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# Impact of Indonesian fires on Equatorial Asian air quality between 2002 and 2015

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Forest and peatland fires in Indonesia contribute to poor air quality across Equatorial Asia, with negative impacts on human health. Fires are common in Indonesia as they are used to clear forest and as an agricultural management tool. Indonesia also contains large areas of peatland, which have become more susceptible to fire as a result of deforestation. Peatland fires typically emit higher concentrations of particulate matter (PM) when burnt than vegetation fires.

Vegetation and peatland fires in Indonesia are strongly regulated by climate, with greater fire emissions in drought years. Fire emissions exhibit strong interannual variability, and years with higher emissions can result in severe air pollution events. Previous research has generally focussed on specific pollution events, and few studies have compared the impacts of fire emissions from multiple years.

We used data on fire emissions along with a regional air quality model (the Weather Research and Forecasting model coupled with chemistry; WRF-Chem) to simulate pollution events across Equatorial Asia during 2002 to 2015. The Fire Inventory from NCAR (FINN) was used to identify years with high fire emissions. Within this period, 2002, 2004, 2006, 2009 and 2015 contained months where fire emissions in Indonesia exceeded the long-term monthly mean by more than one standard deviation, all occurring during the dry season (August - October).

WRF-chem has been run for these dry seasons, and the simulated PM and aerosol optical depth (AOD) evaluated using ground and satellite observations. Population-weighted PM concentrations will be compared across years to identify fire events had the largest impact on regional air quality and human health.