

Meteor 0126 (2020)

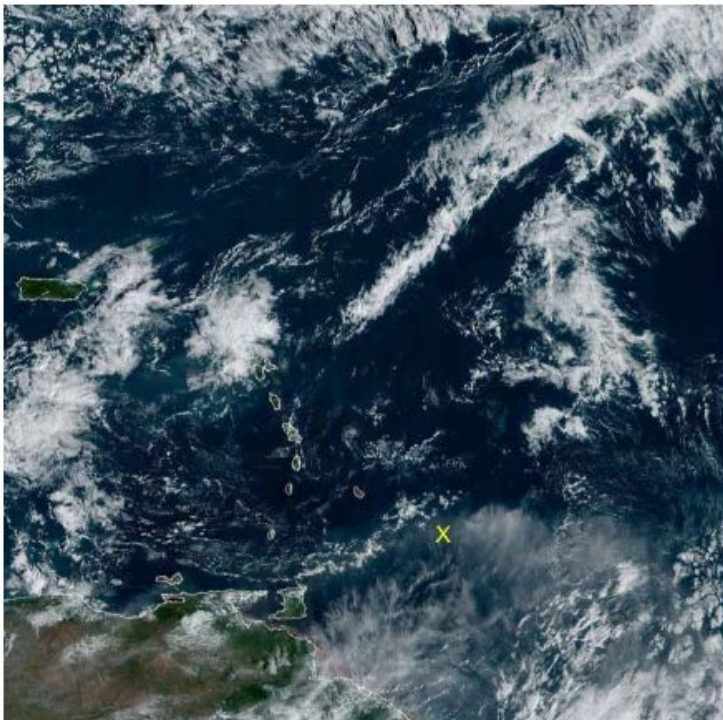
Stefan Kinne (27 jan 2am)

1. Objective

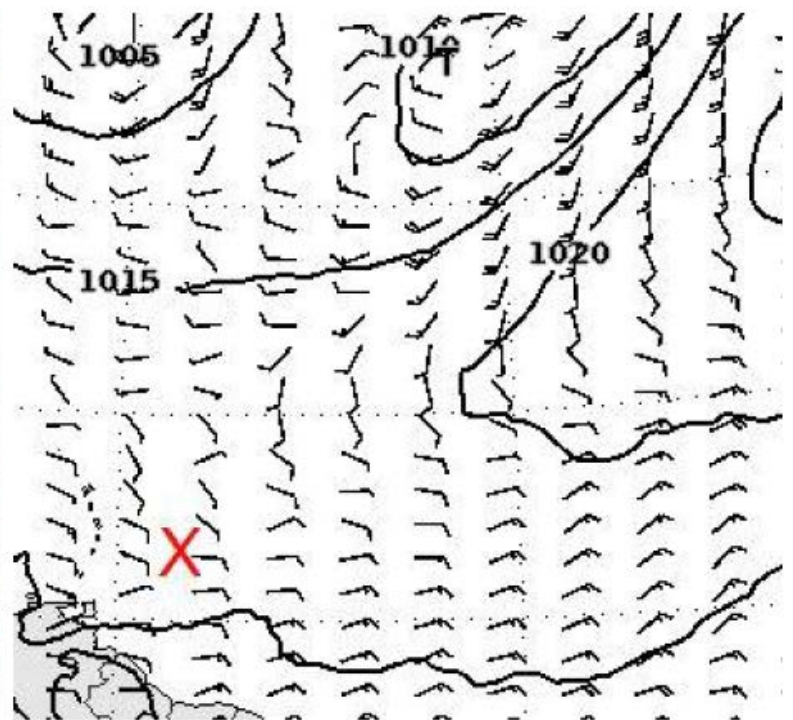
Coordinated vertical curtain comparison between METEOR (looking up) and HALO (looking down) on the same trajectory. First cloud-kite long-term instrument ride. Deployment of one Argo float. Return to Meteor with regular CTD every 2 hours. Launching radiosondes at 2.45, 6.45, 10.45, 14.45, 18.45 and 22.45 UTC.

After a morning CTD and the instrument attachment to the balloon (now light enough, though without the particle probe) we left the L2 point (the southern HALO / METEOR track crossing at 12.418N / 57.245W) at 12UTC at full speed (ca 10.5kn) in a pre-defined HALO flight direction of ca 110deg towards the boundary of the Barbados EEZ (at 12.202N / 56.191W). We started the track well in advance (130min) for the first HALO overpass and ended the track well after (90min) after the last (and fourth) HALO overpass that day to provide with the slow speed of the vessel a relatively long curtain for comparisons. That track offered only high cirrus clouds (usually above 12km) as lower clouds were not present. Still, we learned a lot about (and improved) our communication for coordinated activities. The lighter cloud-kite instrument held up well, even though the recording failed due to a glitch. Still, we learned that the instrument package will only stay up with the extra lift by strong (relative) wind, which reduces the wanted capability for extended air-time possibly not before the transit to the Azores. The far-east end of the curtain offered an opportunity to deploy an ARGO float before the METEOR headed back with regular CTD stops to their baseline longitude near 57W.

2. Synoptic Situation



Satellitenbild GOES 26.01.2020 13:00 UTC



Vorhersage für Montag 12 UTC

Weather observations (every 3hr)

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20 01 26001 99124 70575 16/// /0305 10258 20212 40147 53009 7///// 8///// 22262 04274
2///// 3///// 4///// 5///// 6///// ICE /////
 20 01 26031 99124 70576 46/// /0505 10257 20208 40152 50005 7///// 8///// 22261 04274
2///// 3///// 4///// 5///// 6///// ICE /////
 20 01 26061 99127 70573 16/// /0907 10258 20204 40142 58010 7///// 8///// 22212 04274
2///// 3///// 4///// 5///// 6///// ICE /////
 20 01 26091 99125 70572 46/// /1008 10256 20198 40137 56005 7///// 8///// 22231 04274
2///// 3///// 4///// 5///// 6///// ICE /////
 20 01 26121 99124 70572 11599 70807 10260 20184 40154 53017 70322 81806 22241 04274
20301 334// 41002 5///// 6///// ICE /////
 20 01 26151 99123 70567 41598 71004 10261 20199 40164 50010 70222 81208 22222 04276
20100 308// 41002 5///// 6///// ICE /////
 20 01 26181 99122 70562 11599 70904 10261 20201 40142 58022 70222 81108 22223 04278
20100 30902 40702 50902 6///// ICE /////
 20 01 26211 99122 70562 46/// /0504 10262 20212 40143 53001 7///// 8///// 22261 04277
2///// 3///// 4///// 5///// 6///// ICE /////

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High altitude cirrus clouds all day.

3. Cruise-day Elements

IWV (integrated water vapor): 27 kg /m2 +/- 4
LWP (liquid water path): 23 g /m2 +/- 36

Time	0-3UTC	4-6UTC	7-9UTC	10-12UTC	13-15UTC	16-18UTC
Height_m	1185.03	1185.03	1185.03	313.03	760.21	670.77
max_hydro_frac_low	0.00	0.34	0.43	0.00	0.00	0.02
Height_m	1363.90	1319.19	1408.62	1207.39	1207.39	1207.39
max_hydro_frac_mid	0.10	0.58	0.73	0.00	0.00	0.00
Height_m	14965.51	14935.70	14935.70	12759.44	12193.01	13266.24
max_hydro_frac_high	0.01	0.01	0.01	0.09	0.03	0.03

low= up to 1200m, mid=up to 6000m, high=up to 15000m

hourly means of ship data (1st line 0-1 UTC, 2nd line 1-2 UTC ... last line 23-24 UTC)

salinity	Tdew	Tair	Twater	TrueDir	RH	rel.Wind	trueWind	lw Rad	sw Rad	lat	lon
PSU	°C	°C	°C	deg	%	m/s	m/s	W/m ²	W/m ²	°N	°
35.4206	21.45	25.5	27.43	24.3	78	5.75	5.65	397.87	-1	12.42	-57.48
35.4835	21.54	25.36	27.39	27.55	79.05	4.89	5.33	390.75	-1	12.42	-57.56
35.5063	21.24	25.5	27.43	44.53	76.85	5.31	4.68	391.48	-1	12.42	-57.63
35.4758	20.58	25.76	27.41	62.44	72.59	8.81	5.01	389.83	-1	12.47	-57.57
35.3948	20.99	25.7	27.46	64.68	74.87	9	5.2	395.9	-0.88	12.54	-57.47

35.3743	20.81	25.78	27.41	80.3	73.62	9.85	6.34	434.08	-0.07	12.62	-57.37
35.3328	20.24	25.68	27.4	87.53	71.48	9.05	6.4	430.28	-0.38	12.69	-57.27
35.3299	19.96	25.58	27.4	90.35	70.67	6.61	5.74	405.07	-1	12.71	-57.24
35.3209	19.81	25.61	27.4	100.52	69.88	9.56	7.35	423	-0.57	12.59	-57.24
35.3013	19.48	25.55	27.4	97.85	68.72	8.56	6.99	403.02	-0.97	12.45	-57.25
35.2842	19.05	25.56	27.4	93.88	66.9	7.24	6.89	376.63	36.32	12.42	-57.25
35.2866	18.52	25.84	27.42	91.47	63.57	8.26	7.24	375.9	167.78	12.42	-57.24
35.3486	18.25	26.08	27.38	79.23	61.62	11.78	6.54	376.23	357.42	12.39	-57.13
35.4716	18.38	26.14	27.45	84.6	61.98	10.84	5.34	374.95	599.02	12.36	-56.95
35.4627	19.65	25.99	27.56	95.2	67.67	9.15	3.88	374.9	818.23	12.32	-56.77
35.2956	19.43	26.27	27.59	85.77	65.75	9.09	3.54	372.16	897.18	12.29	-56.61
35.2652	19.39	26.32	27.64	77.42	65.3	9.21	3.69	371.58	932.37	12.25	-56.43
35.2698	19.91	26.2	27.7	86.18	67.95	9.72	4.29	375.7	845.93	12.21	-56.24
35.3286	20.64	26.25	27.84	92.05	70.87	5.17	3.95	381.65	680.73	12.19	-56.13
35.3258	21.03	26.36	27.78	87.2	72.05	3.81	3.62	387.43	416.73	12.19	-56.12
35.3004	21.14	26.25	27.74	63.18	73.08	4.24	3.63	392.53	136.98	12.19	-56.15
35.2706	21.01	26.16	27.65	42.98	72.88	5.43	3.64	395.93	31.27	12.23	-56.33
35.2844	20.86	26.04	27.65	49.65	72.72	4.3	3.67	378.62	-1.43	12.26	-56.47
35.2734	21.06	25.98	27.55	68.92	73.93	3.36	4.63	378.22	-1.02	12.28	-56.56

inter-calibration: none
CTD stations: 5
radiosondes: 6
overflights: 4 (HALO curtains)

station no.	UTC	device	action	latitude	longitude	depth	contact person
M161 54	26 jan 2020 / 22:12-02:43	CTD	CTD	12°25.109 N	57°27.781' W	800	Baranowski
M161 55	26 jan 2020 / 06:57-07:33	CTD	CTD	12°42.813 N	57°14.684' W	800	Baranowski
M161 56	26 jan 2020 / 09:46-10:21	CTD	CTD	12°25.126 N	57°14.702' W	800	Baranowski
M161 57	26 jan 2020 / 18:53-20:10	CTD	CTD	12°11.225 N	56°07.059' W	2000	Baranowski
M161 58	26 jan 2020 / 20:15	float	ARGO	12°11.220 N	56°07.057' W	0	Kinne
M161 59	26 jan 2020 / 22:22-22:57	CTD	CTD	12°15.863 N	56°28.705' W	800	Baranowski

4. Instrument Status

Instrument-Status (**W**-working, **P**-partially-working, **F**-failure, **U**-untested)

	status	operators
radiosondes	W	Katharina, Imke, Yanmichel, Almuth, Kevin
cloud-radar	W	Heike, Johannes

micro-radiometer			W	Heike, Johannes
spect-radiometer			W	Heike, Johannes
Raman-lidar			W	Ludwig
cloud-kite			P	Oliver, Marcel, Marcel, Antonio, Robert, Sanola
Picarro			W	Sebastian
micro-biology			W	Wiebke, Jan, Abiel
ADPC ocean curr.			W	Callum, Beth
thermosalinograph			W	Callum, Beth
glider			W	Callum, Beth
UAV			W	Darek, Jakub, Michal, Wojciech
eddy-flux-data			W	Katharina, Imke, Heike
wind-lidar (DTU)			W	Geiske, Kevin
wind-lidar (Bre)			F	Geiske, Kevin
MAX-DOAS			W	Alma
ceilometer			W	Stefan
cloud camera			W	Stefan
sunphotometer			W	Stefan, Przemek, Andreas, John
aero scat/abs			W	Przemek
WRAS (aero size)			W	Alma
CTD			W	Darek and friends (almost all)

5. Outlook

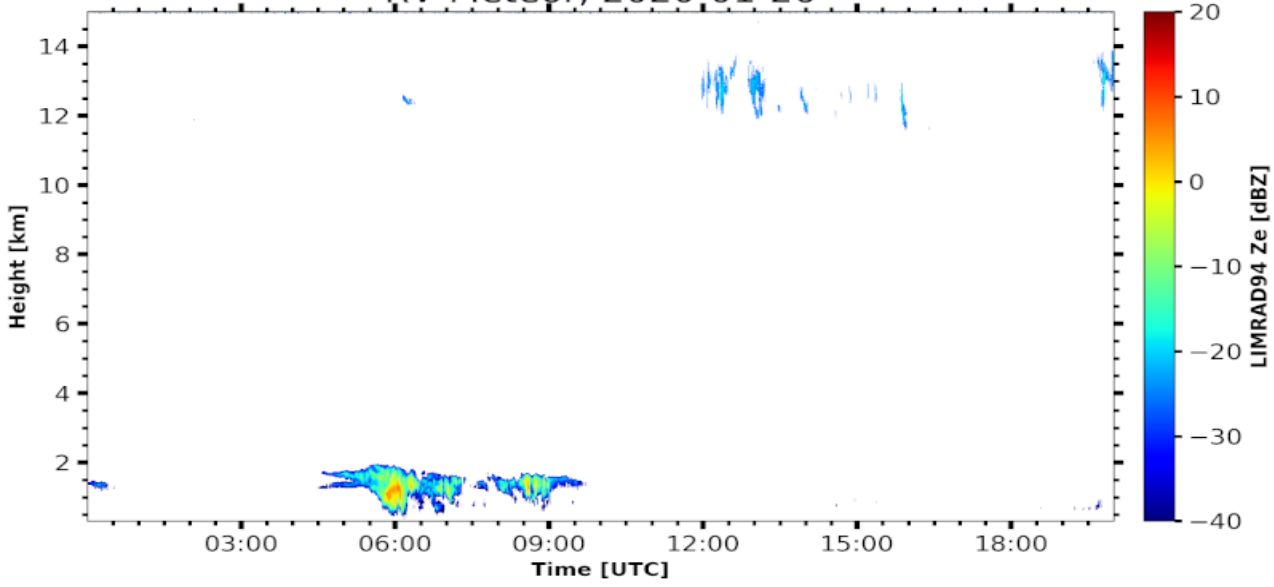
Tomorrow, we will be on the Meteor longitude (57.235W) heading north from L2 to L1 with regular CTD stop and a small diversion to permit ca 2 hours of cloud-kite operations into the wind.

Note, in the plots below focus on the **12.30 UTC to the 18.15 UTC period** when the METEOR collected a curtain along the HALO flight path.

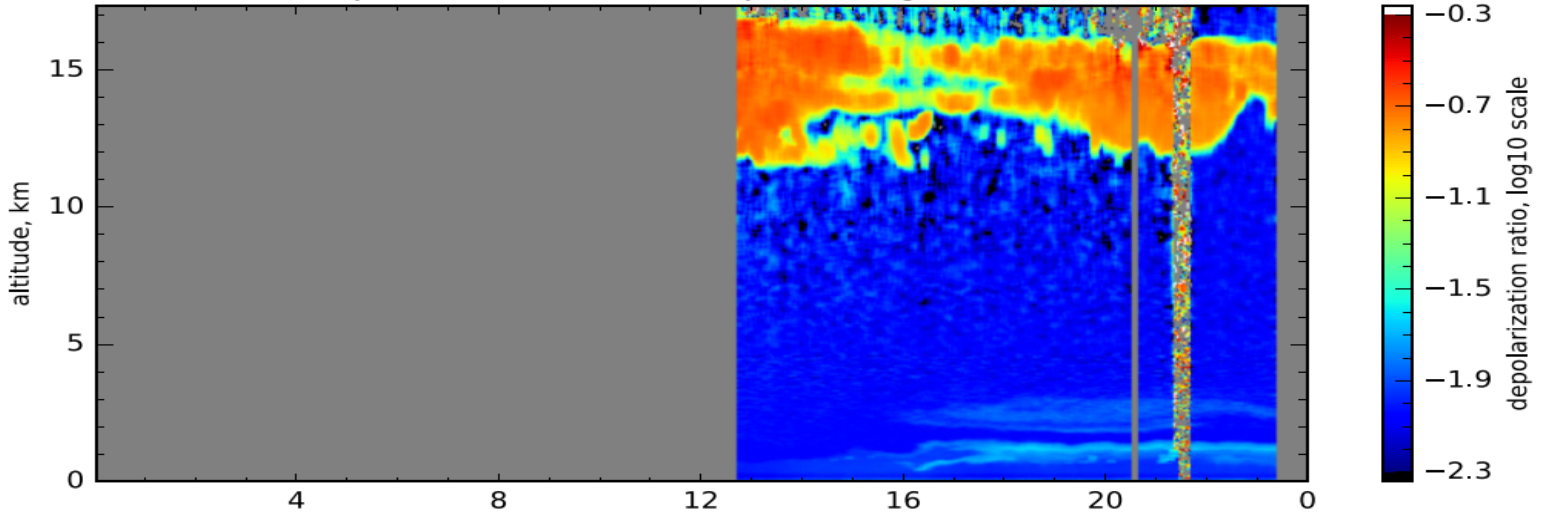
HALO overpasses (at 240m/s aircraft speed) all at 10.34 km and 500m to the south of us:

- o ~15:52 UTC
- o ~16:24 UTC
- o ~16:40 UTC
- o ~17:11 UTC (flo-manoeuver for radar calibration in between)

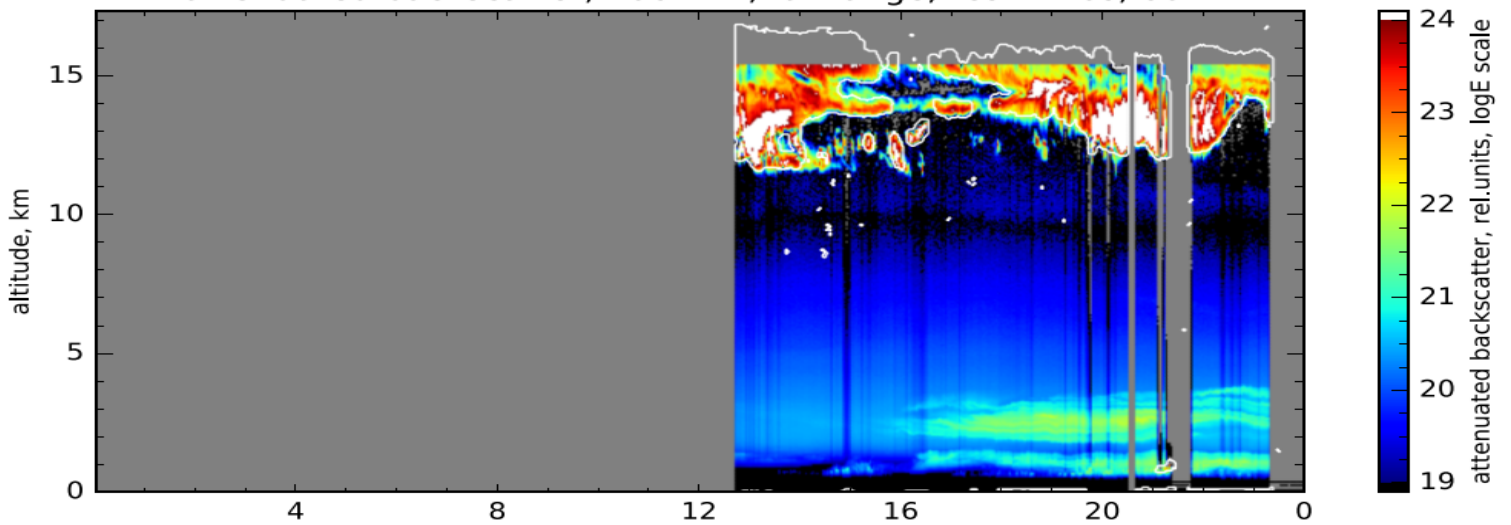
RV-Meteor, 2020-01-26



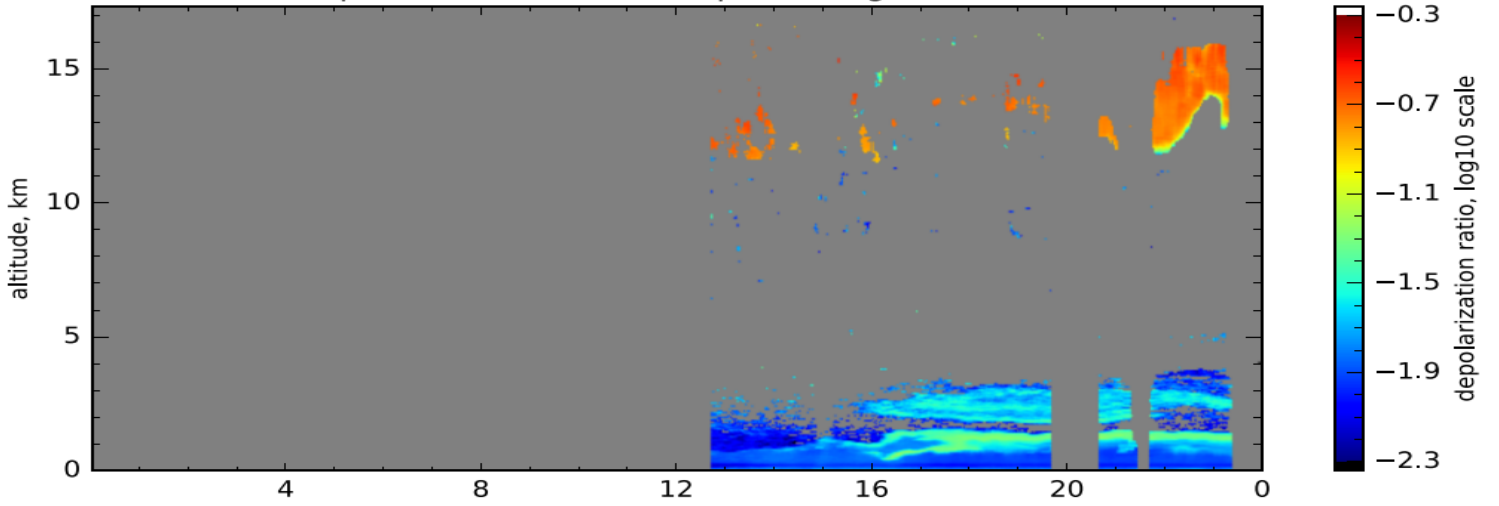
Volume linear depol. ratio, 532nm, complete range, res.: 600s, 60m-660m



attenuated backscatter, 1064nm, far range, res.: 120s, 60m



Particle linear depol. ratio, 532nm, complete range, res.: 600s, 60m-660m



Water vapor mixing ratio, FAR+NEAR, res.: 600s, 60m-540m

