

# Has northern-hemisphere pollution affected Australian rainfall?

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New research announced at the International Water in a Changing Climate Science Conference in Melbourne 24-28 August, implicates pollution from Asia, Europe and North America as a contributor to recent Australian rainfall changes. Australian scientists using a climate model that includes a treatment of tiny particles - or aerosols - report that the build up of these particles in the northern hemisphere affects their simulation of recent climate change in the southern hemisphere, including rainfall in Australia.

The CSIRO climate model, which can include the effects of aerosols caused by humans, suggests that aerosols - whose major sources are in the northern hemisphere - can drive changes in atmospheric and oceanic circulation in the southern hemisphere. Their model results suggest that human-generated aerosols from the northern hemisphere may have contributed to increased rainfall in north-western and central [Australia](#), and decreased rainfall in parts of southern Australia.

Lead researcher, Dr Leon Rotstayn, Principal Research Scientist at the Centre for Australian Weather and Climate Research, a partnership between CSIRO and the Bureau of Meteorology, said: "Perhaps surprisingly, inclusion of northern hemisphere aerosols may be important for accurate modelling of Australian climate change."

Aerosols come from many different sources. Sulphur is released when we burn coal and oil. More dust, also an aerosol, circulates in the atmosphere when land is cleared, burned or overgrazed. Some aerosols

occur naturally like sea spray and volcanic emissions, but NASA estimates ten percent of the total aerosols in the atmosphere are caused by people. Most of this ten percent is in the [northern hemisphere](#).

European researchers also attending the conference will discuss a new forecasting service that will identify in unprecedented detail where these aerosols are coming from and where they are going.

The new service, part of Europe's Global Monitoring for Environment and Security (GMES) initiative, will give global information on how pollutants move around the world across oceans and continents, and will refine estimates of their sources and sinks.

Dr Adrian Simmons from the European Centre for Medium-Range Weather Forecasts, which is coordinating the multi-institution initiative, says: "The service will give much more detailed forecast information on air quality over Europe and provide the basis for better health advice across Europe and beyond". The service has clear implications for environmental policy and legislation.

The five-day conference, organised by the Global Energy and Water Cycle Experiment (GEWEX) and the Integrated Land Ecosystem-Atmosphere Processes Study (iLEAPS) and locally hosted by Monash University, brings together many of the world's leading experts to discuss the important processes that govern water availability and drought and their role in present and future climate and global change.

Professor Christian Jakob, who holds the Chair for Climate Modelling at Monash University and who chairs the local organising committee for the conference says: "It is fantastic to have attracted more than 350 researchers from more than 15 countries to come to Australia to discuss these very timely issues with us here in Melbourne."

"The exchanges of energy, carbon and water between the land, ocean and atmosphere are of utmost importance to current and future climate. The fundamental role of the land surface, clouds, [aerosols](#) and of course [rainfall](#) for climate has been highlighted many times in the reports of the Intergovernmental Panel on Climate Change (IPCC). This conference will advance our knowledge in all these important areas by bringing world-leading experts together for a week of discussions. It has been a great privilege for me and Monash University to host this event," he added.

The conference brings together the work of two major international research projects: GEWEX and iLEAPS. These projects complement each other and collaborate in a variety of global-change and [climate-change](#) research.

Source: International Geosphere-Biosphere Programme

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