



Extreme Fire Behavior in Russia in 2010: Pyroconvection Across the Continent

Michael Fromm (1), Zdeněk Charvát (2), and Pat Kablick (3)

(1) Naval Research Laboratory, Washington DC, United States (mike.fromm@nrl.navy.mil, 202 767 7885), (2) Czech Hydrometeorological Institute, Prague, Czech Republic, (3) University of Maryland, ESSIC, College Park, Maryland, USA

The heat wave and fires in western Russia in summer 2010 captured the headlines. However, unusual fire weather conditions occurred in both western and eastern Russia, leading to what may be an unprecedented number of pyrocumulonimbus (pyroCb) fire storms. These storms, and the less intensive form called pyrocumulus (pyroCu), reveal that pyroconvection was an important aspect of the heat waves across Russia. Pyroconvection by its nature efficiently injects biomass burning emissions throughout and even above the free troposphere. This may lead to greater sensitivity than low-altitude plumes for many satellite-based remote sensors. The higher injection altitude by pyroconvection also implies greater potential for long-range impact from the fire point sources. Stratospheric smoke has been seen to completely circle the globe.

Here we will show that on at least eleven occasions, pyroCbs occurred in western, northern, and northeastern Russia in 2010. PyroCu and pyroCb occurred starting on 24 July and were in evidence until 13 August. Several of the pyroCbs injected smoke and other emissions above the tropopause. Our analysis will reveal when and where the blowups occurred, provide an indication of the fuels consumed during the fire storm, and characterize the maximum injection height. The basis for the pyroconvection analysis is geostationary visible and infrared image data from Meteosat (for western and northern Russia) and MTSAT (for northeastern Russia). We also use MODIS fire detections, and GOME 2 plus OMI absorbing aerosol index for characterizing the smoke plumes. Finally, we show CALIPSO backscatter curtains to reveal the top injection height from the pyroCbs.