



Assessment of the impact of fire emissions on air quality during SMOCC 2002 using the CMAQ regional scale model

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We assess the impact of biomass burning emissions on regional air quality using the EPA Community Multi-scale Air Quality Model for an approximately 1000 kilometer x 1000 kilometer domain in Amazonia corresponding to the SMOCC (Smoke Aerosols, Clouds, Rainfall and Climate) experiment in Rondonia, Brazil which was conducted during the months of September and October in 2002. The season corresponds to the end of the burning season, where there are significant emissions from fire which effect air quality and impair visibility. The pollution in the Amazon basin, which is located near the equatorial doldrums, is further affected by the steep topology presented by the Andes and Brazilian Highlands surrounding the region. We developed a gridded 9 km resolution emissions inventory by counting the fire geolocations detected by the infrared by the Geostationary Operational Environmental Satellites (GOES) Wildfire Automated Biomass Burning Algorithm (WF_ABBA) from NOAA/NESDIS. Emissions are calculated according to the Olsen ecosystem categories, the Merlet and Andreae emissions factors and allocated to grids. Meteorological inputs were developed using the Penn State/NCAR MM5 model with 23 vertical layers and simple land surface model. Assessment of fire duration and fire area in the GOES WF_ABBA data indicates that detected fires are very small, and typically observed for less than two hours. This indicates that satellite observations likely do not detect smoldering fires and as a consequence calculated fire emissions are likely too low. We report the initial results of air quality modeling simulations from September 20 to September 25, 2002 and compare calculated ozone concentrations to typical experimental values measured by aircraft during this period. We find that modeled ozone

concentration values are approximately within the range of experimental values in the northern part of the modeling domain.