2.049 The impact of extreme vegetation fires in South East Asia.

Early Career Scientist

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Abstract:

Illegal vegetation fires have been estimated to cause approximately 11000 premature deaths during intense fire years in highly densely populated regions in South-East Asia. Strong El-Niño and positive Indian Ocean Dipole conditions are associated with an increase in the frequency and intensity of vegetation fires in Indonesia and Borneo, enhancing population exposure to hazardous concentrations of smoke and air pollutants. In this work we investigate the impact on human health and climate of the vegetation fires in South East Asia during Fall 2015, which were the largest of the past two decades. We performed high resolution simulations using the Weather Research and Forecasting model with coupled Chemistry based on a new release of fire emissions from the Fire INventory from NCAR and a sectional approach for aerosol size distribution. Model skill is

evaluated against a suite of space- and ground-based observations of aerosol optical properties and concentrations of particles and trace gases. The model is able to capture both the spatial and temporal variability of extreme pollution episodes and allows for identification of the sources and transport of pollutants over South East Asia. The impact of these events on climate and human health is quantified relative to a control run without fire emissions and by integrating high resolution population density maps with concentration response functions and threshold exceedances analysis. Results from this research provide decision-relevant information to policy makers regarding the impacts of land use changes and human driven deforestation on fire frequency and population exposure to degraded air quality.