



Biomass burning in the Amazon – fertilizer for the mountaineous rain forest in Ecuador

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It is well established that substances emitted into the atmosphere from burning forests, along with their photochemically generated reaction products, can be transported over very long distances, even traversing oceans. Chemical analysis of rain and fogwater samples collected in the mountaineous rain forest of south Ecuador, on the eastern slopes of the Andean mountains, show frequent episodes of low pH and high conductivity and acidity values. From these, annual deposition rates of sulfate were calculated ranging between 4 and 13 kgS/ha year, about as high as in polluted central Europe. Nitrogen deposition via ammonia (1.5-4.4 kgN/ha year) and nitrate (0.5-0.8 kgN/ha year) was found to be lower but still higher than to be expected in such pristine natural forest environment. By means of back trajectory and satellite data analyses it can be shown that most of the enhanced sulfur and nitrogen deposition is most likely due to forest fires far upwind of the ecuadorian sampling site, showing a seasonal variation, with sources predominantly found in the East/NorthEast during January-March (Colombia, Venezuela, northern Brazil) and East/SouthEast during July-September (Peru, Brazil). Thus it appears that biomass burning in the Amazon basin is the predominant source of sulfur and nitrogen compounds that fertilize the mountaineous rain forest.