Supplement of

Observed changes in stratospheric circulation: Decreasing lifetime of N_2O, 2005-2021

Michael J. Prather[1], Lucien Froidevaux[2], Nathaniel J. Livesey[2]

[1]Earth System Science Department, University of California Irvine; Irvine, CA 92697-3100, USA
[2]Jet Propulsion Laboratory, California Institute of Technology; Pasadena, CA 91011, USA

Correspondence to: Michael Prather (mprather@uci.edu)

This Supplement contains data tables of the time series plotted in the paper. It also includes the time series and figures for the N_2O stratospheric abundances (f-N_2O) in northern and southern mid-latitudes that were discussed but not plotted or shown

Table S1.

year		loss (TgN/y)	burden (TgN)		lifetime (y)		prod NO (TgN/y)
		fig 1A	**fig 1B**		**fig 1C**		**fig 1D**
2005.08		12.92	1523.0		117.90		0.7538
2005.17		12.99	1523.3		117.20		0.7570
2005.25		13.02	1523.5		117.00		0.7578
2005.33		13.00	1523.9		117.30		0.7563
2005.42		12.98	1524.2		117.40		0.7551
2005.50		13.04	1524.5		116.90		0.7586
2005.58		13.20	1524.8		115.50		0.7670
2005.67		13.33	1525.2		114.40		0.7734
2005.75		13.35	1525.5		114.30		0.7746
2005.83		13.29	1525.9		114.80		0.7720
2005.92		13.17	1526.3		115.90		0.7670
2006.00		13.04	1526.7		117.10		0.7616
2006.08		12.91	1527.1		118.30		0.7555
2006.17		12.76	1527.5		119.70		0.7484
2006.25		12.65	1527.9		120.80		0.7430
2006.33		12.58	1528.2		121.50		0.7392
2006.42		12.54	1528.5		121.90		0.7375
2006.50		12.47	1528.8		122.60		0.7330
2006.58		12.34	1529.1		123.90		0.7261
2006.67		12.25	1529.3		124.80		0.7216
2006.75		12.27	1529.5		124.60		0.7225
2006.83		12.36	1529.7		123.70		0.7269
2006.92		12.50	1529.9		122.40		0.7330
2007.00		12.62	1530.2		121.20		0.7385
2007.08		12.75	1530.4		120.00		0.7441
2007.17		12.88	1530.6		118.80		0.7505
2007.25		12.97	1530.9		118.00		0.7552
2007.33		13.03	1531.2		117.50		0.7588
2007.42		13.05	1531.5		117.30		0.7603
2007.50		13.09	1531.8		117.00		0.7625
2007.58		13.16	1532.2		116.40		0.7669
2007.67		13.28	1532.6		115.40		0.7736
2007.75		13.36	1533.0		114.80		0.7781
2007.83		13.35	1533.5		114.90		0.7779
2007.92		13.27	1534.0		115.60		0.7743
2008.00		13.17	1534.5		116.50		0.7703
2008.08		13.06	1534.9		117.60		0.7652
2008.17		12.93	1535.4		118.80		0.7587
2008.25		12.83	1535.8		119.70		0.7537
2008.33		12.79	1536.2		120.20		0.7516
2008.42		12.79	1536.5		120.10		0.7518
2008.50		12.79	1536.9		120.10		0.7517
2008.58		12.75	1537.2		120.60		0.7490
2008.67		12.68	1537.6		121.30		0.7443
2008.75		12.58	1537.9		122.20		0.7390
2008.83		12.56	1538.2		122.50		0.7376
2008.92		12.62	1538.5		121.90		0.7400
2009.00		12.71	1538.6		121.10		0.7437
2009.08		12.80	1538.9		120.20		0.7476
2009.17		12.88	1539.1		119.50		0.7509
2009.25		12.93	1539.4		119.00		0.7532

2009.33		12.94		1539.8		119.00		0.7532
2009.42		12.96		1540.1		118.80		0.7538
2009.50		13.06		1540.4		118.00		0.7584
2009.58		13.17		1540.7		117.00		0.7642
2009.67		13.25		1541.0		116.30		0.7684
2009.75		13.30		1541.2		115.90		0.7707
2009.83		13.31		1541.6		115.80		0.7715
2009.92		13.31		1542.0		115.90		0.7713
2010.00		13.29		1542.4		116.10		0.7707
2010.08		13.29		1542.8		116.10		0.7718
2010.17		13.36		1543.2		115.50		0.7763
2010.25		13.40		1543.6		115.20		0.7798
2010.33		13.41		1544.0		115.10		0.7816
2010.42		13.37		1544.4		115.60		0.7806
2010.50		13.28		1544.8		116.30		0.7776
2010.58		13.26		1545.3		116.50		0.7780
2010.67		13.31		1545.8		116.10		0.7817
2010.75		13.43		1546.2		115.20		0.7887
2010.83		13.53		1546.7		114.40		0.7932
2010.92		13.62		1547.1		113.60		0.7971
2011.00		13.67		1547.6		113.20		0.7989
2011.08		13.67		1548.0		113.20		0.7981
2011.17		13.62		1548.4		113.70		0.7943
2011.25		13.57		1548.8		114.10		0.7911
2011.33		13.55		1549.1		114.30		0.7890
2011.42		13.58		1549.4		114.10		0.7896
2011.50		13.60		1549.8		114.00		0.7892
2011.58		13.57		1550.2		114.20		0.7867
2011.67		13.47		1550.5		115.10		0.7800
2011.75		13.32		1550.9		116.40		0.7720
2011.83		13.21		1551.2		117.40		0.7669
2011.92		13.09		1551.5		118.50		0.7615
2012.00		13.01		1551.8		119.30		0.7578
2012.08		12.97		1552.1		119.70		0.7562
2012.17		12.97		1552.5		119.70		0.7569
2012.25		12.98		1552.9		119.60		0.7577
2012.33		12.98		1553.2		119.60		0.7578
2012.42		12.92		1553.5		120.20		0.7551
2012.50		12.81		1553.8		121.30		0.7502
2012.58		12.74		1554.1		122.00		0.7476
2012.67		12.74		1554.3		122.00		0.7483
2012.75		12.76		1554.6		121.90		0.7493
2012.83		12.75		1554.9		122.00		0.7492
2012.92		12.71		1555.3		122.30		0.7482
2013.00		12.66		1555.7		122.90		0.7466
2013.08		12.61		1556.1		123.40		0.7450
2013.17		12.58		1556.5		123.70		0.7440
2013.25		12.61		1556.9		123.40		0.7462
2013.33		12.69		1557.2		122.70		0.7509
2013.42		12.79		1557.6		121.80		0.7559
2013.50		12.85		1558.0		121.20		0.7590
2013.58		12.80		1558.4		121.70		0.7561
2013.67		12.74		1558.9		122.40		0.7529
2013.75		12.73		1559.3		122.40		0.7532

2013.83		12.81		1559.7		121.80		0.7570
2013.92		12.93		1560.1		120.60		0.7625
2014.00		13.06		1560.5		119.50		0.7677
2014.08		13.17		1560.9		118.60		0.7720
2014.17		13.24		1561.4		117.90		0.7752
2014.25		13.26		1561.9		117.80		0.7755
2014.33		13.25		1562.4		117.90		0.7745
2014.42		13.26		1562.9		117.90		0.7745
2014.50		13.35		1563.5		117.10		0.7791
2014.58		13.50		1564.1		115.90		0.7864
2014.67		13.59		1564.6		115.10		0.7909
2014.75		13.58		1565.1		115.20		0.7900
2014.83		13.51		1565.6		115.90		0.7863
2014.92		13.43		1566.0		116.60		0.7822
2015.00		13.37		1566.5		117.10		0.7797
2015.08		13.35		1566.9		117.40		0.7785
2015.17		13.31		1567.2		117.80		0.7760
2015.25		13.26		1567.6		118.20		0.7737
2015.33		13.21		1567.9		118.70		0.7712
2015.42		13.14		1568.3		119.40		0.7680
2015.50		13.04		1568.7		120.30		0.7622
2015.58		12.91		1569.0		121.50		0.7553
2015.67		12.86		1569.3		122.00		0.7523
2015.75		12.92		1569.7		121.50		0.7550
2015.83		13.03		1570.1		120.50		0.7596
2015.92		13.13		1570.5		119.60		0.7637
2016.00		13.21		1570.8		118.90		0.7668
2016.08		13.27		1571.1		118.40		0.7691
2016.17		13.33		1571.4		117.90		0.7720
2016.25		13.40		1571.7		117.30		0.7754
2016.33		13.44		1571.9		116.90		0.7771
2016.42		13.48		1572.2		116.60		0.7787
2016.50		13.50		1572.4		116.40		0.7801
2016.58		13.53		1572.6		116.30		0.7816
2016.67		13.55		1572.9		116.10		0.7834
2016.75		13.56		1573.1		116.00		0.7846
2016.83		13.57		1573.4		115.90		0.7858
2016.92		13.59		1573.6		115.80		0.7868
2017.00		13.58		1573.9		115.90		0.7867
2017.08		13.58		1574.2		115.90		0.7866
2017.17		13.60		1574.6		115.70		0.7877
2017.25		13.64		1575.0		115.50		0.7890
2017.33		13.70		1575.4		115.00		0.7915
2017.42		13.76		1575.8		114.50		0.7946
2017.50		13.84		1576.2		113.90		0.7977
2017.58		13.90		1576.6		113.40		0.8005
2017.67		13.91		1577.0		113.30		0.8006
2017.75		13.86		1577.5		113.90		0.7969
2017.83		13.75		1578.0		114.70		0.7914
2017.92		13.67		1578.5		115.50		0.7874
2018.00		13.63		1578.9		115.80		0.7854
2018.08		13.59		1579.3		116.20		0.7833
2018.17		13.53		1579.7		116.70		0.7803
2018.25		13.45		1580.2		117.50		0.7768

2018.33		13.35		1580.7		118.40		0.7723
2018.42		13.24		1581.3		119.40		0.7673
2018.50		13.21		1581.8		119.80		0.7661
2018.58		13.30		1582.3		119.00		0.7714
2018.67		13.41		1582.8		118.00		0.7771
2018.75		13.54		1583.2		116.90		0.7844
2018.83		13.70		1583.5		115.60		0.7923
2018.92		13.81		1583.9		114.70		0.7983
2019.00		13.86		1584.3		114.30		0.8011
2019.08		13.87		1584.7		114.20		0.8027
2019.17		13.88		1585.1		114.20		0.8033
2019.25		13.93		1585.4		113.80		0.8056
2019.33		14.04		1585.7		112.90		0.8108
2019.42		14.16		1586.1		112.00		0.8165
2019.50		14.25		1586.4		111.40		0.8208
2019.58		14.24		1586.6		111.40		0.8203
2019.67		14.20		1587.0		111.80		0.8181
2019.75		14.14		1587.3		112.20		0.8152
2019.83		14.12		1587.8		112.50		0.8132
2019.92		14.12		1588.3		112.50		0.8125
2020.00		14.17		1588.8		112.10		0.8139
2020.08		14.22		1589.2		111.70		0.8158
2020.17		14.28		1589.7		111.30		0.8181
2020.25		14.28		1590.3		111.30		0.8180
2020.33		14.22		1590.8		111.90		0.8145
2020.42		14.14		1591.4		112.60		0.8100
2020.50		14.04		1591.9		113.40		0.8041
2020.58		13.97		1592.5		114.00		0.7996
2020.67		13.93		1593.0		114.40		0.7965
2020.75		13.86		1593.6		115.00		0.7929
2020.83		13.79		1594.2		115.60		0.7894
2020.92		13.73		1594.7		116.20		0.7867
2021.00		13.66		1595.2		116.70		0.7838
2021.08		13.60		1595.7		117.30		0.7808
2021.17		13.54		1596.1		117.90		0.7775
2021.25		13.47		1596.6		118.50		0.7742
2021.33		13.44		1597.0		118.90		0.7720
2021.42		13.45		1597.6		118.80		0.7724
2021.50		13.52		1598.1		118.20		0.7762

Table S2.

year	j-N2O 30S-30N (1e-7/s)							
	fig 1E							
pressure	15 hPa	12 hPa	10 hPa	8.3 hPa	6.8 hPa	5.6 hPa	4.6 hPa	3.8 hPa
2005.08	0.156	0.232	0.333	0.459	0.612	0.787	0.979	1.179
2005.17	0.156	0.233	0.334	0.460	0.613	0.788	0.980	1.180
2005.25	0.156	0.233	0.334	0.461	0.614	0.789	0.980	1.180
2005.33	0.156	0.233	0.334	0.462	0.615	0.789	0.980	1.180
2005.42	0.156	0.233	0.335	0.462	0.615	0.789	0.980	1.179
2005.50	0.156	0.233	0.334	0.461	0.613	0.787	0.977	1.177
2005.58	0.155	0.232	0.333	0.459	0.611	0.785	0.975	1.175
2005.67	0.156	0.233	0.334	0.460	0.612	0.786	0.976	1.176
2005.75	0.156	0.234	0.335	0.461	0.613	0.787	0.977	1.176
2005.83	0.157	0.235	0.336	0.462	0.613	0.787	0.976	1.176
2005.92	0.158	0.235	0.336	0.462	0.613	0.786	0.976	1.175
2006.00	0.158	0.236	0.337	0.462	0.613	0.786	0.975	1.175
2006.08	0.159	0.237	0.337	0.463	0.613	0.786	0.976	1.175
2006.17	0.160	0.237	0.338	0.463	0.614	0.787	0.976	1.176
2006.25	0.160	0.238	0.338	0.463	0.614	0.787	0.977	1.177
2006.33	0.160	0.238	0.338	0.463	0.614	0.787	0.977	1.177
2006.42	0.160	0.238	0.338	0.463	0.614	0.787	0.977	1.177
2006.50	0.161	0.238	0.339	0.464	0.615	0.789	0.979	1.179
2006.58	0.161	0.239	0.339	0.465	0.616	0.791	0.981	1.181
2006.67	0.161	0.238	0.338	0.464	0.615	0.789	0.980	1.180
2006.75	0.160	0.237	0.337	0.463	0.615	0.789	0.980	1.180
2006.83	0.159	0.237	0.337	0.463	0.615	0.789	0.980	1.180
2006.92	0.159	0.236	0.336	0.463	0.615	0.790	0.981	1.181
2007.00	0.158	0.236	0.336	0.463	0.616	0.790	0.982	1.182
2007.08	0.158	0.235	0.336	0.462	0.615	0.790	0.981	1.182
2007.17	0.158	0.235	0.336	0.462	0.615	0.789	0.981	1.181
2007.25	0.158	0.235	0.336	0.462	0.615	0.789	0.980	1.180
2007.33	0.158	0.235	0.337	0.463	0.615	0.788	0.979	1.180
2007.42	0.158	0.236	0.337	0.463	0.615	0.789	0.980	1.180
2007.50	0.158	0.236	0.338	0.464	0.616	0.790	0.981	1.181
2007.58	0.158	0.236	0.338	0.464	0.615	0.789	0.980	1.180
2007.67	0.158	0.236	0.337	0.463	0.615	0.788	0.979	1.179
2007.75	0.158	0.236	0.337	0.463	0.614	0.787	0.978	1.178
2007.83	0.159	0.237	0.338	0.463	0.614	0.787	0.977	1.178
2007.92	0.159	0.238	0.338	0.463	0.614	0.786	0.977	1.178
2008.00	0.160	0.238	0.338	0.463	0.613	0.786	0.977	1.178
2008.08	0.160	0.239	0.339	0.464	0.614	0.787	0.978	1.179
2008.17	0.161	0.239	0.340	0.465	0.615	0.788	0.979	1.180
2008.25	0.161	0.239	0.340	0.465	0.616	0.789	0.980	1.181
2008.33	0.161	0.239	0.339	0.464	0.615	0.789	0.980	1.181
2008.42	0.160	0.238	0.339	0.464	0.615	0.789	0.980	1.182
2008.50	0.160	0.238	0.338	0.463	0.615	0.789	0.980	1.181
2008.58	0.160	0.238	0.338	0.463	0.615	0.789	0.980	1.181
2008.67	0.160	0.238	0.338	0.464	0.616	0.791	0.983	1.184
2008.75	0.160	0.238	0.339	0.465	0.618	0.793	0.985	1.186
2008.83	0.159	0.237	0.339	0.465	0.618	0.793	0.986	1.187
2008.92	0.159	0.237	0.338	0.465	0.618	0.794	0.986	1.187
2009.00	0.158	0.236	0.337	0.465	0.618	0.794	0.986	1.187
2009.08	0.158	0.236	0.337	0.465	0.618	0.794	0.986	1.187
2009.17	0.158	0.236	0.337	0.465	0.618	0.793	0.985	1.186
2009.25	0.158	0.236	0.337	0.465	0.618	0.793	0.985	1.186
2009.33	0.158	0.236	0.338	0.466	0.619	0.793	0.985	1.186
2009.42	0.158	0.236	0.339	0.466	0.619	0.793	0.984	1.185
2009.50	0.158	0.236	0.338	0.465	0.618	0.792	0.983	1.183
2009.58	0.158	0.236	0.338	0.466	0.618	0.791	0.982	1.183
2009.67	0.158	0.236	0.338	0.465	0.617	0.791	0.981	1.182
2009.75	0.157	0.236	0.338	0.465	0.617	0.790	0.981	1.182
2009.83	0.157	0.236	0.339	0.465	0.617	0.790	0.980	1.181
2009.92	0.158	0.236	0.339	0.466	0.617	0.790	0.981	1.182
2010.00	0.158	0.237	0.339	0.466	0.617	0.790	0.980	1.181
2010.08	0.158	0.237	0.339	0.465	0.616	0.788	0.978	1.179
2010.17	0.158	0.236	0.338	0.464	0.615	0.787	0.977	1.178
2010.25	0.158	0.236	0.338	0.464	0.614	0.787	0.977	1.177
2010.33	0.158	0.236	0.338	0.463	0.614	0.786	0.976	1.176
2010.42	0.158	0.236	0.338	0.463	0.613	0.785	0.975	1.175
2010.50	0.158	0.236	0.337	0.462	0.612	0.785	0.975	1.175
2010.58	0.158	0.236	0.336	0.461	0.611	0.784	0.974	1.175
2010.67	0.157	0.235	0.335	0.460	0.610	0.782	0.973	1.174
2010.75	0.157	0.234	0.334	0.459	0.609	0.781	0.971	1.173
2010.83	0.157	0.234	0.333	0.458	0.608	0.781	0.971	1.172

2010.92	0.156	0.233	0.333	0.457	0.608	0.781	0.971	1.172
2011.00	0.156	0.233	0.332	0.457	0.608	0.781	0.971	1.172
2011.08	0.156	0.233	0.333	0.458	0.609	0.782	0.973	1.175
2011.17	0.156	0.233	0.333	0.459	0.610	0.783	0.973	1.175
2011.25	0.156	0.233	0.333	0.459	0.610	0.784	0.974	1.176
2011.33	0.156	0.233	0.333	0.459	0.611	0.784	0.975	1.177
2011.42	0.155	0.232	0.333	0.460	0.611	0.785	0.976	1.178
2011.50	0.156	0.233	0.334	0.461	0.613	0.786	0.977	1.179
2011.58	0.156	0.233	0.335	0.462	0.613	0.787	0.978	1.180
2011.67	0.156	0.234	0.336	0.463	0.615	0.789	0.979	1.181
2011.75	0.156	0.234	0.336	0.464	0.615	0.789	0.979	1.181
2011.83	0.156	0.234	0.337	0.464	0.615	0.788	0.979	1.181
2011.92	0.157	0.235	0.337	0.464	0.615	0.788	0.978	1.180
2012.00	0.157	0.235	0.337	0.464	0.615	0.788	0.978	1.180
2012.08	0.157	0.235	0.337	0.463	0.614	0.786	0.976	1.178
2012.17	0.157	0.235	0.337	0.462	0.613	0.785	0.975	1.177
2012.25	0.157	0.235	0.336	0.461	0.611	0.783	0.973	1.175
2012.33	0.157	0.235	0.336	0.461	0.611	0.783	0.973	1.175
2012.42	0.158	0.236	0.336	0.462	0.612	0.784	0.974	1.175
2012.50	0.158	0.236	0.337	0.462	0.612	0.784	0.974	1.176
2012.58	0.158	0.236	0.337	0.462	0.612	0.784	0.974	1.175
2012.67	0.158	0.236	0.337	0.462	0.612	0.784	0.974	1.175
2012.75	0.159	0.237	0.337	0.461	0.611	0.784	0.974	1.175
2012.83	0.159	0.237	0.337	0.461	0.611	0.783	0.973	1.175
2012.92	0.159	0.237	0.337	0.461	0.610	0.782	0.972	1.174
2013.00	0.159	0.237	0.337	0.461	0.610	0.782	0.972	1.173
2013.08	0.159	0.237	0.337	0.460	0.610	0.782	0.972	1.174
2013.17	0.159	0.237	0.336	0.460	0.609	0.781	0.972	1.174
2013.25	0.159	0.236	0.335	0.459	0.609	0.781	0.972	1.174
2013.33	0.158	0.235	0.334	0.458	0.607	0.780	0.971	1.174
2013.42	0.158	0.234	0.333	0.457	0.606	0.779	0.971	1.173
2013.50	0.158	0.234	0.332	0.456	0.605	0.779	0.970	1.173
2013.58	0.158	0.234	0.332	0.456	0.606	0.780	0.971	1.174
2013.67	0.157	0.233	0.331	0.455	0.605	0.778	0.970	1.173
2013.75	0.156	0.232	0.330	0.454	0.604	0.777	0.969	1.172
2013.83	0.155	0.231	0.329	0.453	0.603	0.777	0.969	1.172
2013.92	0.155	0.230	0.328	0.452	0.603	0.778	0.970	1.173
2014.00	0.154	0.230	0.328	0.452	0.604	0.778	0.971	1.174
2014.08	0.154	0.229	0.328	0.452	0.604	0.778	0.970	1.174
2014.17	0.154	0.229	0.327	0.452	0.604	0.778	0.971	1.174
2014.25	0.154	0.229	0.327	0.452	0.604	0.778	0.970	1.173
2014.33	0.153	0.229	0.328	0.453	0.605	0.779	0.970	1.173
2014.42	0.153	0.228	0.328	0.453	0.604	0.778	0.969	1.172
2014.50	0.153	0.228	0.327	0.452	0.603	0.776	0.967	1.170
2014.58	0.152	0.228	0.327	0.452	0.603	0.776	0.966	1.169
2014.67	0.153	0.228	0.327	0.452	0.603	0.776	0.966	1.169
2014.75	0.153	0.229	0.328	0.454	0.604	0.777	0.967	1.170
2014.83	0.153	0.229	0.329	0.454	0.605	0.777	0.967	1.169
2014.92	0.154	0.230	0.330	0.455	0.605	0.777	0.967	1.169
2015.00	0.154	0.230	0.330	0.455	0.605	0.777	0.967	1.168
2015.08	0.154	0.231	0.330	0.455	0.606	0.778	0.968	1.169
2015.17	0.155	0.231	0.331	0.456	0.606	0.779	0.969	1.170
2015.25	0.155	0.232	0.332	0.457	0.607	0.779	0.969	1.171
2015.33	0.156	0.233	0.333	0.457	0.607	0.779	0.969	1.171
2015.42	0.157	0.233	0.333	0.457	0.607	0.780	0.970	1.172
2015.50	0.157	0.234	0.334	0.458	0.608	0.781	0.972	1.174
2015.58	0.157	0.234	0.334	0.458	0.609	0.782	0.973	1.175
2015.67	0.157	0.234	0.333	0.458	0.609	0.782	0.973	1.175
2015.75	0.156	0.233	0.332	0.456	0.607	0.781	0.972	1.175
2015.83	0.156	0.232	0.331	0.456	0.607	0.781	0.973	1.176
2015.92	0.156	0.232	0.331	0.455	0.606	0.781	0.973	1.176
2016.00	0.156	0.232	0.330	0.454	0.606	0.781	0.973	1.175
2016.08	0.156	0.232	0.330	0.454	0.606	0.780	0.972	1.175
2016.17	0.156	0.231	0.329	0.453	0.604	0.779	0.971	1.174
2016.25	0.156	0.231	0.329	0.453	0.605	0.779	0.971	1.174
2016.33	0.156	0.231	0.329	0.454	0.605	0.780	0.972	1.175
2016.42	0.156	0.231	0.329	0.453	0.605	0.780	0.972	1.175
2016.50	0.155	0.231	0.329	0.453	0.605	0.779	0.972	1.175
2016.58	0.155	0.231	0.329	0.453	0.604	0.779	0.971	1.174
2016.67	0.155	0.231	0.328	0.452	0.604	0.778	0.970	1.173
2016.75	0.156	0.231	0.329	0.453	0.604	0.779	0.971	1.173
2016.83	0.156	0.231	0.329	0.453	0.603	0.778	0.970	1.173
2016.92	0.155	0.231	0.329	0.453	0.604	0.778	0.970	1.173
2017.00	0.155	0.231	0.329	0.453	0.604	0.778	0.971	1.173
2017.08	0.155	0.230	0.329	0.453	0.604	0.778	0.970	1.172

2017.17	0.155	0.230	0.328	0.453	0.604	0.778	0.970	1.173
2017.25	0.154	0.230	0.328	0.453	0.604	0.779	0.971	1.173
2017.33	0.154	0.229	0.328	0.453	0.605	0.779	0.971	1.173
2017.42	0.154	0.230	0.329	0.454	0.605	0.780	0.971	1.173
2017.50	0.154	0.230	0.329	0.455	0.607	0.781	0.972	1.174
2017.58	0.154	0.230	0.330	0.456	0.608	0.782	0.973	1.174
2017.67	0.154	0.231	0.331	0.457	0.608	0.782	0.973	1.174
2017.75	0.155	0.232	0.332	0.458	0.610	0.784	0.974	1.176
2017.83	0.155	0.232	0.333	0.460	0.612	0.785	0.976	1.177
2017.92	0.155	0.233	0.334	0.460	0.612	0.785	0.976	1.177
2018.00	0.156	0.234	0.335	0.461	0.613	0.786	0.976	1.177
2018.08	0.157	0.235	0.336	0.463	0.614	0.787	0.978	1.179
2018.17	0.157	0.236	0.337	0.464	0.615	0.788	0.979	1.180
2018.25	0.158	0.236	0.338	0.464	0.615	0.788	0.978	1.179
2018.33	0.158	0.237	0.339	0.464	0.615	0.787	0.977	1.179
2018.42	0.159	0.237	0.339	0.464	0.615	0.787	0.977	1.178
2018.50	0.158	0.237	0.338	0.463	0.612	0.784	0.974	1.175
2018.58	0.158	0.236	0.337	0.461	0.611	0.783	0.972	1.173
2018.67	0.159	0.236	0.337	0.461	0.611	0.783	0.973	1.173
2018.75	0.159	0.236	0.336	0.460	0.609	0.781	0.971	1.171
2018.83	0.158	0.236	0.335	0.458	0.607	0.779	0.969	1.170
2018.92	0.158	0.235	0.334	0.457	0.606	0.778	0.969	1.170
2019.00	0.158	0.235	0.333	0.456	0.606	0.778	0.968	1.169
2019.08	0.157	0.234	0.332	0.455	0.604	0.776	0.966	1.167
2019.17	0.157	0.233	0.331	0.454	0.604	0.776	0.966	1.167
2019.25	0.156	0.231	0.329	0.453	0.602	0.775	0.966	1.166
2019.33	0.155	0.231	0.329	0.452	0.603	0.776	0.967	1.167
2019.42	0.155	0.230	0.328	0.452	0.603	0.777	0.967	1.168
2019.50	0.155	0.230	0.328	0.453	0.604	0.778	0.969	1.170
2019.58	0.155	0.230	0.328	0.453	0.605	0.779	0.970	1.171
2019.67	0.154	0.230	0.328	0.453	0.605	0.779	0.970	1.171
2019.75	0.154	0.230	0.329	0.454	0.606	0.780	0.971	1.172
2019.83	0.154	0.229	0.329	0.455	0.607	0.781	0.972	1.173
2019.92	0.154	0.230	0.329	0.455	0.608	0.782	0.972	1.173
2020.00	0.154	0.230	0.329	0.455	0.608	0.782	0.972	1.173
2020.08	0.154	0.230	0.330	0.456	0.608	0.781	0.972	1.172
2020.17	0.154	0.230	0.330	0.456	0.607	0.781	0.971	1.172
2020.25	0.155	0.231	0.332	0.457	0.609	0.782	0.972	1.173
2020.33	0.155	0.232	0.332	0.458	0.608	0.781	0.971	1.172
2020.42	0.156	0.233	0.333	0.458	0.608	0.781	0.971	1.171
2020.50	0.156	0.233	0.333	0.458	0.609	0.781	0.971	1.171
2020.58	0.156	0.233	0.333	0.458	0.608	0.780	0.970	1.170
2020.67	0.156	0.233	0.333	0.459	0.609	0.781	0.971	1.172
2020.75	0.156	0.233	0.334	0.459	0.610	0.782	0.972	1.172
2020.83	0.156	0.233	0.334	0.459	0.610	0.782	0.972	1.172
2020.92	0.156	0.233	0.334	0.459	0.610	0.782	0.972	1.172
2021.00	0.156	0.233	0.334	0.459	0.610	0.783	0.972	1.173
2021.08	0.156	0.234	0.334	0.460	0.611	0.783	0.973	1.174
2021.17	0.157	0.234	0.335	0.461	0.612	0.784	0.974	1.174
2021.25	0.157	0.234	0.335	0.461	0.612	0.784	0.974	1.174
2021.33	0.157	0.234	0.335	0.461	0.612	0.784	0.974	1.174
2021.42	0.157	0.234	0.335	0.461	0.612	0.783	0.973	1.173
2021.50	0.157	0.235	0.335	0.461	0.611	0.783	0.973	1.173

Table S3.

year	f-N2O 30S-30N (ppb)						
	fig 1F						
	32 hPa	22 hPa	15 hPa	10 hPa	6.8 hPa	4.6 hPa	3.2 hPa
2005.08	209.19	203.02	196.73	163.04	119.83	78.55	47.37
2005.17	209.30	202.90	197.61	163.83	118.97	77.17	47.20
2005.25	209.53	202.84	198.29	164.44	118.00	75.29	46.34
2005.33	210.19	203.06	198.64	164.67	116.99	73.36	45.12
2005.42	210.93	203.63	199.30	164.96	116.25	71.88	43.89
2005.50	211.78	204.24	199.80	165.25	116.48	72.45	44.72
2005.58	212.87	204.81	199.93	165.33	117.16	74.19	47.06
2005.67	214.05	205.29	199.55	164.47	116.87	75.31	49.26
2005.75	215.03	205.43	198.20	162.12	115.07	75.17	50.48
2005.83	216.01	205.67	196.80	159.30	112.59	74.39	51.05
2005.92	216.89	205.97	195.42	156.28	109.81	73.27	51.23
2006.00	217.68	206.34	194.12	153.47	107.20	71.93	50.87
2006.08	218.10	206.40	192.79	151.46	105.56	70.59	49.67
2006.17	218.21	206.21	191.61	150.28	104.91	69.46	47.79
2006.25	218.25	205.85	190.38	149.52	105.24	69.35	46.34
2006.33	218.06	205.31	189.33	148.94	105.75	69.85	45.80
2006.42	217.48	204.58	188.34	148.47	106.29	70.64	45.99
2006.50	217.04	204.33	188.12	148.37	106.18	70.00	44.88
2006.58	216.46	204.26	188.69	149.11	106.30	68.83	42.75
2006.67	215.84	204.38	189.93	150.80	107.29	68.30	40.91
2006.75	215.23	204.73	192.06	153.87	109.56	68.86	40.05
2006.83	214.40	204.79	194.07	157.19	112.22	69.78	39.79
2006.92	213.76	204.92	195.97	160.50	115.00	70.90	39.76
2007.00	213.37	205.02	197.43	163.09	117.37	72.20	40.15
2007.08	213.39	205.48	198.78	164.54	118.60	73.49	41.36
2007.17	213.76	206.55	200.19	164.97	118.49	74.40	43.25
2007.25	214.34	207.90	201.78	164.89	117.02	73.99	44.68
2007.33	214.92	209.30	203.48	165.09	115.59	73.00	45.28
2007.42	215.61	210.61	204.94	165.38	114.33	71.49	44.75
2007.50	216.19	211.27	205.28	165.22	113.88	71.07	44.42
2007.58	216.71	211.46	204.55	164.18	113.64	72.03	45.80
2007.67	217.35	211.55	203.51	162.86	113.35	73.32	48.23
2007.75	218.09	211.54	202.09	160.78	112.17	73.92	50.30
2007.83	219.00	211.66	200.54	158.17	110.35	73.99	51.69
2007.92	219.86	211.79	198.97	155.31	108.17	73.62	52.47
2008.00	220.42	212.09	197.81	152.87	106.21	73.09	52.80
2008.08	220.63	212.09	196.70	151.25	105.03	72.37	52.13
2008.17	220.48	211.43	195.63	150.63	104.75	71.54	50.52
2008.25	220.00	210.44	194.71	150.88	105.62	71.40	49.01
2008.33	219.51	209.39	193.77	151.41	107.39	72.54	48.53
2008.42	219.00	208.40	192.98	151.90	109.24	74.28	49.04
2008.50	218.32	207.76	192.96	152.73	110.46	75.19	49.46
2008.58	217.40	207.31	193.91	154.33	111.26	74.61	48.24
2008.67	216.36	206.75	195.29	156.63	112.43	73.73	45.85
2008.75	214.87	206.00	196.61	158.97	113.58	72.59	43.09
2008.83	213.28	205.11	197.87	161.60	115.25	72.01	41.08
2008.92	211.93	204.18	199.01	164.45	117.49	72.26	40.00
2009.00	210.94	203.34	200.10	167.28	119.85	72.84	39.43
2009.08	210.39	202.98	201.03	169.17	121.25	73.21	39.36
2009.17	210.16	203.16	201.70	169.74	121.37	73.25	39.75
2009.25	210.19	203.79	202.42	169.47	120.35	72.76	40.26
2009.33	210.23	204.62	203.38	169.00	118.42	71.10	39.89
2009.42	210.25	205.46	204.57	169.04	117.04	69.57	39.16
2009.50	210.48	206.08	205.64	169.41	116.59	69.39	39.63
2009.58	211.01	206.81	206.29	169.24	115.86	69.34	40.64
2009.67	211.78	207.73	206.60	168.68	114.80	68.98	41.64
2009.75	212.88	208.86	207.04	168.24	113.68	68.30	42.15
2009.83	214.12	210.12	207.68	168.05	112.68	67.42	42.09
2009.92	215.29	211.39	208.16	167.63	111.72	66.46	41.55
2010.00	216.40	212.64	208.20	166.57	110.51	65.63	41.15
2010.08	217.26	213.51	208.03	165.44	109.67	65.74	41.72
2010.17	218.01	214.20	208.02	164.84	109.64	66.91	43.41
2010.25	218.52	214.39	207.57	164.04	109.44	67.72	44.76
2010.33	218.81	214.16	206.70	163.07	109.13	68.37	46.05
2010.42	218.84	213.65	205.50	161.89	108.62	68.78	47.08
2010.50	218.76	213.36	204.55	161.32	108.96	69.34	47.23
2010.58	218.53	212.98	203.98	161.73	110.69	71.38	48.33
2010.67	217.62	212.11	203.53	162.46	112.67	73.64	50.01
2010.75	216.55	211.02	203.17	163.58	115.25	76.47	52.07

2010.83	215.28	209.69	202.88	164.72	117.60	78.77	53.33
2010.92	213.87	208.29	202.86	166.02	119.58	80.76	54.79
2011.00	212.45	206.76	202.83	167.27	121.11	82.16	55.92
2011.08	211.34	205.49	202.82	168.31	122.00	82.49	56.02
2011.17	210.40	204.50	202.74	169.09	122.40	81.96	55.07
2011.25	209.62	203.97	202.94	169.96	122.93	81.50	54.08
2011.33	208.84	203.60	203.33	170.77	123.34	81.07	53.01
2011.42	208.21	203.42	203.99	171.76	123.82	80.77	52.15
2011.50	207.62	203.14	204.51	171.99	122.96	79.44	51.21
2011.58	207.37	202.96	204.94	171.93	121.58	77.45	49.78
2011.67	207.66	203.30	205.22	171.19	119.58	74.92	47.45
2011.75	208.04	203.98	205.52	170.35	117.55	72.42	45.38
2011.83	208.68	205.06	205.66	169.31	115.92	70.91	44.46
2011.92	209.36	206.25	205.50	167.81	114.27	69.58	43.41
2012.00	209.93	207.37	205.28	166.29	112.81	68.63	42.69
2012.08	210.34	208.31	205.17	165.17	111.87	68.31	42.71
2012.17	210.83	209.02	205.12	164.37	111.30	68.41	43.19
2012.25	211.43	209.47	204.88	163.58	110.88	68.71	43.82
2012.33	212.29	209.99	204.46	162.61	110.34	68.90	44.37
2012.42	213.25	210.57	203.96	161.18	108.93	68.20	44.40
2012.50	214.21	210.88	203.02	159.65	107.53	67.15	43.75
2012.58	215.17	211.05	201.71	158.41	107.61	67.74	43.79
2012.67	216.04	210.78	199.67	156.72	108.02	69.32	45.00
2012.75	217.03	210.42	197.30	154.31	107.81	70.97	46.66
2012.83	217.82	210.05	195.24	151.70	106.70	71.91	48.22
2012.92	218.78	209.95	193.86	149.65	105.31	72.12	49.44
2013.00	219.58	209.91	193.02	148.29	104.10	71.85	49.98
2013.08	220.18	209.84	192.43	147.77	103.99	71.89	49.79
2013.17	220.45	209.59	191.84	147.84	105.03	72.96	49.93
2013.25	220.50	209.25	191.40	148.43	107.02	75.17	51.00
2013.33	220.23	208.63	190.87	149.20	109.44	77.97	52.69
2013.42	219.90	207.89	190.24	150.08	112.19	81.07	54.61
2013.50	219.27	207.20	189.76	150.61	113.99	83.22	56.15
2013.58	218.27	206.74	190.01	150.92	113.64	82.38	55.43
2013.67	217.09	206.48	191.17	152.24	113.80	81.52	54.29
2013.75	215.91	206.13	192.68	154.48	115.16	81.66	53.74
2013.83	214.82	205.77	194.07	157.14	117.50	82.64	53.61
2013.92	213.56	205.13	194.94	159.64	120.26	84.06	53.67
2014.00	212.47	204.62	195.65	161.83	122.83	85.53	53.93
2014.08	211.55	204.45	196.57	163.53	124.22	86.19	54.37
2014.17	210.71	204.41	197.68	164.99	124.68	85.74	54.22
2014.25	210.12	204.63	198.83	166.22	124.57	84.38	53.15
2014.33	209.70	205.23	200.31	167.54	124.37	82.79	51.65
2014.42	209.28	206.01	202.02	168.81	124.20	81.55	50.43
2014.50	209.11	206.95	203.92	170.29	124.62	81.55	50.76
2014.58	209.33	207.80	205.20	171.04	124.84	82.19	52.25
2014.67	209.60	208.81	206.21	170.94	123.98	81.99	53.32
2014.75	209.87	209.90	206.91	170.02	121.83	80.28	52.97
2014.83	210.42	211.08	207.65	169.07	119.29	77.89	52.03
2014.92	211.14	212.17	208.35	168.24	116.93	75.45	50.68
2015.00	211.90	212.69	208.30	167.52	115.78	74.17	49.66
2015.08	212.62	212.63	207.22	166.55	115.77	74.32	49.17
2015.17	213.22	212.31	205.42	164.76	115.61	75.07	49.20
2015.25	213.43	211.79	203.36	162.35	114.93	76.07	50.04
2015.33	213.44	211.24	201.28	159.66	113.72	76.84	51.31
2015.42	213.19	210.60	199.42	157.39	112.47	77.07	52.19
2015.50	212.77	210.01	198.27	156.33	111.82	76.46	51.34
2015.58	212.00	209.17	197.60	156.52	112.29	75.92	49.52
2015.67	211.49	208.13	197.04	157.76	114.55	77.00	48.51
2015.75	211.43	207.01	196.42	159.62	118.28	79.99	49.27
2015.83	211.30	205.66	195.19	160.92	121.94	83.19	50.37
2015.92	211.11	204.38	193.75	161.57	124.88	86.23	51.90
2016.00	210.77	203.47	192.81	161.80	126.56	88.26	53.34
2016.08	210.40	202.95	192.59	161.81	126.84	88.98	54.37
2016.17	210.05	202.66	192.96	162.15	126.87	89.31	55.24
2016.25	209.80	202.26	193.47	162.92	127.18	89.44	55.69
2016.33	209.77	201.69	193.67	163.64	127.58	89.36	55.52
2016.42	210.09	201.16	193.63	164.18	128.20	89.73	55.67
2016.50	210.45	200.80	193.25	164.05	128.59	90.44	56.24
2016.58	210.66	200.70	192.88	163.65	128.71	91.15	57.11
2016.67	210.76	200.87	192.77	163.24	128.51	91.51	57.94
2016.75	210.36	201.18	192.96	162.75	127.82	91.26	58.39
2016.83	209.51	201.38	193.68	162.73	127.31	91.35	59.17
2016.92	208.51	201.51	194.71	163.20	127.16	91.48	59.68

2017.00	207.56	201.72	195.87	164.04	127.28	91.47	59.80
2017.08	206.87	202.08	197.16	165.46	128.02	91.52	59.64
2017.17	206.44	202.57	198.47	167.18	129.27	91.70	59.26
2017.25	206.12	203.32	199.88	169.03	130.66	91.79	58.53
2017.33	205.74	204.36	201.68	171.02	131.88	91.67	57.74
2017.42	205.23	205.54	203.68	172.74	132.55	91.29	56.99
2017.50	204.74	206.61	205.56	173.83	132.35	90.60	56.62
2017.58	204.33	207.62	207.24	174.23	131.14	89.44	56.63
2017.67	204.17	208.35	208.53	174.24	129.31	87.50	56.10
2017.75	204.16	208.95	209.63	174.10	127.04	84.57	54.30
2017.83	204.40	209.84	210.69	173.77	124.50	81.02	51.65
2017.92	204.90	210.91	211.63	173.49	122.47	78.09	49.31
2018.00	205.51	212.01	212.29	172.72	120.46	75.91	47.77
2018.08	205.85	212.88	212.51	171.16	117.99	74.08	46.84
2018.17	206.22	213.74	212.56	169.16	115.09	72.13	46.13
2018.25	206.79	214.65	212.70	167.19	112.07	70.21	45.78
2018.33	207.40	215.10	212.46	165.31	109.37	68.49	45.55
2018.42	207.96	214.96	211.84	163.95	107.45	66.94	44.97
2018.50	208.72	214.55	211.14	163.77	107.78	67.39	45.26
2018.58	209.66	214.10	210.12	163.97	109.96	70.17	47.12
2018.67	210.14	213.33	208.32	163.46	112.01	73.08	49.09
2018.75	210.34	212.39	206.26	162.55	113.85	76.41	51.84
2018.83	210.53	211.33	204.32	161.95	116.21	80.49	55.16
2018.92	210.63	210.21	202.60	161.65	118.37	83.99	58.10
2019.00	210.79	209.32	201.42	161.89	120.29	86.45	60.10
2019.08	210.89	208.68	200.97	162.81	122.16	88.08	61.13
2019.17	210.75	208.23	201.22	164.38	124.04	89.06	61.23
2019.25	210.68	207.84	201.90	166.79	126.76	90.38	61.13
2019.33	210.56	207.68	202.79	169.52	129.84	91.90	61.07
2019.42	210.56	207.92	203.56	171.46	132.19	93.41	61.51
2019.50	210.22	208.38	204.23	172.30	132.94	93.80	61.78
2019.58	209.48	208.83	205.22	173.01	132.47	92.28	60.46
2019.67	208.58	209.61	207.03	174.27	132.21	90.81	58.71
2019.75	207.74	210.34	209.14	176.05	132.37	89.33	56.55
2019.83	207.15	210.94	211.24	178.01	132.32	87.43	54.34
2019.92	206.84	211.45	213.01	179.48	132.04	85.85	52.68
2020.00	206.55	211.77	214.30	180.28	131.53	84.81	51.91
2020.08	206.24	211.82	214.80	180.21	130.82	84.34	51.93
2020.17	205.92	211.69	214.79	179.62	130.11	84.56	52.83
2020.25	205.38	211.25	214.16	178.24	128.58	84.15	53.57
2020.33	204.91	210.72	213.30	176.62	126.77	83.33	53.90
2020.42	204.24	210.05	212.51	175.53	125.56	82.47	53.64
2020.50	203.76	209.58	212.07	174.96	124.71	81.45	52.62
2020.58	203.65	209.33	212.21	175.31	124.88	81.30	51.93
2020.67	203.52	208.97	212.44	175.87	125.02	80.90	51.23
2020.75	203.39	208.67	212.42	176.00	124.79	80.17	50.35
2020.83	202.93	208.38	212.21	175.81	124.62	79.78	49.82
2020.92	202.28	208.21	212.20	175.77	124.58	79.68	49.61
2021.00	201.42	207.95	212.31	175.94	124.64	79.44	49.12
2021.08	200.92	208.05	212.65	176.32	124.63	78.78	48.26
2021.17	200.61	208.18	212.88	176.50	124.20	77.57	47.08
2021.25	200.34	208.62	213.24	176.34	123.39	76.18	45.78
2021.33	200.06	209.29	213.79	176.13	122.69	75.16	44.69
2021.42	200.06	210.14	214.50	176.11	122.41	74.84	44.18
2021.50	200.08	210.68	214.73	175.64	122.18	75.40	45.07

Table S4.

year	f-N2O 30N-58N	(ppb)					
no figure							
pressure	32 hPa	22 hPa	15 hPa	10 hPa	6.8 hPa	4.6 hPa	3.2 hPa
2005.08	140.94	131.71	112.79	76.69	48.41	31.91	21.18
2005.17	139.81	131.22	114.28	79.30	50.45	32.92	21.61
2005.25	138.73	130.53	115.31	81.54	52.64	34.44	22.54
2005.33	138.25	130.05	115.93	83.31	54.69	35.96	23.34
2005.42	137.58	129.74	116.79	84.94	55.74	35.96	22.92
2005.50	136.92	129.71	116.92	84.01	53.76	34.26	22.33
2005.58	136.98	129.55	115.38	81.18	51.27	33.35	22.67
2005.67	138.18	129.58	113.49	78.25	48.99	32.61	23.06
2005.75	140.82	130.87	112.42	75.52	46.50	31.38	22.85
2005.83	143.67	132.51	111.72	73.26	44.46	30.32	22.46
2005.92	146.07	133.86	111.04	71.13	42.51	29.33	22.16
2006.00	148.42	135.52	110.92	69.52	40.74	28.33	21.85
2006.08	150.55	137.31	111.16	68.24	39.01	27.14	21.33
2006.17	152.56	139.31	111.85	67.42	37.46	25.78	20.51
2006.25	154.56	141.32	112.68	66.96	36.18	24.36	19.40
2006.33	156.25	143.21	113.66	66.58	34.86	22.93	18.40
2006.42	158.26	145.21	114.42	65.96	34.01	22.69	18.55
2006.50	159.62	145.78	114.77	67.27	36.14	24.36	19.09
2006.58	159.73	145.99	116.50	70.19	38.46	24.99	18.49
2006.67	158.30	145.87	118.56	73.13	40.57	25.60	18.11
2006.75	156.11	144.99	119.74	75.57	42.70	26.65	18.29
2006.83	153.77	143.92	120.99	78.08	44.63	27.53	18.62
2006.92	151.26	142.62	121.91	80.32	46.51	28.39	18.86
2007.00	149.05	141.39	122.44	82.04	48.17	29.24	19.08
2007.08	146.90	139.92	122.64	83.51	49.80	30.30	19.54
2007.17	144.93	138.25	122.27	84.38	51.17	31.48	20.27
2007.25	143.04	136.61	121.77	84.89	52.25	32.65	21.18
2007.33	141.47	135.21	121.23	85.29	53.24	33.70	22.01
2007.42	139.72	133.93	120.85	85.66	53.75	33.85	21.89
2007.50	138.91	134.23	121.50	85.49	52.69	32.79	21.42
2007.58	139.85	135.28	120.76	83.53	51.23	32.55	21.89
2007.67	141.34	135.21	118.46	80.82	49.70	32.44	22.56
2007.75	142.50	134.54	115.89	78.04	48.07	32.10	22.97
2007.83	143.55	134.12	113.35	75.08	46.36	31.66	22.99
2007.92	145.20	134.39	111.31	72.32	44.62	31.15	22.97
2008.00	146.57	134.68	109.73	69.93	42.90	30.51	22.91
2008.08	147.93	135.29	108.52	67.66	41.02	29.56	22.58
2008.17	149.25	136.12	107.82	65.80	39.15	28.33	21.93
2008.25	150.50	136.97	107.41	64.38	37.45	26.89	20.90
2008.33	151.55	137.80	107.36	63.32	35.87	25.41	19.84
2008.42	152.41	138.28	106.98	62.30	35.04	25.19	19.98
2008.50	152.44	137.38	105.63	61.74	35.69	26.19	20.48
2008.58	150.73	135.32	105.63	63.91	38.00	27.15	20.31
2008.67	147.93	134.17	107.78	67.50	40.50	27.67	19.55
2008.75	146.18	134.52	111.33	71.59	42.54	27.41	18.31
2008.83	144.76	135.05	114.93	75.63	44.53	27.42	17.72
2008.92	143.27	135.01	117.83	79.36	46.65	27.81	17.52
2009.00	141.82	134.42	119.91	82.71	48.94	28.51	17.48
2009.08	140.47	133.44	121.07	85.41	51.28	29.62	17.74

2009.17	139.20	132.29	121.54	87.43	53.48	31.02	18.33
2009.25	138.11	131.17	121.57	88.78	55.37	32.64	19.41
2009.33	137.22	130.12	121.22	89.62	57.03	34.35	20.64
2009.42	136.28	128.80	120.60	90.07	57.75	34.59	20.47
2009.50	135.10	128.26	121.34	90.59	56.69	32.84	19.37
2009.58	134.75	128.82	121.78	89.37	54.44	31.32	19.13
2009.67	135.41	130.12	122.28	88.57	53.05	30.60	19.47
2009.75	136.47	131.24	122.52	88.19	52.52	30.47	19.89
2009.83	137.53	132.09	122.54	87.96	52.30	30.39	20.01
2009.92	138.54	133.15	122.82	87.98	52.34	30.36	19.92
2010.00	139.34	134.46	123.38	88.13	52.49	30.51	19.97
2010.08	140.00	135.82	124.28	88.51	52.74	30.76	20.16
2010.17	140.57	137.26	125.46	89.12	53.09	31.11	20.51
2010.25	141.06	138.74	126.86	89.92	53.46	31.34	20.71
2010.33	141.56	140.17	128.31	90.58	53.32	30.93	20.46
2010.42	142.51	141.89	129.48	90.42	52.54	30.56	20.75
2010.50	143.33	141.56	127.30	88.49	52.67	32.06	22.14
2010.58	142.56	138.89	124.44	87.66	53.79	33.58	23.03
2010.67	140.85	135.37	121.40	86.61	54.66	35.08	24.18
2010.75	138.00	131.32	117.93	85.04	55.10	36.50	25.62
2010.83	134.17	127.18	115.31	84.31	55.72	37.44	26.29
2010.92	130.75	123.28	112.76	83.40	55.97	38.10	26.85
2011.00	127.93	119.62	109.97	81.95	55.58	38.22	27.10
2011.08	125.58	116.14	107.04	80.25	54.88	37.98	27.01
2011.17	123.48	112.81	104.01	78.33	53.94	37.55	26.74
2011.25	121.31	109.55	100.99	76.32	52.87	37.02	26.47
2011.33	119.31	106.49	97.94	74.40	52.28	37.11	26.57
2011.42	117.54	103.99	95.92	74.17	53.43	38.28	26.94
2011.50	116.27	103.14	96.83	76.08	54.67	38.37	26.45
2011.58	115.87	104.93	99.55	77.46	54.27	37.27	25.52
2011.67	116.69	108.02	102.33	78.01	53.08	35.60	23.98
2011.75	118.00	110.77	104.39	78.43	52.26	34.23	22.52
2011.83	119.91	113.39	105.60	77.98	51.17	33.28	21.80
2011.92	121.46	115.75	106.77	77.61	50.22	32.48	21.23
2012.00	122.46	117.71	108.09	77.71	49.69	31.96	20.89
2012.08	123.13	119.51	109.60	78.18	49.48	31.68	20.76
2012.17	123.72	121.05	111.10	78.91	49.53	31.47	20.60
2012.25	124.33	122.28	112.47	79.84	49.92	31.50	20.46
2012.33	124.64	123.39	114.06	81.14	50.45	31.42	20.28
2012.42	124.94	124.92	116.32	82.58	50.44	30.64	19.62
2012.50	126.02	127.04	117.76	82.39	49.35	29.70	19.20
2012.58	128.26	127.90	116.26	80.20	48.17	29.52	19.32
2012.67	130.89	127.52	113.23	77.57	47.25	29.48	19.34
2012.75	133.27	126.61	110.08	75.18	46.88	30.43	20.51
2012.83	135.88	125.93	107.23	73.08	46.49	31.04	21.36
2012.92	138.34	125.39	104.42	70.65	45.52	31.03	21.70
2013.00	140.93	125.57	102.18	68.32	44.44	30.89	21.85
2013.08	143.52	126.29	100.62	66.21	43.14	30.44	21.76
2013.17	145.84	127.41	99.77	64.48	41.75	29.73	21.45
2013.25	148.09	128.75	99.46	63.18	40.37	28.72	20.83
2013.33	150.04	129.92	99.29	61.99	38.97	27.73	20.35
2013.42	151.30	130.27	98.42	60.53	37.92	27.60	20.84
2013.50	151.92	130.44	98.50	61.12	39.17	28.97	21.80
2013.58	151.38	130.41	100.14	64.09	41.95	30.52	22.25

2013.67	149.48	130.51	103.26	68.06	44.58	31.61	22.57
2013.75	147.38	131.42	107.06	71.50	45.83	31.28	21.83
2013.83	144.96	131.88	110.03	74.05	46.80	31.37	21.68
2013.92	142.37	131.97	112.71	76.75	48.17	31.77	21.71
2014.00	139.87	131.66	114.93	79.35	49.63	32.17	21.68
2014.08	137.38	130.94	116.52	81.69	51.25	32.80	21.80
2014.17	135.06	129.92	117.45	83.54	52.77	33.60	22.13
2014.25	132.90	128.87	117.91	84.73	53.92	34.45	22.70
2014.33	131.15	127.98	117.97	85.45	54.94	35.36	23.26
2014.42	129.67	126.94	117.64	85.98	55.78	35.61	22.79
2014.50	128.10	125.69	117.17	85.67	54.69	33.98	21.56
2014.58	126.95	125.78	117.71	84.84	52.65	32.45	21.39
2014.67	127.29	126.88	117.72	82.94	50.37	31.56	21.97
2014.75	128.14	128.13	118.07	82.12	49.27	31.07	22.18
2014.83	128.37	129.03	118.96	82.44	48.78	30.26	21.67
2014.92	128.78	129.93	119.84	82.94	48.68	29.82	21.32
2015.00	129.25	130.88	120.70	83.42	48.74	29.68	21.21
2015.08	129.71	131.64	121.31	83.79	48.86	29.62	21.09
2015.17	130.10	132.19	121.68	84.03	49.03	29.61	20.95
2015.25	130.49	132.84	122.14	84.42	49.35	29.71	20.86
2015.33	130.90	133.59	122.88	84.97	49.55	29.59	20.65
2015.42	131.59	134.66	123.80	85.13	49.23	29.61	21.19
2015.50	132.11	134.96	123.38	84.75	49.99	31.24	22.64
2015.58	132.18	134.12	122.38	85.27	51.85	32.76	22.89
2015.67	130.74	132.11	121.82	87.05	54.34	33.96	22.44
2015.75	128.13	129.38	120.64	87.70	55.80	34.87	22.31
2015.83	126.52	127.97	120.08	88.24	57.07	35.91	22.55
2015.92	125.21	126.79	119.67	88.67	57.96	36.60	22.73
2016.00	124.03	125.45	119.07	88.88	58.61	37.20	22.99
2016.08	122.92	124.18	118.49	88.95	59.04	37.71	23.37
2016.17	122.05	123.18	118.08	89.06	59.48	38.32	23.94
2016.25	121.27	122.25	117.60	88.93	59.62	38.72	24.49
2016.33	120.58	121.46	117.15	88.75	59.64	38.97	24.83
2016.42	119.87	120.24	115.96	87.90	59.29	38.94	24.75
2016.50	118.71	119.22	115.62	88.10	59.60	38.92	24.37
2016.58	117.63	118.53	115.44	87.96	59.38	38.79	24.45
2016.67	116.86	117.89	114.98	87.71	59.22	38.67	24.50
2016.75	116.67	117.50	114.40	87.32	59.02	38.56	24.57
2016.83	116.42	116.76	113.38	86.39	58.54	38.52	24.80
2016.92	116.02	116.01	112.48	85.66	58.22	38.58	25.01
2017.00	115.46	115.33	111.61	84.88	57.80	38.48	25.05
2017.08	114.80	114.66	110.86	84.20	57.34	38.32	25.07
2017.17	114.10	113.99	110.21	83.61	56.85	37.99	24.91
2017.25	113.19	113.16	109.56	83.17	56.50	37.71	24.73
2017.33	112.00	112.13	108.76	82.74	56.48	37.94	24.97
2017.42	110.91	111.49	108.74	83.56	57.72	38.79	25.16
2017.50	110.29	111.35	109.40	84.56	58.22	38.64	24.79
2017.58	110.28	112.76	111.50	85.76	57.91	37.78	24.35
2017.67	111.16	115.07	113.60	86.06	56.83	36.90	24.37
2017.75	112.85	118.72	117.11	87.49	56.35	36.01	24.01
2017.83	114.57	122.04	120.30	89.05	56.15	35.13	23.34
2017.92	116.33	125.26	123.16	90.43	56.13	34.57	22.90
2018.00	117.88	128.20	125.97	92.04	56.48	34.30	22.61
2018.08	119.16	130.90	128.66	93.75	57.13	34.28	22.43

2018.17	120.35	133.48	131.33	95.62	58.17	34.71	22.50
2018.25	121.76	135.96	133.87	97.51	59.36	35.35	22.74
2018.33	123.46	138.52	136.57	99.58	60.50	35.63	22.57
2018.42	125.55	141.47	139.08	100.48	59.89	34.64	22.08
2018.50	127.94	143.32	138.97	98.48	57.55	33.37	21.95
2018.58	129.77	141.78	134.74	94.13	55.34	33.14	22.28
2018.67	130.84	138.26	129.41	91.08	55.54	34.47	23.07
2018.75	130.64	133.30	123.82	88.90	56.50	36.21	24.42
2018.83	129.90	127.93	118.08	86.42	57.19	38.12	26.23
2018.92	128.98	122.66	112.12	83.33	57.15	39.50	27.70
2019.00	128.64	118.45	106.63	79.81	56.38	40.30	28.85
2019.08	128.93	115.17	101.71	76.18	55.09	40.52	29.50
2019.17	129.37	112.51	97.16	72.21	53.00	39.97	29.63
2019.25	129.66	110.37	93.52	68.75	50.73	38.91	29.32
2019.33	129.52	108.34	90.26	65.53	48.52	37.91	29.14
2019.42	128.57	106.25	87.94	64.16	48.58	38.74	29.80
2019.50	126.72	104.70	87.82	65.54	50.16	39.41	29.78
2019.58	125.29	105.70	90.98	69.00	51.98	39.65	29.77
2019.67	124.26	108.51	95.22	71.23	51.78	38.75	29.34
2019.75	123.96	111.66	98.68	72.59	51.96	38.75	29.02
2019.83	123.67	114.77	102.55	75.04	53.22	39.38	28.90
2019.92	123.34	117.80	106.51	77.64	54.47	39.82	28.74
2020.00	122.62	120.25	110.16	80.23	55.75	40.29	28.66
2020.08	121.51	122.16	113.54	82.81	57.03	40.79	28.77
2020.17	120.23	123.58	116.66	85.51	58.52	41.45	29.04
2020.25	119.01	124.61	119.05	87.74	60.01	42.29	29.48
2020.33	118.03	125.41	120.89	89.50	61.23	43.00	29.78
2020.42	117.77	126.34	122.07	89.99	60.94	42.41	29.38
2020.50	118.26	127.40	122.63	89.58	60.30	42.27	29.51
2020.58	117.82	126.46	121.26	88.67	60.32	42.54	29.28
2020.67	117.47	126.14	121.11	88.82	60.54	42.38	28.56
2020.75	117.03	126.13	121.80	89.41	60.13	41.16	27.34
2020.83	117.00	126.72	122.50	89.23	58.87	39.54	26.23
2020.92	116.94	127.21	123.26	89.20	57.87	38.40	25.58
2021.00	116.51	127.22	123.82	89.53	57.40	37.62	25.10
2021.08	116.19	127.01	124.01	89.77	57.20	37.08	24.66
2021.17	116.01	126.72	123.97	90.01	57.31	36.87	24.33
2021.25	115.70	126.29	123.75	90.13	57.52	36.96	24.29
2021.33	115.50	125.75	123.29	90.15	57.89	37.18	24.19
2021.42	114.76	124.68	123.01	90.89	58.52	37.06	23.71
2021.50	114.02	124.22	123.38	91.10	57.82	36.04	23.12

Table S5.

year	f-N2O 30S-58S	(ppb)					
no figure							
pressure	32 hPa	22 hPa	15 hPa	10 hPa	6.8 hPa	4.6 hPa	3.2 hPa
2005.08	131.23	109.32	99.84	79.50	56.59	38.02	24.24
2005.17	129.96	109.84	101.95	80.84	55.99	36.77	23.77
2005.25	129.54	111.23	104.00	81.56	54.90	35.20	23.02
2005.33	129.41	112.64	105.96	82.80	54.58	33.81	21.79
2005.42	129.09	113.96	108.14	84.52	54.98	33.08	20.85
2005.50	128.90	115.31	110.41	86.41	55.83	33.03	20.44
2005.58	128.54	116.36	112.57	88.47	57.08	33.53	20.50
2005.67	128.16	117.30	114.48	90.38	58.38	34.24	20.84
2005.75	127.93	118.21	116.24	92.22	59.71	35.04	21.31
2005.83	127.90	119.54	118.46	94.40	61.24	35.87	21.66
2005.92	128.73	121.43	120.88	95.99	61.36	35.14	20.99
2006.00	130.54	123.72	122.53	95.78	59.65	33.37	19.88
2006.08	133.34	125.64	122.50	94.26	58.22	32.65	19.50
2006.17	135.88	125.92	120.80	92.88	58.30	33.11	19.34
2006.25	137.44	125.12	118.75	91.83	58.71	33.62	19.02
2006.33	138.61	123.80	116.29	90.37	58.95	34.55	19.41
2006.42	139.72	122.87	114.07	88.63	58.86	35.57	20.29
2006.50	140.40	121.82	111.87	86.68	58.20	35.96	20.87
2006.58	141.31	121.12	109.85	84.51	56.92	35.68	21.08
2006.67	142.10	120.63	108.23	82.55	55.54	35.05	20.89
2006.75	142.70	120.13	106.74	80.68	54.09	34.24	20.49
2006.83	143.34	119.38	104.91	78.65	52.53	33.32	20.05
2006.92	143.10	118.08	103.05	77.21	52.03	33.55	20.53
2007.00	141.97	116.71	102.37	77.69	53.28	34.90	21.59
2007.08	139.77	116.00	103.80	80.07	55.16	35.98	22.26
2007.17	137.87	116.79	106.61	81.96	55.11	35.44	22.34
2007.25	136.76	118.97	110.25	83.59	54.30	34.47	22.52
2007.33	136.44	122.03	114.48	85.39	53.06	32.61	21.91
2007.42	136.35	125.01	119.03	88.27	52.85	30.87	20.74
2007.50	136.30	127.57	123.21	91.53	53.63	29.95	19.72
2007.58	135.59	129.32	126.84	94.94	55.29	30.01	19.19
2007.67	135.14	130.98	130.09	98.22	57.40	30.86	19.34
2007.75	134.86	132.66	133.05	101.20	59.54	32.11	19.99
2007.83	134.72	134.33	135.88	103.97	61.58	33.37	20.71
2007.92	135.31	136.41	138.62	106.21	62.76	33.70	20.71
2008.00	136.69	138.29	140.04	106.52	62.30	33.16	20.44
2008.08	138.98	139.53	139.36	104.91	61.26	33.02	20.63
2008.17	141.11	139.75	137.91	103.98	61.88	34.17	21.09
2008.25	142.77	138.86	135.76	103.14	62.86	35.32	21.18
2008.33	143.48	136.77	132.52	101.62	63.71	36.72	21.59
2008.42	144.15	134.87	129.02	99.09	63.53	37.86	22.42
2008.50	145.01	133.77	126.21	96.49	62.62	38.31	23.10
2008.58	145.98	133.12	123.99	93.98	61.15	38.02	23.35
2008.67	146.79	132.49	122.16	91.74	59.42	37.12	23.06
2008.75	147.29	131.65	120.37	89.62	57.63	35.95	22.44
2008.83	147.69	130.88	118.71	87.67	56.02	34.97	21.99
2008.92	147.34	129.53	116.79	86.21	55.65	35.36	22.43
2009.00	146.10	127.59	115.12	85.99	56.82	36.79	23.27
2009.08	144.16	125.62	114.44	87.19	58.83	38.14	23.60
2009.17	142.50	125.12	115.66	89.41	60.46	38.42	23.17

2009.25	141.09	126.24	118.88	92.37	61.49	37.93	22.57
2009.33	140.23	128.41	123.03	95.79	62.56	37.33	21.81
2009.42	138.97	129.96	126.83	99.56	64.55	37.51	21.28
2009.50	137.34	130.12	129.11	102.56	66.74	38.38	21.25
2009.58	136.19	130.25	130.77	104.92	68.69	39.42	21.55
2009.67	135.23	130.45	132.02	106.74	70.33	40.46	22.03
2009.75	134.72	130.85	133.17	108.25	71.70	41.43	22.61
2009.83	134.16	130.94	133.77	109.32	72.99	42.50	23.24
2009.92	133.97	131.21	134.55	110.56	74.04	42.90	23.18
2010.00	134.18	132.28	136.44	112.27	74.61	42.50	22.66
2010.08	135.17	134.71	139.01	113.01	73.39	40.93	21.87
2010.17	136.68	136.86	139.48	110.54	70.02	39.06	21.72
2010.25	138.64	138.15	138.14	106.98	67.00	38.13	22.15
2010.33	140.91	139.18	136.18	102.84	63.56	37.00	22.62
2010.42	143.55	140.89	135.26	99.40	59.82	34.99	22.37
2010.50	145.58	143.11	135.97	97.81	57.10	32.93	21.62
2010.58	146.80	144.74	136.88	97.21	55.51	31.39	20.74
2010.67	147.96	146.23	137.87	97.17	54.78	30.57	20.15
2010.75	148.83	147.66	138.98	97.42	54.46	30.12	19.78
2010.83	149.93	148.99	140.27	98.16	54.56	30.03	19.82
2010.92	151.09	150.50	141.46	98.25	53.96	29.67	19.95
2011.00	152.44	151.70	141.63	97.49	53.31	29.78	20.55
2011.08	152.95	151.45	141.08	97.67	54.50	31.34	21.84
2011.17	152.60	150.47	141.09	99.50	56.91	32.93	22.42
2011.25	151.78	149.30	141.19	101.49	59.22	34.05	22.40
2011.33	150.73	148.26	142.00	104.66	62.77	35.93	22.59
2011.42	148.87	146.18	141.59	106.72	65.95	38.19	23.31
2011.50	147.94	144.59	140.56	107.32	67.80	39.98	24.21
2011.58	147.38	143.46	139.73	107.45	68.82	41.21	25.06
2011.67	146.59	142.23	138.89	107.25	69.15	41.78	25.58
2011.75	145.96	141.13	138.10	107.04	69.36	42.13	25.94
2011.83	145.28	140.30	137.28	106.39	69.05	42.01	25.81
2011.92	144.57	139.47	136.68	106.33	69.27	41.97	25.40
2012.00	143.95	138.94	136.75	106.93	69.61	41.55	24.51
2012.08	143.67	139.25	137.17	106.56	68.31	39.95	23.21
2012.17	143.76	139.71	136.91	105.02	66.34	38.62	22.75
2012.25	144.18	140.42	136.80	103.35	64.26	37.58	22.81
2012.33	144.55	141.42	136.78	101.27	61.52	36.06	22.62
2012.42	144.73	142.74	137.29	99.67	58.83	34.12	21.99
2012.50	144.44	143.93	138.31	99.03	56.94	32.42	21.21
2012.58	144.82	145.11	139.55	99.44	56.19	31.25	20.40
2012.67	145.25	146.04	140.42	99.88	55.88	30.53	19.80
2012.75	145.70	146.72	141.12	100.43	55.93	30.18	19.33
2012.83	145.93	147.21	141.93	101.29	56.30	30.01	19.01
2012.92	146.30	147.69	142.54	101.65	56.06	29.50	18.73
2013.00	146.81	148.04	142.36	100.63	54.58	28.37	18.24
2013.08	147.17	147.20	140.12	98.06	53.12	28.14	18.40
2013.17	147.04	144.82	136.48	95.92	53.43	29.45	19.21
2013.25	145.95	141.07	132.45	94.77	55.04	31.56	20.40
2013.33	144.73	137.10	128.52	93.69	56.48	33.60	21.77
2013.42	144.19	133.32	124.26	91.94	57.21	35.08	22.82
2013.50	143.83	130.05	120.07	89.70	57.35	36.12	23.60
2013.58	143.83	127.71	116.20	86.64	56.35	36.46	24.17
2013.67	143.73	125.67	112.97	83.83	55.02	36.29	24.36

2013.75	143.36	123.80	110.20	81.28	53.51	35.71	24.20
2013.83	142.70	122.05	107.77	78.83	51.74	34.74	23.74
2013.92	141.52	120.26	105.44	76.67	50.81	35.05	24.40
2014.00	140.01	118.30	103.38	75.72	51.55	36.61	25.72
2014.08	138.05	116.59	103.16	77.29	53.47	37.73	26.22
2014.17	136.07	116.13	105.11	79.96	54.74	37.50	25.70
2014.25	134.46	116.91	107.90	82.56	55.60	36.80	24.74
2014.33	132.96	117.94	110.61	85.19	56.90	36.48	23.72
2014.42	131.55	118.94	113.36	88.12	58.92	37.20	23.52
2014.50	130.35	119.53	115.47	90.54	60.79	38.19	23.75
2014.58	128.51	119.35	116.92	92.52	62.50	39.30	24.24
2014.67	126.83	119.17	118.09	94.15	63.93	40.29	24.80
2014.75	125.50	119.10	119.03	95.48	65.21	41.27	25.44
2014.83	124.43	119.02	119.87	96.88	66.66	42.35	26.02
2014.92	123.66	119.34	121.41	98.68	67.53	42.10	25.37
2015.00	123.59	120.89	123.65	99.84	67.08	40.88	24.28
2015.08	125.05	123.25	125.07	99.50	66.01	40.06	23.76
2015.17	127.37	125.45	125.37	98.34	65.06	39.76	23.56
2015.25	130.49	127.33	124.46	96.06	63.59	39.56	23.60
2015.33	133.86	128.63	122.36	92.52	61.36	39.43	24.38
2015.42	137.01	130.33	120.98	89.21	58.62	38.49	24.75
2015.50	139.40	132.10	120.60	86.88	56.15	37.20	24.60
2015.58	141.56	133.63	120.64	85.33	54.06	35.71	23.98
2015.67	143.71	135.12	120.99	84.50	52.60	34.44	23.25
2015.75	145.52	136.38	121.52	84.09	51.52	33.39	22.53
2015.83	147.00	137.32	121.83	83.57	50.55	32.68	22.32
2015.92	148.26	137.87	121.55	83.15	50.92	33.87	23.56
2016.00	149.03	137.44	120.93	83.66	52.48	35.35	24.33
2016.08	148.63	136.27	120.48	84.56	53.82	36.15	24.55
2016.17	147.74	135.00	119.82	84.63	54.31	36.85	25.27
2016.25	146.55	133.85	119.59	84.91	54.83	37.71	26.29
2016.33	145.16	132.70	119.88	85.77	55.29	37.86	26.46
2016.42	143.68	131.23	119.60	86.35	55.78	37.96	26.35
2016.50	143.04	129.95	119.04	86.68	56.23	38.15	26.33
2016.58	142.94	129.37	118.67	86.89	56.67	38.42	26.42
2016.67	142.81	128.97	118.36	86.96	56.99	38.67	26.54
2016.75	142.62	128.58	117.88	86.79	57.08	38.75	26.56
2016.83	142.63	128.38	117.60	86.61	56.95	38.49	26.25
2016.92	142.65	127.95	117.05	85.74	55.50	36.92	25.22
2017.00	142.16	127.47	116.38	84.39	53.98	36.18	25.39
2017.08	141.12	126.68	115.76	83.59	53.36	36.09	25.64
2017.17	139.46	125.83	116.04	84.62	54.36	36.43	25.45
2017.25	137.61	125.59	117.36	86.62	55.91	36.87	25.08
2017.33	135.74	125.84	119.11	88.95	58.02	37.98	25.12
2017.42	134.10	125.96	120.61	90.98	59.85	39.01	25.30
2017.50	132.60	126.04	121.75	92.58	61.44	40.04	25.64
2017.58	130.85	125.72	122.53	93.80	62.73	41.03	26.14
2017.67	129.42	125.39	123.11	94.76	63.76	41.91	26.70
2017.75	128.07	124.97	123.55	95.62	64.77	42.84	27.39
2017.83	126.86	124.32	123.66	96.50	66.17	44.19	28.22
2017.92	125.54	123.86	124.44	98.53	68.49	45.62	28.49
2018.00	124.61	123.91	126.16	101.29	70.53	46.12	28.00
2018.08	124.63	125.35	128.95	103.95	71.85	46.41	27.99
2018.17	125.69	128.07	131.98	104.98	70.93	45.36	27.61

2018.25	127.18	130.75	133.80	103.93	68.10	43.06	26.71
2018.33	129.42	134.15	136.14	103.01	64.89	40.16	25.39
2018.42	130.94	136.81	138.71	103.16	62.66	37.75	24.18
2018.50	131.38	138.41	141.16	104.21	61.58	35.99	23.10
2018.58	131.77	139.81	143.60	105.99	61.68	35.04	22.17
2018.67	131.89	140.84	145.59	107.64	62.17	34.65	21.58
2018.75	132.31	142.09	147.52	109.22	62.91	34.74	21.33
2018.83	132.91	143.59	149.49	110.53	63.20	34.46	21.03
2018.92	133.77	145.14	150.82	110.57	62.42	33.97	21.27
2019.00	134.67	145.76	150.23	109.04	61.35	34.06	22.07
2019.08	135.44	145.77	149.09	107.83	61.06	34.35	22.33
2019.17	135.42	144.49	147.49	107.68	62.25	35.48	22.78
2019.25	134.49	142.74	146.98	109.77	65.45	37.58	23.39
2019.33	132.71	140.15	145.96	111.63	68.53	39.66	23.99
2019.42	131.11	137.53	144.00	112.32	71.07	41.73	24.68
2019.50	131.08	136.29	142.12	112.10	72.76	43.61	25.61
2019.58	131.35	135.49	140.13	110.93	73.26	44.82	26.49
2019.67	131.42	134.93	138.47	109.63	73.17	45.46	27.14
2019.75	131.20	134.07	136.91	108.32	72.62	45.46	27.42
2019.83	130.79	133.19	135.48	107.20	72.30	45.74	27.81
2019.92	130.39	132.43	134.50	106.91	72.93	46.46	27.88
2020.00	129.75	131.96	134.74	108.02	73.98	46.54	27.10
2020.08	129.60	131.98	135.24	108.47	73.68	45.74	26.44
2020.17	130.08	132.45	135.27	107.31	71.96	44.74	26.37
2020.25	130.89	132.99	134.83	105.40	69.78	43.85	26.70
2020.33	131.68	133.15	134.03	103.35	67.54	42.76	26.85
2020.42	133.26	134.42	134.58	102.42	65.82	41.66	26.82
2020.50	133.85	135.01	135.36	102.32	64.69	40.53	26.37
2020.58	133.20	134.57	135.85	102.68	64.19	39.68	25.89
2020.67	132.99	134.43	136.20	102.95	63.90	39.05	25.38
2020.75	132.81	134.41	136.51	103.16	63.70	38.61	24.98
2020.83	132.84	134.59	136.81	103.23	63.35	38.12	24.68
2020.92	132.94	134.77	136.87	102.81	62.63	37.70	24.73
2021.00	133.38	135.01	136.50	101.59	61.42	37.39	25.07
2021.08	133.08	134.29	135.51	100.94	61.55	38.01	25.55
2021.17	132.50	133.92	135.95	102.30	62.59	37.99	25.07
2021.25	132.16	133.89	137.03	104.40	63.86	37.57	24.01
2021.33	131.83	133.93	138.28	107.10	66.27	38.21	23.35
2021.42	131.15	133.71	139.05	109.30	68.82	39.66	23.46
2021.50	130.79	133.63	139.26	110.35	70.57	41.08	23.97

Table S6. Summary of linear trends fitted to time series of f-N2O (ppb)

```
tropics
      32 hPa   -3.4 ± 0.8 %/dec
      22 hPa   +0.8 ± 0.8 %/dec
      15 hPa   +3.7 ± 1.4 %/dec
      10 hPa   +5.5 ± 2.0 %/dec
     6.8 hPa   +8.6 ± 2.6 %/dec
     4.6 hPa  +12.0 ± 3.8 %/dec
     3.2 hPa  +12.6 ± 4.7 %/dec
NH
      32 hPa  -14.9 ± 3.0 %/dec
      22 hPa   -7.7 ± 3.2 %/dec
      15 hPa   +0.6 ± 4.0 %/dec
      10 hPa   +8.4 ± 4.9 %/dec
     6.8 hPa  +16.1 ± 4.9 %/dec
     4.6 hPa  +19.5 ± 4.6 %/dec
     3.2 hPa  +18.3 ± 5.0 %/dec
SH
      32 hPa   -3.1 ± 2.5 %/dec
      22 hPa   +4.0 ± 3.4 %/dec
      15 hPa   +7.9 ± 4.3 %/dec
      10 hPa   +7.2 ± 4.6 %/dec
     6.8 hPa   +7.2 ± 4.7 %/dec
     4.6 hPa  +11.1 ± 4.7 %/dec
     3.2 hPa  +14.5 ± 3.7 %/dec
```
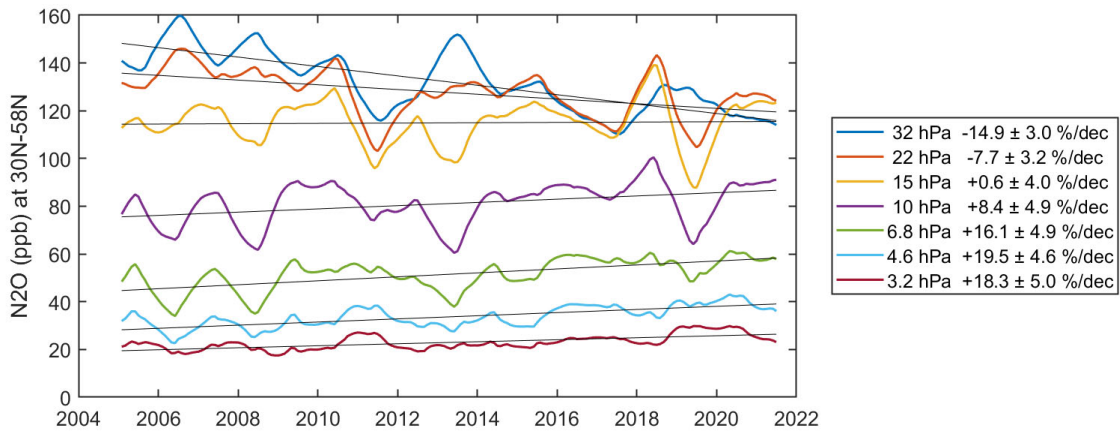
Figure S1a. Time series of stratospheric f-N$_2$O (ppb) at northern mid-latitudes (30N-58N). See main text Fig. 1
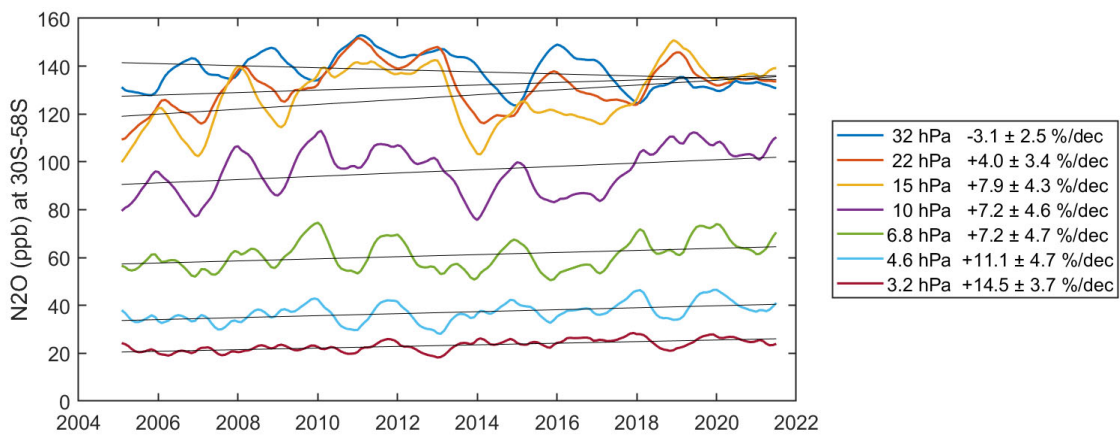
Figure S1b. Time series of stratospheric f-N$_2$O (ppb) at northern mid-latitudes (30S-58S)