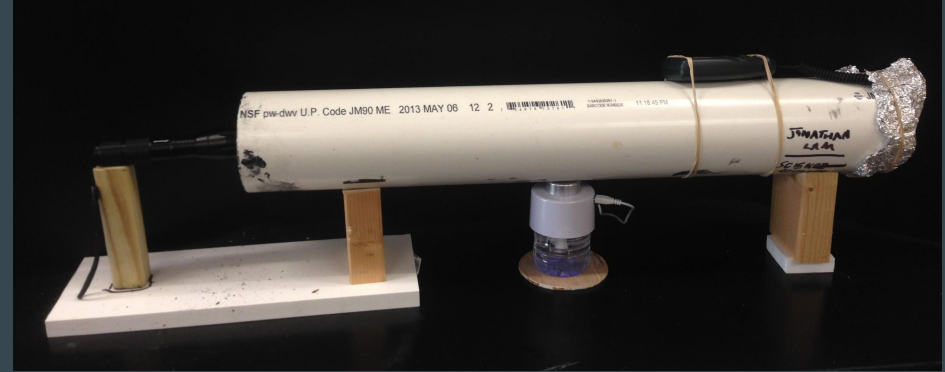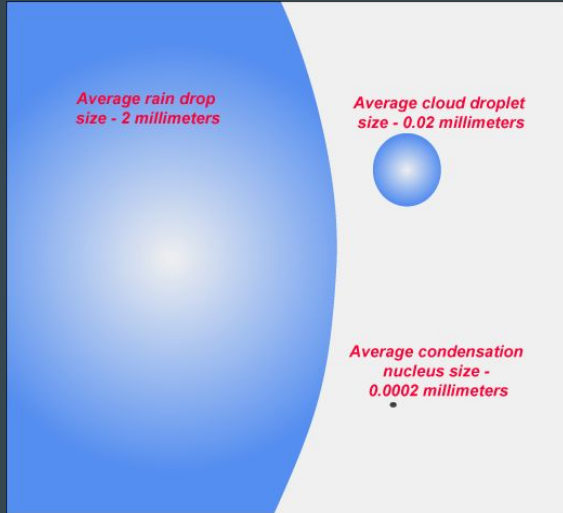
$$a = \frac{b_{total} - b_{measured}}{b_{total}}$$

Average albedo vs. time for different aerosols

Table 5. Albedo vs. time trend lines

Aerosol	Equation of Best Fit Line	Correlation Coefficient
None (control)	$y = 0.794(0.987)^x + 0.188$	$r = -0.875$ $r^2 = 0.766$
H_2SO_4	$y = 0.514(0.985)^x + 0.464$	$r = -0.846$ $r^2 = 0.715$
NaCl	$y = 0.569(0.990)^x + 0.480$	$r = -0.909$ $r^2 = 0.827$
C	$y = 0.558(0.990)^x + 0.473$	$r = -0.922$ $r^2 = 0.851$

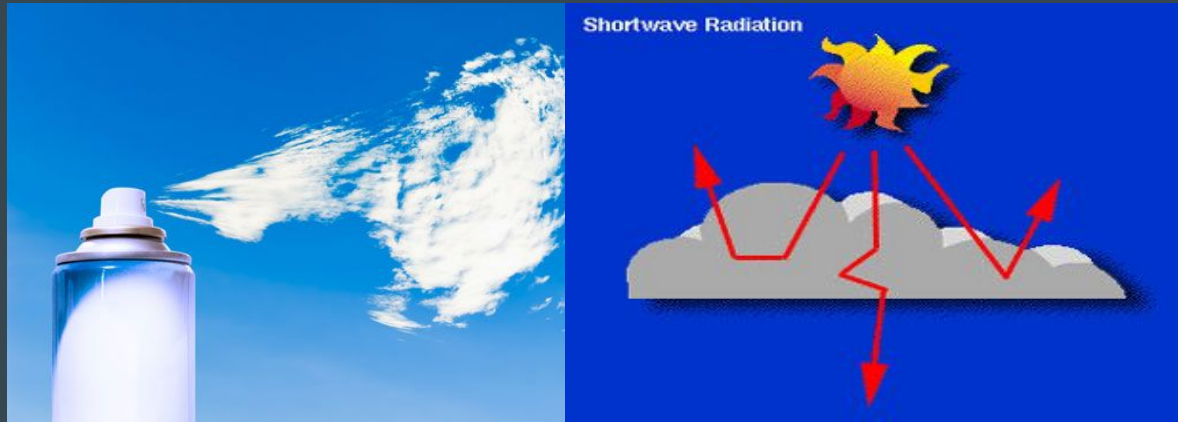# Potential Errors, Conclusions, and Future Investigations

- Precise calculations (small r coefficients for data)
- NaCl, C > SO_2^{2-}, H_2O
  (assuming model is accurate)
  - Thus MCB > sulfate model

>

Thank you! Are there any questions?

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