Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09697, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09697
EGU General Assembly 2008

The influence of El Niño on fires and fire emissions in Indonesia

A. Heil (1,2), S. Rast (1), M.G. Schultz (2)

(1) Max Planck Institute for Meteorology, Hamburg, Germany (2) Research Center Jülich (ICG2), Germany (angelika.heil@zmaw.de)

Vegetation fires in Indonesia occur every year during the relatively dry monsoonal season (July to October) when fuel moisture is getting low enough to allow ignition for land conversion purposes. The amount of burning occurring during this season is subject to strong interannual variability. The emissions released in years with extremely intensive burning (e.g. 1997) significantly contribute to the global budget of atmospherically and climatically relevant trace species. The majority of emissions are produced by burning peat soils, which cover large areas of Sumatra and Kalimantan.

We investigate the influence of the climatic anomaly El Niño Southern Oscillation (ENSO) on precipitation and fire patterns in Indonesia over the last decades. The study is based on time series analysis of various satellite derived datasets combined with ENSO indexes.

Interannual variations in precipitation and fire activity are statistically correlated to the state of the ENSO. Abnormally dry conditions combined with abnormally intensive burning occur during El Niño conditions. The ENSO-fire connection is most pronounced for Kalimantan where more than 70% of the interannual variability in precipitation and fire activity can be explained by ENSO, respectively.

We demonstrate that areas with peat soils are significantly stronger affected by extreme drought conditions ($<$50 mm/month) during El Niño years than areas with no peat. We suggest that the extremely low hydraulic conductivity of dry peat surfaces reduces local evaporation and therefore can reduce precipitation and reinforce drought conditions. We also show that the relative contribution of peat fires to total fire activ-

ity is enhanced during El Niño years and here notably during the end of the burning season. This is relevant for emission estimation as fires in peat areas emit much more atmospherically relevant trace species per unit area than fires in surface vegetation on mineral soils.