

Data composite of airborne sulfur dioxide measurements in the upper troposphere

*Hans Schlager¹

1. Deutsches Zentrum fuer Luft- und Raumfahrt (DLR)

Sulfur dioxide (SO₂) is a key aerosol precursor gas, however, only during recent years high-precision in-situ data could be obtained for the upper troposphere (UT) using airborne chemical ionization mass spectrometry. Data summaries of SO₂ will be presented from a large number of campaigns performed with the research aircraft Falcon and HALO during the years 2005 to 2015 covering a geographical region from 83°N to 65°S and 105°W to 135°E and altitudes up to 15 km. The SO₂ data were gridded onto a 5° latitude by 5° longitude horizontal grid with a 1-km vertical resolution. The data composites provide information about the SO₂ distribution at mid-latitudes, tropical and polar regions. Median SO₂ background mixing ratios in the UT range between 10-25 ppt, however, also areas with strongly enhanced SO₂ mixing ratios in the UT were observed, associated with events of new particle formation. The SO₂ sources and transport pathways for these specific observations will be discussed.

Keywords: sulfur dioxide, aircraft measurements, new particle formation