

# Meteor 0129 (2020)

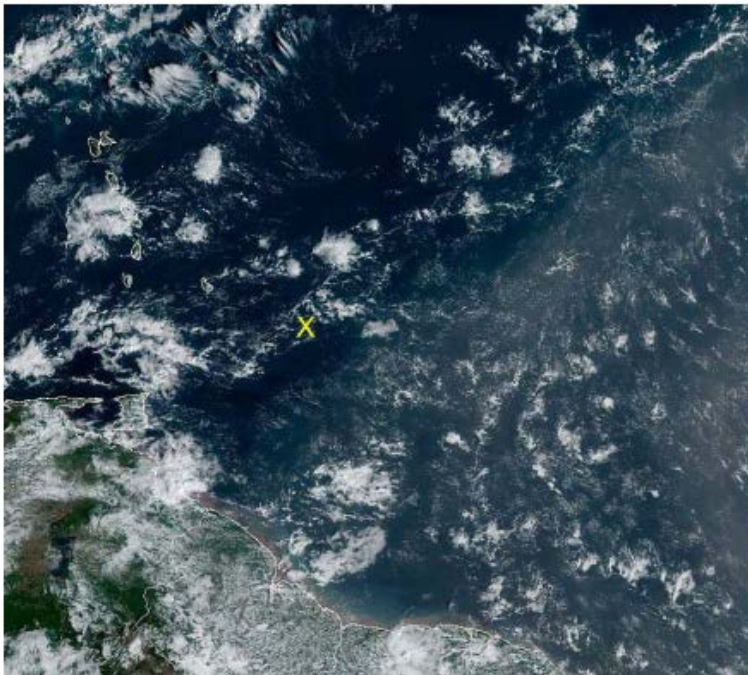
Stefan Kinne (30 jan 2am)

## 1. Objective

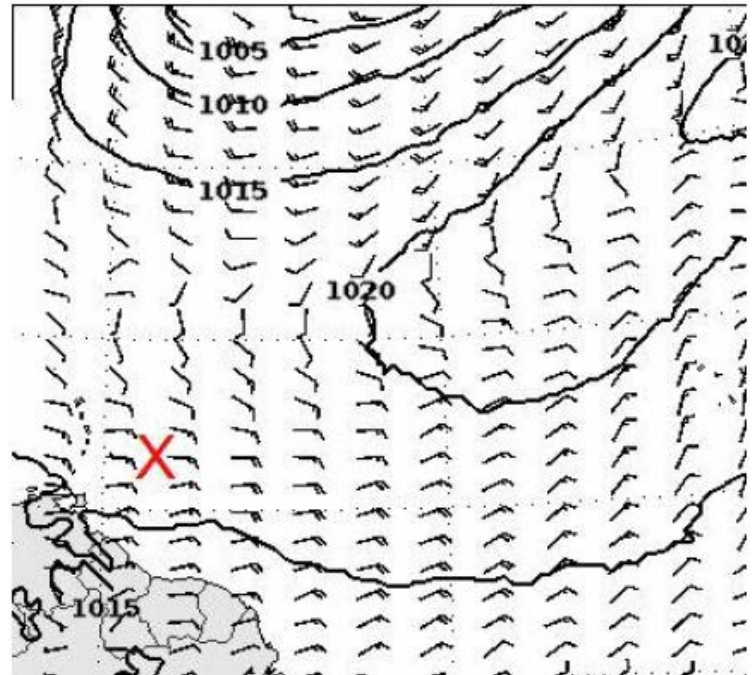
Just regular CTD every couple of hours and launching radiosondes at 2.45, 6.45, 10.45, 14.45, 18.45 and 22.45 UTC.

Today no cloud-kite observations - so just regular radiosonde launches and CTD stops. At noon we reached the southern point and turned around in the northern direction. At that time, the arrival of the dust plume at relatively low altitudes (1800-800m by the lidar) was even visually noticed by a weakening of (blue) sky and yellow (sun) colors. As we moved northward away from larger dust loads, the dust AOD slightly decreased but remained at significant levels (AOD<sub>dust</sub>~0.15). Forecasts indicate that dust will be in air above the Meteor for the next 3 days. The wind-lidar group (needing aerosol to determine wind-speeds) is particular happy with the extra aerosol at higher altitudes and also the biology group is curious on impacts from potential dust depositions. In the afternoon, the shallow water profiling probing with a p/T sensor on the rod ('rodney') was moved to the bow for more undisturbed sampling (this will extend CTD associated stops by ca 10min). The UAV group now derives near surface winds (as the wind-lidar for lower altitudes is still down until we get the spare parts in about a week) from the energy consumption needed to remain in position. We are curious how well this works once the wind-lidar is operating again. A comparison of rain-measurements (of the day with significant rainfall) illustrated that among different rain-instruments both frequency and amount varied enormously.

## 2. Synoptic Situation



Satellitenbild GOES16 29.01.2020 13:00 UTC



Vorhersage für Donnerstag 12 UTC

**Weather observations (every 3hr)**

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20 01 29001 99134 70572 11498 11009 10262 20214 40144 53014 70211 81200 22241 04273
2//// 3//// 4//// 5//// 6//// ICE ////
 20 01 29031 99130 70572 46//// /0807 10263 20220 40152 50008 7//// 8//// 22242 04273
2//// 3//// 4//// 5//// 6//// ICE ////
 20 01 29061 99129 70572 16//// /0807 10262 20221 40135 58017 7//// 8//// 22241 04273
2//// 3//// 4//// 5//// 6//// ICE ////
 20 01 29091 99127 70572 46//// /0807 10262 20220 40136 53001 7//// 8//// 22241 04274
2//// 3//// 4//// 5//// 6//// ICE ////
 20 01 29121 99125 70572 11498 21008 10268 20216 40156 52020 71581 82300 22241 04275
20201 312// 40703 5//// 6//// ICE ////
 20 01 29151 99122 70572 41498 11009 10269 20218 40161 50005 70100 81200 22241 04276
20301 311// 40803 5//// 6//// ICE ////
 20 01 29181 99123 70572 11497 11008 10270 20217 40139 58022 70600 81200 22281 04277
20201 309// 40703 5//// 6//// ICE ////
 20 01 29211 99125 70572 41597 11007 10269 20223 40135 55009 70600 81200 222// 04276
20201 309// 40802 5//// 6//// ICE ////

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After some early clouds (for a beautiful sunrise) skies lots of blue skies with a very few clouds. During the afternoon dust advected in to reduce visibility and colors of sun and sky.

**3. Cruise-day Elements**

IWV (integrated water vapor): 34 kg /m2 +/- 2  
LWP (liquid water path): 29 g /m2 +/- 46

Time	0-3UTC	4-6UTC	7-9UTC	10-12UTC	13-15UTC	16-18UTC
Height_m	648.41	626.05	581.34	603.70	670.77	715.49
max_hydro_frac_low	0.07	0.15	0.20	0.14	0.06	0.04
Height_m	2168.83	2325.34	1430.98	2280.63	1207.39	1274.47
max_hydro_frac_mid	0.17	0.05	0.08	0.16	0.02	0.00
Height_m	6004.98	6004.98	6004.98	6004.98	6004.98	6004.98
max_hydro_frac_high	0.00	0.00	0.00	0.00	0.00	0.00

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

**hourly means of ship data (1<sup>st</sup> line 0-1 UTC, 2<sup>nd</sup> 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 <sup>2</sup>	W/m <sup>2</sup>	°N	°E
35.4989	21.25	26.27	27.38	94.42	73.53	8.95	8.3	391.72	-1	13.31	-57.24
35.4723	21.43	26.26	27.32	88.82	74.33	9.56	8.22	410.32	-0.95	13.25	-57.25
35.4341	21.71	26.37	27.32	85.15	75.22	9.46	7.97	414.43	-1	13.07	-57.24
35.4053	21.72	26.42	27.37	92.95	75.1	7.49	7.34	410.68	-0.88	13	-57.25

35.312	21.77	26.38	27.31	92.22	75.33	9.34	8.18	409.78	-1	12.93	-57.24
35.2685	21.7	26.24	27.3	88.98	75.8	7.9	7.65	396.23	-1	12.88	-57.24
35.2711	21.88	26.11	27.3	76.57	77.08	7.97	7.75	397.4	-1	12.88	-57.24
35.2722	21.99	26.13	27.28	83.6	77.55	8.2	7.65	407.35	-1	12.88	-57.24
35.2604	21.38	26.22	27.34	86.45	74.25	9.19	8.18	389.87	-1	12.78	-57.25
35.2713	21.66	26.24	27.4	77.45	75.6	7.61	7.29	397.62	-1	12.71	-57.25
35.4253	22.07	26.32	27.49	78.07	77.12	9.01	7.84	422.85	23.33	12.63	-57.24
35.4798	21.83	26.63	27.46	95.7	74.62	9.18	8.05	401.82	231.82	12.53	-57.24
35.4458	21.69	26.87	27.47	100.4	72.93	8.88	8.18	403.25	486.45	12.43	-57.25
35.4682	22.22	26.68	27.5	103.29	76.08	9.04	7.74	407.15	631.92	12.4	-57.25
35.6121	21.71	26.94	27.51	97.58	72.72	10.45	8.71	400.63	804.62	12.28	-57.24
35.5892	21.61	26.93	27.53	99.13	72.32	9.81	8.6	402.62	873.73	12.16	-57.24
35.5727	21.58	26.97	27.59	94.7	71.97	8.2	7.81	398.78	902.95	12.13	-57.25
35.6169	21.7	26.98	27.68	96.17	72.35	8.87	7.79	401.43	809.25	12.24	-57.25
35.4733	21.86	26.99	27.71	98.97	73.15	7.95	7.18	402.18	641.57	12.38	-57.25
35.435	21.97	26.96	27.72	99.35	73.73	6.66	6.47	399.87	474.23	12.42	-57.25
35.4467	22.09	26.97	27.69	100.17	74.25	8.21	7.24	396.25	247.9	12.48	-57.25
35.4649	22.11	26.85	27.65	99.2	74.75	8.01	7.23	400.8	43.93	12.62	-57.25
35.2786	22.09	26.79	27.48	90.48	75.1	7.35	6.95	405.18	-1.02	12.71	-57.25
35.2702	21.96	26.75	27.43	89.47	74.64	8.79	7.42	401.59	-1	12.77	-57.25

inter-calibration: none  
CTD stations: 9  
radiosondes: 7  
overflights: none

station no.	UTC	device	action	latitude	longitude	depth	contact person
M161 74	29 jan 2020 / 00:31-01:03	CTD	CTD	13°18.004 N	57°14.728' W	800	Baranowski
M161 75	29 jan 2020 / 03:12-03:50	CTD	CTD	13°00.066 N	57°14.721' W	800	Baranowski
M161 76	29 jan 2020 / 05:01-05:57	CTD	CTD	12°52.849 N	57°14.697' W	800	Baranowski
M161 77	29 jan 2020 / 07:07-07:33	CTD	CTD / MPI	12°52.850 N	57°14.696' W	250	Baranowski
M161 78	29 jan 2020 / 09:04-09:40	CTD	CTD	12°42.784 N	57°14.737' W	800	Baranowski
M161 79	29 jan 2020 / 12:31-13:09	CTD	CTD	12°25.206 N	57°14.742' W	800	Baranowski
M161 80	29 jan 2020 / 15:56-16:32	CTD	CTD	12°07.498 N	57°14.708' W	800	Baranowski
M161 81	29 jan 2020 / 18:54-19:33	CTD	CTD	12°25.141 N	57°14.741' W	800	Baranowski
M161 82	29 jan 2020 / 09:04-09:40	CTD	CTD	12°42.751 N	57°14.740' W	800	Baranowski

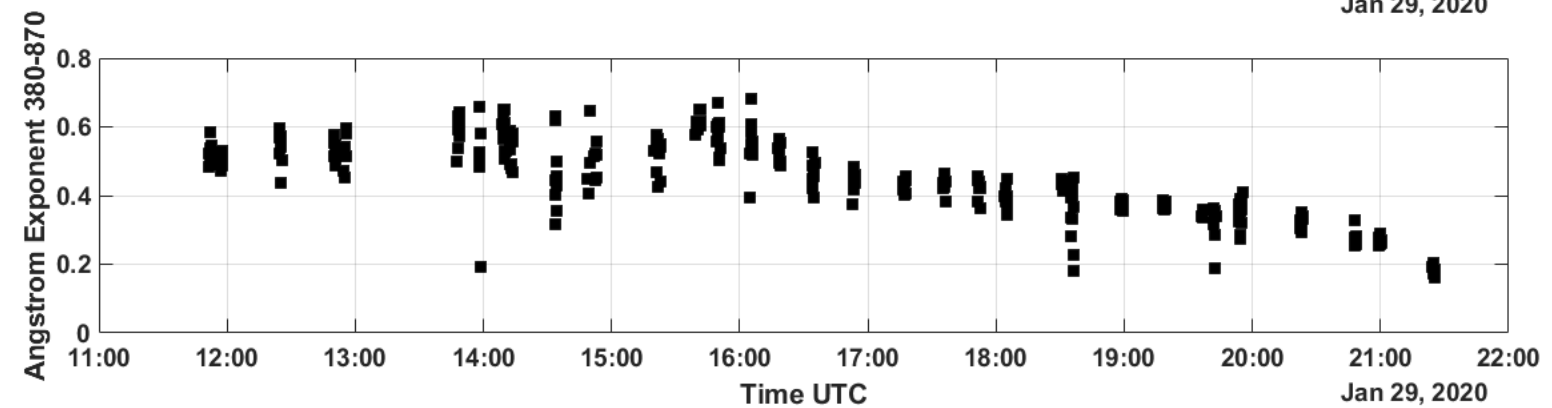
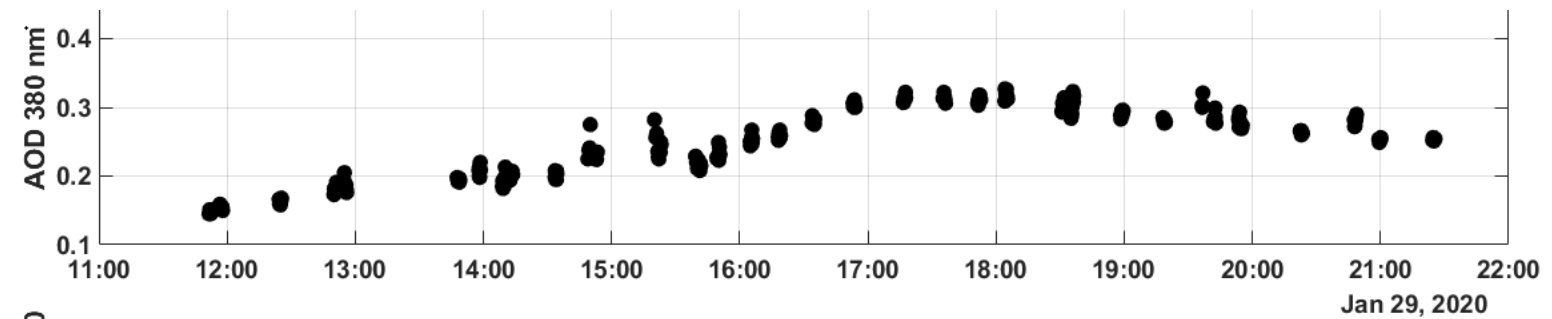
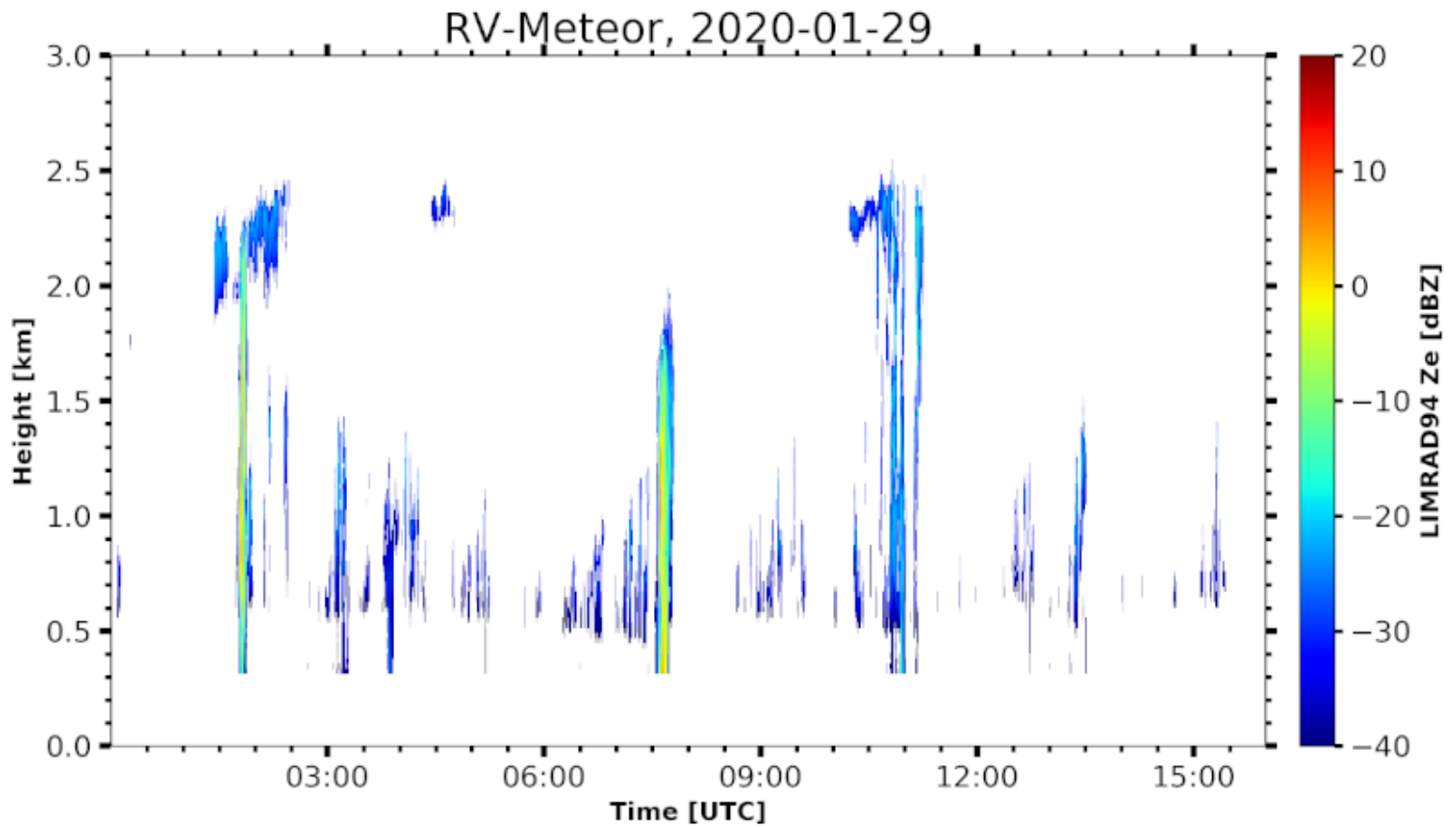
#### 4. Instrument Status

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

			status	operators
radiosondes			W	Katharina, Imke, Yanmichel, Almuth, Kevin, Sebastian, Geiske
cloud-radar			W	Heike, Johannes
micro-radiometer			W	Heike, Johannes
spect-radiometer			W	Heike, Johannes
Raman-lidar			W	Ludwig
cloud-kite			R	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, Sanola
aero scat/abs			W	Przemek (Mr P)
WRAS (aero size)			W	Alma
CTD			W	Darek and friends (almost all)
Rodney			W	Darek and his helpers

## 5. Outlook

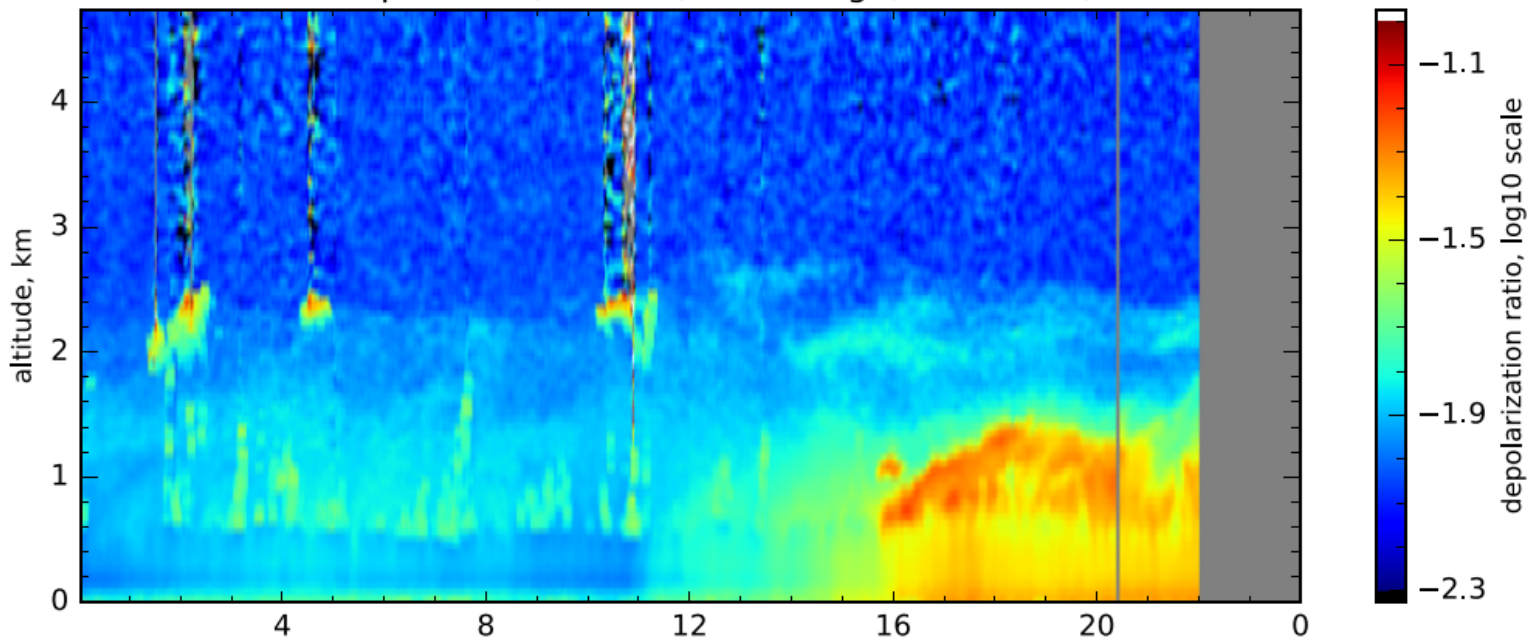
Early next morning we will reach the most northerly point above L1 and then go SW diagonally to the west side of the METEOR box for two 40mile.eastern legs into the wind (just north of the along the L1 latitude) for cloud-kite samples: one from 10-15 and - if everything goes well - another leg on the same track from 20-01.



The sunphotometer data time-series on Jan 29 (near 57W) shows a steady increase in AOD from 16 UTC also associated with an increase in typical aerosol size (lower Angstrom exponents). Towards the evening the dust load decreased as the Meteor was moving (from 12 to 13N ) into a northerly direction away from the higher aerosol loads.

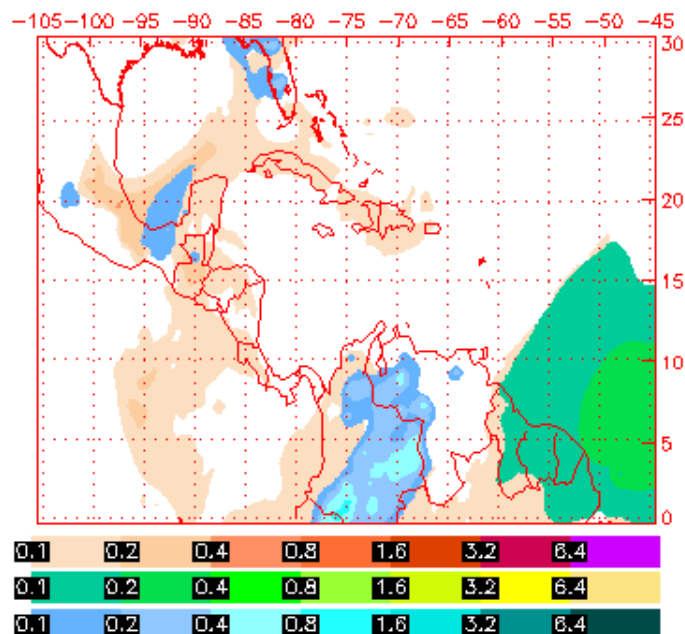


Volume linear depol. ratio, 532nm, near range, res.: 600s, 60m-180m

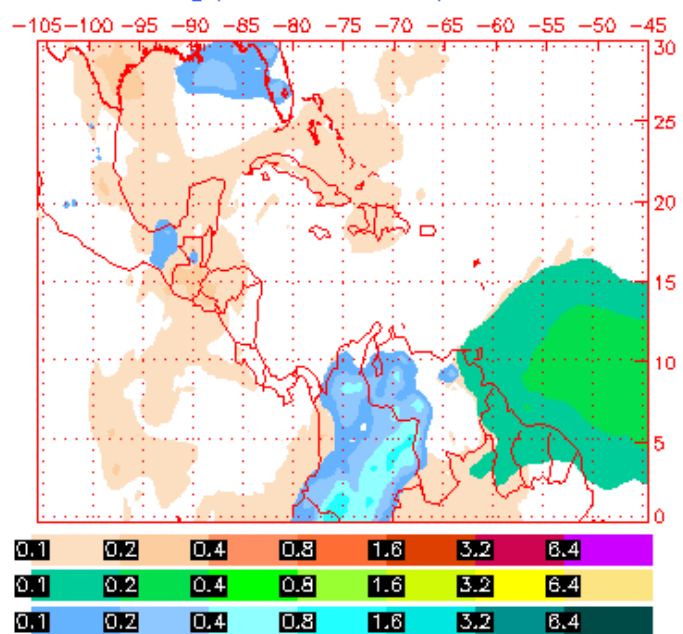


The arrival of the dust after 16 UTC was also registered by depolarization of the lidar, which places the dust between 1800 and 800m altitude

NAAPS Total Optical Depth for 18:00Z 29 Jan 2020  
Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue

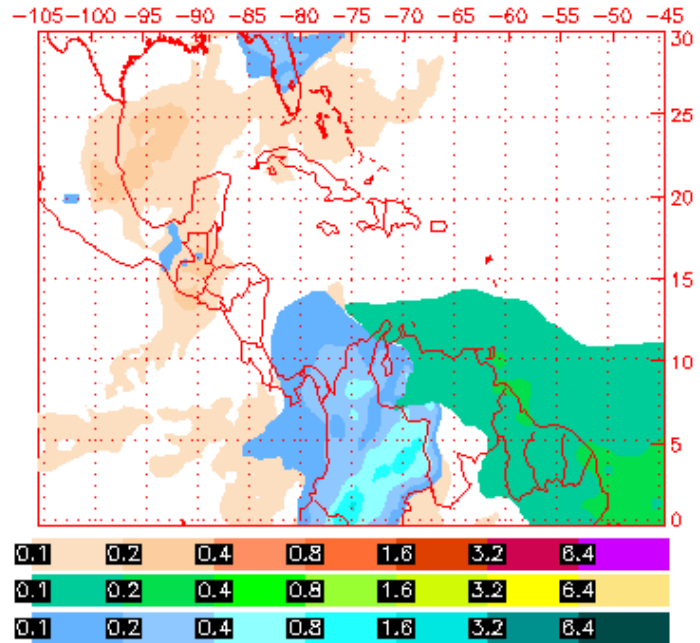
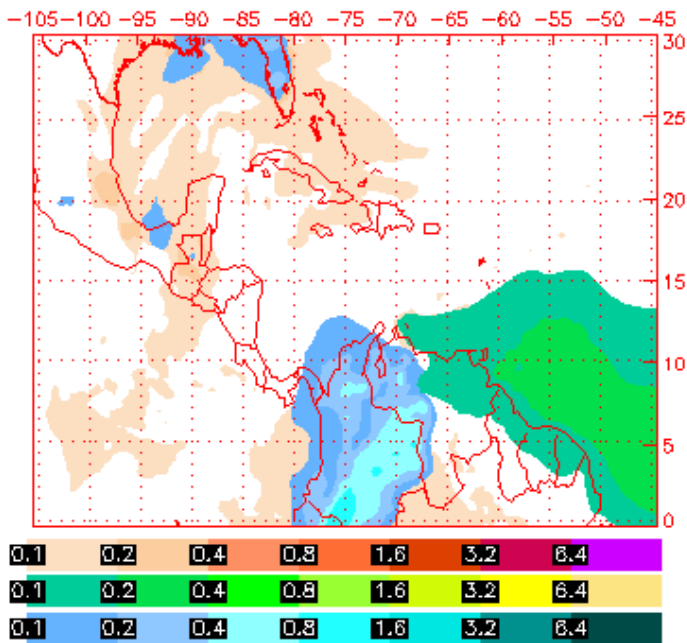


NAAPS Total Optical Depth for 18:00Z 30 Jan 2020  
Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue



NAAPS Total Optical Depth for 18:00Z 31 Jan 2020  
 Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue

NAAPS Total Optical Depth for 18:00Z 01 Feb 2020  
 Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue



Predicted mineral dust optical depths for 18UTC on Jan 29 (upper left), Jan 30 (upper right), for Jan 31 (lower left) and Feb 1 (lower right). By Feb 2 the dust event should have passed the 12-15N / 56.5 – 57.5W region of the METEOR ([https://www.nrlmry.navy.mil/aerosol\\_web/loop\\_html/globaer\\_centam\\_loop.html#](https://www.nrlmry.navy.mil/aerosol_web/loop_html/globaer_centam_loop.html#))