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A 10-year Record of Fire Emissions in South America Derived from Satellite-based Fire Occurrence Data

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Biomass burning is a major factor contributing to land use and land cover change globally and in particular in the Amazon region of South America. Space-borne sensors provide valuable information on fire activity. Most of South America is well positioned for monitoring its fire activity from the Geostationary Operational Environmental Satellite (GOES) series, which provide better temporal coverage and an opportunity to monitor daily fire dynamics with consistent observing geometry. In this study, which is part of the LBA-Eco Phase III experiment, we created a 10-year (1998-2007) active fire data record for South America derived from GOES imager data, using a refined fire detection algorithm within the Wildfire Automated Biomass Burning Algorithm (WF_ABBA) system. The fire detection data served then as source terms for the quantification of fire emissions in the region using the Coupled Aerosol and Tracer Transport model to the Brazilian developments of the Regional Atmospheric Modeling System (CATT-BRAMS). The paper will present an analysis of the observed spatial and temporal dynamics of fire activity and the corresponding modeled emissions. Initial results show that during the 1998-2007 period a total of 16.3 million 4km pixels were classified as fire. The two most active years in South America were 1998 and 2007, with approximately 1.8 million fire pixels. On the other hand, 2006 was the least active fire year in South America with a total of 1.2 million fire pixels as detected by WF_ABBA. However, regional differences from the overall patterns exist both in terms of fire pixel counts and corresponding emission estimates. For example, in the Brazilian states of Mato Grosso and Para, the lowest fire year was 2000, followed by a systematic increase in peak fire emission through 2007.