



# Climate Change and Aerosols

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## What are aerosols?

Atmospheric aerosols consist of very small particles, microscopic particles, in the atmosphere, which come from two different sources. One of which is of human origin from things like burning fossil fuels and the other is natural aerosols which come from things like wind blown dust or sea salt from breaking waves.

## How do you measure them?

I am involved in measuring aerosols using instruments on a BAe 146 aircraft. We measure these atmospheric particles either on the wings of the aircraft where we have special equipment mounted or we take the air through into the fuselage of the aircraft and analyse the particles there.

## How do aerosols affect the climate?

Aerosols interact with the climate in two different ways the first of which is the interaction with sunlight where they reflect sunlight back to space and this tends to lead to a cooling of climate. The second of which is where they interact with clouds and the detailed microphysics of clouds. They change cloud droplet sizes within clouds thereby reflecting more radiation from the clouds themselves so there is two distinct affects one of which is interaction with sunlight and the second is interaction with clouds.

## Why are they important to climate change?

Climate change really is about the balance of several different things. There is obviously greenhouse gases which are increasing in the atmosphere owing to human emissions and that is trying to pull the climate to a warmer situation. The other is these aerosols which are trying to cool the climate and they are trying to pull the climate to a cooler situation. How we understand things at the moment is that the balance between the warming of the greenhouse gases and the cooling from aerosols is that the warming from greenhouse gases wins out. However, that doesn't mean the cooling is unimportant. It is still a significant part of what is called climate forcing. So we need to understand these aerosols and their affects a lot better if we are going to be able to predict climate accurately in the future.

## Don't aerosols destroy the ozone layer?

It is a common misconception that aerosols deplete ozone and attack the ozone layer. That is actually not really the case. What was contained in aerosol cans was that the gas propellants that propel these little particles that you use in deodorants that were actually ozone depleting gases. So, it was the aerosols cans themselves, and the use of the canisters and the gases within the canisters, that were damaging the ozone layer. Under the Montreal Protocol these gases have been replaced by non-ozone depleting gases so that is not so much of a problem any more. However, it is interesting that these gases that we have used to replace the ozone depleting gases are actually greenhouse gases themselves.