Geophysical Research Abstracts
Vol. 20, EGU2018-11272, 2018
EGU General Assembly 2018

Stratospheric Injection of Bromine from VSL Biogenic Sources Inferred from CONTRAST and ATTREX Observations

Pamela A. Wales (1), Ross J. Salawitch (1), Rainer Volkamer (2,3), Greg Huey (4), Elliot Atlas (5), Rafael Fernandez (6,7), and Alfonso Saiz-Lopez (6)

(1) University of Maryland, United States (pwales@umd.edu), (2) Department of Chemistry & Biochemistry, University of Colorado, Boulder, CO, USA, (3) Cooperative Institute for Research in Environmental Sciences (CIRES), Boulder, CO, USA, (4) School of Earth & Atmospheric Sciences, Georgia Tech, Atlanta, Georgia, USA,, (5) Department of Atmospheric Sciences, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL, (6) Department of Atmospheric Chemistry and Climate, Institute of Physical Chemistry Rocasolano, Spanish National Research Council (CSIC), Madrid, Spain, (7) National Research Council (CONICET), FCEN-UNCuyo, UTN-FRM, Mendoza, Argentina

The CONvective TRansport of Active Species in the Tropics (CONTRAST) and Airborne Tropical TRopopause EXperiment (ATTREX) aircraft campaigns sampled the tropical Western Pacific in the winter of 2014. In this region, strong convection provides an efficient pathway to transport very short lived (VSL) biogenic bromocarbons and their degradation products from the marine boundary layer to the stratosphere, where they contribute to ozone depletion. A stratospheric tracer-tracer relation was developed based on CONTRAST and ATTREX whole air sampler observations of bromocarbons and CFC-11, a commonly used tracer. This relation is used to calculate the release of inorganic bromine both from VSL source gas injection and from long-lived bromocarbons as a function of CFC-11. Additionally, a photochemical box model is used to infer inorganic bromine loading using observations of BrO obtained in the lower stratosphere by the CIMS and AMAX-DOAS instruments during CONTRAST. This inferred inorganic bromine loading is combined with the tracer-tracer relation to provide an estimate of product gas injection due to VSL bromocarbons. The simulated injection of bromine from VSL substances will also be compared to the representation of this process in 14 Chemistry Climate Models that submitted output to the CCMI archive.