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Estimating Wildfire-Generated Ozone over North America Using Ozonesonde Profiles and a Differential Back Trajectory Technique

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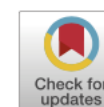
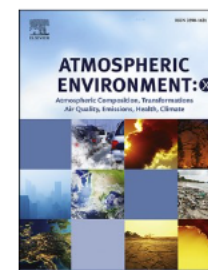
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ABSTRACT

An objective method, employing HYSPLIT back-trajectories and Moderate Resolution Imaging Spectroradiometer (MODIS) fire observations, is developed to estimate ozone enhancement in air transported from regions of active forest fires at 18 ozone sounding sites located across North America. The Differential Back Trajectory (DBT) method compares mean differences between ozone concentrations associated with fire-affected and fire-unaffected parcels. It is applied to more than 1100 ozonesonde profiles collected from these sites during the summer months June to August 2006, 2008, 2010 and 2011. Layers of high ozone associated with low humidity were first removed from the ozonesonde profiles to minimize the potential effects of stratospheric intrusions on the calculations. No significant influence on average ozone levels by North American fires was found for stations located at Arctic latitudes. The ozone enhancement for stations nearer large fires, such as Trinidad Head and Bratt's Lake, was up to 4.8% of the TTOC (Total Tropospheric Ozone Column). Fire ozone accounted for up to

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