

Comparisons with Stratospheric Aerosol and Gas Experiment-III (SAGE III-ISS) Ozone Profiles and Umkehr

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OCTOBER 20, 2020, SAGE III/ISS ST MEETING

Data

SAGE III (v5.1)

- SAGE II (1985-2005), SAGE III (2017.06-2020.06)
- Matched time +/- 24 hrs
- Latitude +/- 2 degree ~200 km
- Longitude +/- 20 degree ~2000 km
- Binary conversion using IDL program for SAGE II
- HDF conversion by Allen program for SAGE III
- Individual profile applied Aks
- <https://asdc.larc.nasa.gov/project/SAGE%20III-ISS>

Aura MLS (MLS) V4

- Station overpass data from AVDC archive

https://avdc.gsfc.nasa.gov/pub/data/satellite/Aura/MLS/V04/L2GPOVP_Prof/O3

UMKEHR (UMK)

- UMK applied Stray light correction and Optimized
- Umkehr 61 layers pressure interpolation

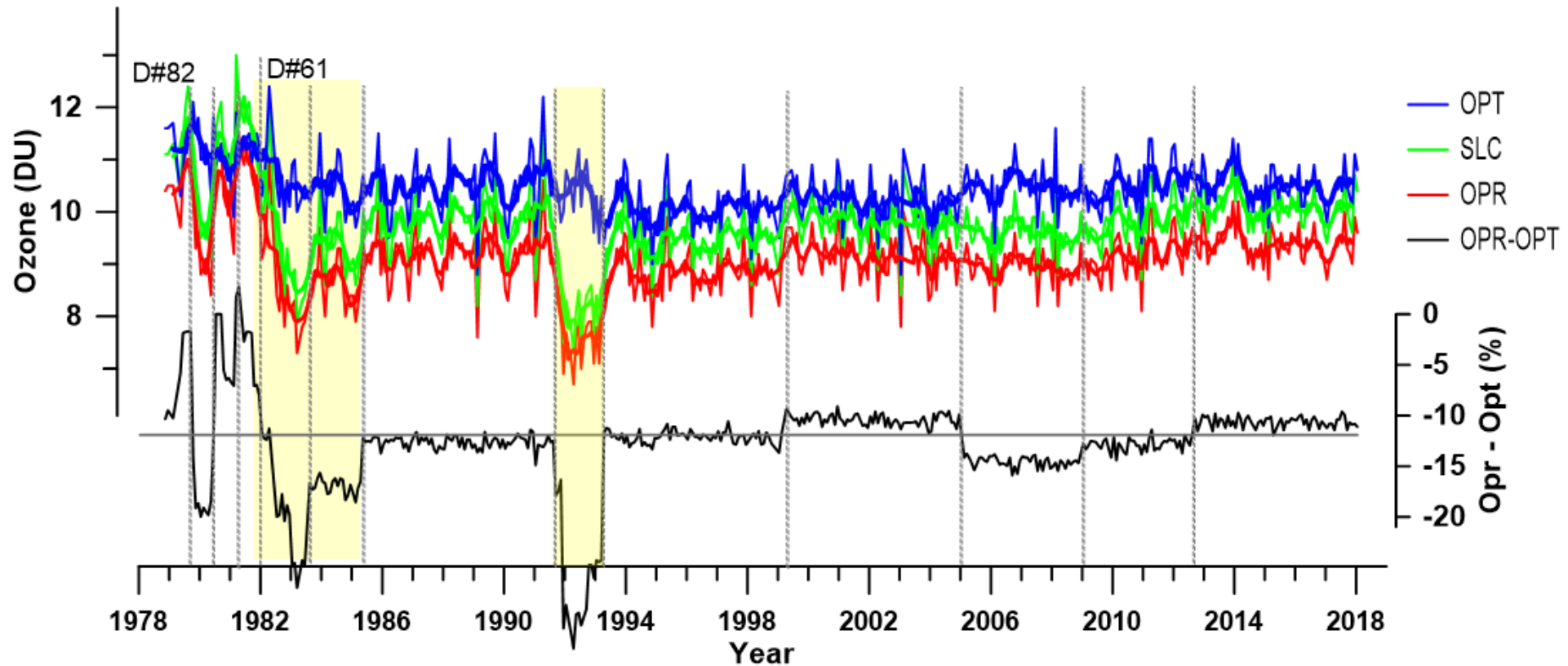
Ozonesonde (SND)

- NOAA GML processing
- With Umkehr AK smoothing

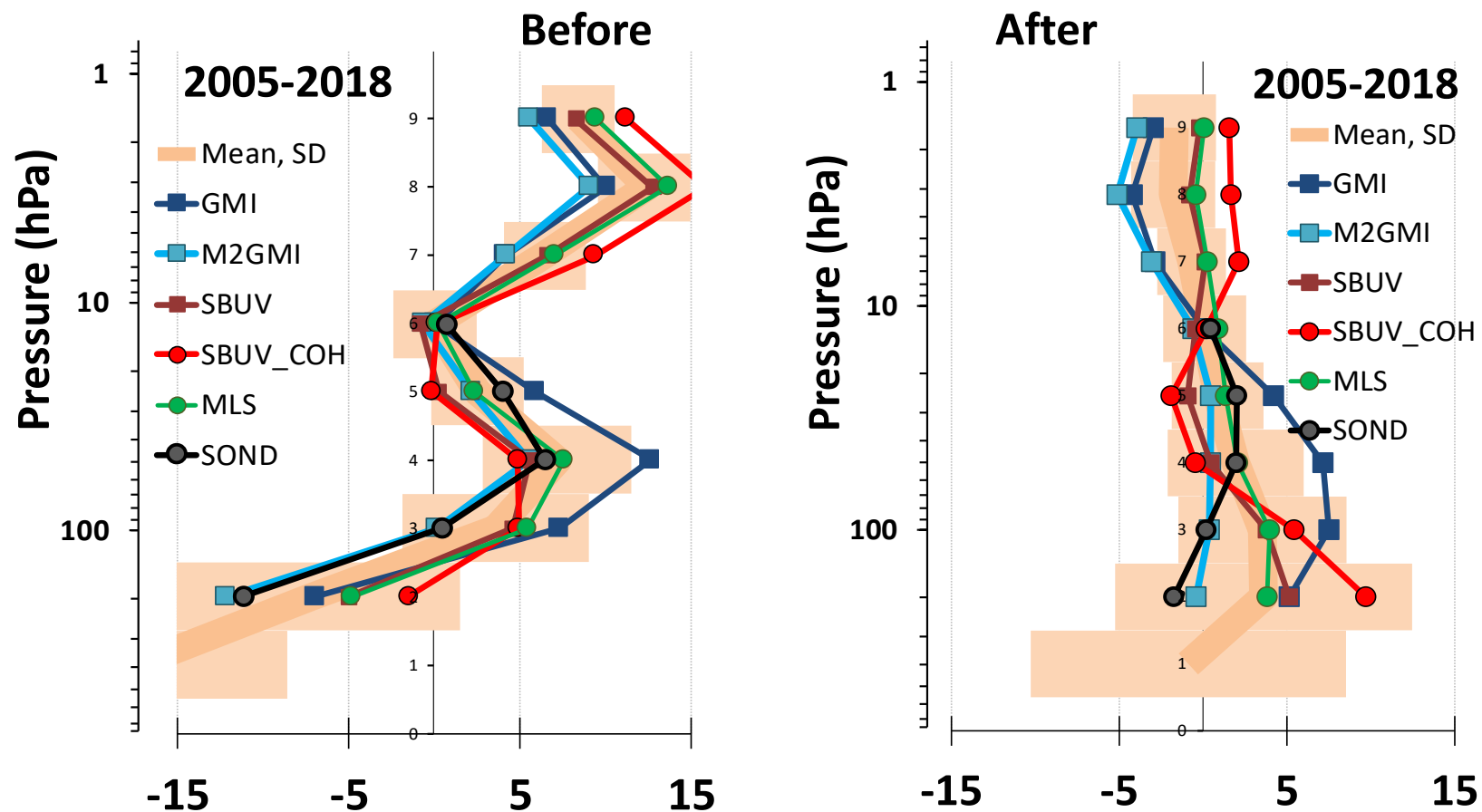
GMI model (GMI)

- NDACC station dataset – hourly ozone, temperature, PV etc.

Umkehr O3 optimization and homogenization (SAGE III/ISS and AC4)

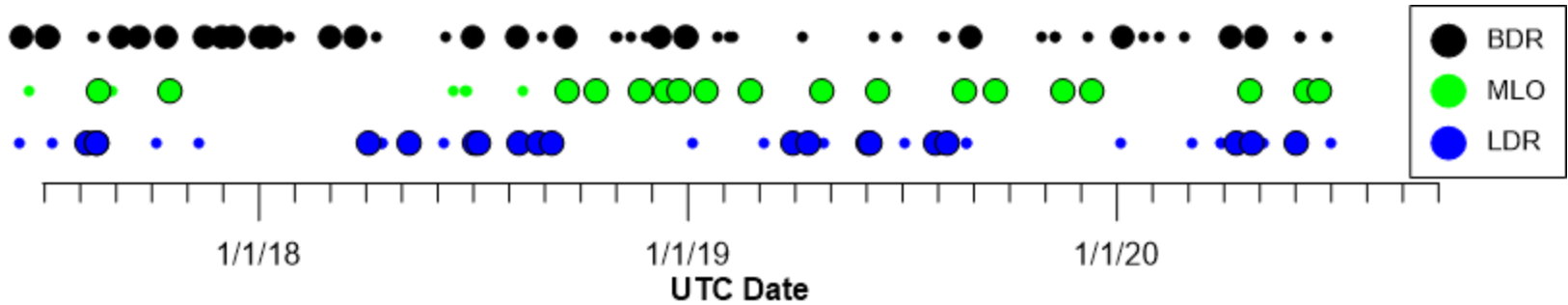


Verificaton of Umkehr optimization (Boulder)

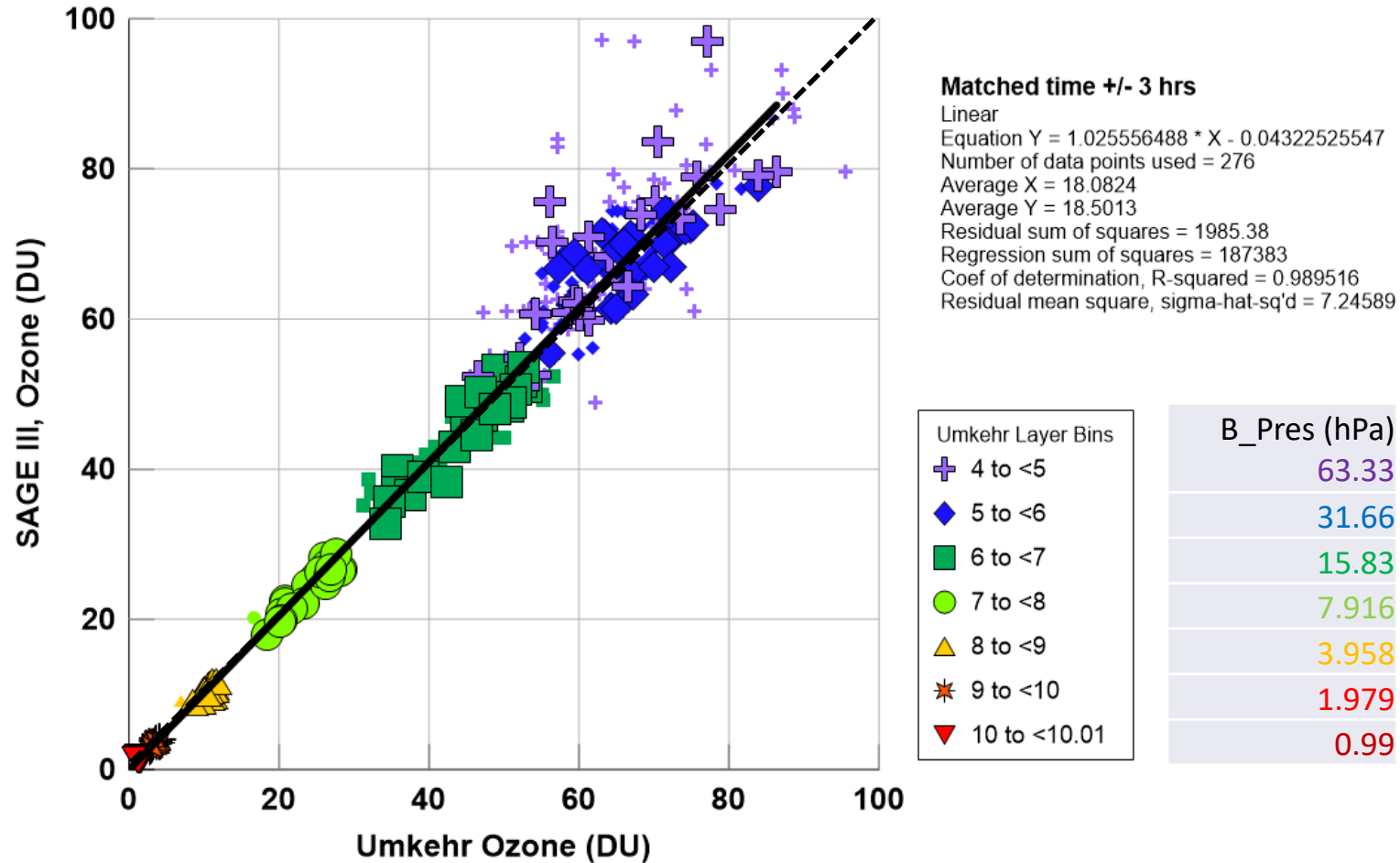


SAGE III/ISS and Umkehr, matched date +/- 3 hrs

utc_umk	utc_sageIII	d_hrs	sage_lat	sage_lon	stn	utc_umk	utc_sageIII	d_hrs	sage_lat	sage_lon	stn	utc_umk	utc_sageIII	d_hrs	sage_lat	sage_lon	stn
06/13/2017 01:28	06/13/2017 01:46	0	41.22	-94.65	BDR	08/17/2017 04:02	08/17/2017 03:36	-1	21.5	-137.7	MLO	07/09/2017 03:39	07/09/2017 04:55	1	-44.0	174.1	LDR
07/04/2017 12:38	07/04/2017 12:47	0	38.23	-120.04	BDR	10/17/2017 03:10	10/17/2017 04:05	0	21.3	-158.8	MLO	08/06/2017 21:07	08/06/2017 21:06	-1	-45.4	152.3	LDR
07/05/2017 12:39	07/05/2017 11:57	-1	41.59	-109.95	BDR	09/20/2018 16:56	09/20/2018 17:30	0	20.8	-174.5	MLO	08/14/2017 20:52	08/14/2017 20:35	-1	-45.8	157.3	LDR
09/03/2017 13:27	09/03/2017 13:20	-1	41.64	-116.98	BDR	10/14/2018 03:12	10/14/2018 03:21	0	20.5	-146.9	MLO	08/15/2017 20:49	08/15/2017 19:45	-2	-44.6	168.9	LDR
09/21/2017 13:45	09/21/2017 13:48	0	38.09	-119.34	BDR	11/21/2018 02:51	11/21/2018 03:03	0	20.2	-147.0	MLO	04/03/2018 20:06	04/03/2018 20:20	0	-45.4	151.4	LDR
10/12/2017 23:25	10/12/2017 23:40	0	40.49	-95.26	BDR	12/13/2018 02:52	12/13/2018 04:53	2	20.9	-174.2	MLO	05/09/2018 04:10	05/09/2018 05:16	1	-44.2	172.4	LDR
11/15/2017 14:56	11/15/2017 14:44	-1	39.53	-118.76	BDR	12/24/2018 17:46	12/24/2018 18:12	0	18.9	-174.8	MLO	07/03/2018 03:31	07/03/2018 04:39	1	-43.3	177.5	LDR
11/30/2017 22:21	11/30/2017 23:21	0	39.73	-102.48	BDR	01/15/2019 17:50	01/15/2019 17:03	-1	21.3	-154.8	MLO	07/07/2018 03:36	07/07/2018 05:57	2	-43.4	158.6	LDR
12/10/2017 22:17	12/10/2017 22:43	0	41.4	-94.63	BDR	02/22/2019 17:34	02/22/2019 17:07	-1	19.0	-159.9	MLO	08/09/2018 21:02	08/09/2018 21:12	0	-46.5	150.4	LDR
01/02/2018 15:40	01/02/2018 15:20	-1	41.5	-117.1	BDR	04/24/2019 16:44	04/24/2019 15:54	-1	18.7	-153.5	MLO	08/26/2018 04:56	08/26/2018 06:39	1	-44.1	160.3	LDR
01/11/2018 15:37	01/11/2018 15:31	-1	41.2	-120.3	BDR	06/12/2019 04:10	06/12/2019 04:10	0	20.1	-143.6	MLO	09/07/2018 05:14	09/07/2018 05:57	0	-45.4	173.9	LDR
03/02/2018 14:32	03/02/2018 14:23	-1	40.8	-116.6	BDR	08/23/2019 16:51	08/23/2019 16:45	-1	19.8	-164.8	MLO	03/31/2019 20:01	03/31/2019 19:44	-1	-45.7	159.4	LDR
03/24/2018 00:18	03/24/2018 00:14	-1	39.9	-91	BDR	09/18/2019 16:55	09/18/2019 15:14	-2	18.3	-140.7	MLO	04/12/2019 20:19	04/12/2019 19:18	-2	-45.5	169.8	LDR
07/01/2018 12:37	07/01/2018 11:33	-2	38.8	-102.5	BDR	11/15/2019 17:20	11/15/2019 17:13	-1	20.9	-164.8	MLO	06/02/2019 21:44	06/02/2019 20:23	-2	-44.1	166.8	LDR
08/09/2018 01:07	08/09/2018 02:04	0	41.7	-105	BDR	12/11/2019 02:51	12/11/2019 02:51	0	21.3	-144.0	MLO	06/04/2019 21:47	06/04/2019 20:21	-2	-44.0	167.7	LDR
09/18/2018 13:41	09/18/2018 12:55	-1	38.1	-106.8	BDR	04/22/2020 16:45	04/22/2020 16:23	-1	21.2	-161.3	MLO	07/30/2019 21:21	07/30/2019 19:59	-2	-43.6	170.3	LDR
12/07/2018 22:18	12/07/2018 22:10	-1	41	-86.2	BDR	06/10/2020 04:10	06/10/2020 03:34	-1	18.9	-135.4	MLO	08/08/2019 21:04	08/08/2019 20:37	-1	-44.4	158.5	LDR
12/29/2018 15:40	12/29/2018 14:07	-2	39.9	-100.4	BDR	06/21/2020 16:34	06/21/2020 15:59	-1	18.9	-157.8	MLO	04/10/2020 20:18	04/10/2020 19:06	-2	-44.9	172.0	LDR
12/30/2018 15:40	12/30/2018 14:50	-1	41.5	-109.8	BDR							04/25/2020 04:37	04/25/2020 05:47	1	-46.8	168.0	LDR
08/28/2019 13:21	08/28/2019 12:53	-1	41.1	-111.6	BDR							05/31/2020 21:43	05/31/2020 21:05	-1	-43.1	178.5	LDR
01/05/2020 15:40	01/05/2020 15:29	-1	41.9	-119.0	BDR												
04/06/2020 00:32	04/06/2020 01:22	0	38.6	-104.7	BDR												
04/27/2020 13:02	04/27/2020 12:36	-1	41.8	-112.6	BDR												

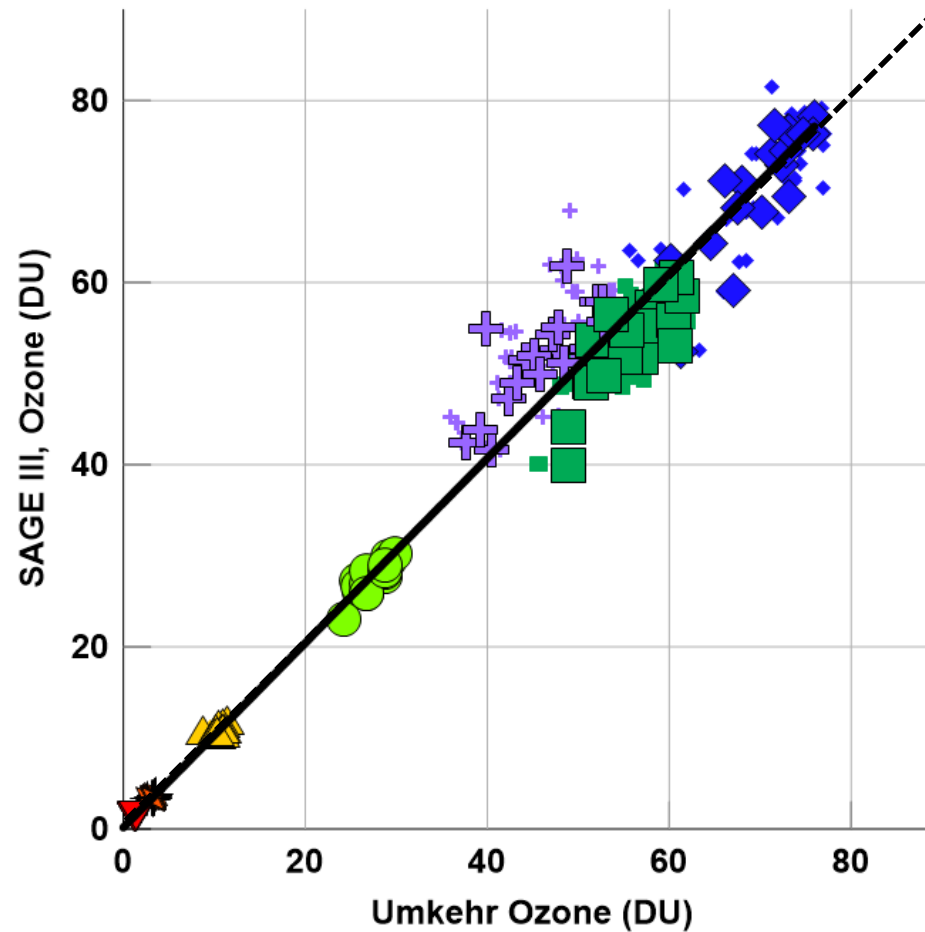


Boulder



A big symbol is within 3 hours, and a small symbol is +/-24 hours.

MLO



Matched time +/- 3 hrs

Linear

Equation $Y = 1.014114085 * X + 0.1434920742$

Number of data points used = 216

Average X = 17.8272

Average Y = 18.2223

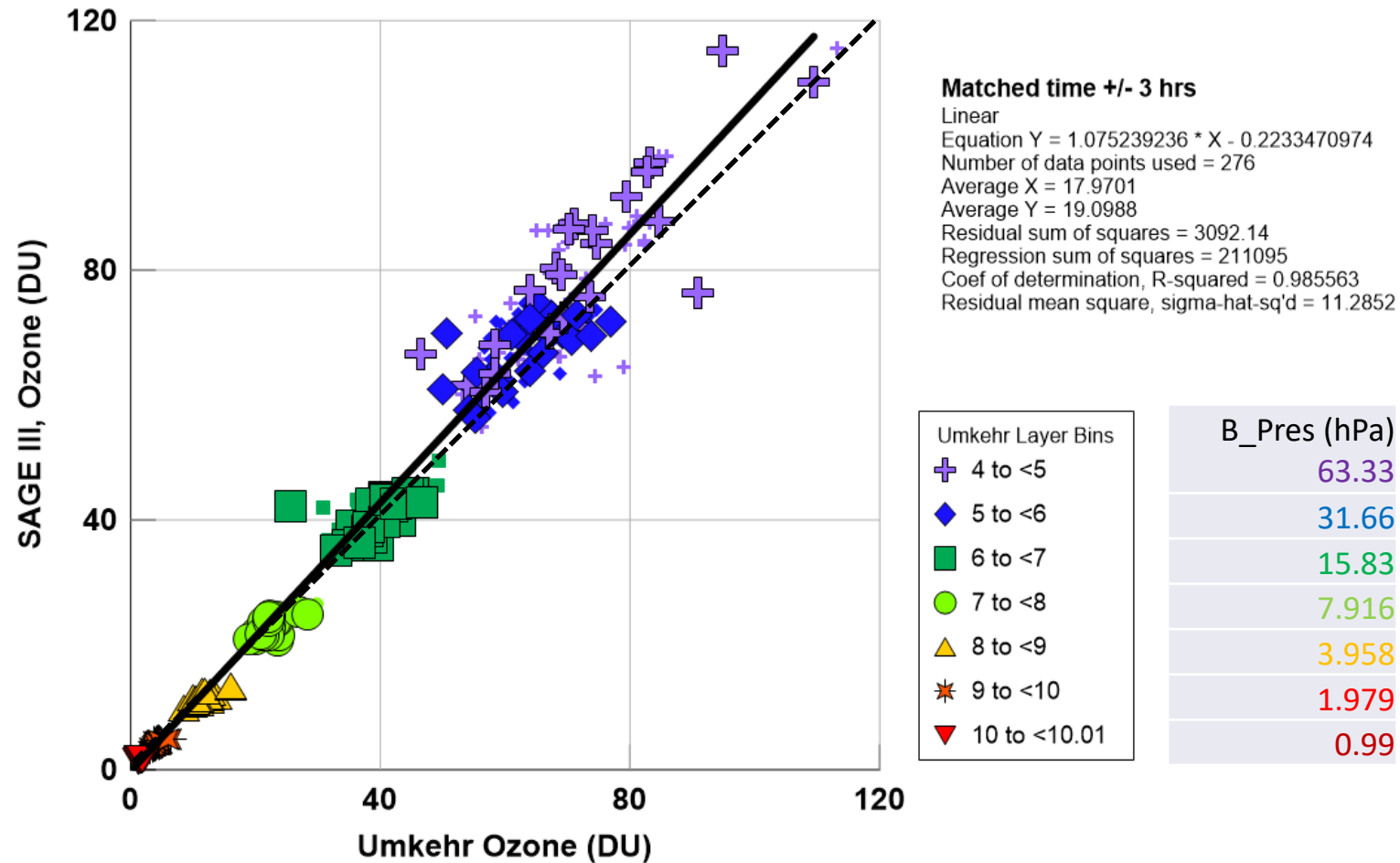
Residual sum of squares = 1331.52

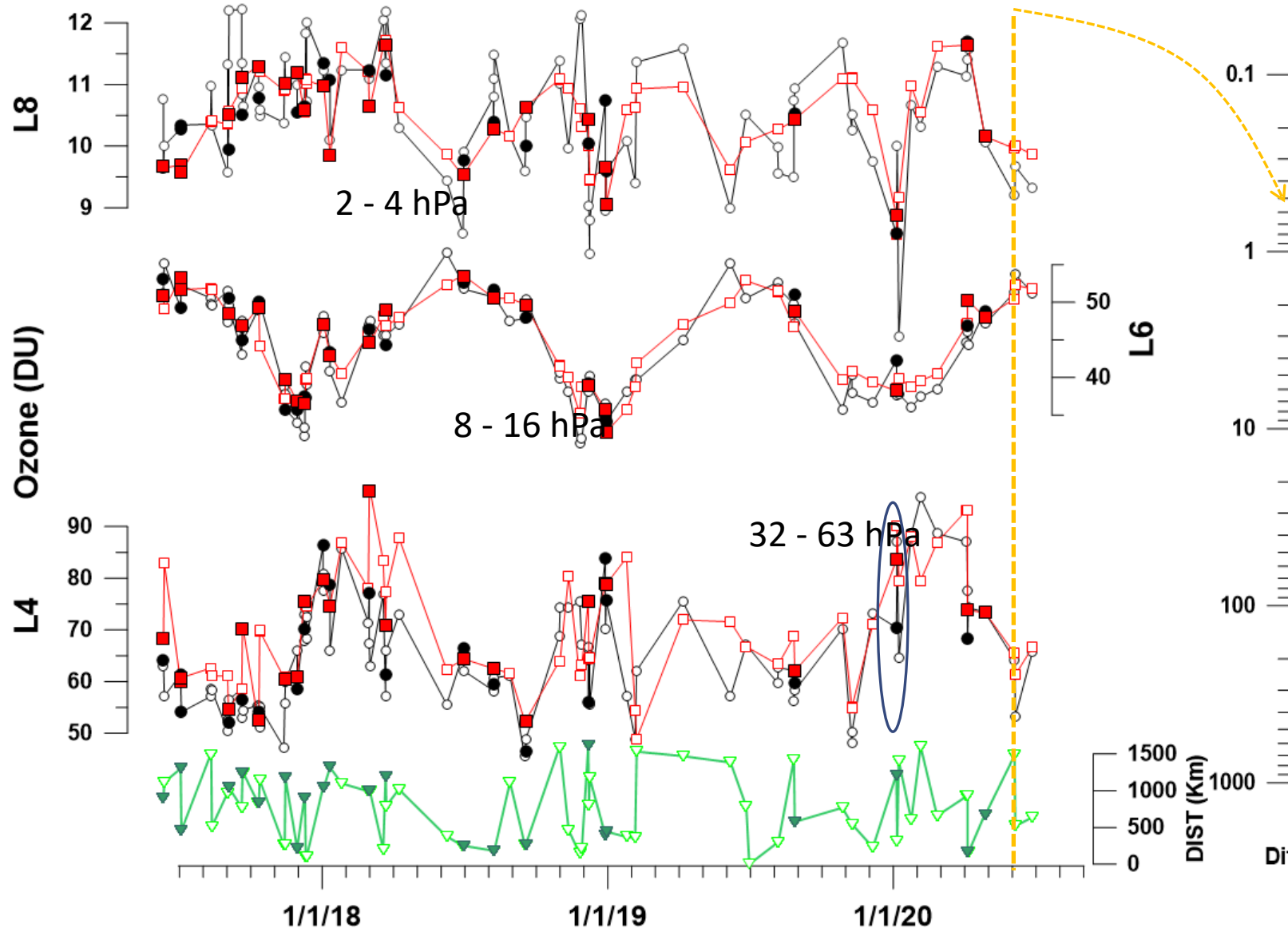
Regression sum of squares = 133233

Coef of determination, R-squared = 0.990105

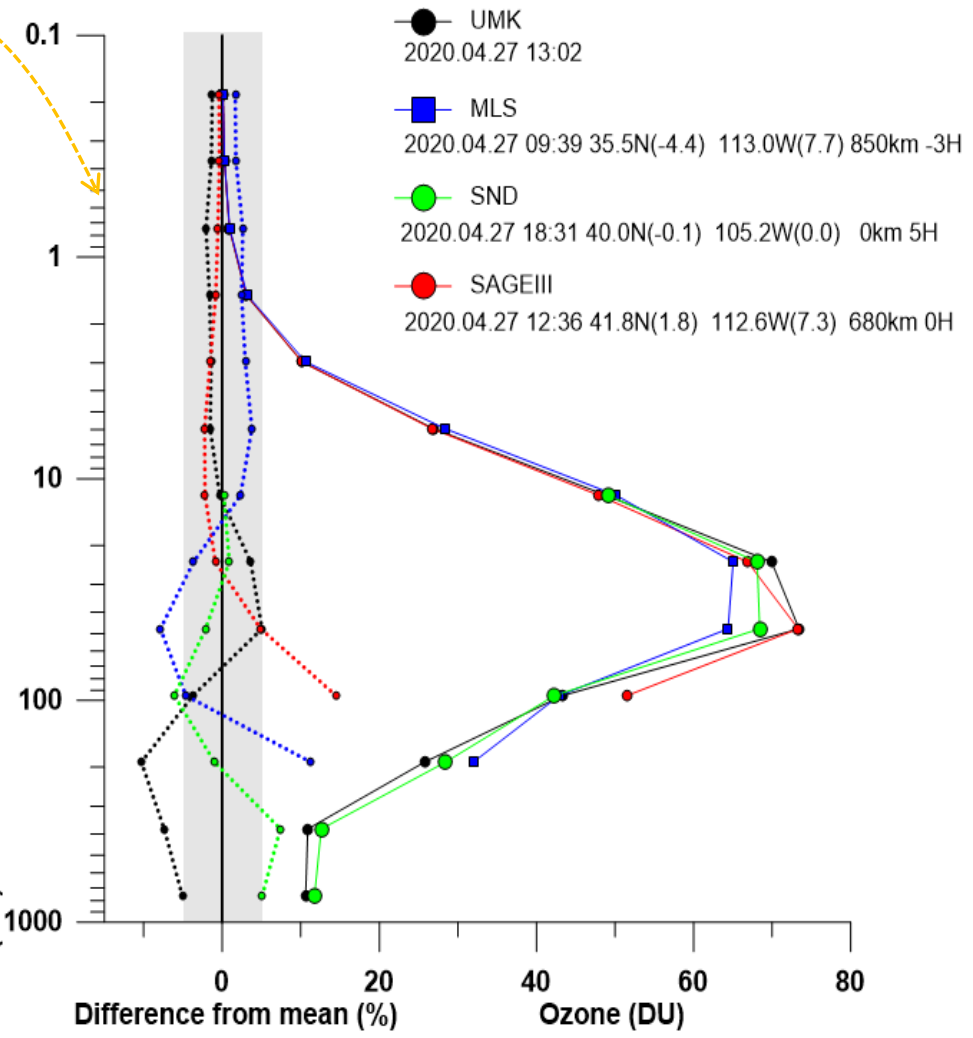
Residual mean square, sigma-hat-sq'd = 6.22204

Lauder

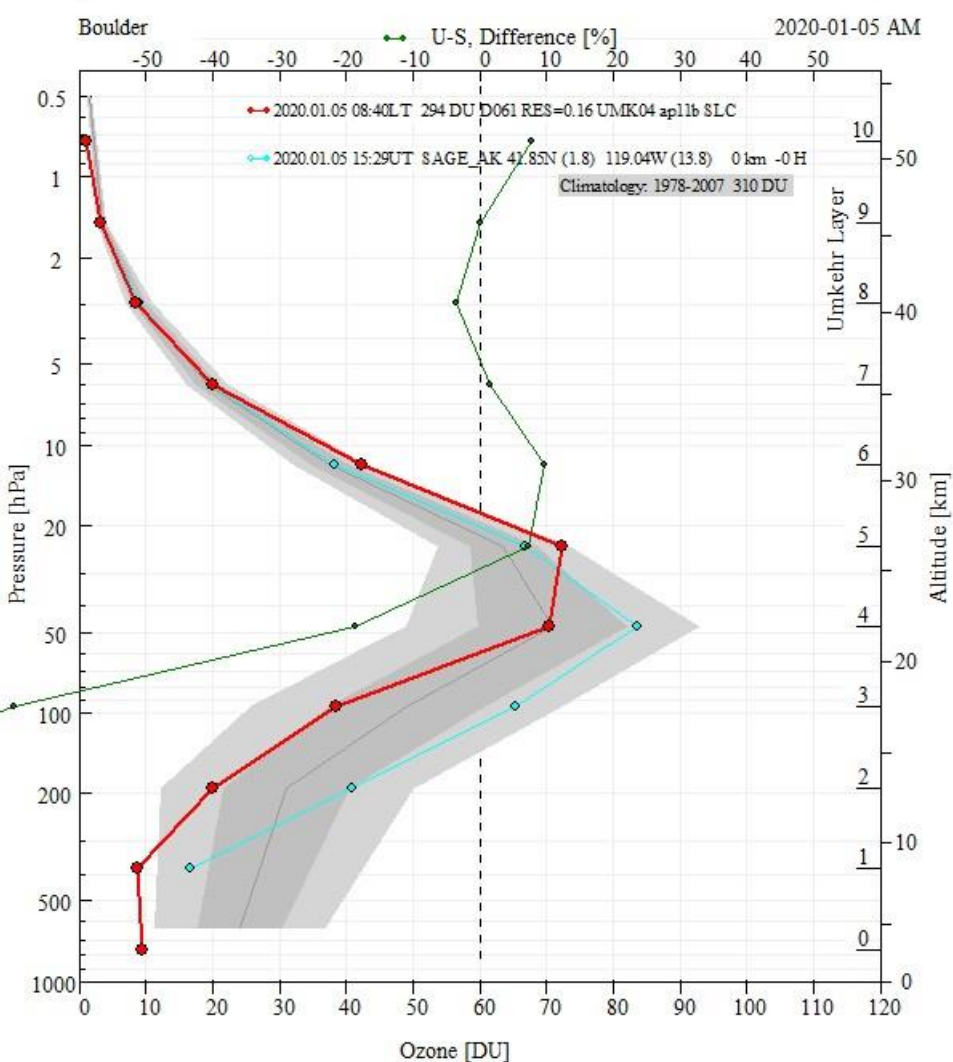
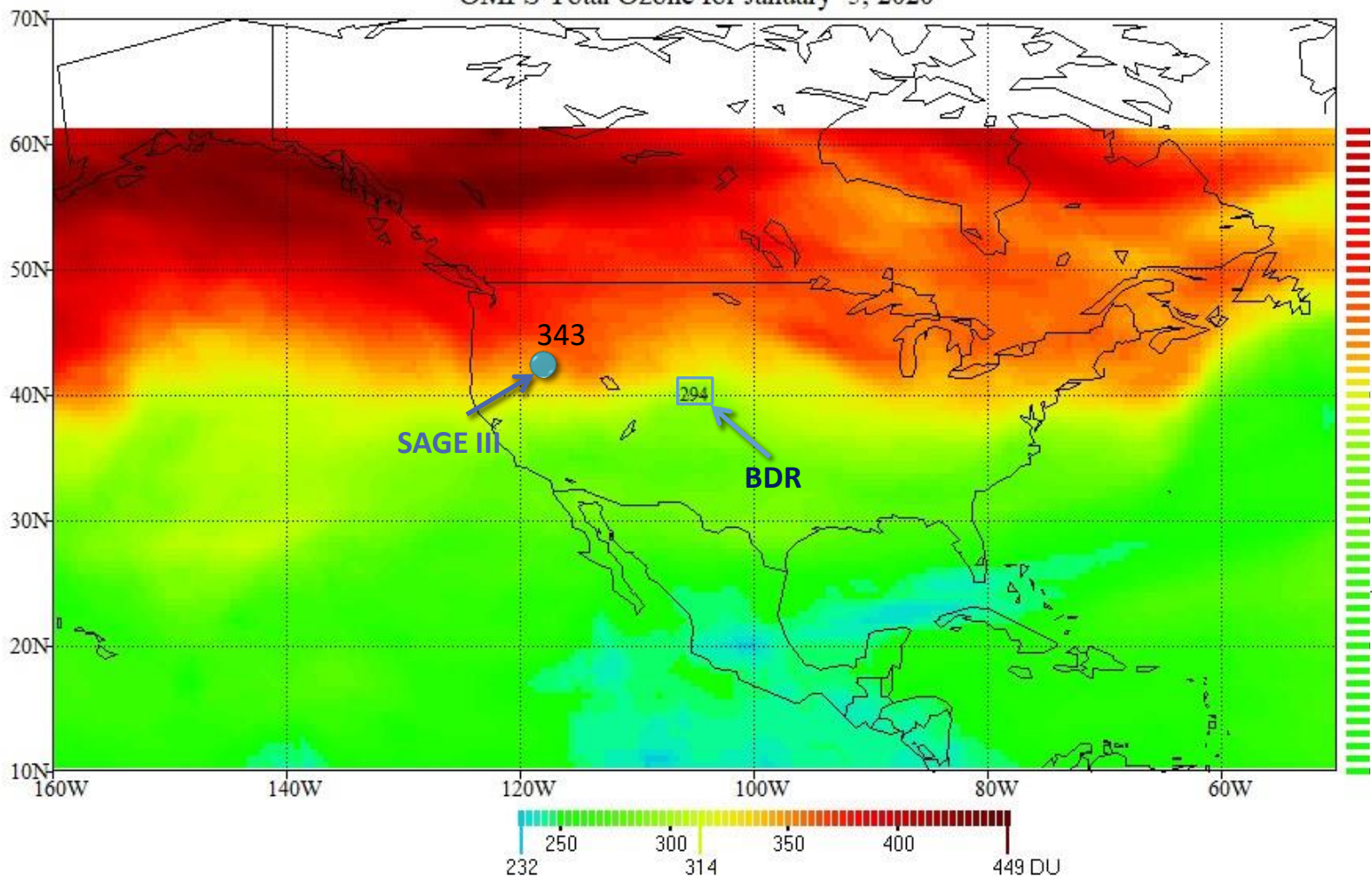


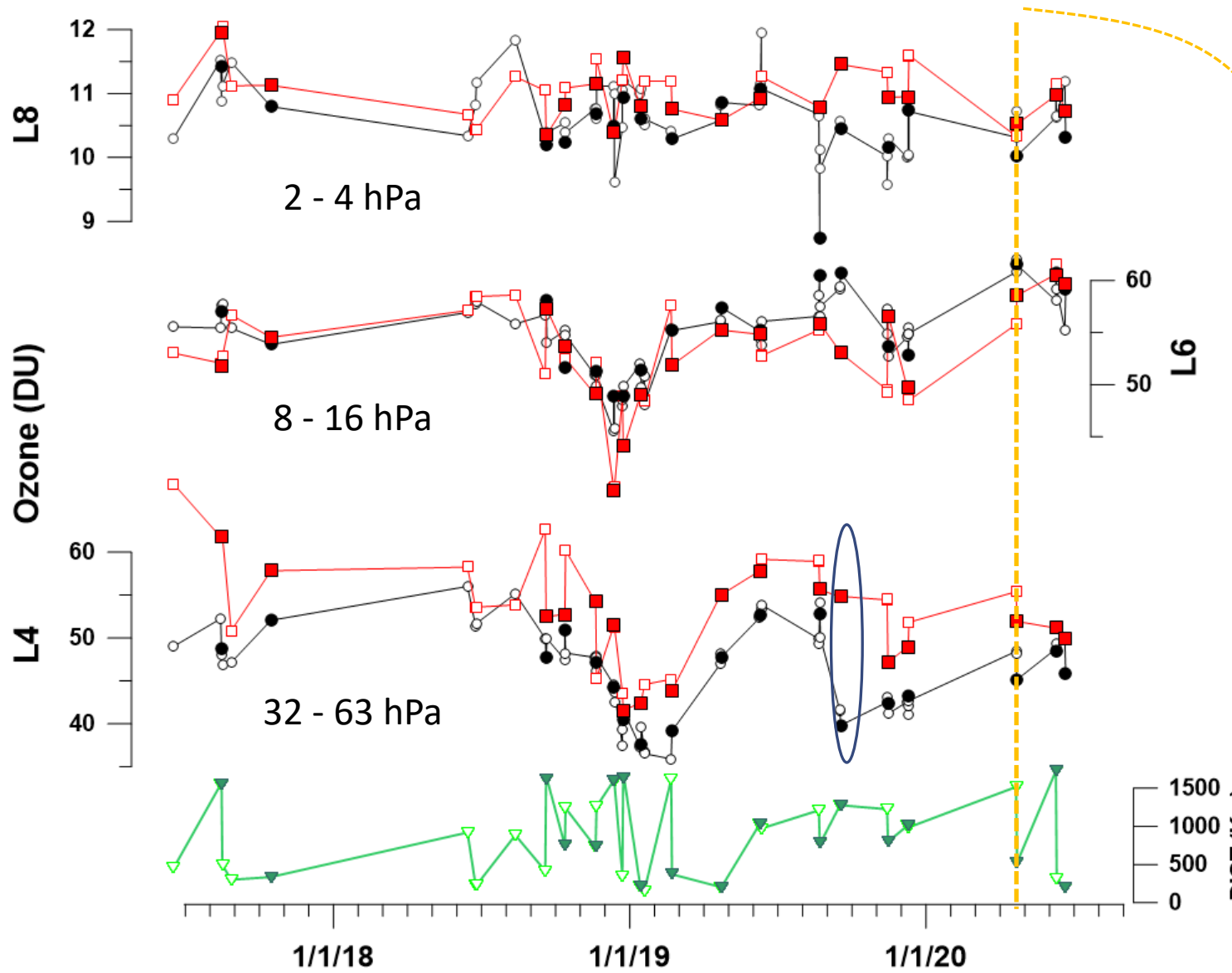


Boulder

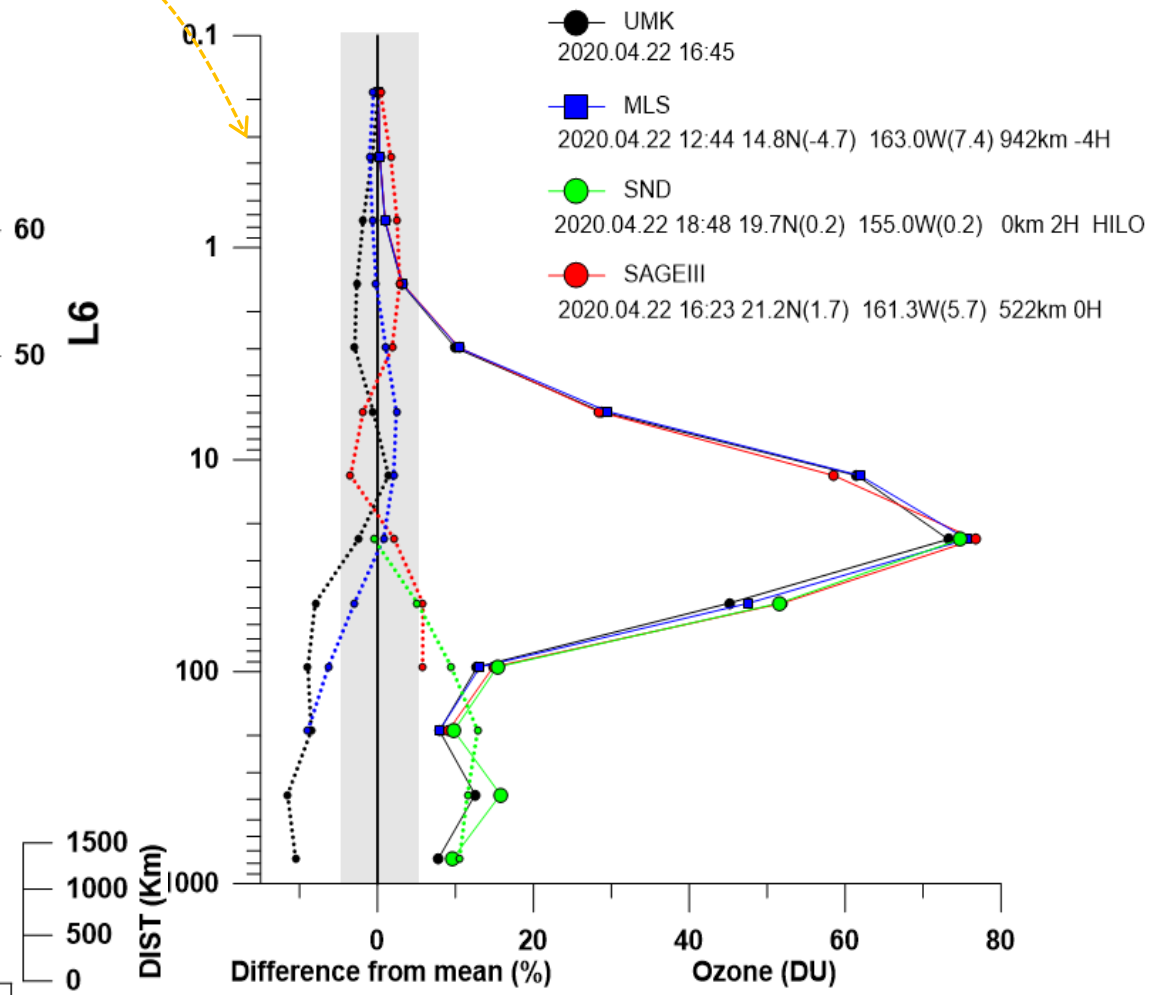


OMPS Total Ozone for January 5, 2020

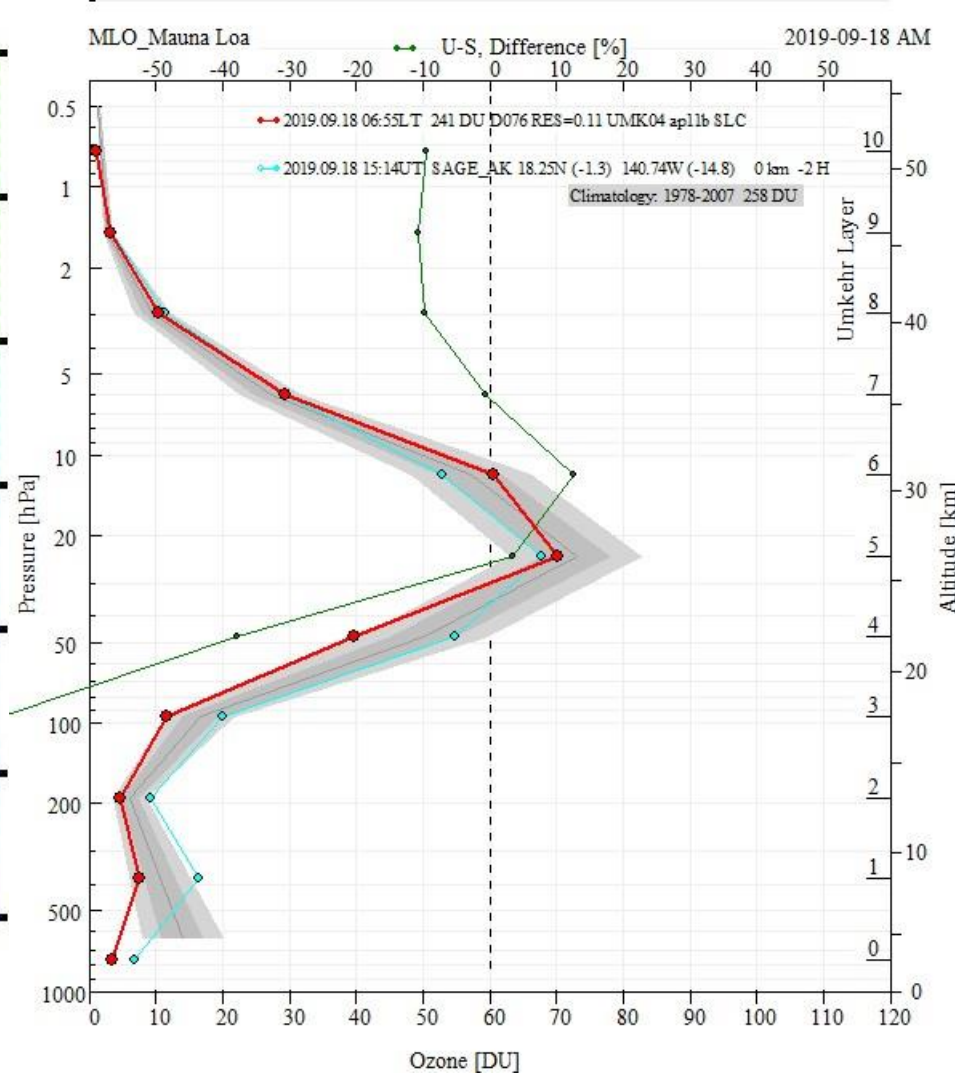
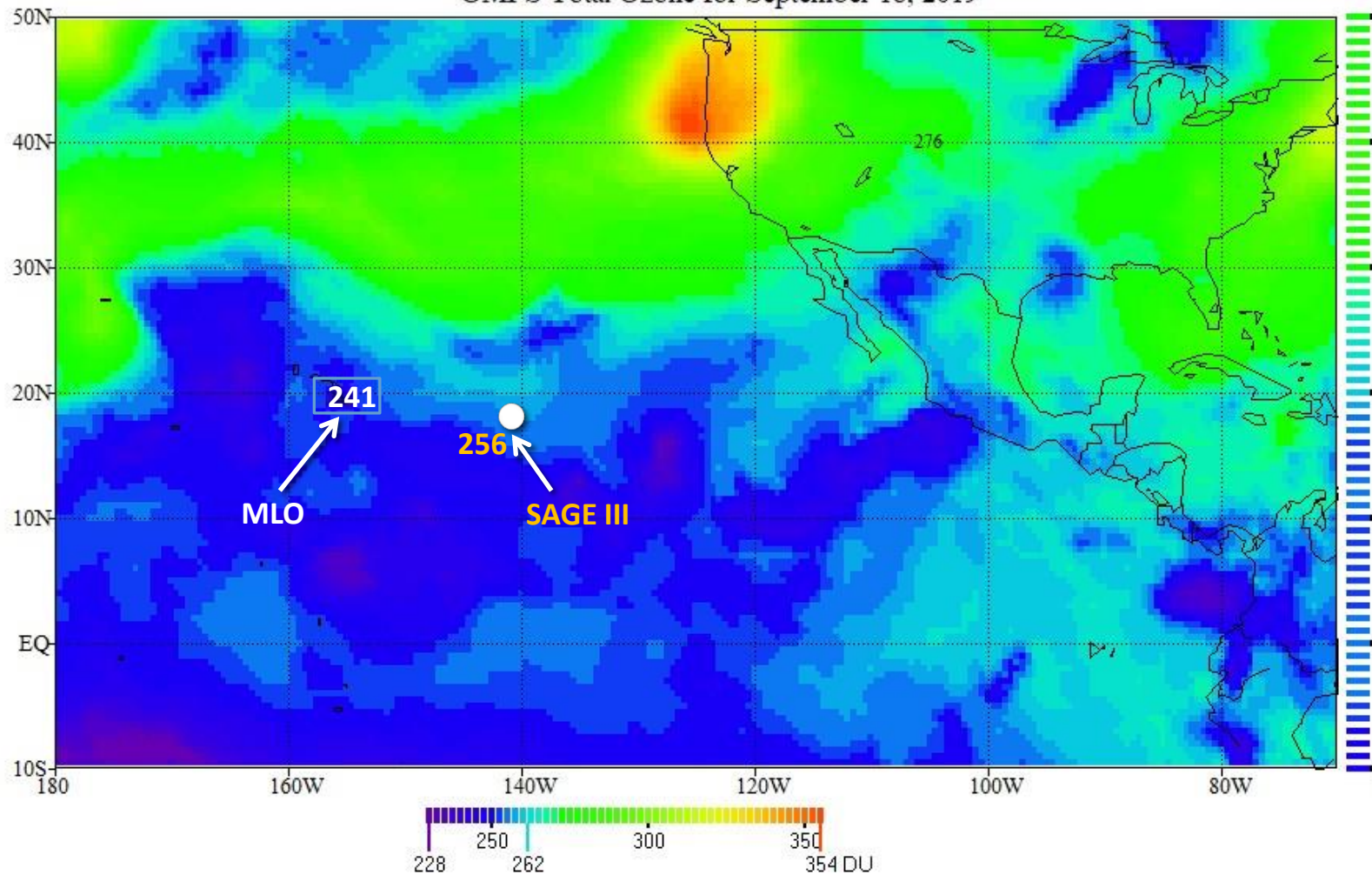




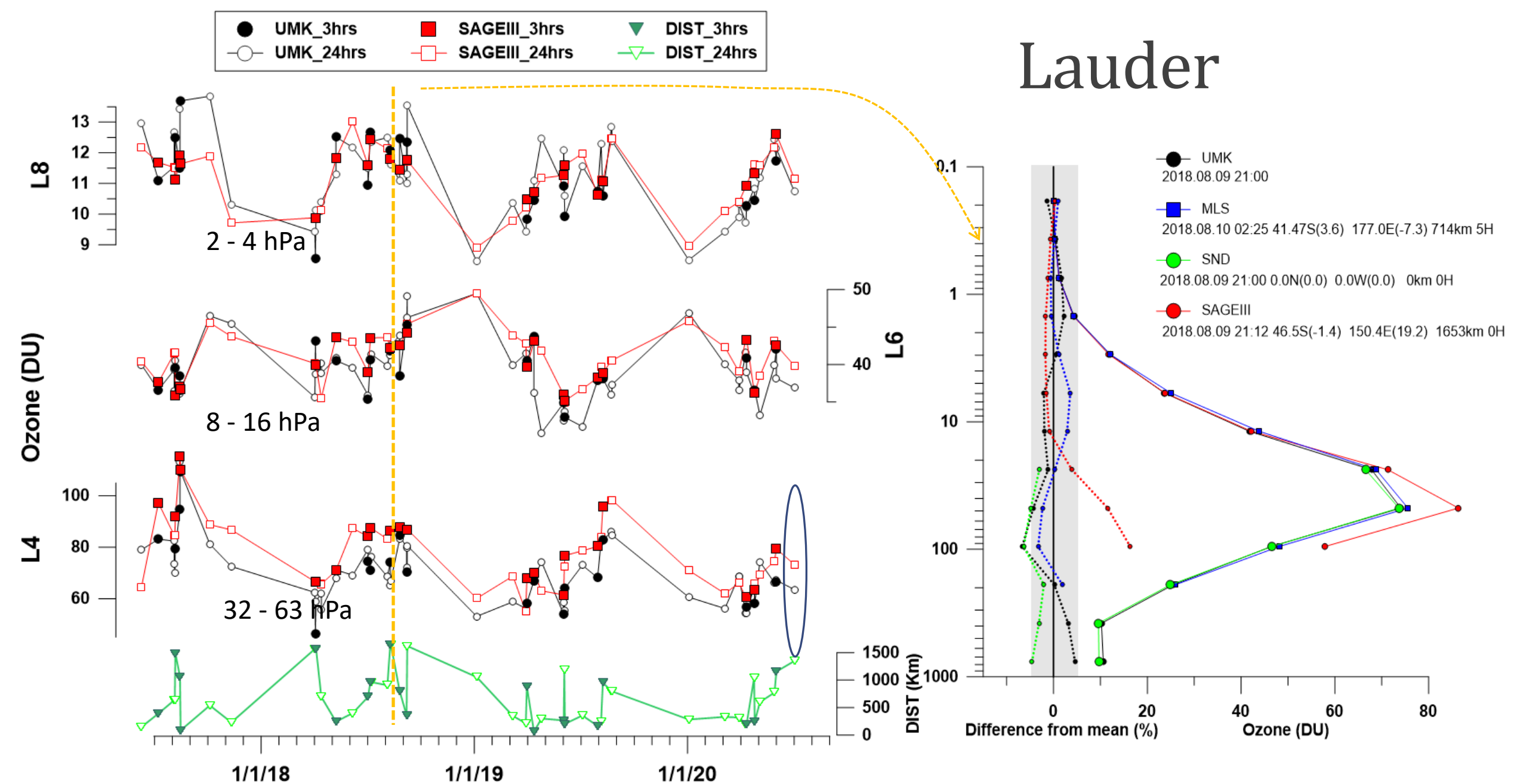
MLO



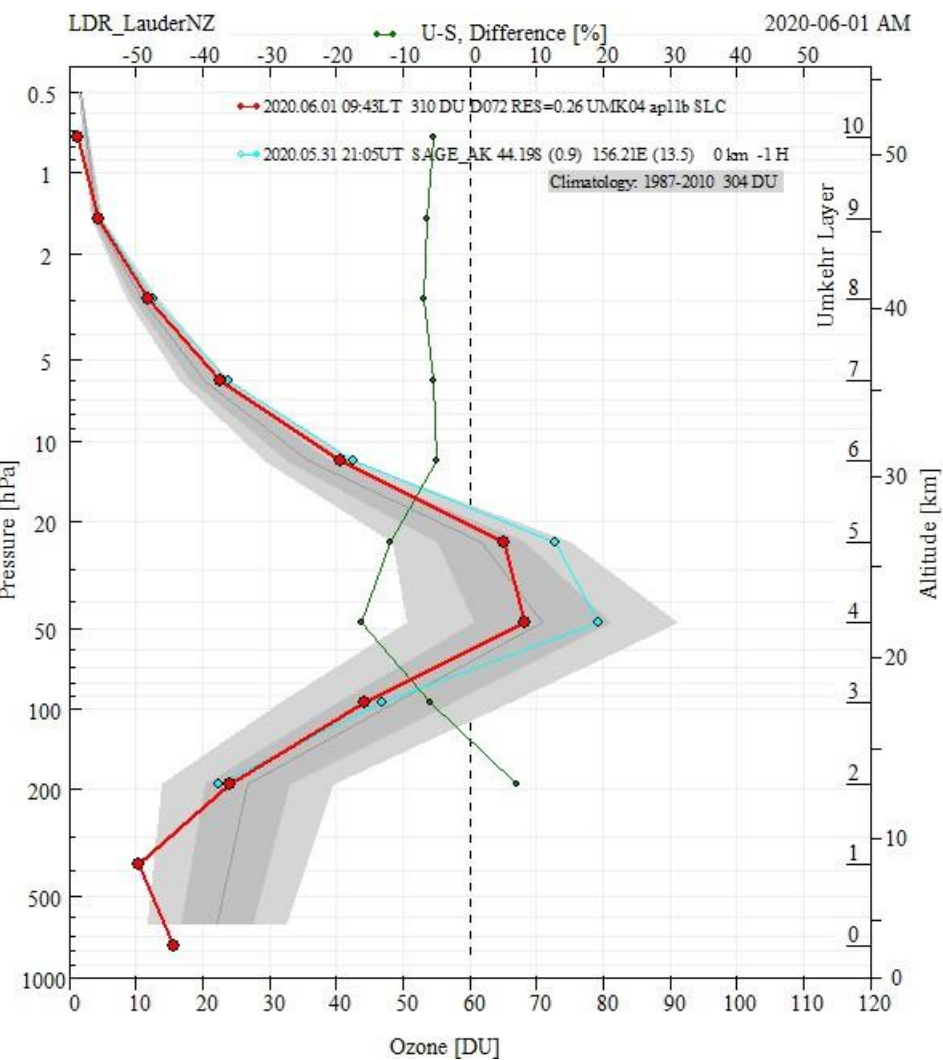
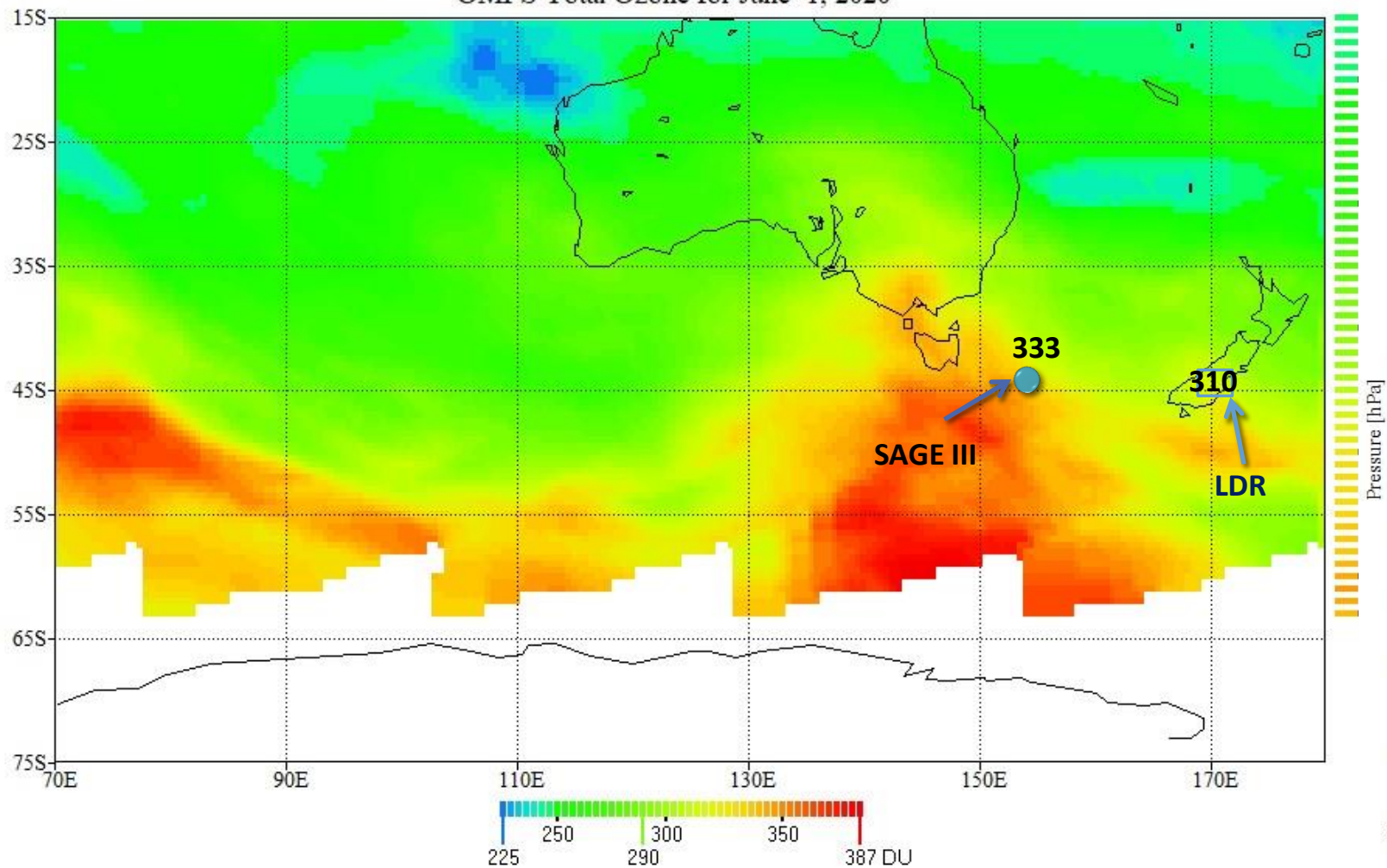
OMPS Total Ozone for September 18, 2019



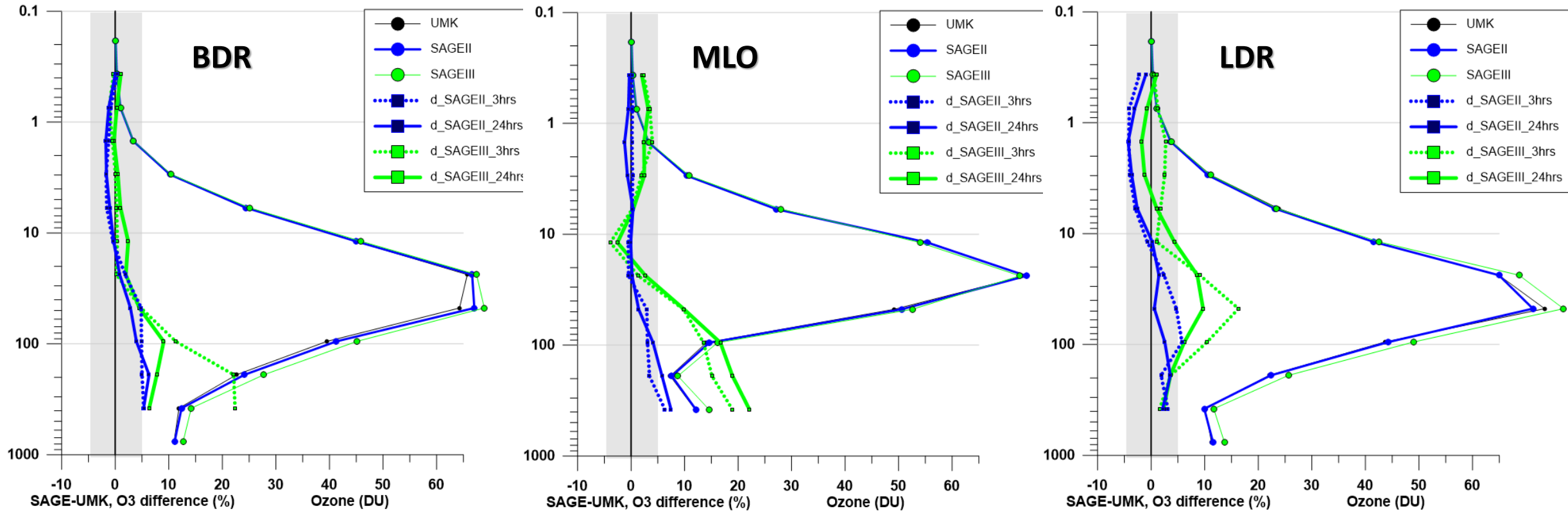
Lauder

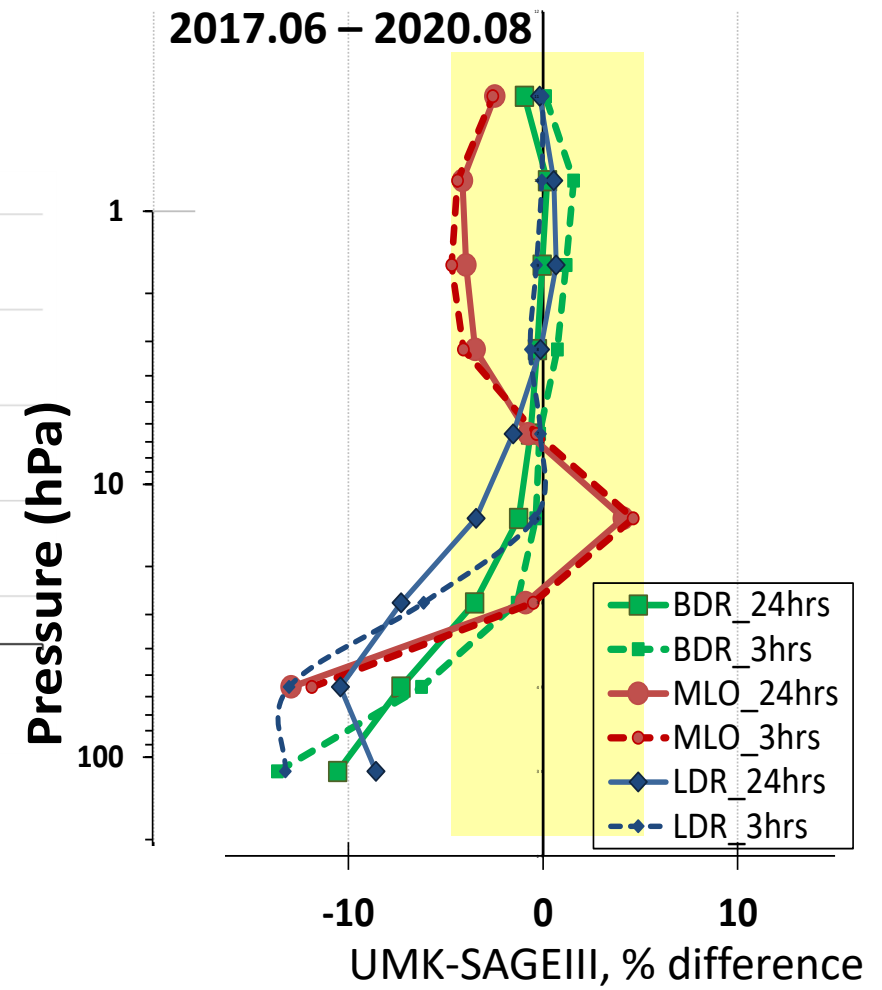
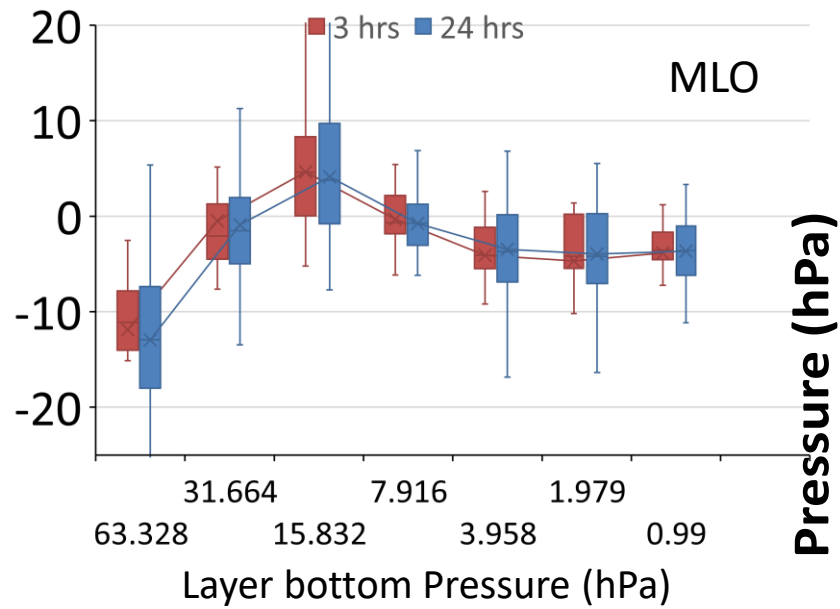
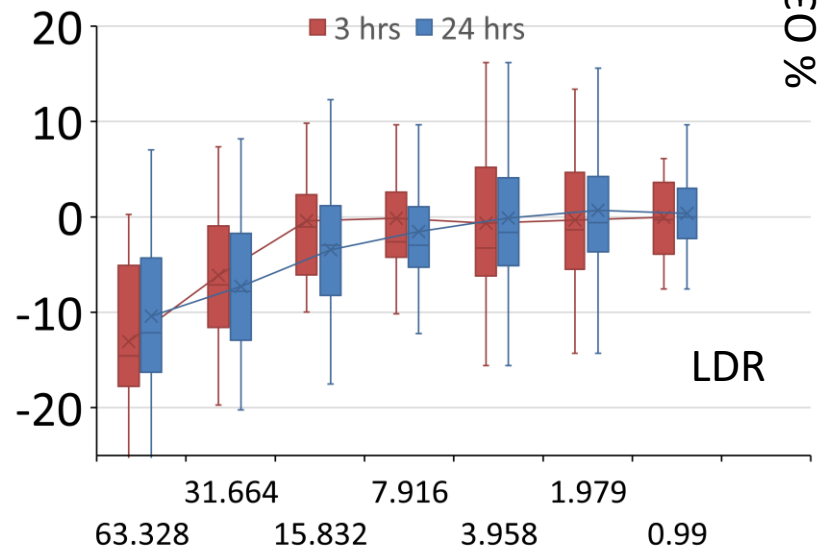
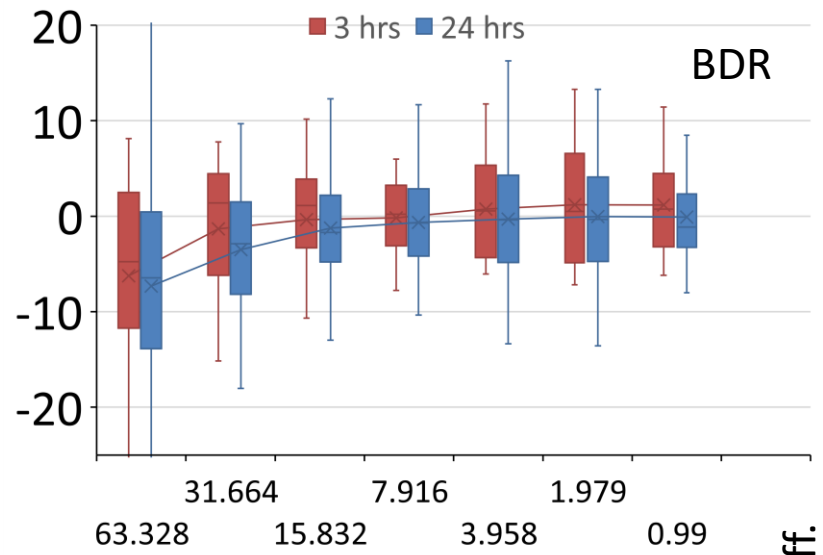


OMPS Total Ozone for June 1, 2020

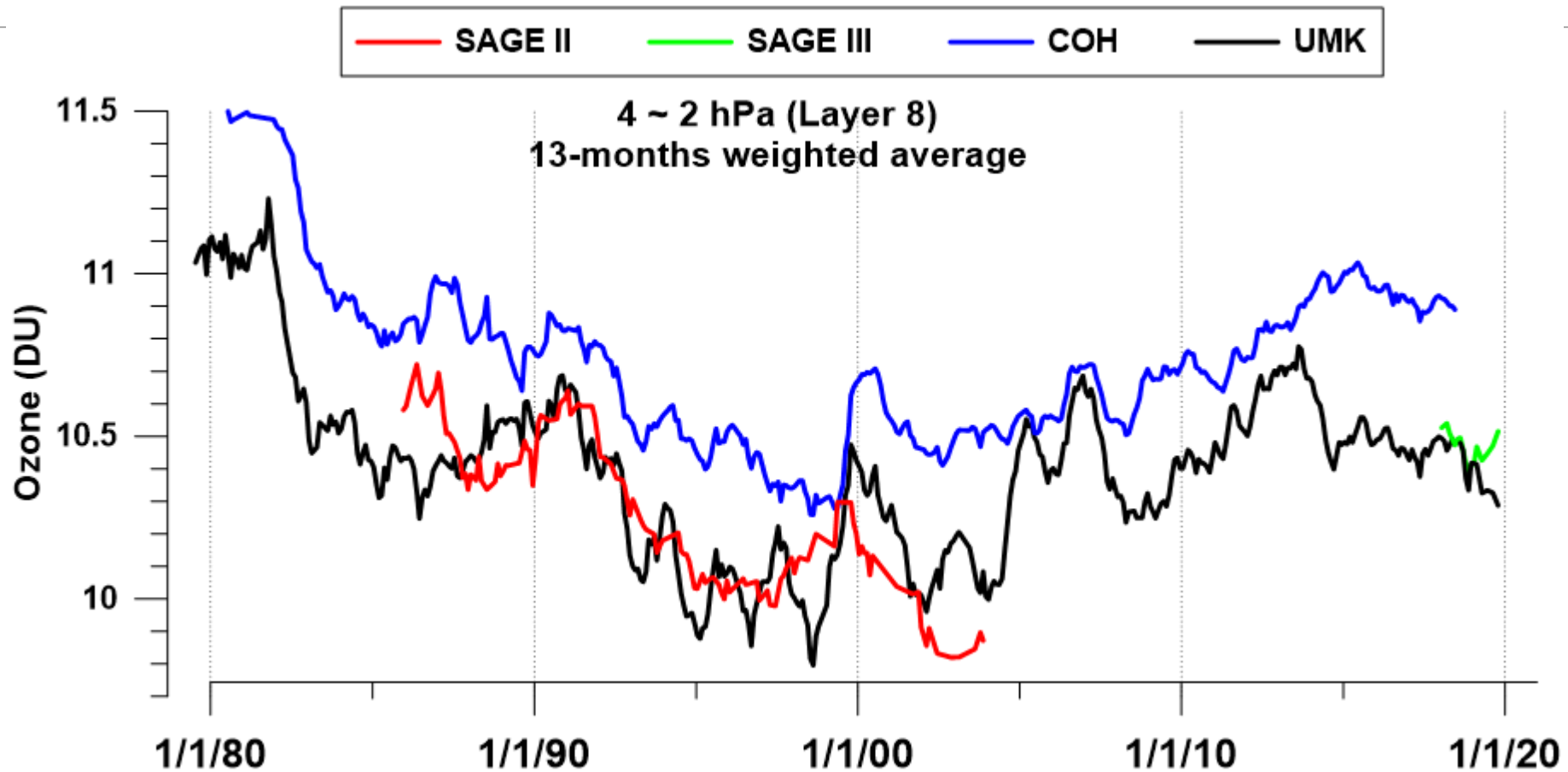


SAGE II (1985-2005) and SAGE III (2017-2020.08)



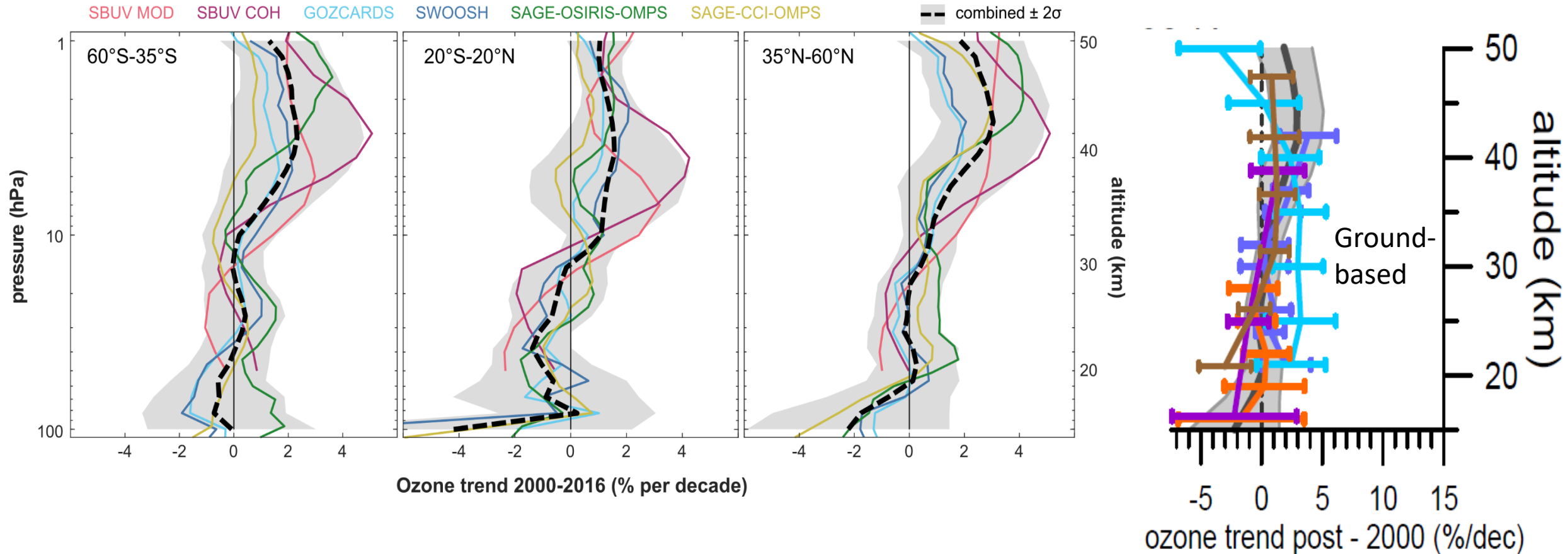


Time series of Umkehr data (MM), SAGE II and SAGE III, and COH (6-2hPa) in Boulder



Ozone assessment and SPARC LOTUS-1

New LOTUS-2 – updated data needs





Thank you very much!

