Indonesian fires exposed 69 million to 'killer haze'

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Wildfires in Indonesia and Borneo exposed 69 million people to unhealthy air pollution and are responsible for thousands of premature deaths, new research has shown.

The study, published today in *Scientific Reports*, gives the most accurate picture yet of the impact on human health of the wildfires which ripped through forest and peatland in Equatorial Asia during the autumn of 2015.

The study used detailed observations of the haze from Singapore and Indonesia. Analysing hourly air quality data from a model at a resolution of 10km - where all previous studies have looked at daily levels at a much lower resolution - the team was able to show that a quarter of the population of Malaysia, Singapore and Indonesia was exposed to unhealthy air quality conditions between September and October 2015.

Estimating between 6,150 and 17,270 premature deaths occurred as a direct result of the polluted haze, the research team - involving academics from the UK, US, Singapore and Malaysia - said the study confirmed the extent of this public health crisis.

Lead author Dr Paola Crippa, from Newcastle University, UK, said:

"Our study showed that 69 million people living in Malaysia, Singapore and Indonesia were exposed to unhealthy air quality conditions during the time of the fires - that's more than a quarter of the local population.

"The wildfires of 2015 were the worst we've seen for almost two decades as a result of global climate change, land use changes and deforestation. The extremely dry conditions in that region mean that these are likely to become more common events in the future, unless concerted action is taken to prevent fires.

"Our study estimated that between 6,150 and 17,270 premature deaths occurred due to breathing in the polluted air over that short two month period. To put this into perspective, we estimate that around 1 in 6,000 people exposed to the polluted haze from these fires died as a result. The uncertainty in these estimates is mostly due to the lack of medical studies on exposure from extreme air pollution in the area."

Ten times the recommended limit of PM2.5

Performing numerical simulations on the Indiana University high performance computing resources, the team analysed the levels of particulate matter in the air - PM2.5 - during the two months of the fires.

WHO air quality guidelines state that levels of PM2.5 should not exceed 25 $\mu g/m^3$ in a 24 hour period.

Dr Christine Wiedinmyer, from the National Center for Atmospheric Research in Colorado, said:

"Exposure to particulate pollution was substantially greater in autumn 2015 than in other recent years. This is due to the large particulate matter emissions from fires in this region in 2015."

During the two month period, levels of PM2.5 - the most dangerous of these tiny toxic particles - were on average above 70 $\mu g/m^3$ with peaks reaching 300 $\mu g/m^3$ in densely populated areas such as Singapore.

Professor Dominick Spracklen, a co-author of the study based at the University of Leeds, explained:

"In most of the UK, levels of PM2.5 are usually below 10 μg/m^3 and we would consider a serious pollution episode to be where concentrations rose to above 30 μg/m^3. During these fires, Singapore experienced levels of pollution 10 times higher. It is hard for us in the UK to imagine air pollution as bad as that experienced across much of Indonesia and Singapore last autumn.

"If large fires occurred every year, repeatedly exposing the local population to polluted air, the number of deaths would rise substantially - to as many as 75,000. Our findings are consistent with a recent estimate of the number of deaths that occurred due to long-term exposure to air pollution from these fires."

The team say it is imperative that action is taken to prevent forest fires and killer haze events in the future. Deforestation and drainage of peatlands makes for very susceptible conditions for fire and new efforts are needed to re-wet peatlands and reduce further deforestation in this region.

Provided by Newcastle University