# Meteor 0204 (2020)

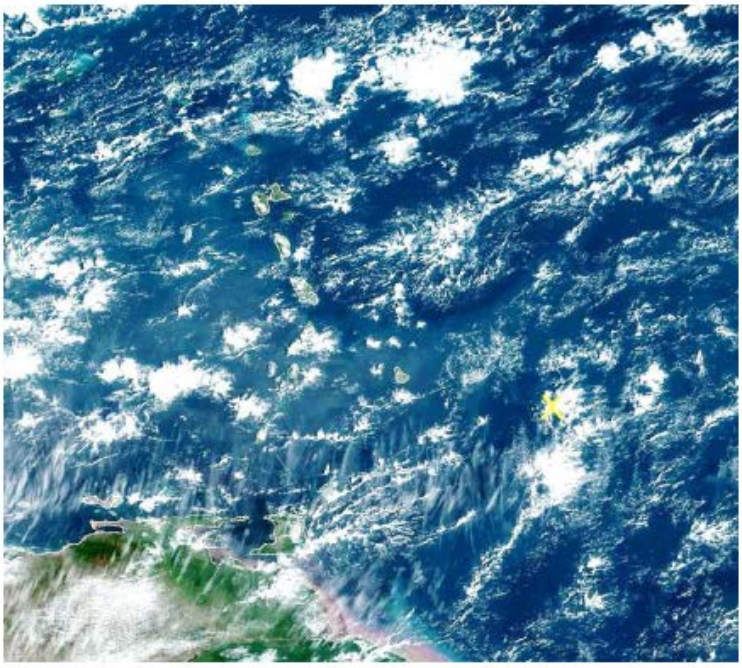
Stefan Kinne ( 5 feb 2am)

## 1. Objective

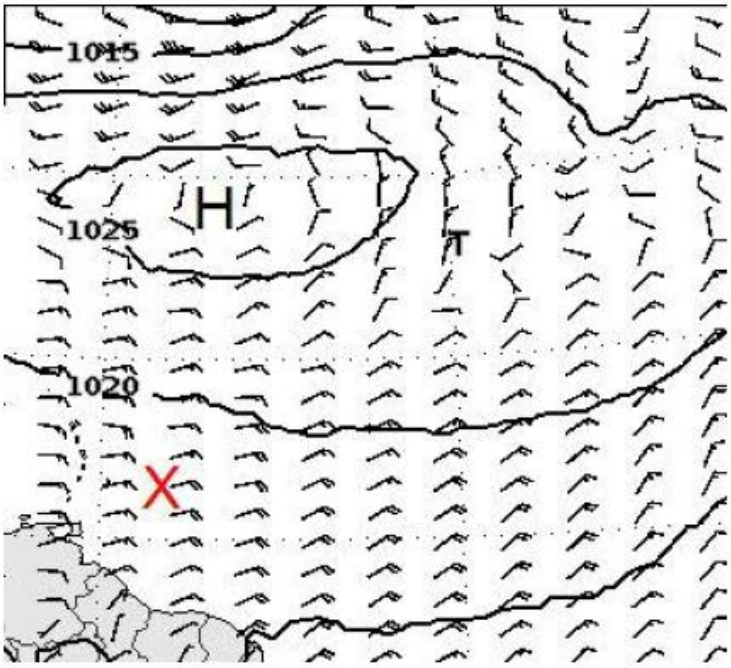
Switch to an electric ship winch (instead of the petrol winch) for the line for raising and lowering the cloud-kite. Continue regular CTD and radiosonde launches (at 2.45, 6.45, 10.45, 14.45, 16.33 (DWD), 18.45 and 22.45 UTC) along the Meteor track in a northern direction.

After taking MPI-MM samples (as every 3rd morning) during the late night (after a successful 10hour cloud-kite run) we reached the Meteor track in the morning hours just north of L2 and headed the entire day in a northward direction. We had one extra stop to move the cloud-kite line onto an electric winch of the ship as the available fuel for the petrol winch is running short. Due to the limited balloon lift and the otherwise significant instrument weight, cloud-kite operations are only possible, when heading into the wind. However, with higher near surface (trade-) winds expected for the next two days it is hoped that the stronger wind gives the cloud-kite sufficient lift to operate stationary at one location near L1, so that daily CTD and atmospheric cycles could be locally investigated and also compared to those of the nearby glider data statistics.

## 2. Synoptic Situation



Satellitenbild GOES16 **04.02.2020** 12:50 UTC




Vorhersage für Mittwoch 12 UTC

**Weather observations** (every 3hr)

```
20 02 04001 99124 70583 11598 10508 10265 20201 40178 53009 70111 81108 22222 04275
2//// 3//// 4//// 5//// 6//// ICE /////
 20 02 04031 99125 70579 46/// /0508 10263 20202 40181 50003 7//// 8//// 22222 04277
2//// 3//// 4//// 5//// 6//// ICE /////
```

```
 20 02 04061 99126 70576 16/// /0608 10258 20195 40166 58015 7//// 8//// 22221 04277
2//// 3//// 4//// 5//// 6//// ICE /////
 20 02 04091 99126 70575 46/// /0608 10259 20187 40158 56008 7//// 8//// 22221 04276
2//// 3//// 4//// 5//// 6//// ICE /////
 20 02 04121 99127 70572 11598 60606 10262 20195 40177 53019 70322 81308 22221 04277
20201 308// 40903 5//// 6//// ICE /////
 20 02 04151 99129 70572 41598 40710 10265 20202 40184 50007 72581 84801 22201 04276
20301 307// 40903 5//// 6//// ICE /////
 20 02 04181 99130 70572 11598 30709 10264 20203 40164 58020 70281 83200 22201 04278
20301 307// 40803 5//// 6//// ICE /////
 20 02 04211 99132 70572 41598 30709 10264 20207 40162 55002 70200 83230 22281 04275
20201 306// 40703 5//// 6//// ICE /////
```

Convection with nearby rain yielded only trace of precipitation in the morning as we escaped northward out of cirrus and larger convection to the north. Still nice non-precipitating lower altitude convection all day with intermittent cloud-free spots and no cirrus anymore.

## 3. Cruise-day Elements

IWV (integrated water vapor): 26 kg /m2 +/- 2
LWP (liquid water path): 30 g /m2 +/- 72

| Time | 0-3UTC | 4-6UTC | 7-9UTC | 10-12UTC | 13-15UTC | 16-18UTC | 19-21UTC |
|---|---|---|---|---|---|---|---|
| Height_m | 804.93 | 760.21 | 894.36 | 849.65 | 1117.95 | 804.93 | 760.21 |
| max_hydro_frac_low | 0.05 | 0.08 | 0.05 | 0.04 | 0.24 | 0.12 | 0.12 |
| Height_m | 1207.39 | 1207.39 | 1274.47 | 1207.39 | 1587.49 | 1274.47 | 1498.06 |
| max_hydro_frac_mid | 0.01 | 0.04 | 0.02 | 0.04 | 0.30 | 0.07 | 0.05 |
| Height_m | 12836.47 | 12836.47 | 12920.65 | 12836.47 | 12121.00 | 12836.47 | 12878.56 |
| max_hydro_frac_high | 0.00 | 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** (1st line 0-1 UTC, 2nd line 1-2 UTC … last line 23-24 UTC)

| salinity PSU | Tdew °C | Tair °C | Twater °C | TrueDir deg | RH % | rel.Wind m/s | trueWind m/s | lw Rad W/m² | sw Rad W/m² | lat °N | lon °E |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35.5289 | 20.1 | 26.47 | 27.64 | 53.78 | 67.62 | 12.28 | 7.83 | 379.65 | -1 | 12.38 | -58.2 |
| 35.6397 | 20.44 | 26.43 | 27.69 | 53.77 | 69.28 | 12.62 | 8.24 | 385.53 | -1 | 12.43 | -58.06 |
| 35.6302 | 20.21 | 26.32 | 27.69 | 49.08 | 68.68 | 12.91 | 8.59 | 388.05 | -1 | 12.48 | -57.92 |
| 35.6176 | 20.46 | 26.19 | 27.69 | 53.07 | 70.33 | 12.83 | 8.37 | 399.08 | -1 | 12.53 | -57.78 |
| 35.5767 | 20.21 | 26.05 | 27.68 | 51.7 | 69.9 | 11.58 | 8.58 | 392.15 | -1 | 12.58 | -57.64 |
| 35.5286 | 19.83 | 25.92 | 27.79 | 47.88 | 68.77 | 8.57 | 8.22 | 381.08 | -1.23 | 12.59 | -57.61 |
| 35.5264 | 19.67 | 25.84 | 27.79 | 58.15 | 68.39 | 8.58 | 8.25 | 384.03 | -1 | 12.59 | -57.61 |
| 35.5228 | 19.49 | 25.82 | 27.71 | 64.43 | 67.7 | 9.1 | 8.61 | 383.8 | -1 | 12.59 | -57.61 |
| 35.4726 | 19.23 | 25.84 | 27.64 | 62.93 | 66.58 | 12.36 | 8.86 | 378.73 | -1 | 12.61 | -57.55 |
| 35.3685 | 19.03 | 25.84 | 27.59 | 68.75 | 65.73 | 11.99 | 8.34 | 381.22 | -1 | 12.65 | -57.43 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35.359 | 19 | 25.89 | 27.6 | 66.95 | 65.32 | 11.21 | 7.51 | 372.17 | 32.25 | 12.69 | -57.32 |
| 35.351 | 19.3 | 25.99 | 27.67 | 56.4 | 66.23 | 7.97 | 7.25 | 378.53 | 218.8 | 12.71 | -57.25 |
| 35.363 | 19.76 | 26.23 | 27.67 | 55.42 | 67.15 | 9.47 | 7.8 | 402.22 | 326.38 | 12.76 | -57.25 |
| 35.36 | 20.2 | 26.16 | 27.62 | 61.83 | 69.35 | 9.07 | 8.8 | 425.58 | 253.02 | 12.78 | -57.25 |
| 35.3764 | 20.44 | 26.43 | 27.6 | 65.44 | 69.15 | 11.62 | 10.07 | 411.34 | 661.73 | 12.81 | -57.25 |
| 35.4694 | 20.62 | 26.41 | 27.68 | 67 | 70.02 | 11.39 | 9.57 | 392.19 | 887.19 | 12.92 | -57.24 |
| 35.4601 | 20.5 | 26.39 | 27.75 | 68.4 | 69.78 | 8.97 | 8.72 | 397.8 | 827.25 | 12.95 | -57.24 |
| 35.4653 | 20.45 | 26.41 | 27.8 | 68.67 | 69.28 | 9.1 | 8.84 | 402.07 | 700.68 | 12.95 | -57.24 |
| 35.4377 | 20.54 | 26.47 | 27.7 | 62.55 | 69.53 | 10.16 | 9.14 | 409.72 | 502.28 | 12.99 | -57.25 |
| 35.4218 | 20.58 | 26.55 | 27.77 | 63.3 | 69.38 | 10.52 | 8.69 | 396.6 | 395.8 | 13.03 | -57.24 |
| 35.2735 | 20.72 | 26.53 | 27.61 | 66.97 | 70.02 | 11.25 | 8.83 | 389.82 | 240.7 | 13.15 | -57.24 |
| 35.2363 | 20.64 | 26.32 | 27.47 | 68.47 | 70.55 | 10.43 | 8.76 | 385.27 | 53.28 | 13.27 | -57.25 |
| 35.2272 | 20.56 | 26.21 | 27.41 | 63.7 | 70.62 | 9.61 | 8.32 | 386.7 | -1.03 | 13.31 | -57.25 |
| 35.3009 | 20.6 | 26.17 | 27.33 | 63.27 | 71.02 | 11.44 | 8.8 | 386.76 | -1 | 13.43 | -57.25 |

**inter-calibration:** **none**
**CTD stations:** **5**
**radiosondes**: **7**
**overflights:** **none**

| station no. | UTC | device | action | latitude | longitude | depth | contact person |
|---|---|---|---|---|---|---|---|
| M161 115 | 4 feb 2020 / 05:10-06:04 | CTD | CTD | 12°35.274 N | 59°36.416' W | 800 | Baranowski |
| M161 116 | 4 feb 2020 / 07:23-07:49 | CTD | CTD / MPI | 12°35.274 N | 57°36.416' W | 250 | Baranowski |
| M161 117 | 4 feb 2020 / 11:17-11:52 | CTD | CTD | 12°42.756 N | 57°14.741' W | 800 | Baranowski |
| M161 118 | 4 feb 2020 / 18:33-19:12 | CTD | CTD | 13°00.035 N | 57°14.752' W | 800 | Baranowski |
| M161 119 | 4 feb 2020 / 21:49-22:32 | CTD | CTD | 13°18.021 N | 57°14.751' W | 800 | Baranowski |

## 4. Instrument Status

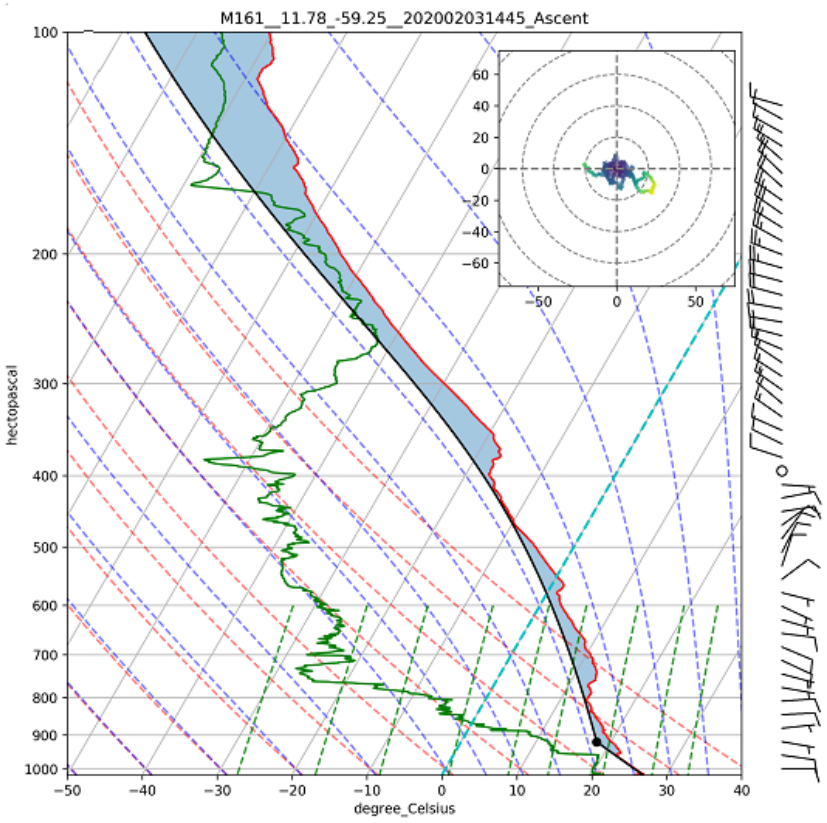
Instrument-Status (**W**-working, **P**-partially-working, **F**-failure, **U**-untested, **R**-ready)

| | | | 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 | | | **W** | Oliver, Marcel, Marcel, Antonio, Robert, Sanola |
| Picarro | | | **P** | Sebastian |
| micro-biology | | | **W** | Wiebke, Jan, Abiel |

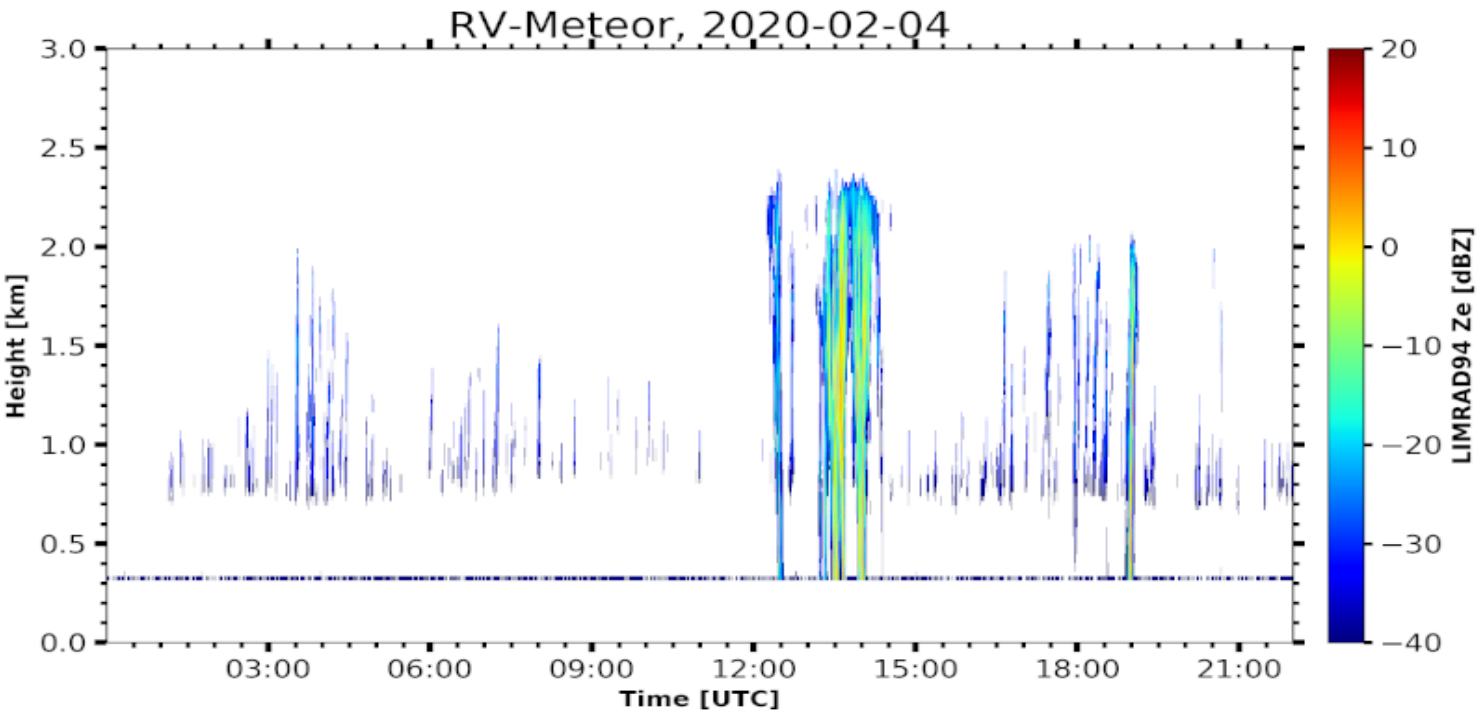
| | | | | |
|---|---|---|---|---|
| ADPC ocean curr. | | | W | Callum, Beth |
| thermosalinograph | | | W | Callum, Beth |
| glider | | | W | Callum, Beth |
| UAV | | | W | Darek, Jakub, Michal, Wojciech |
| eddy-flux-data | | | W | Katharina, Imke, Heike |
| wind-lidar (DTU) | | | W | Geiske, Kevin |
| wind-lidar (Bre) | | | P | 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, Przemek, Beth, Callum, Alma, Sanola, Kevin, Robert, Wojtek, Almuth |
| Rodney | | | W | Darek, Jakub, Przemek |

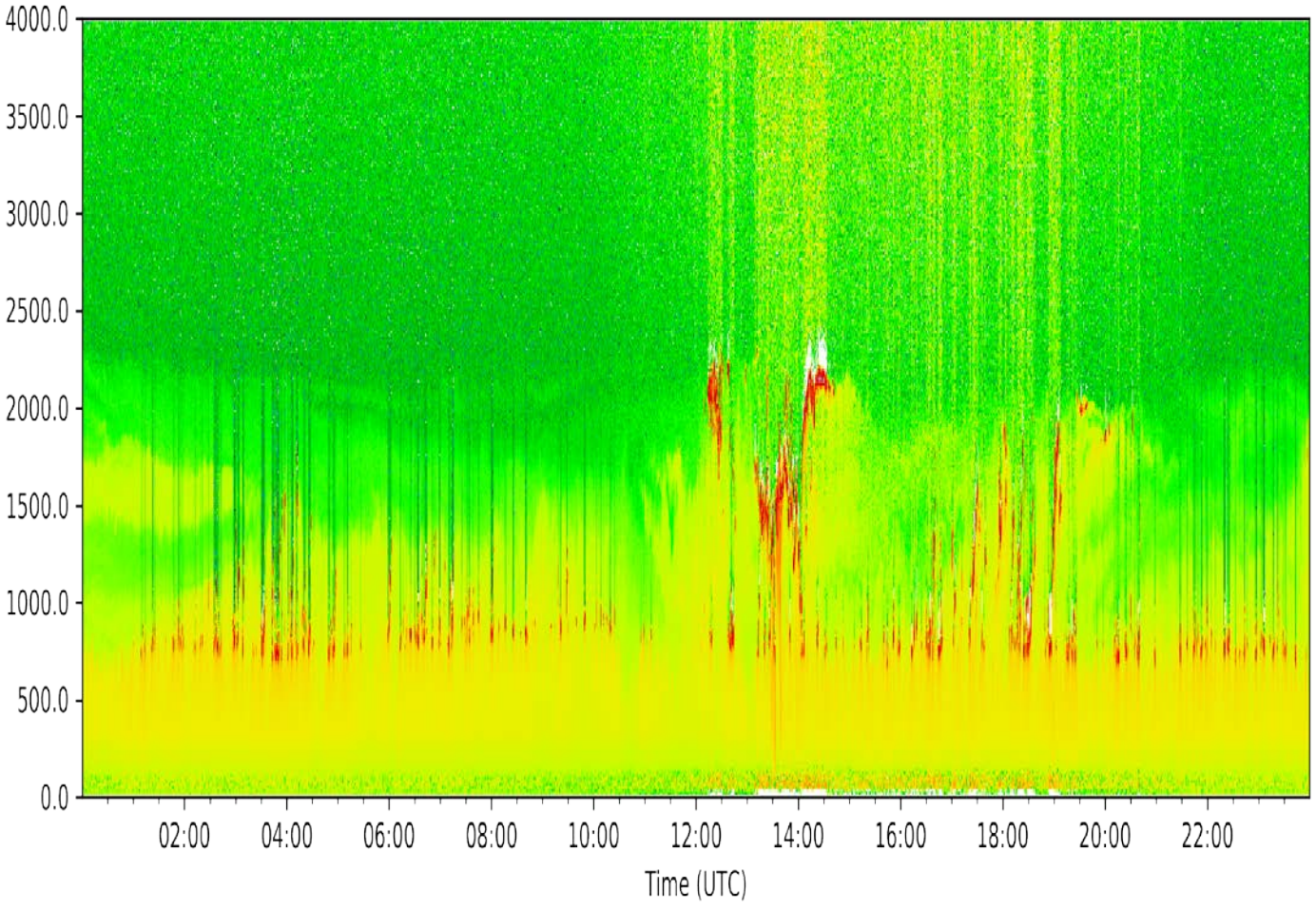
## 5. Outlook

During the late night we will reach the northern turning point and remain for some extra glider station and cloud-kite time near L1. Hopefully the swell is not so high so that we can service the autonaut and the pink glider.




Sample radiosonde output of Feb 3 (more than 100 radiosondes have been launched so far)




Corresponding METEOR radar (top) and ceilometer images (bottom) for Feb 4