



Supplement of

Measurement report: Aerosol vertical profiles over the western North Atlantic Ocean during the North Atlantic Aerosols and Marine Ecosystems Study (NAAMES)

Francesca Gallo et al.

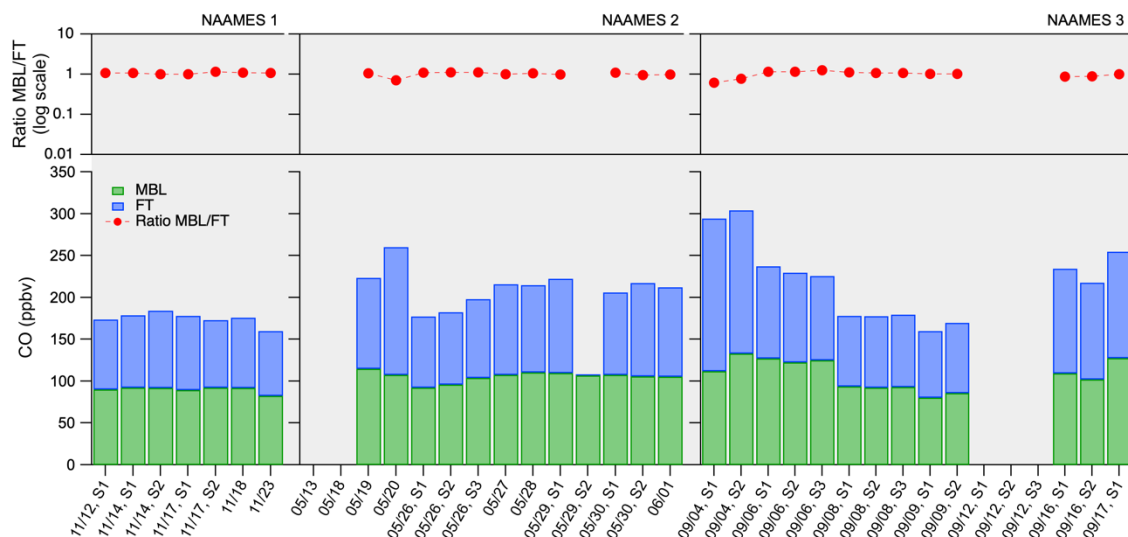
Correspondence to: Richard H. Moore (richard.h.moore@nasa.gov) and Francesca Gallo (francesca.gallo@nasa.gov)

The copyright of individual parts of the supplement might differ from the article licence.

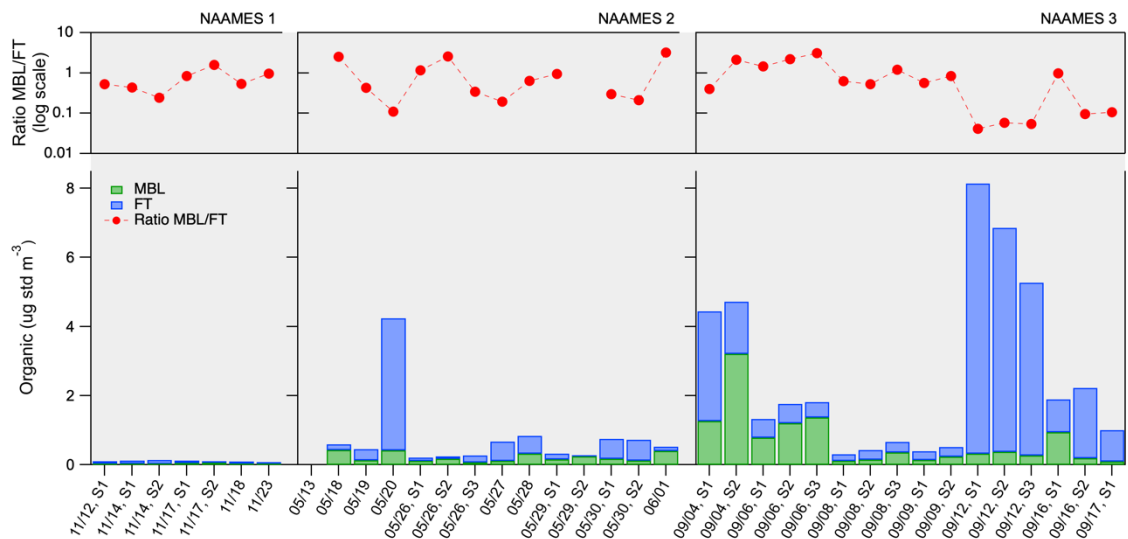
SI.1. Comparison between marine boundary layer and free troposphere aerosol properties for NAAMES-1, 2, and 3

Figures below show MBL (green bars) and FT (blue bars) mean values of aerosol properties for each C-130 spirals during NAAMES-1, -2, and -3. The red circles denote the ratio between MBL and FT mean values for each parameter considered.

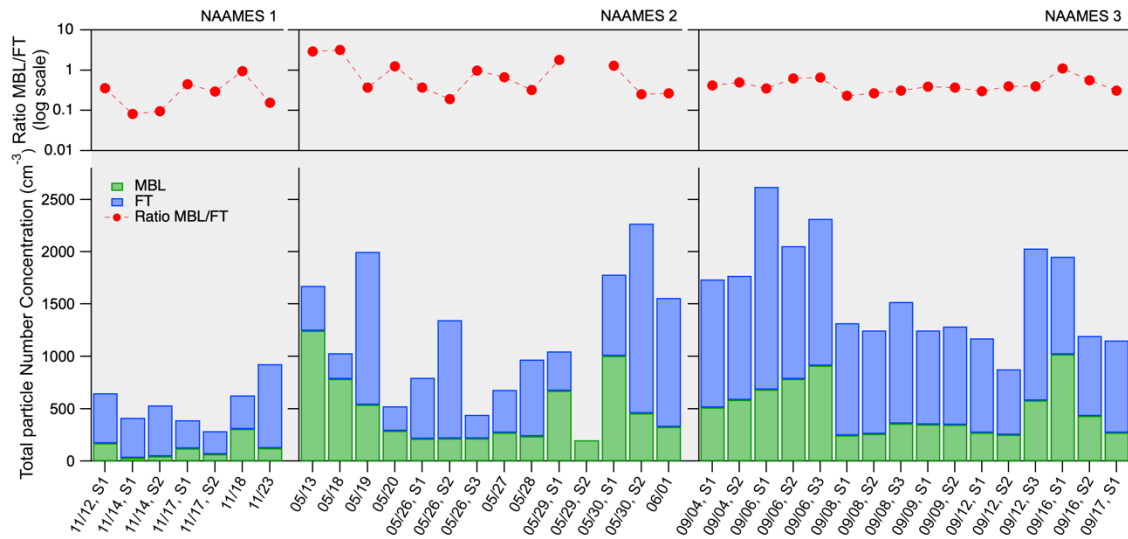
5 **Figures SI.1.a.** Mean values of CO in the MBL and FT, and MBL/FT ratio



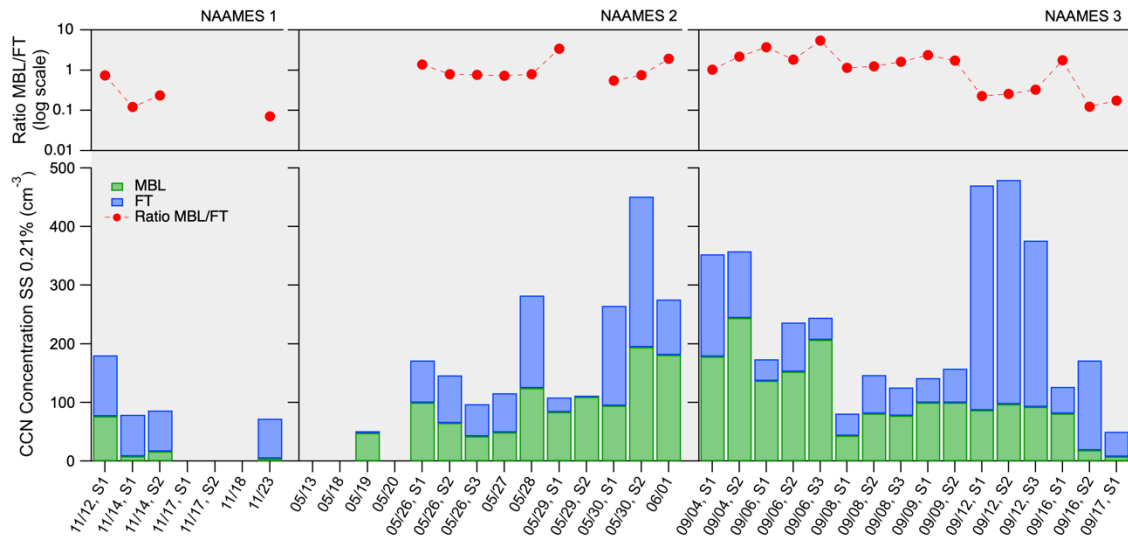
Figures SI.1.b. Mean values of organic in the MBL and FT, and MBL/FT ratio



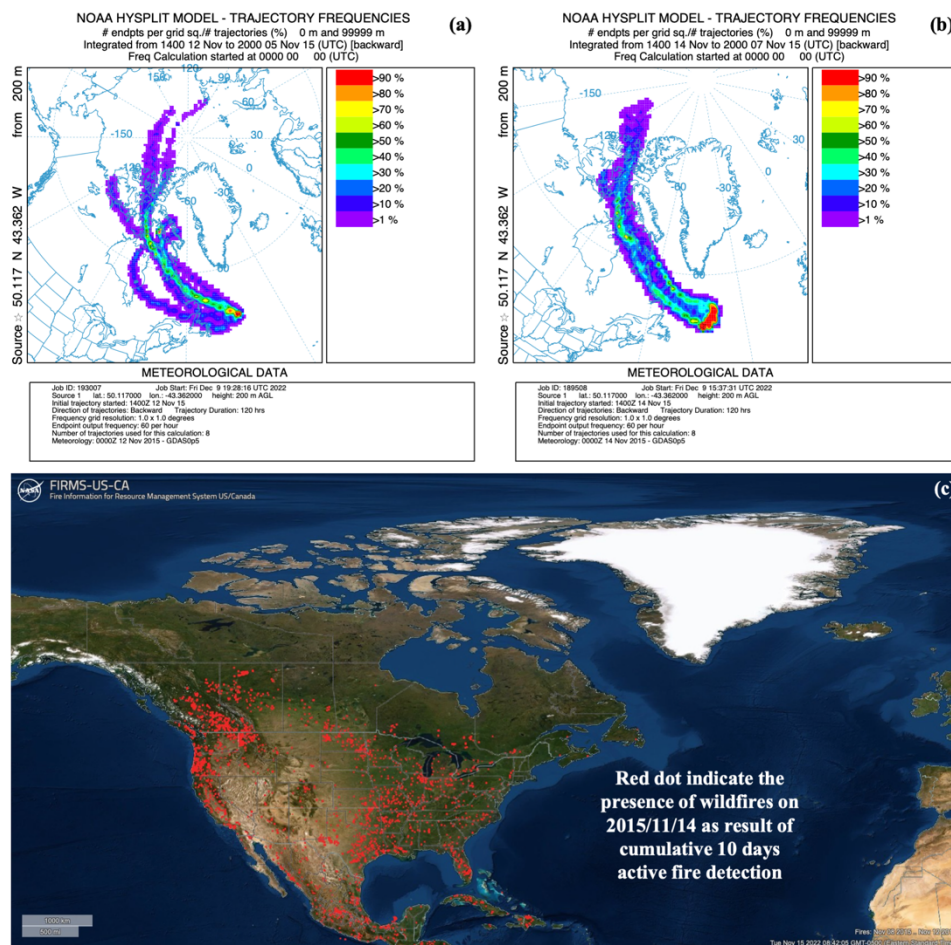
Figures SI.1.c. Mean values of total particle concentration in the MBL and FT, and MBL/FT ratio



Figures SI.1.d. Mean values of cloud condensation nuclei in the MBL and FT, and MBL/FT ratio



SI.2. Hysplit 5-days frequency back trajectories arriving at NAAMES C-130 location on September 12th, 2017 (a) and September 14th, 2017, and NASA Worldview VIIRS 375 Active fires between September 4th and 14th, 2017 (© Google Earth 2015)

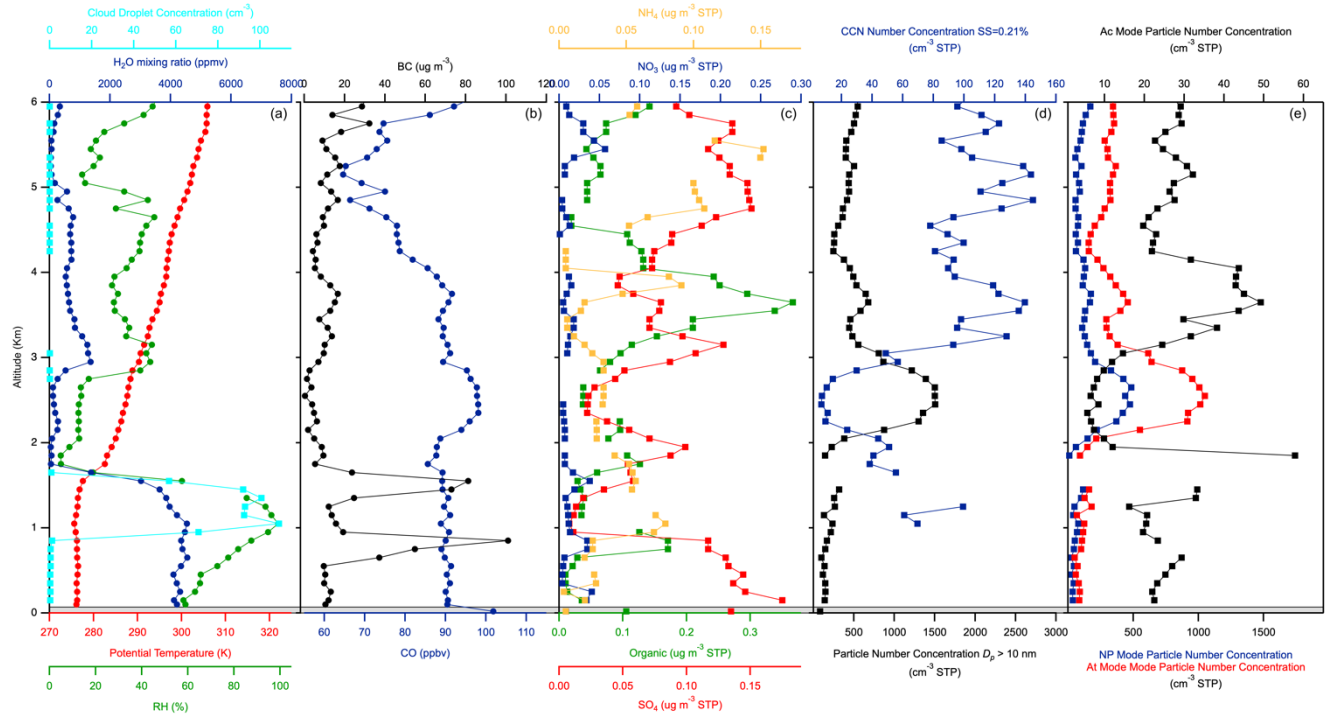


SI.3. Vertical profiles of meteorological parameters and aerosol properties for NAAMES-1, 2, and 3

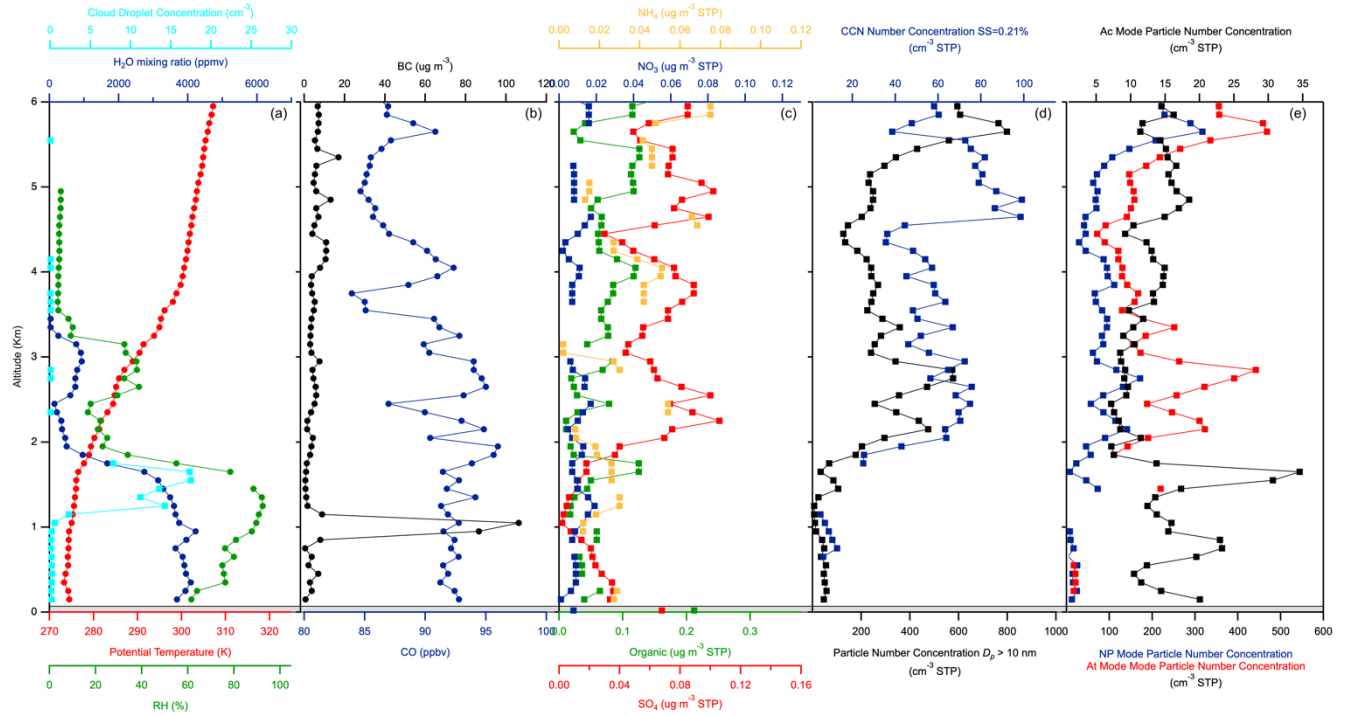
Figures below show vertical profiles for each C-130 spirals, the circle and square markers represent respectively 100-meters altitude mean and geometric mean values. The first panel on the left (a) shows the thermodynamic profiles of potential temperature (red), relative humidity (green), and H₂O mixing ratio (blue), and vertical profiles of cloud droplet number concentration (light blue). Blue, red, and black traces and markers in Panel (b) denote respectively CO mixing ratio, DMS mixing ratio and refractory black carbon particle (BC) mass. Panel (c) shows the vertical profiles of the mass concentrations of non-refractory organic (green), sulfate (red), nitrate (blue), and ammonium (yellow). Number concentrations of submicron particle (black) and cloud condensation nuclei (blue) are shown in Panel (d). The rightmost panel (e) shows the number concentration of particles in the NP (blue), At (red), and Ac (black) modes Aerosol measurements collected at the ocean surface aboard the *R/V Atlantis* are shown in the grey box.

Figures SI.3.a. Vertical profiles of meteorological parameters and aerosol properties for NAAMES-1 spirals

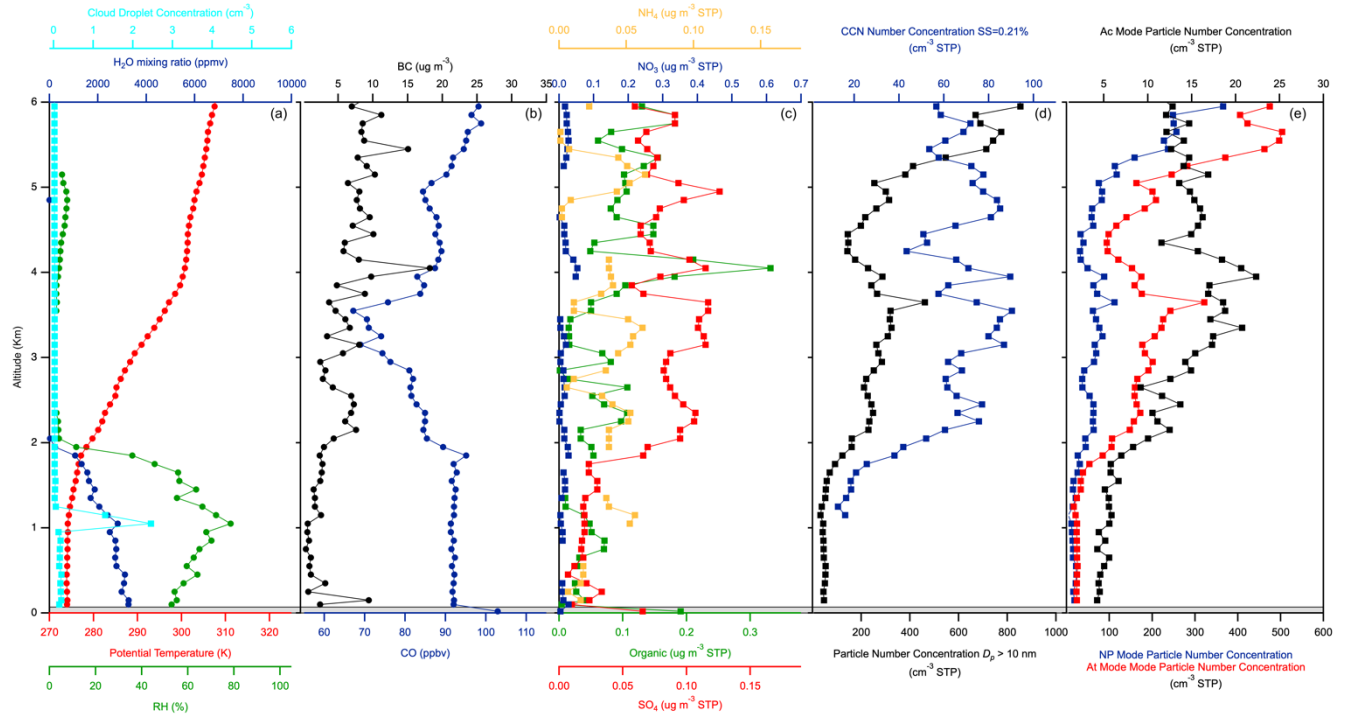
1) 12 Nov. 2015 - Spiral 1, 13:00 - 13:21 UTC, C-130 Lat. 50.12 Long. -43.36, R/V Atlantis Lat. 51.04 Long. -43.62



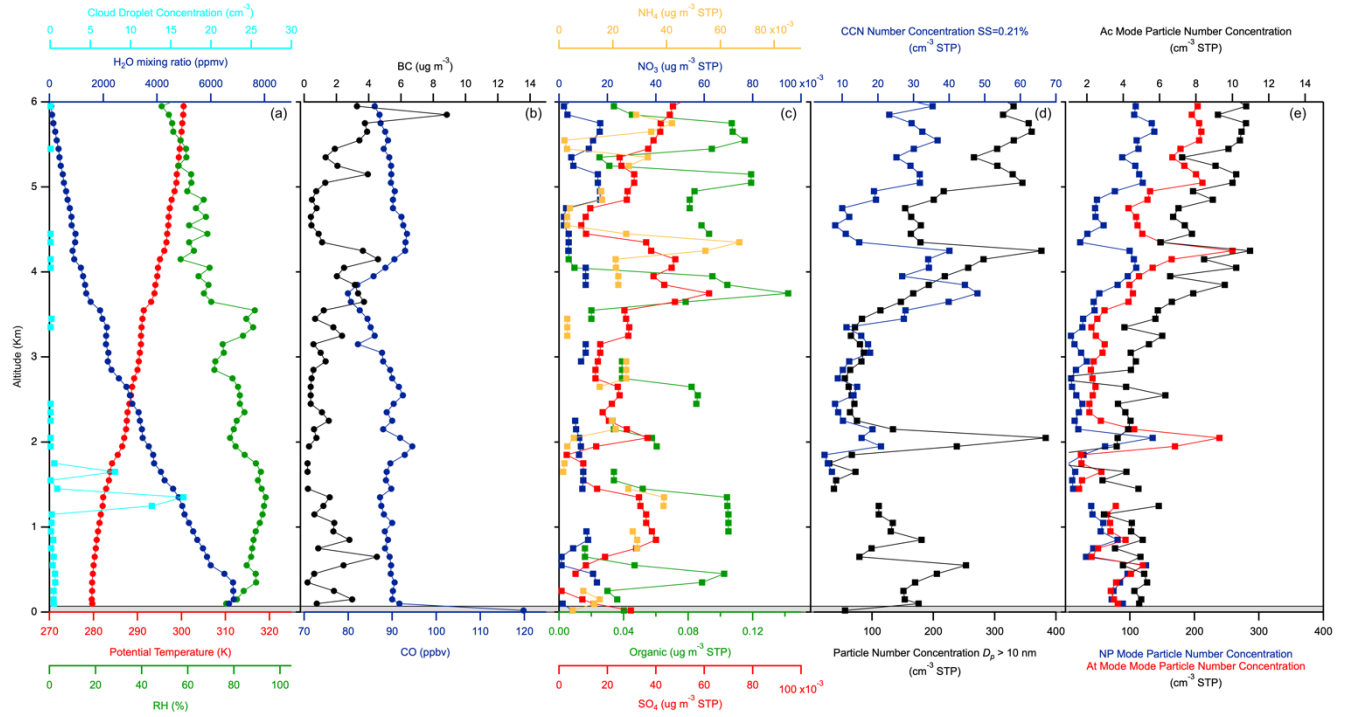
2) 14 Nov. 2015 - Spiral 1, 13:24 - 13:41 UTC, C-130 Lat. 54.04 Long. -38.35, R/V Atlantis Lat. 54.11 Long. -40.18



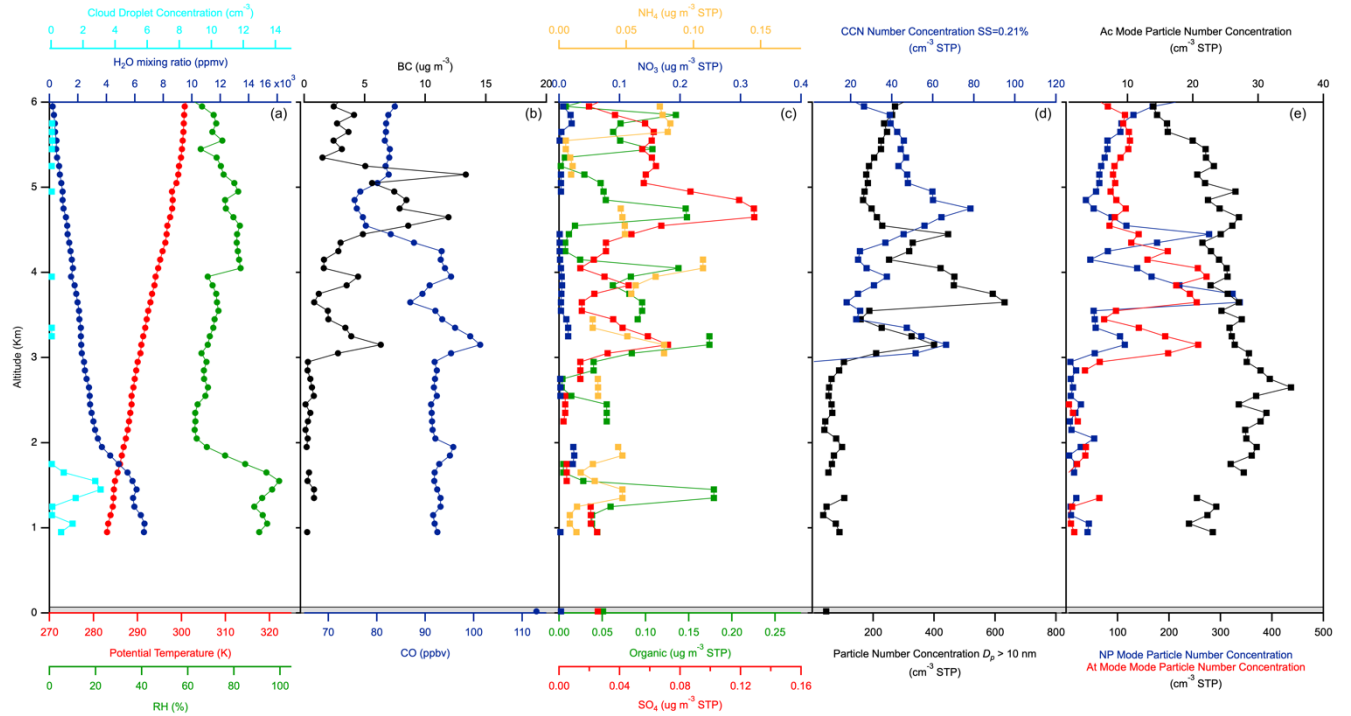
3) 14 Nov. 2015 - Spiral 2, 15:01 - 15:23 UTC, C-130 Lat. 54.16 Long. -41.51, R/V Atlantis Lat. 54.11 Long. -40.18



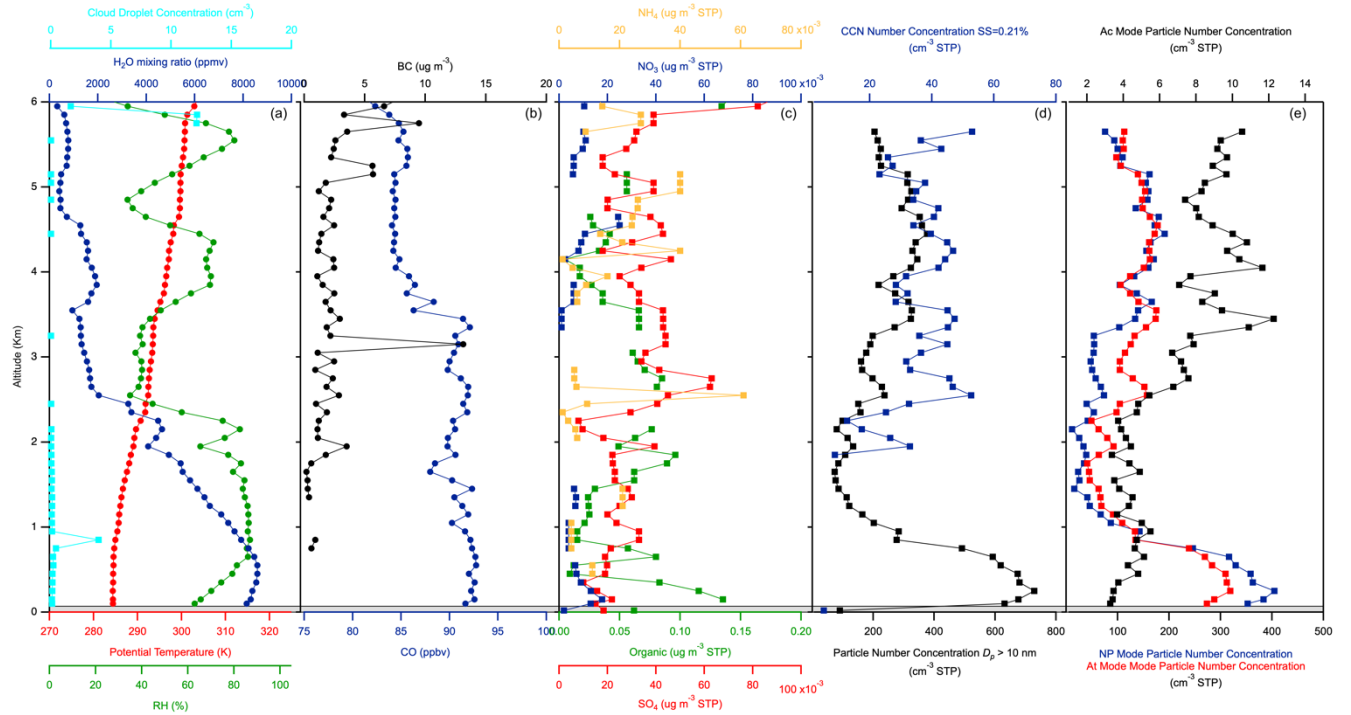
4) 17 Nov. 2015 - Spiral 1, 14:40 - 14:59 UTC, C-130 Lat. 50.75 Long. -39.65, R/V Atlantis Lat. 48.06 Long. -38.72



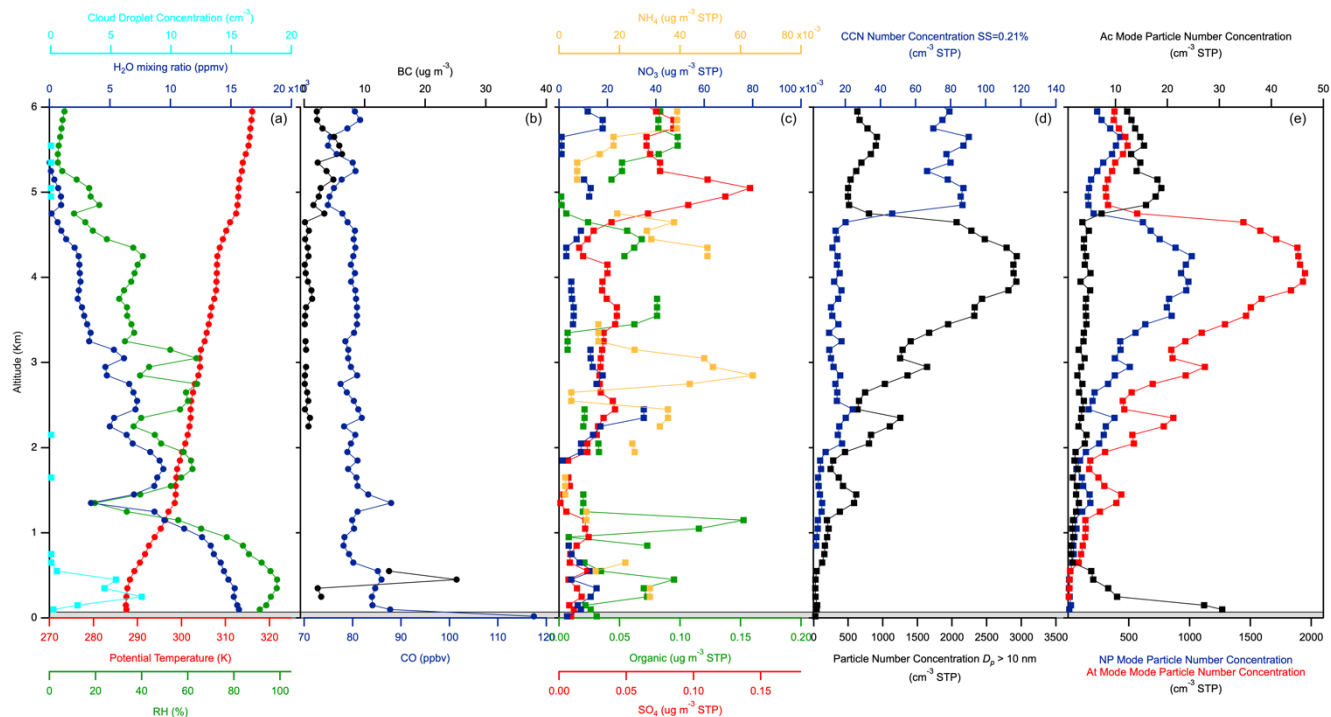
5) 17 Nov. 2015 - Spiral 2, 16:07 - 16:22 UTC, C-130 Lat. 49.80 Long. -39.72, R/V Atlantis Lat. 47.93 Long. -38.67



6) 18 Nov. 2015 - Spiral 1, 14:45 - 15:02 UTC, C-130 Lat. 46.46 Long. -36.69, R/V Atlantis Lat. 46.20 Long. -37.87

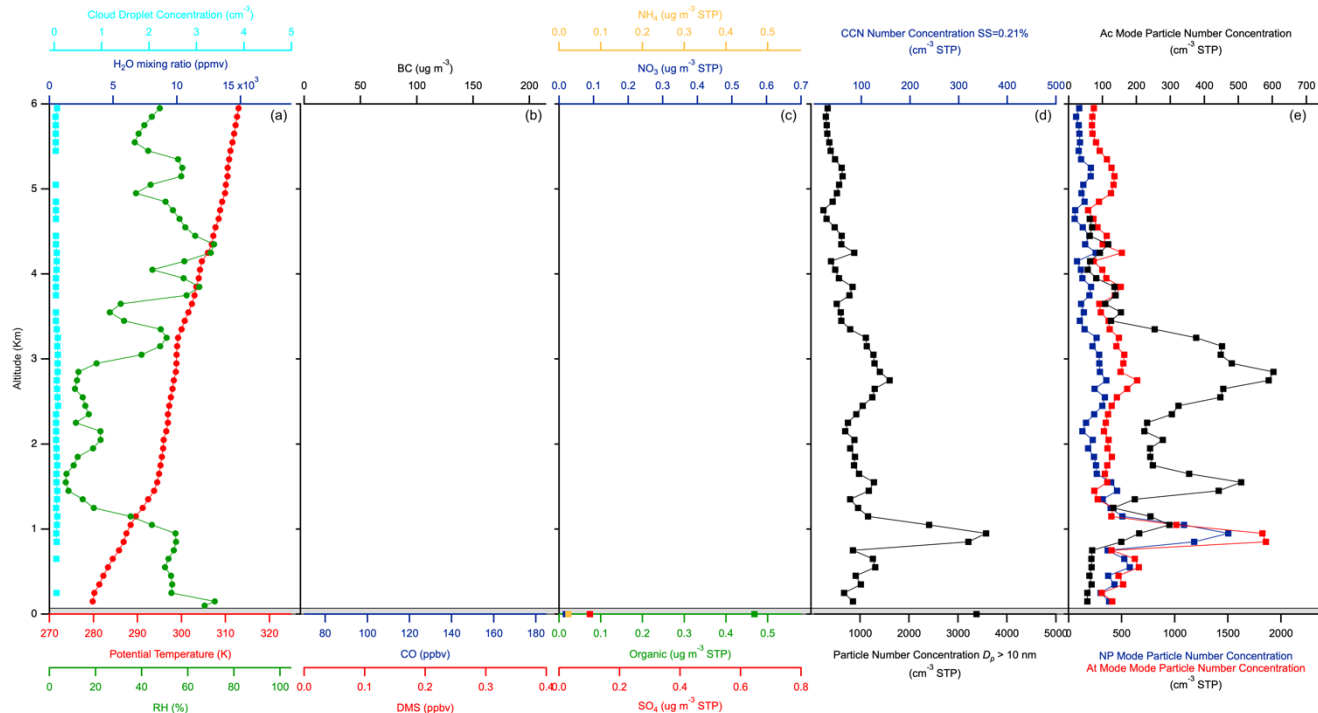


7) 23 Nov. 2015 - Spiral 1, 12:25 - 12:46 UTC, C-130 Lat. 42.50 Long. -39.80, R/V Atlantis Lat. 42.98 Long. -40.20

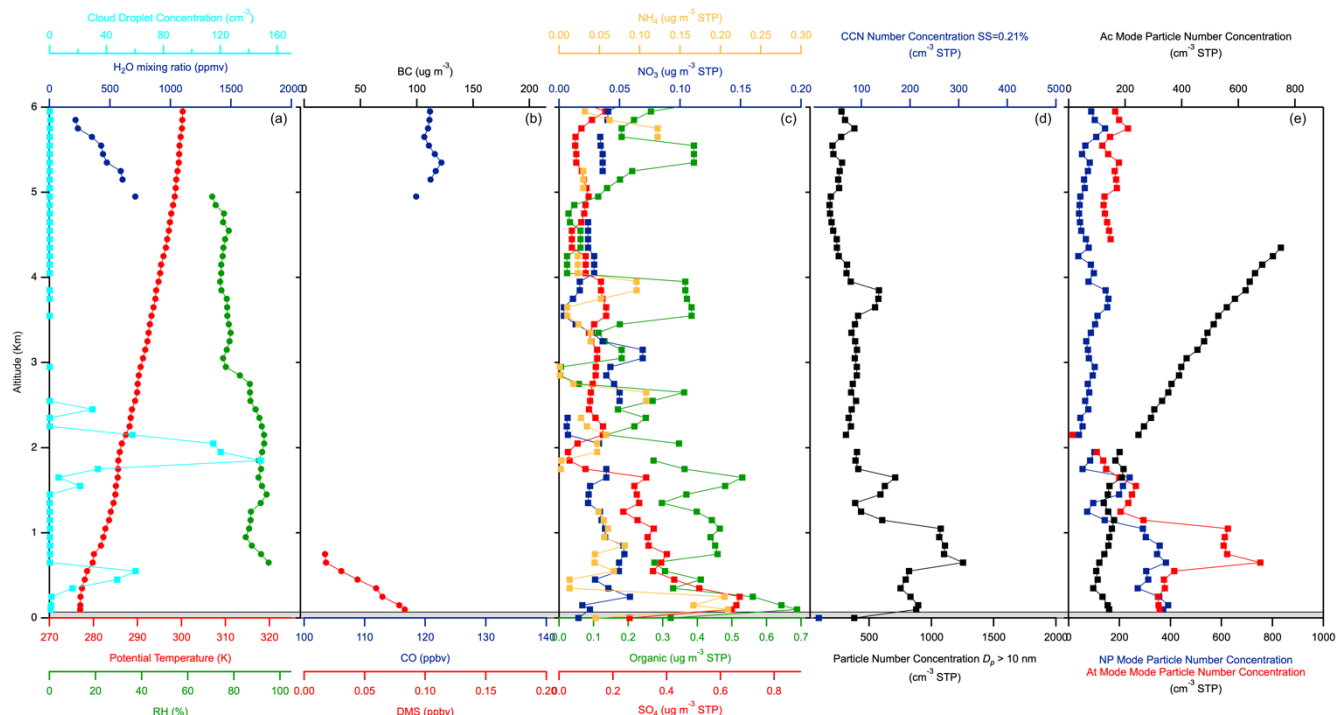


Figures SI3.b. Vertical profiles of meteorological parameters and aerosol properties for NAAMES-2 spirals

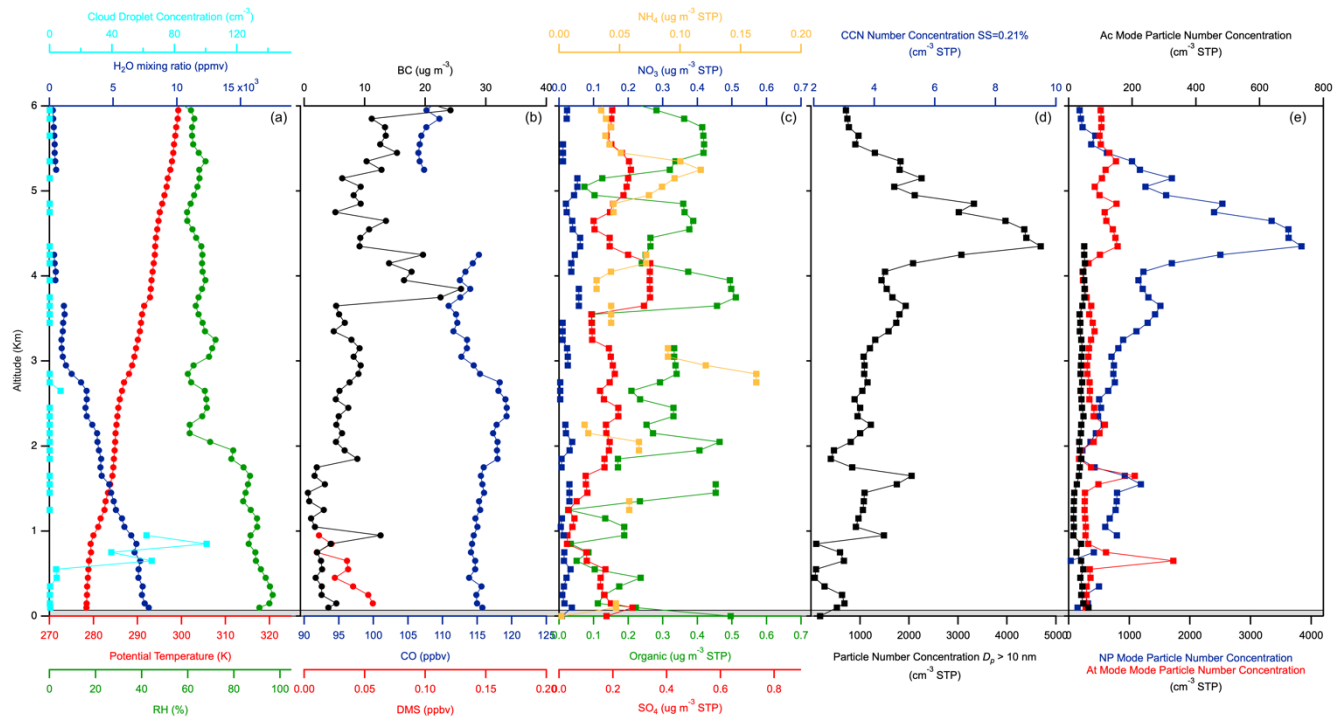
8) 13 May 2016 - Spiral 1, 21:09 - 21:30 UTC, C-130 Lat. 43.91 Long. -59.98, R/V Atlantis Lat. 42.72 Long. -61.57



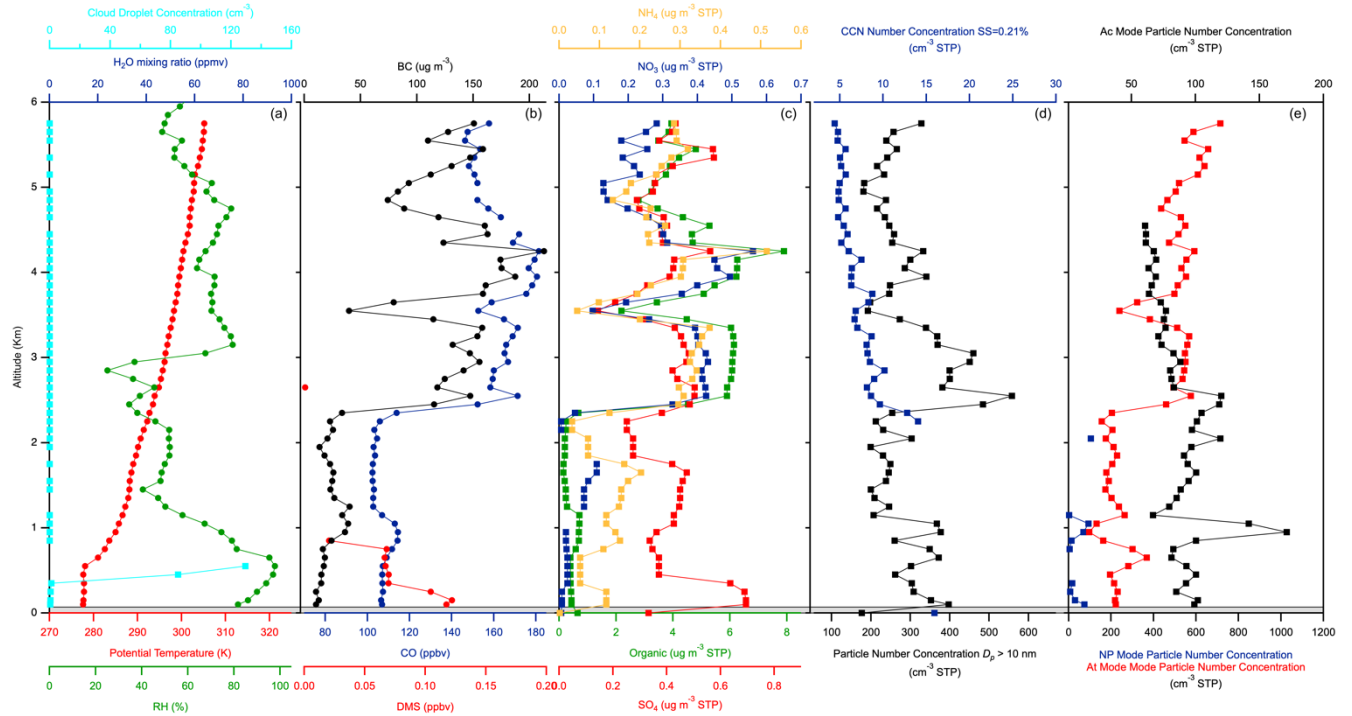
9) 18 May 2016 - Spiral 1, 11:19 - 11:40 UTC, C-130 Lat. 56.63 Long. -44.48, R/V Atlantis Lat. 56.33 Long. -46.06



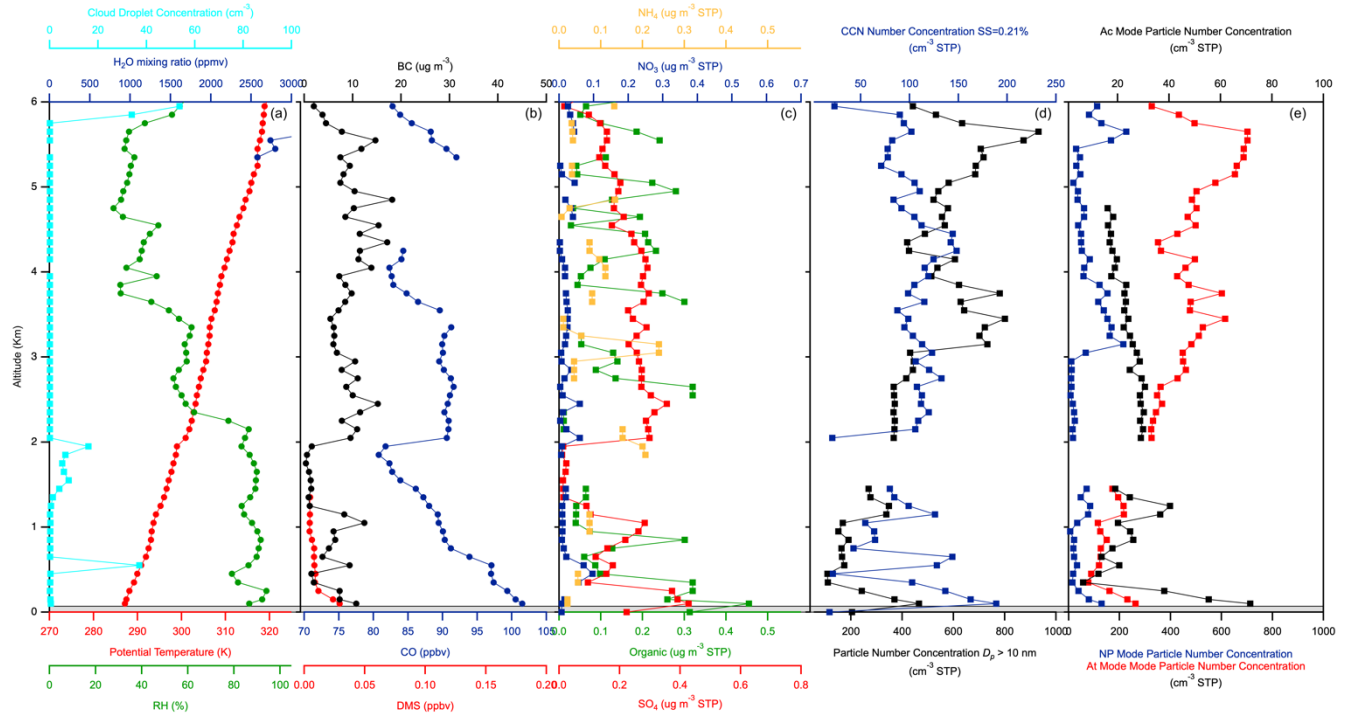
10) 19 May 2016 - Spiral 1, 13:54 - 14:15 UTC, C-130 Lat. 53.53 Long. -42.95, R/V Atlantis Lat. 56.33 Long. -46.05



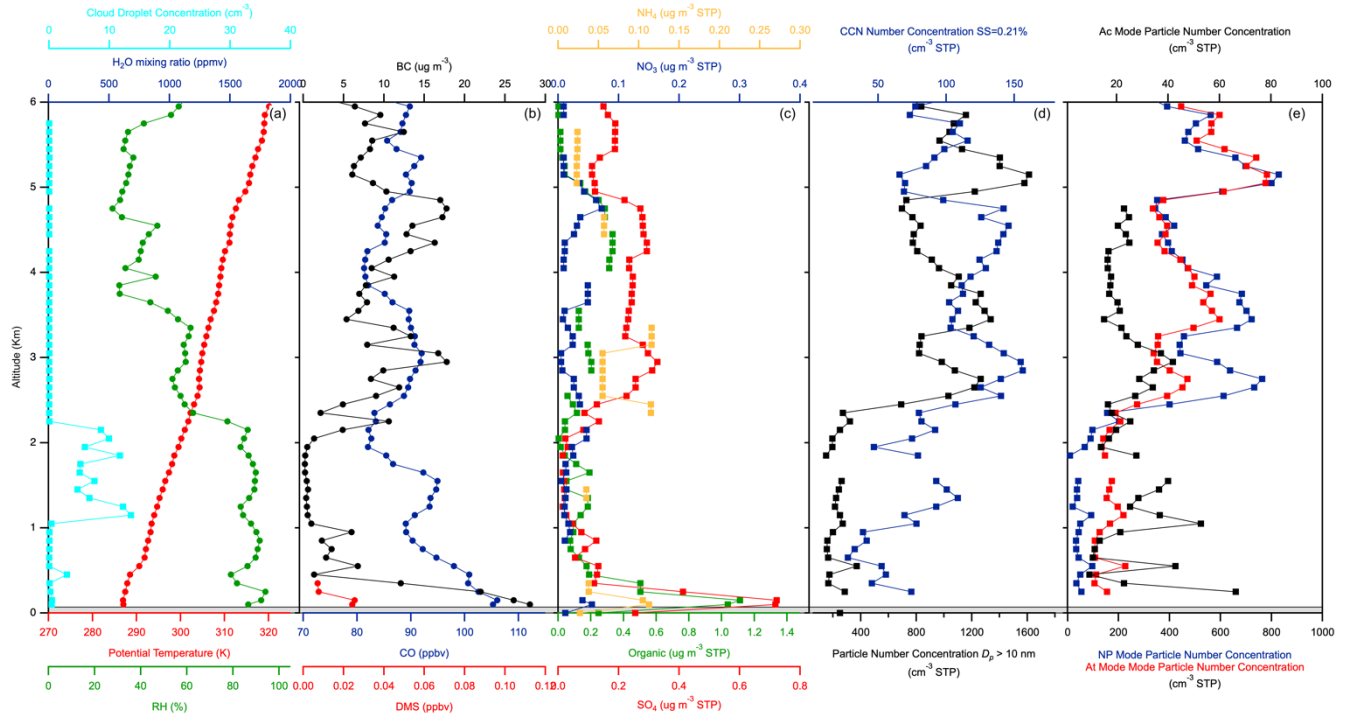
11) 20 May 2016 - Spiral 1, 14:58 - 15:15 UTC, C-130 Lat. 53.55 Long. -42.25, R/V Atlantis Lat. 53.53 Long. -42.24



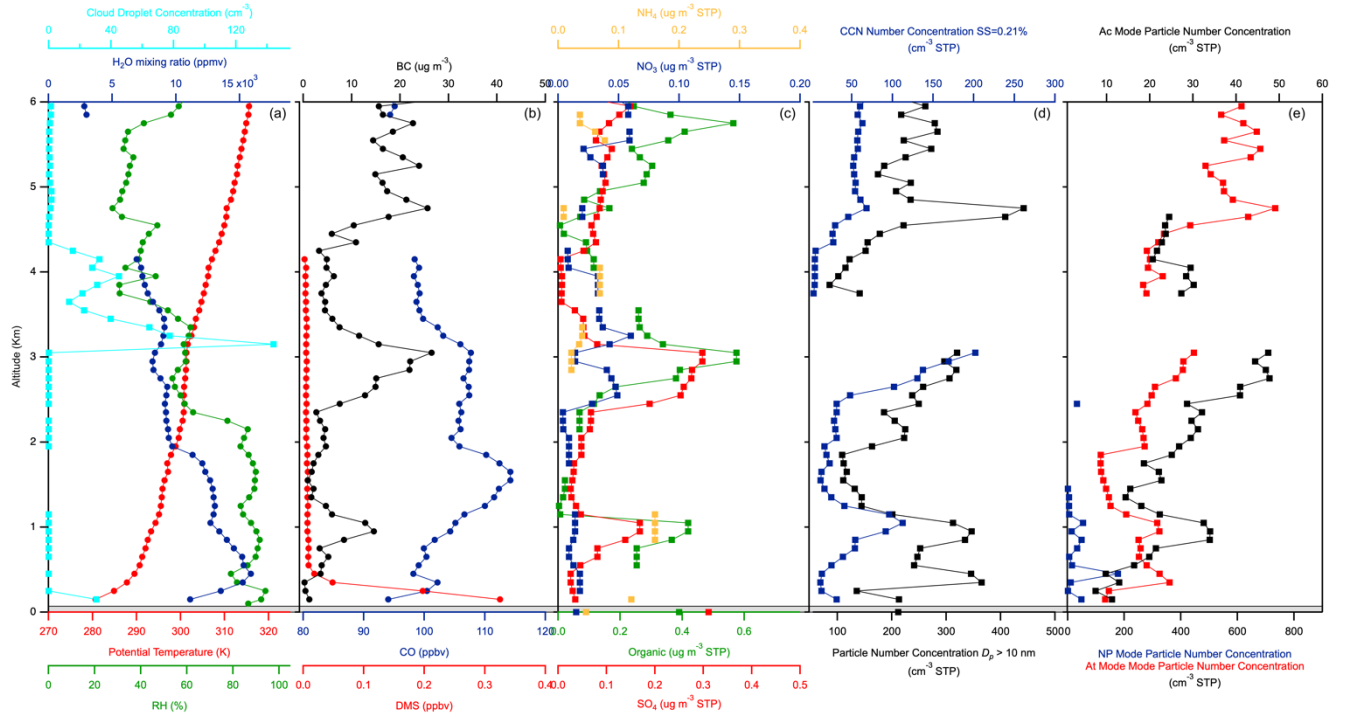
12) 26 May 2016 - Spiral 1, 14:17 - 14:41 UTC, C-130 Lat. 48.20 Long. -38.59, R/V Atlantis Lat. 47.39 Long. -38.64



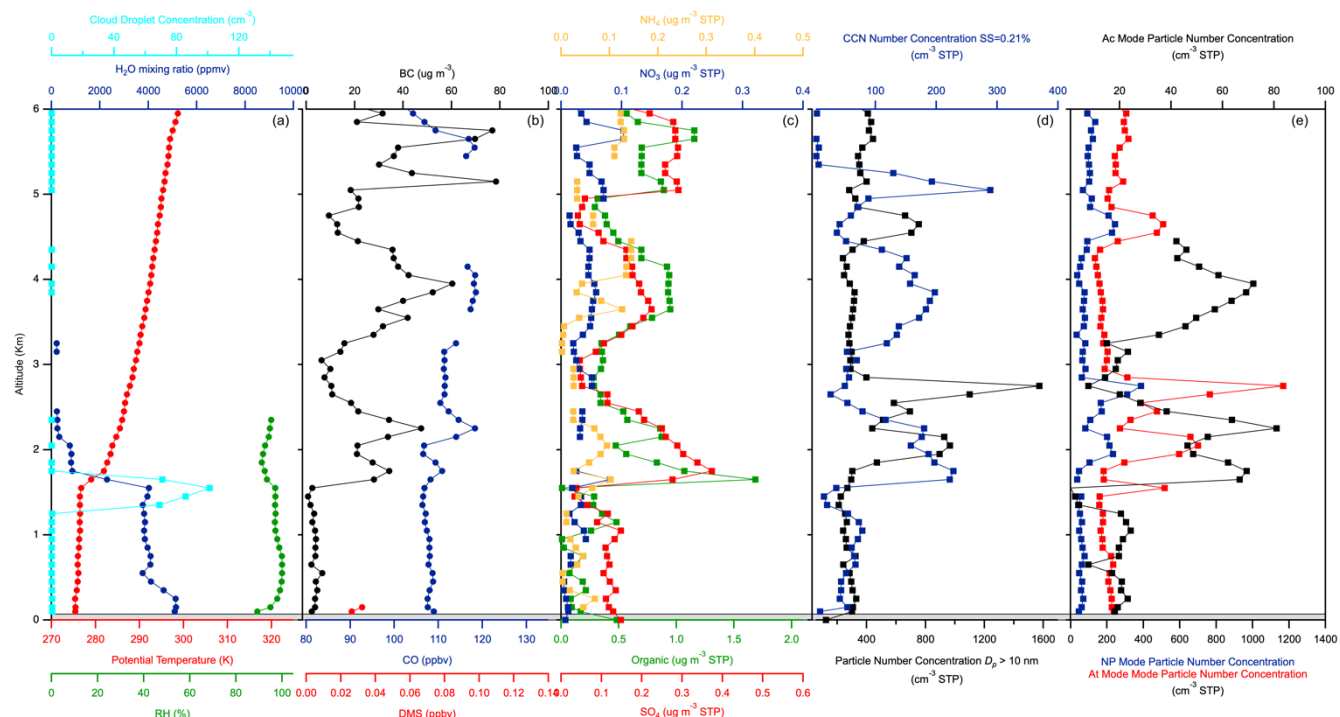
13) 26 May 2016 - Spiral 2, 15:44 - 16:08 UTC, C-130 Lat. 46.58 Long. -38.77, R/V Atlantis Lat. 47.38 Long. -38.60



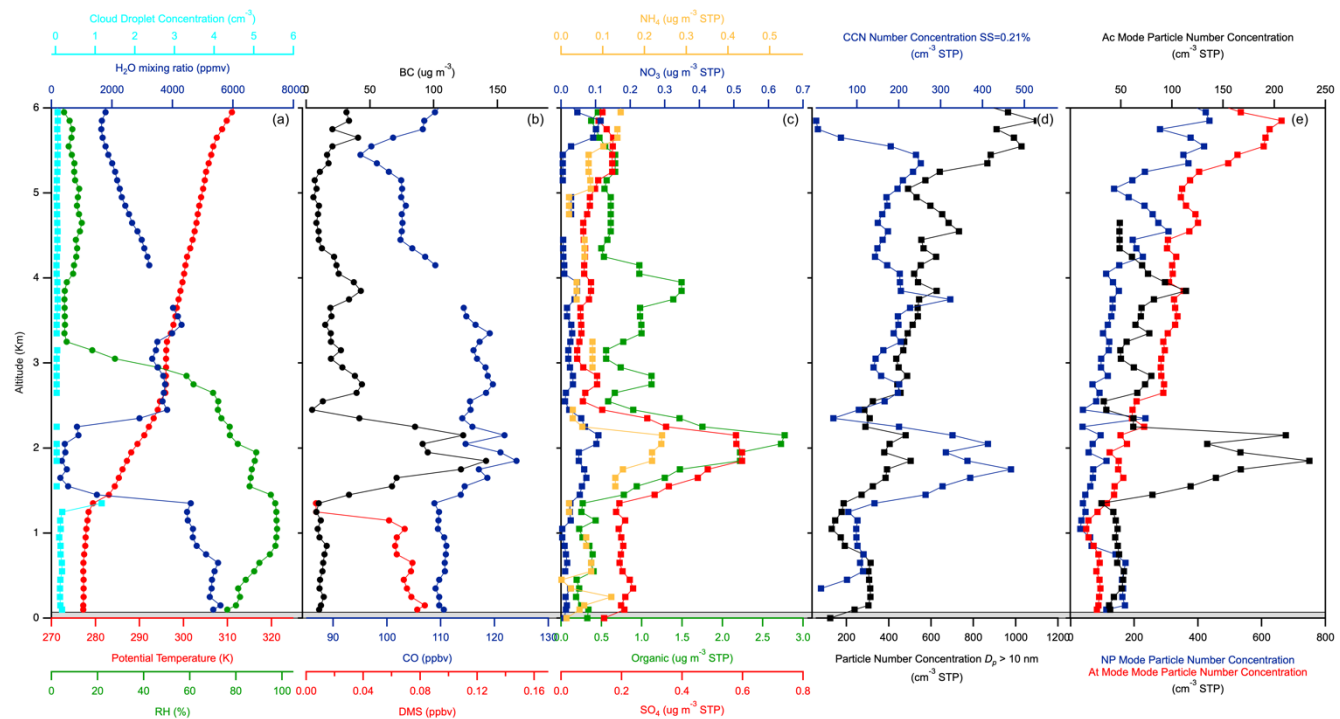
14) 26 May 2016 - Spiral 3, 18:24 - 18:39 UTC, C-130 Lat. 49.17 Long. -45.32, R/V Atlantis Lat. 47.33 Long. -38.53



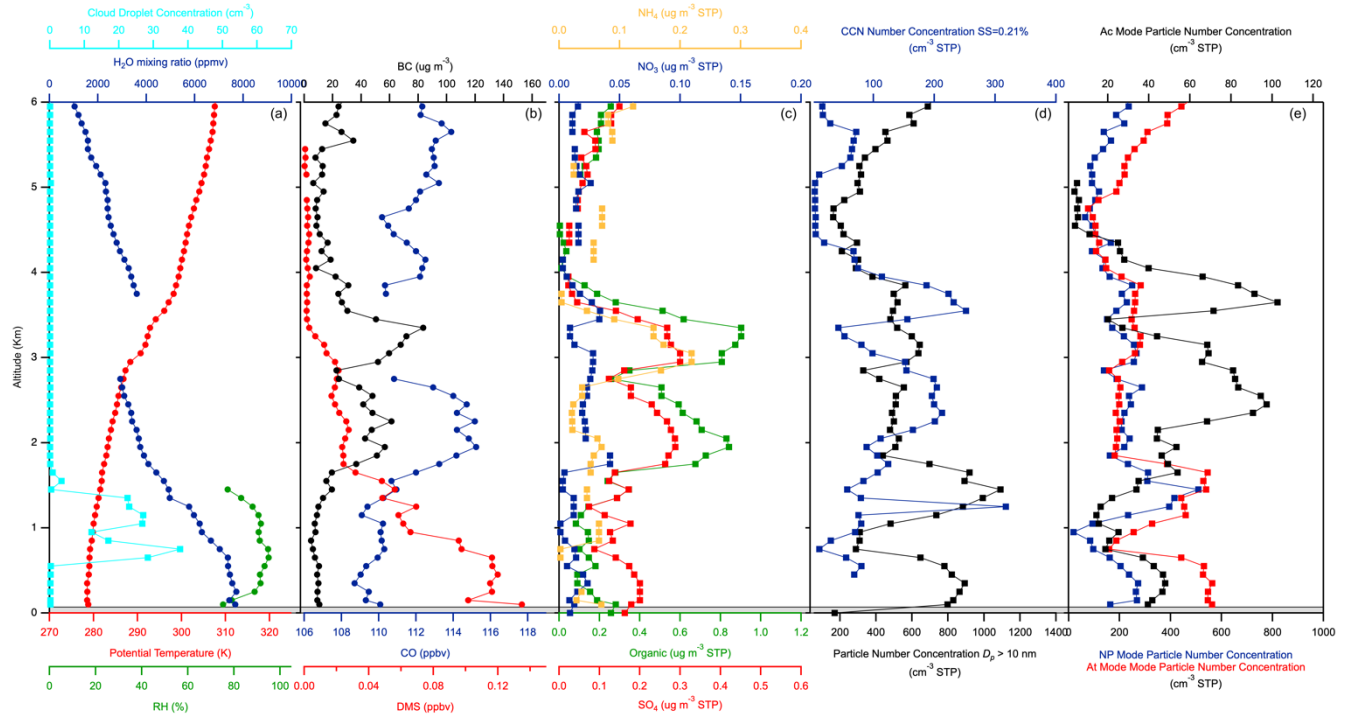
15) 27 May 2016 - Spiral 1, 13:00 - 13:21 UTC, C-130 Lat. 56.68 Long. -45.65, R/V Atlantis Lat. 47.22 Long. -38.21



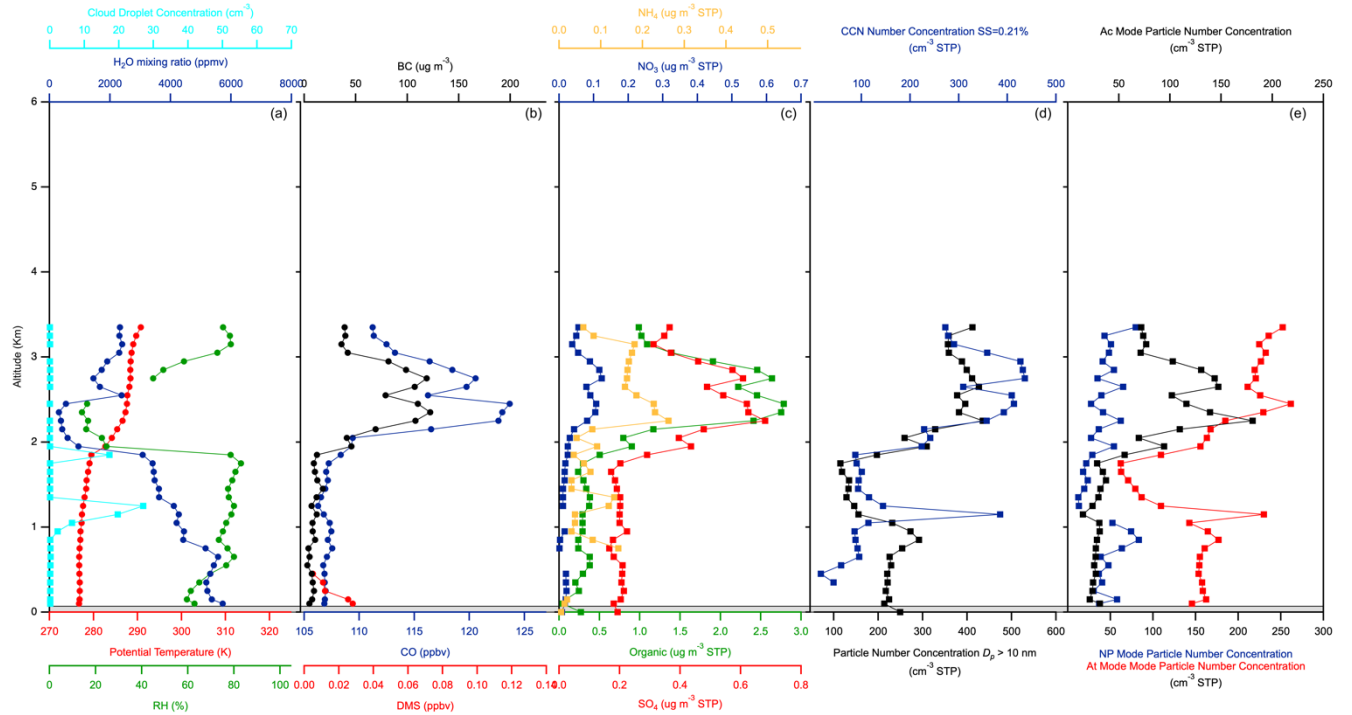
16) 28 May 2016 - Spiral 1, 13:24 - 13:41 UTC, C-130 Lat. 50.00 Long. -44.49, R/V Atlantis Lat. 45.37 Long. -41.53



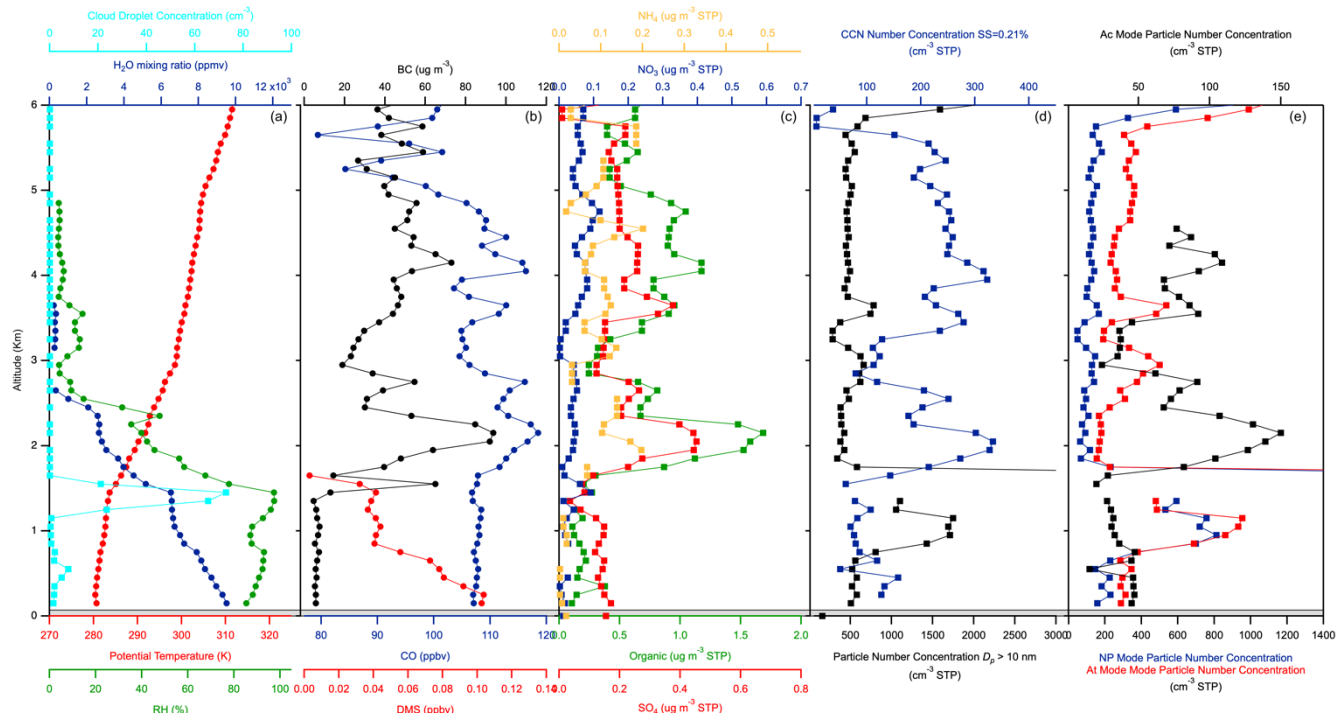
17) 29 May 2016 - Spiral 1, 12:28 - 12:52 UTC, C-130 Lat. 50.03 Long. -44.49, R/V Atlantis Lat. 44.19 Long. -43.58



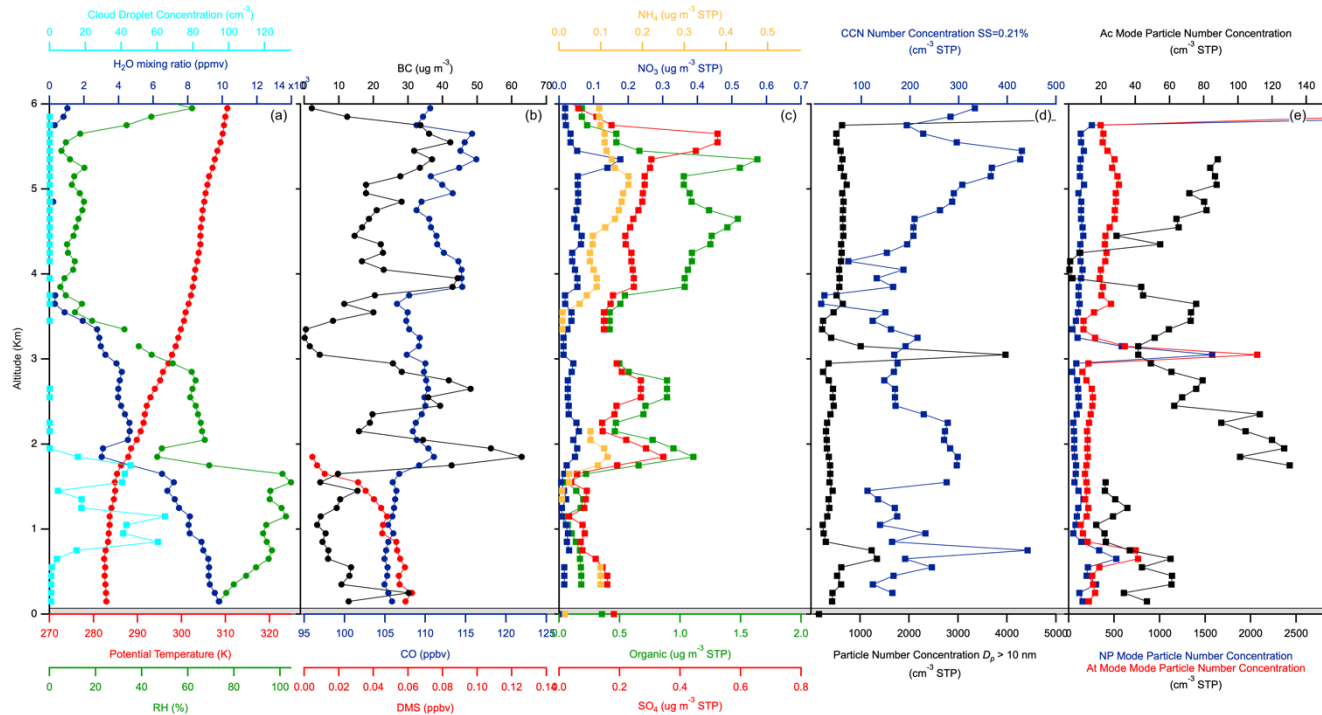
18) 29 May 2016 - Spiral 2, 13:44 - 13:56 UTC, C-130 Lat. 53.12 Long. -40.71, R/V Atlantis Lat. 44.20 Long. -43.53



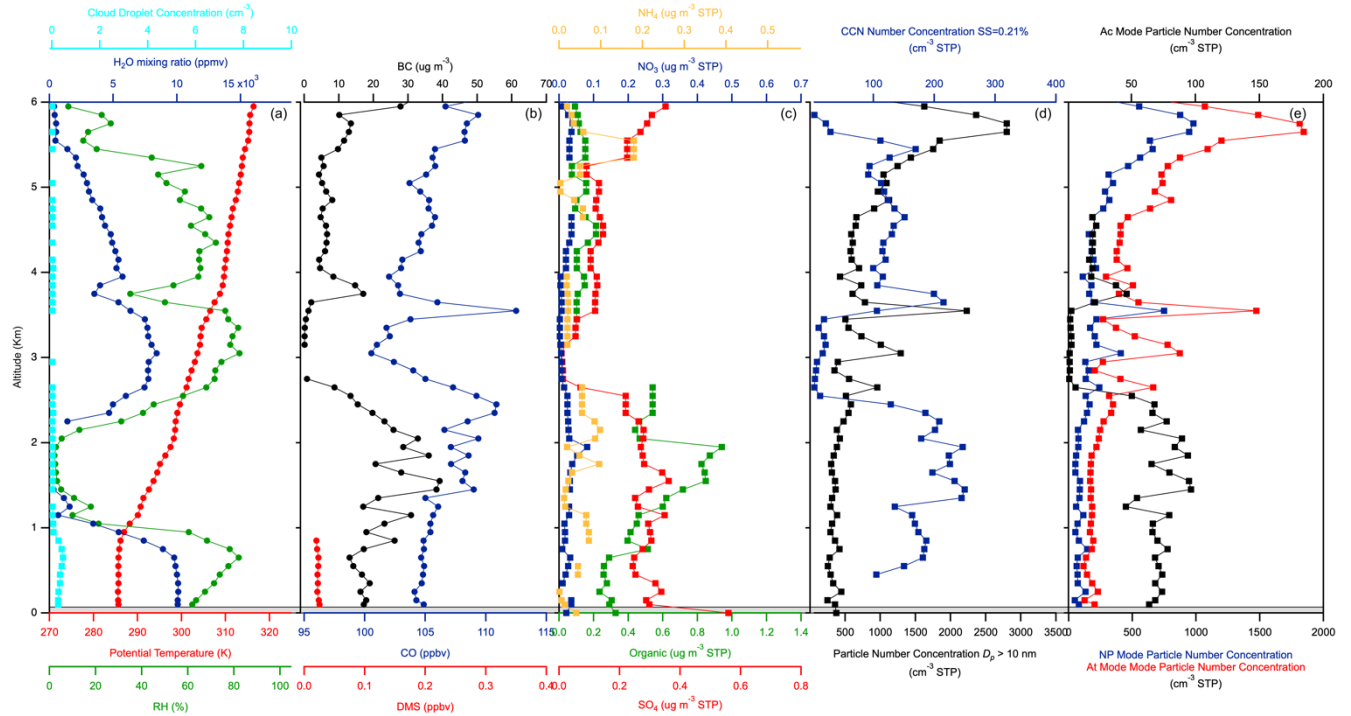
19) 30 May 2016 - Spiral 1, 14:46 - 15:07 UTC, C-130 Lat. 43.54 Long. -44.68, R/V Atlantis Lat. 44.62 Long. -43.11



20) 30 May 2016 - Spiral 2, 17:39 - 17:58 UTC, C-130 Lat. 44.67 Long. -43.08, R/V Atlantis Lat. 44.70 Long. -43.03

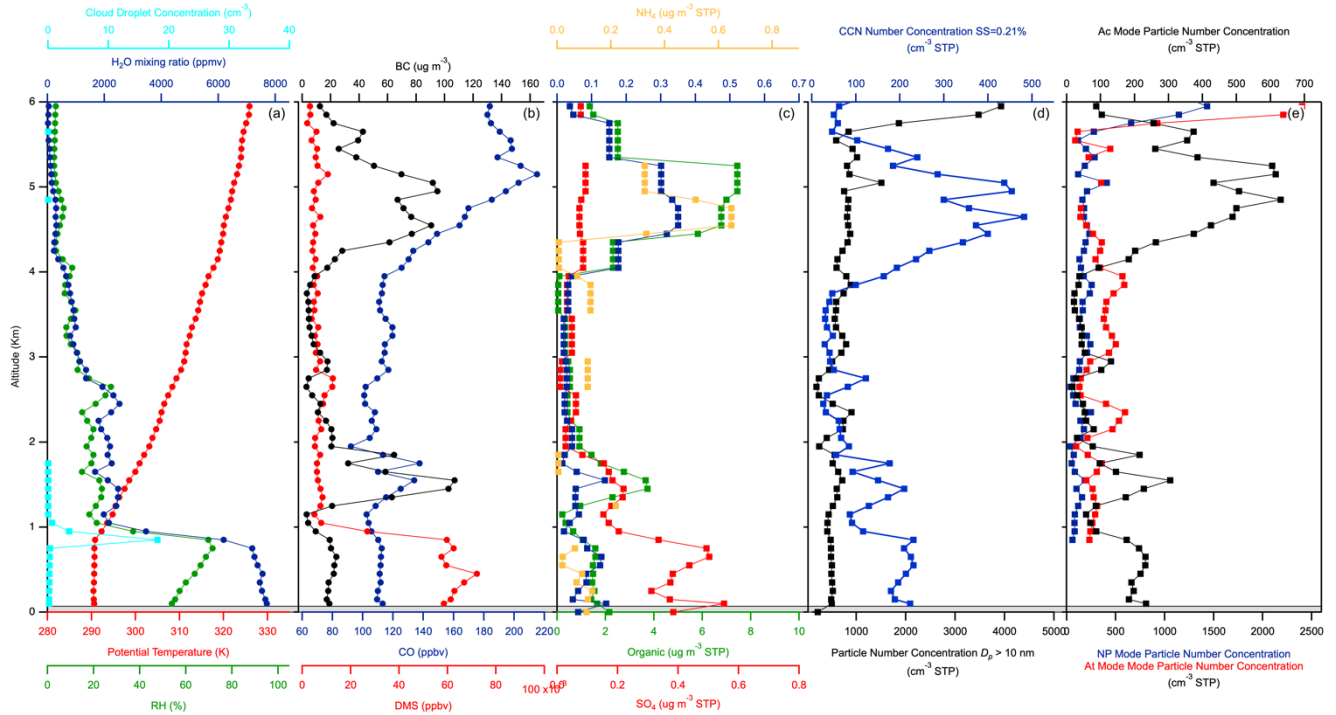


21) 1 Jun. 2016 - Spiral 1, 15:12 - 14:17 UTC, C-130 Lat. 43.56 Long. -38.36, R/V Atlantis Lat. 44.41 Long. -50.22

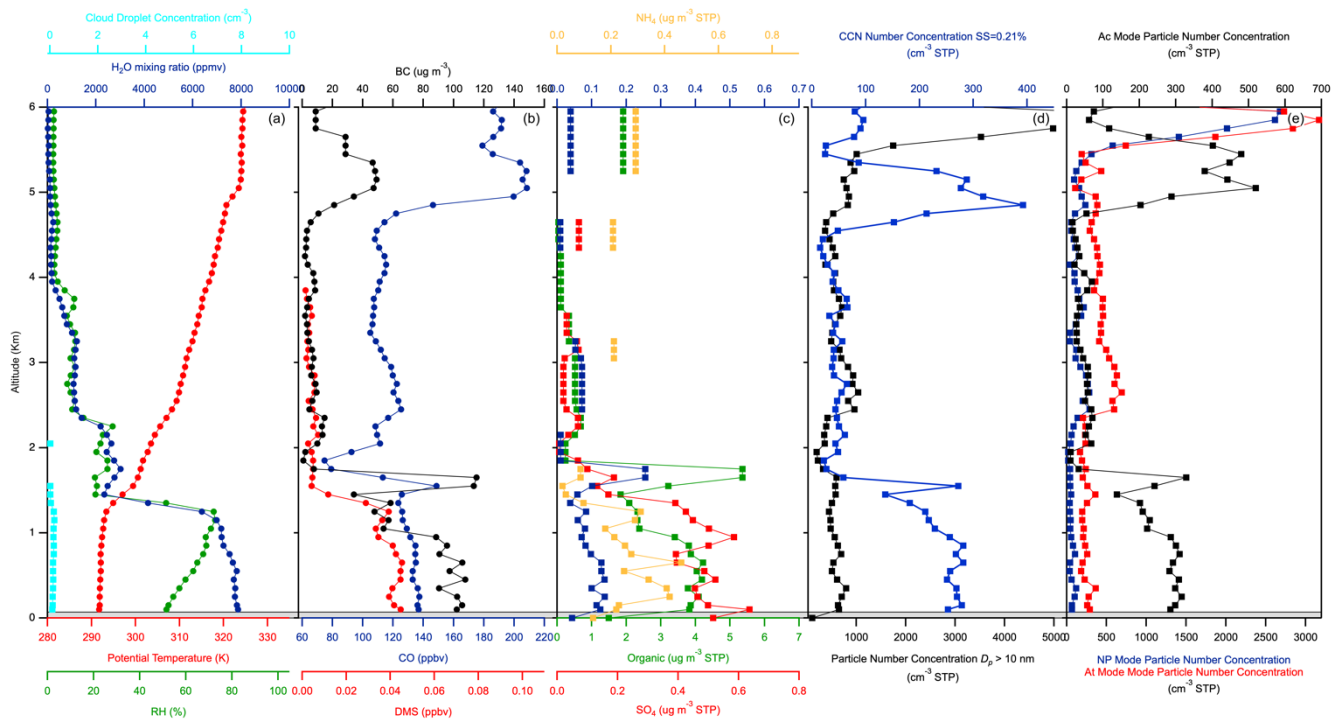


Figures SI3.c. Vertical profiles of meteorological parameters and aerosol properties for NAAMES-3 spirals

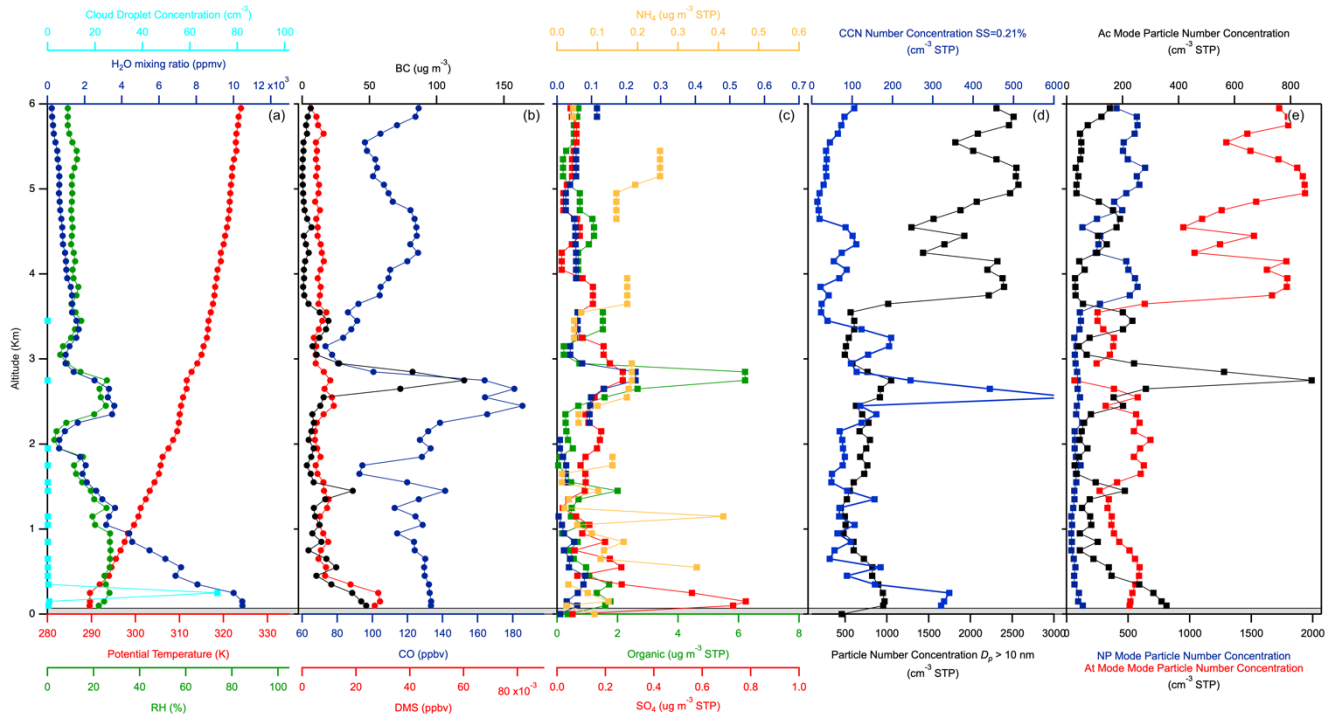
22) 4 Sept. 2017 - Spiral 1, 13:36 - 13:56 UTC, C-130 Lat. 43.06 Long. -43.74, R/V Atlantis Lat. 42.39 Long. -42.97



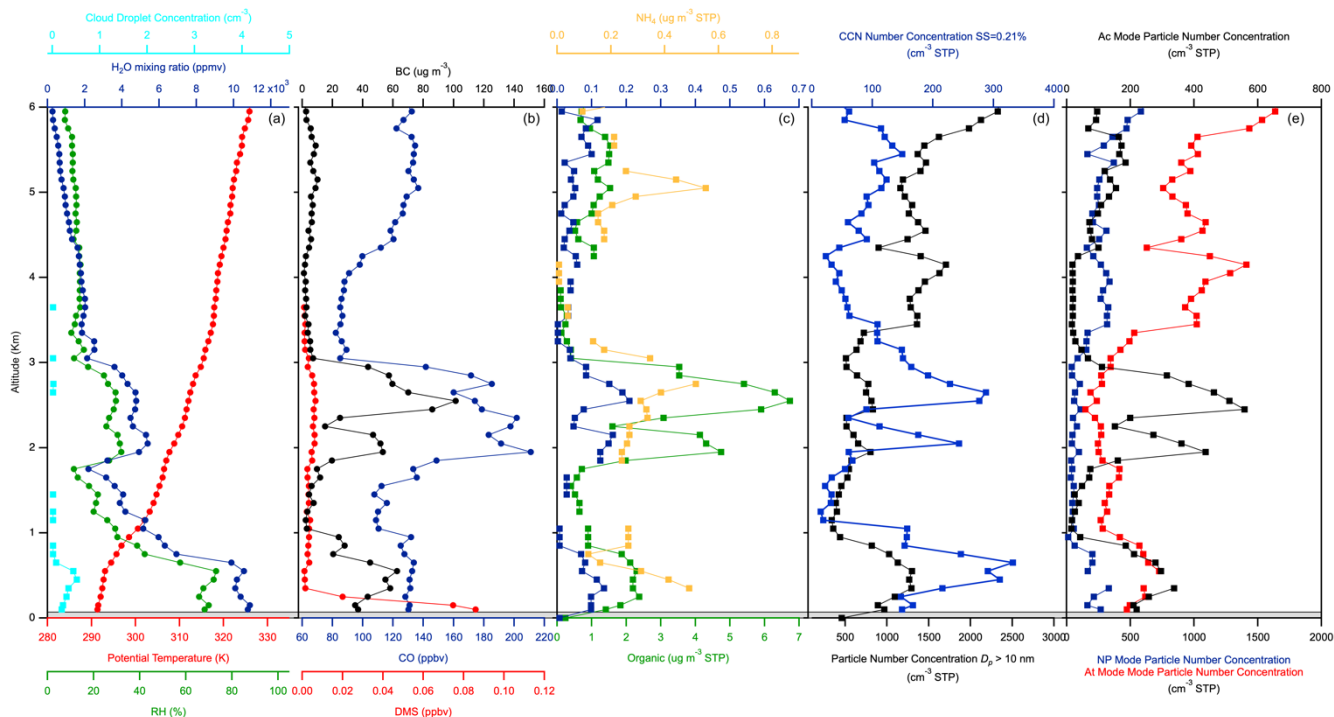
23) 4 Sept. 2017 - Spiral 2, 16:07 - 16:21 UTC, C-130 Lat. 42.02 Long. -42.41, R/V Atlantis Lat. 42.39 Long. -42.95



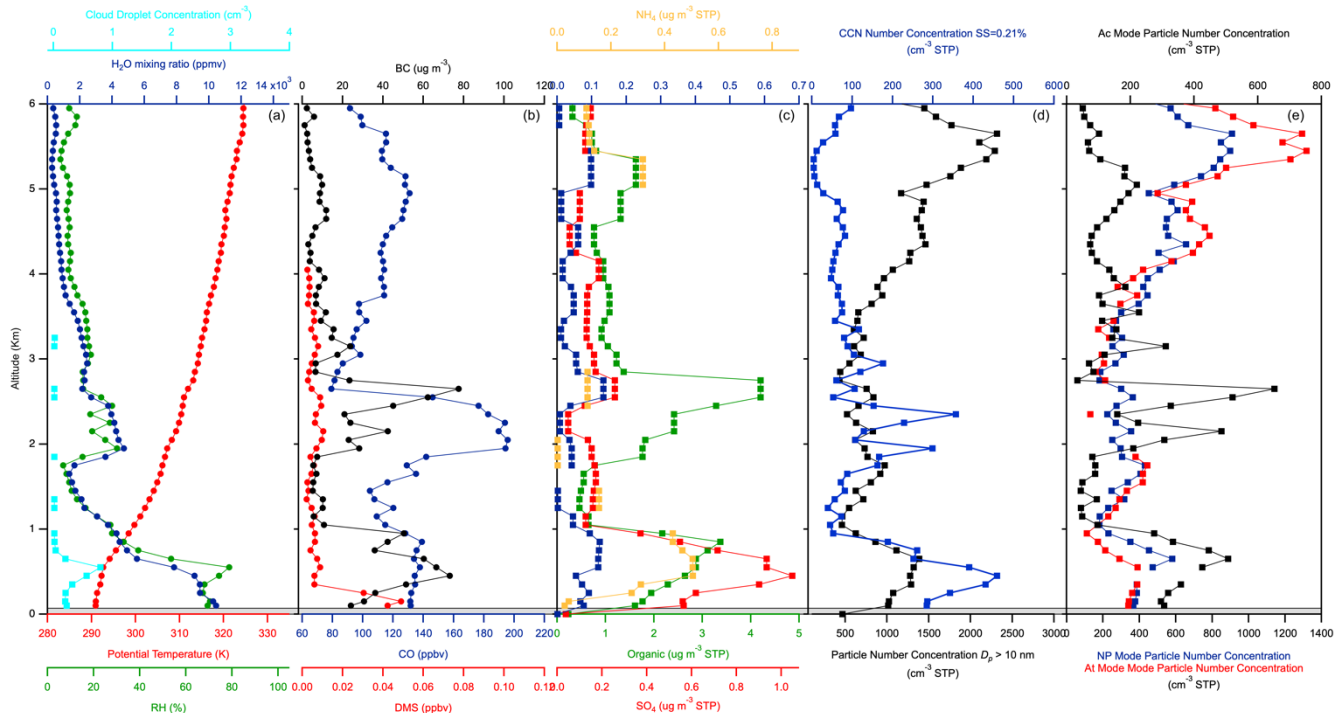
24) 6 Sept. 2017 - Spiral 1, 11:35 - 11:58 UTC, C-130 Lat. 44.16 Long. -41.78, R/V Atlantis Lat. 44.37 Long. -43.38



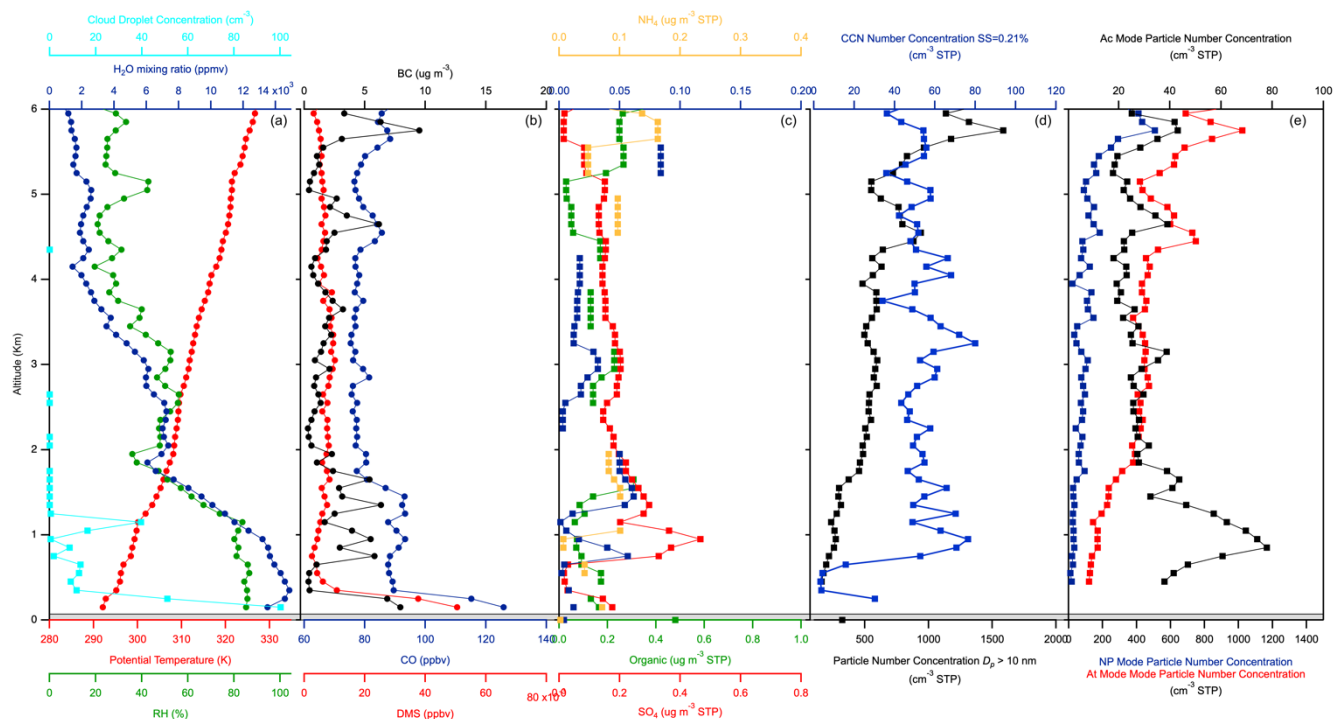
25) 6 Sept. 2017 - Spiral 2, 13:59 - 14:28 UTC, C-130 Lat. 44.36 Long. -43.36, R/V Atlantis Lat. 44.36 Long. -43.36



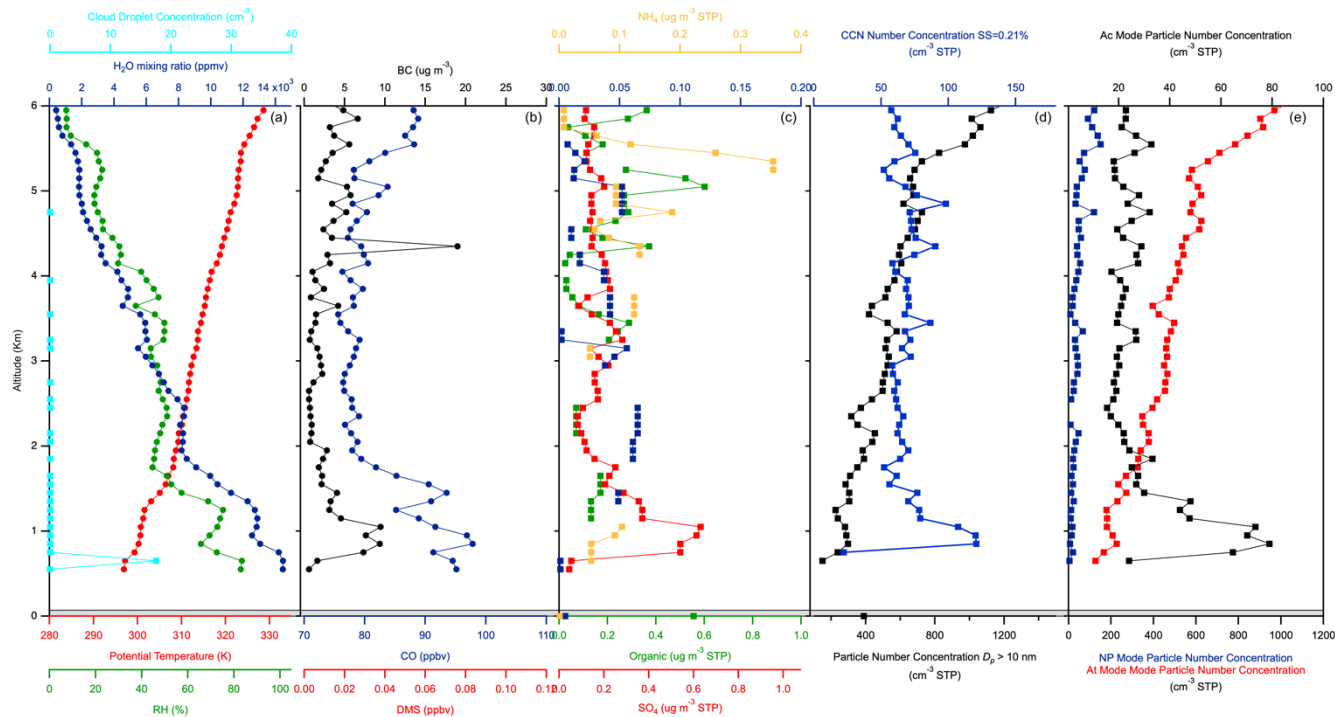
26) 6 Sept. 2017 - Spiral 3, 14:57 - 15:11 UTC, C-130 Lat. 44.38 Long. -43.74, R/V Atlantis Lat. 44.36 Long. -43.37



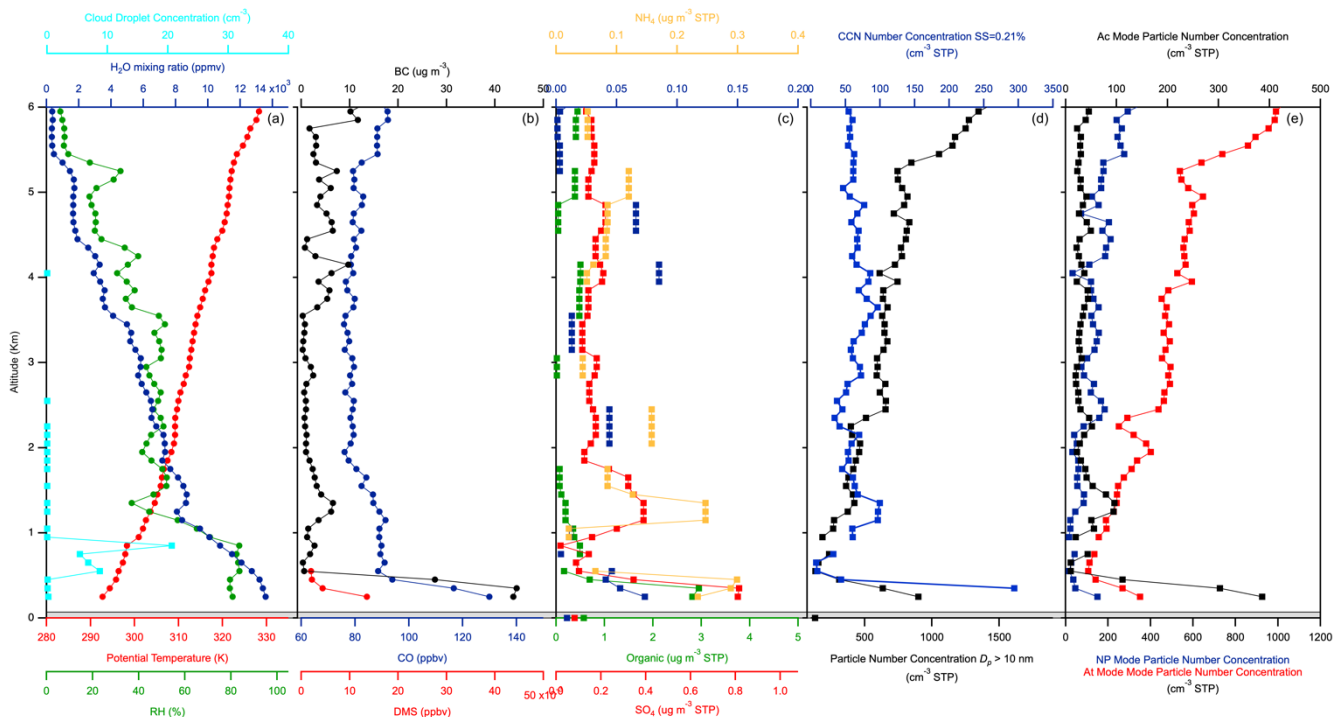
27) 8 Sept. 2017 - Spiral 1, 12:34 - 12:54 UTC, C-130 Lat. 47.66 Long. -40.58, R/V Atlantis Lat. 46.98 Long. -40.11



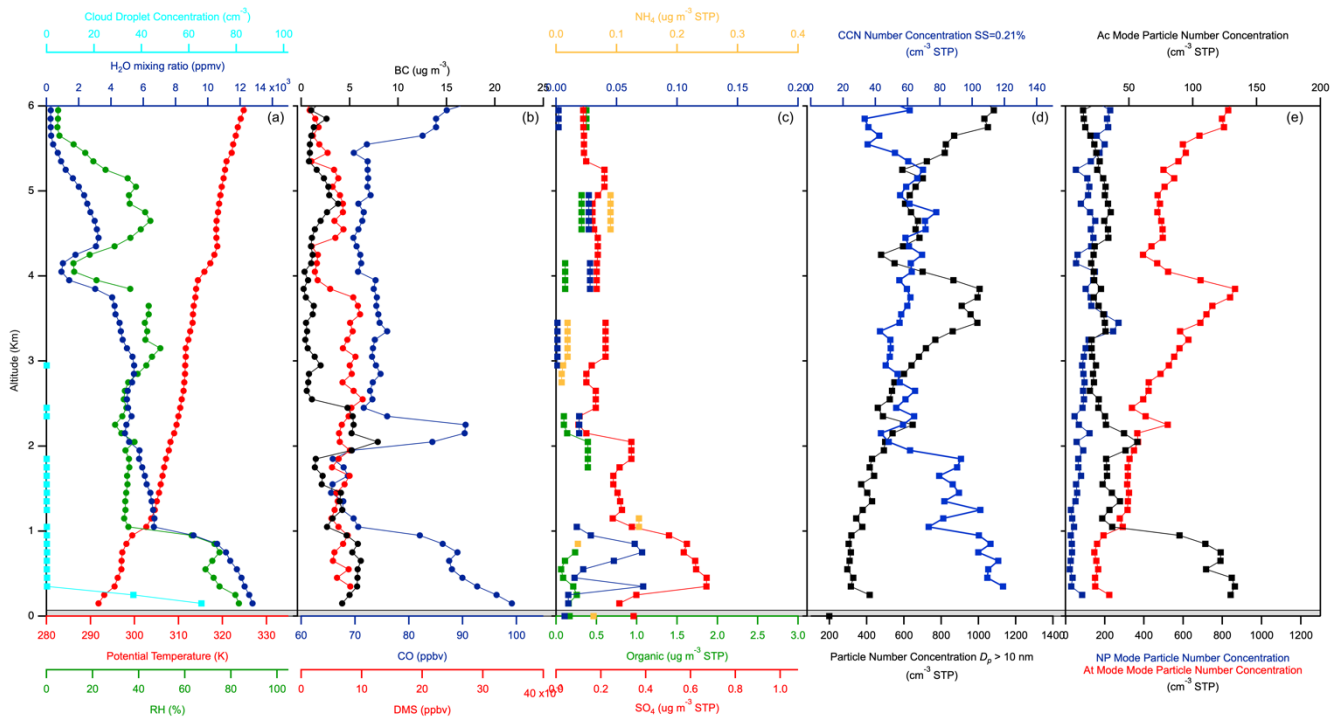
28) 8 Sept. 2017 - Spiral 2, 14:43 - 15:04 UTC, C-130 Lat. 47.24 Long. -40.27, R/V Atlantis Lat. 46.97 Long. -40.16



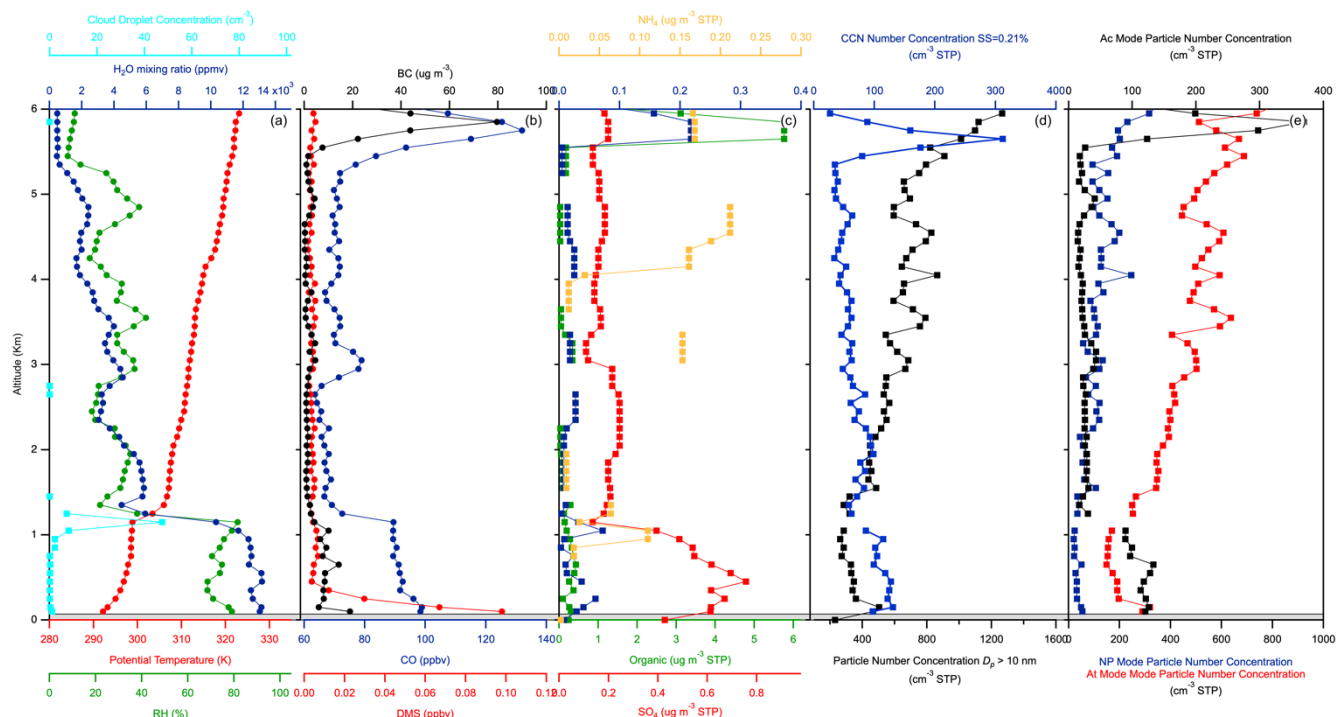
29) 8 Sept. 2017 - Spiral 3, 15:32 - 15:45 UTC, C-130 Lat. 47.45 Long. -39.19, R/V Atlantis Lat. 46.99 Long. -40.16



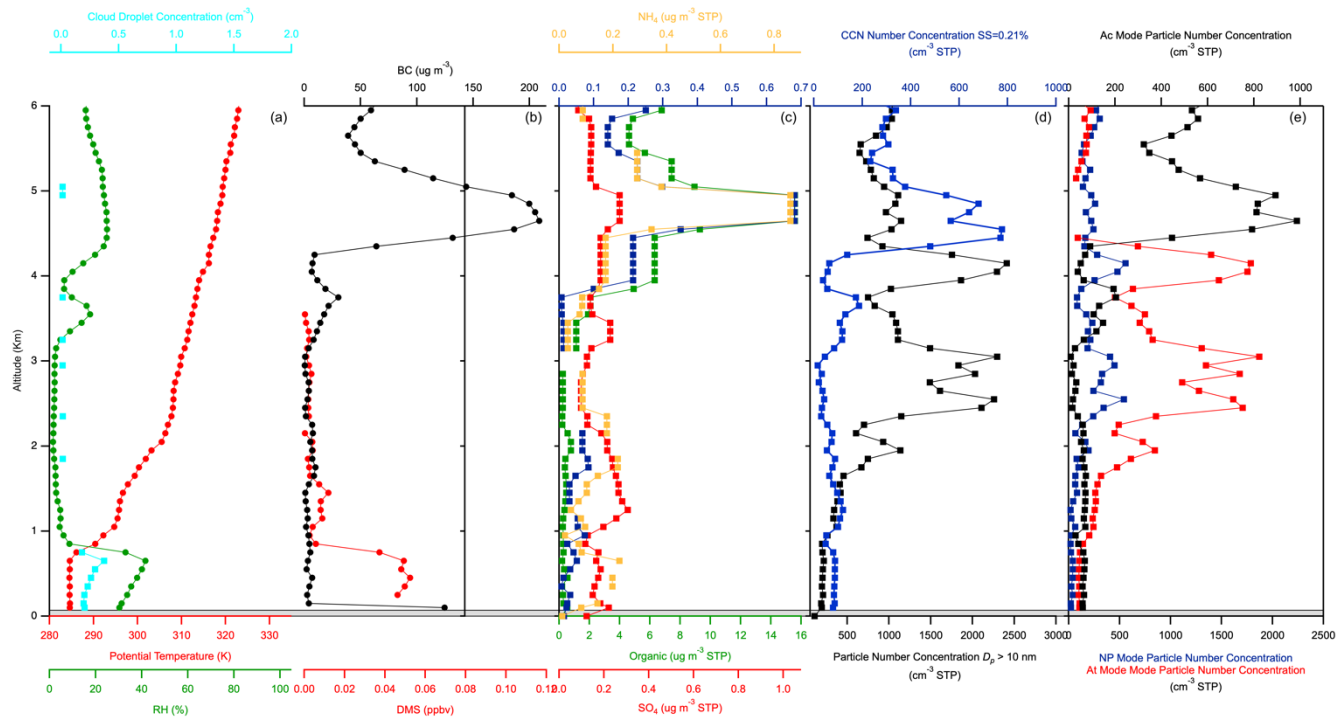
30) 9 Sept. 2017 - Spiral 1, 12:25 - 12:41 UTC, C-130 Lat. 48.45 Long. -36.35, R/V Atlantis Lat. 48.17 Long. -39.14



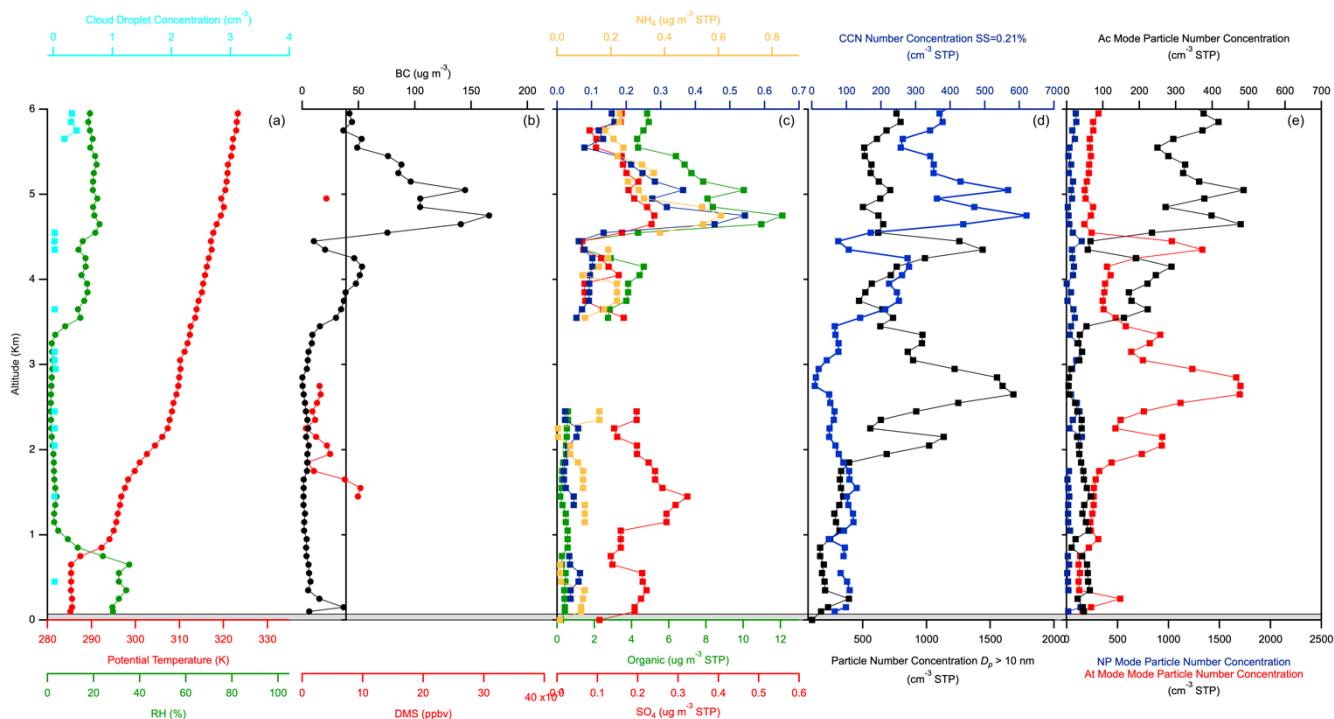
31) 9 Sept. 2017 - Spiral 2, 14:27 - 14:47 UTC, C-130 Lat. 48.48 Long. -38.95, R/V Atlantis Lat. 48.50 Long. -38.97



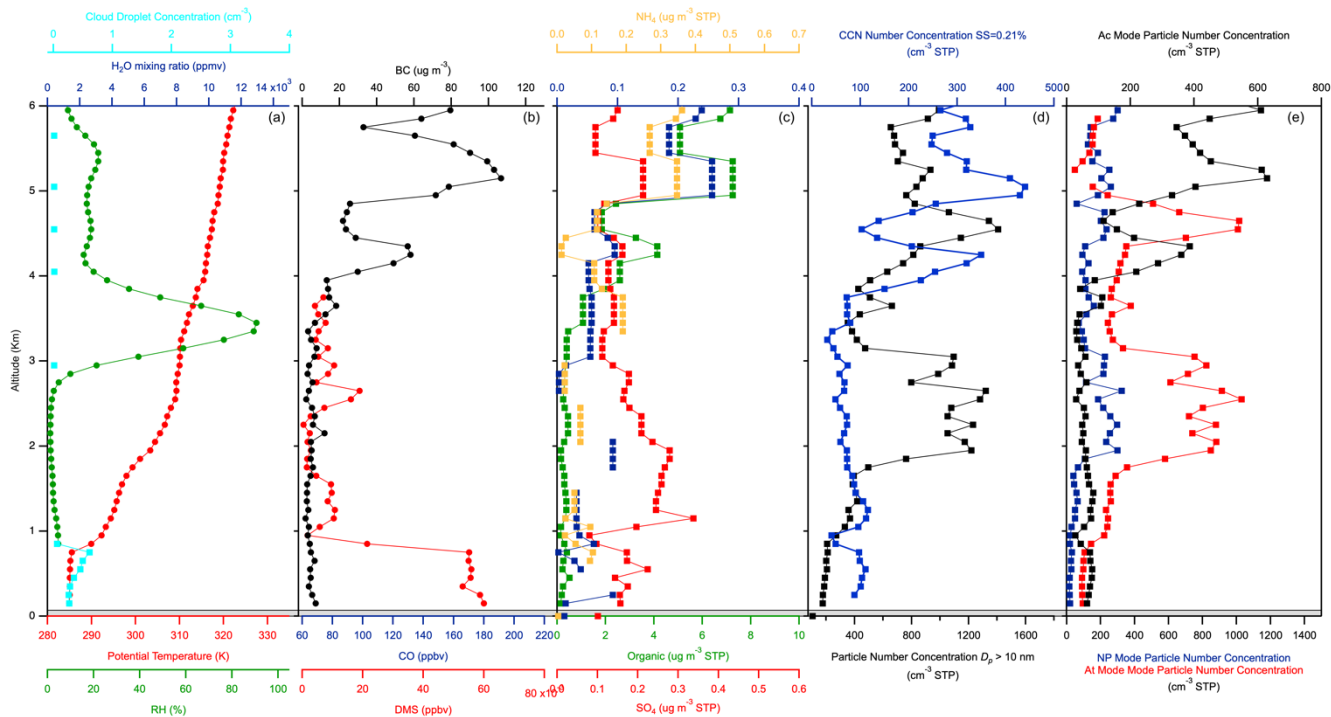
32) 12 Sept. 2017 - Spiral 1, 17:57 - 18:14 UTC, C-130 Lat. 51.83 Long. -40.58, R/V Atlantis Lat. 51.72 Long. -39.57



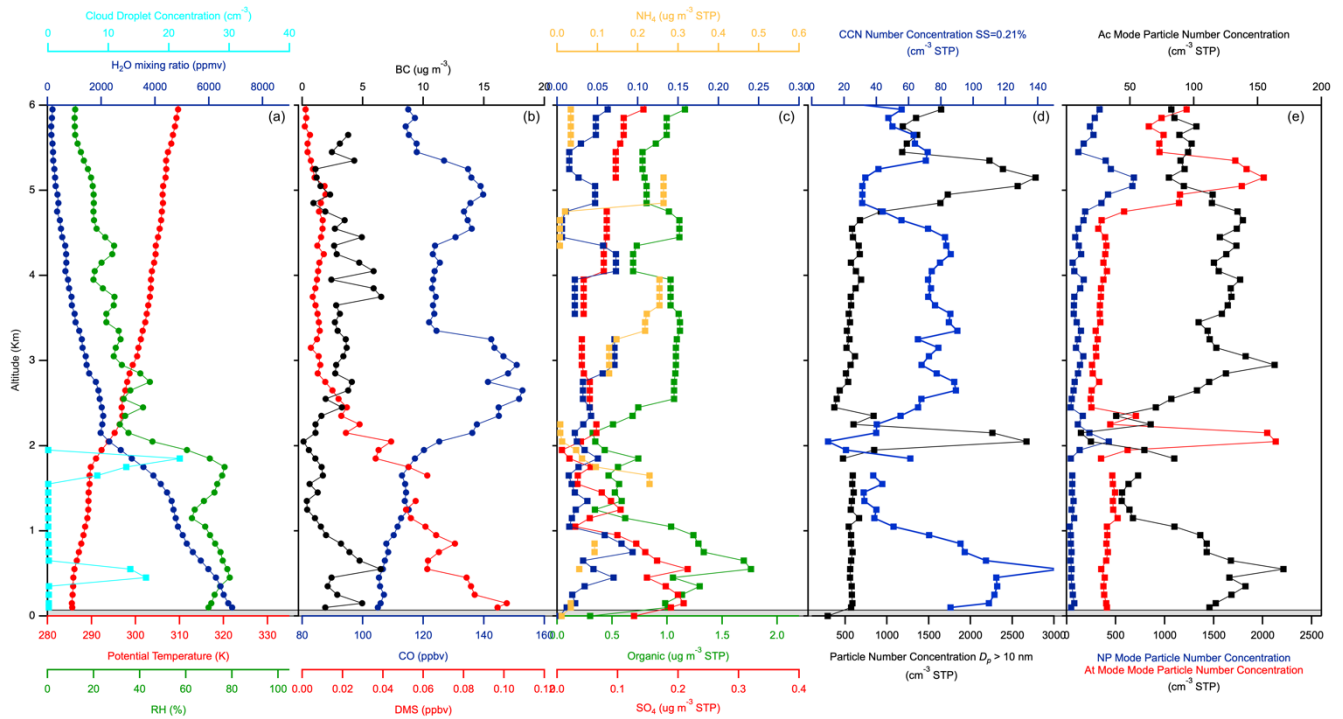
33) 12 Sept. 2017 - Spiral 2, 18:44 - 19:03 UTC, C-130 Lat. 51.72 Long. -39.57, R/V *Atlantis* Lat. 51.72 Long. -39.58



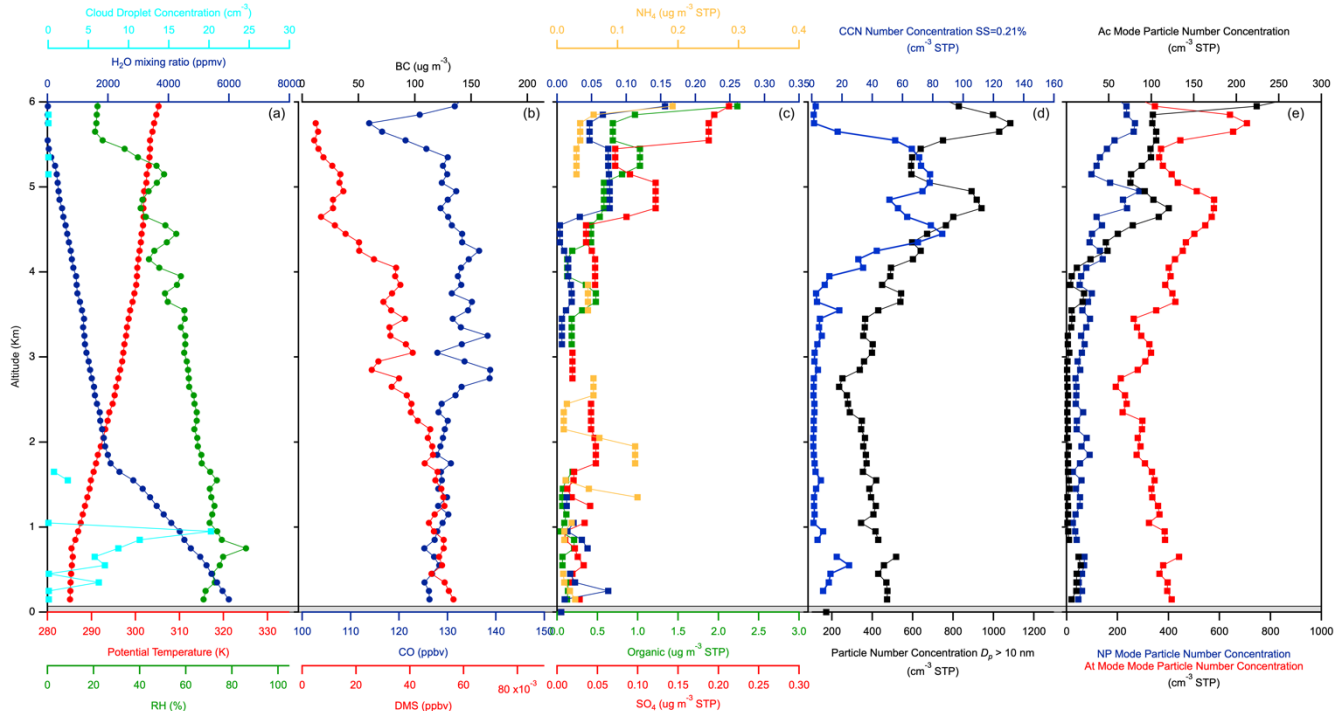
34) 12 Sept. 2017 - Spiral 3, 19:29 - 19:45 UTC, C-130 Lat. 51.45 Long. -38.35, R/V *Atlantis* Lat. 51.72 Long. -39.58



35) 16 Sept. 2017 - Spiral 1, 11:57 - 12:12 UTC, C-130 Lat. 54.03 Long. -38.95, R/V Atlantis Lat. 53.40 Long. -39.63



37) 17 Sept. 2017 - Spiral 1, 12:29 - 12:44 UTC, C-130 Lat. 53.38 Long. -39.43, R/V Atlantis Lat. 53.42 Long. -39.61



37) 17 Sept. 2017 - Spiral 1, 12:29 - 12:44 UTC, C-130 Lat. 53.38 Long. -39.43, R/V Atlantis Lat. 53.42 Long. -39.61

