Physics 506

# Can Mist Save the Earth?

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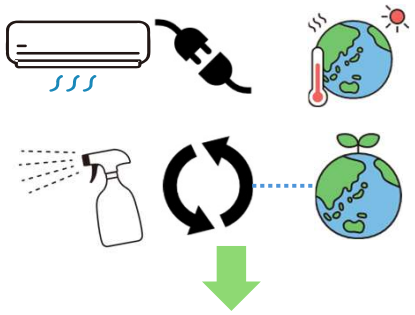
## Motivation

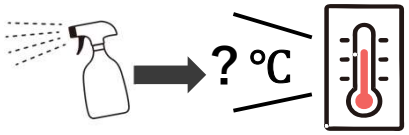


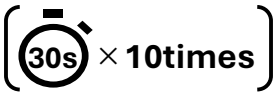
The goal: to find the most effective cooling method

## Experimental conditions and procedures

Requires : spray bottle, thermometer, stopwatch
Amount of water : 0.95ml per push
Thermometer position : 1.25m away from the floor in the center of the room

| Initial conditions | | |
|---|---|---|
| Temperature | humidity | sensible temperature |
| 25.6℃ | 62％ | 23.4℃ |

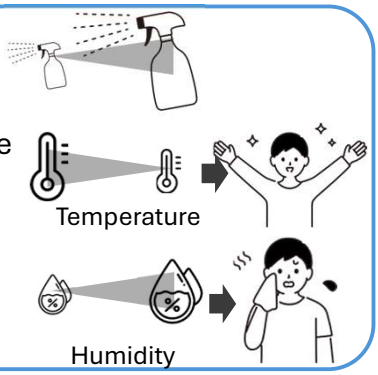



1. Spray a set number of times (20, 60, 100 times)
2. Measure temperature and humidity separated by time
3. Calculate the sensible temperature from air temperature and humidity

## Hypothesis

The more mist is sprayed, the lower the temperature and the higher the humidity. There is a volume of mist that is most effective.




## Definition of sensible temperature [1]

It is consistent with common human perception.

$$Tm=37-\frac{37-T}{0.68-0.0014h}\frac{1}{1.76+1.4v^{0.75}}-0.29T\left(1-\frac{h}{100}\right)$$

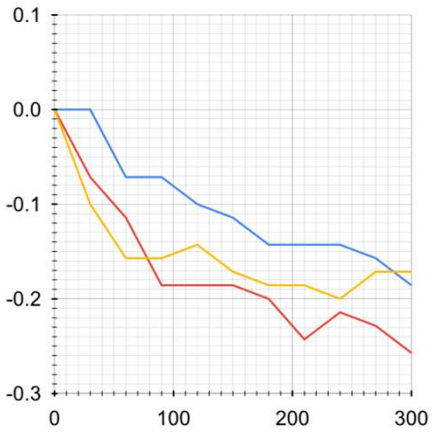
Tm=Sensory temperature T=temperature (℃) h=humidity (%)
v=wind velocity (m/s) Calculated at 0.2 because it is indoors

## Results

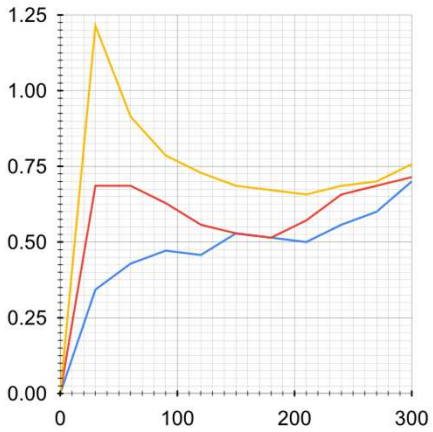
Calculated from the average of 7 trials

Vertical axis: 20times 60times 100times Abscissa: Measurement time(s)

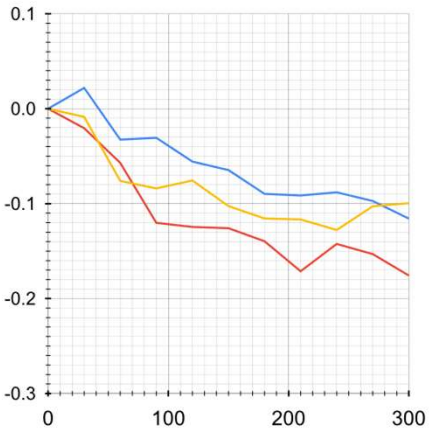
Temperature change(℃)




Humidity change(%)




Sensible temperature change(%)




## Consideration

The temperature and perceived temperature dropped the most after 60 sprays.
Therefore, it cannot be said that the more mist is injected, the lower the temperature and perceived temperature.
Humidity rose the most when spraying 100 times.
It can be said that the humidity rises as more mist is sprayed.

## Conclusion

In this study, we found that:
(1) Mist is effective for lowering the perceived temperature.
(2) It cannot be said that the larger the amount of mist, the more effective it is. So, there is an optimal amount of mist.
From the above, it can be said that mist has the effect of relieving heat.

## Reference

**[1]** Hong Kong Observatory・Application of a Weather Stress Index for Alerting the Public to Stressful Weather in Hong Kong・Meteorological Applications, Volume 7, p.p. 369-375, 2000