Using FLEXTRA and Flexpart to model MLS observations of pollutants from a forest fire in British Columbia

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The large pyroCb events of 12 August 2017 in British Columbia injected about 2 Tg of CO into the upper troposphere. The MLS instrument observed the polluted airmass for three to four weeks, with the first detections being made 34 hours after the convective event and 1500-2500 km to the North of it. Back trajectories from the MLS observations of enhanced CO, calculated using FLEXTRA, allow us to estimate the time when the polluted airmass left the convective event and entered the bulk regional airflow. We use Flexpart to model the dispersion of the plume in some detail. By adjusting the mass injected into the model so that the Flexpart output agrees well with the MLS data, we obtain an estimate of the mass injected into the upper troposphere by the fire. The Flexpart results agree well with the MLS data for the first few days after the fire. After this, the polluted airmass ascends into the lower stratosphere; Flexpart does not model this ascent. We infer that the polluted airmass is not in radiative balance.