El Nino, Indonesian fires and pollution

While the link between El Nino and drought in eastern Australia is well established, recent NASA satellite and rainfall data suggest El Nino may also have boosted wildfire activity in Indonesia, adding to pollution levels over the Indian Ocean.

In the wake of the recent El Nino, rainfall dropped sharply across the tropical rainforests of Sumatra and Borneo during late 2006.

The unusually dry landscape allowed wildfires to spread quickly, releasing large amounts of carbon monoxide and fine particles – known as aerosols – that caused widespread pollution in the Southern Hemisphere, according to US scientist Dr David Edwards, leader of the MOPITT (Measurements of Pollution in the Troposphere) project at the National Center for Atmospheric Research (NCAR) in Colorado, USA.

The MOPITT sensor aboard NASA's Terra satellite tracked wildfire smoke plumes as they spread from Indonesian islands to the Indian Ocean from September to November 2006. It measured associated increases in atmospheric carbon monoxide levels throughout the Southern Hemisphere, while another instrument, called MODIS (Moderate Resolution Imaging Spectroradiometer), recorded aerosol data.

'MOPITT is an especially valuable tool because it monitors carbon monoxide, a good indicator of pollution from combustion that remains in the atmosphere for several weeks, often travelling vast distances,' said Dr Edwards.

Every year in Indonesia, land clearing for agriculture is carried out during the dry season, from September to November. This is accompanied by increased fire activity and thick haze that can ground air traffic in the region.

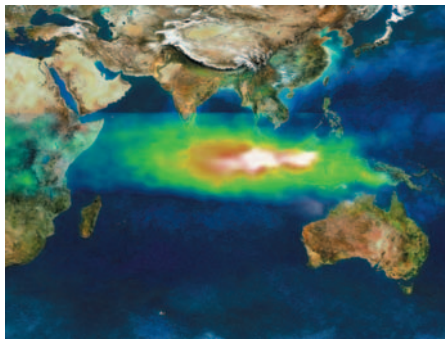
The number and intensity of fires depends largely on rainfall and soil moisture conditions. As land is cleared, peat deposits – thick layers of partially decayed vegetation – build up.

Once ignited, peat often smoulders for weeks or months, releasing thick smoke and high levels of carbon monoxide into the atmosphere until monsoon rains begin, usually in December.

When exposed to sunlight, the carbon monoxide, hydrocarbons and nitrogen oxides released by the fire chemically react to create ground-level ozone.

But unlike the ozone in the stratosphere, which protects life on earth by absorbing ultraviolet light, ozone near the earth's surface is a pollutant that can damage or destroy living tissue.

Dr Edwards says that while aerosol and carbon monoxide emissions from urban and industrial sources continually contribute to pollution, wildfires add to global pollution levels in seasonal bursts.



Smoke and pollution from Indonesia gradually spread over the Indian Ocean and Southern Hemisphere as shown by this imagery from the Tropospheric Ozone and Smoke from Earth Probe TOMS. NASA Images

'Even though fires in South America and southern Africa typically produce the greatest amount of carbon monoxide, the pollution from Indonesian fires is likely responsible for most of the year-to-year variation in pollution levels throughout the Southern Hemisphere.'

He adds that as well as releasing large amounts of carbon monoxide, wildfires also release significant amounts of carbon dioxide which exacerbates global warming.

As a result, wildfires may also have an impact on long-term climate change, providing a focus for future research activity.

More information:
MOPITT website:
http://mopitt.eos.ucar.edu/mopitt

Off-the-shelf disinfectants kill devastating frog fungus

James Cook University scientists have discovered that a commercially available disinfectant can kill the deadly chytrid fungus, which has wiped out several Australian frog species.

Chytrid fungus (*Batrachochytrium dendrobatidis*) causes chytridiomycosis, a highly infectious amphibian disease that results in increased skin shedding and death. It was first discovered in dead and dying frogs in Queensland in 1993, and researchers have been racing to find ways of containing it.

Dr Lee Skerratt from James Cook University says the fungus had led to the extinction of up to 122 frog species, including eight in Australia.

'Some of the species that have been lost were unique,' says Dr Skerratt. 'For example, the remarkable gastric brooding frogs, that swallowed their eggs which then developed into young in their stomach before hatching out the adult's mouth, have gone.'

The university's scientists have been testing a range of commercially available disinfectants for their effectiveness in killing the fungus.

A great barred frog infected by the killer chytrid fungus.
CSIRO Scienceimage

So far 'TriGene' and 'F10' are more effective than two previously recommended DDAC (didecyl dimethyl ammonium chloride) products because they are active at much lower concentrations and appear to have no record of environmental toxicity.

The disinfectants effectively clean equipment for handling amphibians or that has been in contact with contaminated water bodies.

The team is also investigating how chytrid fungus causes frog deaths, as well as mortality rates, transmission rates, differences in species susceptibility, and the spread and origin of fungal strains.