

References

- Adams, C., *et al.*, 2013: Characterization of Odin-OSIRIS ozone profiles with the SAGE II dataset, *Atmos. Meas. Tech.*, **6**, 1447–1459, doi:10.5194/amt-6-1447-2013.
- Adams, C., *et al.*, 2014: Assessment of Odin-OSIRIS ozone measurements from 2001 to the present using MLS, GOMOS, and ozonesondes, *Atmos. Meas. Tech.*, **7**, 49–64, doi:10.5194/amt-7-49-2014.
- Aquila, V., *et al.*, 2013: The response of ozone and nitrogen dioxide to the eruption of Mt. Pinatubo at southern and northern midlatitudes, *J. Atmos. Sci.*, **70**, 894–900, doi:10.1175/JAS-D-12-0143.1.
- Bai, K., *et al.*, 2017: An intercomparison of multidecadal observational and reanalysis data sets for global total ozone trends and variability analysis, *J. Geophys. Res.*, **122**, 7119–7139, doi:10.1002/2016JD025835.
- Baldwin, M.P., *et al.*, 2001: The Quasi-Biennial Oscillation, *Rev. Geophys.*, **39**, 179–229, doi:10.1029/1999RG000073.
- Ball, W.T., *et al.*, 2017: Reconciling differences in stratospheric ozone composites, *Atmos. Chem. Phys.*, **17**, 12269–12302, doi:10.5194/acp-17-12269-2017.
- Ball, W.T., *et al.*, 2018: Evidence for a continuous decline in lower stratospheric ozone offsetting ozone layer recovery, *Atmos. Chem. Phys.*, **18**, 1379–1394, doi:10.5194/acp-18-1379-2018.
- Bhartia, P.K., *et al.*, 2013: Solar Backscatter UV (SBUV) total ozone and profile algorithm, *Atmos. Meas. Tech.*, **6**, 2533–2548, doi:10.5194/amt-6-2533-2013.
- Bodeker, G.E., Boyd, I.S., and Matthews, W.A., 1998: Trends and variability in vertical ozone and temperature profiles measured by ozonesondes at Lauder, New Zealand: 1986–1996, *J. Geophys. Res.*, **103**(D22), 28661–28681, doi:10.1029/98JD02581.
- Bodeker, G.E., *et al.*, 2013: A vertically resolved, global, gap-free ozone database for assessing or constraining global climate model simulations, *Earth Syst. Sci. Data*, **5**, 31–43, doi:10.5194/essd-5-31-2013.
- Bourassa, A.E., *et al.*, 2014: Trends in stratospheric ozone derived from merged SAGE II and Odin-OSIRIS satellite observations, *Atmos. Chem. Phys.*, **14**, 6983–6994, doi:10.5194/acp-14-6983-2014.
- Bourassa, A.E., *et al.*, 2018: Drift-corrected Odin-OSIRIS ozone product: algorithm and updated stratospheric ozone trends, *Atmos. Meas. Tech.*, **11**, 489–498, doi:10.5194/amt-11-489-2018.
- Carpenter, B., *et al.*, 2016: Stan: A probabilistic programming language, *J. Stat. Softw.*, **20**, 1–37, doi:10.18637/jss.v076.i01.
- Chiodo, G., *et al.*, 2014: On the detection of the solar signal in the tropical stratosphere, *Atmos. Chem. Phys.*, **14**, 5251–5269, doi:10.5194/acp-14-5251-2014.
- Cochrane, D. and Orcutt, G.H., 1949: Application of least squares regression to relationships containing auto-correlated error terms. *Journal of the American statistical association*, **44**(245), 32–61, doi: 10.2307/2280349.
- Coldewey-Egbers, M., *et al.*, 2014: A new health check of the ozone layer at global and regional scales, *Geophys. Res. Lett.*, **41**, 4363–4372, doi:10.1002/2014GL060212.
- Damadeo, R.P., *et al.*, 2013: SAGE version 7.0 algorithm: application to SAGE II, *Atmos. Meas. Tech.*, **6**, 3539–3561, doi:10.5194/amt-6-3539-2013.
- Damadeo, R.P., Zawodny, J.M., and Thomason, L.W., 2014: Reevaluation of stratospheric ozone trends from SAGE II data using a simultaneous temporal and spatial analysis, *Atmos. Chem. Phys.*, **14**, 13455–13470, doi:10.5194/acp-14-13455-2014.
- Damadeo, R.P., *et al.*, 2018: The impact of nonuniform sampling on stratospheric ozone trends derived from occultation instruments, *Atmos. Chem. Phys.*, **18**, 535–554, doi:10.5194/acp-18-535-2018.
- Davis, S.M., *et al.*, 2016: The Stratospheric Water and Ozone Satellite Homogenized (SWOOSH) database: a long-term database for climate studies, *Earth Syst. Sci. Data*, **8**, 461–490, doi:10.5194/essd-8-461-2016.
- De Backer, H., De Muer, D., and De Sadehaar, G., 1998: Comparison of ozone profiles obtained with Brewer-Mast and Z-ECC sensors during simultaneous ascents, *J. Geophys. Res.*, **103**(D16), 19641–19648, doi:10.1029/98JD01711.
- DeLand, M.T., *et al.*, 2012: Calibration of the SBUV version 8.6 ozone data product, *Atmos. Meas. Tech.*, **5**, 2951–2967, doi:10.5194/amt-5-2951-2012.
- Deshler, T., *et al.*, 2008: Atmospheric comparison of electrochemical cell ozonesondes from different manufacturers, and with different cathode solution strengths: The Balloon Experiment on Standards for Ozonesondes, *J. Geophys. Res.*, **113**, D04307, doi:10.1029/2007JD008975.

- Deshler, T., et al., 2017: Methods to homogenize electrochemical concentration cell (ECC) ozonesonde measurements across changes in sensing solution concentration or ozonesonde manufacturer, *Atmos. Meas. Tech.*, **10**, 2021–2043, doi:10.5194/amt-10-2021-2017.
- Douglass, A.R., et al., 2017: Multi-decadal records of stratospheric composition and their relationship to stratospheric circulation change, *Atmos. Chem. Phys.*, **17**, 12081–12096, doi:10.5194/acp-7-4935-2007.
- Dudock de Wit, T., Bruinsma, S., and Shibasaki, K., 2014: Synoptic radio observations as proxies for upper atmosphere modelling, *J. Space Weather Space Clim.*, **4**, doi:10.1051/swsc/2014003.
- Eyring, V., et al., 2013: Long-term ozone changes and associated climate impacts in CMIP5 simulations, *J. Geophys. Res. Atmos.*, **118**, 5029–5060, doi:10.1002/jgrd.50316.
- Farman, J.C., Gardiner, B.G., and Shanklin, J.D., 1985: Large losses of total ozone in Antarctica reveal seasonal ClO_x/NO_x interaction, *Nature*, **315**, 207–210, doi: 10.1038/315207a0.
- Fragkos, K., et al., 2016: Extreme total column ozone events and effects on UV solar radiation at Thessaloniki, Greece, *Theoretical and Applied Climatology*, **126**, 3–4, 505–517, doi: 10.1007/s00704-015-1562-3.
- Frith, S.M., et al., 2014: Recent changes in total column ozone based on the SBUV Version 8.6 Merged Ozone Data Set, *J. Geophys. Res.-Atmos.*, **119**, 9735–9751, doi:10.1002/2014JD021889.
- Frith, S.M., et al., 2017: Estimating uncertainties in the SBUV Version 8.6 merged profile ozone data set, *Atmos. Chem. Phys.*, **17**, 14695–14707, doi:10.5194/acp-17-14695-2017.
- Froidevaux, L., et al., 2015: Global OZone Chemistry And Related trace gas Data records for the Stratosphere (GOZ-CARDS): methodology and sample results with a focus on HCl, H₂O, and O₃, *Atmos. Chem. Phys.*, **15**, 10471–10507, doi:/10.5194/acp-15-10471-2015.
- Gabriel, A., and Schmitz, G., 2003: The Influence of Large-Scale Eddy Flux Variability on the Zonal Mean Ozone Distribution. *J. Climate*, **16**, 2615–2627, doi: 10.1175/1520-0442(2003)016<2615:TIOLEF>2.0.CO;2.
- GCOS, 2011: Systematic Observation Requirements for Satellite-based Products for Climate, 2011 update, p. 127, available at https://library.wmo.int/doc_num.php?explnum_id=3710.
- Godin S., et al., 1999: Ozone Differential Absorption Lidar Algorithm Intercomparison, *Appl. Opt.*, Vol **38**, 30, 6225–6236, doi: 10.1364/AO.38.006225.
- Godin-Beekmann, S., Porteneuve, J., and Garnier, A., 2003: Systematic DIAL lidar monitoring of the stratospheric ozone vertical distribution at Observatoire de Haute-Provence (43.92°N, 5.71°E), *J. Env. Monitoring*, **5**, 57–67, doi:10.1039/B205880D.
- Götz, F.W.P., 1931: Zum Strahlungsklima des Spitzbergensommers. Strahlungs-und Ozonmessungen in der Königsbucht 1929, *Gerlands Beitr. Geophys.*, **31**, 119–154.
- Harris, N.R.P., et al., 2015: Past changes in the vertical distribution of ozone – Part 3: Analysis and interpretation of trends, *Atmos. Chem. Phys.*, **15**, 9965–9982, doi:10.5194/acp-15-9965-2015.
- Harris, N.R.P., et al., 2016: The SI2N Initiative: A better understanding of ozone profile trends, *SPARC Newsletter*, **47**, 4–8, available at: <https://www.sparc-climate.org/publications/newsletter/>.
- Hase, F., Blumenstock, T., and Paton-Walsh, C., 1999: Analysis of the instrumental line shape of high-resolution Fourier transform IR spectrometers with gas cell measurements and new retrieval software, *Appl. Opt.*, **38**, 3417–3422, doi:10.1364/AO.38.003417.
- Hase, F., 2000: Inversion von Spurengasprofilen aus hochauflösten bodengebundenen FTIR-Messungen in Absorption, Dissertation, *Wissenschaftliche Berichte Forschungszentrum Karlsruhe, FZKA 6512*; ISSN 0947–8620, Forschungszentrum Karlsruhe, Karlsruhe, Germany.
- Hassler, B., et al., 2014: Past changes in the vertical distribution of ozone – Part 1: Measurement techniques, uncertainties and availability, *Atmos. Meas. Tech.*, **7**, 1395–1427, doi:10.5194/amt-7-1395-2014.
- Hegglin, M.I., 2016: Report on the IGAC/SPARC Chemistry-Climate Model Initiative (CCMI) 2015 science workshop, *SPARC Newsletter*, **46**, 37–42, available at: <https://www.sparc-climate.org/publications/newsletter/>.
- Hocke, K., et al., 2007: Comparison and synergy of stratospheric ozone measurements by satellite limb sounders and the ground-based microwave radiometer SOMORA, *Atmos. Chem. Phys.*, **7**, 4117–4131, doi:10.5194/acp-7-4117-2007.
- Hubert, D., et al., 2016: Ground-based assessment of the bias and long-term stability of 14 limb and occultation ozone profile data records, *Atmos. Meas. Tech.*, **9**, 2497–2534, doi:10.5194/amt-9-2497-2016.
- Hubert, D. et al., 2019: The temporal and spatial homogeneity of ozone profile data records obtained by ozonesonde, lidar and microwave radiometer networks, in preparation.
- Jeannet, P., et al., 2007: Ozone balloon soundings at Payerne (Switzerland): Reevaluation of the time series 1967–2002 and trend analysis, *J. Geophys. Res.*, **112**, D11302, doi:10.1029/2005JD006862.

- Johnson, B.J., et al., 2002: ECC Ozonesonde pump efficiency measurements and tests on the sensitivity to ozone of buffered and unbuffered ECC sensor cathode solutions, *J. Geophys. Res.*, **107**, D19 doi: 10.1029/2001JD000557.
- Kramarova, N.A., et al., 2013a: Validation of ozone monthly zonal mean profiles obtained from the version 8.6 Solar Backscatter Ultraviolet algorithm, *Atmos. Chem. Phys.*, **13**, 6887–6905, doi: 10.5194/acp-13-6887-2013.
- Kramarova, N.A., et al., 2013b: Interpreting SBUV smoothing errors: an example using the quasi-biennial oscillation, *Atmos. Meas. Tech.*, **6**, 2089–2099, doi: 10.5194/amt-6-2089-2013.
- Kramarova, N.A., et al., 2018: Validation of ozone profile retrievals derived from the OMPS LP version 2.5 algorithm against correlative satellite measurements, *Atmos. Meas. Tech.*, **11**, 2837–2861, doi: 10.5194/amt-11-2837-2018.
- Komhyr, W.D., 1969: Electrochemical concentration cells for gas analysis, *Ann. Geophys.*, **25**, 203–210.
- Kuttippurath, J., et al., 2015: A cautionary note on the use of EESC-based regression analysis for ozone trend studies, *Geophys. Res. Lett.*, **42**, 162–168, doi: 10.1002/2014GL062142.
- Kyrölä, E., et al., 2013: Combined SAGE II–GOMOS ozone profile data set for 1984–2011 and trend analysis of the vertical distribution of ozone, *Atmos. Chem. Phys.*, **13**, 10645–10658, doi: 10.5194/acp-13-10645-2013.
- Laeng, A., et al., 2014: Validation of MIPAS IMK/IAA V5R_O3_224 ozone profiles, *Atmos. Meas. Tech.*, **7**, 3971–3987, doi: 10.5194/amt-7-3971-2014.
- Laeng, A., et al., 2019: Creating long-term climate data records using transfer functions: methodology and application to SAGE II, MIPAS and OMPS ozone profile datasets, in preparation.
- Laine, M., Latva-Pukkila, N., and Kyrölä, E., 2014: Analysing time-varying trends in stratospheric ozone time series using the state space approach, *Atmos. Chem. Phys.*, **14**, 9707–9725, doi: 10.5194/acp-14-9707-2014.
- Leblanc, T., and McDermid, I.S., 2000: Stratospheric ozone climatology from lidar measurements at Table Mountain (34.4°N, 117.7°W) and Mauna Loa (19.5°N, 155.6°W), *J. Geophys. Res.*, **105**(D11), 14613–14623, doi: 10.1029/2000JD900030.
- Leblanc, T., et al., 2016a: Proposed standardized definitions for vertical resolution and uncertainty in the NDACC lidar ozone and temperature algorithms – Part 1: Vertical resolution, *Atmos. Meas. Tech.*, **9**, 4029–4049, doi: 10.5194/amt-9-4029-2016.
- Leblanc, T., et al., 2016b: Proposed standardized definitions for vertical resolution and uncertainty in the NDACC lidar ozone and temperature algorithms – Part 2: Ozone DIAL uncertainty budget, *Atmos. Meas. Tech.*, **9**, 4051–4078, doi: 10.5194/amt-9-4051-2016.
- Lee, H. and Smith, A.K., 2003: Simulation of the combined effects of solar cycle, quasi-biennial oscillation, and volcanic forcing on stratospheric ozone changes in recent decades, *J. Geophys. Res.*, **108**, ACH 4, doi: 10.1029/2001JD001503.
- Li, F., Stolarski, R.S., and Newman, P.A., 2009: Stratospheric ozone in the post-CFC era, *Atmos. Chem. Phys.*, **9**, 2207–2213, doi: 10.5194/acp-9-2207-2009.
- Lin, M., et al., 2015: Climate variability modulates western US ozone air quality in spring via deep stratospheric intrusions, *Nature Communications*, **6**, 7105, doi: 10.1038/ncomms8105.
- Liu, G., et al., 2009: Ozone correlation lengths and measurement uncertainties from analysis of historical ozonesonde data in North America and Europe, *J. Geophys. Res.*, **114**, D04112, doi: 10.1029/2008JD010576.
- Logan, J.A., 1994: Trends in the vertical distribution of ozone: An analysis of ozonesonde data, *J. Geophys. Res.*, **99**(D12), 25553–25585, doi: 10.1029/94JD02333.
- Logan, J.A., 1999a: An analysis of ozonesonde data for the lower stratosphere: Recommendations for testing models, *J. Geophys. Res.*, **104**(D13), 16151–16170, doi: 10.1029/1999JD900216.
- Logan, J.A., et al., 1999b: Trends in the vertical distribution of ozone: A comparison of two analyses of ozonesonde data, *J. Geophys. Res.*, **104**(D21), 26373–26399, doi: 10.1029/1999JD900300.
- Logan, J.A., et al., 2012: Changes in ozone over Europe: Analysis of ozone measurements from sondes, regular aircraft (MOZAIC) and alpine surface sites, *J. Geophys. Res.*, **117**, D09301, doi: 10.1029/2011JD016952.
- Long, C.S., et al., 2017: Climatology and interannual variability of dynamic variables in multiple reanalyses evaluated by the SPARC Reanalysis Intercomparison Project (S-RIP), *Atmospheric Chemistry and Physics*, **17**(23), 14593–14629, doi: 10.5194/acp-17-14593-2017.
- Maillard Barras, E., Ruffieux, D., and Hocke, K., 2009: Stratospheric ozone profiles over Switzerland measured by SOMORA, ozonesonde, and MLS/Aura satellite, *Int. J. Remote Sens.*, **30**, 4033–4041, doi: 10.1080/01431160902821890.
- McDermid, I.S., et al., 1998: OPAL: Network for the Detection of Stratospheric Change ozone profiler assessment at Lauder, New Zealand 2. Intercomparison of revised results, *J. Geophys. Res.*, **103**(D22), 28693–28699, doi: 10.1029/98JD02707.
- McLinden, C.A., and Fioletov, V., 2011: Quantifying stratospheric ozone trends: Complications due to stratospheric cooling, *Geophys. Res. Lett.*, **38**, L03808, doi: 10.1029/2010GL046012.
- McPeters, R.D., et al., 1999: Results from the 1995 stratospheric ozone profile intercomparison at Mauna Loa, *J. Geophys. Res.*, **104**, 30505–30514.

- McPeters, R.D., et al., 2013: The version 8.6 SBUV ozone data record: An overview, *J. Geophys. Res. Atmos.*, **118**, 8032–8039, doi:10.1002/jgrd.50597.
- Mégie, G., and Menzies, R.T., 1980: Complementarity of UV and IR differential absorption lidar for global measurements of atmospheric species, *Appl. Opt.*, **19**, 1173–1183 doi: 10.1364/AO.19.001173.
- Millán, L.F., et al., 2016: Case studies of the impact of orbital sampling on stratospheric trend detection and derivation of tropical vertical velocities: solar occultation vs. limb emission sounding, *Atmos. Chem. Phys.*, **16**, 11 521–11 534, doi:10.5194/acp-16-11521-2016.
- Misios, S., et al., 2016: Solar signals in CMIP-5 Simulations: Effects of Atmosphere–Ocean Coupling, *Q. J. R. Meteorol. Soc.*, QJ-15-0113, **142**(695), doi:10.1002/qj.2695, 928–941.
- Molina, M.J. and Rowland, F.S., 1974: Stratospheric sink for chlorofluoromethanes: chlorine atom catalysed destruction of ozone. *Nature*, Vol. **249**(5460), p. 810–812, doi:10.1038/249810a0.
- Moreira, L., et al., 2015: Trend analysis of the 20-year time series of stratospheric ozone profiles observed by the GROMOS microwave radiometer at Bern, *Atmos. Chem. Phys.*, **15**, 10999–11009, doi:10.5194/acp-15-10999-2015.
- Morgenstern, O., et al., 2017: Review of the global models used within phase 1 of the Chemistry–Climate Model Initiative (CCMI), *Geosci. Model Dev.*, **10**, 639–671, doi:10.5194/gmd-10-639-2017.
- Morris, G.A., et al., 2013: On the use of the correction factor with Japanese ozonesonde data, *Atmos. Chem. Phys.*, **13**, 1243–1260, doi:10.5194/acp-13-1243-2013.
- Moy, L., et al., 2017: Altitude registration of limb-scattered radiation, *Atmos. Meas. Tech.*, **10**, 167–178, doi:10.5194/amt-10-167-2017.
- Nair, P.J., et al., 2012: Relative drifts and stability of satellite and ground-based stratospheric ozone profiles at NDACC lidar stations, *Atmos. Meas. Tech.*, **5**, 1301–1318, doi:10.5194/amt-5-1301-2012.
- Nair, P.J., et al., 2013: Ozone trends derived from the total column and vertical profiles at a northern mid-latitude station, *Atmos. Chem. Phys.*, **13**, 10373–10384, doi:10.5194/acp-13-10373-2013.
- Nair, P.J., et al., 2015: Subtropical and midlatitude ozone trends in the stratosphere: Implications for recovery. *J. Geophys. Res. Atmos.*, **120**, 7247–7257. doi: 10.1002/2014JD022371.
- Neal, R.M. 1993: Probabilistic inference using Markov chain Monte Carlo methods, *Technical Report, CRG-TR-93-1*, University of Toronto, Toronto.
- Nedoluha G.E., et al., 2015: Unusual stratospheric ozone anomalies observed in 22 years of measurements from Lauder, New Zealand, *Atmos. Chem. Phys.*, **15**, 6817–6826, doi:10.5194/acp-15-6817-2015.
- Newman, P.A., et al., 2007: A new formulation of equivalent effective stratospheric chlorine (EESC), *Atmos. Chem. Phys.*, **7**, 4537–4552, doi:10.5194/acp-7-4537-2007.
- Oman, L.D., et al., 2013: The ozone response to ENSO in Aura satellite measurements and a chemistry-climate simulation, *J. Geophys. Res.*, **118**, 965–976, doi:10.1029/2012JD018546.
- Pelon, J., Godin, S., and Mégie, G., 1986: Upper stratospheric (30–50 km) lidar observations of the ozone vertical distribution, *Journal of Geophysical Research: Atmospheres*, **91**, 8667–8671, 10.1029/JD091iD08p08667.
- Petropavlovskikh, I., Bhartia, P.K., and DeLuisi, J., 2005: New Umkehr ozone profile retrieval algorithm optimized for climatological studies, *Geophys. Res. Lett.*, **32**, L16808, doi:10.1029/2005GL023323.
- Petropavlovskikh, I., et al., 2009: Effect of the out-of-band stray light on the retrieval of the Umkehr Dobson ozone profiles, *Int. J. of Remote Sens.*, **30** (24), 6461 – 6482, doi: 10.1080/01431160902865806.
- Petropavlovskikh, I., et al., 2011: Sensitivity of Dobson and Brewer Umkehr ozone profile retrievals to ozone cross-sections and stray light effects. *Atmos. Meas. Tech.*, **4**, 1–29, doi: 10.5194/amt-4-1-2011.
- Pougatchev, N.S., Connor, B.J., and Rinsland, C.P., 1995: Infrared measurements of the ozone vertical distribution above Kitt Peak, *J. Geophys. Res.*, **100**(D8), 16689–16697, doi:10.1029/95JD01296.
- Prais, S.J. and Winsten, C.B., 1954: Trend estimators and serial correlation, *Cowles Commission discussion paper*, **383**, 1–26, Chicago.
- Rahpoe, N., et al., 2015: Relative drifts and biases between six ozone limb satellite measurements from the last decade, *Atmos. Meas. Tech.*, **8**, 4369–4381, doi:10.5194/amt-8-4369-2015.
- Randel, W.J. and Wu, F., 2007: A stratospheric ozone profile data set for 1979–2005: Variability, trends, and comparisons with column ozone data, *J. Geophys. Res.*, **112**, D06313, doi:10.1029/2006JD007339.
- Randel, W.J., et al., 2009: An update of observed stratospheric temperature trends, *J. Geophys. Res.*, **114**, D02107, doi:10.1029/2008JD010421.
- Randel, W.J., et al., 2016: Stratospheric temperature trends over 1979–2015 derived from combined SSU, MLS, and SABER satellite observations, *J. Climate*, **29**, 4843–4859, doi:10.1175/JCLI-D-15-0629.1.

- Rodgers, C.D., 2000: Inverse Methods for Atmospheric Sounding: Theory and Practice, Series on Atmospheric, Oceanic and Planetary Physics, Vol. 2, World Scientific Publishing Co., Singapore.
- Savin, N.E. and White, K.J., 1978: Estimation and testing for functional form and autocorrelation: A simultaneous approach, *Journal of Econometrics*, **8**(1), 1-12, doi:10.1016/0304-4076(78)90085-4.
- Shepherd, T.G., 2008: Dynamics, stratospheric ozone, and climate change, *Atmosphere-Ocean*, **46**:1, 117-138, doi:10.3137/ao.460106.
- Smit, H.G.J., *et al.*, 2007: Assessment of the performance of ECC-ozonesondes under quasi-flight conditions in the environmental simulation chamber: Insights from the Jülich Ozone Sonde Intercomparison Experiment (JOSIE), *J. Geophys. Res.*, **112**, D19306, doi:10.1029/2006JD007308.
- Smit, H.G.J., and ASOPOS-panel, 2012a: Quality Assurance and Quality Control for Ozonesonde Measurements in GAW, WMO *Global Atmosphere Watch report series*, No. **201**, World Meteorological Organization, Geneva, available at http://www.wmo.int/pages/prog/arep/gaw/documents/GAW_201_30_Sept.pdf.
- Smit, H.G.J., and the O3S-DQA-Panel (Ozone Sonde Data Quality Assessment), 2012b: Guidelines for homogenization of ozonesonde data, SI2N/O3S-DQA activity as part of “Past changes in the vertical distribution of ozone assessment”, available at: http://www.das.uwyo.edu/~deshler/NDACC_O3Sondes/O3s_DQA/O3S-DQA-Guidelines%20Homogenization-V2-19November2012.pdf.
- Sofieva, V.F., *et al.*, 2014: On sampling uncertainty of satellite ozone profile measurements, *Atmos. Meas. Tech.*, **7**, 1891–1900, doi:10.5194/amt-7-1891-2014.
- Sofieva, V.F., *et al.*, 2017: Merged SAGE II, Ozone_cci and OMPS ozone profiles dataset and evaluation of ozone trends in the stratosphere, *Atmos. Chem. Phys.*, **17**, 12533-12552, doi:10.5194/acp-17-12533-2017.
- Solomon, S., *et al.*, 1986: On the depletion of Antarctic ozone, *Nature*, **321**, 755–758, doi: 10.1038/321755a0.
- Solomon, S., *et al.*, 1998: Ozone depletion at mid-latitudes: Coupling of volcanic aerosols and temperature variability to anthropogenic chlorine, *Geophys. Res. Lett.*, **25**, 11, 1944-8007, doi:10.1029/98GL01293.
- SPARC, 1998: SPARC-IOC-GAW Assessment of Trends in the Vertical Distribution of Ozone. N. Harris, R. Hudson and C. Phillips (eds.), SPARC report No.1, WMO Global Ozone Research and Monitoring Project Report No. **43**, available at: www.sparc-climate.org/publications/sparc-reports/.
- SPARC, 2013, SPARC Report on the Lifetimes of Stratospheric Ozone-Depleting Substances, Their Replacements, and Related Species. Ko, M.K.W., Newman, P. A., Reimann, S., and Strahan, S. E. (eds.), SPARC Report No. **6**, WCRP-15/2013, available at: www.sparc-climate.org/publications/sparc-reports/.
- Steinbrecht, W., *et al.*, 1998: Correlations between tropopause height and total ozone: Implications for long-term changes, *J. Geophys. Res.*, **103**, 19 183–19, 192, doi:10.1029/98JD01929.
- Steinbrecht, W., *et al.*, 2006: Long-term evolution of upper stratospheric ozone at selected stations of the Network for the Detection of Stratospheric Change (NDSC), *J. Geophys. Res.*, **111**, D10308, doi:10.1029/2005JD006454.
- Steinbrecht, W., *et al.*, 2009: Ozone and temperature trends in the upper stratosphere at five stations of the Network for the Detection of Atmospheric Composition Change, *Int. J. of Remote Sens.*, **30**:15-16, 3875-3886, doi:10.1080/01431160902821841.
- Steinbrecht, W., *et al.*, 2017: An update on ozone profile trends for the period 2000 to 2016, *Atmos. Chem. Phys.*, **17**, 10675-10690, doi:10.5194/acp-17-10675-2017.
- Sterling, C.W., *et al.*, 2018: Homogenizing and estimating the uncertainty in NOAA’s long-term vertical ozone profile records measured with the electrochemical concentration cell ozonesonde, *Atmos. Meas. Tech.* **11**, 3661-3687, doi:10.5194/amt-11-3661-2018.
- Stolarski, R.S. and Frith, S.M., 2006: Search for evidence of trend slow-down in the long-term TOMS/SBUV total ozone data record: the importance of instrument drift uncertainty, *Atmos. Chem. Phys.*, **6**, 4057-4065, doi:10.5194/acp-6-4057-2006.
- Stolarski, R., *et al.*, 2006: Trends in Stratospheric Ozone: Lessons Learned from a 3D Chemical Transport Model, *J. Atmos. Sci.*, **63**, 1028–1041, doi:10.1175/JAS3650.1.
- Stübi R., *et al.*, 2008: In-flight comparison of Brewer-Mast and electrochemical concentration cell ozonesondes, *J. Geophys. Res.*, **113**, D13302, doi:10.1029/2007JD009091.
- Studer, S., *et al.*, 2013: Intercomparison of stratospheric ozone profiles for the assessment of the upgraded GROMOS radiometer at Bern, *Atmos. Meas. Tech.*, **6**, 6097–6146, doi:10.5194/amt-6-6097-2013.
- Studer, S., *et al.*, 2014: A climatology of the diurnal variations in stratospheric and mesospheric ozone over Bern, Switzerland , *Atmos. Chem. Phys.*, **14**, 5905–5919, doi:10.5194/acp-14-5905-2014.
- Tarasick, D.W., *et al.*, 2016: A re-evaluated Canadian ozonesonde record: measurements of the vertical distribution of ozone over Canada from 1966 to 2013, *Atmos. Meas. Tech.*, **9**, 195-214, doi:10.5194/amt-9-195-2016.

- Tegtmeier, S., et al., 2013: SPARC Data Initiative: A comparison of ozone climatologies from international satellite limb sounders, *J. Geophys. Res. Atmos.*, **118**, 12,229–12,247, doi:10.1002/2013JD019877.
- Terao, Y., and Logan, J.A., 2007: Consistency of time series and trends of stratospheric ozone as seen by ozonesonde, SAGE II, HALOE, and SBUV(/2), *J. Geophys. Res.*, **112**, D06310, doi:10.1029/2006JD007667.
- Thomason, L.W., et al., 2018: A global space-based stratospheric aerosol climatology: 1979–2016, *Earth Syst. Sci. Data*, **10**, 469–492, doi:10.5194/essd-10-469-2018.
- Thompson, A.M., et al., 2007: Southern Hemisphere Additional Ozonesondes (SHADOZ) 1998–2004 tropical ozone climatology: 3. Instrumentation, station-to-station variability, and evaluation with simulated flight profiles, *J. Geophys. Res.*, **112**, D03304, doi:10.1029/2005JD007042.
- Thompson, D.W.J. and Wallace, J.M., 2000: Annular Modes in the Extratropical Circulation. Part I: Month-to-Month Variability, *J. Climate*, **13**, 1000–1016, doi:10.1175/1520-0442.
- Thompson, D.W.J. and Solomon, S., 2002: Interpretation of Recent Southern Hemisphere Climate Change, *Science*, **296**, 895–899, doi:10.1126/science.1069270.
- Thompson, D.W.J., et al., 2012: The mystery of recent stratospheric temperature trends, *Nature*, **491**(7426), 692–697, doi:10.1038/nature11579.
- Tie, X., and Brasseur, G., 1995: The response of stratospheric ozone to volcanic eruptions: Sensitivity to atmospheric chlorine loading, *Geophys. Res. Lett.*, **22**, 3035–3038, doi:10.1029/95GL03057.
- Toohey, M., et al., 2013: Characterizing sampling biases in the trace gas climatologies of the SPARC Data Initiative, *J. Geophys. Res. Atmos.*, **118**, 11,847–11,862, doi:10.1002/jgrd.50874.
- Tummon, F., et al., 2015: Intercomparison of vertically resolved merged satellite ozone data sets: interannual variability and long-term trends, *Atmos. Chem. Phys.*, **15**, 3021–3043, doi:10.5194/acp-15-3021-2015.
- Van Malderen, R., et al., 2016: On instrumental errors and related correction strategies of ozonesondes: possible effect on calculated ozone trends for the nearby sites Uccle and De Bilt, *Atmos. Meas. Tech.*, **9**, 3793–3816, doi:10.5194/amt-9-3793-2016.
- Verhoelst, T., et al., 2015: Metrology of ground-based satellite validation: co-location mismatch and smoothing issues of total ozone comparisons, *Atmos. Meas. Tech.*, **8**, 5039–5062, doi:10.5194/amt-8-5039-2015.
- Vigouroux, C., et al., 2015: Trends of ozone total columns and vertical distribution from FTIR observations at eight NDACC stations around the globe, *Atmos. Chem. Phys.*, **15**, 2915–2933, doi:10.5194/acp-15-2915-2015.
- Wang, H.J., Cunnold, D.M., and Bao, X., 1996: A critical analysis of Stratospheric Aerosol and Gas Experiment ozone trends, *J. Geophys. Res.*, **101**(D7), 12495–12514, doi:10.1029/96JD00581.
- Weber, M., Rahpoe, N., and Burrows, J.P., 2016: Stability requirements on long-term (satellite) ozone observations and their implication for trend detection, *Quadrennial Ozone Symposium of the International Ozone Commission, QOS2016-280*.
- Weber, M., et al., 2018: Total ozone trends from 1979 to 2016 derived from five merged observational datasets – the emergence into ozone recovery, *Atmos. Chem. Phys.*, **18**, 2097–2117, doi:10.5194/acp-18-2097-2018.
- Weiss, A.K., et al., 2001: Chemical and dynamical contributions to ozone profile trends of the Payerne (Switzerland) balloon soundings, *J. Geophys. Res.*, **106**, D19, 2156–2202, doi:10.1029/2000JD000106.
- Wild, J.D., et al., 2019: A coherent ozone profile dataset from SBUV, SBUV/2: 1979 to 2017, in preparation.
- Witte, J.C., et al., 2017: First reprocessing of Southern Hemisphere ADDitional OZonesondes (SHADOZ) profile records (1998–2015): 1. Methodology and evaluation, *J. Geophys. Res. Atmos.*, **122**, 6611–6636, doi:10.1002/2016JD026403.
- Witte, J.C., et al., 2018: First Reprocessing of Southern Hemisphere ADDitional OZonesondes (SHADOZ) Profile Records: 3. Uncertainty in Ozone Profile and Total Column, *J. Geophys. Res. Atmos.*, **123**, doi:10.1002/2017JD027791.
- WMO (World Meteorological Organization), 1986: Atmospheric Ozone 1985, Assessment of Our Understanding of the Processes Controlling Its Present Distribution and Change, Global Ozone Research and Monitoring Project Report No. **16**, Geneva, Switzerland, available at: <https://www.esrl.noaa.gov/csd/assessments/ozone/1985/report.html>.
- WMO (World Meteorological Organization), 2007: Scientific Assessment of Ozone Depletion: 2006, Global Ozone Research and Monitoring Project - Report No. **50**, 572 pp., Geneva, Switzerland, available at: <https://www.esrl.noaa.gov/csd/assessments/ozone/2006/>.
- WMO (World Meteorological Organization), 2011: Scientific Assessment of Ozone Depletion: 2010, Global Ozone Research and Monitoring Project - Report No. **52**, 516 pp., Geneva, Switzerland, available at: <https://www.esrl.noaa.gov/csd/assessments/ozone/2010/>.

- WMO (World Meteorological Organization), 2014: Scientific Assessment of Ozone Depletion: 2014, Global Ozone Research and Monitoring Project-Report No. 55, Geneva, Switzerland, available at: <https://www.esrl.noaa.gov/csd/assessments/ozone/2014/>.
- WMO (World Meteorological Organization), 2018: Scientific Assessment of Ozone Depletion: 2018, Global Ozone Research and Monitoring Project-Report No. 58, 588pp, Geneva, Switzerland, available at: <https://www.esrl.noaa.gov/csd/assessments/ozone/2018/>.
- Wolter, K., and Timlin, M.S., 2011: El Niño/Southern Oscillation behaviour since 1871 as diagnosed in an extended multivariate ENSO index (MEI.ext), *Intl. J. Climatology*, **31**, 1074-1087.
- Zawada, D.J., et al., 2018: Tomographic retrievals of ozone with the OMPS Limb Profiler: algorithm description and preliminary results, *Atmos. Meas. Tech.*, **11**, 2375-2393, doi:10.5194/amt-11-2375-2018.
- Zerefos, C.S., et al., 2012: Evidence of a possible turning point in solar UV-B over Canada, Europe and Japan, *Atmos. Chem. Phys.*, **12**, 2469-2477, doi:10.5194/acp-12-2469-2012.
- Zerefos, C., et al., 2018: Representativeness of single lidar stations for zonally averaged ozone profiles, their trends and attribution to proxies, *Atmos. Chem. Phys.*, **18**, 6427-6440, doi:10.5194/acp-18-6427-2018.
- Zitto, M.E., et al., 2016: 110 years of temperature observations at Orcadas Antarctic Station: multidecadal variability, *Int. J. Climatol.*, **36**, 809–823, doi:10.1002/joc.4384.

