

WILDFIRE SMOKE DESTROYS STRATOSPHERIC OZONE

PETER F. BERNATH, *Department of Chemistry and Biochemistry, Old Dominion University, Norfolk, VA, USA*; CHRIS BOONE, JEFF CROUSE, *Department of Chemistry, University of Waterloo, Waterloo, ON, Canada*.

Large wildfires inject smoke and biomass burning products into the midlatitude stratosphere where they destroy ozone, which protects us from ultraviolet radiation. The infrared spectrometer on the Atmospheric Chemistry Experiment (ACE) satellite has measured the spectra of smoke particles from the Black Summer Australian fires in late 2019 /early 2020, demonstrating that they contain oxygenated organic functional groups and water adsorption on the surfaces. The injected smoke particles produce unexpected and extreme perturbations in stratospheric gases beyond any seen in the previous 15 years of measurements: increases in formaldehyde, chlorine nitrate, chlorine monoxide and hypochlorous acid, and decreases in ozone, nitrogen dioxide and hydrochloric acid. These perturbations in stratospheric composition have the potential to affect ozone chemistry in unexpected ways.