

Aerosols -- their part in our rainfall

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This is CSIRO atmosphere expert Dr. Leon Rotstajn. Photo by: Bruce Miller

Aerosols may have a greater impact on patterns of Australian rainfall and future climate change than previously thought, according to leading atmospheric scientist, CSIRO's Dr. Leon Rotstajn.

"We have identified that the extensive pollution haze emanating from Asia may be re-shaping rainfall patterns in northern Australia but we wonder what impact natural and human-generated aerosols are having across the rest of the country," Dr Rotstajn said.

Aerosols are fine particles suspended in the atmosphere. Sources of human-generated aerosols include industry, motor vehicles and vegetation burning. Natural sources include volcanoes, dust storms and ocean plankton. Human-generated aerosols have long been known to exert a cooling effect on climate. This has partly masked the warming

effect of increasing greenhouse gases. As aerosol pollution is predicted to decrease over the next few decades, unmasking of the greenhouse effect may lead to accelerated global warming.

However, in an address tomorrow to the International Conference on Southern Hemisphere Meteorology and Oceanography in Melbourne, Dr Rotstayn said aerosols are much more than a "negative greenhouse gas" because they can actively force changes in winds and ocean currents by altering the distribution of solar heating at the earth's surface.

"Recent climate modelling at CSIRO shows that there may be important effects on Australian climate due to aerosol pollution from the Northern Hemisphere. These include an increase of rainfall in north-western Australia, and an increase of air pressure over southern Australia, which may have contributed to less rainfall there.

"New simulations with the CSIRO climate model also show big improvements in the simulation of El Niño and the associated natural rainfall variability over eastern Australia, when natural and human-generated aerosols are included in the model. Natural aerosol includes Australian dust, which may be the key factor that improved our simulation. A realistic simulation of natural rainfall variability is essential if a climate model is to be used to improve our understanding of Australian rainfall changes.

Dr Rotstayn said that further research into how aerosols are influencing climate and rainfall patterns across Australia is critical to scientists' ability to more accurately predict the longer-term effects of climate change.

"It is crucial to quantify the relative roles of different drivers of recent Australian rainfall changes. A rainfall decline attributed to natural variability will be a passing phenomenon, and changes forced by human-

generated aerosols are likely to be more short-term than changes forced by increasing greenhouse gases. The implications for decision makers will be very different, depending on whether the drivers are long-term or short-term," Dr Rotstayn said.

Source: CSIRO Australia

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