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Compendium of NASA Data Base for the Global Tropospheric Experiment's Transport and Chemical Evolution Over the Pacific (TRACE-P)

Volume 1: DC-8

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October 2003

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COMPENDIUM OF NASA DATA BASE FOR THE GLOBAL TROPOSPHERIC EXPERIMENT'S TRANSPORT AND CHEMICAL EVOLUTION OVER THE PACIFIC (TRACE-P), VOLUME 1: DC-8

By Mary M. Kleb and A. Donald Scott, Jr.
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SUMMARY

This report provides a compendium of NASA aircraft data that are available from NASA's Global Tropospheric Experiment's (GTE) Transport and Chemical Evolution over the Pacific (TRACE-P) Mission conducted from late February through early April 2001 in the western Pacific. The broad goal of TRACE-P was to characterize the transit and evolution of the Asian outflow over the western Pacific. It provided the scientific community an opportunity to investigate the impact of the rapid industrialization in Asia and compare the current conditions with those observed during the Pacific Exploratory Missions in the western Pacific (PEM-West missions), A in 1991 and B in 1994. Conducted from February 24 through April 10, 2001, TRACE-P integrated airborne, satellite- and ground-based observations, as well as forecasts from aerosol and chemistry models. PEM-West A (fall 1991) and PEM-West B (early spring 1994) examined the impact of natural and human activities on the chemistry of the troposphere over the northwestern Pacific from 10°N to 50°N. TRACE-P was conducted in early spring when there was strong continental outflow, as was the case with PEM-West B. The two main operational bases were Hong Kong and Yokota Air Force Base in Fussa, Japan. Additional operational sites included Okinawa; Kona, Hawaii; and Guam. The transit sites were Palmdale, California; Wake Island; and Midway Island.

TRACE-P was conducted as part of the National Aeronautics and Space Administration's (NASA) Global Tropospheric Experiment (GTE). The GTE has been an ongoing

element of the Tropospheric Chemistry Program, a Research and Analysis (R&A) program within the Science Division of NASA's Office for Earth Science Enterprise. The major thrust of GTE has been to utilize NASA's DC-8 and P-3B aircraft to carry multi-instrument payloads into regions of the global troposphere where natural and/or human impacts are believed to be particularly significant in effecting chemical composition changes and/or where the troposphere is still relatively unaffected. This was the case with TRACE-P as well, however in addition, data from satellites, ground–based stations, and chemistry and aerosol models were integrated and comprised an important aspect of the mission in the planning, execution and analysis of results.

The format of this compendium utilizes data plots (time series and altitude profiles) of selected data acquired aboard the NASA/Dryden DC-8 (vol. 1) and NASA/Wallops P-3B (vol. 2) aircraft during TRACE-P. The purpose of this document is to provide a representation of aircraft data that are available in archived format via NASA Langley's Atmospheric Sciences Data Center (ASDC) and through the GTE Project Office archive. The data format is not intended to support original research/analyses, but to assist the reader in identifying data that are of interest. This compendium is for only the NASA aircraft data. The ASDC archived databases includes numerous supporting data including meteorological observations/products, results from surface studies, satellite observations, and data from ozonesonde and FTIR stations.

INTRODUCTION

The goal of the NASA Tropospheric Chemistry Program is to develop an understanding of the chemical cycles that control the composition of the troposphere and to assess the susceptibility of the global atmosphere to chemical change. A major component of the NASA program has been the **G**lobal **T**ropospheric **E**xperiment (GTE). GTE has consisted of a series of field experiments designed to (1) evaluate the capability of instrument techniques to measure, under field conditions, the minute concentrations of key chemical species in the troposphere; and (2) systematically address tropospheric chemistry issues relevant to global change, through airborne sampling expeditions, coupled with modeling and laboratory studies. GTE has been primarily an aircraft-based program supplemented by ground-based measurements. Satellite data also played important roles (however TRACE-P was a more integrative mission). Space Shuttle observations of tropospheric carbon monoxide distributions have been used to plan and direct the course of expeditions, for example, over tropical rain forests and for continental outflow into the tropical Atlantic Ocean. LANDSAT land-surface images have facilitated the extrapolation of regional Arctic-tundra measurements into global-scale conclusions. **T**otal **O**zone **M**easurements from **S**atellites (TOMS) has helped place GTE observed ozone distributions/budgets into a global perspective (temporal and spatial) and has been used to guide intensive aircraft studies over the tropical Atlantic Ocean. Weather data returned by environmental satellites have guided flight planning for research flights. During TRACE-P chemical and aerosol models participated in flight planning and execution. The **A**tmospheric **S**ciences **D**ata **C**enter (ASDC) data include many of the satellite, surface, and meteorological products used to support GTE missions or analyses.

The GTE airborne expeditions have focused on studies of the remote global atmosphere in order to provide well-documented baseline measurements of the unperturbed environment and to fully understand the chemical cycles underlying the natural environment. Table 1 and Figure 1 summarize GTE missions conducted through 2001. The GTE expeditions have been conducted in a diverse range of environments and with

different scientific goals. The **C**hemical **I**nstrument **T**est and **E**valuation (CITE) series was designed to study the ability to measure key tropospheric gaseous species by exposing selected instrumentation to a wide range of measurement conditions. The **A**tmospheric **B**oundary **L**ayer **E**xperiments (ABLE) were designed to study the emission, chemical processes, and dynamics of the boundary layer, and have been conducted over ecosystems known to have significant influence on the global troposphere. The importance of long-range transport of natural and anthropogenic emissions on the global troposphere has been investigated in the **P**acific **E**xploratory **M**issions (PEM) and the **Tr**ansport and **A**tmospheric **C**hemistry near the **E**quator – **A**tlantic (TRACE-A). The Pacific Exploratory Missions in the Western Pacific Ocean (PEM-West) Phases A and B focused on the impact of emissions from the Asian continent over the northwest Pacific Ocean during contrasting meteorological conditions. The Pacific Exploratory Missions over the Tropical Pacific (PEM-Tropics) Phases A and B studied the oxidizing power of the atmosphere and sulfur chemistry over the Pacific basin also during contrasting seasons. The **Tra**nsport and **C**hemical **E**volution over the **P**acific (TRACE-P) mission focused on the composition and evolution of Asian outflow.

The GTE, managed as part of the Tropospheric Chemistry Program in the Mission to Planet Earth Office, NASA Headquarters, was initiated in the early 1980s. Implementation of the GTE Project is via a Project Office at the NASA Langley Research Center, Atmospheric Sciences Competency.

SYMBOLS AND UNITS

ABLE	Atmospheric and Boundary Layer Experiment
ASDC	Atmospheric Sciences Data Center
CITE	Chemical Instrument Test and Evaluation
FTIR	Fourier Transform Infrared Spectrometer
GTE	Global Tropospheric Experiment
ITCZ	Inter-Tropical Convergence Zone

LaRC	Langley Research Center
NASA	National Aeronautics and Space Administration
PEM	Pacific Exploratory Mission
ppbv	parts per billion, by volume
ppmv	parts per million, by volume
pptv	parts per trillion, by volume
SPCZ	South Pacific Convergence Zone
TOMS	Total Ozone Measurements from Satellites
TRACE-A	Transport and Atmospheric Chemistry near the Equator – Atlantic
TRACE-P	Transport and Chemical Evolution over the Pacific

PROGRAM AND DATA DESCRIPTION

The National Aeronautics and Space Administration's TRACE-P mission, conducted from late February through early April 2001, was a major component of the Global Tropospheric Experiment, a project within the Earth Sciences Enterprise program. The long-range goal of the GTE has been to contribute substantially to scientific understanding of human impacts on the chemistry of the global troposphere. Changes in chemical composition of the troposphere on a global scale have been well documented during these last two decades. This has given rise to considerable concern that these chemical changes in the troposphere, which are expected to increase as population increases and economic activity expands, will lead to changes in the earth's climate. The TRACE-P campaign had two main objectives, (1) to determine the chemical composition of the Asian outflow over the western Pacific in spring in order to understand and quantify the export of chemically and radiatively important gases and aerosols, and their precursors, from the Asian continent, and (2) to determine the chemical evolution of the Asian outflow over the western Pacific in the spring and to understand the ensemble of processes that control this evolution. Within this framework, 5 specific tasks were identified: (1) to identify and quantify the contributions to Asian outflow from industrial

sources in Asia, Europe, and North America, as well as from biomass burning sources in Southeast Asia and northern Africa, (2) to demonstrate the potential for synergistic integration of aircraft and satellite observations, together with three-dimensional models, to quantify the chemical outflow from a major continental source, (3) to determine the importance of natural processes (lightning, stratospheric down welling) contributing to the Asian outflow, (4) to understand the long-range transport and chemical aging of Asian pollution over the North Pacific, and to assess the implications for global influence and for intercontinental transport of pollutants, and (5) to determine the role of heterogeneous chemistry in controlling the chemical evolution of the Asian outflow over the Pacific.

The broad design of the TRACE-P campaign employed a series of flights utilizing the NASA Dryden DC-8 and NASA Wallops P-3B aircraft from two main operational sites in the western Pacific (Hong Kong and Yokota Air Force Base in Fussa, Japan). Additional operational and/or transit sites for the DC-8 included Kona, Hawaii; Guam; and Kadena Air Force Base, Okinawa. The P-3B's additional operational/transit sites were Kona, Hawaii; Wake Island; Guam; Kadena Air Force Base, Okinawa; and Midway Island. Geographic coverage of flights originating from the intensive bases ranged from 110E to 150E in longitude approximately 10N to 45N in latitude. Tables 2a and 2b summarize the DC-8 and P-3B flights, respectively as well as briefly describe the science objectives of each flight. Figure 2a shows the TRACE-P transit flights for both aircraft while Figure 2b shows the intensive flights during the mission. Flights 1 through 3 for the DC-8 and P-3B, all test flights, are not included in Figure 2a or 2b.

The overall objective in using two aircraft was to maximize geographical coverage of Asian outflow. The DC-8 had a higher ceiling, greater payload capacity, and longer range than the P-3B. Instrumentation on the DC-8 measured ozone, and aerosol structure above and below flight altitude, ozone photochemical precursors, and airmass characterization. The P-3B however, could fly for longer periods of time at low altitude (below 3km) than the DC-8 so it focused more on hydroxyl radicals, aerosol microphysics, sulfur chemistry, and eddy flux measurements. Table 3 summarizes the

measurement characteristics for the parameters measured aboard both aircraft. Figures 3a and 3b show the mission payloads for the DC-8 and P-3B, respectively. Additional measured quantities (e.g., Project measurements) and some calculated quantities (liquid water content) not listed in Table 3 are available from the ASDC and GTE archives.

The TRACE-P data available on the Langley ASDC and GTE archive include (1) data taken aboard the DC-8 aircraft; (2) data taken aboard the P-3B aircraft; (3) ozonesonde data; (4) FTIR data; (5) merged data; (6) satellite data products; and (7) meteorological data products. The ozonesonde data include releases from the following locations: Trinidad Head, CA (40.8N, 124.2W); Hilo, HI (19.4N, 155.0W); Sapporo (43.1N, 141.3E), Tsukuba (Tateno) (36.1N, 140.1E), Naha (26.2N, 127.7E), and Kagoshima (31.6N, 130.6E), Japan; Hong Kong (22.3N, 114.2E); Taipei, Taiwan (25.0N, 121.4E); and Cheju Island, Korea (33.5N, 126.5E). FTIR measurements were made at Moshiri (44.4N, 142.3E) and Rikubetsu (43.5N, 143.8E) Observatories and Tsukuba (36.1N, 140.1E), Japan.

The data plots for TRACE-P are given in Appendix A. For each DC-8 flight, 19 pages of time series plots followed by altitude profiles of dewpoint, temperature, ozone, and carbon monoxide are provided. The order of the species in the time series plots is given in Table 4. Table 5 lists the parameters plotted and their chemical formulas. The species were selected to provide the reader with information on both the source characteristics and photochemical history of air. There are no plots prior to flight 4 for the DC-8 or the P-3B, as these were test flights and data archival was not required. Data plots are in standardized format as discussed in Appendix A.

CONCLUDING REMARKS

This compendium of data from NASA's Global Tropospheric Transport and Chemical Evolution over the Pacific (TRACE-P) provides only a graphical representation of aircraft data that are available in archived format from NASA Langley's Atmospheric Sciences Data Center (ASDC) and from the GTE Project Office archive. The plots are not intended to support original research/analysis, but serve as an overview of the TRACE-P aircraft data and provide some assistance to the reader in identifying data that are of interest and which may be obtained from Langley's ASDC archive or GTE's Project Office archive. This compendium volume covers only selected NASA P-3B aircraft data. The DC-8 aircraft data is contained in volume 1 of the compendium. The GTE archived database includes other data measured on board the aircraft as well as numerous supporting data including meteorological observations/products, photochemical modeling products, surface station observations, satellite observations, and ozonesonde and FTIR measurements. GTE-sponsored analyses/results from the TRACE-P expedition have been accepted for publication to a Special Issue of the *Journal of Geophysical Research – Atmospheres* and will be published in two parts, October 27, 2003 and November 16, 2003.

Questions or information regarding the Langley ASDC archive should be directed to Langley ASDC User and Data Services, Mail Stop 157D, NASA Langley Research Center, Hampton, Virginia, 23681-2199. A brief description of the ASDC, log on procedures, and databases is given in Appendix B.

Table 1. GTE Field Expeditions Through 2001

Expedition	**Date**	**General Geographic Region**	**Time of Year**
CITE-1	1983	Hawaii	November
CITE-1	1984	Eastern North Pacific – off the California coast	April
ABLE-1	1984	Barbados, French Guyana	June
ABLE-2A	1985	Amazon Basin	August
CITE-2	1986	Western USA	August
ABLE-2B	1987	Amazon Basin	May
ABLE-3A	1988	Alaska – Barrow, Bethel, Cold Bay	July/August
CITE-3	1989	Western North Atlantic – Virginia coast and Western South Atlantic – Brazil coast	August/September
ABLE-3B	1990	Canada – Hudson Bay, Schefferville	July/August
PEM-West A	1991	Western Pacific Rim	October
TRACE-A	1992	Brazil, South Atlantic, Southwest Africa	September
PEM-West B	1994	Western Pacific Rim	February/March
PEM-Tropics A	1996	South Pacific Basin	August/September
PEM-Tropics B	1999	South Pacific Basin	March/April
TRACE-P	2001	Western Pacific	February-April

Table 2(a). Summary of DC-8 Aircraft Flights For TRACE-P Mission

Flight Number	Start Date, GMT	Julian Day, GMT	Start Time, GMT	Stop Time, GMT	Lat. Min, degree	Lat. Max, degree	Lon. Min, degree	Lon. Max, degree	Flight Location and Description
1D*	2/14/01	45	18:20:10	22:16:16	26.7700	35.2800	-121.6717	-117.8633	DFRC Test Flight 1
2D*	2/16/01	47	18:10:00	22:25:36	27.0217	35.2817	-124.5117	-117.3283	DFRC Test Flight 2
3D*	2/21/01	52	23:02:50	04:13:34	25.0483	35.2983	-124.1117	-116.9850	DFRC Test Flight 3
4D	2/26/01	57	17:36:52	01:50:43	19.5133	40.3950	-156.7900	-117.8183	DFRC to Kona, Hawaii – Aged Asian Pollution and MOPITT mid-latitude validation
5D	2/27/01	58	20:02:16	04:53:06	13.5633	19.7533	-156.0417	144.8650	Kona, Hawaii to Guam – Asian Pollution Subsidence and MOPITT tropical validation
6D	3/03/01	62	23:52:36	08:48:43	13.5717	27.7600	-113.9117	145.0450	Guam to Hong Kong – Asian Outflow: Frontal, Convective, S. China Sea
7D	3/07/01	66	01:10:04	10:52:39	20.0067	30.5367	113.7817	140.2000	Hong Kong Local 1 – China Outflow and Frontal Crossing
8D	3/09/01	68	01:01:17	10:21:26	20.0000	26.3600	113.8983	149.9233	Hong Kong Local 2 (to Okinawa) – Chemical Evolution of Frontal Outflow
9D	3/10/01	69	01:49:18	09:08:21	19.9983	37.2033	113.7267	129.0150	Hong Kong Local 3 (from Okinawa) – China Outflow to Yellow Sea
10D	3/13/01	72	02:15:28	10:25:14	18.4183	25.9467	113.7633	135.8950	Hong Kong Local 4 – Aged Asian Outflow
11D	3/17/01	76	00:55:07	08:36:20	19.2150	30.1983	113.8983	138.9167	Hong Kong to Kadena AFB, Okinawa – MOPITT Validation and China Outflow
12D	3/18/01	77	00:50:58	08:17:47	22.5050	35.7533	117.6833	139.4567	Kadena AFB, Okinawa to Yokota AFB, Japan – Formosa Strait and China Outflow
13D	3/20/01	79	22:54:37	08:22:26	21.8100	35.9683	124.5133	139.5167	Yokota Local 1 – Frontal Lifting and Dust Outflow
14D	3/23/01	82	23:21:34	08:19:19	21.2900	35.9750	134.8083	150.1850	Yokota Local 2 – Convective Outflow
15D	3/26/01	85	23:36:04	08:55:26	23.4850	37.3050	124.3550	139.5233	Yokota Local 3 – Convective Outflow and Stratospheric Influence
16D	3/29/01	88	18:15:05	03:37:24	27.7517	35.8817	124.1433	139.4367	Yokota Local 4 – Sunrise Photochemistry of Asian Outflow
17D	3/31/01	90	00:12:09	07:37:10	34.2367	45.5350	131.6683	149.8783	Yokota Local 5 – Warm Conveyor Belt and Cyclonic Recirculation
18D	4/03/01	93	22:38:47	07:46:36	19.5350	36.1567	-156.0150	139.3250	Yokota AFB, Japan to Kona, Hawaii – High Altitude Asian Outflow and Sunset MBL Chemistry
19D	4/06/01	96	17:56:26	04:12:33	18.8617	37.1850	-156.1333	136.0100	Kona, Hawaii Local 1 – Subsidence over E. Pacific and MOPITT Transect
20D	4/09/01	99	17:14:56	00:03:13	19.7233	35.1717	-156,0467	-117.5067	Kona, Hawaii to DFRC – A/C Intercomparison , Stratus Chemistry and Jet Stream Transport

* optional data archival; required for other flights

Table 2(b). Summary of P-3B Aircraft Flights For TRACE-P Mission

Flight Number	Start Date, GMT	Julian Day, GMT	Start Time, GMT	Stop Time, GMT	Lat. Min, degree	Lat. Max, degree	Lon. Min, degree	Lon. Max, degree	Flight Location and Description
1P*	2/09/01	40	16:34:50	19:35:46	34.8738	37.9827	- 75.8625	72.8816	WFF Test Flight 1
2P*	2/13/01	44	20:29:36	22:59:46	34.7859	37.9724	- 75.8612	73.2178	WFF Test Flight 2
3P*	2/17/01	48	19:52:25	00:37:38	37.1159	38.5590	- 75.6416	73.0761	WFF Test Flight 3
4P	2/24/01	55	14:36:15	22:15:18	33.5966	37.6096	-118.0862	- 75.9491	WFF to Palmdale, California – Stratospheric Intrusion
5P	2/26/01	57	17:34:21	00:51:59	19.7055	34.6774	-156.0717	-118.0731	Palmdale, California to Kona, Hawaii – Aged Asian Pollution
6P	2/27/01	58	19:52:12	02:41:40	19.2236	21.2348	-156.1263	166.5762	Kona, Hawaii to Wake Island – Asian Pollution Subsidence
7P	3/01/01	60	21:56:23	04:19:33	9.9016	19.2866	144.8860	166.7067	Wake Island to Guam – Tropical/Subtropical Gradient
8P	3/04/01	63	00:34:00	08:25:00	13.5731	22.4097	113.9184	145.0026	Guam to Hong Kong – A/C Intercomparison; Asian Outflow to S. China Sea
9P	3/07/01	66	02:17:02	10:07:56	20.0490	28.5091	113.7464	124.2517	Hong Kong Local 1 – Post-Frontal Asian Outflow
10P	3/09/01	68	01:07:16	08:39:50	19.9987	22.3419	113.7484	131.2688	Hong Kong Local 2 – Aged Post-Frontal Outflow
11P	3/10/01	69	00:55:45	09:00:53	6.8956	22.3185	111.9539	116.4651	Hong Kong Local 3 – S. China Sea Quiescent Period
12P	3/13/01	72	00:53:42	09:05:30	17.0386	27.6039	113.7251	124.9838	Hong Kong Local 4 – Stratospheric Intrusion; Biomass Burning Outflow
13P	3/17/01	76	00:58:41	09:07:37	20.0514	37.2261	113.8976	127.9529	Hong Kong to Kadena AFB, Okinawa – Low Level Outflow to Yellow Sea
14P	3/18/01	77	01:58:04	09:17:05	26.3539	37.0393	124.3366	139.4325	Kadena AFB, Okinawa to Yokota AFB, Japan – Surface Outflow to Yellow Sea; Volcanic Plume
15P	3/21/01	80	00:21:00	07:56:40	32.9998	40.9278	139.3278	155.0006	Yokota Local 1 – Frontal Boundary Profile
16P	3/23/01	82	23:06:58	07:23:48	30.9409	39.9699	132.9872	140.0680	Yokota Local 2 – A/ C Intercomparison; Japan North-South
17P	3/27/01	86	00:27:51	08:41:41	32.1353	35.9329	139.3172	146.4258	Yokota Local 3 – Air-Sea Exchange; Volcanic Plume; TERRA Underpass
18P	3/30/01	89	23:13:30	06:25:35	28.9584	37.9434	127.9982	139.6035	Yokota Local 4 – ACE Asia; Asian Outflow to Sea of Japan; TERRA Underpass
19P	4/02/01	92	00:23:07	08:31:21	35.6250	40.9494	131.7143	139.3511	Yokota Local 5 – ACE Asia;Moist Conveyor Belt; TERRA Underpass
20P	4/03/01	93	23:23:05	07:12:34	28.1442	36.1534	-177.3796	139.3075	Yokota AFB, Japan to Midway Island – High Altitude Asian Outflow
21P	4/06/01	96	06:53:24	14:21:21	20.0282	28.2473	-177.2093	164.9640	Midway Island Local 1 – Aged Asian Pollution; Stratospheric Influence
22P	4/07/01	97	16:18:40	23:06:02	16.0089	28.2231	-177.5010	-155.5967	Midway Island to Kona, Hawaii – Sunrise Photochemistry; Stratospheric Influence
23P	4/09/01	99	16:57:44	01:03:30	19.7240	34.9655	-156.0468	-117.7267	Kona, Hawaii to NASA- DFRC – A/C Intercomparison
24P	4/10/01	100	15:33:28	22:05:41	30.4674	37.9393	-118.0146	- 75.4597	DFRC to WFF – Transport of Clean Tropical Air

* optional data archival; required for other flights

Table 3. TRACE-P Aircraft Measurement Characteristics

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
B. Anderson[1]	X		Aerosol absorption at 565nm	PSAP	30 to 180 s	20%	20%	5×10^{-7} m^{-1}
	X		Single scatter albedo	Nephelometer	30 to 180 s	NA	NA	NA
	X		Equivalent BC mass	PSAP	30 to 180 s	30%	20%	0.1 µg m^{-3}
	X		CN>4nm Unheated CN>14nm Heated CN>14nm	Condensation nuclei counter	1 s	10%	10%	1 cm^{-3}
	X		Ratio Heated/Unheated	Condensation nuclei counter	1 s	20%	20%	NA
	X		Scatter at 450nm Scatter at 550nm Scatter at 700nm	Nephelometer	1 s	10%	10%	$1 \times 10^{-7} m^{-1}$
	X		Angstrom exponent: 450-550nm 450-700nm 550-700nm	Nephelometer	1 s	NA	NA	NA
	X		Number: .1-.75, .75-2, 2-5, 5-20, 20-50, 50-1550	PCASP aerosol probe, FSSP-300, Cloud, aerosol, and precipitation spectrometer (CAPS)	1 s	20%	20%	0 cm^{-3}
	X		Surface: .1-.75, .75-2, 2-5, 5-20, 20-50, 50-1550 Volume dry: .1-.75, .75-2, 2-5, 5-20, 20-50, 50-1550	PCASP aerosol probe, FSSP-300, CAPS	1 s	50%	50%	0 $\mu m^{-2} m^{-3}$
E. Apel[2]	X		CH_3CHO	GC/MS	10-60 s	±4%	±7%	40 pptv
	X		Methanol	GC/MS	10-60 s	±3%	±7%	50 pptv
	X		Acetone	GC/MS	10-60 s	±3%	±2%	50 pptv
	X		Ethanol	GC/MS	10-60 s	±3%	±19%	5 pptv
	X		Butanal	GC/MS	10-60 s	±3%	±5%	5 pptv
	X		Methyl ethyl ketone	GC/MS	10-60 s	±3%	±3%	5 pptv
	X		Propanal	GC/MS	10-60 s	±3%	±6%	15 pptv

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
E. Browell[1]	X		Aerosol wavelength dependence profiles (1064nm/587nm)	Derived from IR and VIS lidar backscatter data	Horizontal: 1 min; Vertical: 30 m[a]			
	X		IR aerosol scattering ratio profiles (1064nm)	Normalized IR lidar backscattering	Horizontal: 1 min; Vertical: 30 m[a]	10% or ±0.05[b]	0.05	0.01
	X		Ozone profiles	UV DIAL	Horizontal: 5 min; Vertical: 300m[c]	10% or ±2 ppbv[b]	5% or 1 ppbv	NA
	X		Trop. heights and ozone columns	Derived from UV DIAL ozone data	5 min[d]	Derived	Derived	NA
	X		Visible aerosol scattering ratio profiles (587 nm)	Normalized VIS lidar backscattering	Horizontal: 1 min; Vertical: 30 m[a]	10% or ±0.03[b]	0.03	.01
	X		Visible aerosol depolarization profiles	VIS lidar backscatter depolarization	Horizontal: 1 min; Vertical: 150 m[a]	10% relative or ±0.2% absolute[b]	0.2%	NA
W. Brune[3]	X		OH	LIF	20 s	±40% at 2 sigma	1 km 10 ppq, > 5 km 4 ppq	10 ppq
	X		HO_2	LIF	20 s	±40% at 2 sigma	1 km 100 ppq, > 5 km 40 ppq	100 ppq
A. Fried[2]	X		CH_2O	Tunable diode laser absorption spectrometer	60 s	12 to 15%[e]	66 pptv	66 pptv[f]
B. Heikes[4]	X		H_2O_2	HPLC	30 s	±15 ppt or ±0.15 x value	±15 ppt or ±0.15 x value	15 pptv
	X		CH_3OOH	HPLC	30 s	±25 ppt or ±0.25 x value	±25 ppt or ±0.25 x value	25 pptv
	X		CH_2O	Flow Injection Analysis (FIA)	60 s	±50 ppt ±0.15 x value	±50 ppt ±0.15 x value	50 pptv
G. Sachse[1]	X		N_2O	DACOMIR Laser Spectrometer	5 s	1%	0.15% (1σ)	NA[g]
	X		H_2O	DLH NIR Laser Spectrometer	50 ms	1 ppmv or 10% conc. [b]	0.1 ppmv or 1% conc. [b] (1σ)	NA[g]

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
S. Sandholm[5]	X		NO	TP-LIF	60 s	±20%	>10%	2 pptv
	X		NO_2	TP-LIF	60 s	±40%	>20%	5 pptv or 10%[h]
H. Singh[6]	X		PAN	GC	120 s	±20%	±10%	1 pptv
	X		Acetone	GC	180 s	±20%	±10%	5 pptv
	X		Acetaldehyde	GC	180 s	±25%	±10%	10 pptv
	X		Propionaldehyde	GC	180 s	±25%	±15%	10 pptv
	X		Methyl Ethyl Ketone	GC	180 s	±20%	±10%	10 pptv
	X		Methanol	GC	180 s	±25%	±15%	15 pptv
	X		Ethanol	GC	180 s	±25%	±20%	20 pptv
	X		Acetonitrile	GC	180 s	±25%	±15%	30 pptv
	X		HCN	GC	180 s	±25%	±15%	30 pptv
	X		PPN	GC	120 s	±30%	±20%	1 pptv
	X		Methyl nitrate	GC	120 s	±15%	±10%	1 pptv
	X		i-propyl + ethyl nitrate	GC	120 s	±15%	±10%	1 pptv
B. Talbot[7]	X		Chloride	Filter collection	2.7-42.5 min	20%	15% + 23 pptv	25 pptv
	X		Nitrate	Filter collection	2.7-42.5 min	20%	15% + 2.5 pptv	3 pptv
	X		Sulfate	Filter collection	2.7-42.5 min	20%	15% + 2.1 pptv	3 pptv
	X		Oxalate	Filter collection	2.7-42.5 min	20%	15% + 4.4 pptv	5 pptv
	X		Sodium	Filter collection	2.7-42.5 min	20%	15% + 18.4 pptv	20 pptv
	X		Ammonium	Filter collection	2.7-42.5 min	20%	15% + 5.7 pptv	6 pptv
	X		Potassium	Filter collection	2.7-42.5 min	20%	15% + 8.6 pptv	9 pptv
	X		Magnesium	Filter collection	2.7-42.5 min	20%	15% + 3.8 pptv	4 pptv
	X		Calcium	Filter collection	2.7-42.5 min	20%	15% + 3.2 pptv	4 pptv
	X		Beryllium-7	Filter collection	2.7-42.5 min	10%	50%/25%/15%[i]	30 fCi scm^{-1}[i]
	X		HNO_3	Mist Chamber-Ion Chromatography	130-140 s	15%	15%	3 pptv
	X		SO_2	Mist Chamber-Ion Chromatography	130-140 s	20%	20%	3 pptv
	X		Fine aerosol NSS	Mist Chamber-Ion Chromatography	130-140 s	20%	20%	4 pptv
	X		SO_4	Mist Chamber-Ion Chromatography	130-140 s	20%	20%	4 pptv

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
E. Atlas[2]	X	X	CH_3ONO_2 n-$C_3H_7ONO_2$ 2-$C_4H_9ONO_2$	GC/MS	40-150 s	10-20%	5-10%	0.10 pptv
	X	X	$C_2H_5ONO_2$ i-$C_3H_7ONO_2$	GC/MS	40-150 s	10-20%	5-10%	0.14 pptv
	X	X	3-$C_5H_{11}ONO_2$ 2- $C_5H_{11}ONO_2$ 3-CH_3-2-$C_4H_8ONO_2$	GC/MS	40-150 s	10-20%	5-10%	0.30 pptv
	X	X	HFC-134a	GC/MS	40-150 s	5-10%	5-10%	0.30 pptv
	X	X	HCFC-141b HCFC-142b $CHCl_3$	GC/MS	40-150 s	5-10%	5-10%	0.10 pptv
	X	X	HCFC-22	GC/MS	40-150 s	5-10%	5-10%	0.20 pptv
	X	X	HCFC-21 HCFC-123	GC/MS	40-150 s	10-20%	10-20%	0.10 pptv
	X	X	HCFC-124	GC/MS	40-150 s	10-20%	10-20%	0.20 pptv
	X	X	Halon-1211	GC/MS	40-150 s	10-20%	10-20%	0.07 pptv
	X	X	Halon-2402 Halon-1301	GC/MS	40-150 s	5-10%	5-10%	0.15 pptv
	X	X	Halon-1202	GC/MS	40-150 s	5-10%	20% or 0.02 pptv	0.02 pptv
	X	X	CH_3Br	GC/MS	40-150 s	10-20%	5-10%	0.20 pptv
	X	X	C_3H_7Br	GC/MS	40-150 s	10-20%	10-20%	0.54 pptv
	X	X	CH_3Cl OCS	GC/MS	40-150 s	5%	5-10%	1.00 pptv
	X	X	C_2H_5Cl	GC/MS	40-150 s	10-20%	5-10%	0.50 pptv
	X	X	C_2H_3Cl	GC/MS	40-150 s	10-20%	5-10%	0.18 pptv
	X	X	CH_2Cl_2	GC/MS	40-150 s	5%	5-10%	0.40 pptv
	X	X	1_2-$C_2H_4Cl_2$	GC/MS	40-150 s	10-20%	5-10%	0.40 pptv
	X	X	C_2HCl_3	GC/MS	40-150 s	10-20%	5-10%	0.05 pptv
	X	X	C_2Cl_4	GC/MS	40-150 s	5-10%	5-10%	0.16 pptv
	X	X	CH_2Br_2	GC/MS	40-150 s	10-20%	5-10%	0.08 pptv
	X	X	$CHClBr_2$	GC/MS	40-150 s	10-20%	10% or 0.02 pptv	0.02 pptv
	X	X	$CHBr_3$	GC/MS	40-150 s	10-20%	5-10%	0.14 pptv
M. Avery[1]	X	X	Ozone	Nitric oxide chemiluminescense	1 s	5% or 2 ppbv	2% or 0.8 ppbv	0.8 ppbv

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
D. Blake[8]	X	X	Ethane Propane	GC	40-150 s	5%	1% or 2 pptv[b]	3 pptv
	X	X	trans-2-Butene	GC	40-150 s	10%	2% or 3 pptv[b]	3 pptv
	X	X	Benzene Toluene o-Xylene m-Xylene p-Xylene Ethylbenzene	GC	40-150 s	5%	2% or 3 pptv[b]	3 pptv
	X	X	$CHClBr_2$	GC	40-150 s	10-20%	5-10%	0.005 pptv
	X	X	Ethyne n-Butane i-Butane n-Pentane i-Pentane	GC	40-150 s	5%	1% or 2 pptv[b]	2 pptv
	X	X	H-1211	GC	40-150 s	5%	2%	0.1 pptv
	X	X	CH_3I	GC	40-150 s	10-20%	5-10%	0.05 pptv
	X	X	Methyl nitrate Ethyl nitrate 2-Butyl nitrate	GC	40-150 s	10-20%	1-5%	0.05 pptv
	X	X	CH_3CCl_3	GC	40-150 s	5%	1%	3 pptv
	X	X	CCl_4	GC	40-150 s	2%	1%	3 pptv
	X	X	Ethene	GC	40-150 s	10%	2% or 3 pptv[b]	3 pptv
	X	X	Propene	GC	40-150 s	10%	2% or 3 pptv[b]	2 pptv
	X	X	CFC-12	GC	40-150 s	2%	0.7%	1 pptv
	X	X	CFC-11	GC	40-150 s	2%	0.8%	3 pptv
	X	X	CFC-113	GC	40-150 s	2%	1.4%	3 pptv
	X	X	CFC-114	GC	40-150 s	5%	1.5%	1 pptv
	X	X	HCFC-22	GC	40-150 s	5%	1.5%	10 pptv
	X	X	H-2402	GC	40-150 s	5%	5%	0.1 pptv
	X	X	C_2Cl_4	GC	40-150 s	10%	1-5%	0.05 pptv
	X	X	CH_2Cl_2	GC	40-150 s	10%	5%	2 pptv
	X	X	$CHBrCl_2$	GC	40-150 s	10-20%	5-10%	0.05 pptv
	X	X	CH_3Cl	GC	40-150 s	5%	5-10%	100 pptv
	X	X	$CHCl_3$	GC	40-150 s	5%	5-10%	2 pptv
	X	X	$CHBr_3$	GC	40-150 s	10%	5-10%	0.1 pptv

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
D. Blake (cont.)	X	X	CH_3Br	GC	40-150 s	5%	4%	1 pptv
	X	X	CH_2Br_2	GC	40-150 s	10-20%	5-10%	0.4 pptv
	X	X	CH_4	GC	40-150 s	1%	0.1%	NA
	X	X	OCS H-134a	GC	40-150 s	10%	5%	NA
	X	X	DMS	GC	40-150 s	10%	5% or 2pptv[b]	1 pptv
	X	X	HCFC-141b HCFC-142b	GC	40-150 s	10%	3%	NA
	X	X	C_2HCl_3	GC	40-150 s	20%	5%	0.02 pptv
	X	X	CH_2BrCl	GC	40-150 s	20%	5%	NA
	X	X	C_2H_5Cl	GC	40-150 s	20%	5%	0.3 pptv
	X	X	C_2H_5I	GC	40-150 s	20%	10%	0.01 pptv
	X	X	2-$C_5H_{11}ONO_2$ 3-$C_5H_{11}ONO_2$ n-$C_3H_7ONO_2$	GC	40-150 s	10-20%	1-5%	0.01 pptv
	X	X	i-$C_3H_7ONO_2$	GC	40-150 s	10-20%	10%	0.02 pptv
	X	X	CS_2	GC	40-150 s	20%	5%	0.5%
	X	X	1,2-Dichloroethane	GC	40-150 s	20%	10%	0.05 pptv
	X	X	n-Hexane	GC	40-150 s	5%	5%	3 pptv
Project (J. Barrick[1])	X	X	$J(NO_2)$ zenith $J(NO_2)$ nadir	Filter radiometer (PMT)	1 s	10%	4%	1.5×10^{-6} mv^{-1}
	X	X	Dew/Frost point	Chilled mirror hygrometer	1-10 s	±0.5°C	±0.2°C	±75°C
G. Sachse[1]	X	X	CO	DACOM IR Laser Spectrometer	1 s	2%	1 ppbv or 1% conc.[b] (1σ)	NA[g]
	X	X	CH_4	DACOM IR Laser Spectrometer	1 s (DC-8) 5 s (P-3B)	1%	0.15% (1σ)	NA[g]
R. Shetter[2]	X	X	J[O3->O2+O(1D)] J[CH2O->H+HCO] J[CH2O->H2+CO]	SAFS	10 s	~10%	~3%	<0.05mW $cm^{-2}nm^{-1}$
	X	X	J[NO2->NO+O(3P)] J[H2O2->2OH] J[HNO2->OH+NO] J[HNO3->OH+NO2] J[HNO4->HO2+NO2]	SAFS	10 s	~8%	~3%	<0.05mW $cm^{-2}nm^{-1}$

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
R. Shetter (cont.)	X	X	J[CH3CHO-> CH3+ HCO] J[CH3CHO->CH4+CO] J[C2H5CHO-> C2H5+ HCO] J[CHOCHO] J[CH3COCHO] J[CH3COCH3] J[CH3OOH-> CH3O+ OH] J[CH3ONO2-> CH3O+ NO2] J[PAN+hv->products] J[CH3CH2CH2CHO-> C3H7+HCO] J[CH3CH2CH2CHO-> C2H4+CH2CHOH] J[CH3COCH2CH3] J[CH3CH2ONO2+hv-> Products	SAFS	10 s	~8%	~3%	<0.05mW $cm^{-2}nm^{-1}$
S. Vay[1]	X	X	CO_2	Non-dispersive IR Spectrometer	1 s	0.25 ppmv	0.07 ppmv (1 Hz)	0.5 ppmv
A. Bandy[9]		X	SO_2	Atmospheric Pressure Ionization Mass Spectrometry	1 s	2-5%[j]	2 pptv or 2%[k]	1 pptv
C. Cantrell[2]		X	HO_2 HO_2+RO_2	Chemical ionization mass spectrometry	60 s	±35%	±10%	$3x10^{7}$ molec cm^{-3}
A. Clarke[10]		X	Condensation Nuclei cold	CN counter	5 s	5-10%	5%	1 particle cm^{-3}
		X	Condensation Nuclei hot	CN with 300C heater	5 s	5-10%	5%	1 particle cm^{-3}
		X	Cloud liquid water content	PVM optical probe	5 s	5-10%	5%	0.002g-m^{-3}
		X	APS integral number, area, volume[l]	Aerodynamic particle sizing	60 s	20%	5%	NA[m]
		X	FSSP integral number, area, volume[n]	FSSP probe	15 s	20%	5%	NA[m]

Table 3. Continued

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
A. Clarke (cont.)		X	Scatter (all part) at 450nm, 550nm, 700nm Backscatter (all part) at 450nm, 550nm, 700nm	3 Wavelength integrating nephelometer	25 s	±0.2 Mm^{-1}	±0.1 Mm^{-1}	±0.2 Mm^{-1}
		X	Scatter (submicron) at 450nm, 550nm, 700nm Backscatter (submicron) at 450nm, 550nm, 700nm	< 1µm Dp aerodynamic	25 s	±0.2 Mm^{-1}	±0.1 Mm^{-1}	±0.2 Mm^{-1}
		X	Light Absorption (all part) 565nm Absorption (submicron) 565nm	PSAP- light transmission through filter[o]	65 s	15%[p]	<6%	±0.5 Mm^{-1}[q]
		X	DMA number, surface area and volume at 50C[r]	Differential Mobility Analyzer	20 s grab samples	20%	5%	NA[m]
		X	OPC number, surface area and volume at 50C[s]	Optical Particle Counter effective optical particle size	60 s	15%	5%	NA[m]
F. Eisele[5]		X	OH	CIMS	30 s	60%	20%	$1x10^{5}$ OH cm^{-3}
		X X	H_2SO_4 MSA	CIMS	30 s	60%	20%	$2x10^{5}$ cm^{-3}
		X	HNO_3	CIMS	20 s	±25%[t]	20%	5 pptv
W. Flocke[2]		X	PAN PPN	GC	2.5 min[u]	-10% to +5%	1% or 1 pptv[v]	5 pptv
		X X	MPAN PiBN	GC	2.5 min[u]	-10% to +10%	±15% or ±2.5 pptv[b]	5 pptv
Y. Kondo[11]		X	NO NO_Y	Chemiluminescence	1 s 1s	16% 35%	6 pptv 16pptv	12 pptv 28pptv
		X	NO_2	Chemiluminescence	10 s	32%/60%[w]	4 pptv/3 pptv[w]	13 pptv[x]
Project (J. Barrick[1])		X	Air Temp	RTD sensor	1 s	±0.3°C	±0.2°C	±100° C[y]
		X	Surface temp	IR Pyroelectrics (chopped radiation)	1 s	±0.7°C	±0.5°C	-50° to 70° C[y]
Project (L. Thornhill[1])		X	Latitude, longitude	TAMMS	20 s^{-1}	0.4 nm hr^{-1}	NA	0.1 min
		X	Pressure altitude	TAMMS	20 s^{-1}	0.4%	7 ft	0.5 ft
		X	Static pressure	TAMMS	20 s^{-1}	0.2 hPa	0.05 hPa	0.008 hPa

Table 3. Concluded

Investigator	Aircraft		Species/ Parameter	Technique	Averaging Time	Accuracy	Precision	LOD
	DC-8	P-3B						
Project (cont.) (L. Thornhill)		X	Impact pressure	TAMMS	20 s^{-1}	0.4 hPa	0.05 hPa	0.008 hPa
		X	Pitch, roll	TAMMS	20 s^{-1}	0.2 deg	0.1 deg	0.04 deg
		X	True heading	TAMMS	20 s^{-1}	0.1 deg	0.1 deg	0.04 deg
		X	U, V	TAMMS	20 s^{-1}	0.5 m s^{-1}	0.1 m s^{-1}	0.01 m s^{-1}
		X	W	TAMMS	20 s^{-1}	0.1 m s^{-1}	0.05 m s^{-1}	0.01 m s^{-1}
		X	MR[z]	TAMMS	20 s^{-1}	0.6 deg C	0.2 deg C	-50° C
		X	MR (LymanAlpha)	TAMMS	20 s^{-1}	5%	2%	1%
		X	Virtual potential temperature (theta v)	TAMMS	20 s^{-1}	0.5 deg K	0.1 deg K	173° to 373° K[y]
R. Weber[5]		X	Sodium	PILS-Ion Chromatography	3 min	±10%	±5%	21 pptv
		X	Ammonium	PILS-Ion Chromatography	3 min	±10%	±5%	27 pptv
		X	Calcium	PILS-Ion Chromatography	3 min	±10%	±5%	12 pptv
		X	Potassium	PILS-Ion Chromatography	3 min	±10%	±5%	13 pptv
		X	Magnesium	PILS-Ion Chromatography	3 min	±10%	±5%	15 pptv
		X	Chloride Sulfate	PILS-Ion Chromatography	3 min	±10%	±5%	3 pptv
		X	Nitrate	PILS-Ion Chromatography	3 min	±10%	±5%	4 pptv
		X	Total UCN (> 3 nm)	Condensation particle counter and Pulse Height Analysis (PHA)	1 s	±10%	±2%	NA
		X	Total UCN UCN 3-8nm UCN 3-4nm	Condensation particle counter and Pulse Height Analysis (PHA)	60 s	±10%	±10%	NA

Notes:

a. Horizontal sample interval: 10 seconds; Vertical sample interval: 30 meters.
b. Whichever is greater.
c. Horizontal sample interval: 1 minute; Vertical sample interval 60 meters.
d. Horizontal sample interval: 1 minute.
e. Percentage of the ambient concentration. However, as the ambient levels decrease, the accuracy estimate can be somewhat higher.
f. Replicate measurements during constant air mass periods provides realistic assessment of how LOD improves with averaging time. These measurements indicate that LOD does in fact improve by roughly the square root of averaging time out to time periods as long as 10 minutes. For 5 minutes of averaging, based on median 1 min LOD of 66 pptv, 5 min LOD is around 30 pptv.
g. Concentration in the troposphere or lower stratosphere never reaches the LOD.
h. Of the NO value, whichever is greater.

i. For Be-7 there is still some uncertainty due to measured air flow (on the order of 5% max) but this is generally dwarfed by the statistical uncertainty inherent in the counting of radioactive decays. Precision increases notably with higher activity. For samples less than 200 fCi scm^{-1} the mean and median uncertainty was 50%, this improves to 25% for samples between 200 and 600 fCi scm^{-1} and to 15% for samples more active than 600 fCi scm^{-1}. (Note that 52% of all samples with reported Be-7 were in this last group and only 24% were less than 200 fCi scm^{-1}). It is estimated an LOD of 30 fCi scm^{-1} (though this also depends on the volume of air sampled).
j. Below 3 ppbv is 2-3%, and above 3 ppbv is about 5%.
k. Below 200 pptv is 2 pptv, and above 200 pptv is about 2%.
l. 0.7 um <= Dp <= 20.0 um.
m. The overall performance (accuracy, precision & LOD) of the size distribution measurements (DMA, OPC, APD & FSSP) are size dependent and are difficult to generalize. The 3 latter instruments are single particle counters making them sensitive to low concentrations limited primarily by count statistics at a given size. Particle losses in sample inlet become significant for sizes larger than about 4 µm.
n. 0.3 µm <= Dp <= 1.0 µm, 1.0 µm <= Dp <= 20.0 µm, 0.3 µm <= Dp <= 20.0 µm.
o. Longer averaging times are generally required for low absorption environments.
p. At typical atmospheric absorption levels and 60 s averages.
q. For 60 s average but lower with larger averaging time.
r. 0.007 <=Dp<=0.1µm.
s. 0.1<=Dp<=20.0µm, 0.1<=Dp<=0.75µm, 0.75<=Dp<=20.0µm.
t. The overall accuracy is estimated to be ±25% for < 100 pptv, ±20% for 100-200 pptv, and ±15% > 200 pptv.
u. One discreet sample (which is an average of 2.5 seconds) is taken every 2-2.5 minutes.
v. Short term (duration of flight), whichever is greater. Long term (over the entire mission), larger of 5% or 1 pptv.
w. Altitude < 2 km / Altitude > 2 km; (NO_2 median 70 pptv for altitude < 2 km / NO_2 median 30 pptv for altitude > 2 km) .
x. Precision and LOD of NO and NO_y were estimated for a 1 s integration time, while for NO_2, a 10 s integration time was used.
y. Lower number is minimum LOD, higher number is maximum LOD.
z. Derived from dew point (GE 1011).

1. NASA Langley Research Center
2. National Center for Atmospheric Research (NCAR)
3. Pennsylvania State University
4. University of Rhode Island
5. Georgia Institute of Technology
6. NASA Ames Research Center
7. University of New Hampshire
8. University of California-Irvine
9. Drexel University
10. University of Hawaii
11. University of Tokyo

Table 4. DC-8 Time Series Plot Order

Plate	Panel	Parameter	Plate	Panel	Parameter
1	1	Lat, Lon	11	1	Chloride
	2	AltP		2	Nitrate
	3	TS, ProjDP		3	Oxalate
	4	WNS		4	Sodium
	5	WND		5	Ammonium
2	1	Ozone	12	1	Potassium
	2	Carbon Monoxide		2	Calcium
	3	Methane		3	Magnesium
	4	Carbon Dioxide		4	Beryllium-7
	5	Water Vapor Mixing Ratio		5	Sulfate
3	1	NO	13	1	Sulfur Dioxide
	2	NO2		2	Fine aerosol NSS Sulfate
	3	HNO3		3	OCS
	4	PAN, PPN		4	DMS
	5	HCN, Acetonitrile		5	Methyl Iodide
4	1	OH	14	1	Methyl Chloride
	2	HO2		2	Chloroform
	3	CH2O		3	CN>4nm
	4	Hydrogen Peroxide		4	Unheated CN>14nm
	5	Methylhydroperoxide		5	Heated/Unheated
5	1	Ethane	15	1	LWC Calc
	2	Propane		2	Aerosol absorption 565 nm
	3	i-Butane, n-Butane		3	Equivalent BC mass
	4	i-Pentane, n-Pentane		4	Scatter 450 nm
	5	Ethyne		5	Angstrom exponent 450-700
6	1	Ethene	16	1	Number dry (.1 to .75 um)
	2	C3H8/C2H6		2	Number (.75 to 2 um)
	3	C2H4/C2H6		3	Number (2 to 5 um)
	4	C2H2/CO		4	Number (5 to 20 um)
	5	C2H6/CO		5	Number (20 to 50 um)
7	1	Benzene	17	1	Surface dry (.1 to .75 um)
	2	Perchloroethylene		2	Surface (.75 to 2 um)
	3	1-2-Dichloroethane		3	Surface (2 to 5 um)
	4	Acetone		4	Surface (5 to 20 um)
	5	Methyl Ethyl Ketone		5	Surface (20 to 50 um)
8	1	Methanol	18	1	O3 Col
	2	Ethanol		2	SZA
	3	Acetaldehyde		3	J(O3)
	4	Propanal		4	J(H2O2)
	5	Butanal		5	J(NO2)

Table 4. Concluded

Plate	Panel	Parameter	Plate	Panel	Parameter
9	1	Methyl Nitrate	19	1	J(NO2)N + J(NO2)Z
	2	Ethyl Nitrate		2	J(NO2)N/J(NO2)Z
	3	i-Propyl Nitrate		3	Roll
	4	n-Propyl Nitrate		4	AltCab
	5	2-Butyl Nitrate			
10	1	CFC-12			
	2	H-1211			
	3	HCFC-142b			
	4	HCFC-22			
	5	CH3CCl3			

Table 5. Plotted Chemical Names and Formulas: DC-8

Variable Name	**Other Names**
Lat	Latitude
Lon	Longitude
AltP	Pressure altitude
TS	Static temperature
ProjDP	Project dew point
WNS	Wind speed
WND	Wind direction
Ozone	O3
Carbon Monoxide	CO
Methane	CH4
Carbon Dioxide	CO2
Water Vapor Mixing Ratio	H2O mixing ratio
NO	Nitric oxide
NO2	Nitrogen dioxide
HNO3	Nitric acid
PAN	CH3C(O)OONO2
PPN	C2H5C(O)OONO2
HCN	Hydrogen cyanide
Acetonitrile	CH3CN
OH	Hydroxyl radical
HO2	Hydroperoxyl radical
CH2O	Formaldehyde
Hydrogen peroxide	H2O2
Methylhydroperoxide	CH3OOH
Ethane	C2H6
Propane	C3H8
i-Butane	i-C4H10
n-Butane	n-C4H10
i-Pentane	i-C5H12
n-Pentane	n-C5H12
Ethyne	C2H2
Ethene	C2H4
C3H8/C2H6	Propane/Ethane ratio
C2H4/C2H6	Ethene/Ethane ratio
C2H2/CO	Ethyne/Carbon monoxide ratio
C2H6/CO	Ethane/Carbon monoxide ratio
Benzene	C6H6
Perchloroethylene	C2Cl4
1-2-Dichloroethane	1-2-C2H4Cl2
Acetone	CH3COCH3
Methyl Ethyl Ketone	C2H5COCH3

Table 5. Continued

Variable Name	**Other Names**
Methanol	CH3OH
Ethanol	C2H5OH
Acetaldehyde	CH3CHO
Propanal	C2H5CHO
Butanal	C3H7CHO
Methyl Nitrate	CH3ONO2
Ethyl Nitrate	C2H5ONO2
i-Propyl Nitrate	i-C3H7ONO2
n-Propyl Nitrate	n-C3H7ONO2
2-Butyl Nitrate	2-C4H9NO3
CFC-12	CCl2F2
H-1211	CBrClF2
HCFC-142b	CH3CF3Cl- Freon 142b
HCFC-22	CHF2Cl- Freon 22
CH3CCl3	Trichloroethane
Chloride	Cl^-
Nitrate	$NO3^-$
Oxalate	C2H2O4
Sodium	Na
Ammonium	$NH4^+$
Potassium	K
Calcium	Ca^+
Magnesium	Mg
Beryllium-7	^7Be
Sulfate	$SO4^-$
Sulfur Dioxide	SO2
Fine aerosol NSS sulfate	Fine aerosol non-sea-salt sulfate
OCS	Carbonyl Sulfide
DMS	Dimethyl Sulfide
Methyl Iodide	CH3I
Methyl Chloride	CH3Cl
Chloroform	CH3Cl3
CN>4 nm	Condensation nuclei
Unheated CN>14nm	Condensation nuclei
Heated/Unheated	Condensation nuclei
LWC calc	Liquid water content
Aerosol absorption 565 nm	Aerosol optical properties
Equivalent BC mass	Aerosol optical properties
Scatter 450 nm	Aerosol optical properties
Angstrom exponent 450-700 nm	Aerosol optical properties
Number dry (.1 to .75um)	Aerosol number density

Table 5. Concluded

Variable Name	**Other Names**
Number (.75 to 2um)	Aerosol number density
Number (2 to 5um)	Aerosol number density
Number (5 to 20um)	Aerosol number density
Number (20 to 50um)	Aerosol number density
Surface dry (.1 to .75um)	Aerosol surface area
Surface (.75 to 2um)	Aerosol surface area
Surface (2 to 5um)	Aerosol surface area
Surface (5 to 20um)	Aerosol surface area
Surface (20 to 50um)	Aerosol surface area
O3 Col	Ozone column
SZA	Solar zenith angle
J[O3->O2+O(1D)]	Photolysis frequency
J[H2O2->2OH]	Photolysis frequency
J[NO2->NO+O(3P)]	Photolysis frequency
J(NO2)Nadir + J(NO2)Zenith	Photolysis frequency
J(NO2)Nadir/J(NO2)Zenith	Photolysis frequency
Roll	Roll angle
AltCab	Cabin altitude

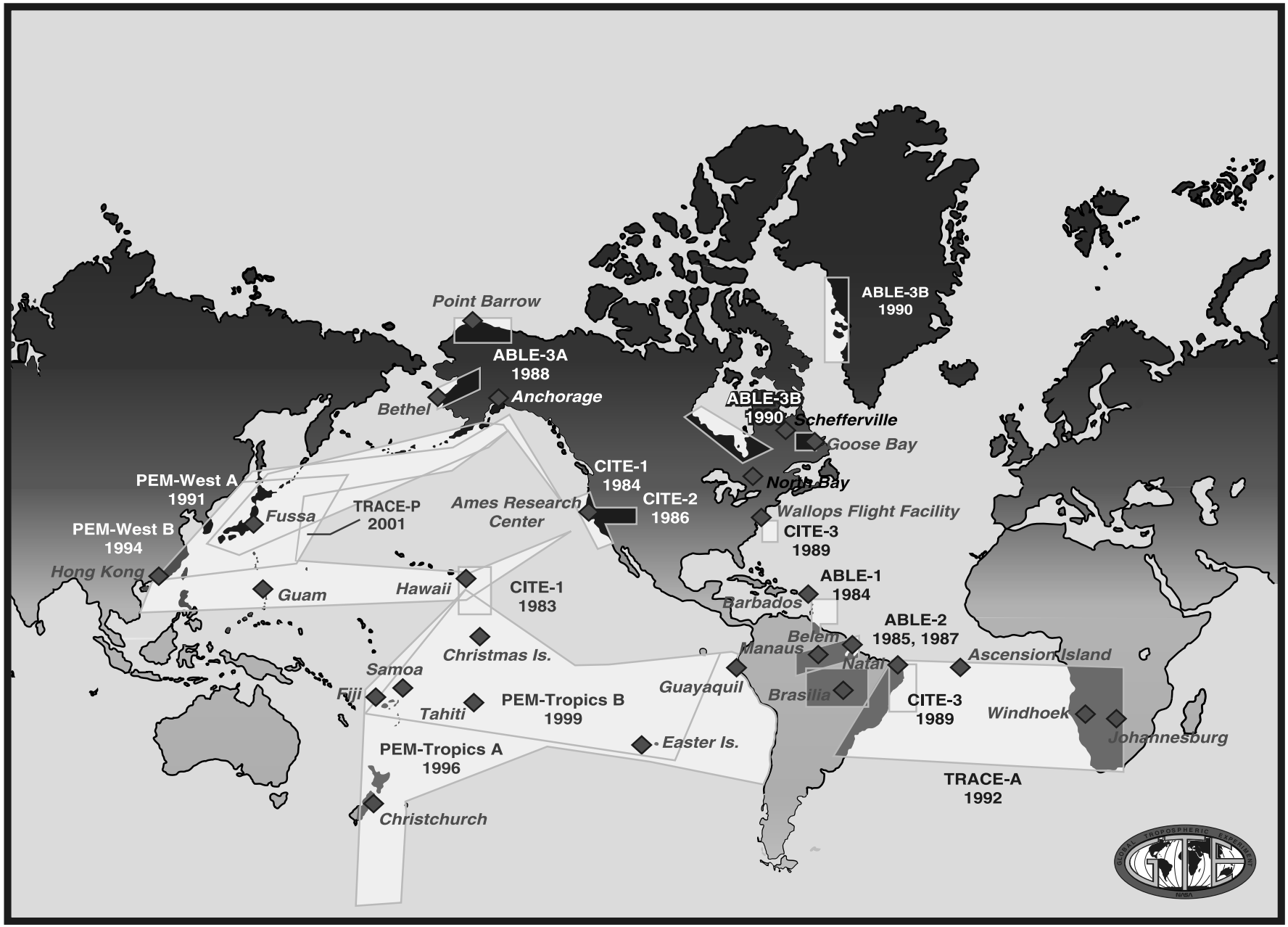


Figure 1. GTE missions through 2001.

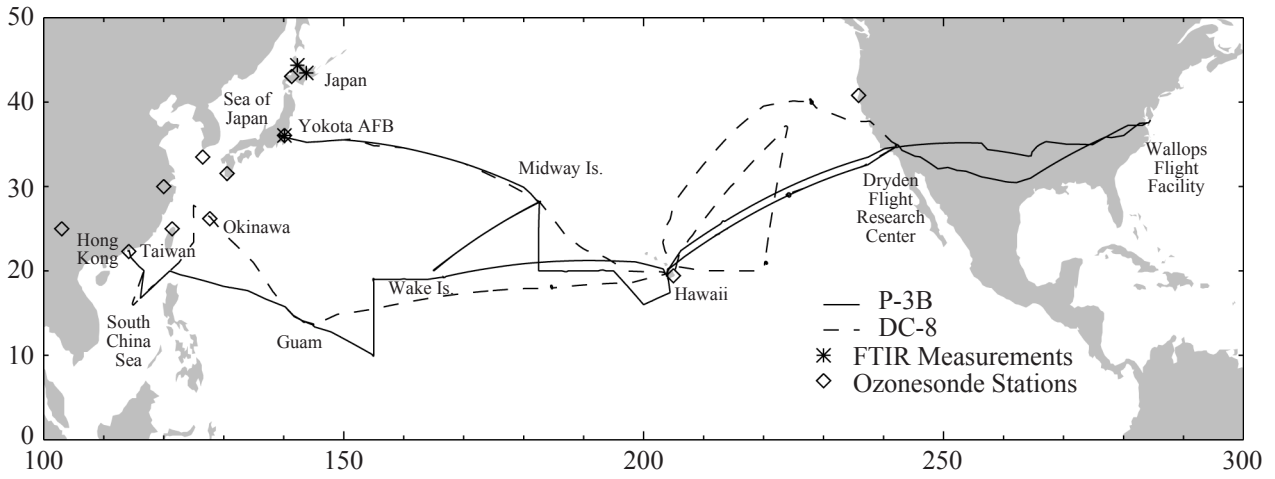


Figure 2(a). TRACE-P transit flight tracks.

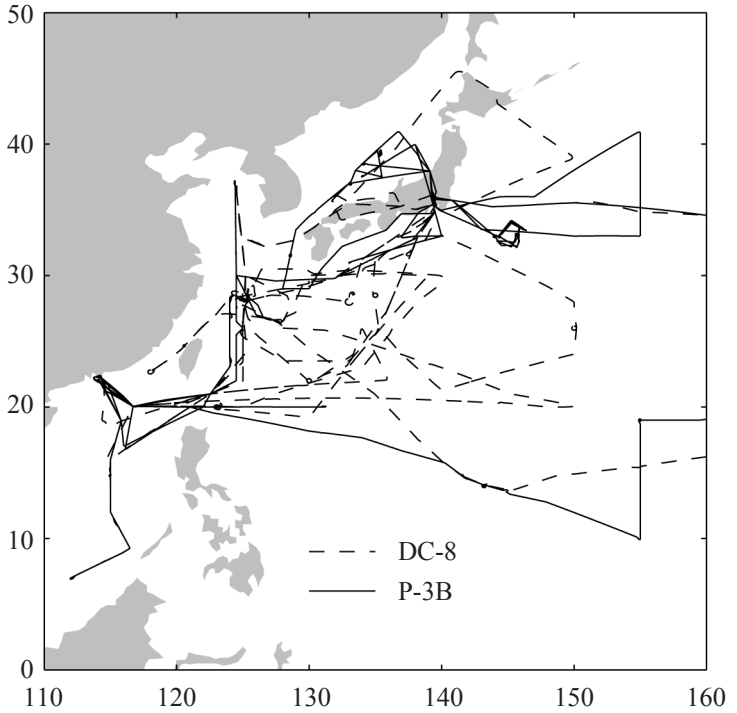


Figure 2(b). TRACE-P intensive flight tracks.

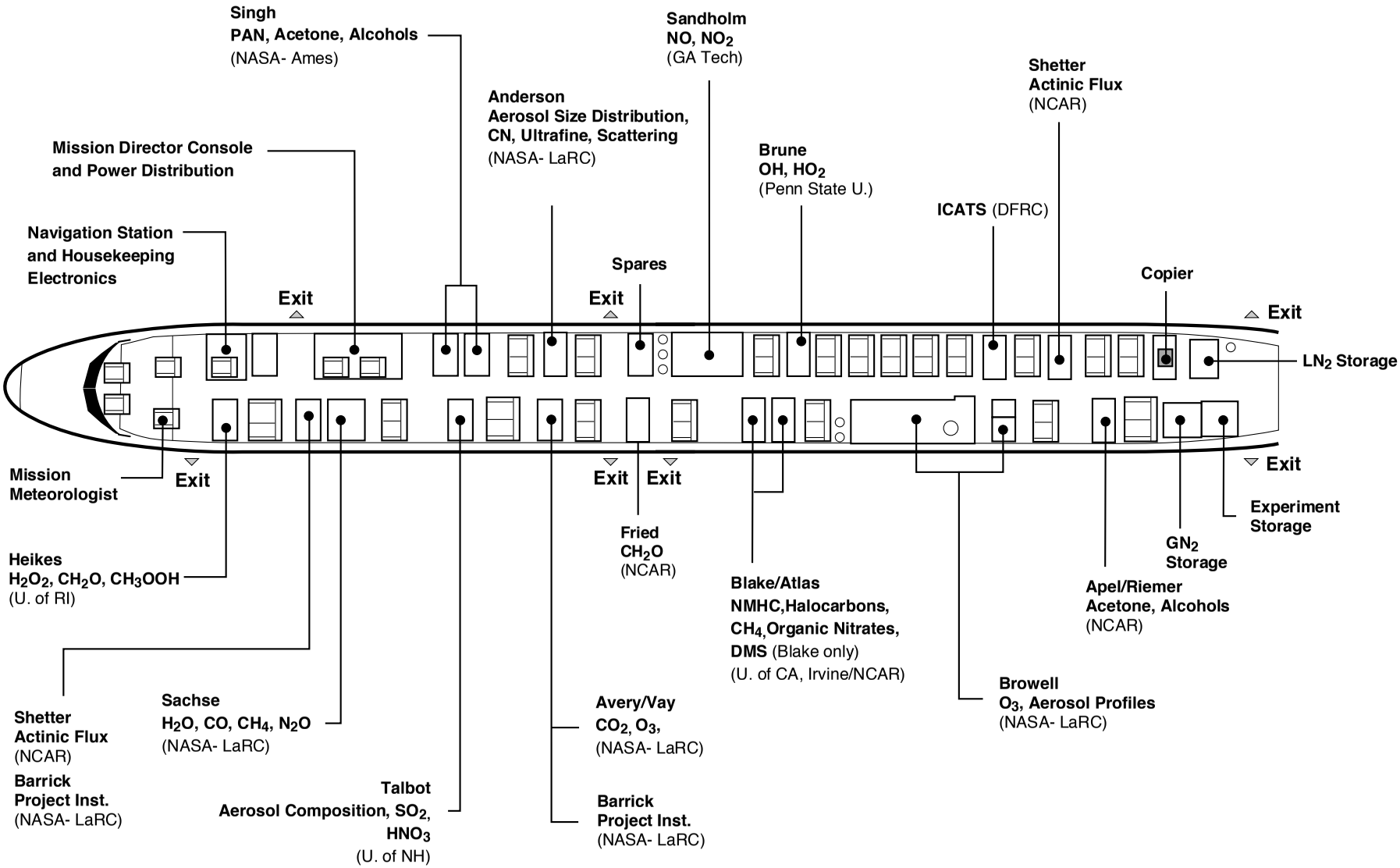


Figure 3(a). TRACE-P DC-8 mission payload.

12.06.02JC

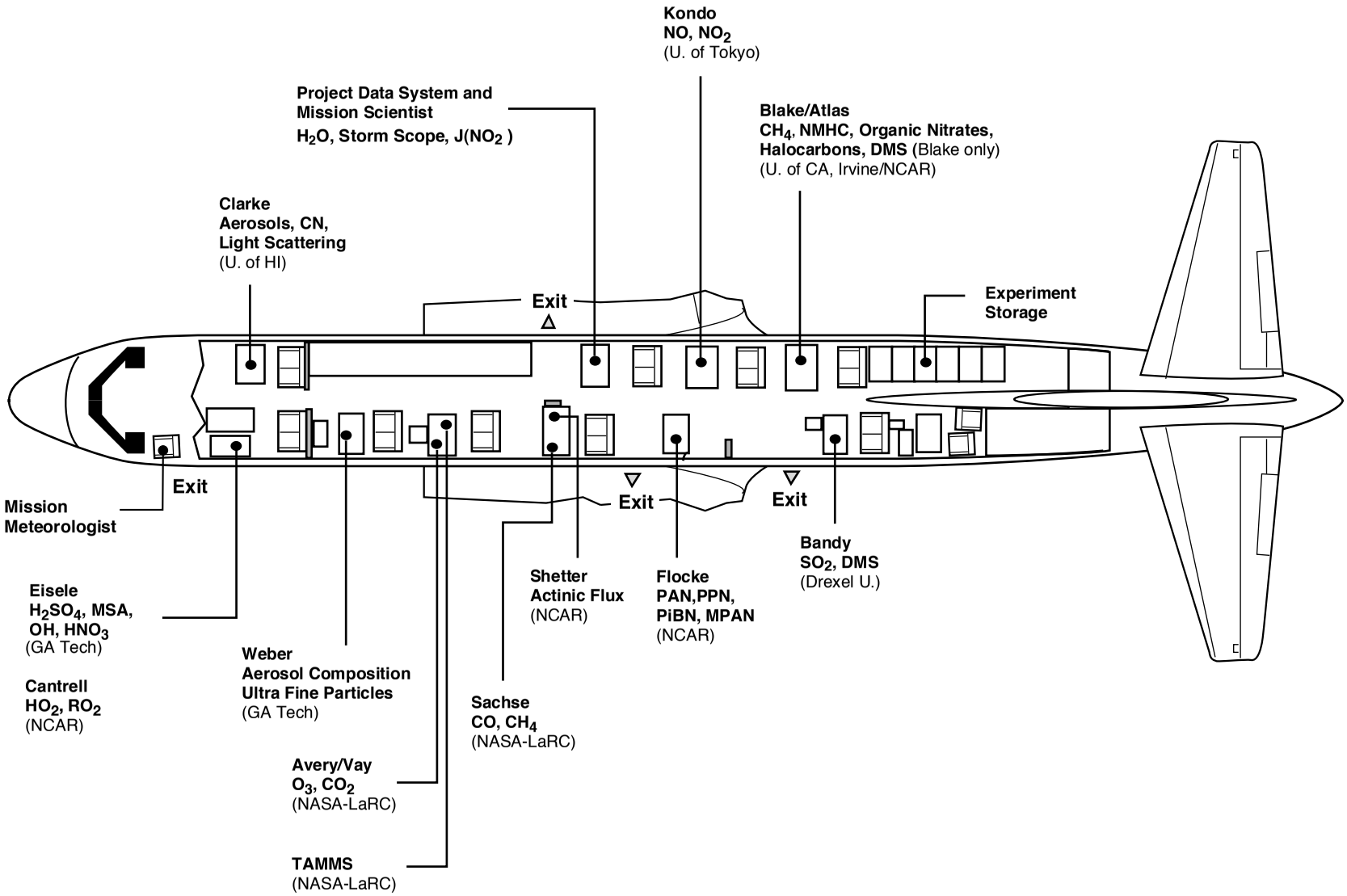


Figure 3(b). TRACE-P P-3B mission payload.

08.07.02JC

APPENDIX A

Transport and Chemical Evolution over the Pacific (TRACE-P)

Plots are presented in a standardized format, and the data (unedited) are from the Langley GTE archive. Relative humidity is calculated from measurements made on the aircraft. In some cases (mostly for moist, boundary layer conditions) relative humidity may exceed 100% (not plotted) as dew point temperature exceeded air temperature by a few degrees (assumed to be the result of instrument measurement/calibration uncertainty). For time series plots, abscissa time scales for given flights are identical. Ordinate scales were selected to best represent all the data for specie measured during the flight. In order to maintain the standardized format, plots for flights in which a specie data were not reported are plotted with the axes and a "NO DATA" entry. On a panel with multiple curves, if a particular curve is missing, it may be assumed that the data for that particular specie for that particular flight is not available ("NO DATA" will not appear on a multi-curve panel). The time series plots are followed by altitude profiles of temperature, dew point, ozone, and carbon monoxide. In general altitude profiles are shown for ascent/descent portions of the flights. As a result the number of altitude profiles shown varies on a flight by flight basis.

Given below are the beginning page numbers for each flight's sequence of plots:

Flight 4D – page 33

Flight 5D – page 63

Flight 6D – page 93

Flight 7D – page 123

Flight 8D – page 155

Flight 9D – page 185

Flight 10D – page 213

Flight 11D – page 241

Flight 12D – page 273

Flight 13D – page 303

Flight 14D – page 335
Flight 15D – page 363
Flight 16D – page 397
Flight 17D – page 425
Flight 18D – page 453
Flight 19D – page 483
Flight 20D – page 513

CHEMICAL and METEOROLOGICAL DATA

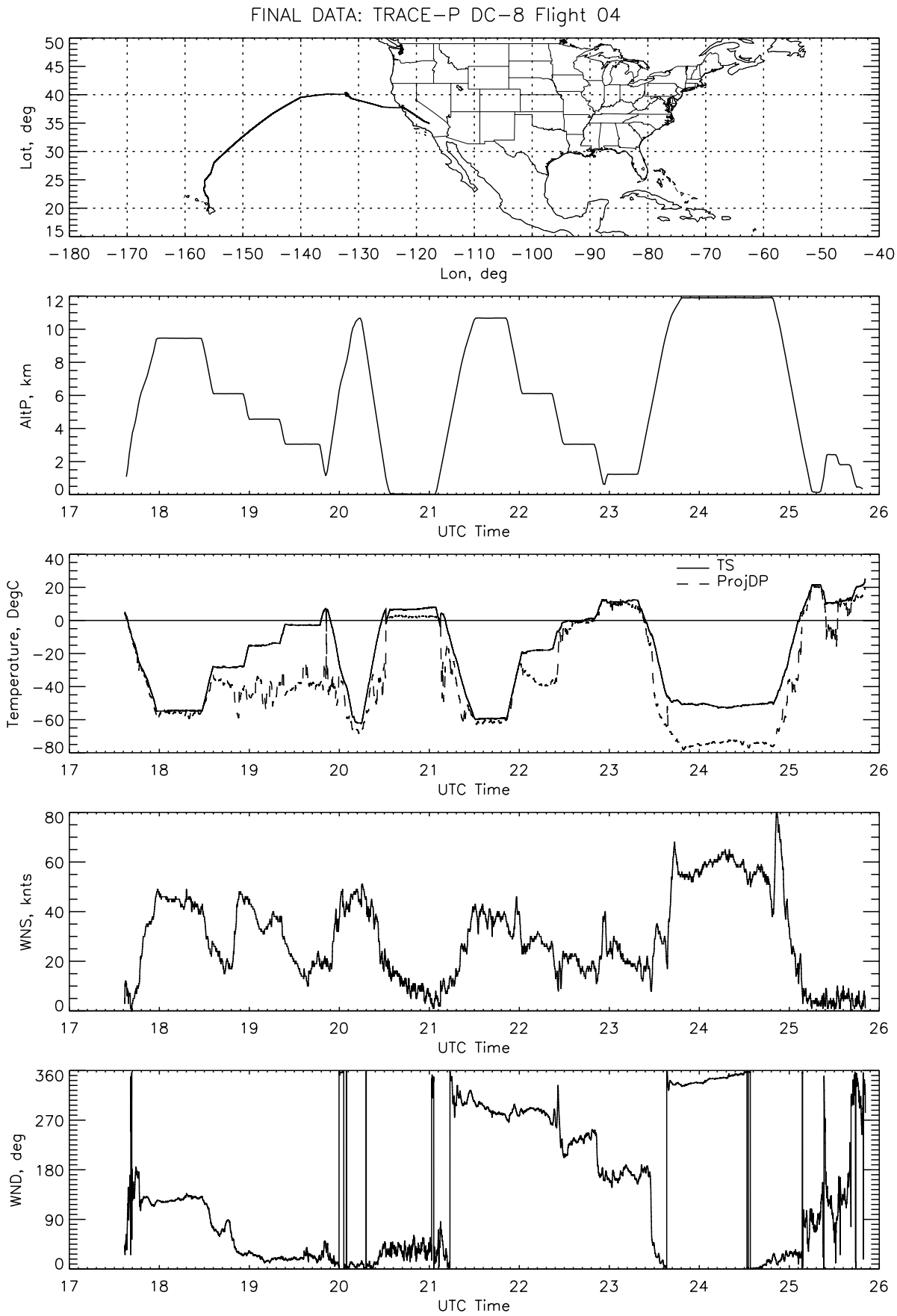
TRACE-P

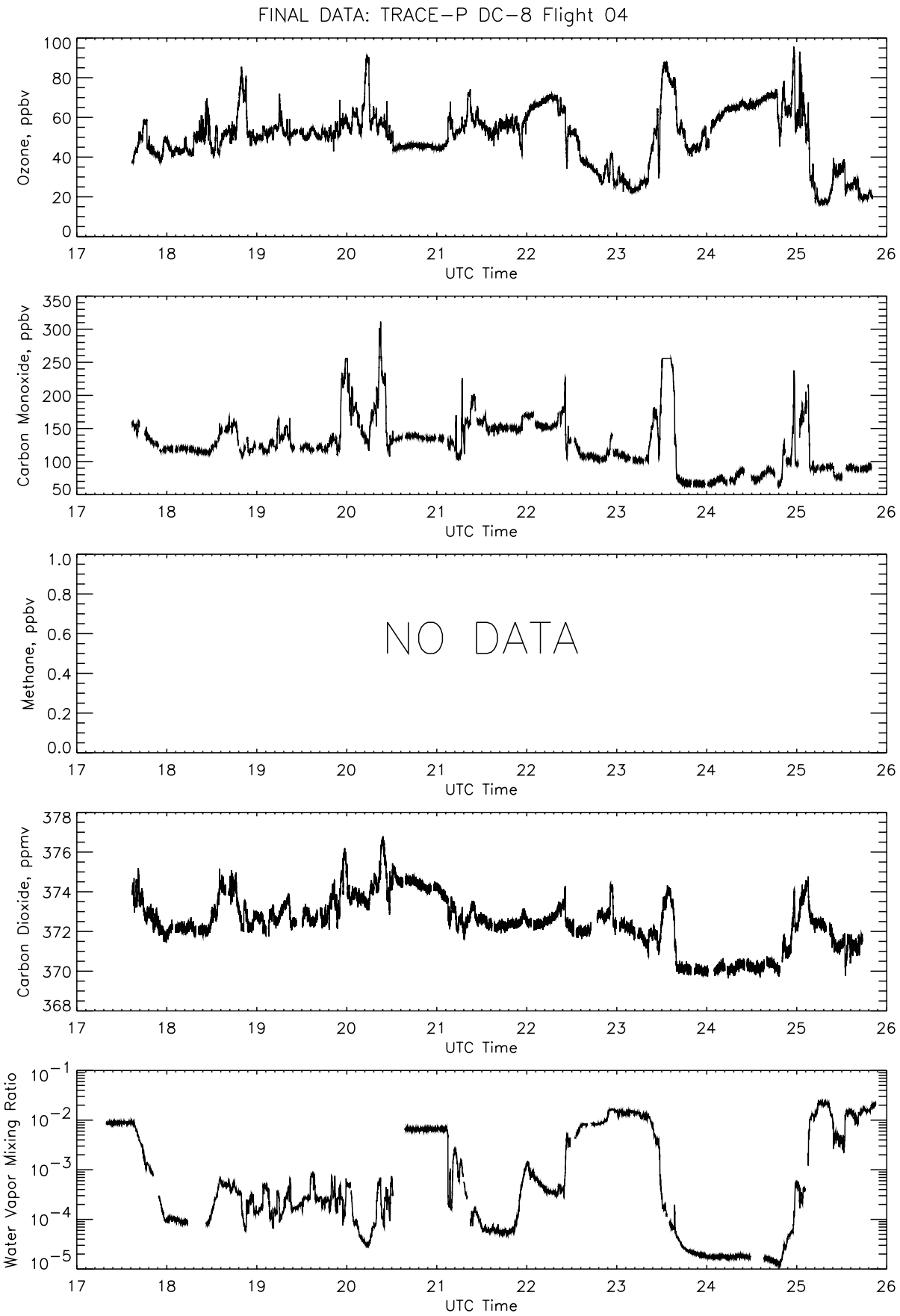
Flight 4D

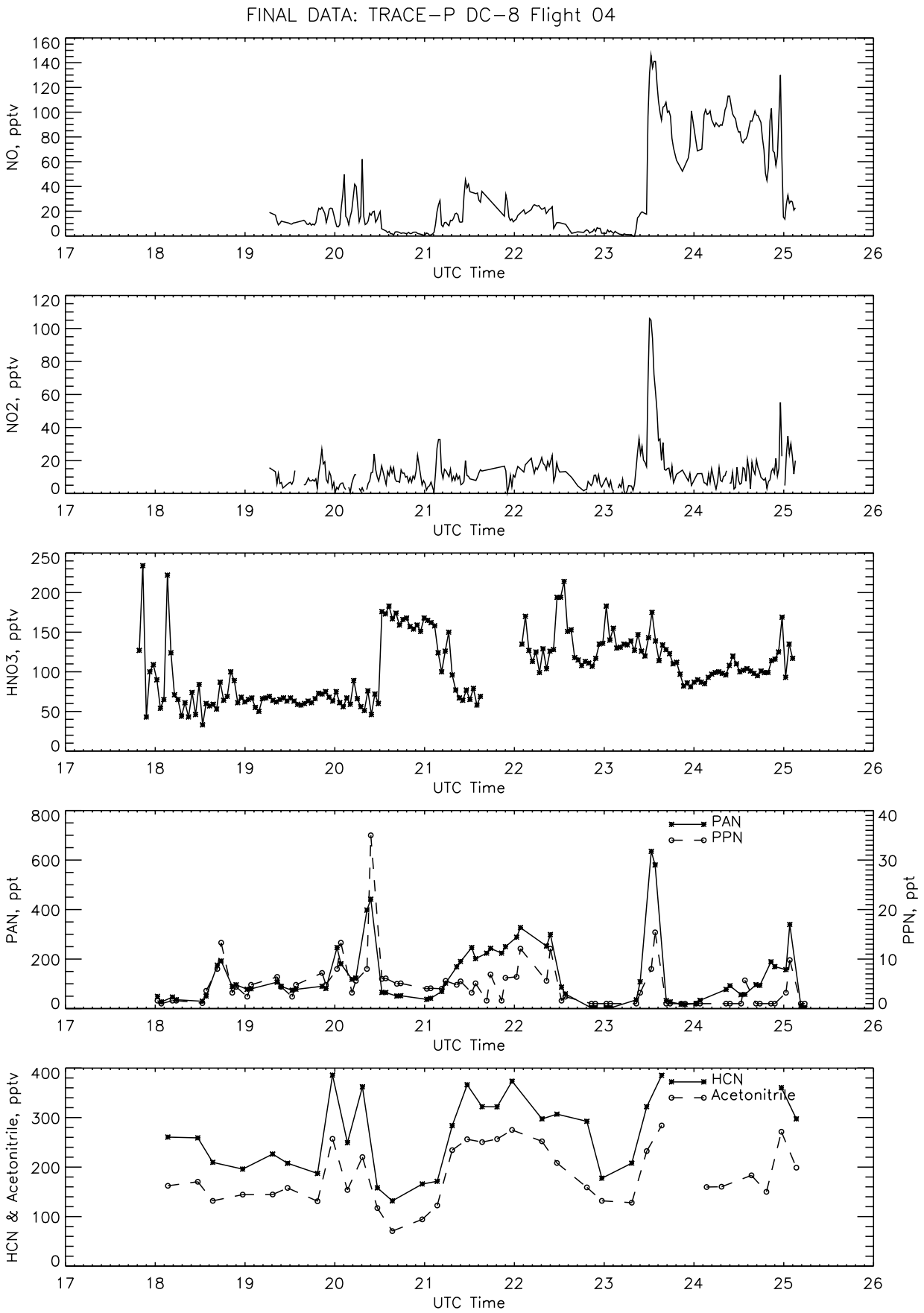
Transit: NASA-DFRC to Kona, HI

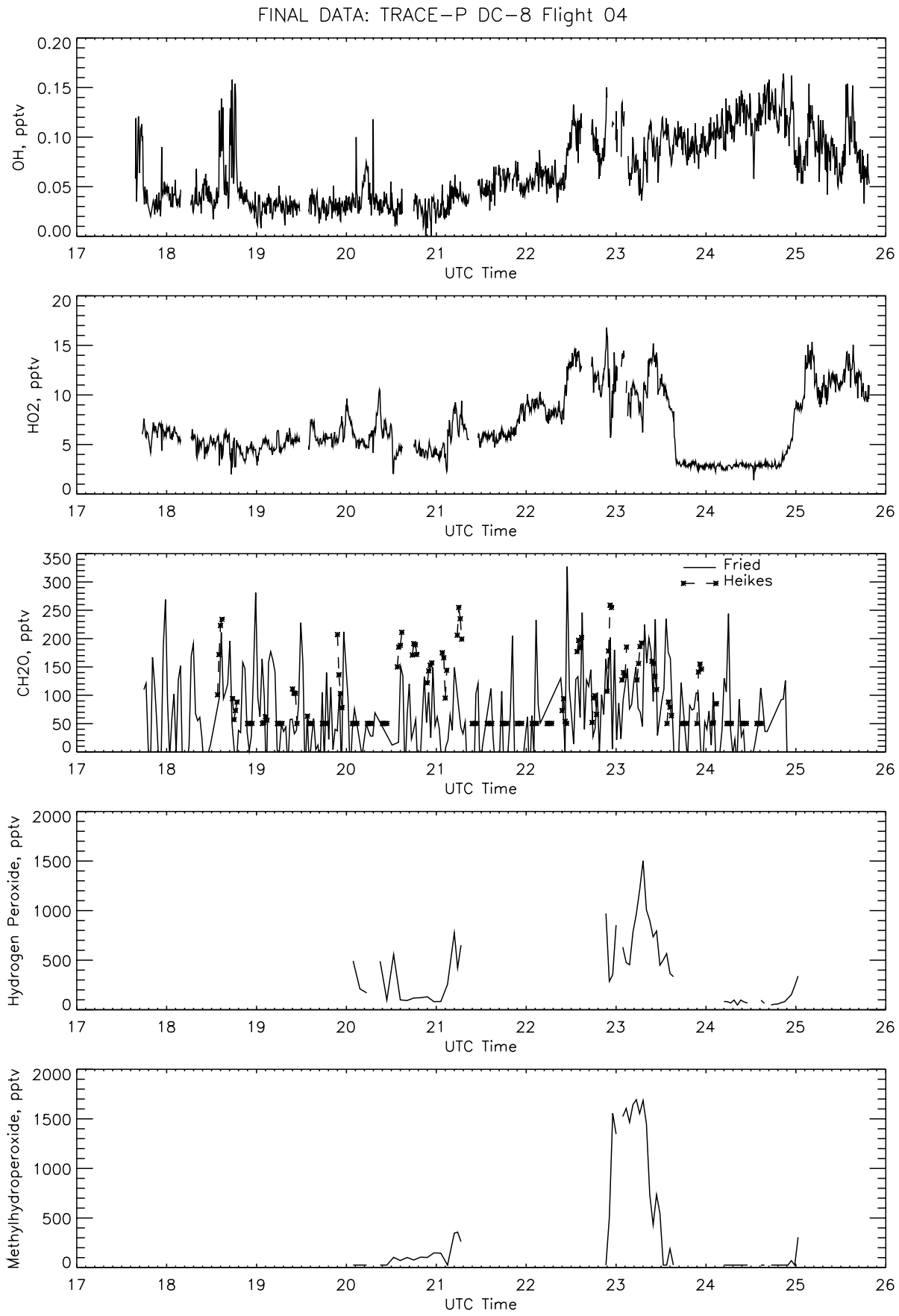
Aged Asian Pollution and MOPITT Mid-Latitude Validation

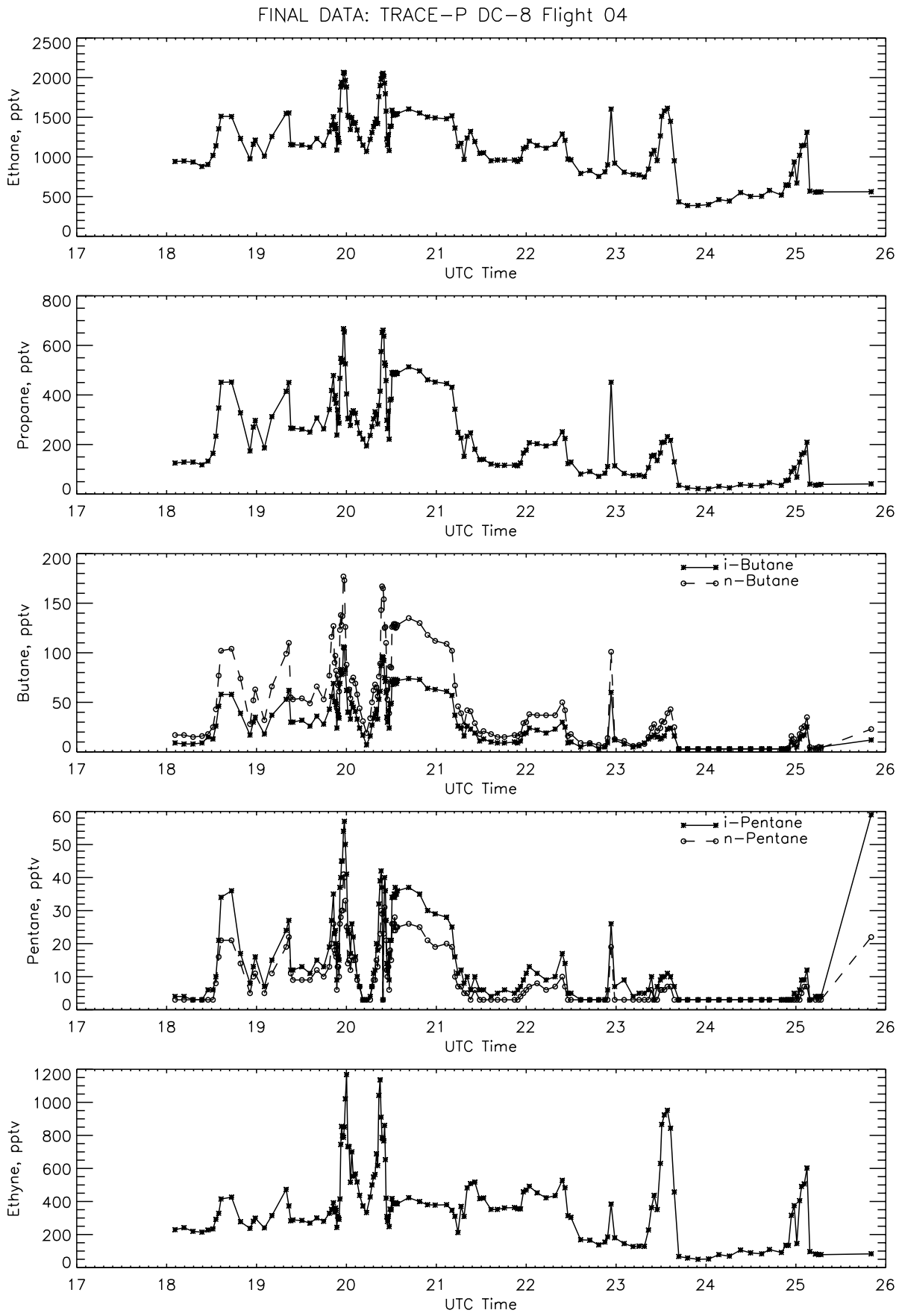
February 26, 2001

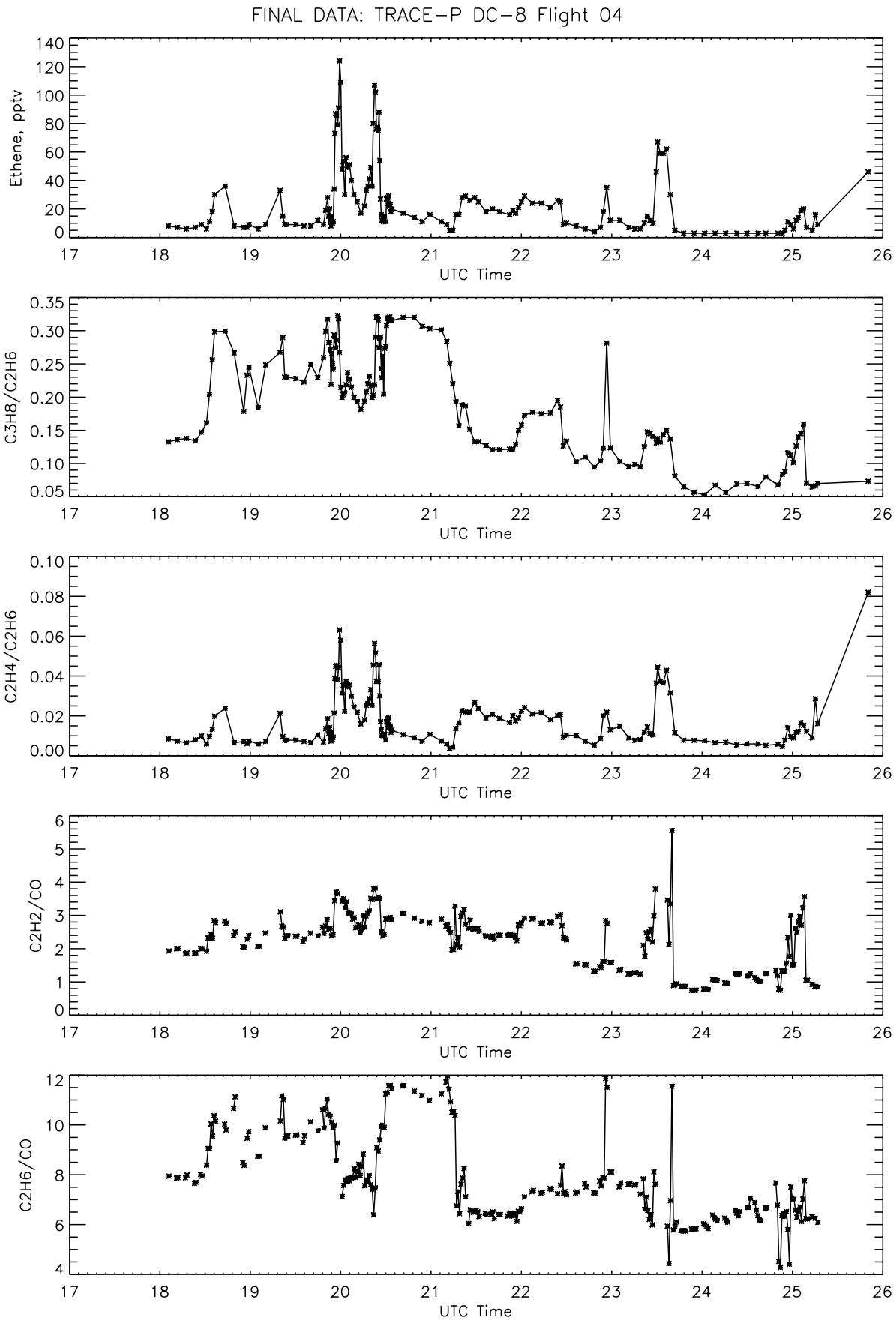

FINAL DATA: TRACE−P DC−8 Flight 04
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

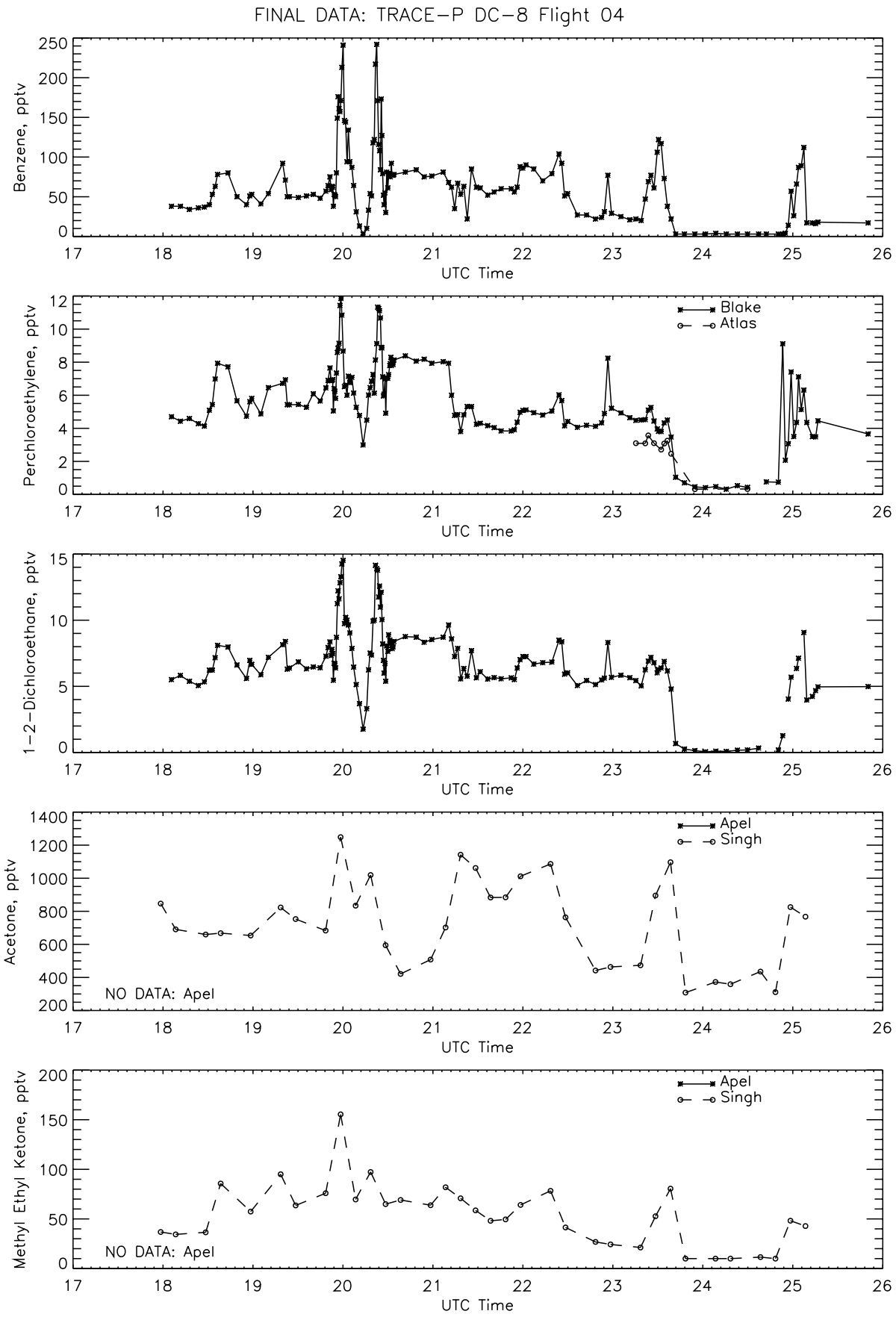

FINAL DATA: TRACE-P DC-8 Flight 04
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
NO DATA
Carbon Dioxide, ppmv
Water Vapor Mixing Ratio
UTC Time

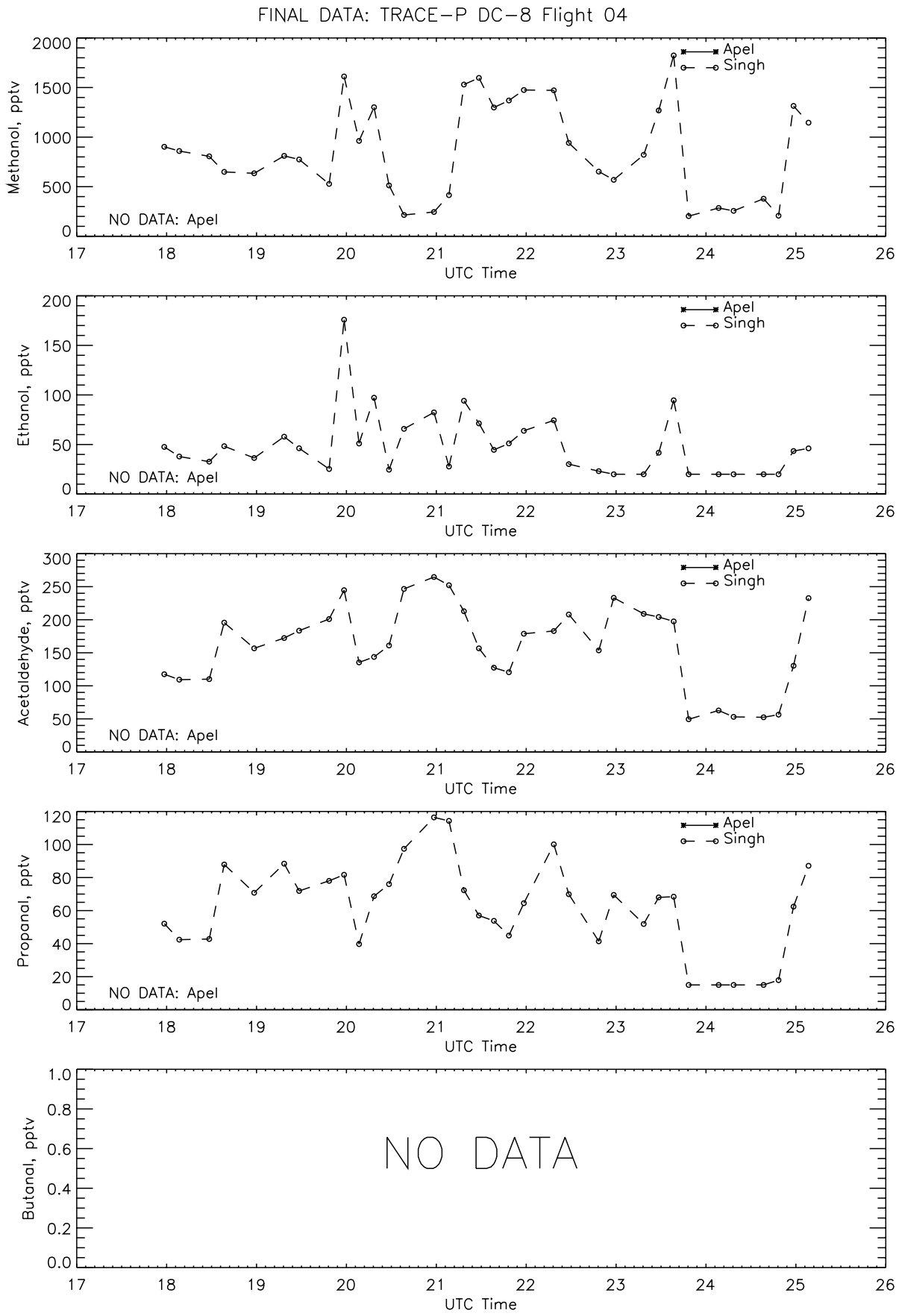

FINAL DATA: TRACE-P DC-8 Flight 04
NO, pptv
NO2, pptv
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

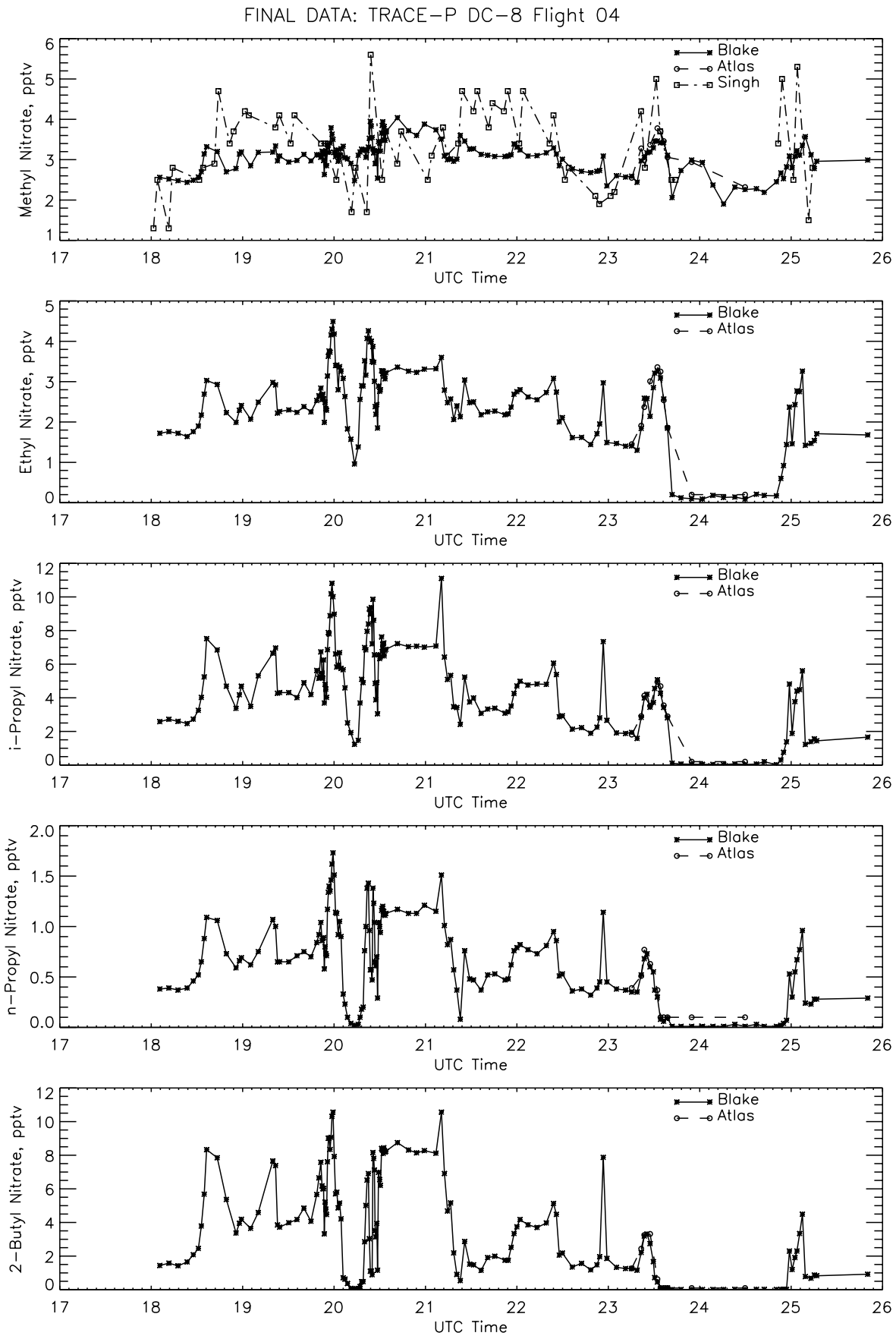

FINAL DATA: TRACE-P DC-8 Flight 04
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

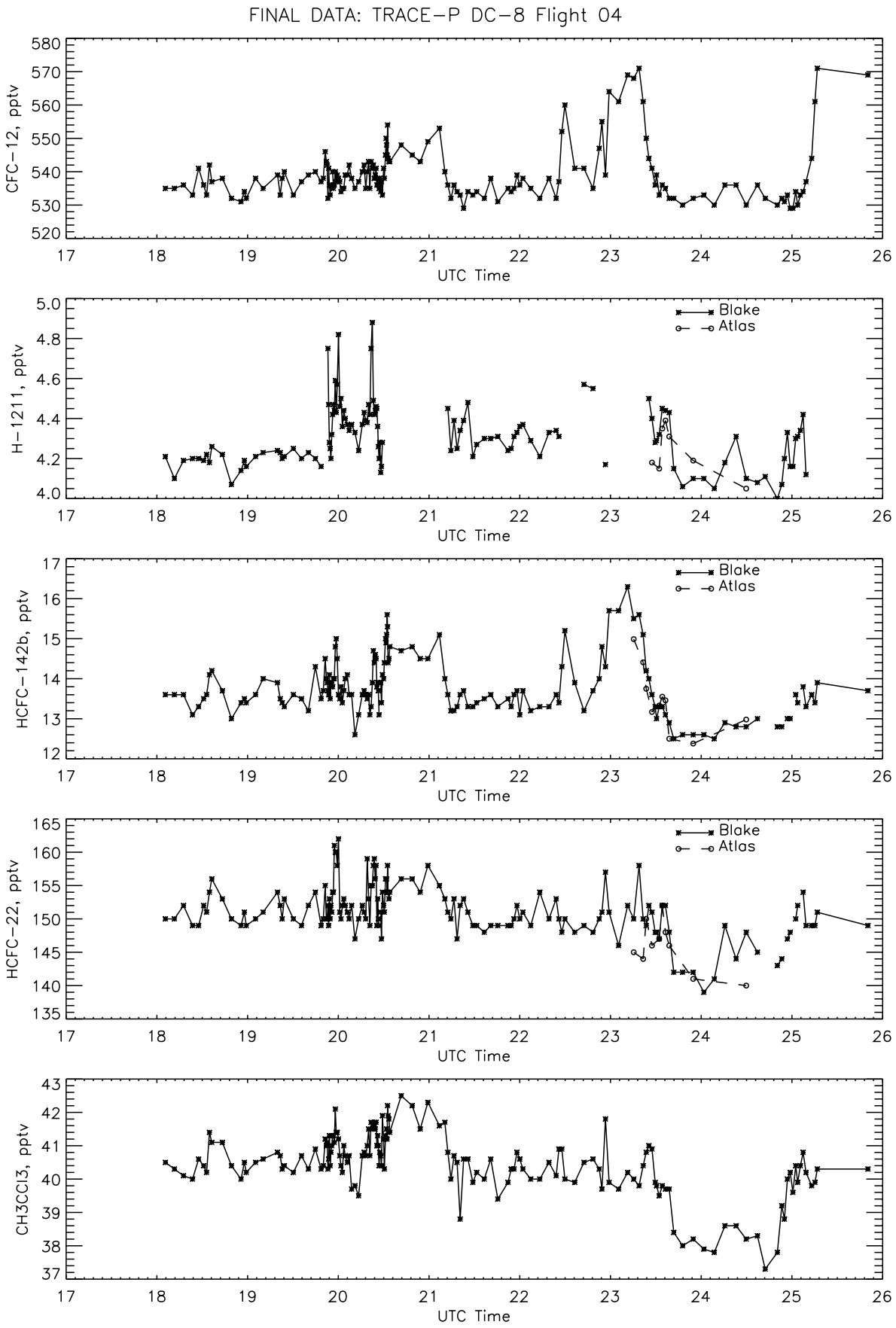

FINAL DATA: TRACE-P DC-8 Flight 04
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

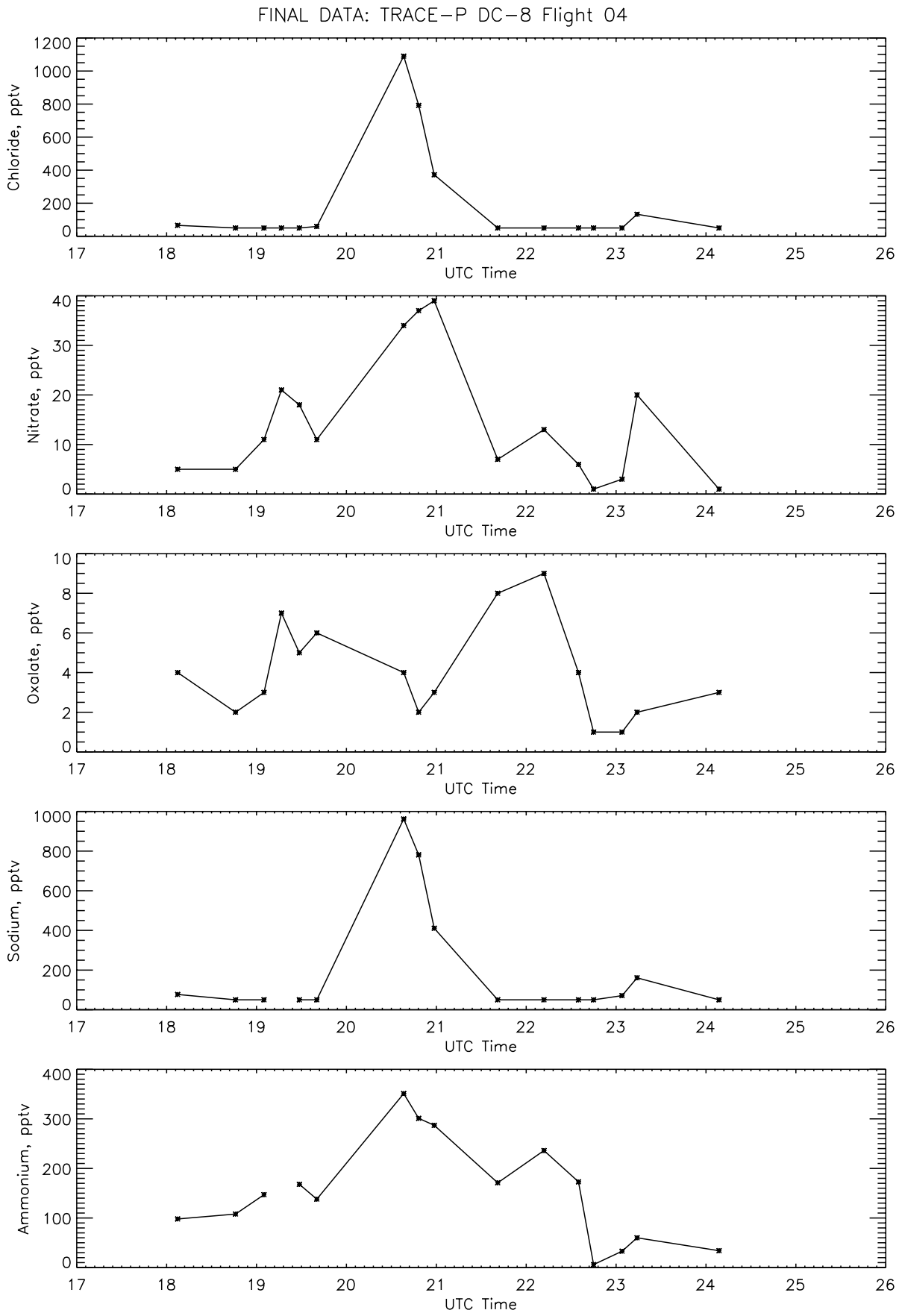

FINAL DATA: TRACE-P DC-8 Flight 04
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
NO DATA: Apel
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
NO DATA: Apel
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh
NO DATA: Apel
NO DATA


FINAL DATA: TRACE-P DC-8 Flight 04
Methyl Nitrate, pptv
Blake
Atlas
Singh
UTC Time
Ethyl Nitrate, pptv
Blake
Atlas
UTC Time
i-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
n-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
2-Butyl Nitrate, pptv
Blake
Atlas
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas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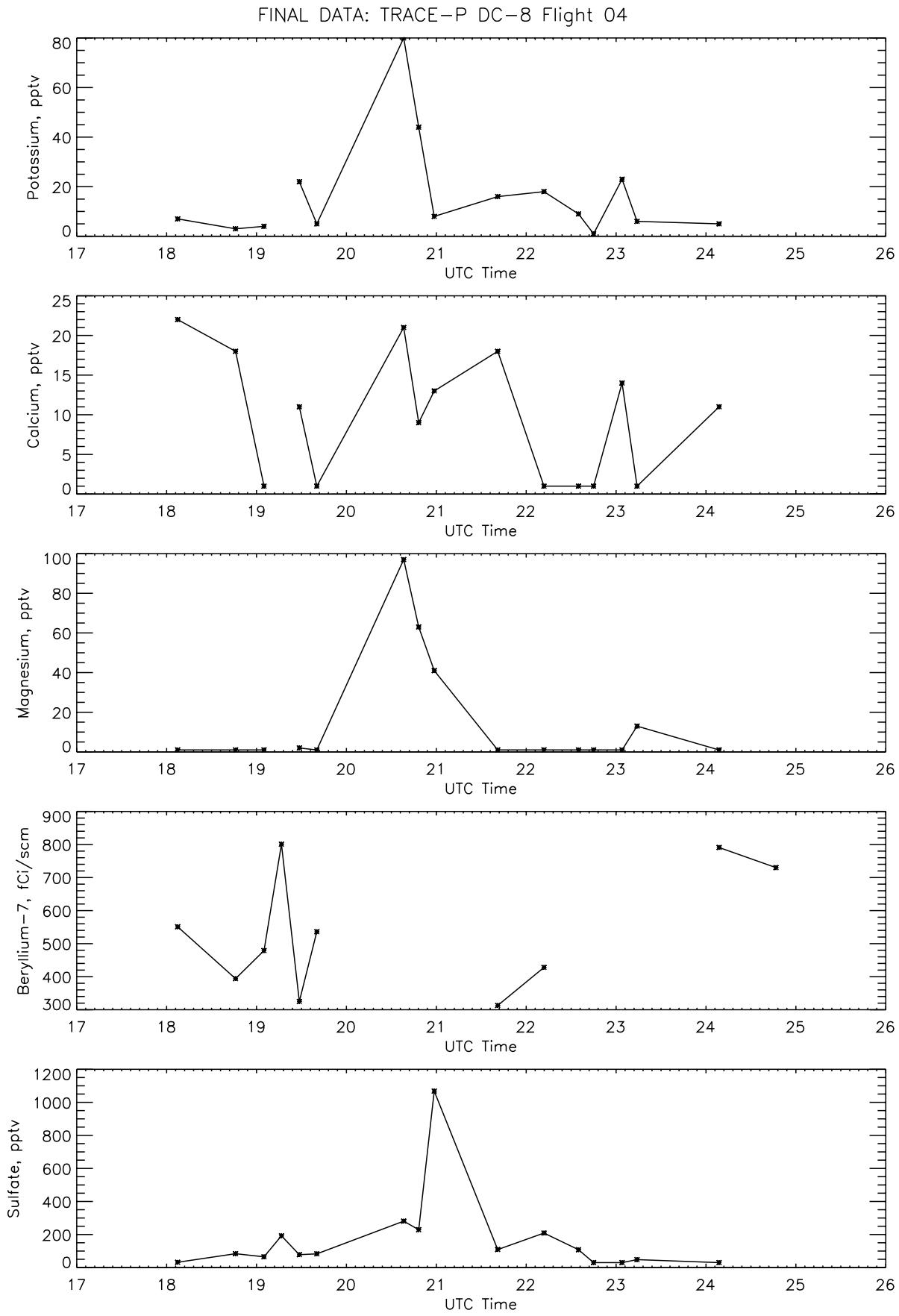
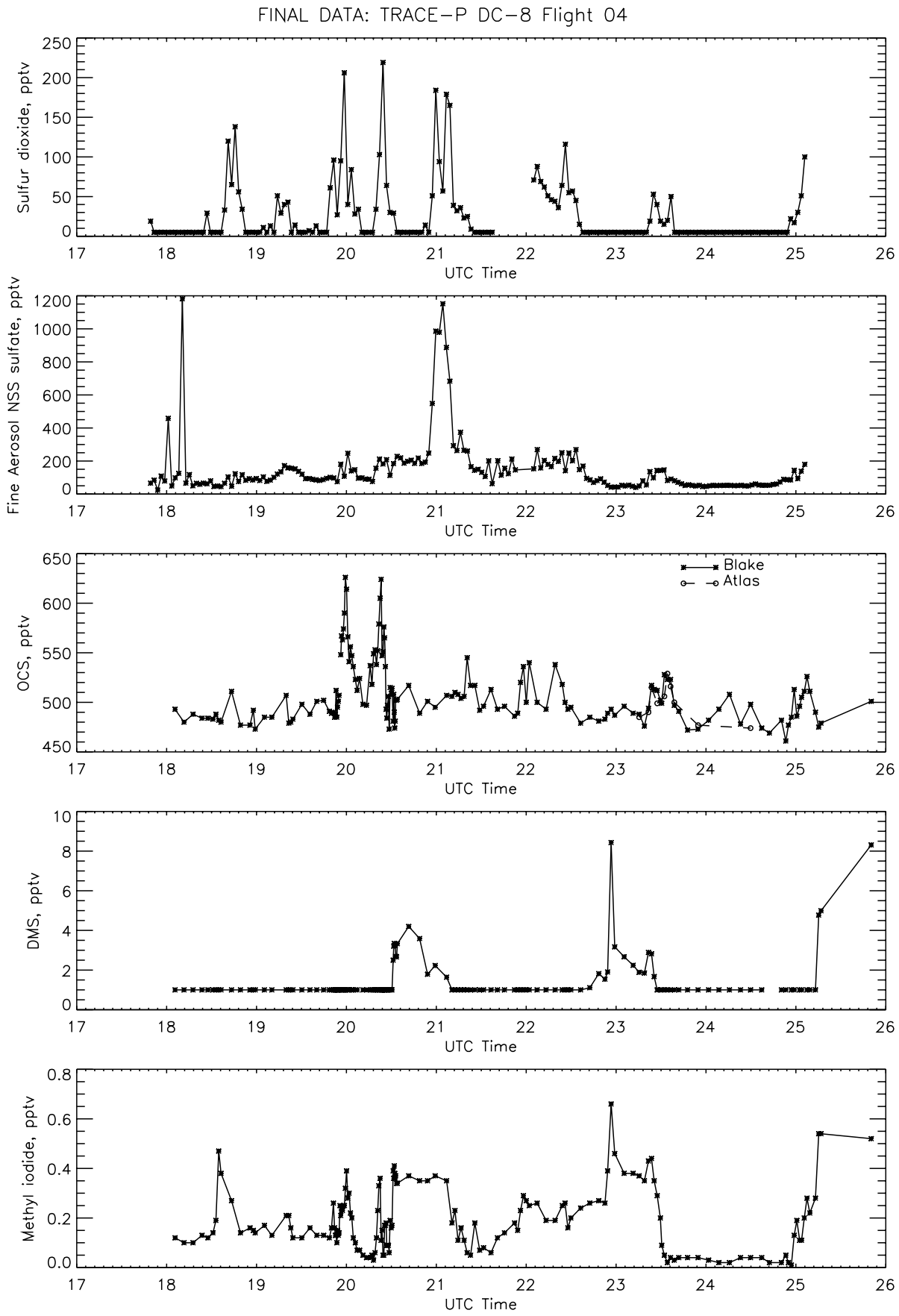
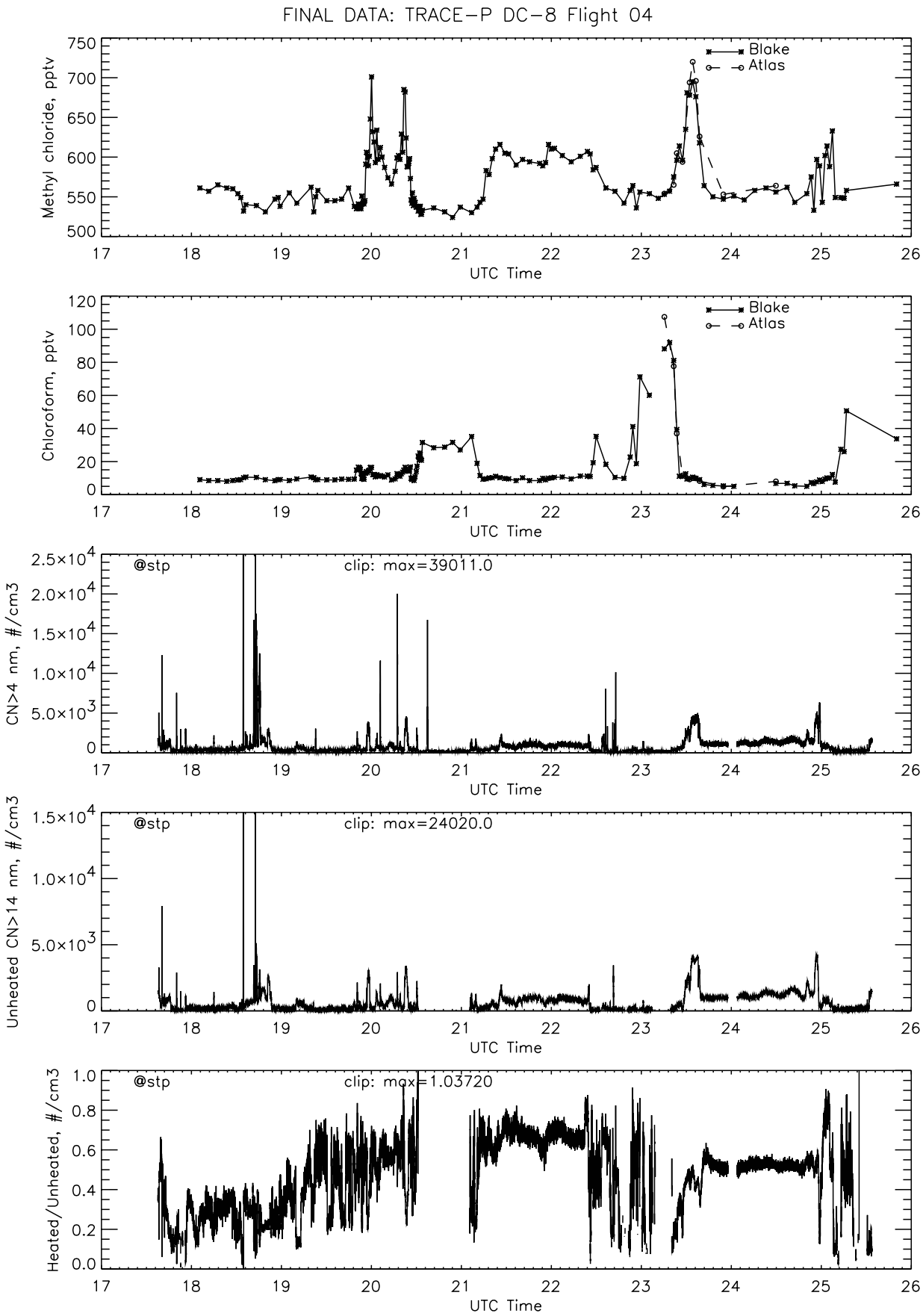
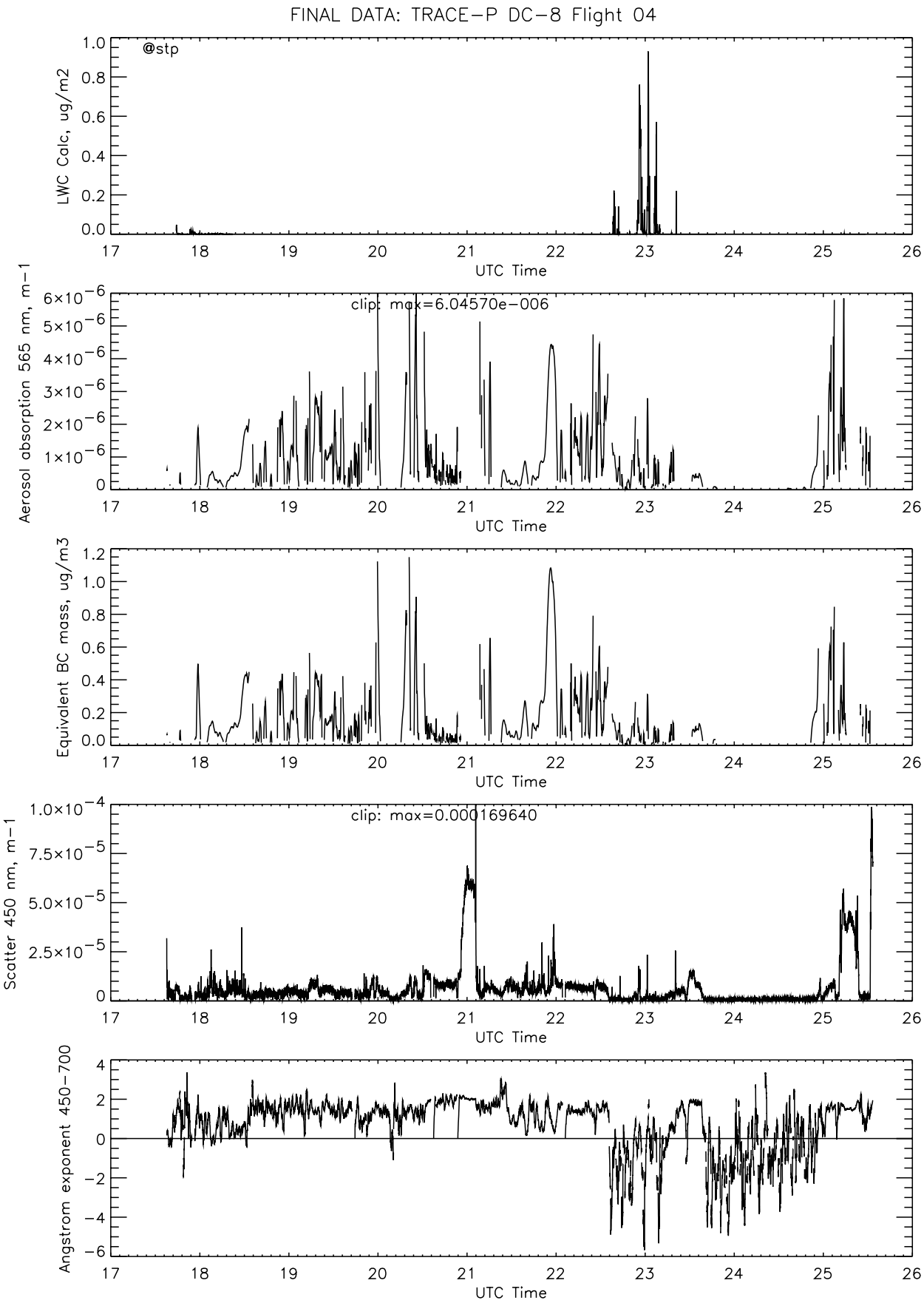
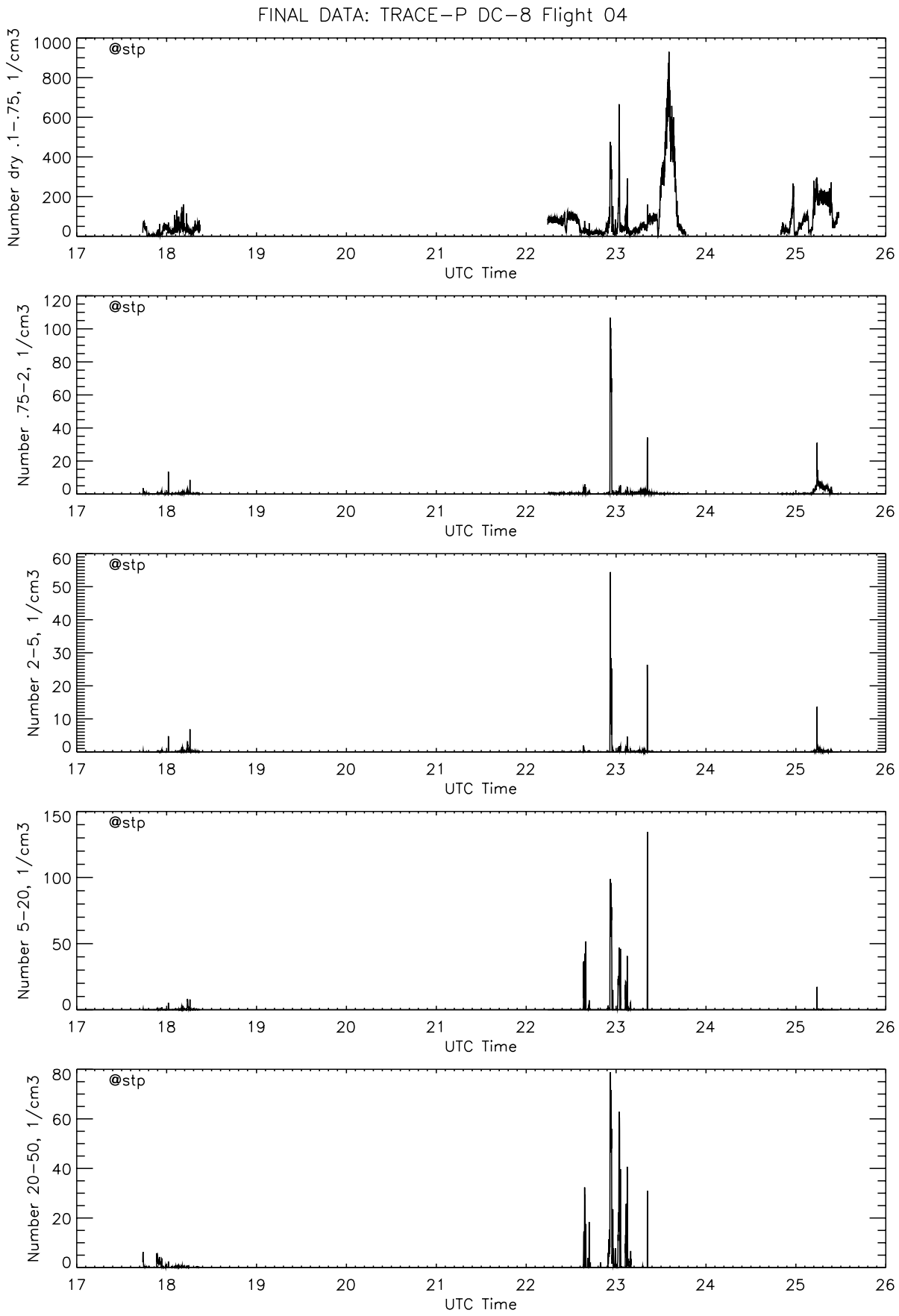
Chloride, pptv
Nitrate, pptv
Oxalate, pptv
Sodium, pptv
Ammonium, pptv
UTC Time

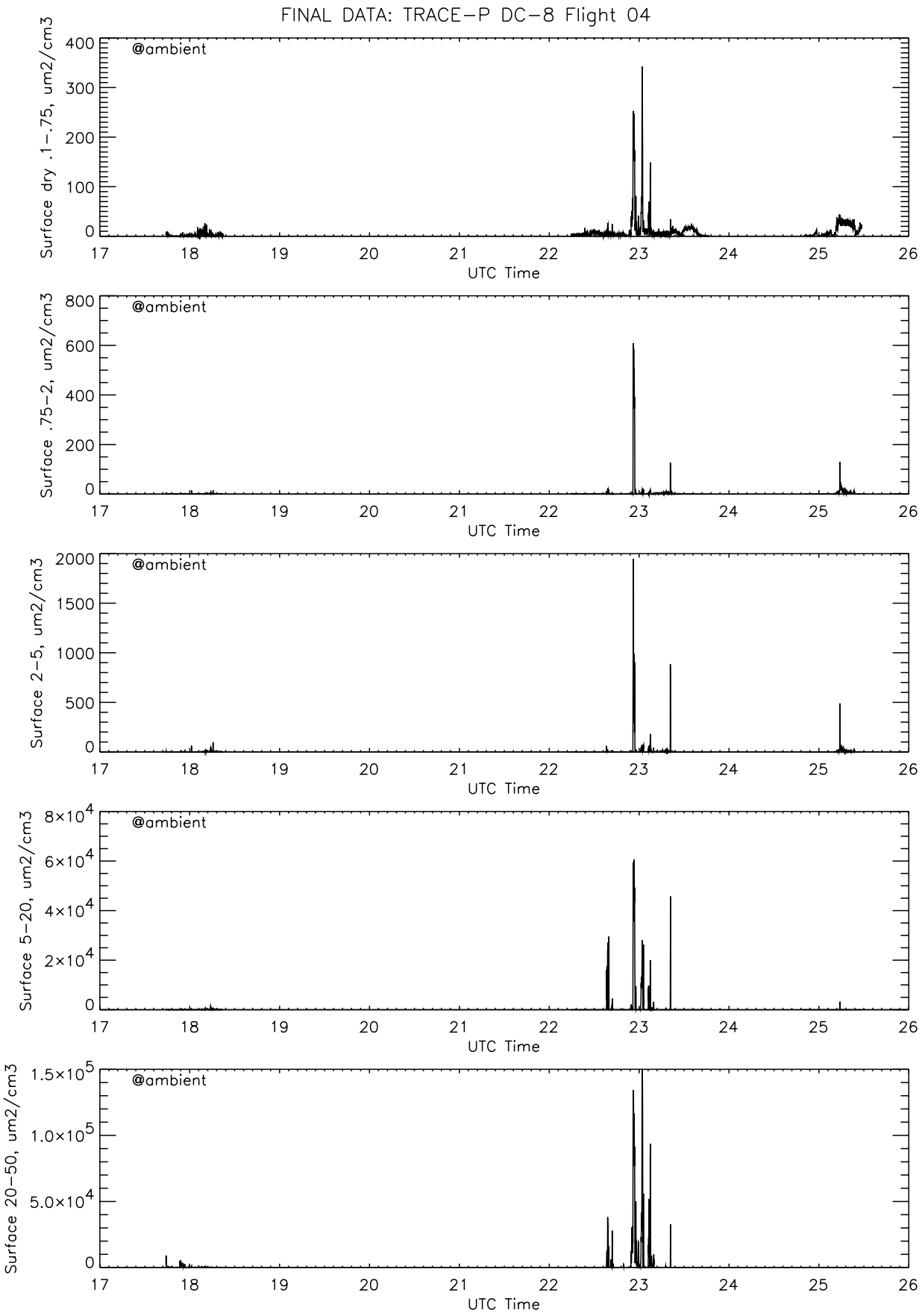

FINAL DATA: TRACE-P DC-8 Flight 04
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
clip: max=39011.0
UTC Time
Unheated CN>14 nm, #/cm3
@stp
clip: max=24020.0
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.03720
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
@stp
LWC Calc, ug/m2
UTC Time
clip: max=6.04570e-006
Aerosol absorption 565 nm, m-1
UTC Time
Equivalent BC mass, ug/m3
UTC Time
clip: max=0.000169640
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 04
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time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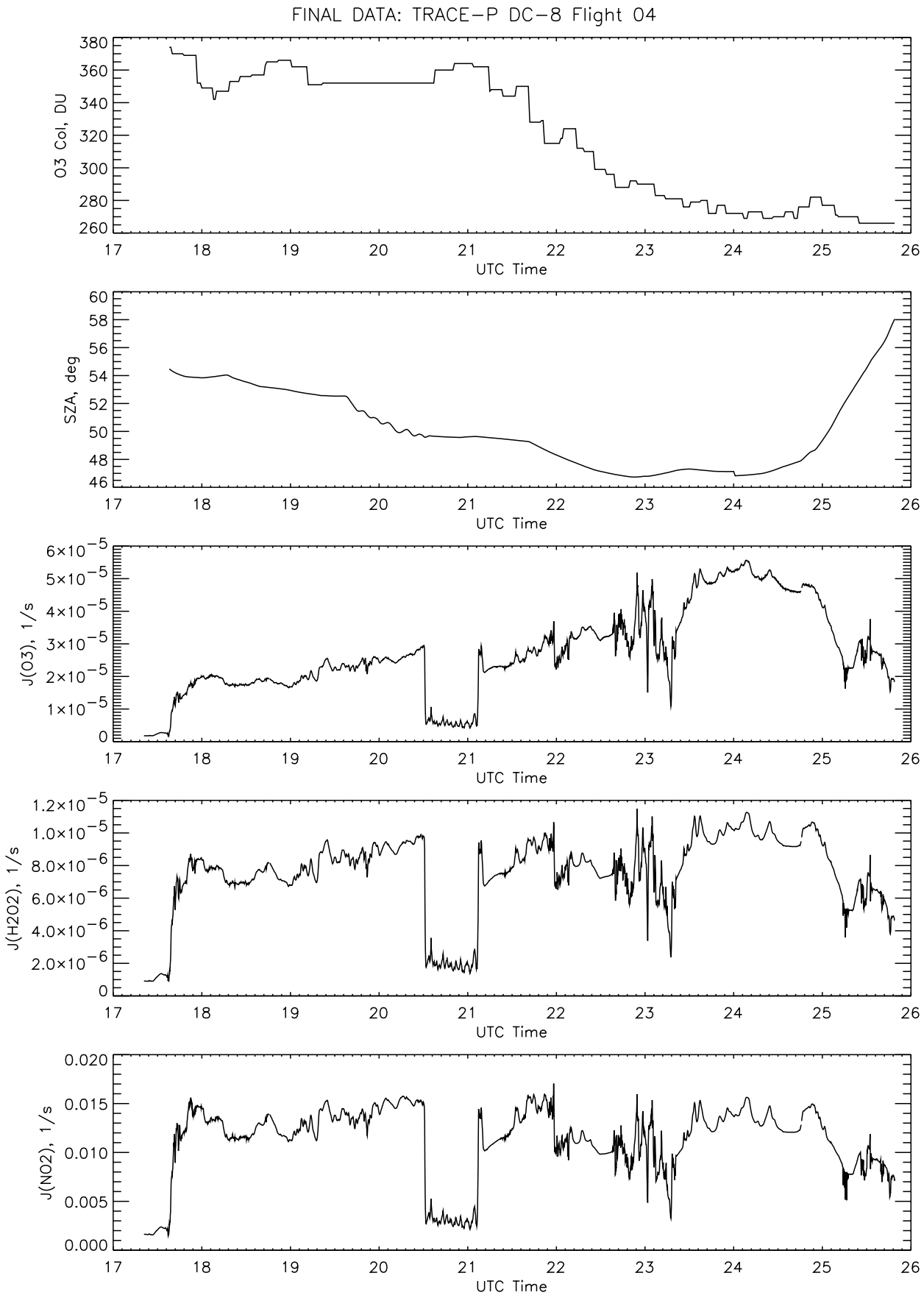
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time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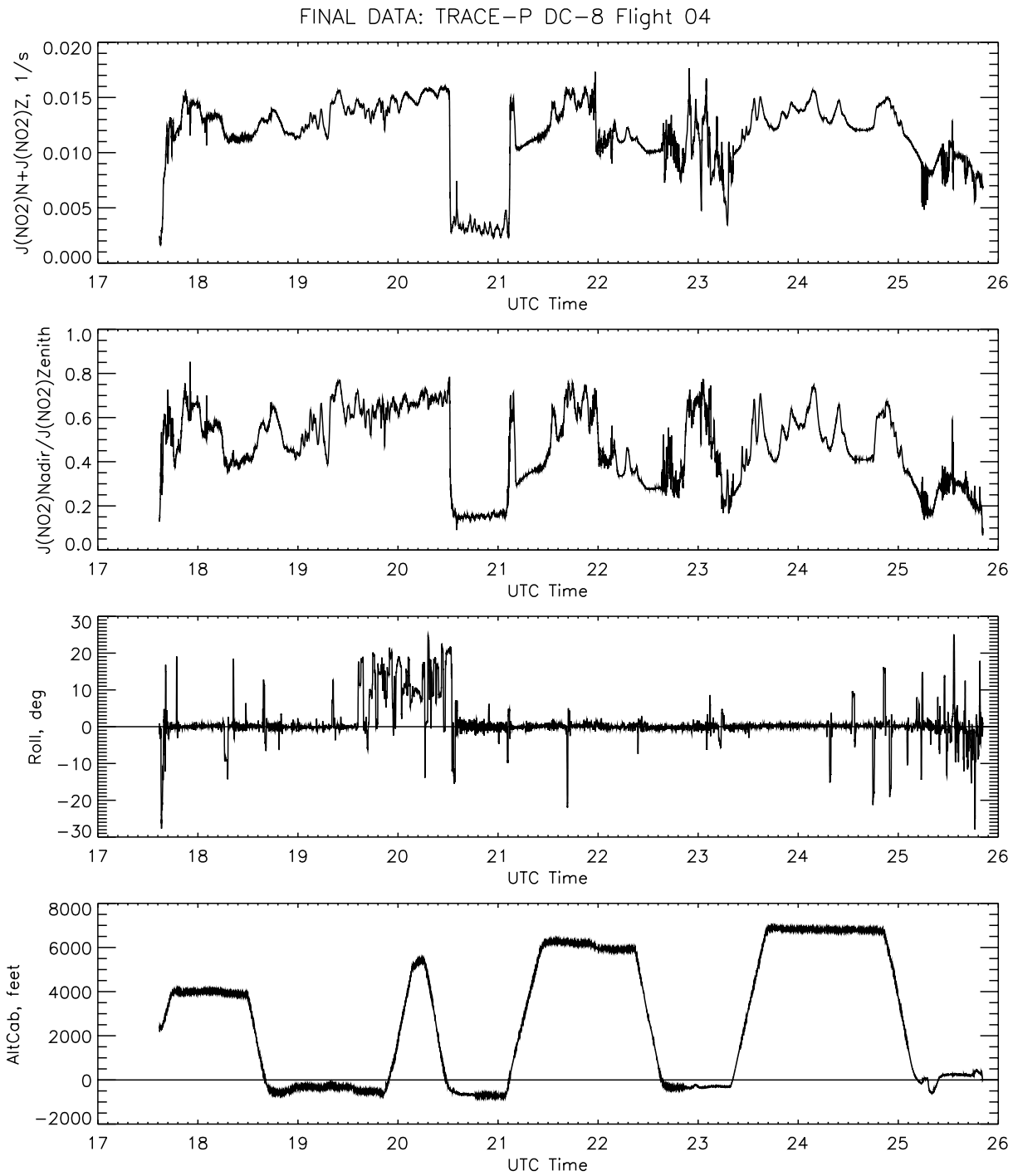
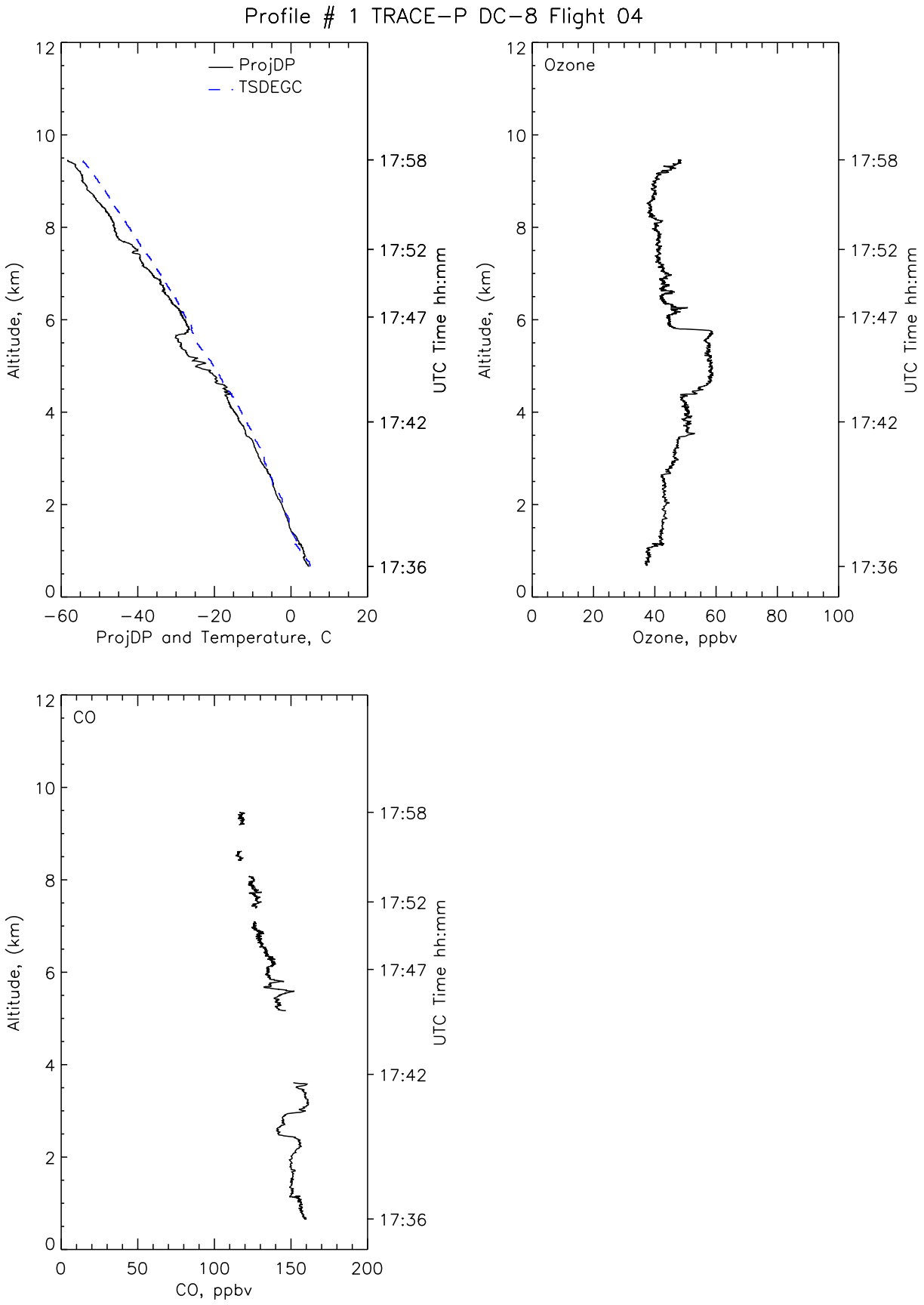
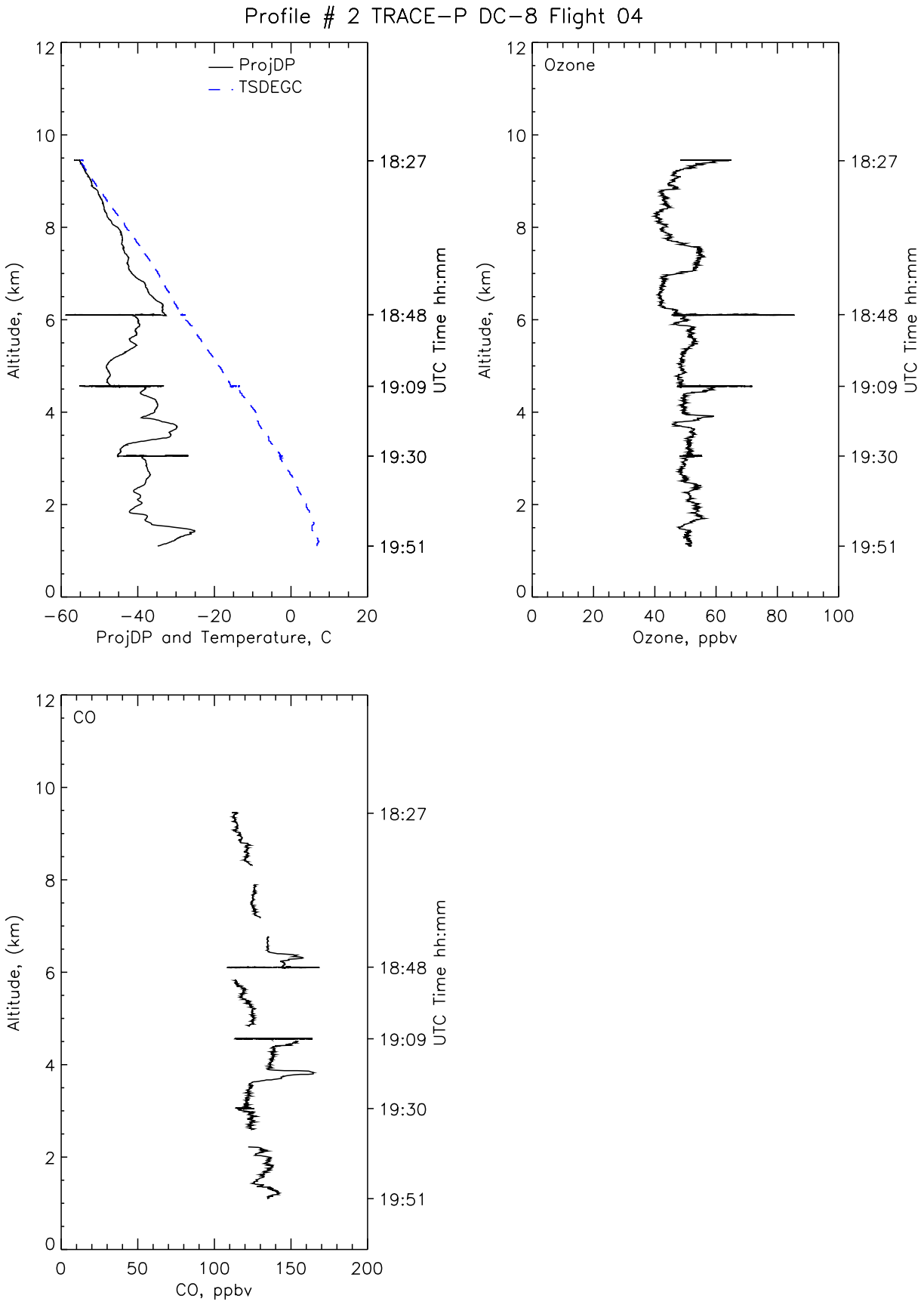
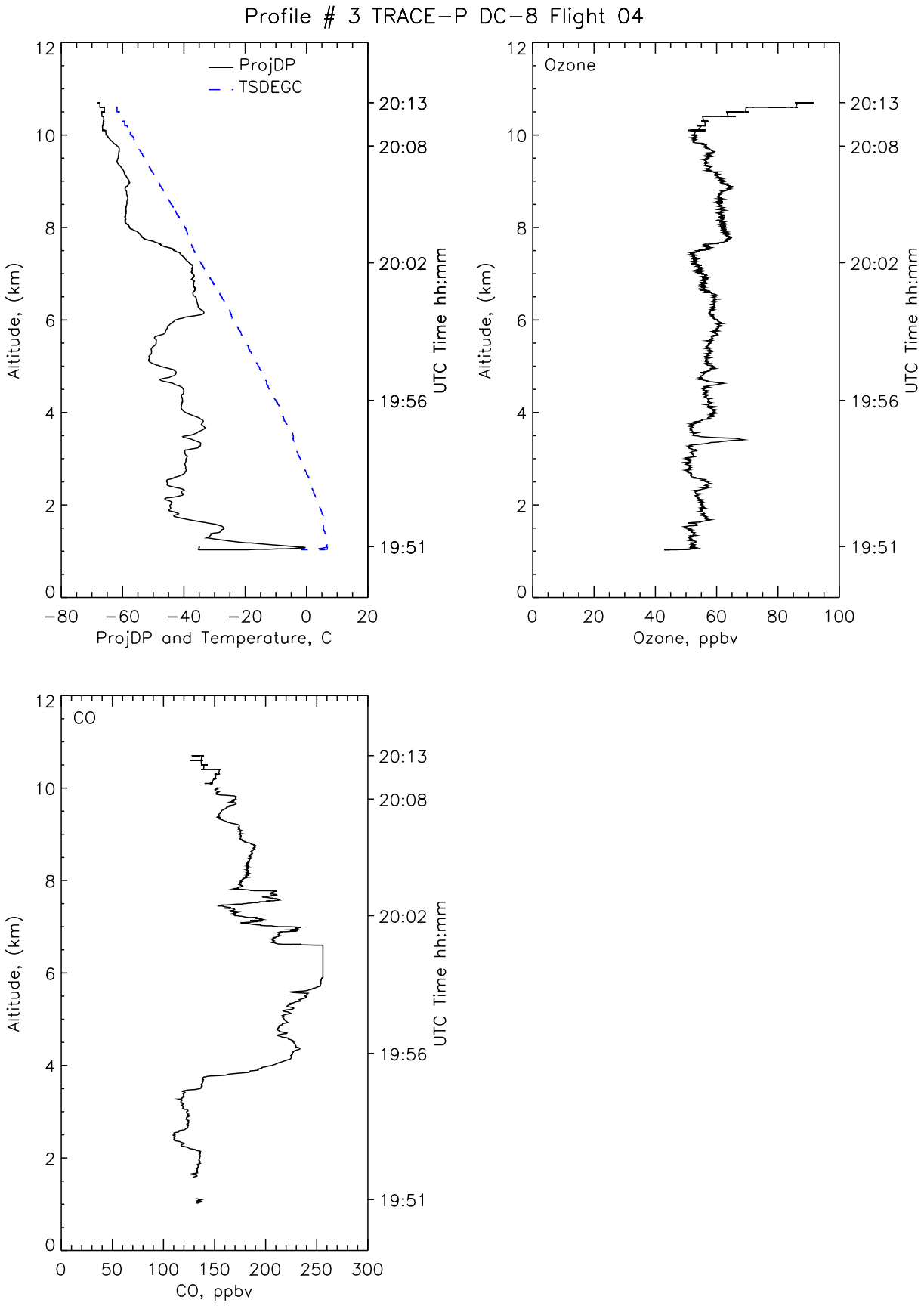
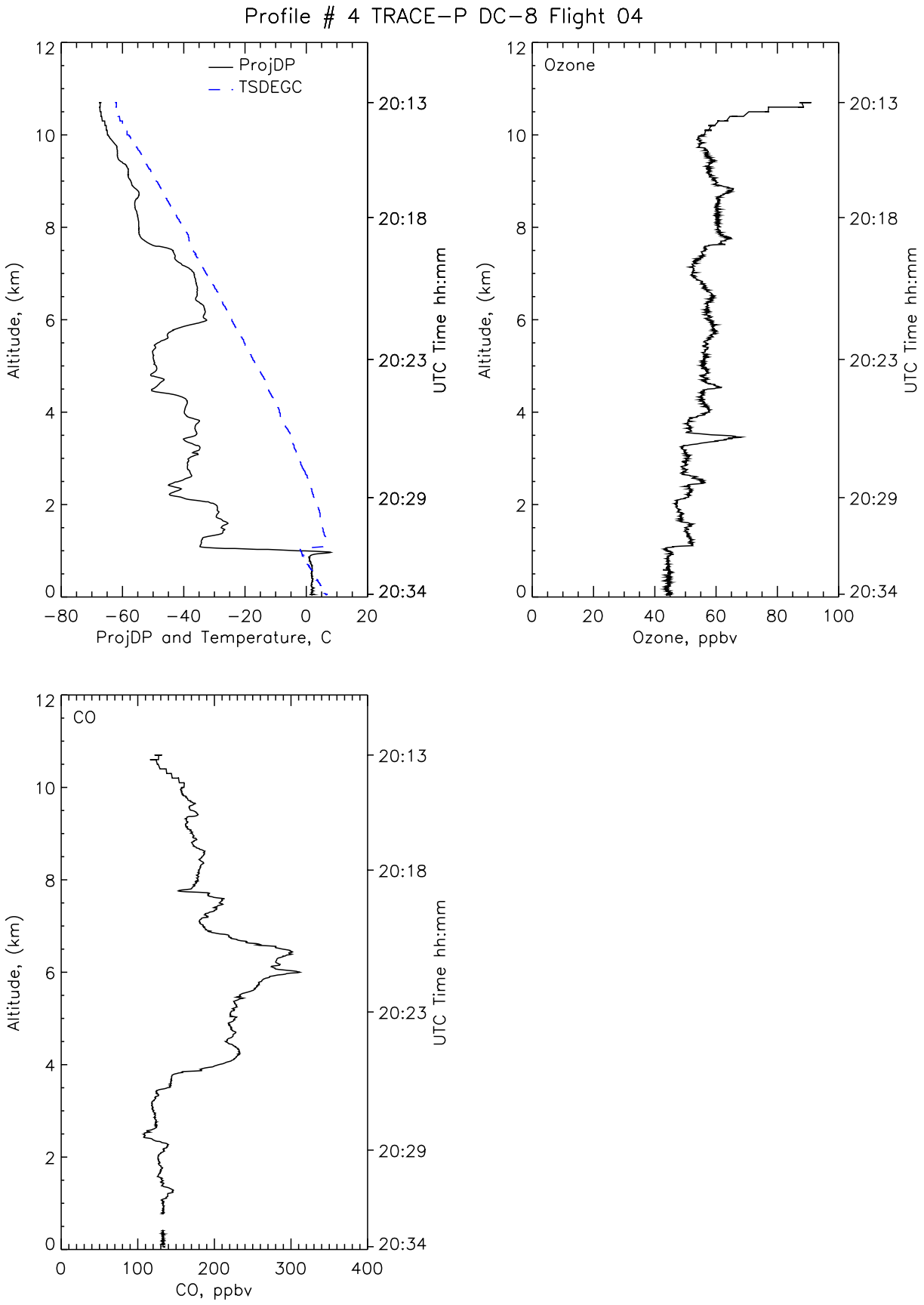
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

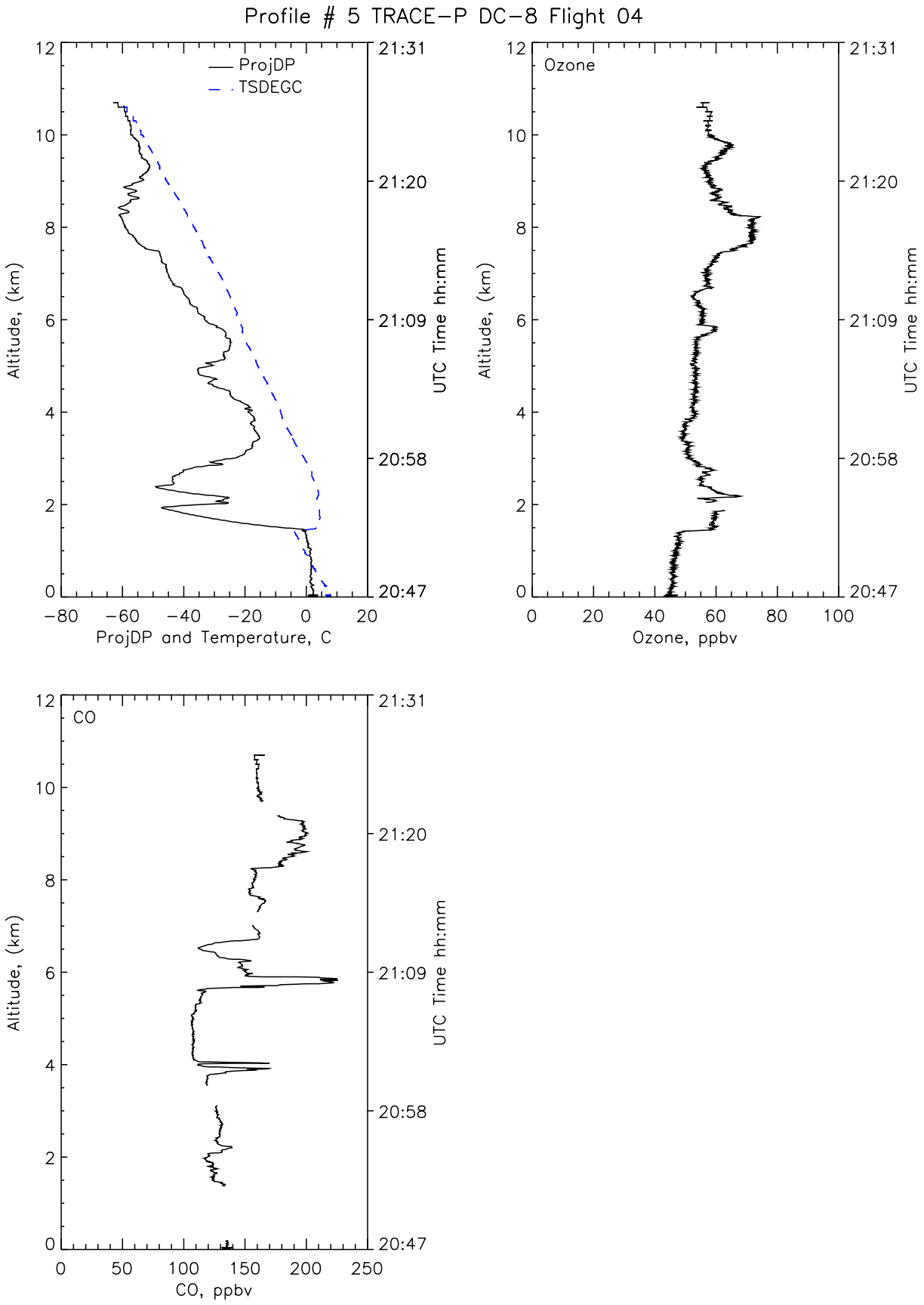

FINAL DATA: TRACE-P DC-8 Flight 04
J(NO2)N+J(NO2)Z, 1/s
0.020
0.015
0.010
0.005
0.000
17
18
19
20
21
22
23
24
25
26
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
UTC Time

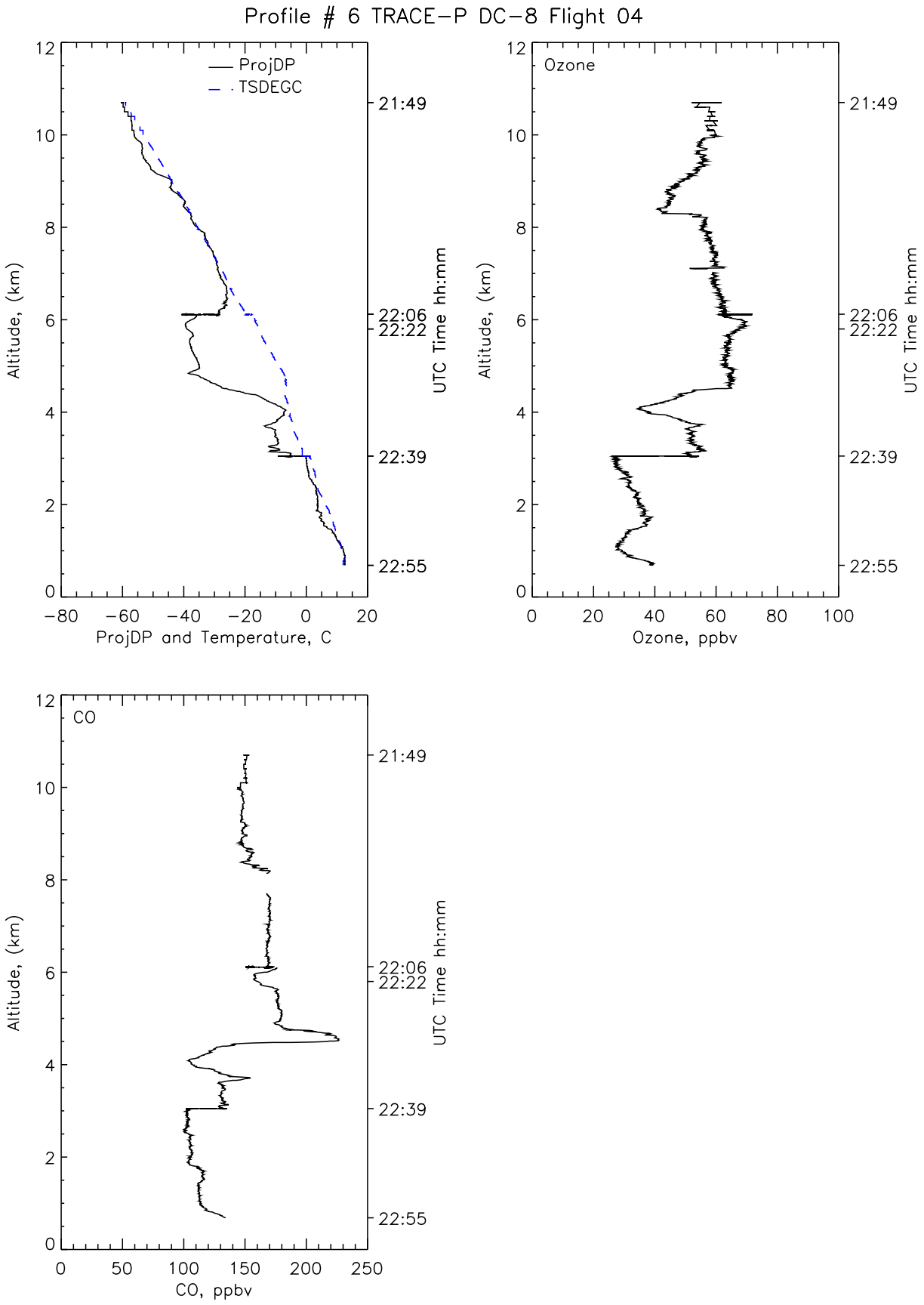

Profile # 1 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
17:58
17:52
17:47
17:42
17:36
Ozone
Ozone, ppbv
CO
CO, ppbv

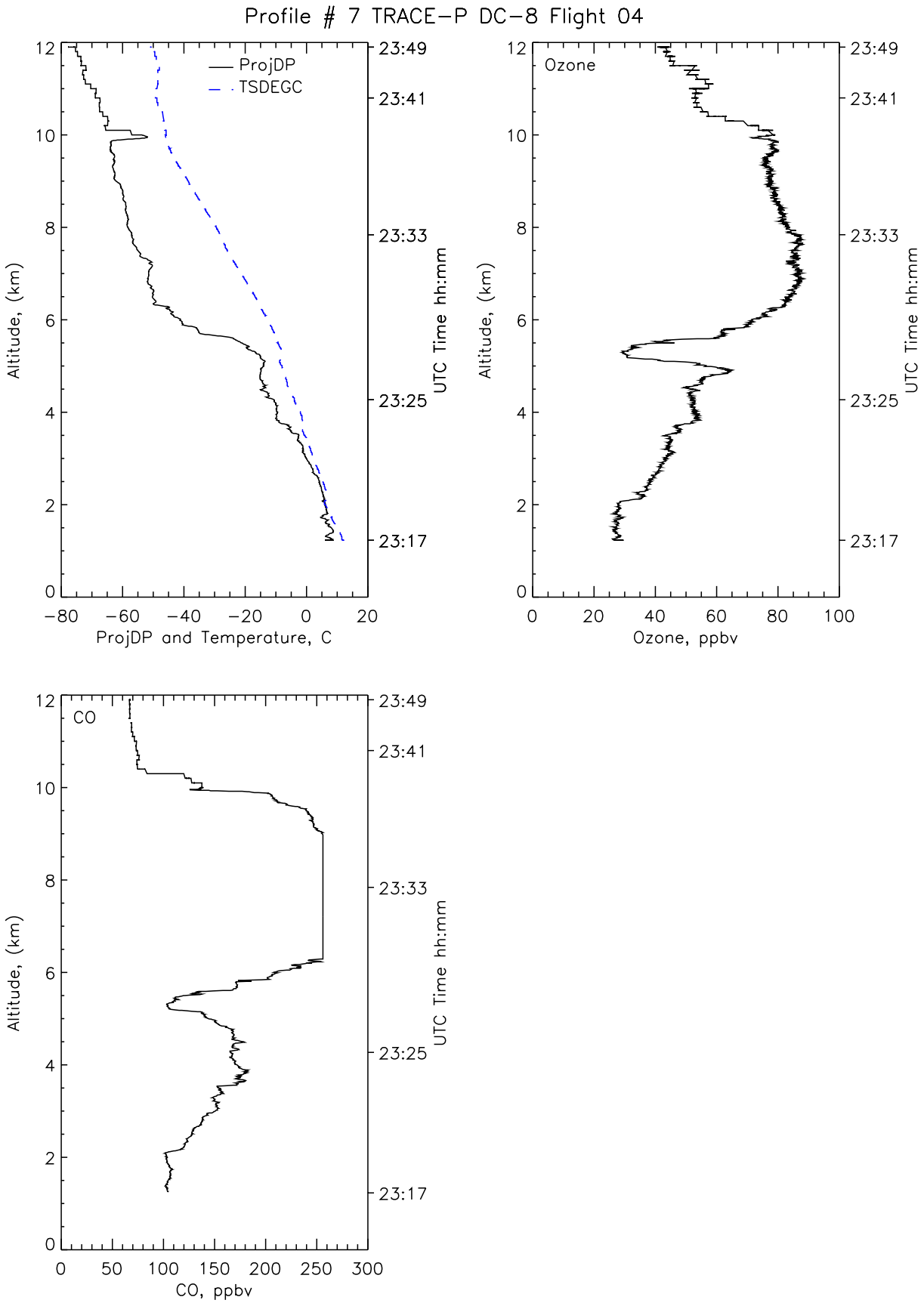

Profile # 2 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
18:27
18:48
19:09
19:30
19:51
Ozone
Ozone, ppbv
CO
CO, ppbv

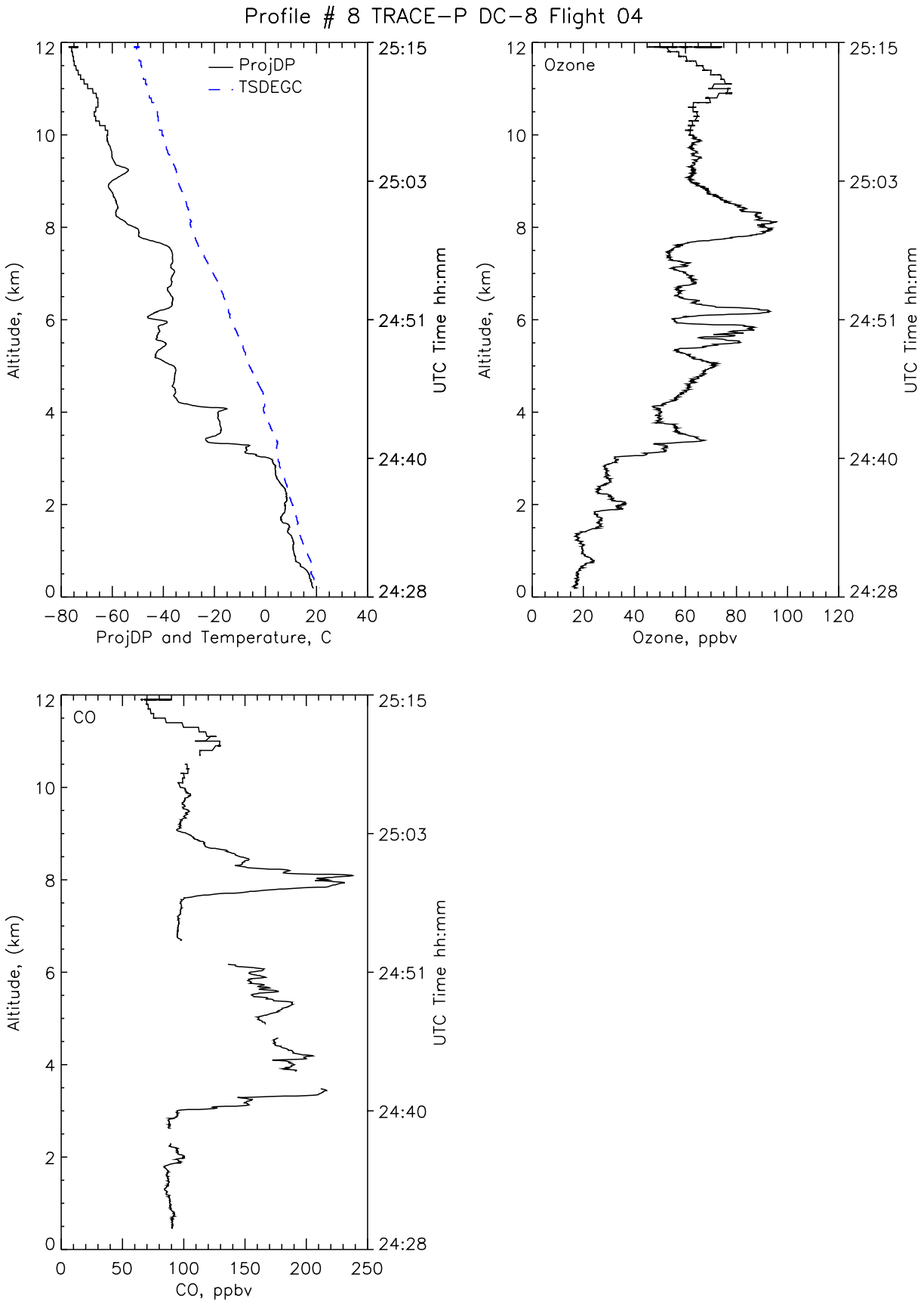

Profile # 3 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
20:13
20:08
20:02
19:56
19:51
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv
20:13
20:18
20:23
20:29
20:34


Profile # 5 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv
21:31
21:20
21:09
20:58
20:47


Profile # 6 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
21:49
22:06
22:22
22:39
22:55
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 7 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv
23:49
23:41
23:33
23:25
23:17


Profile # 8 TRACE-P DC-8 Flight 04
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

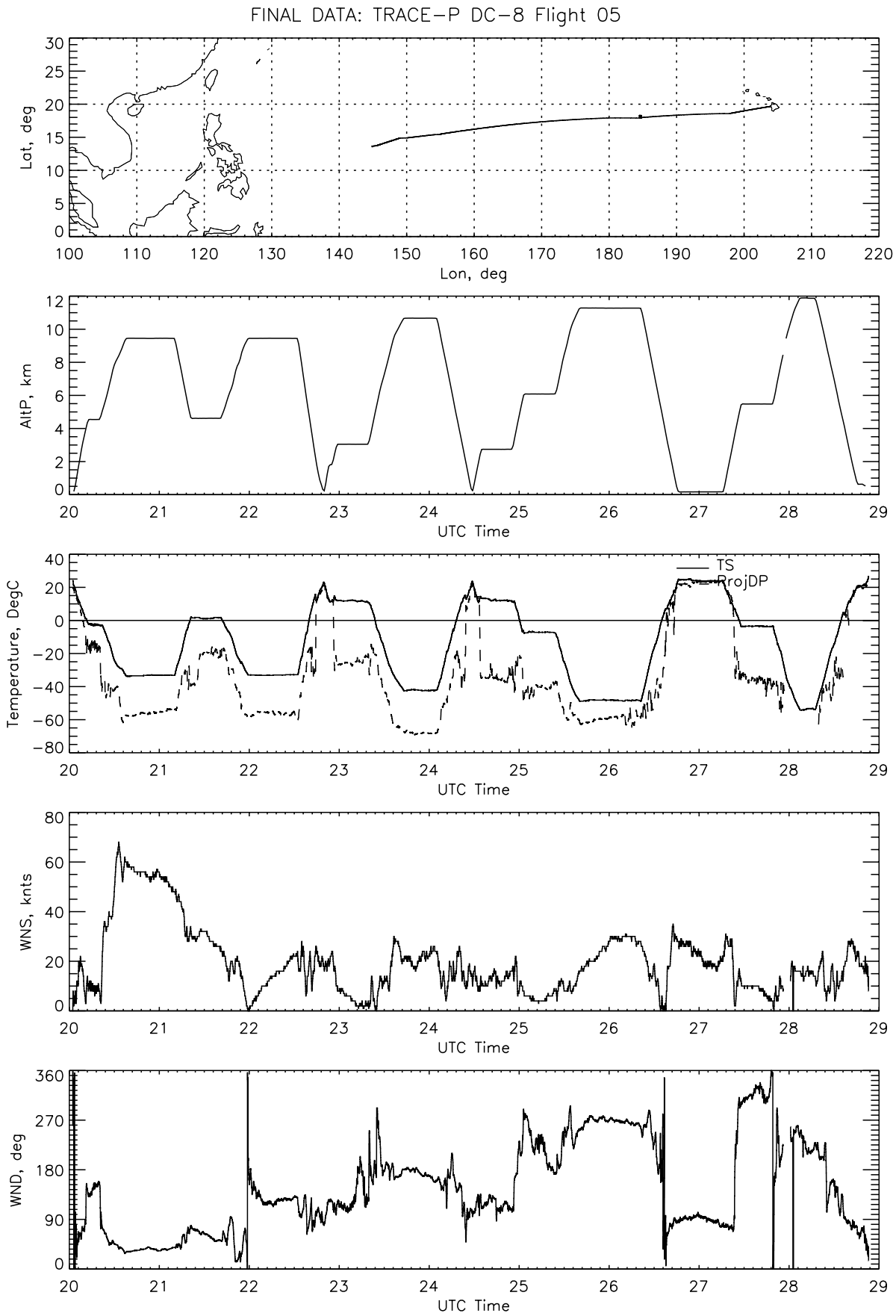
TRACE-P

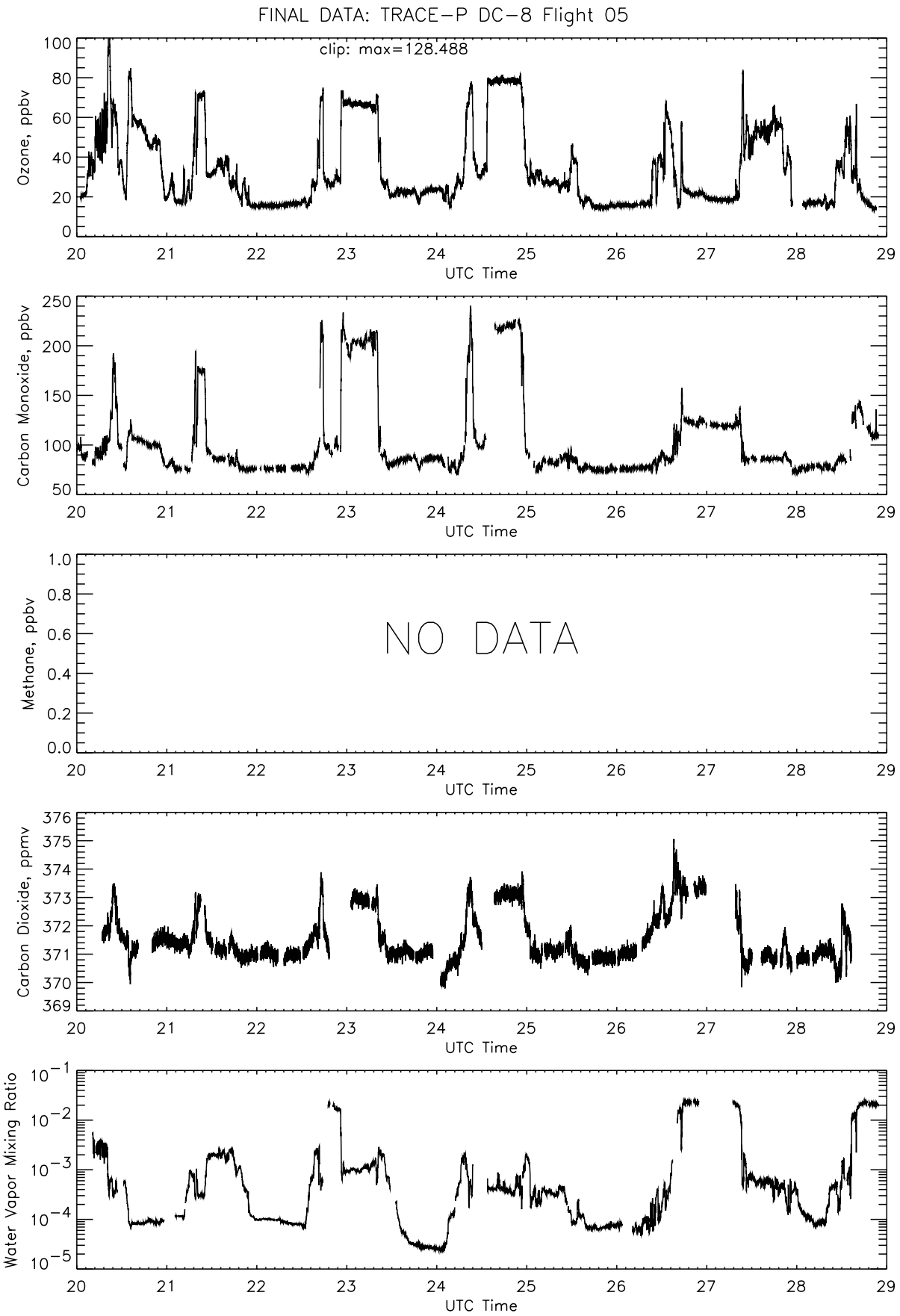
Flight 5D

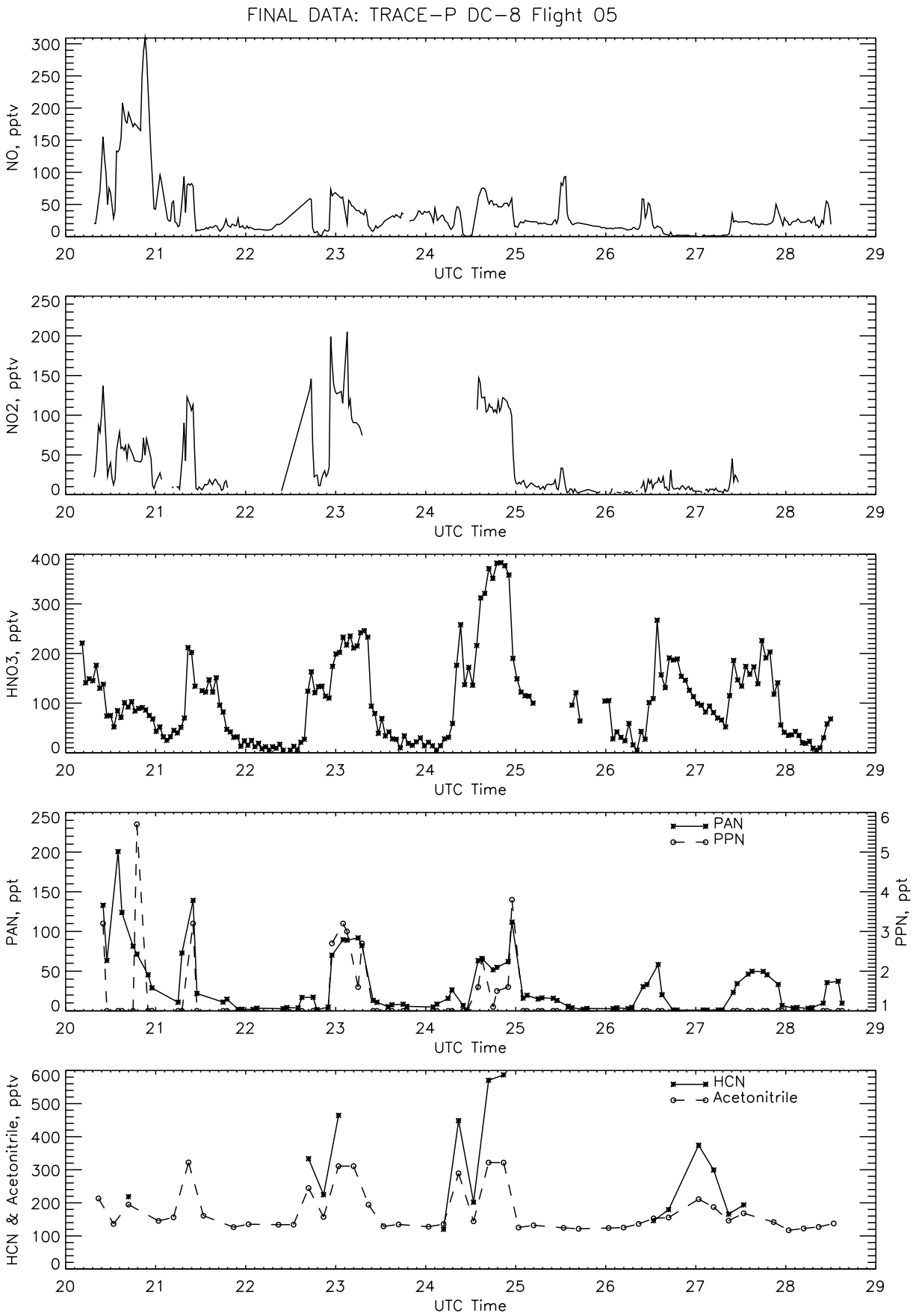
Transit: Kona, HI to Guam

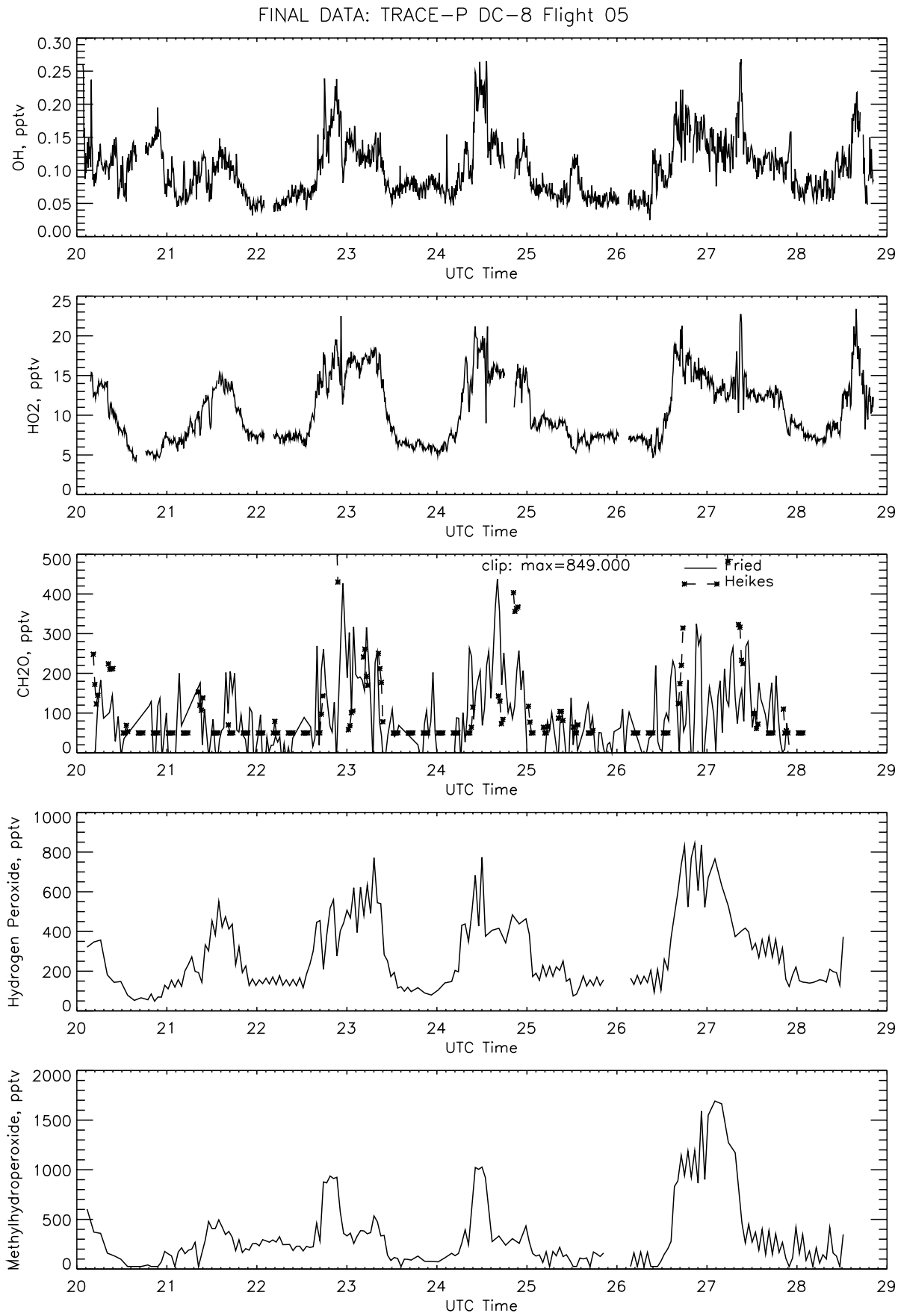
Asian Pollution Subsidence and MOPITT Tropical Validation

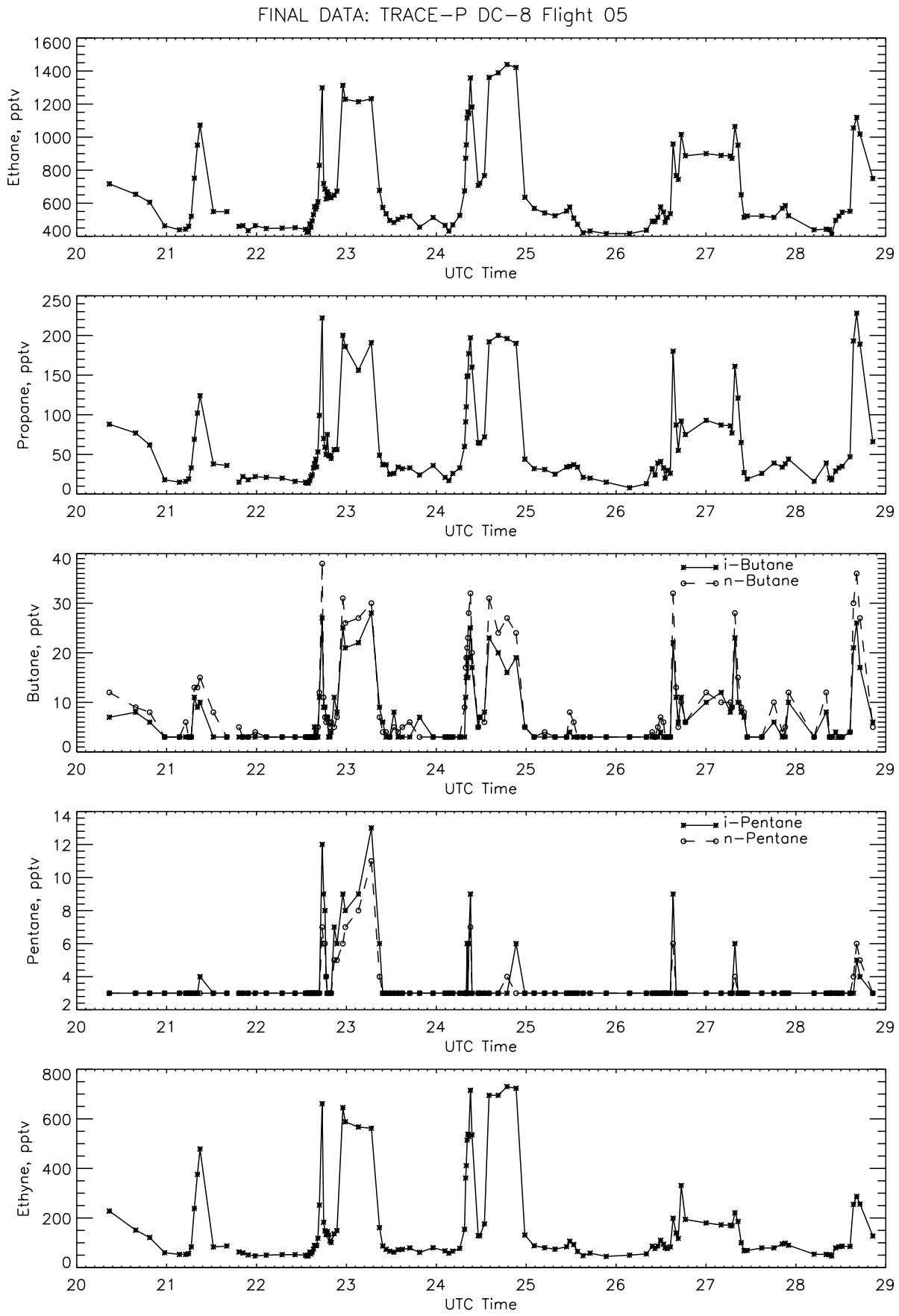
February 27, 2001

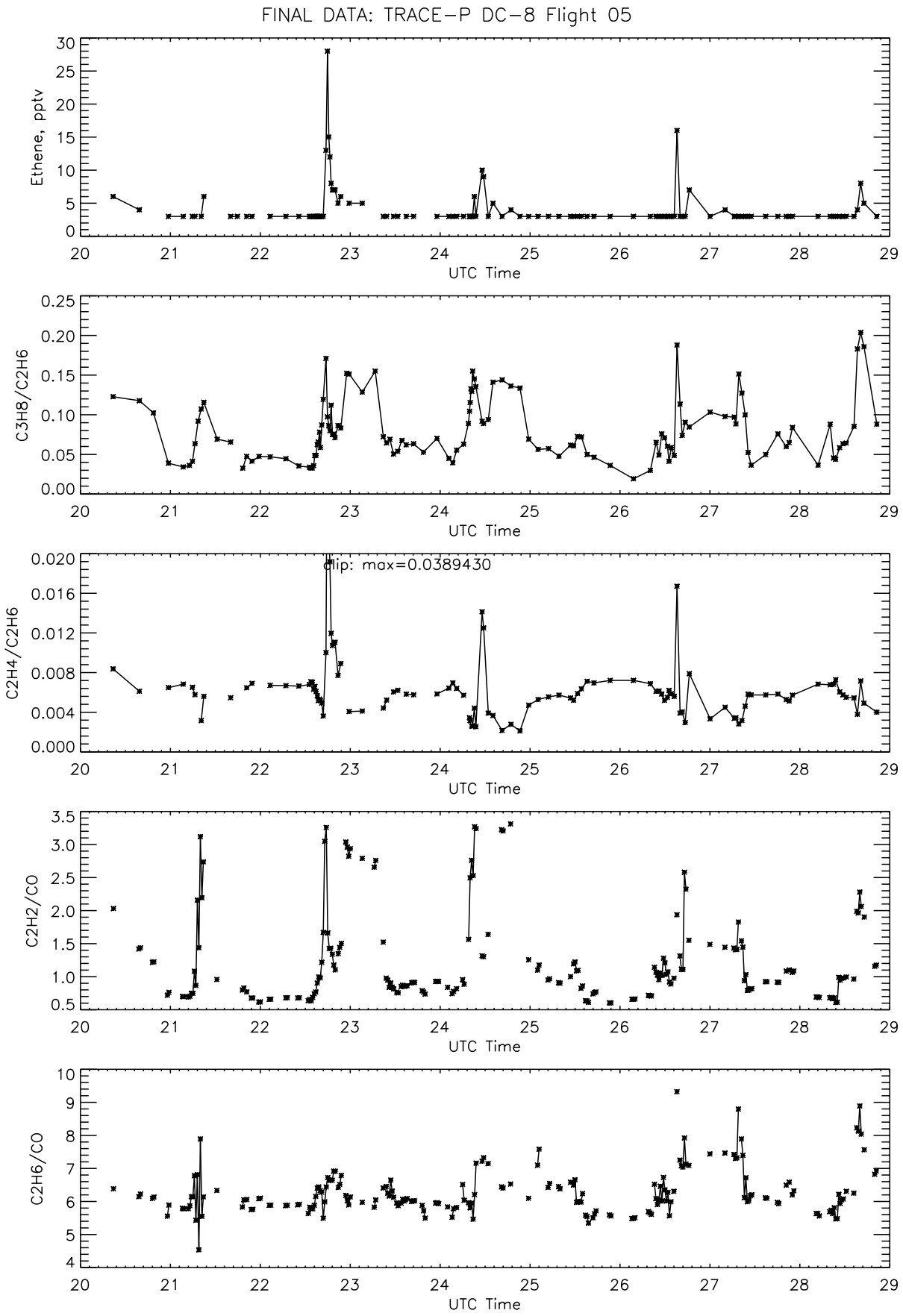

FINAL DATA: TRACE-P DC-8 Flight 05
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
RrojDP
WNS, knts
WND, deg

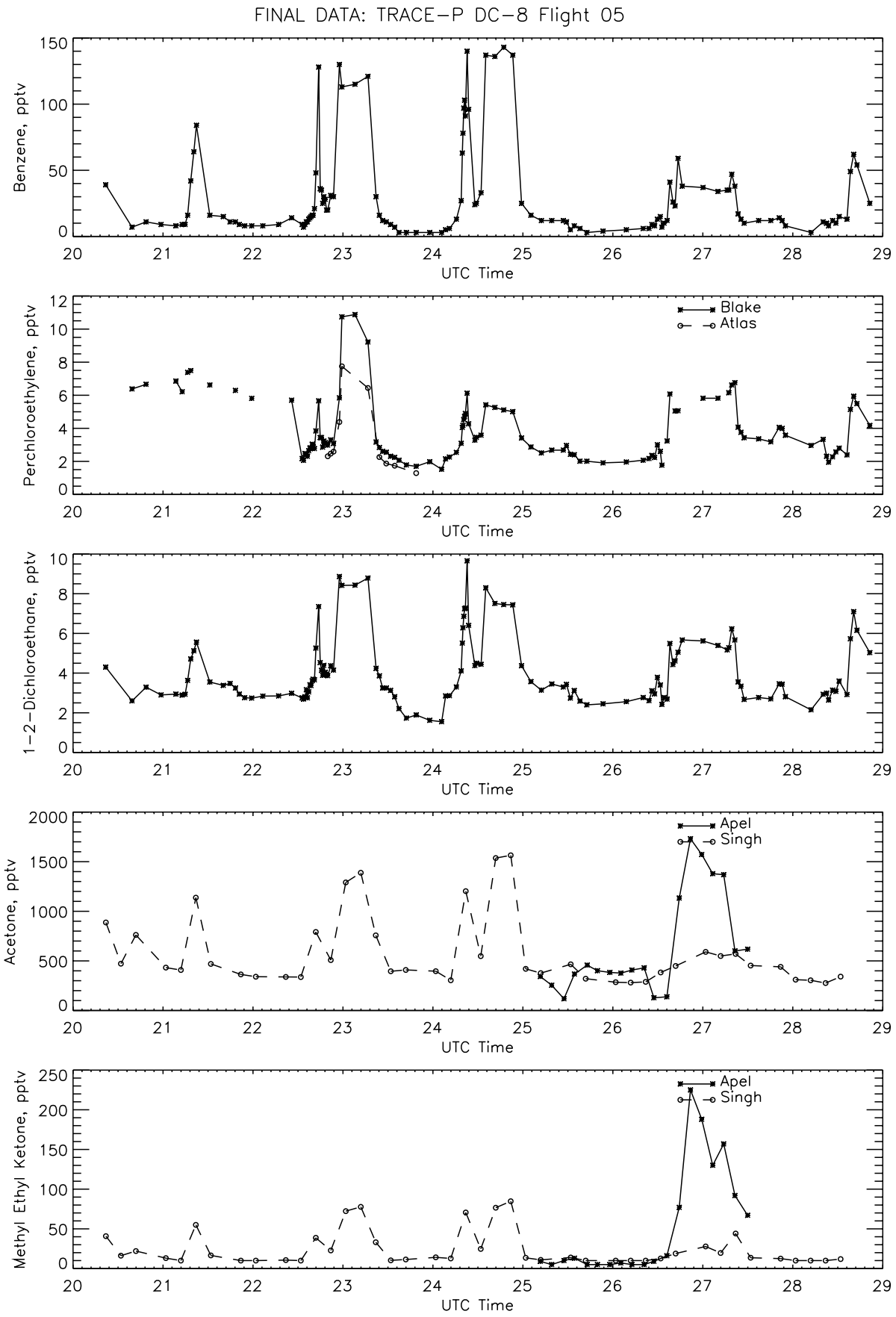

FINAL DATA: TRACE-P DC-8 Flight 05
clip: max=128.488
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
NO DATA
Carbon Dioxide, ppmv
Water Vapor Mixing Ratio
UTC Time

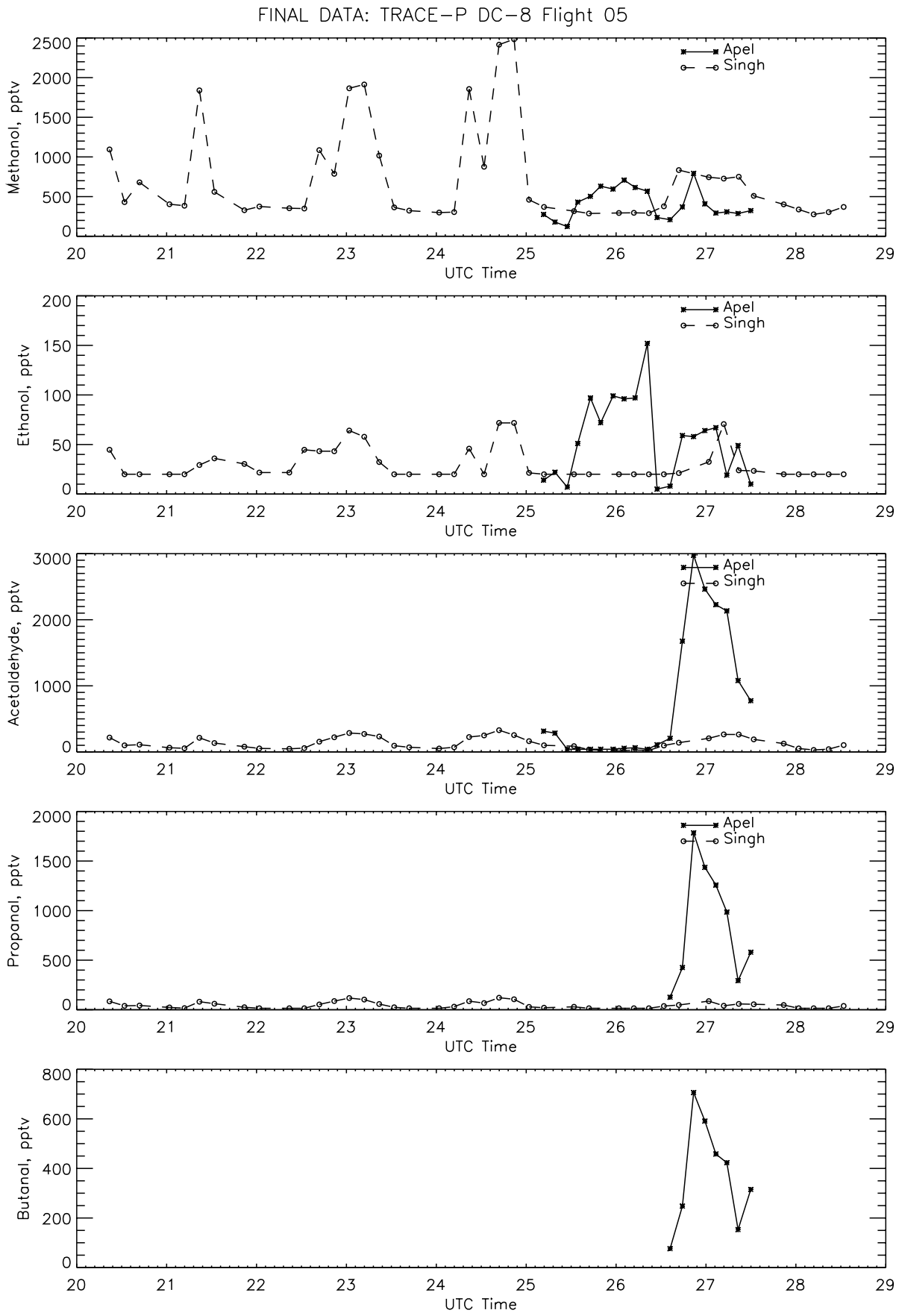

FINAL DATA: TRACE-P DC-8 Flight 05
NO, pptv
NO2, pptv
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

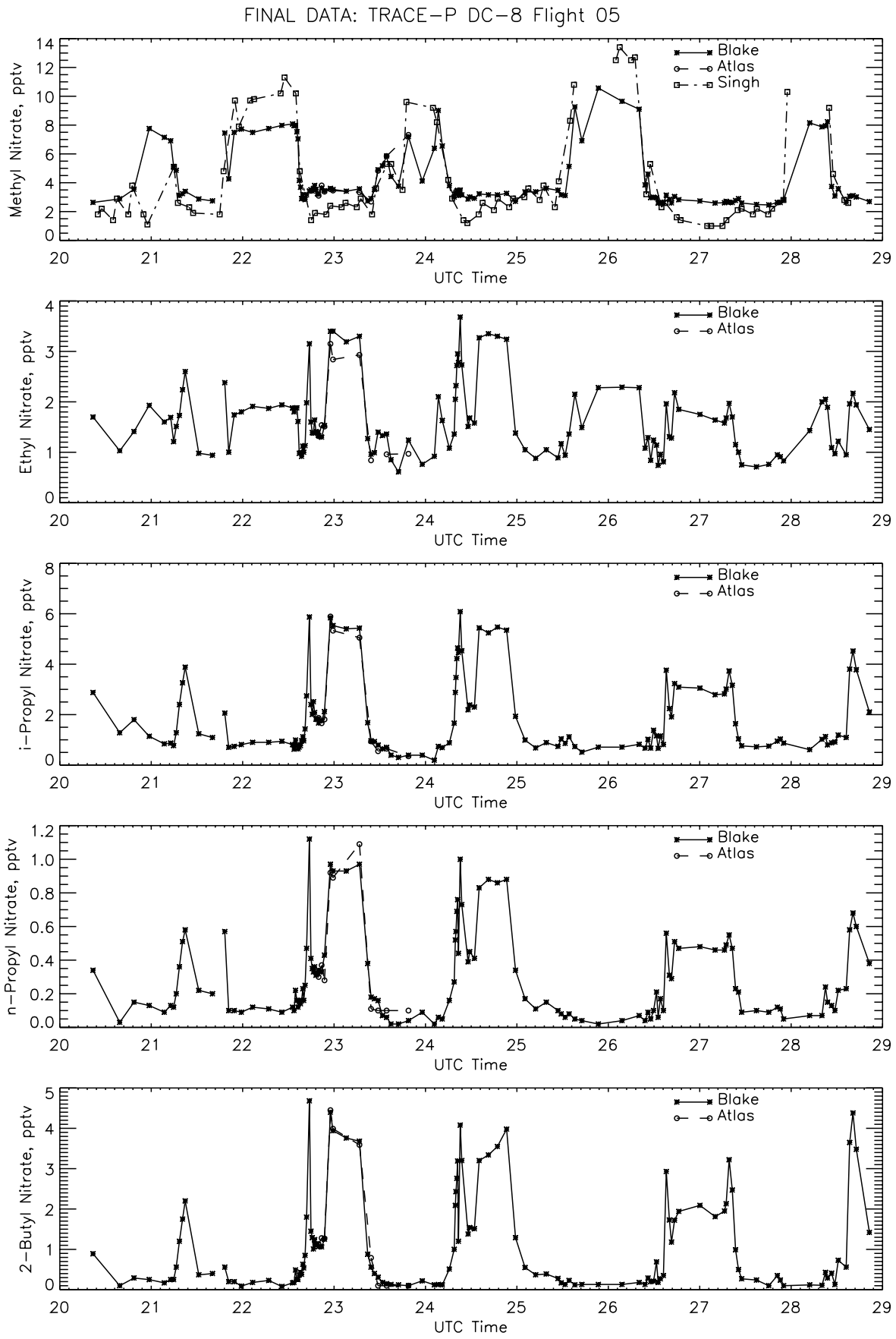

FINAL DATA: TRACE-P DC-8 Flight 05
OH, pptv
HO2, pptv
CH2O, pptv
clip: max=849.000
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

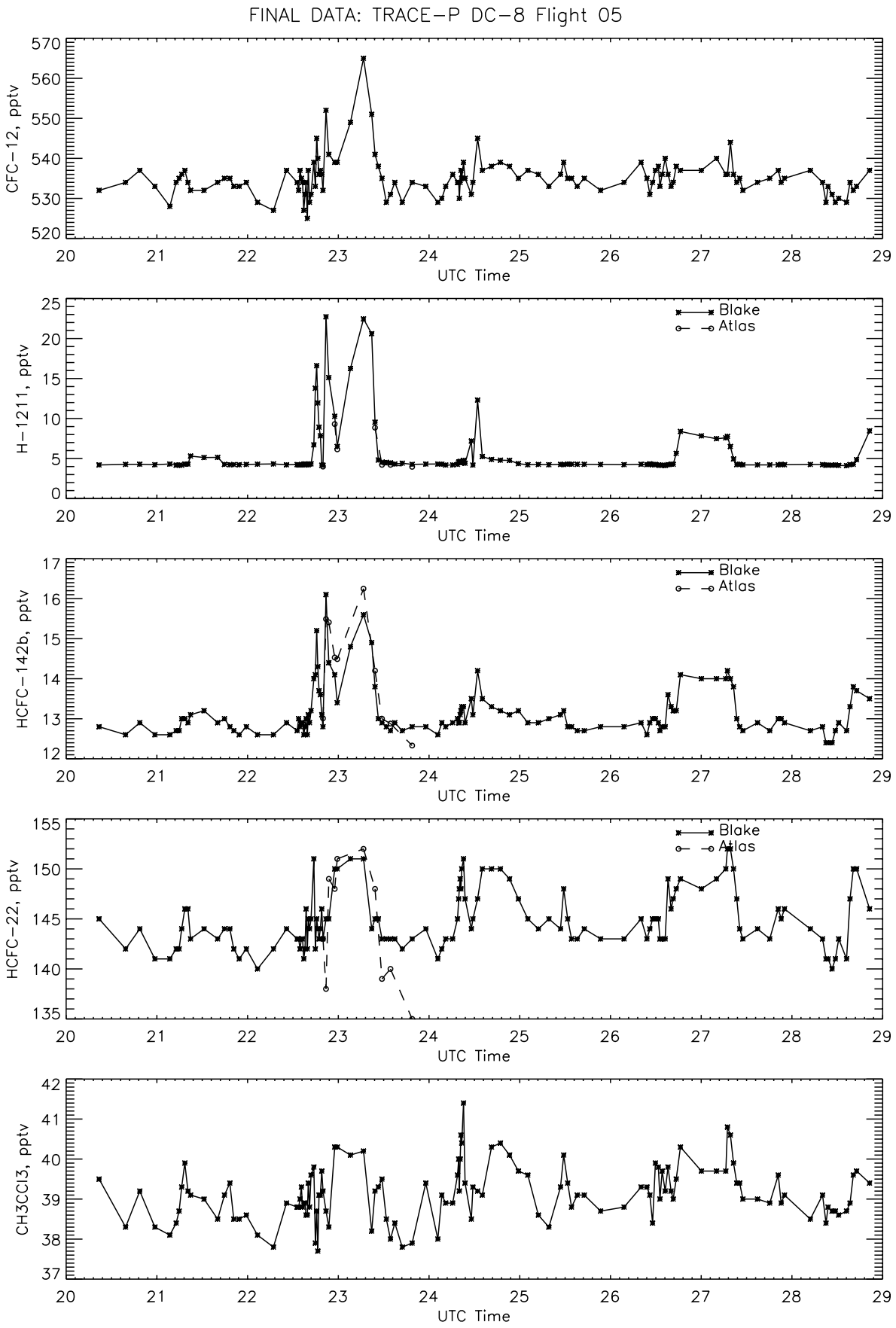

FINAL DATA: TRACE-P DC-8 Flight 05
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 05
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
clip: max=0.0389430
C2H2/CO
C2H6/CO
UTC Time

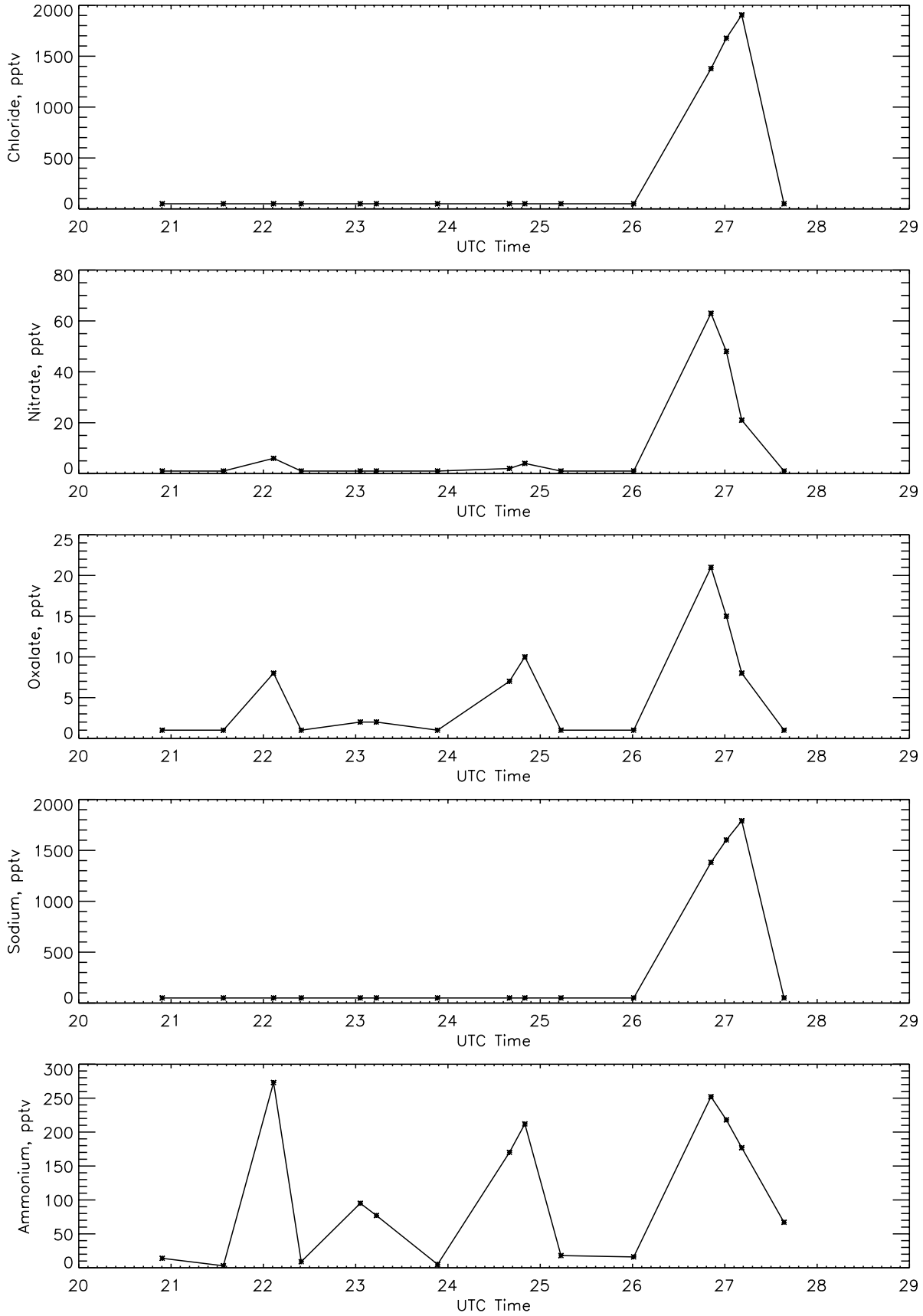

FINAL DATA: TRACE-P DC-8 Flight 05
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 05
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh

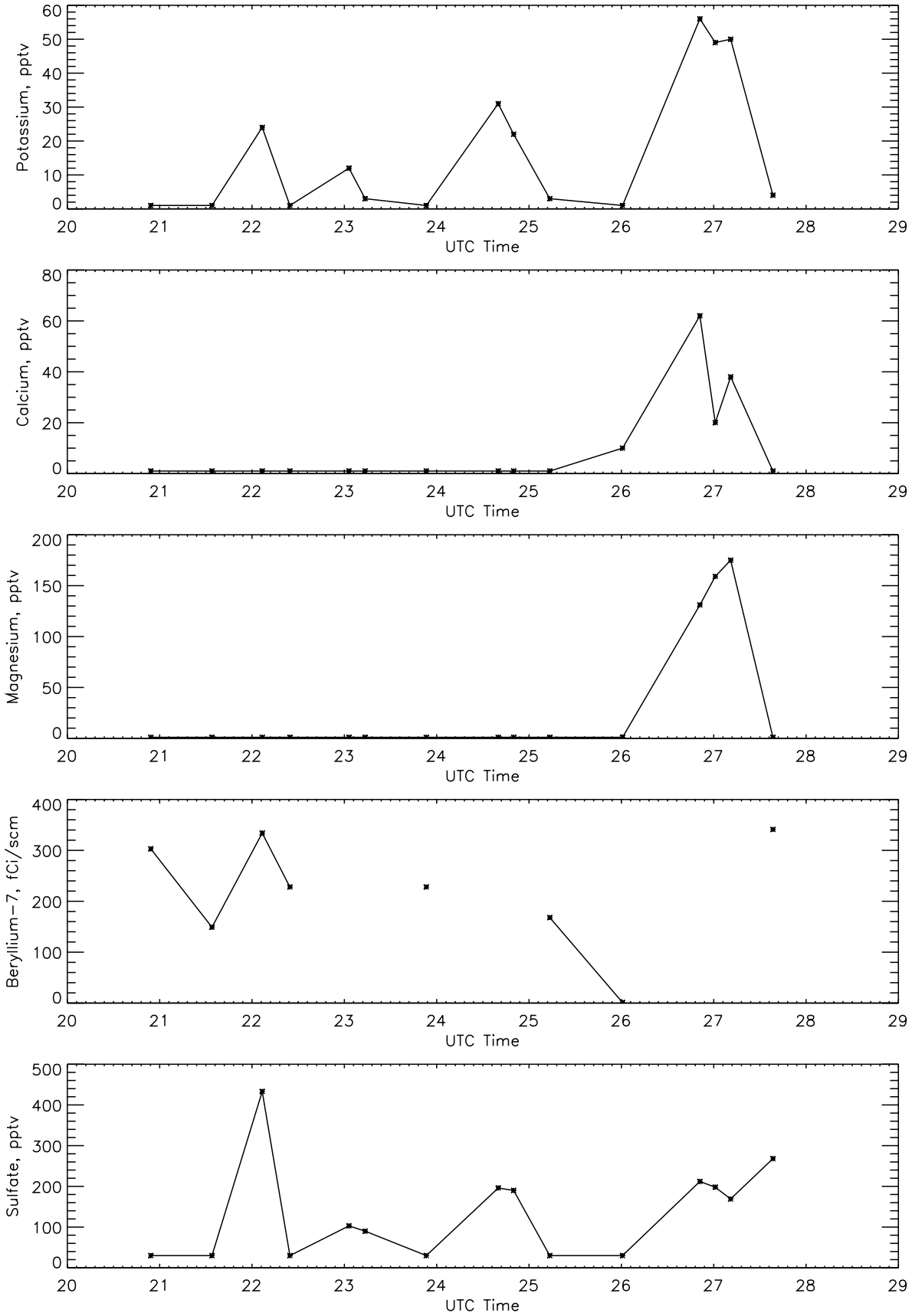

FINAL DATA: TRACE-P DC-8 Flight 05
Methyl Nitrate, pptv
Ethyl Nitrate, pptv
i-Propyl Nitrate, pptv
n-Propyl Nitrate, pptv
2-Butyl Nitrate, pptv
UTC Time
Blake
Atlas
Singh

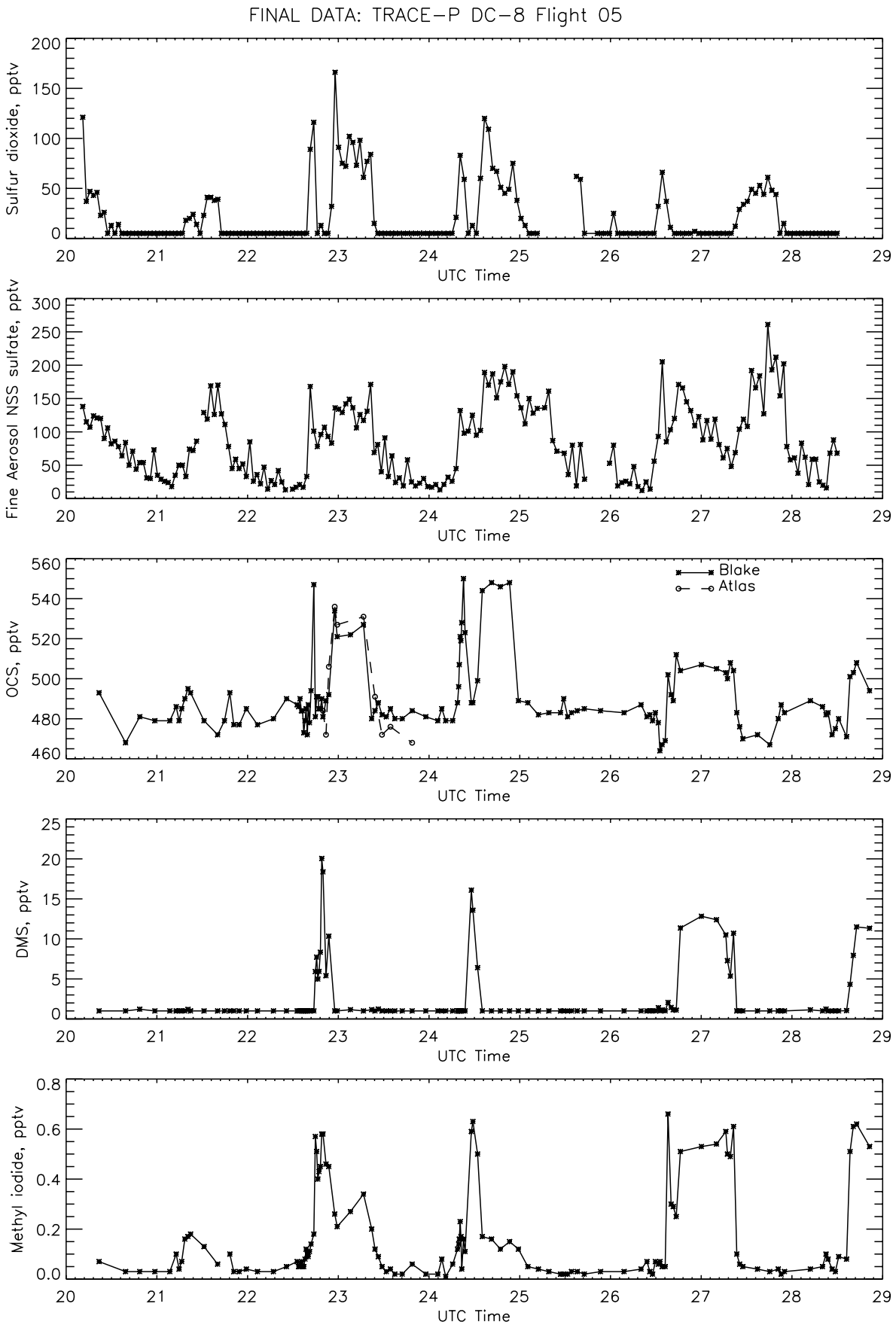

FINAL DATA: TRACE-P DC-8 Flight 05
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas

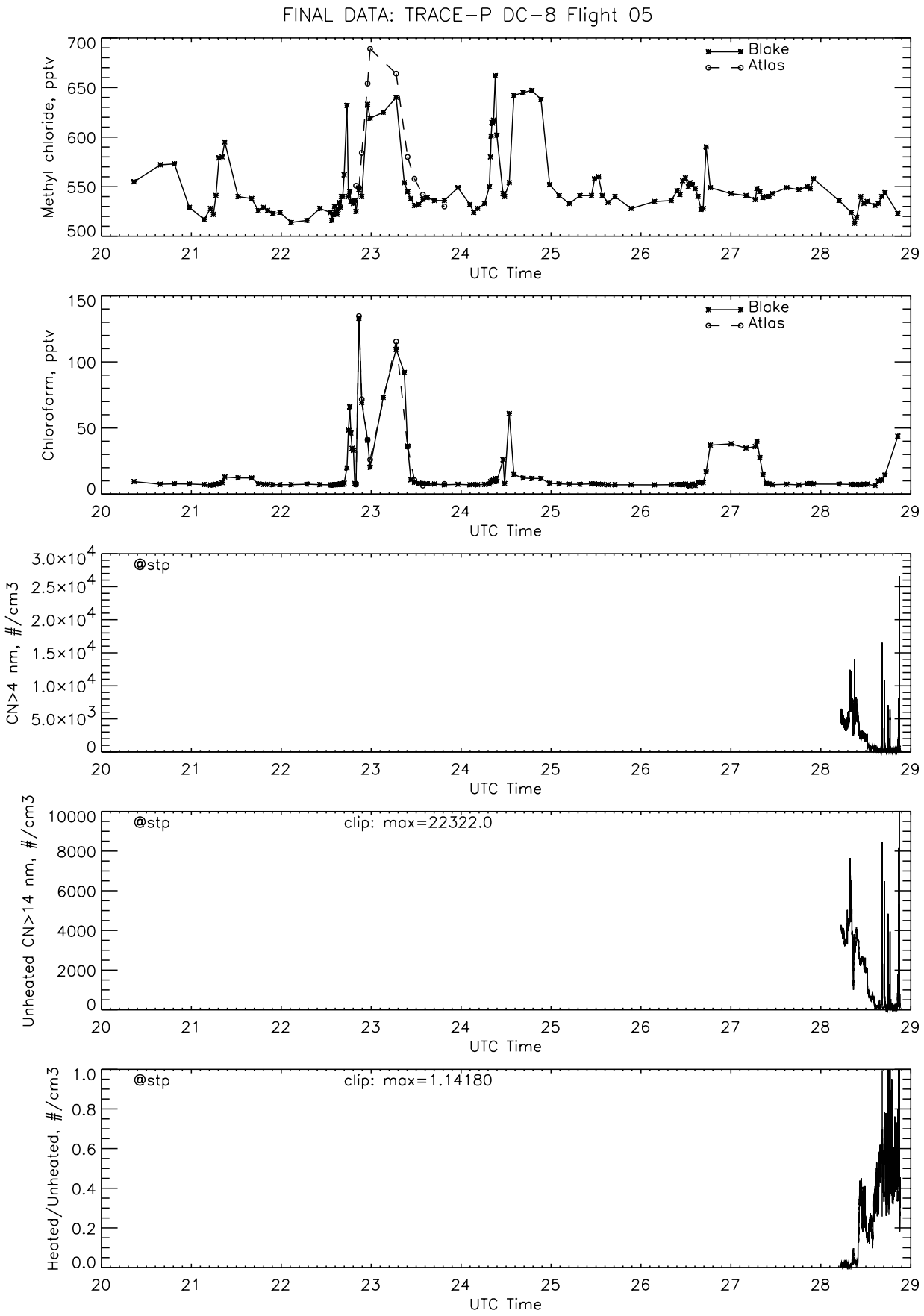
FINAL DATA: TRACE-P DC-8 Flight 05

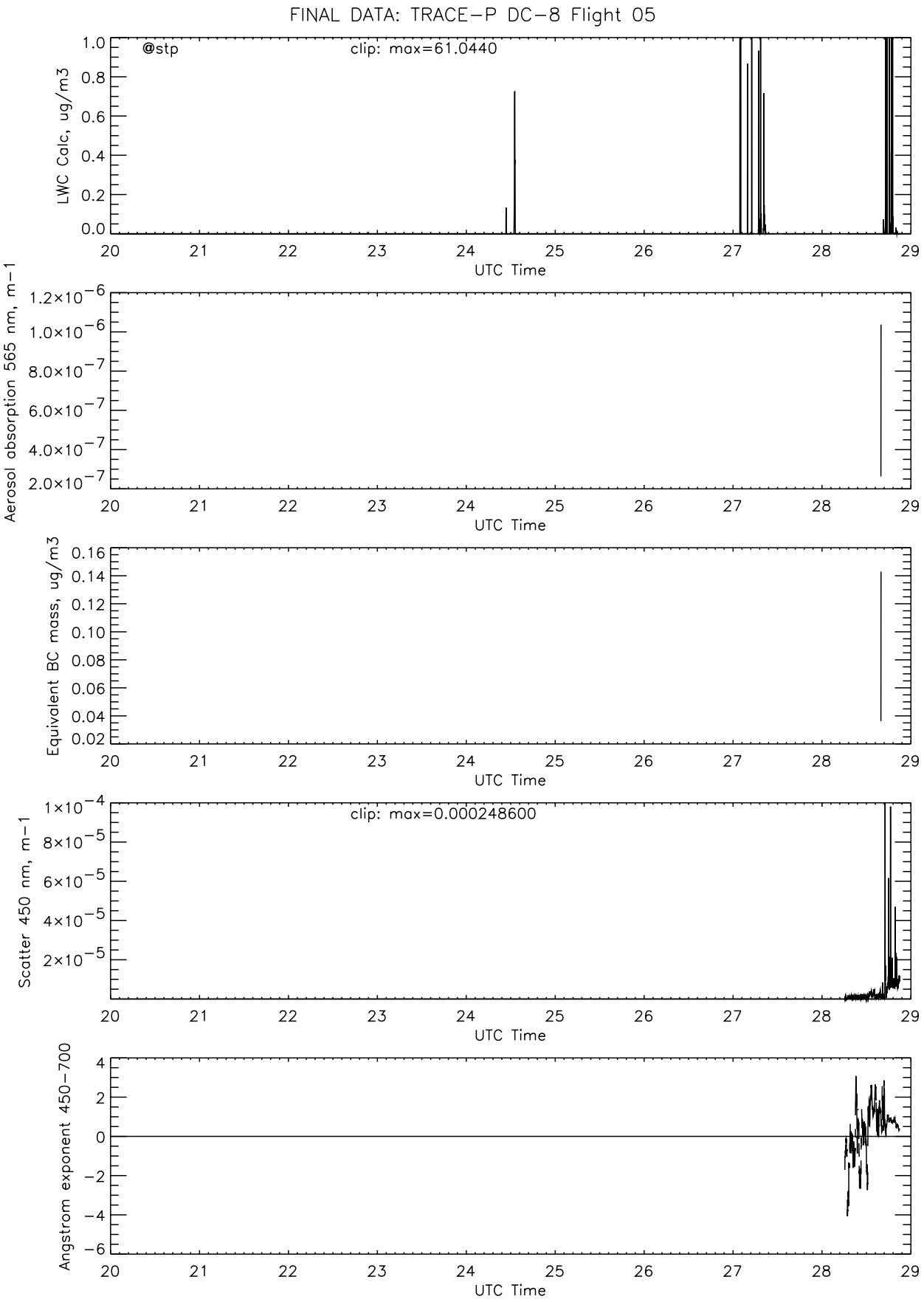


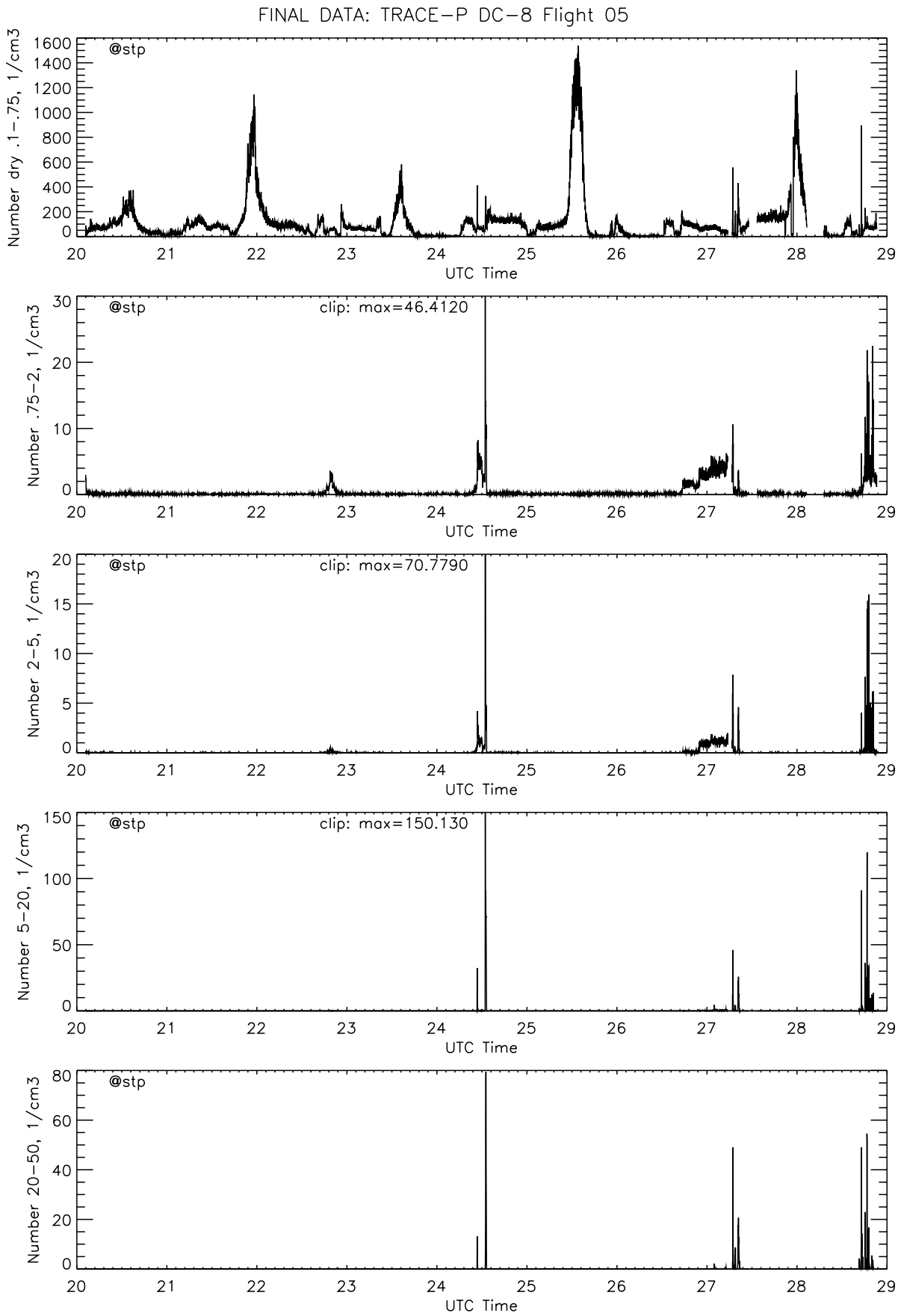
FINAL DATA: TRACE-P DC-8 Flight 05

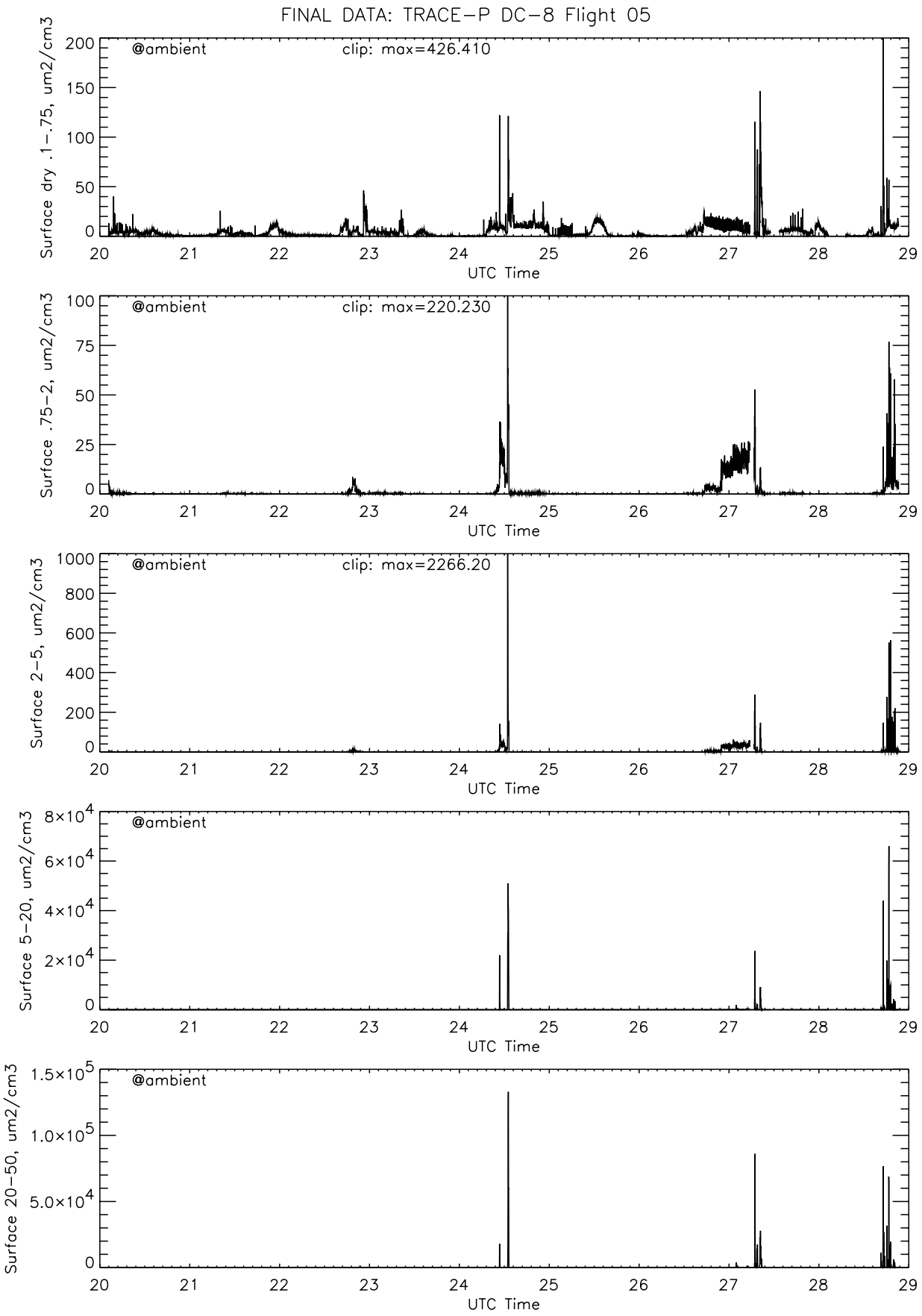


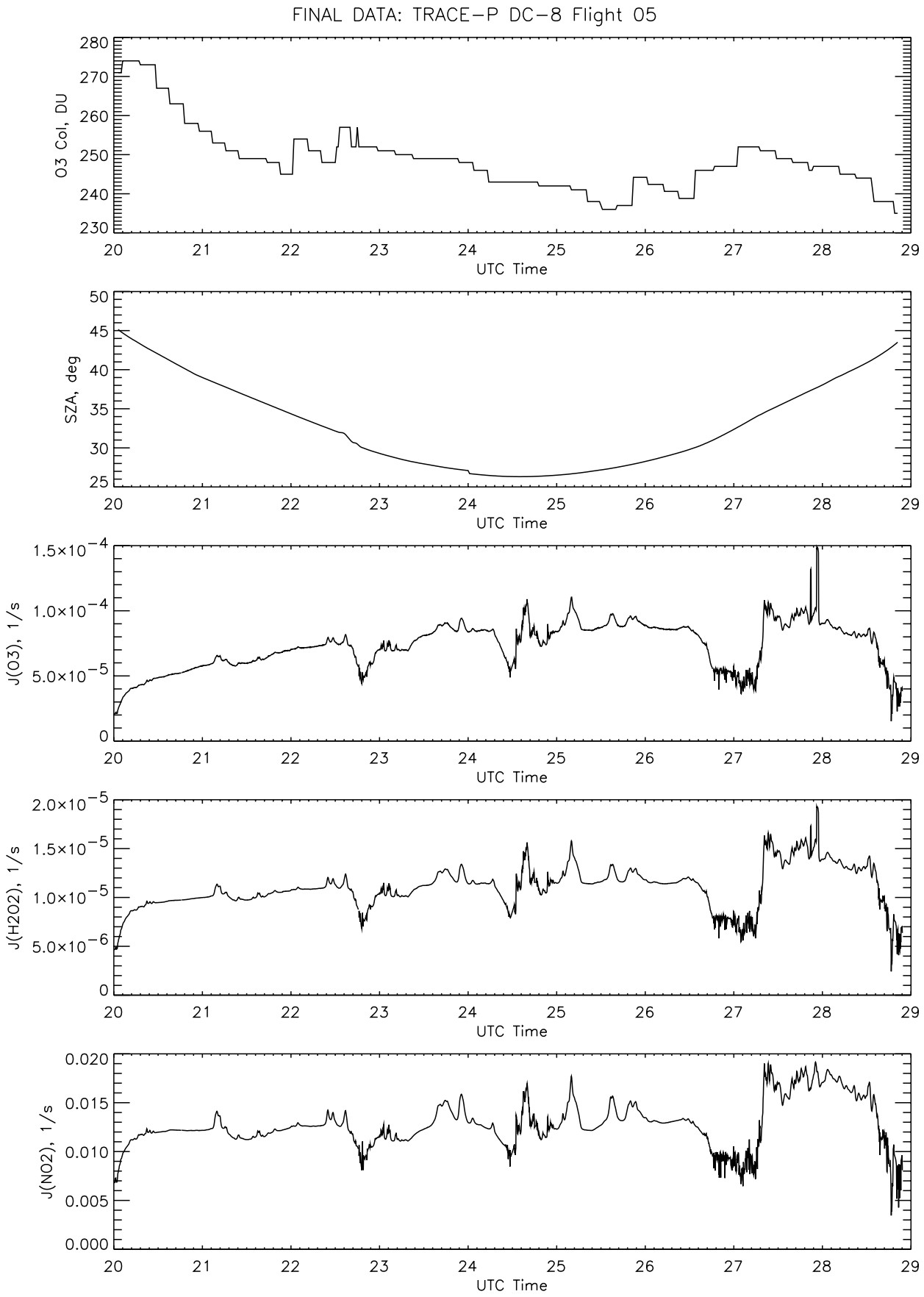

FINAL DATA: TRACE-P DC-8 Flight 05
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

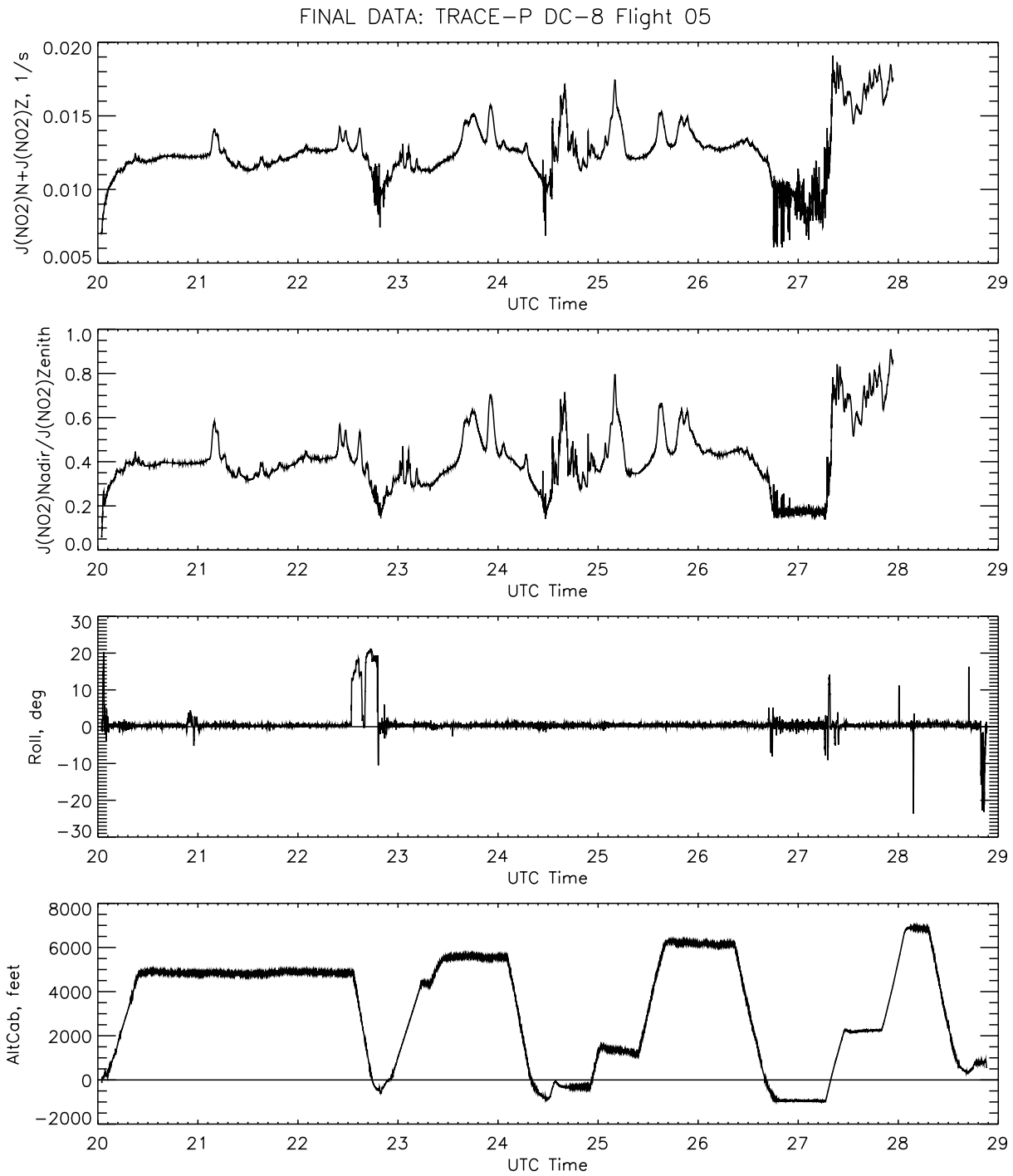

FINAL DATA: TRACE-P DC-8 Flight 05
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
clip: max=22322.0
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14180
UTC Time

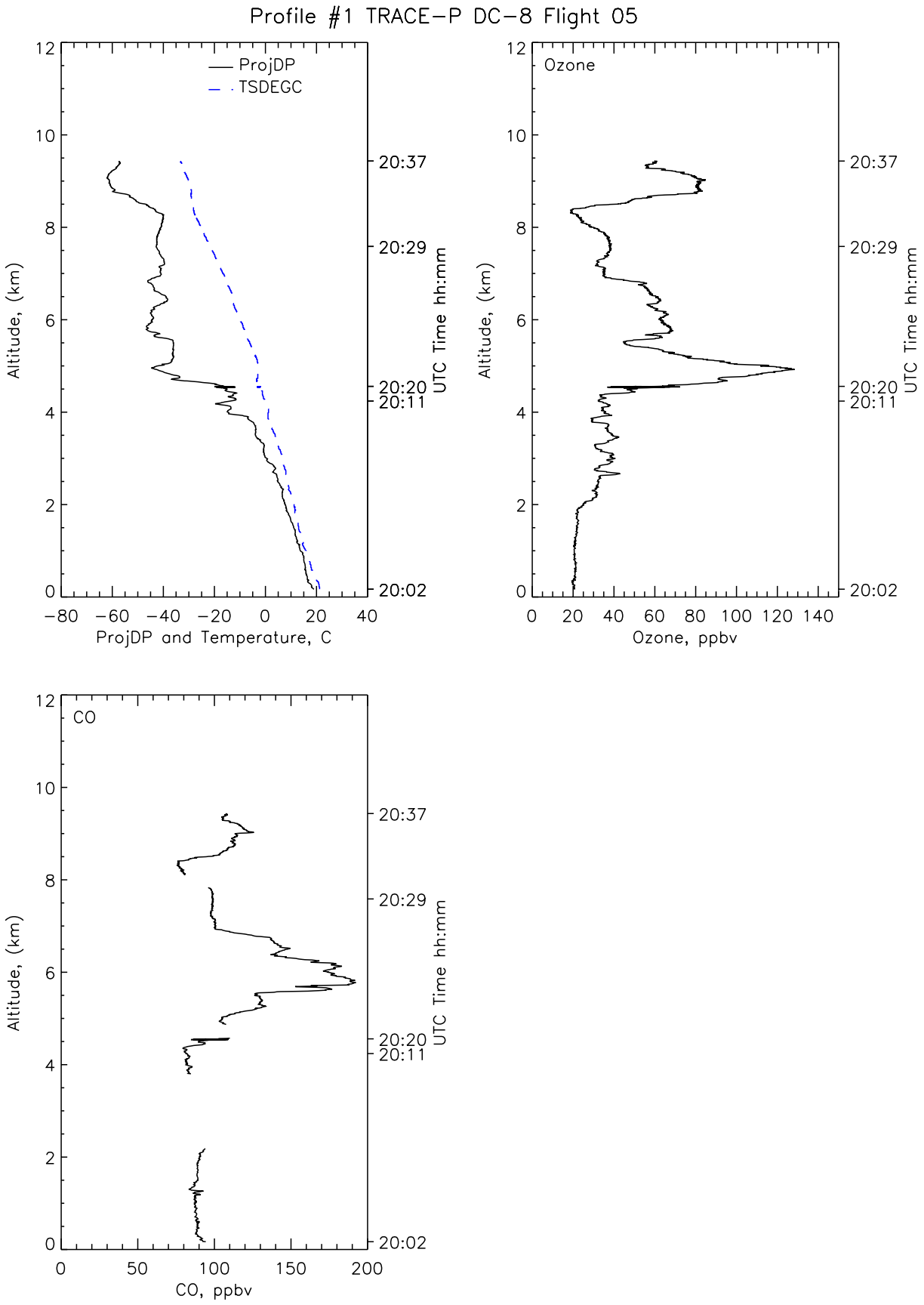

FINAL DATA: TRACE-P DC-8 Flight 05
@stp
clip: max=61.0440
LWC Calc, ug/m3
UTC Time
Aerosol absorption 565 nm, m-1
UTC Time
Equivalent BC mass, ug/m3
UTC Time
clip: max=0.000248600
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

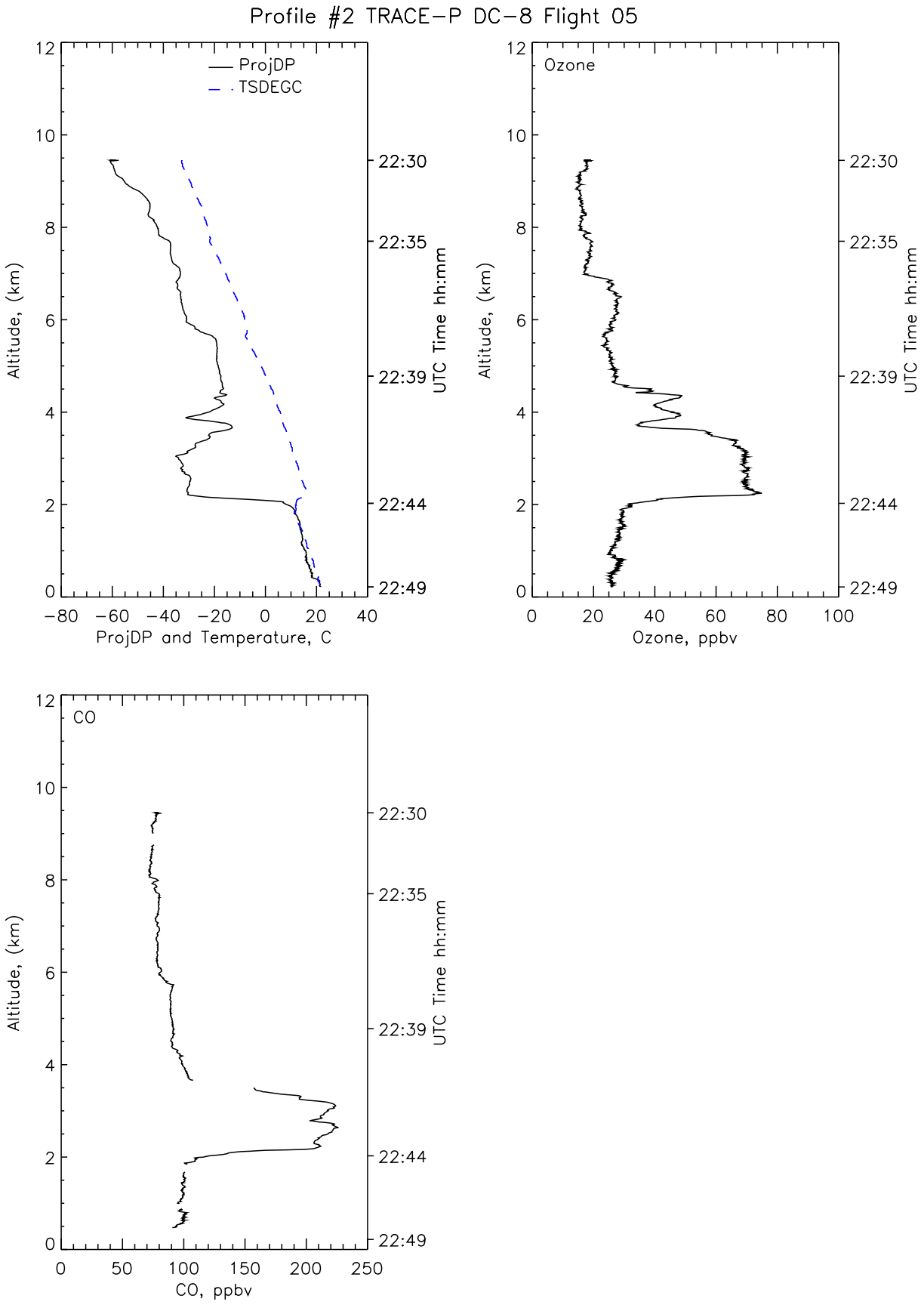

FINAL DATA: TRACE-P DC-8 Flight 05
@stp
Number dry .1-.75, 1/cm3
UTC Time
@stp
clip: max=46.4120
Number .75-2, 1/cm3
UTC Time
@stp
clip: max=70.7790
Number 2-5, 1/cm3
UTC Time
@stp
clip: max=150.130
Number 5-20, 1/cm3
UTC Time
@stp
Number 20-50, 1/cm3
UTC Time

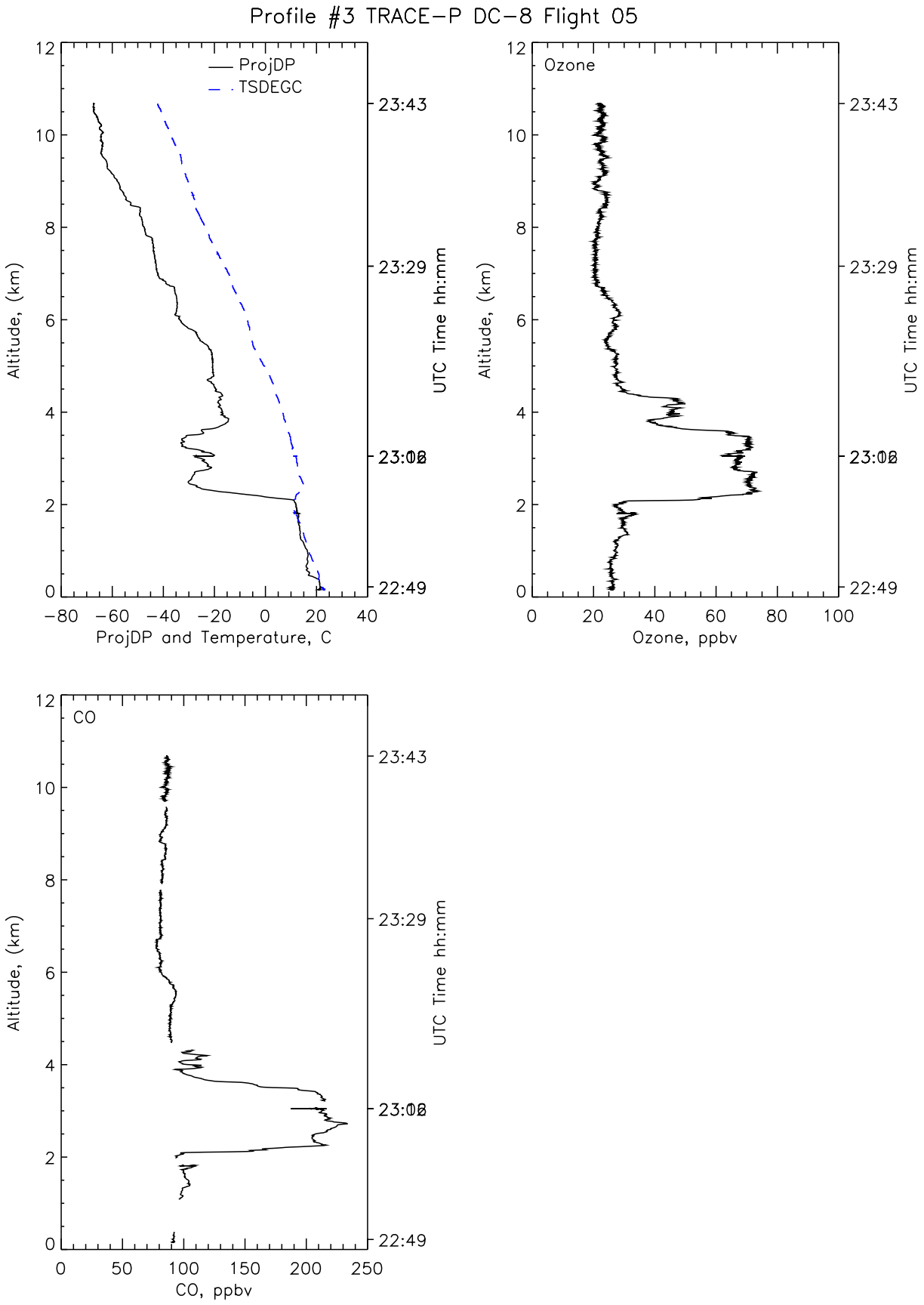

FINAL DATA: TRACE-P DC-8 Flight 05
@ambient
clip: max=426.410
Surface dry .1-.75, um2/cm3
UTC Time
@ambient
clip: max=220.230
Surface .75-2, um2/cm3
UTC Time
@ambient
clip: max=2266.20
Surface 2-5, um2/cm3
UTC Time
@ambient
Surface 5-20, um2/cm3
UTC Time
@ambient
Surface 20-50, um2/cm3
UTC Time

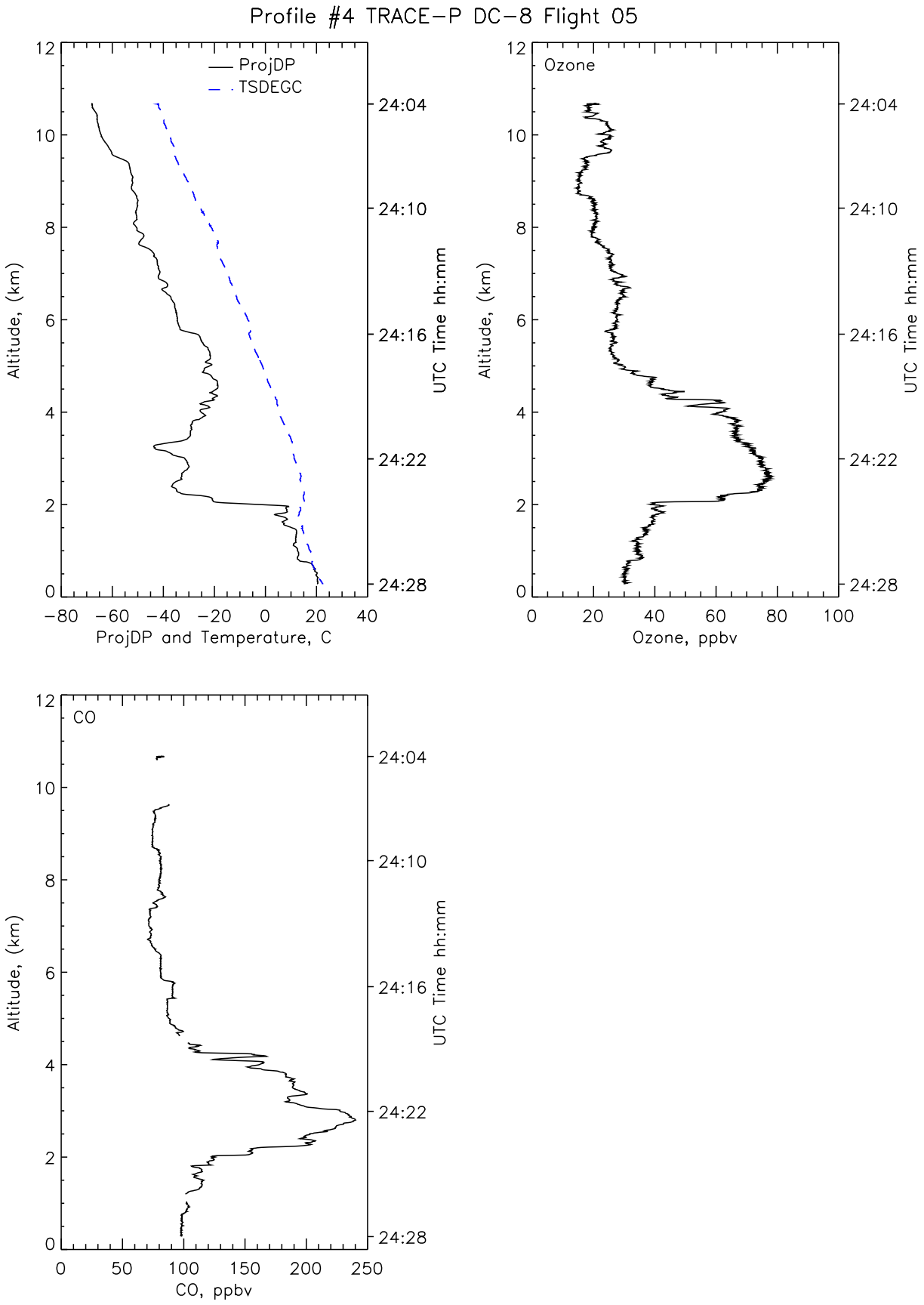

FINAL DATA: TRACE-P DC-8 Flight 05
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

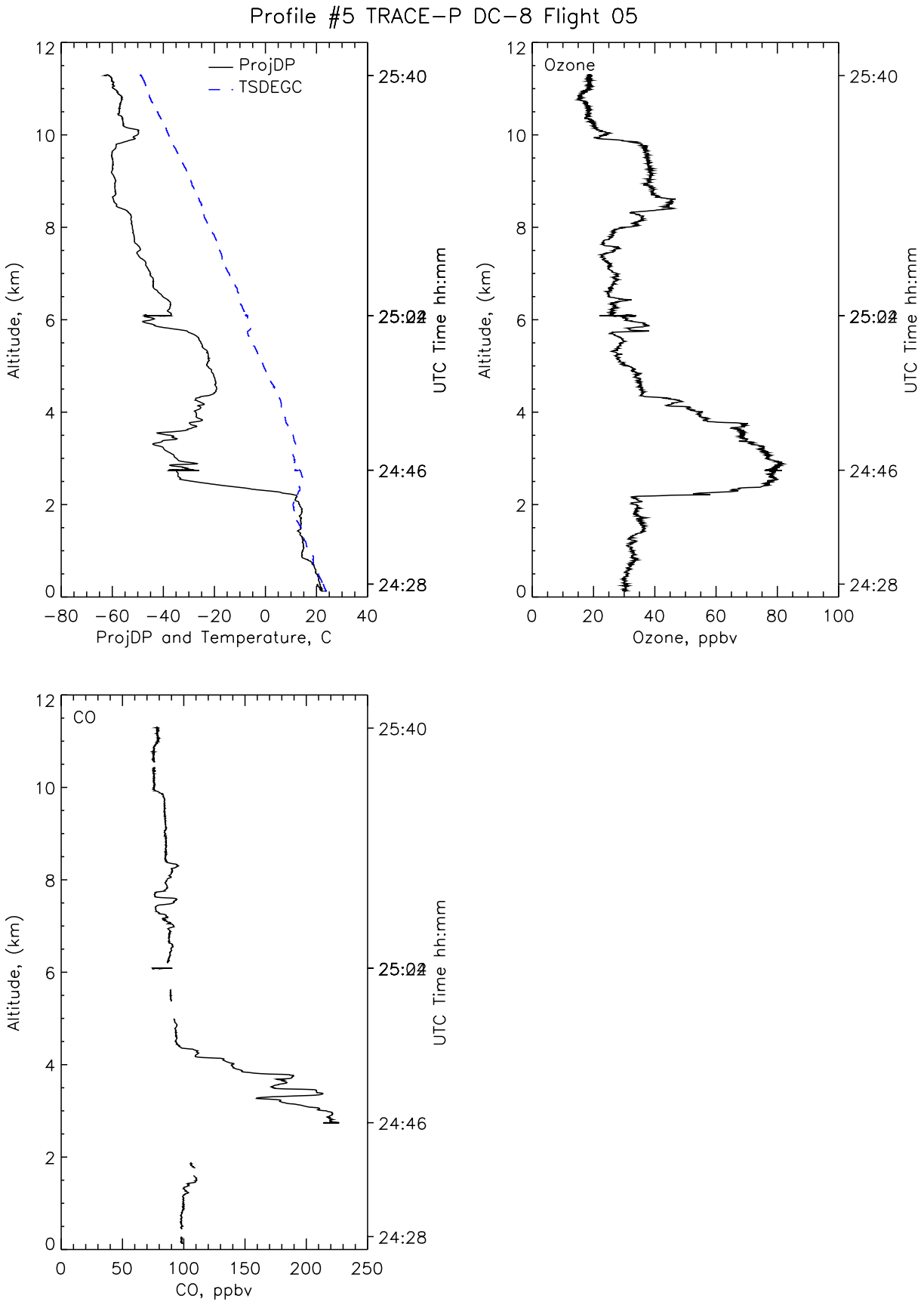

FINAL DATA: TRACE-P DC-8 Flight 05
J(NO2)N+J(NO2)Z, 1/s
0.020
0.015
0.010
0.005
20
21
22
23
24
25
26
27
28
29
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
UTC Time

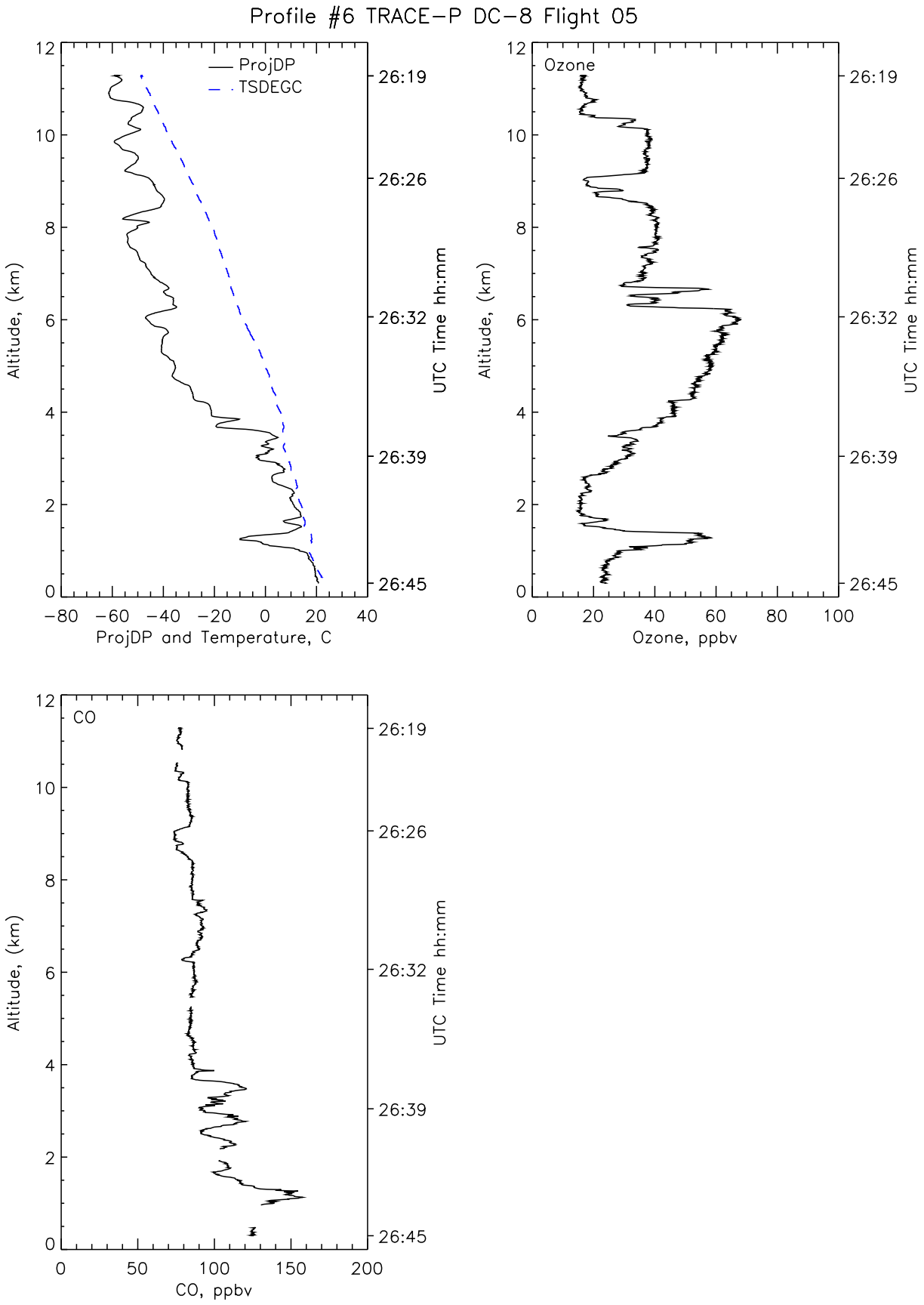

Profile #1 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
20:37
20:29
20:20
20:11
20:02
Ozone
Ozone, ppbv
CO
CO, ppbv

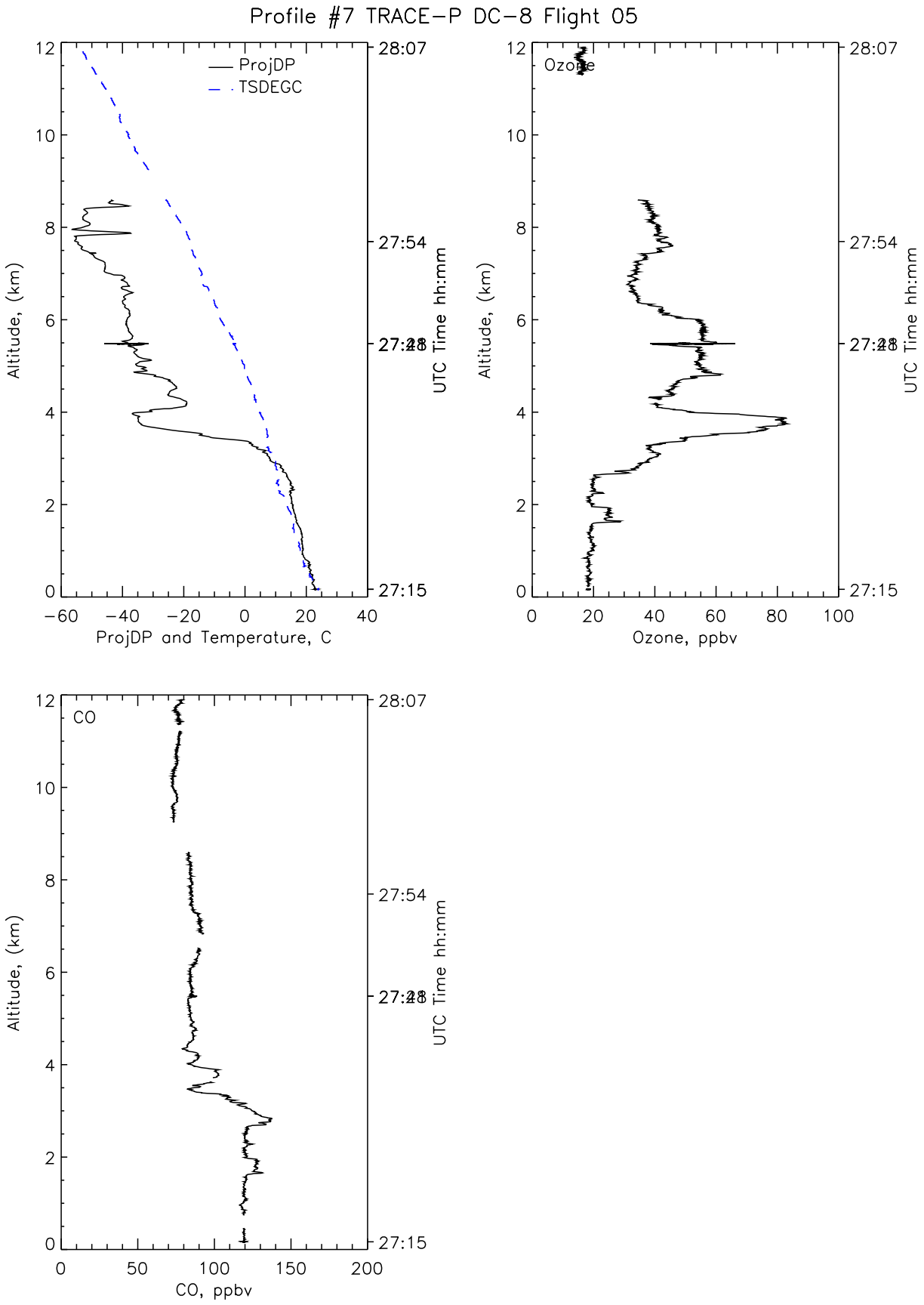

Profile #2 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
22:30
22:35
22:39
22:44
22:49
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

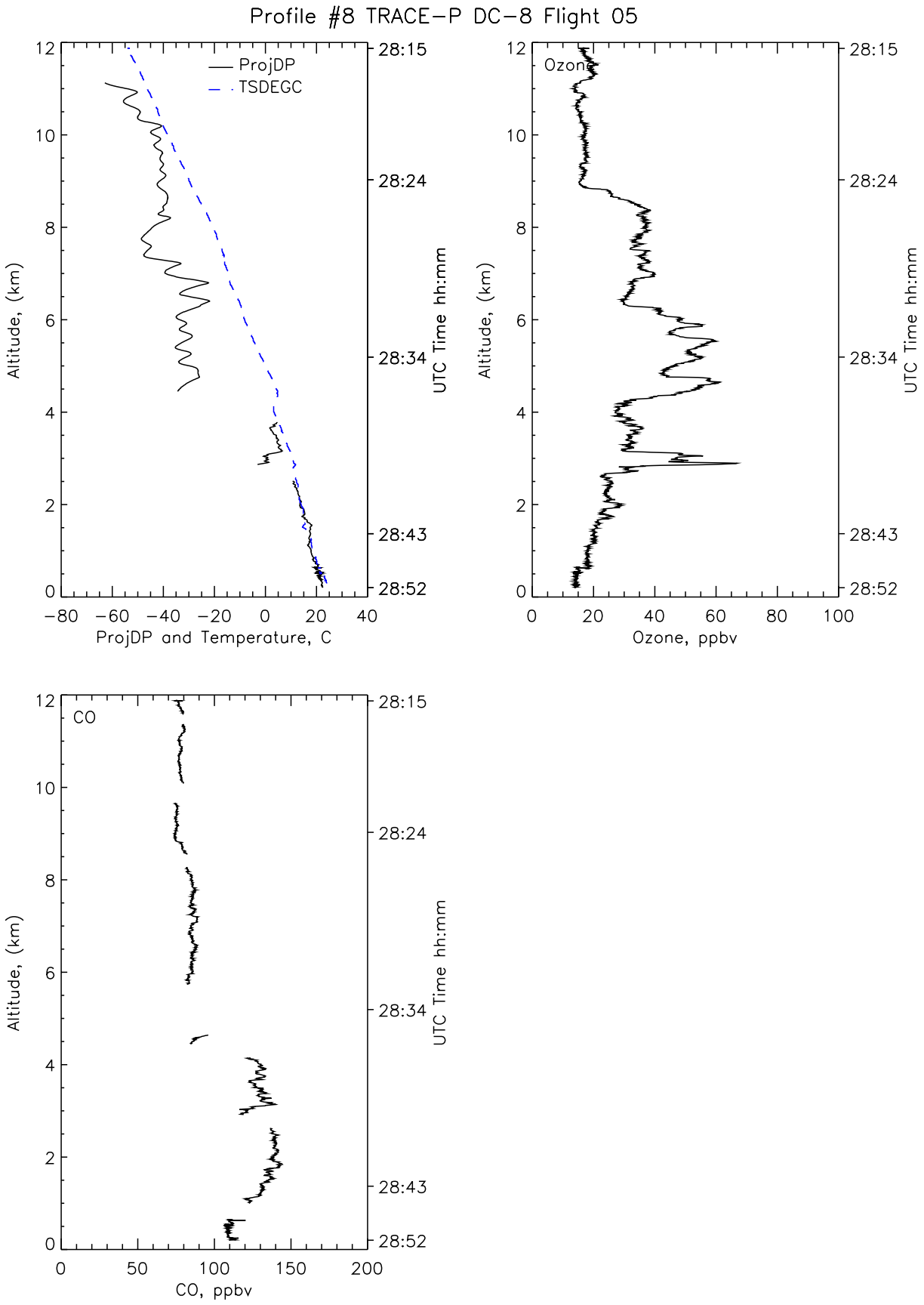

Profile #3 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
23:43
23:29
23:08
22:49
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #4 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #5 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
25:40
25:22
24:46
24:28
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
26:19
26:26
26:32
26:39
26:45
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #7 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
28:07
27:54
27:28
27:15
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #8 TRACE-P DC-8 Flight 05
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv
28:15
28:24
28:34
28:43
28:52

CHEMICAL and METEOROLOGICAL DATA

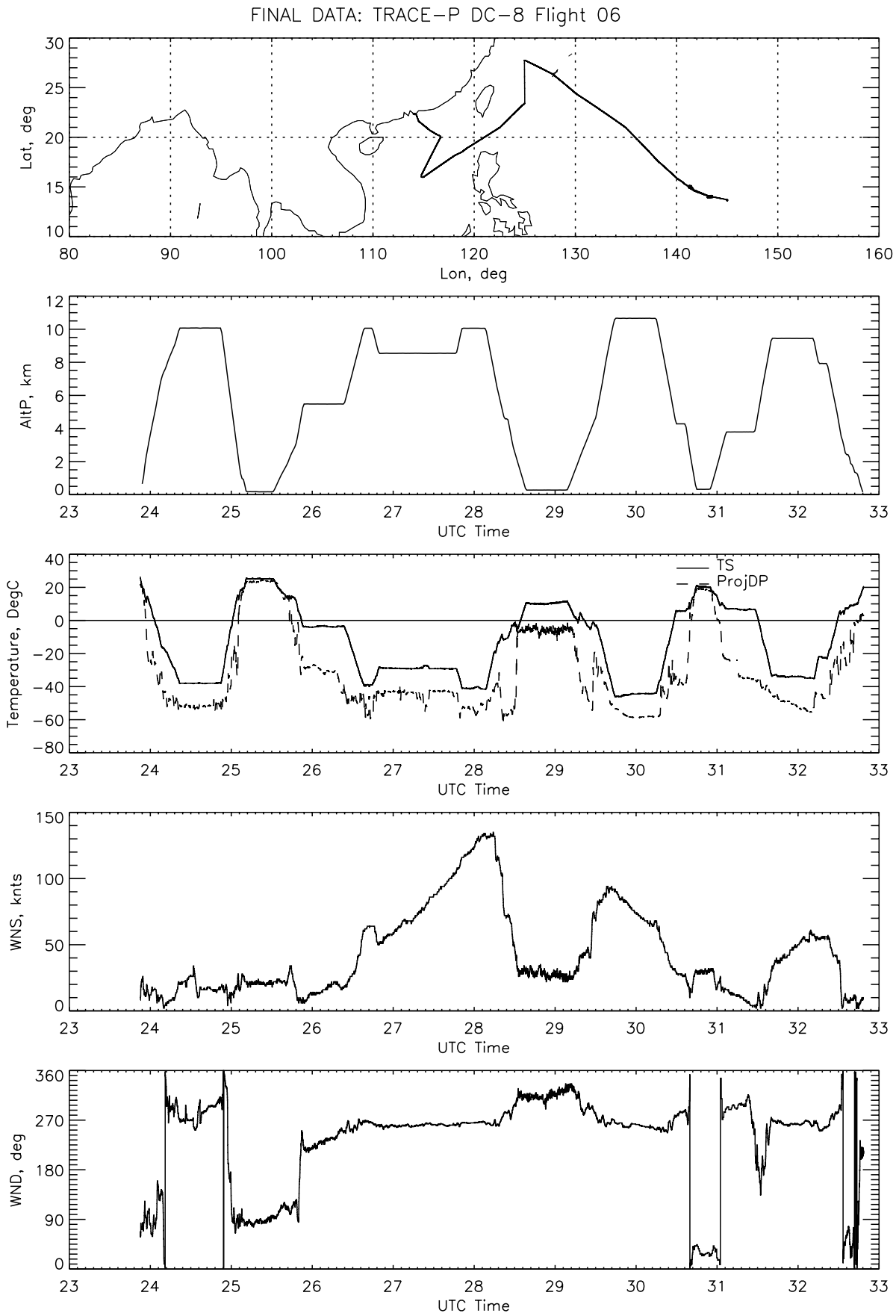
TRACE-P

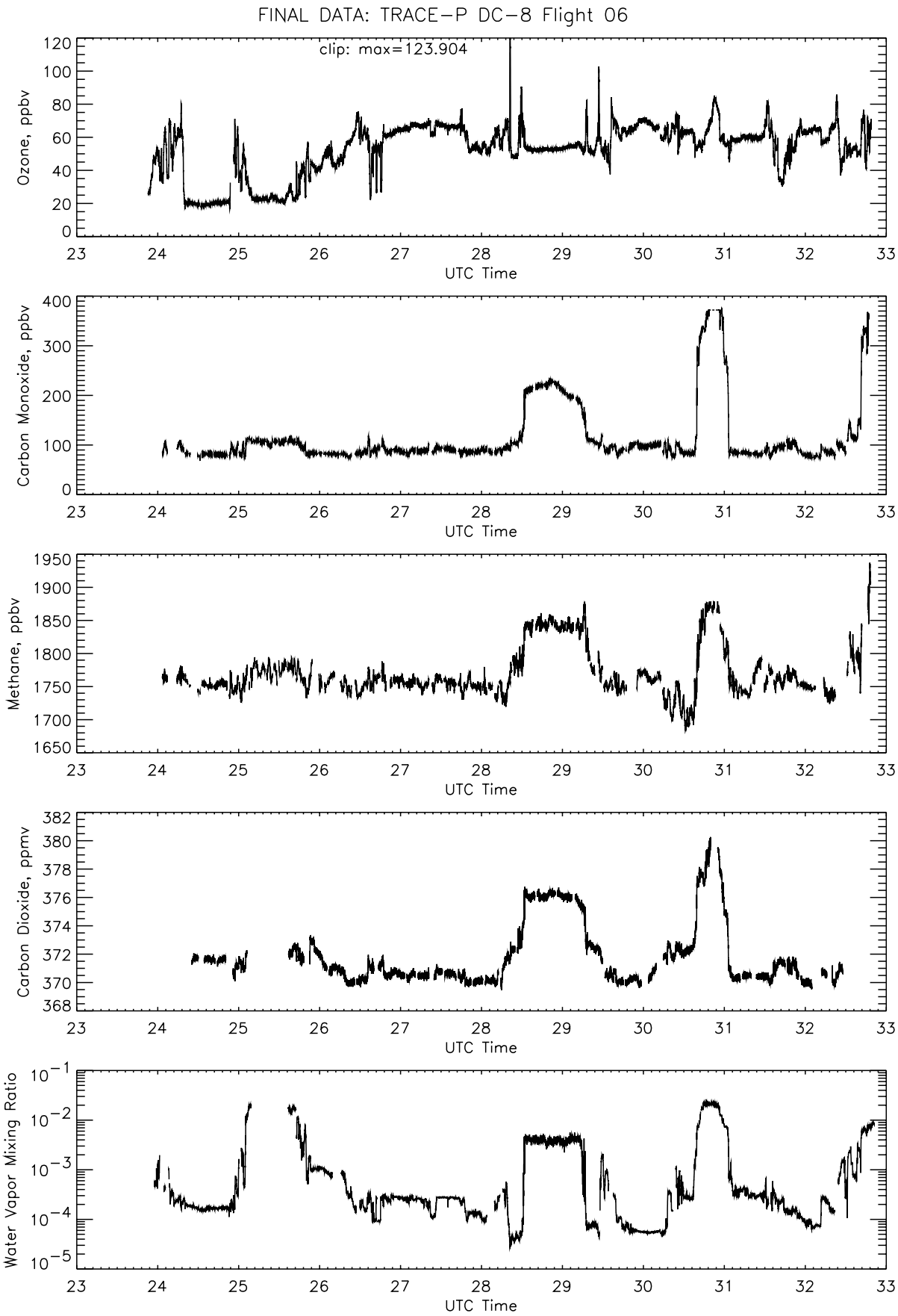
Flight 6D

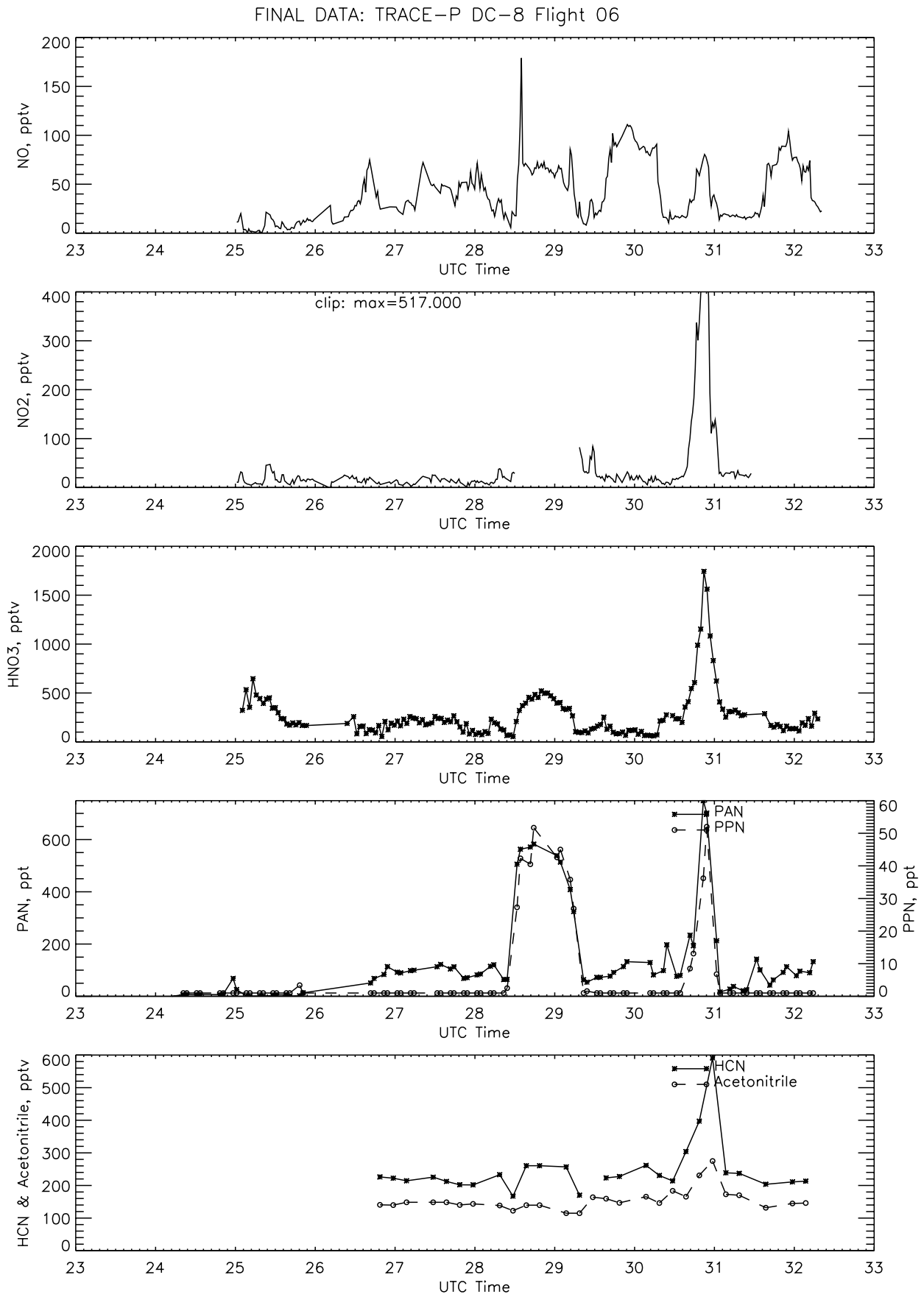
Transit: Guam to Hong Kong

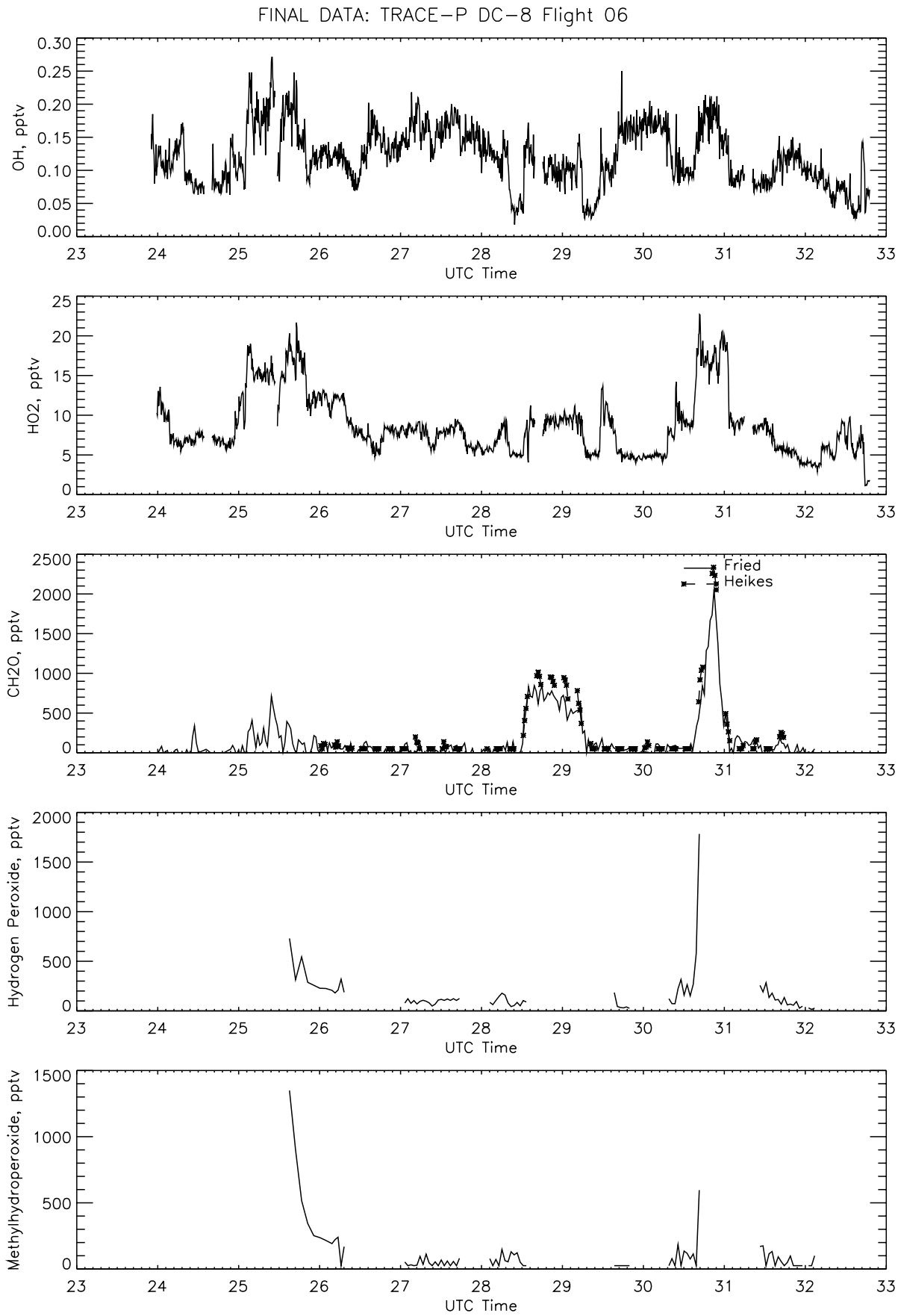
Asian Outflow: Frontal, Convective, and South China Sea

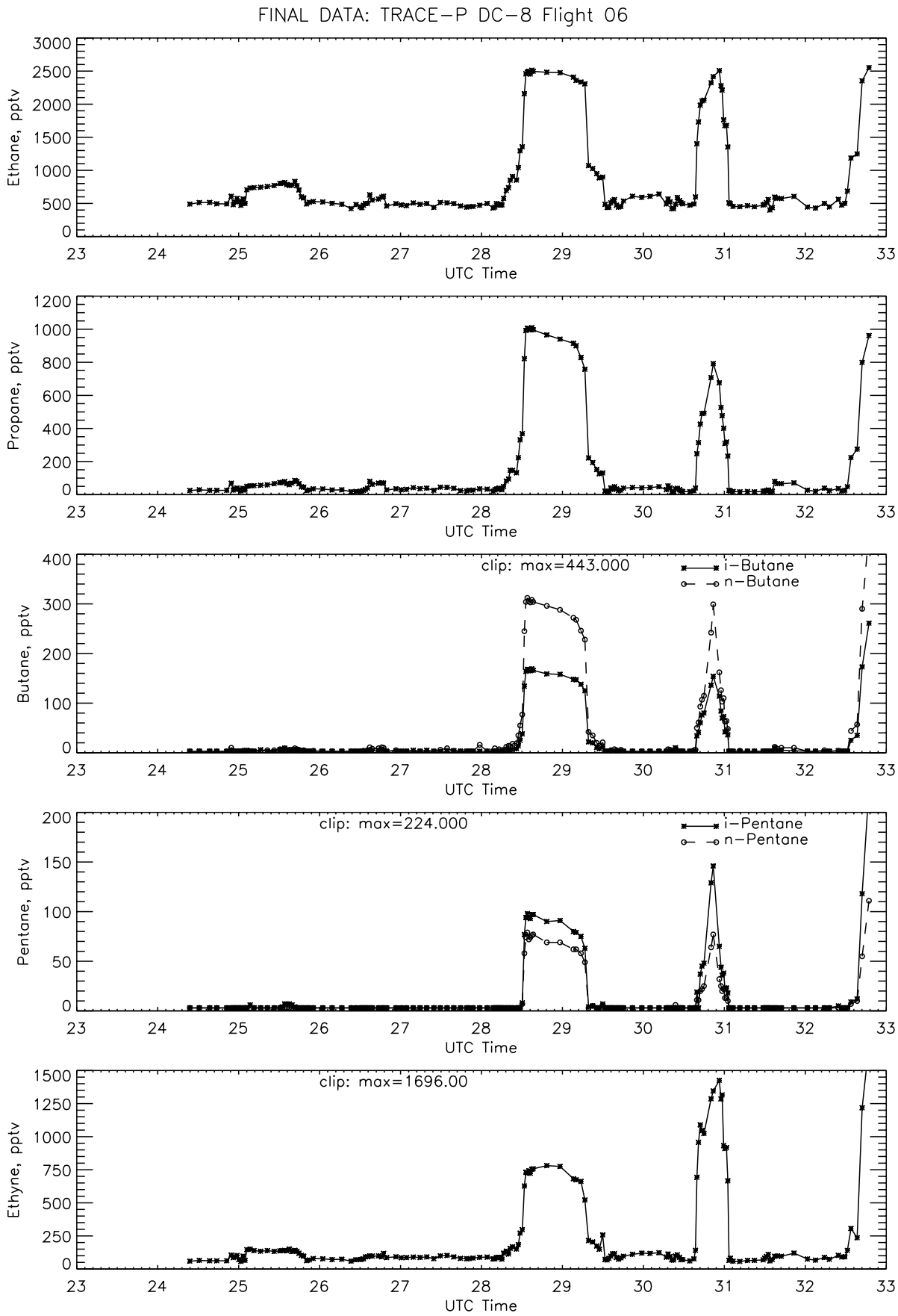
March 3, 2001

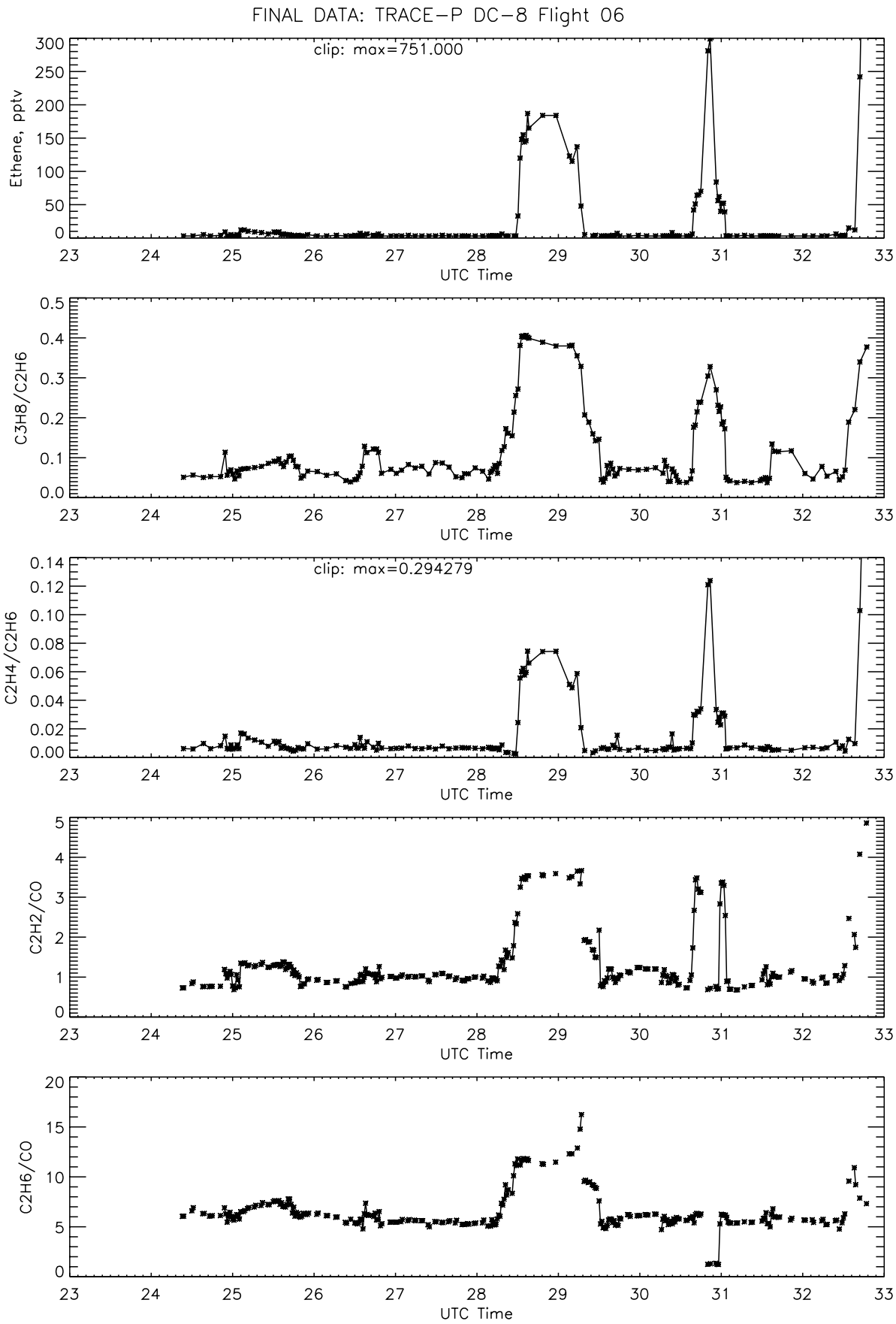

FINAL DATA: TRACE-P DC-8 Flight 06
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

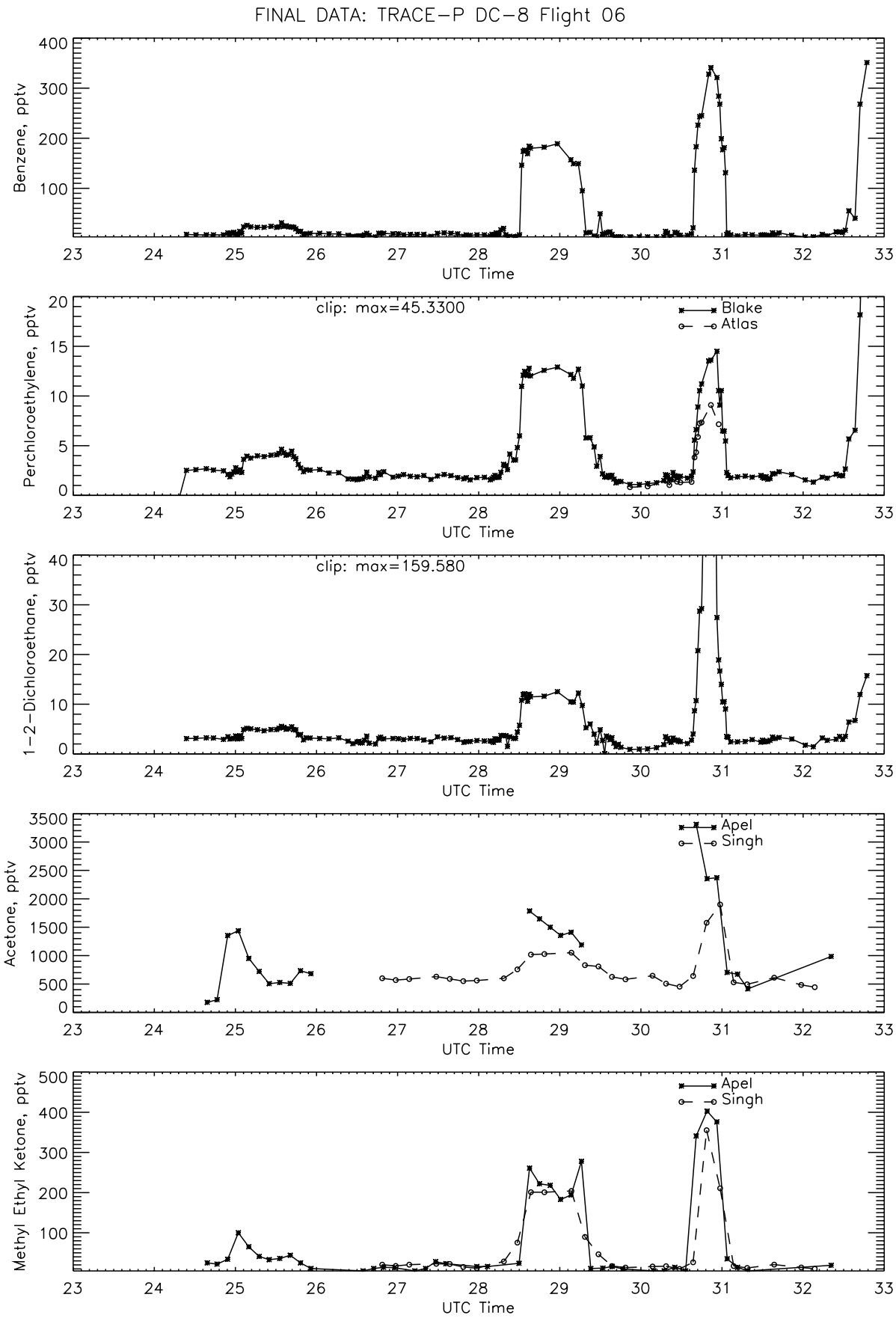

FINAL DATA: TRACE-P DC-8 Flight 06
clip: max=123.904
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
Carbon Dioxide, ppmv
Water Vapor Mixing Ratio
UTC Time

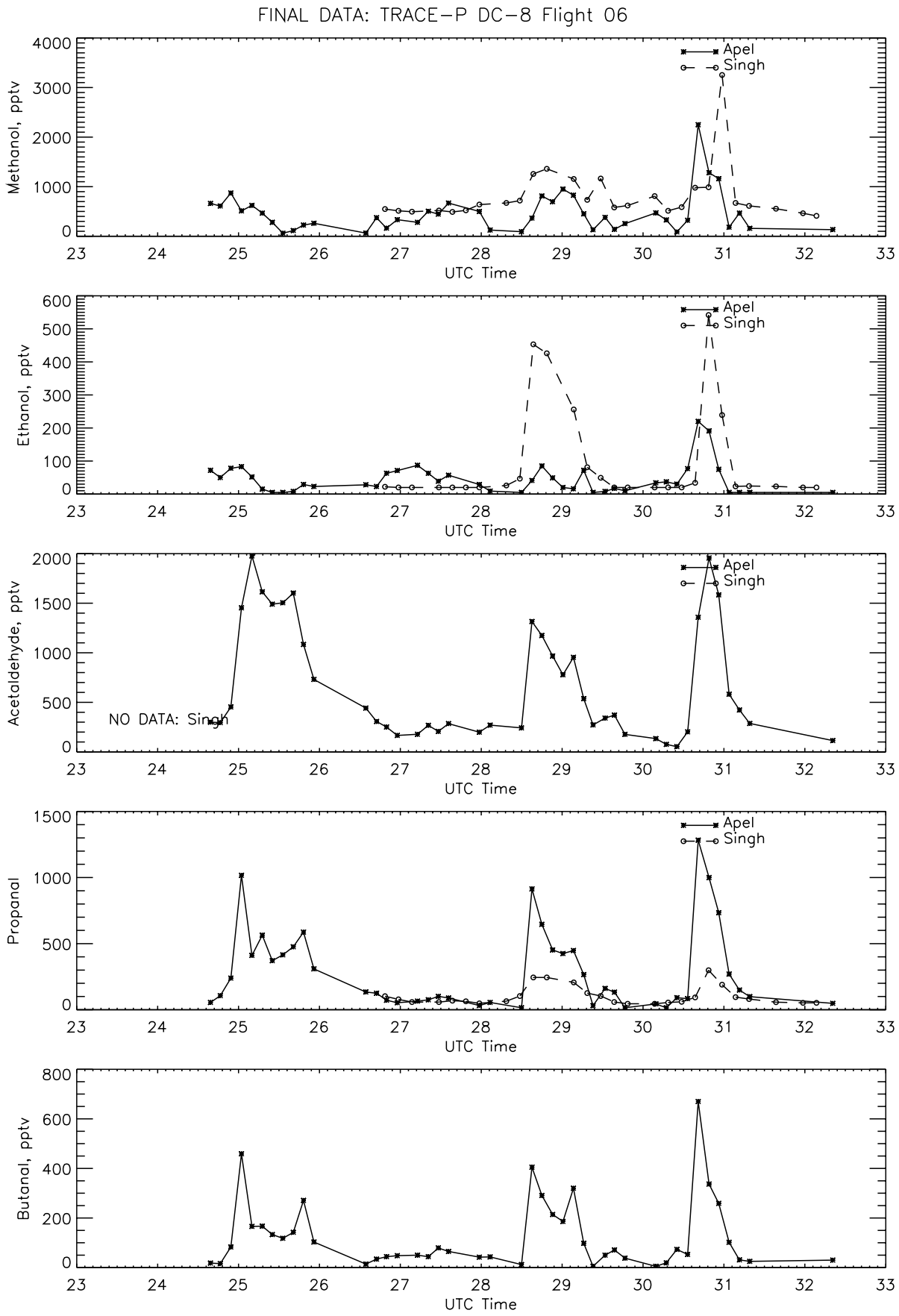

FINAL DATA: TRACE-P DC-8 Flight 06
NO, pptv
UTC Time
NO2, pptv
clip: max=517.000
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile

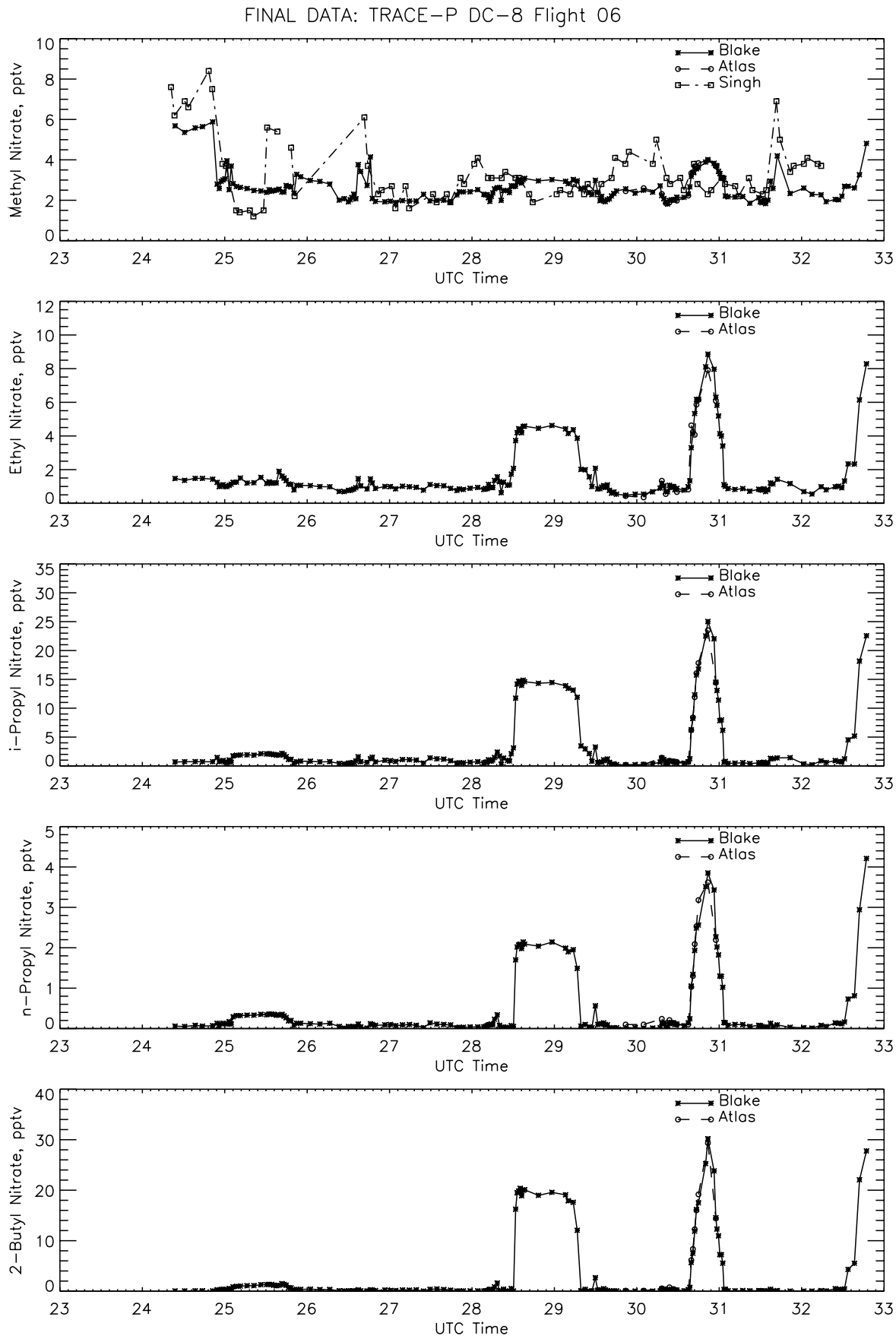

FINAL DATA: TRACE-P DC-8 Flight 06
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

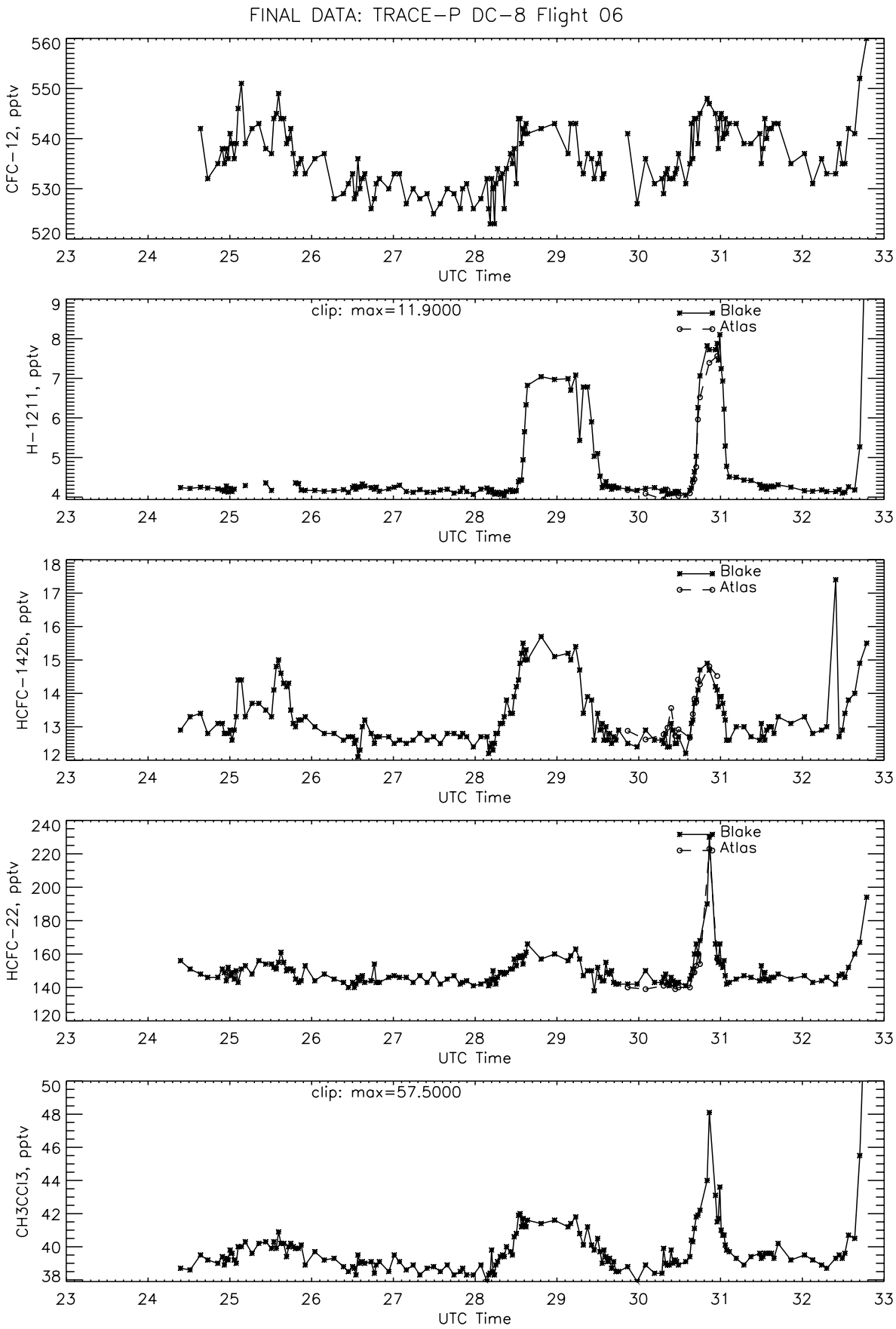

FINAL DATA: TRACE-P DC-8 Flight 06
Ethane, pptv
Propane, pptv
Butane, pptv
clip: max=443.000
i-Butane
n-Butane
Pentane, pptv
clip: max=224.000
i-Pentane
n-Pentane
Ethyne, pptv
clip: max=1696.00
UTC Time

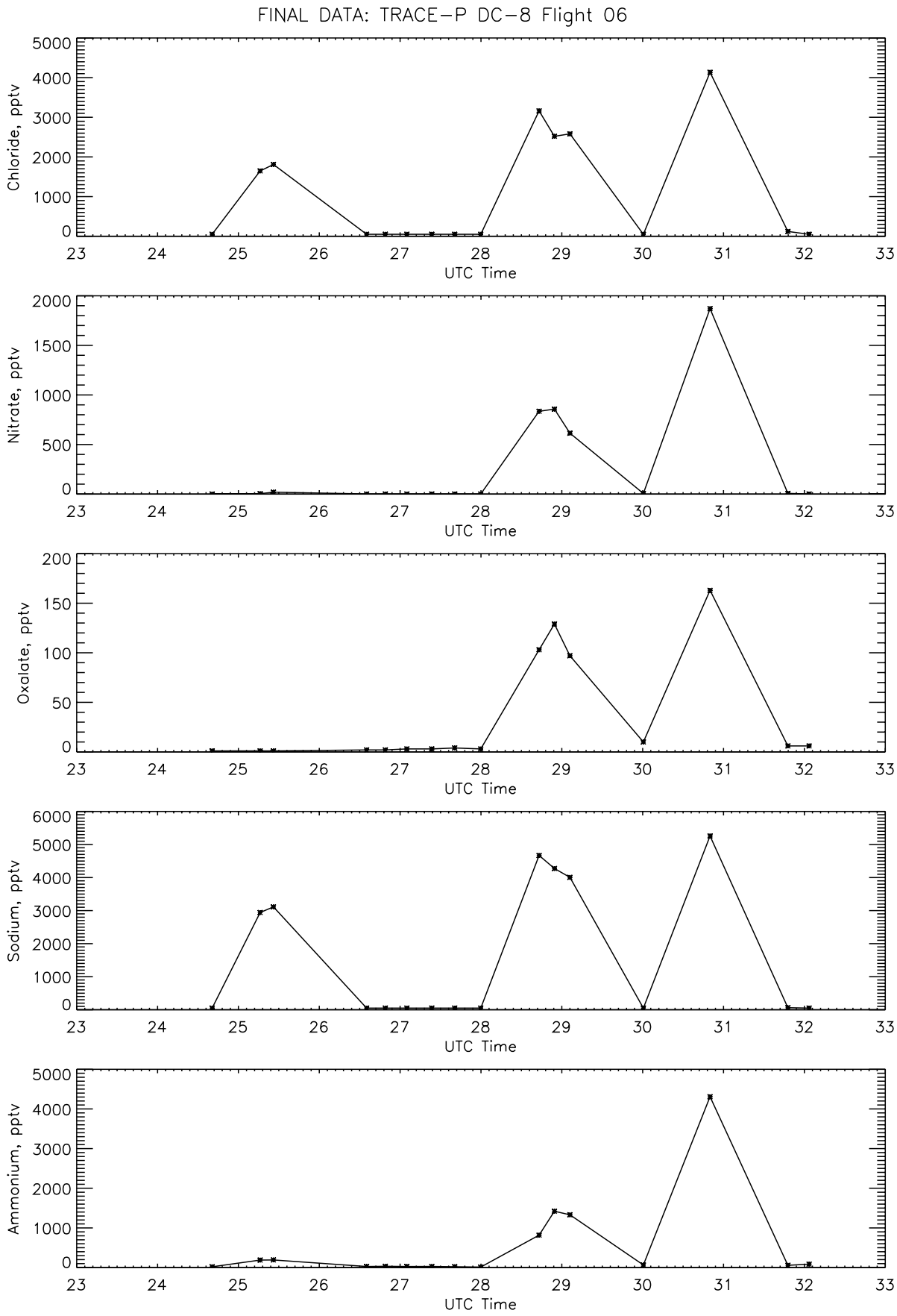

FINAL DATA: TRACE-P DC-8 Flight 06
clip: max=751.000
Ethene, pptv
UTC Time
C3H8/C2H6
UTC Time
clip: max=0.294279
C2H4/C2H6
UTC Time
C2H2/CO
UTC Time
C2H6/CO
UTC Time

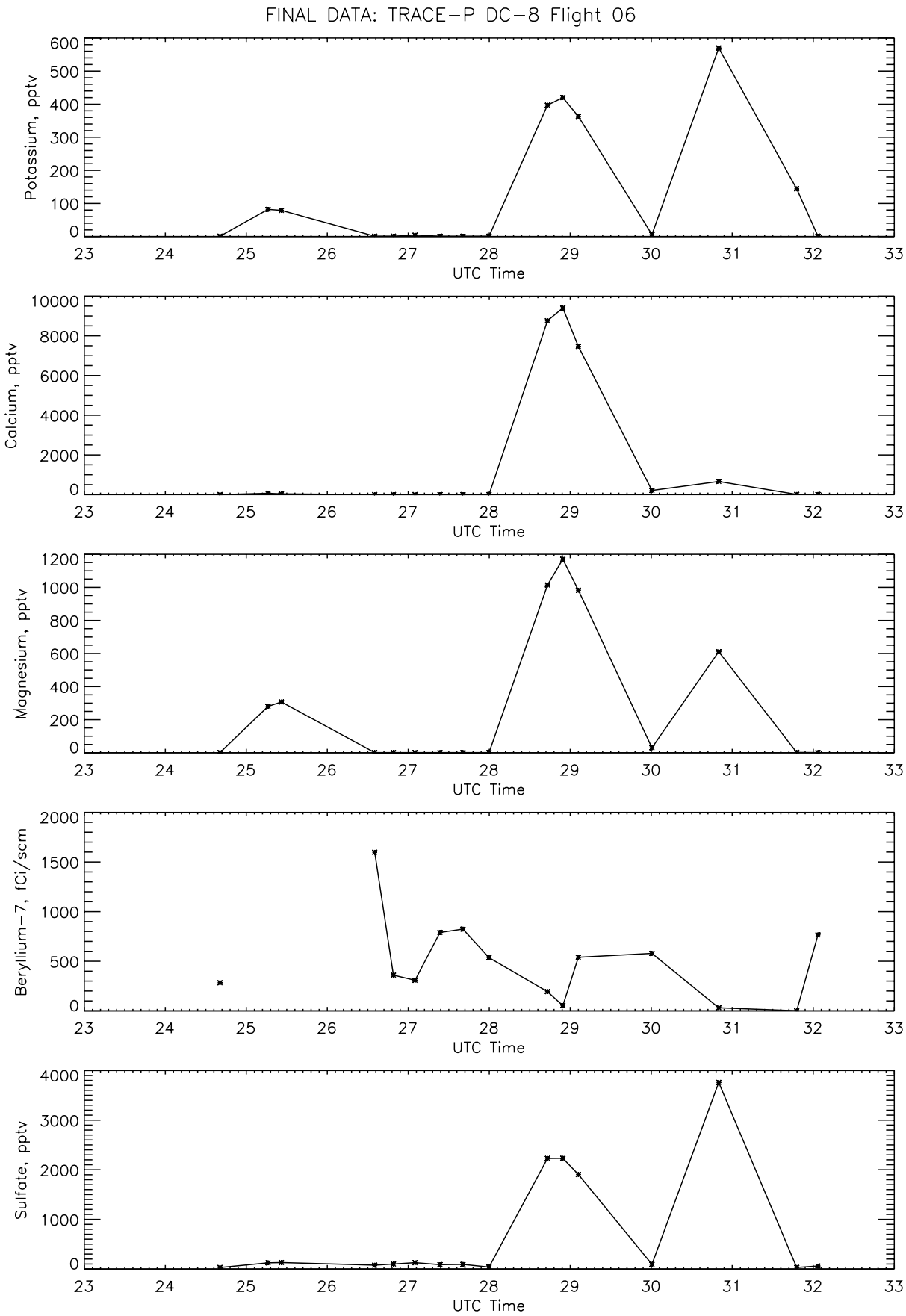

FINAL DATA: TRACE-P DC-8 Flight 06
Benzene, pptv
UTC Time
clip: max=45.3300
Blake
Atlas
Perchloroethylene, pptv
UTC Time
clip: max=159.580
1-2-Dichloroethane, pptv
UTC Time
Apel
Singh
Acetone, pptv
UTC Time
Apel
Singh
Methyl Ethyl Ketone, pptv
UTC Time

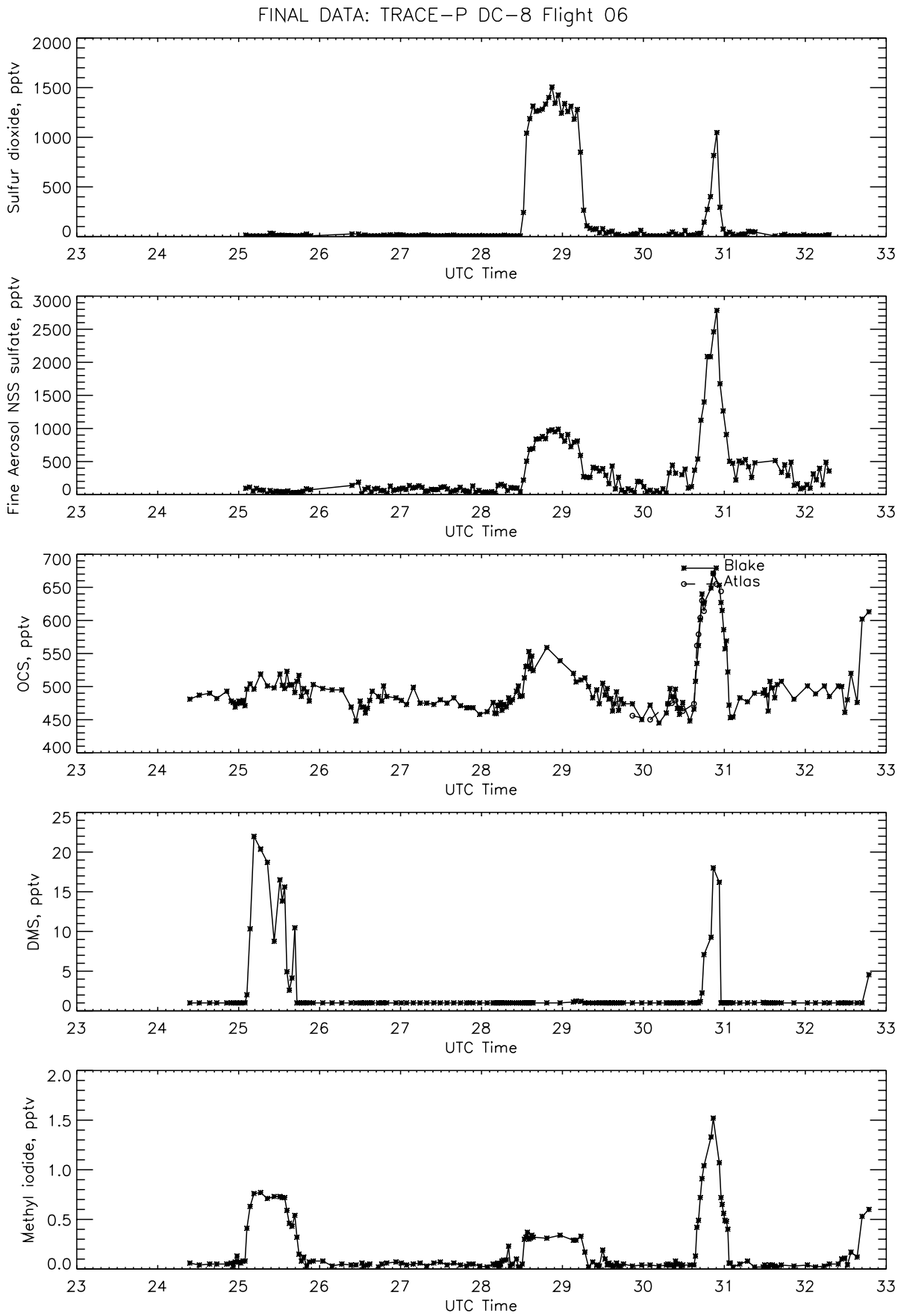

FINAL DATA: TRACE-P DC-8 Flight 06
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal
Butanal, pptv
UTC Time
Apel
Singh
NO DATA: Singh

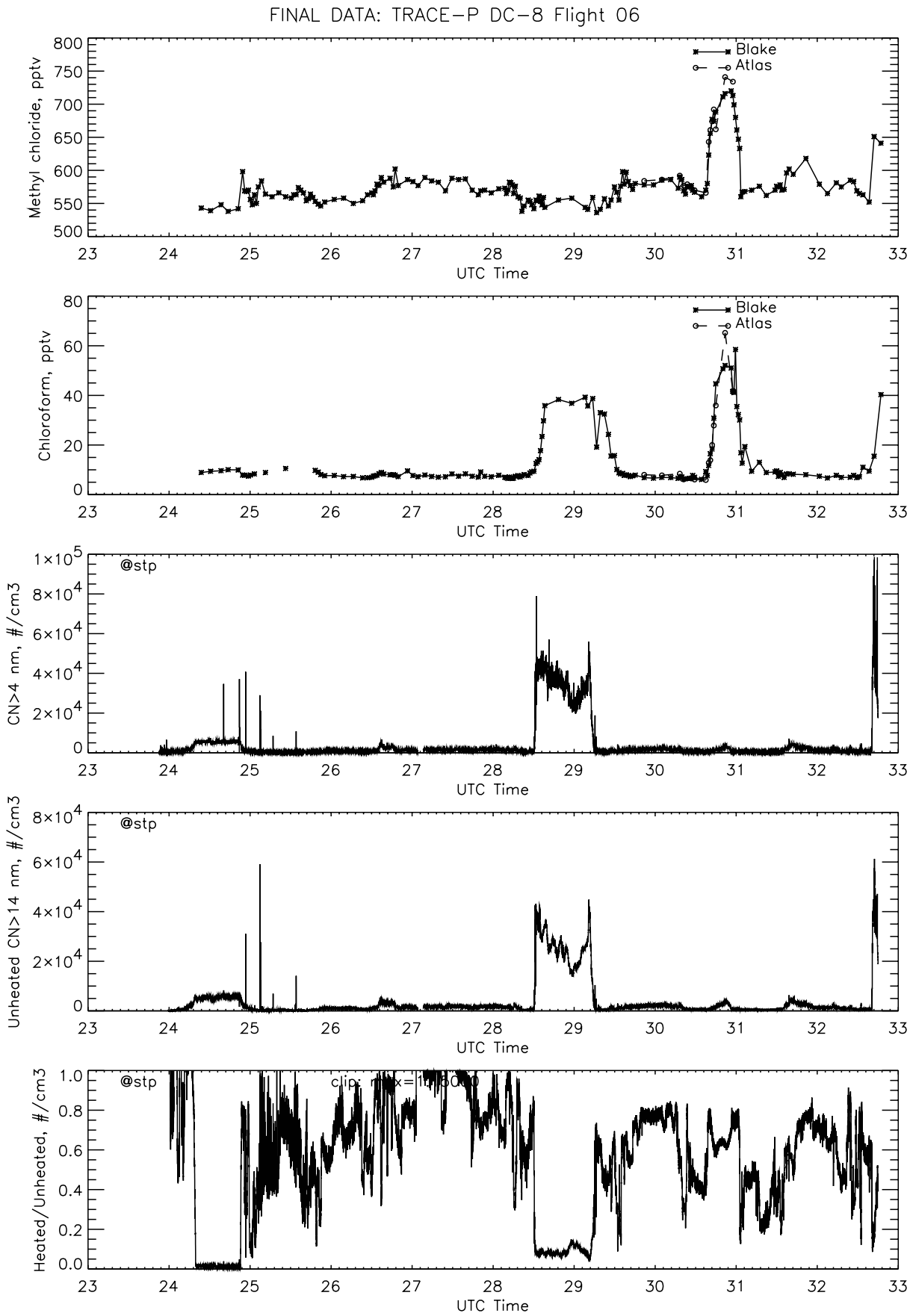

FINAL DATA: TRACE-P DC-8 Flight 06
Methyl Nitrate, pptv
Ethyl Nitrate, pptv
i-Propyl Nitrate, pptv
n-Propyl Nitrate, pptv
2-Butyl Nitrate, pptv
UTC Time
Blake
Atlas
Singh

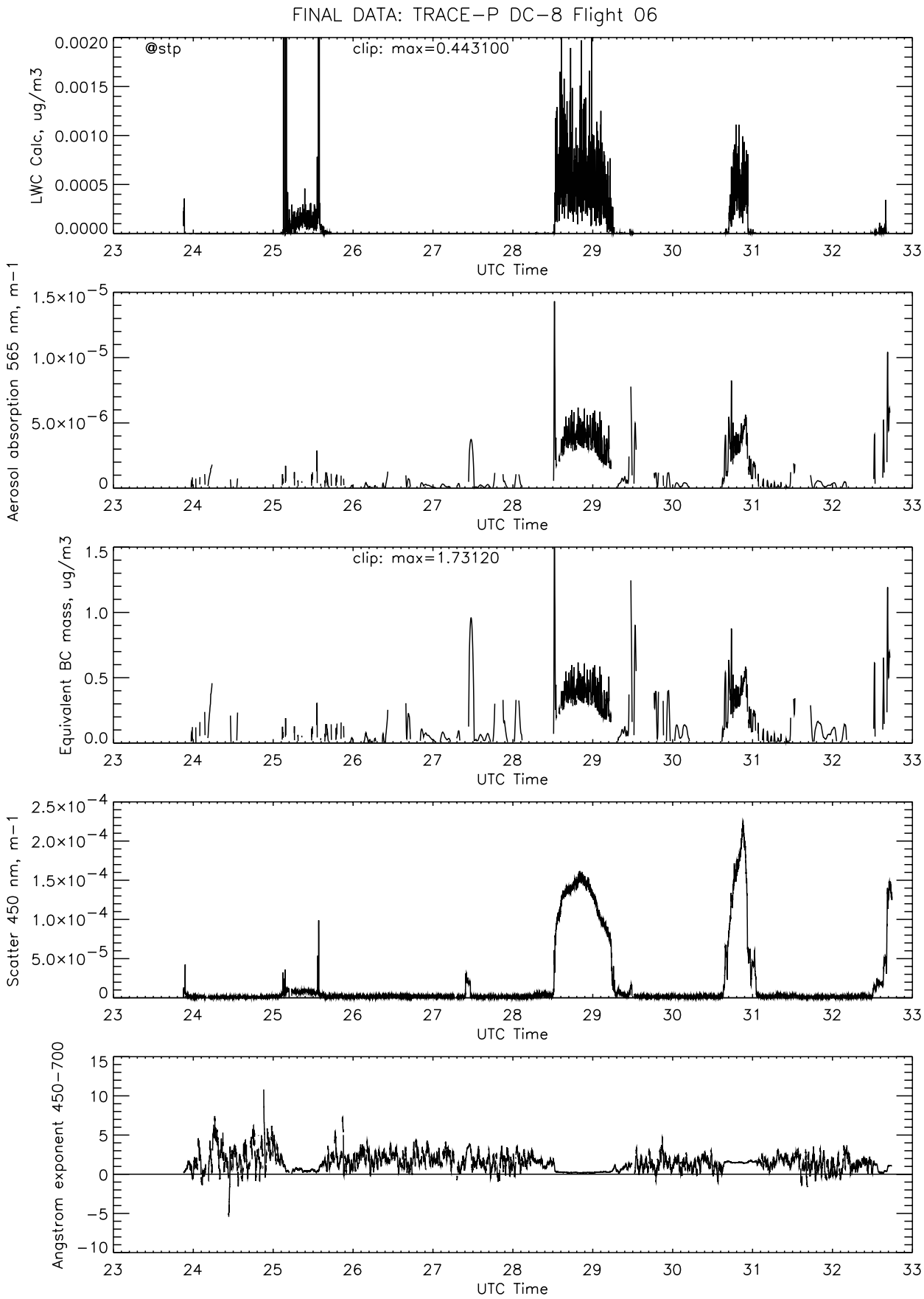

FINAL DATA: TRACE-P DC-8 Flight 06
CFC-12, pptv
UTC Time
clip: max=11.9000
Blake
Atlas
H-1211, pptv
UTC Time
Blake
Atlas
HCFC-142b, pptv
UTC Time
Blake
Atlas
HCFC-22, pptv
UTC Time
clip: max=57.5000
CH3CCl3, pptv
UTC Time

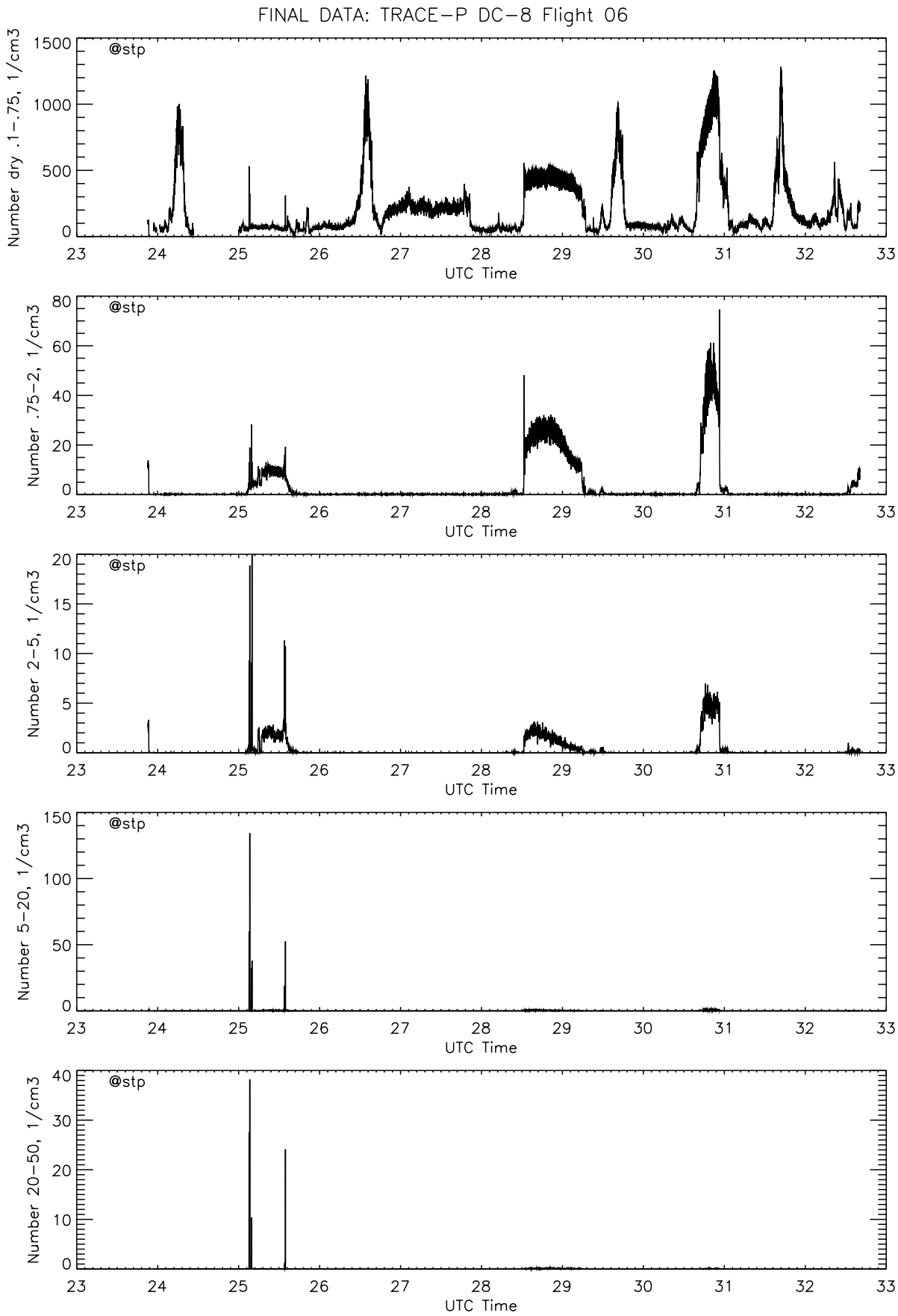

FINAL DATA: TRACE-P DC-8 Flight 06
Chloride, pptv
Nitrate, pptv
Oxalate, pptv
Sodium, pptv
Ammonium, pptv
UTC Time

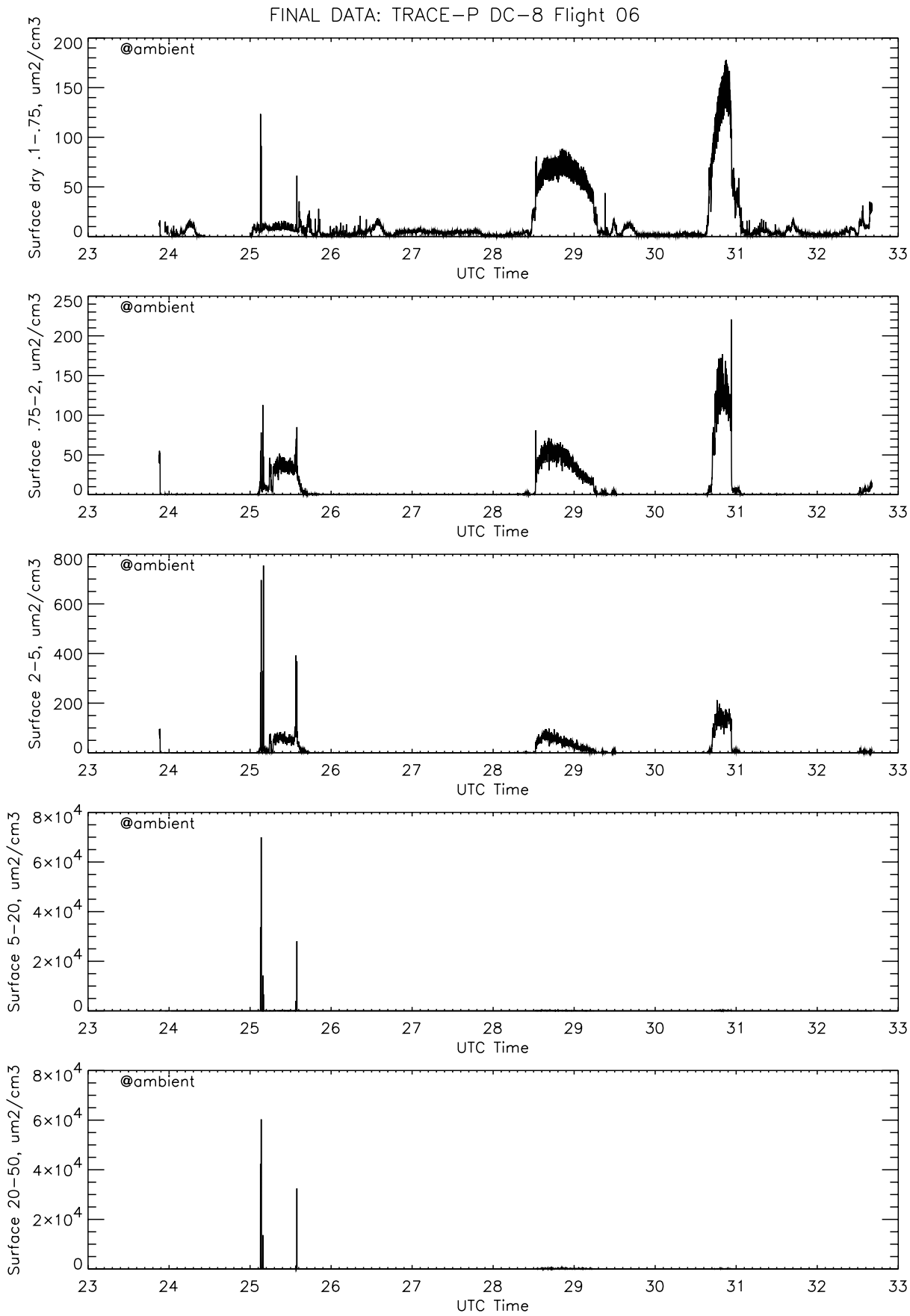

FINAL DATA: TRACE-P DC-8 Flight 06
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time

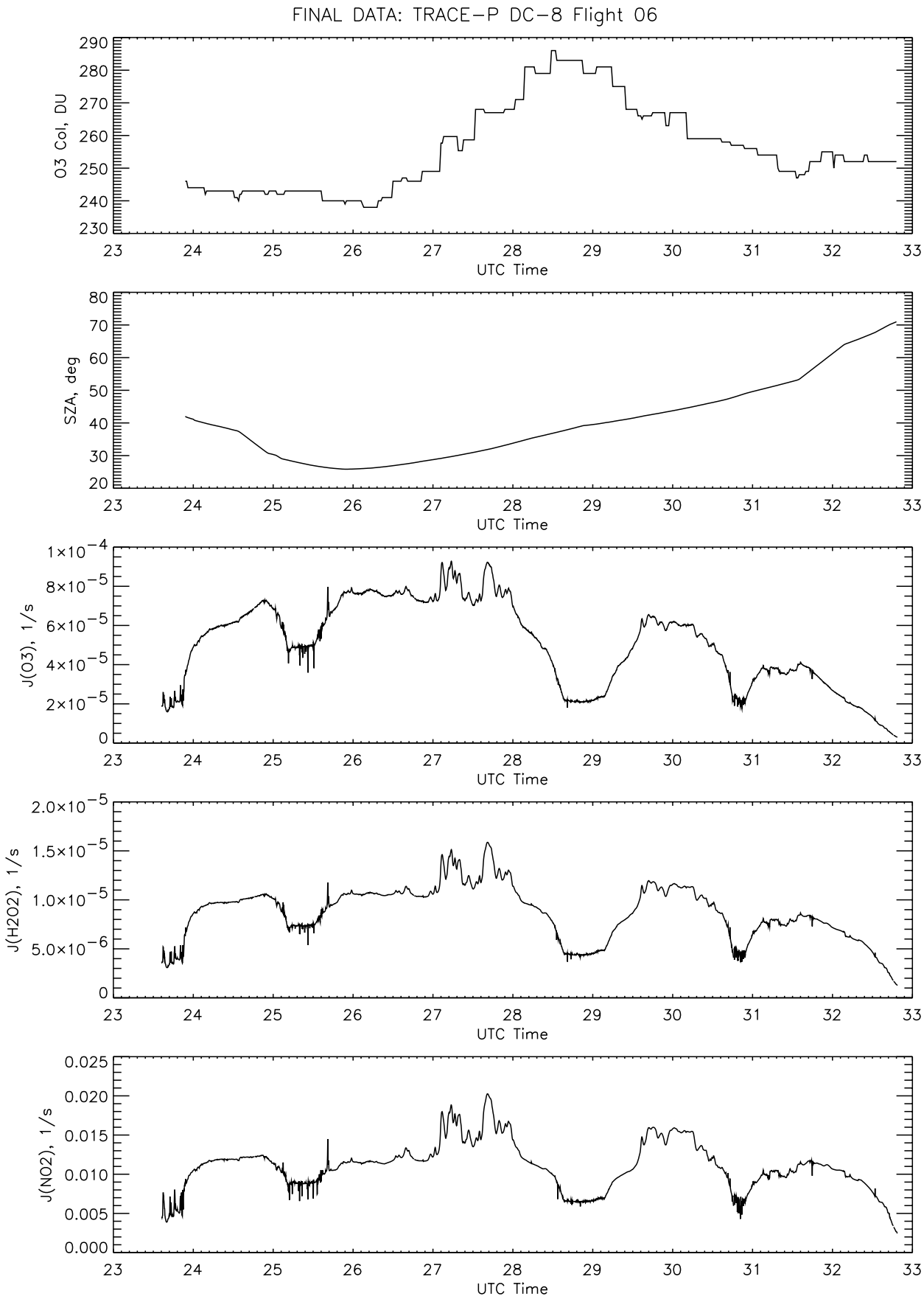

FINAL DATA: TRACE-P DC-8 Flight 06
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

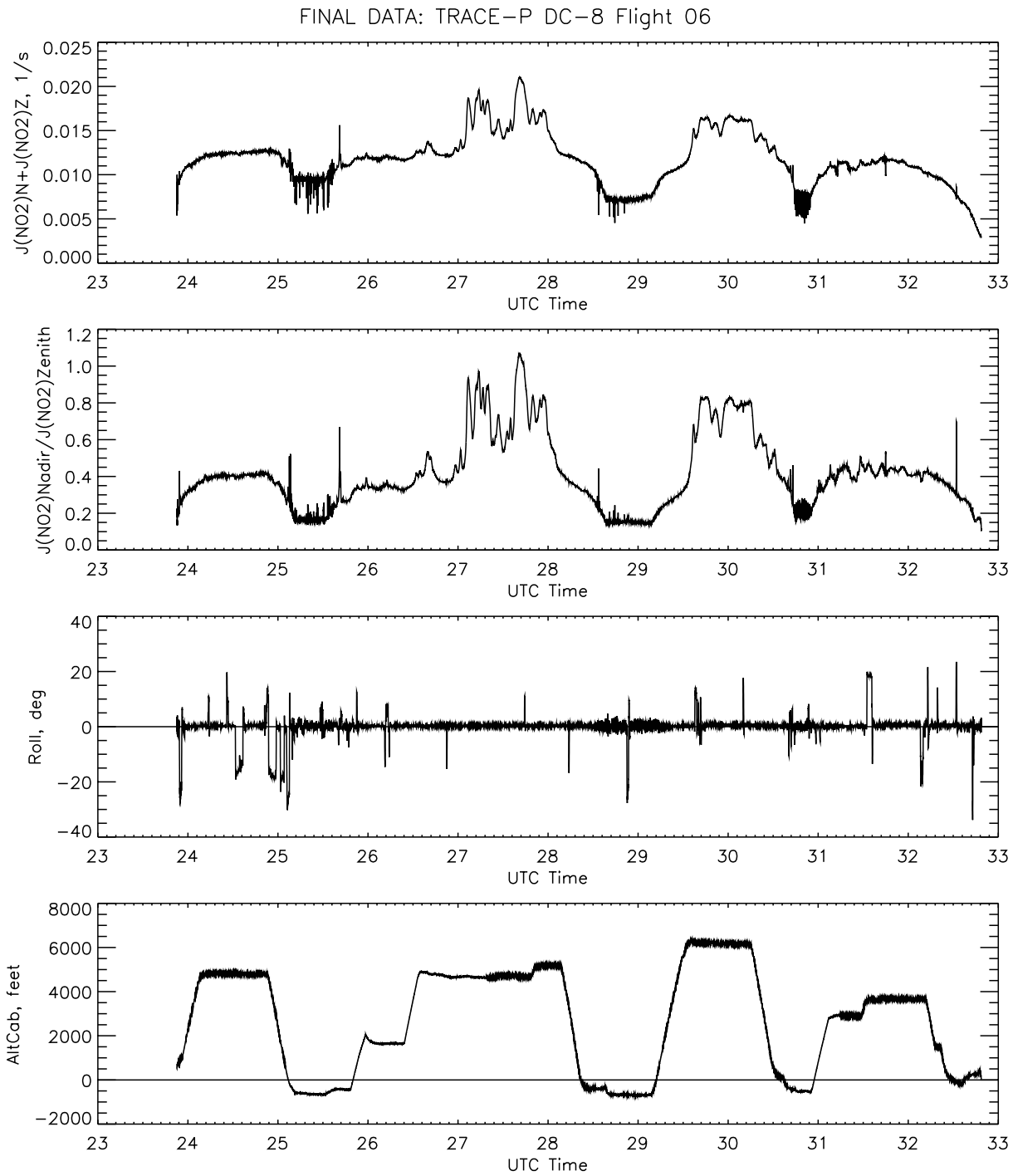

FINAL DATA: TRACE-P DC-8 Flight 06
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
UTC Time

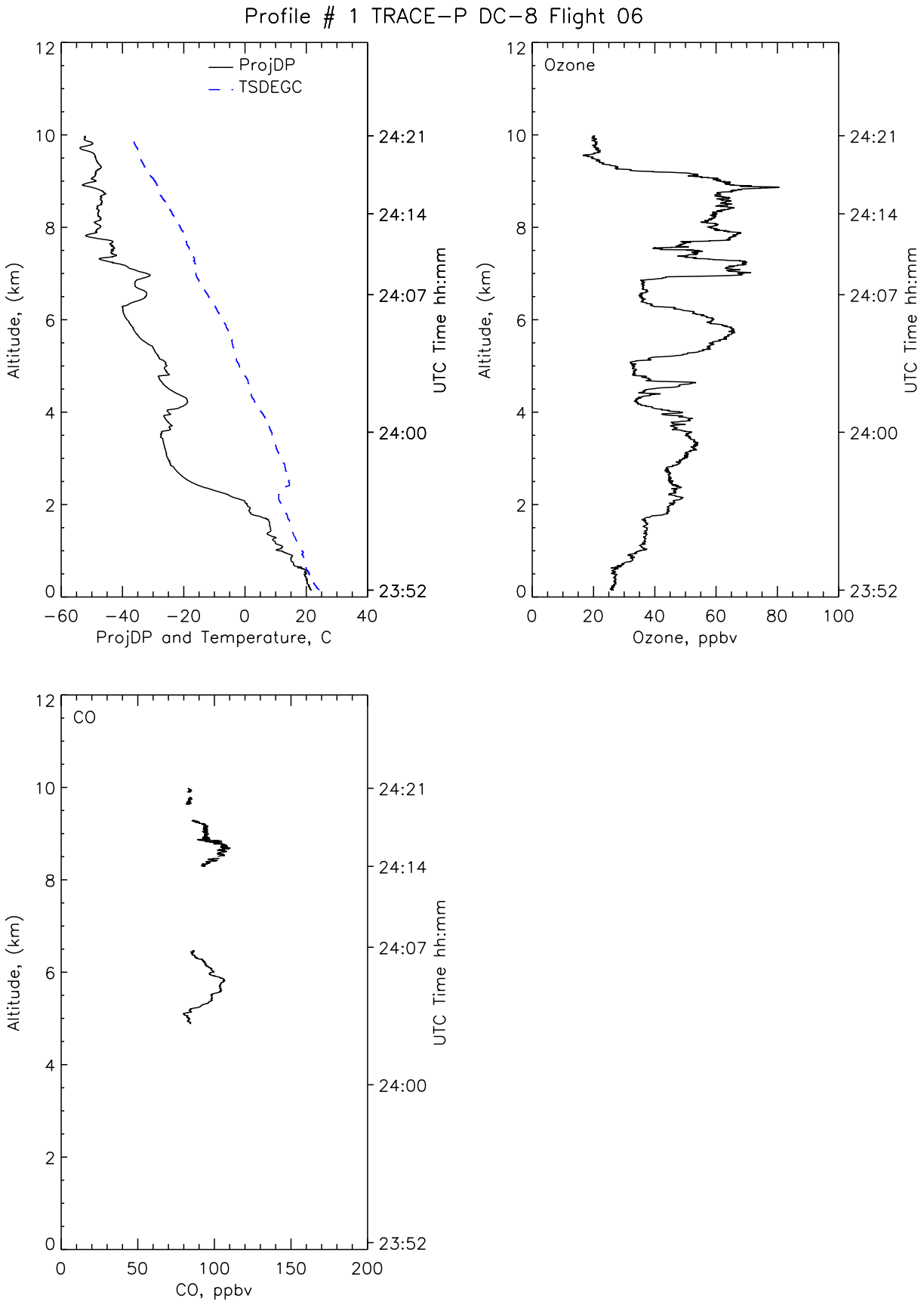

FINAL DATA: TRACE-P DC-8 Flight 06
@stp
clip: max=0.443100
LWC Calc, ug/m3
UTC Time
Aerosol absorption 565 nm, m-1
UTC Time
clip: max=1.73120
Equivalent BC mass, ug/m3
UTC Time
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

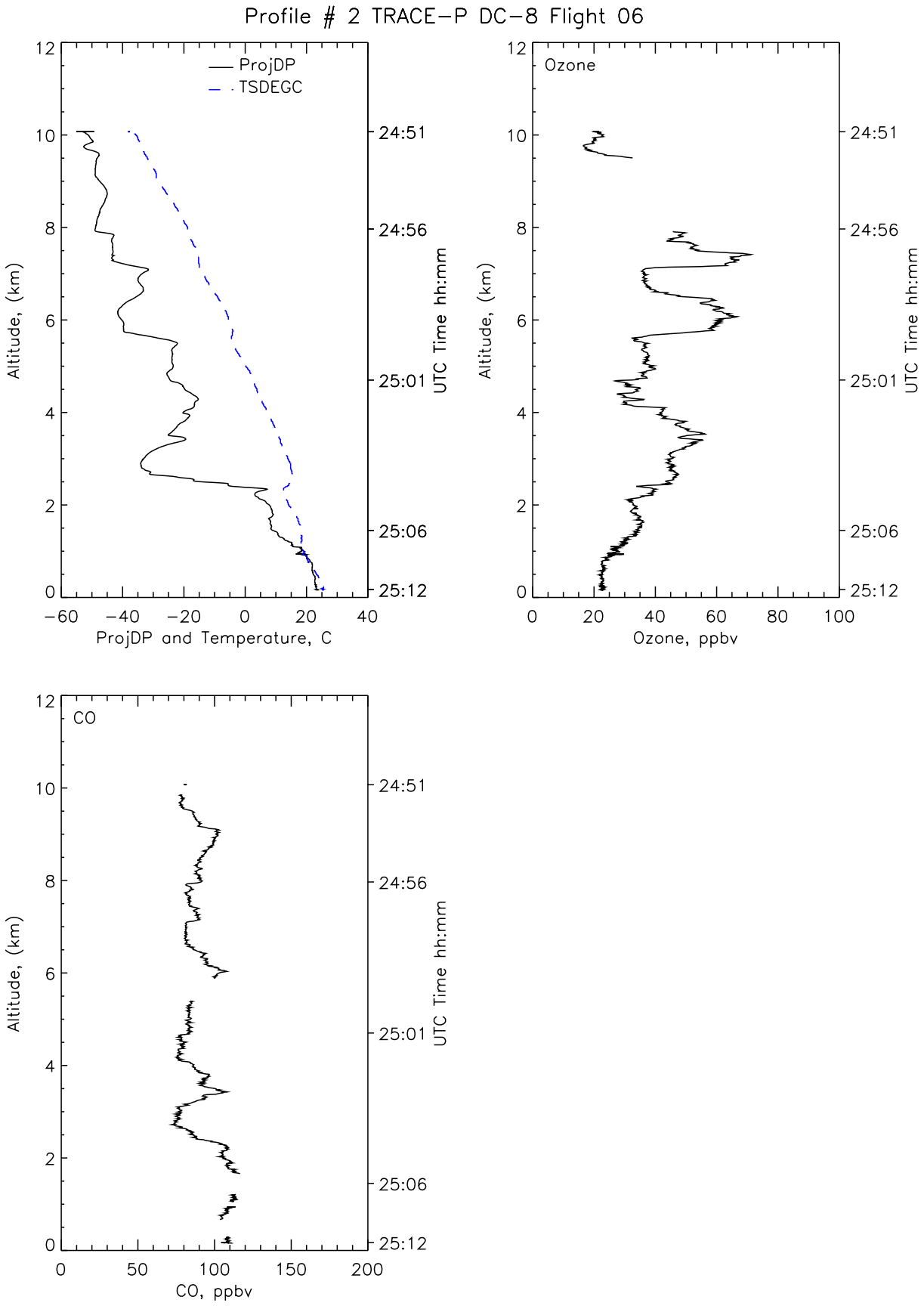

FINAL DATA: TRACE-P DC-8 Flight 06
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

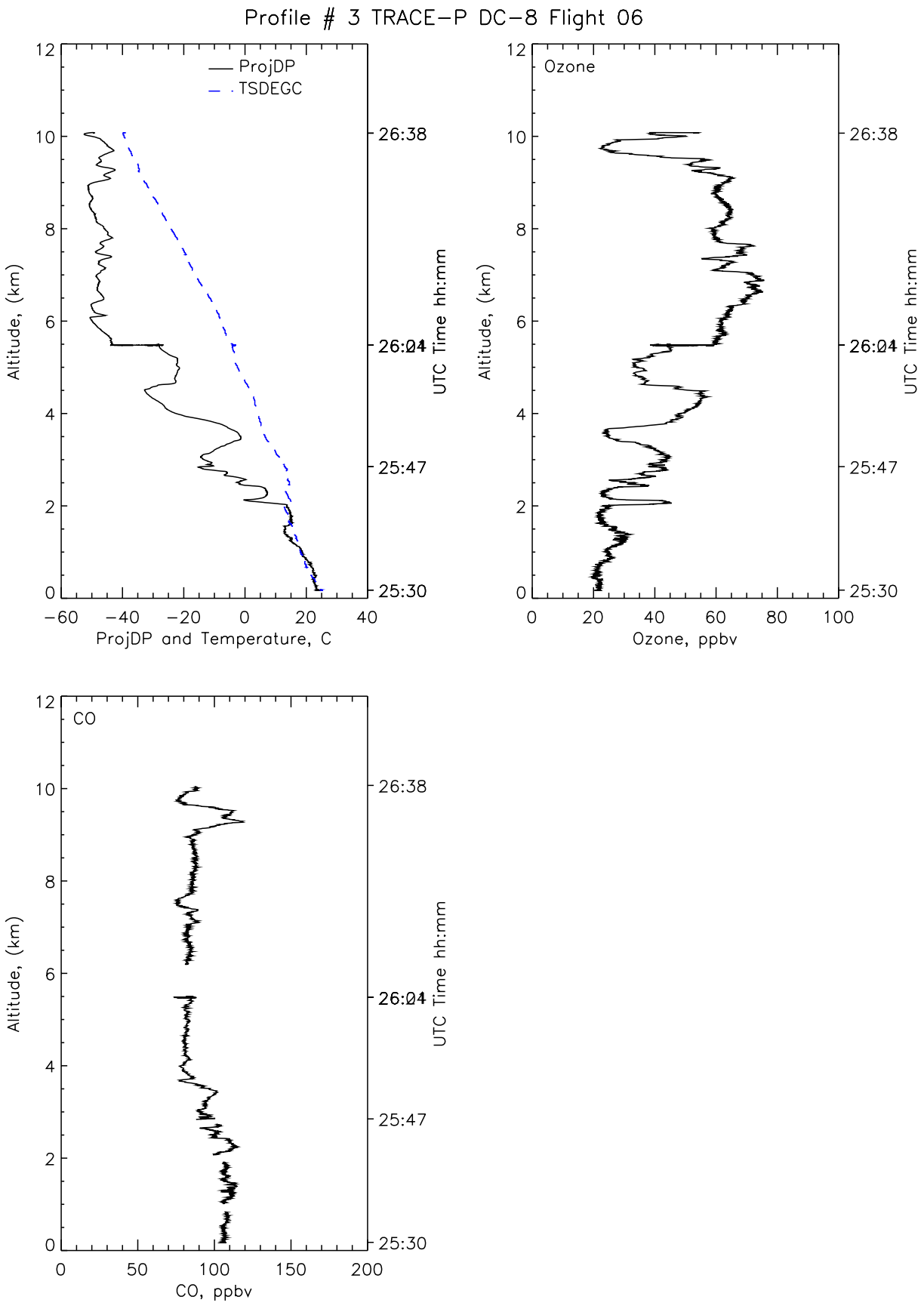

FINAL DATA: TRACE-P DC-8 Flight 06
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

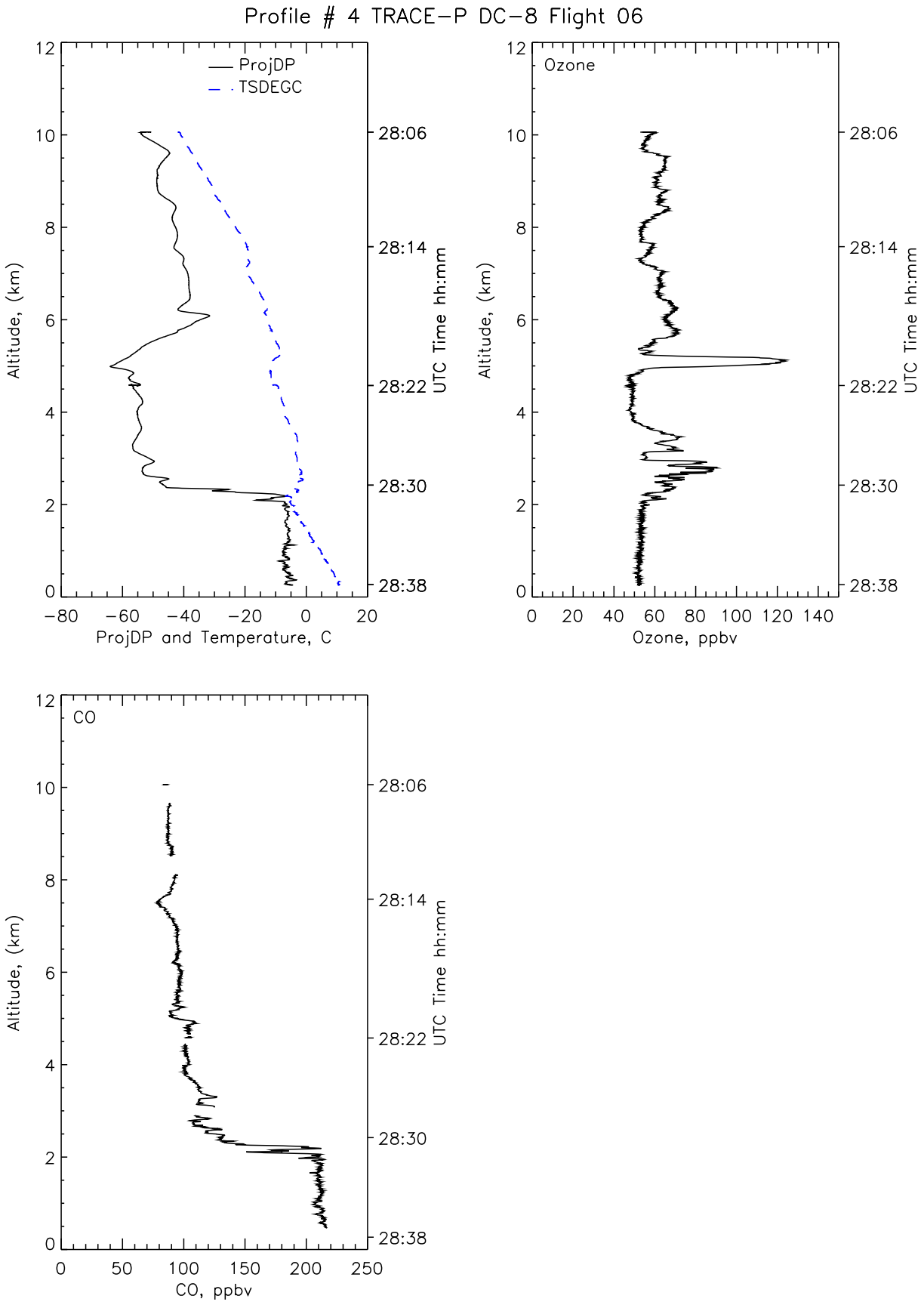

FINAL DATA: TRACE-P DC-8 Flight 06
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

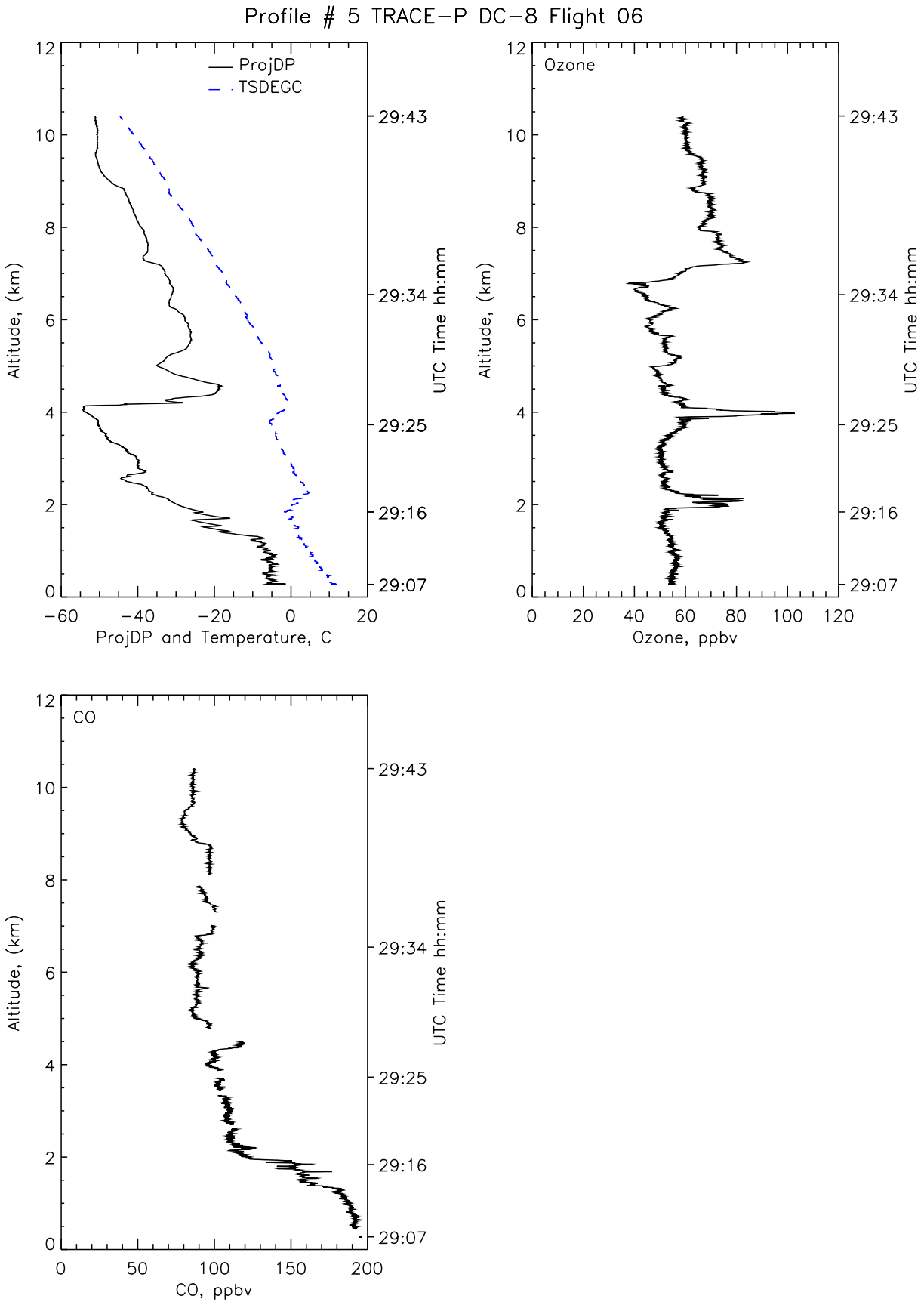

FINAL DATA: TRACE-P DC-8 Flight 06
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
23
24
25
26
27
28
29
30
31
32
33
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.2
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
40
20
0
−20
−40
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
UTC Time

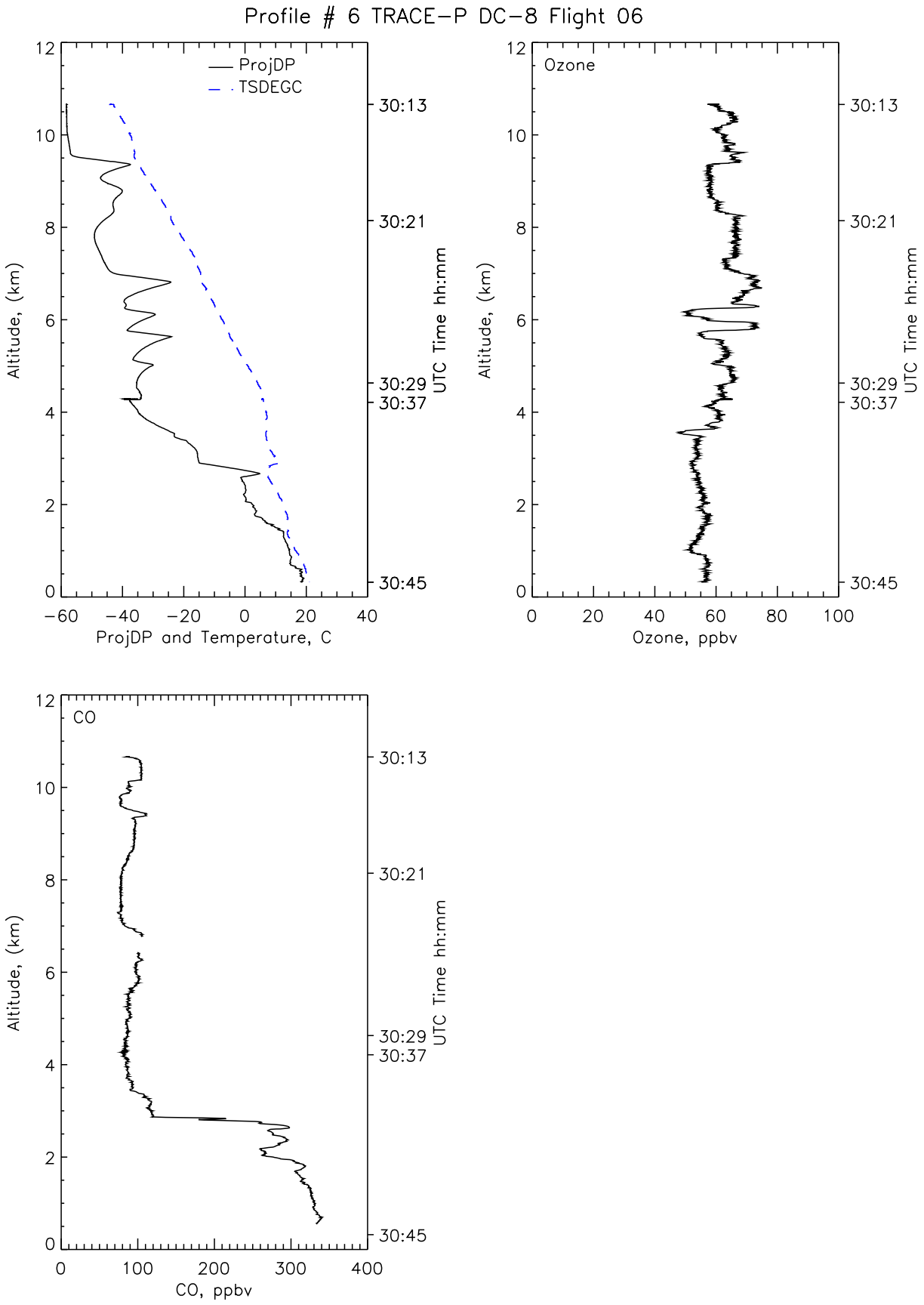

Profile # 1 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

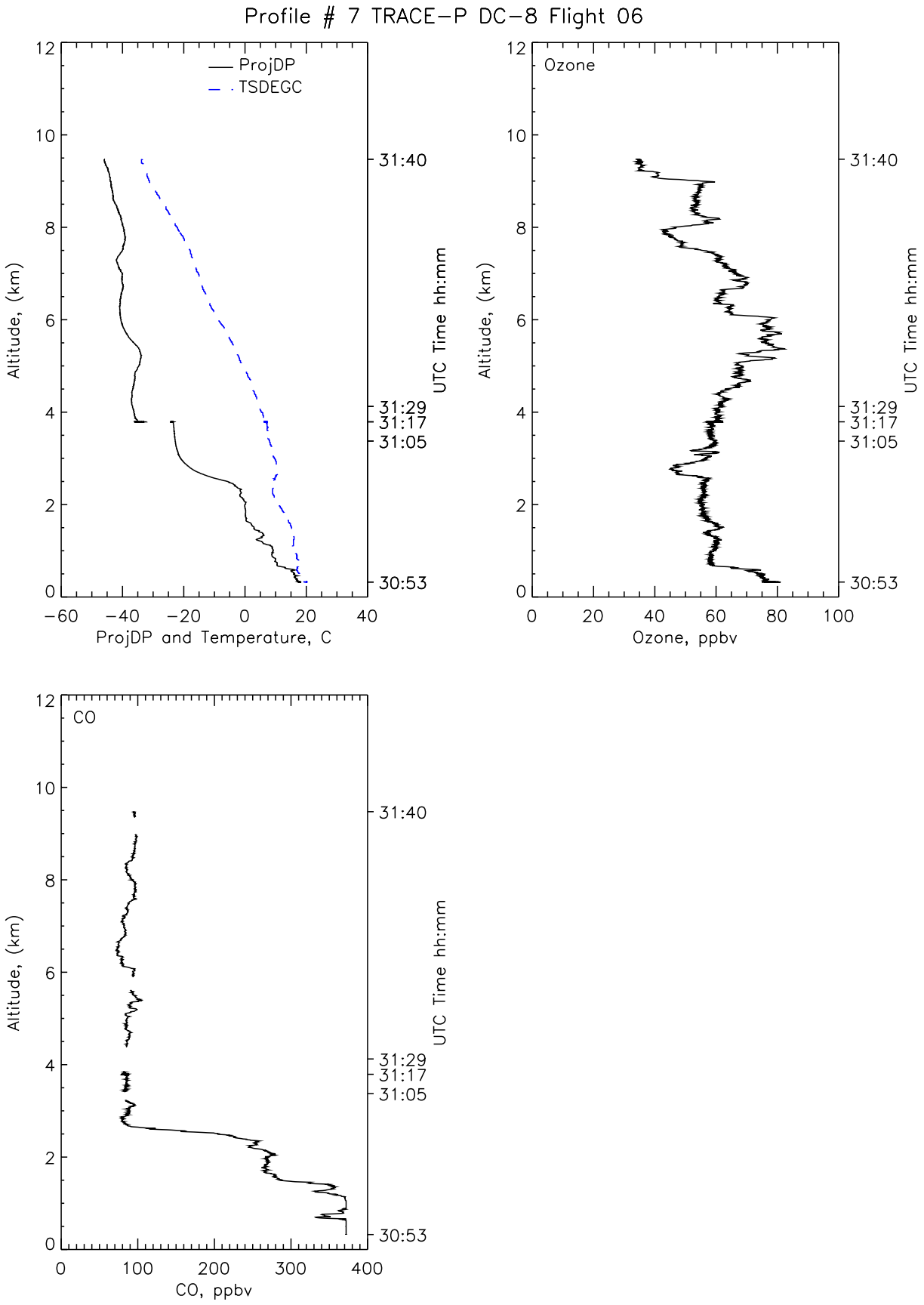

Profile # 2 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

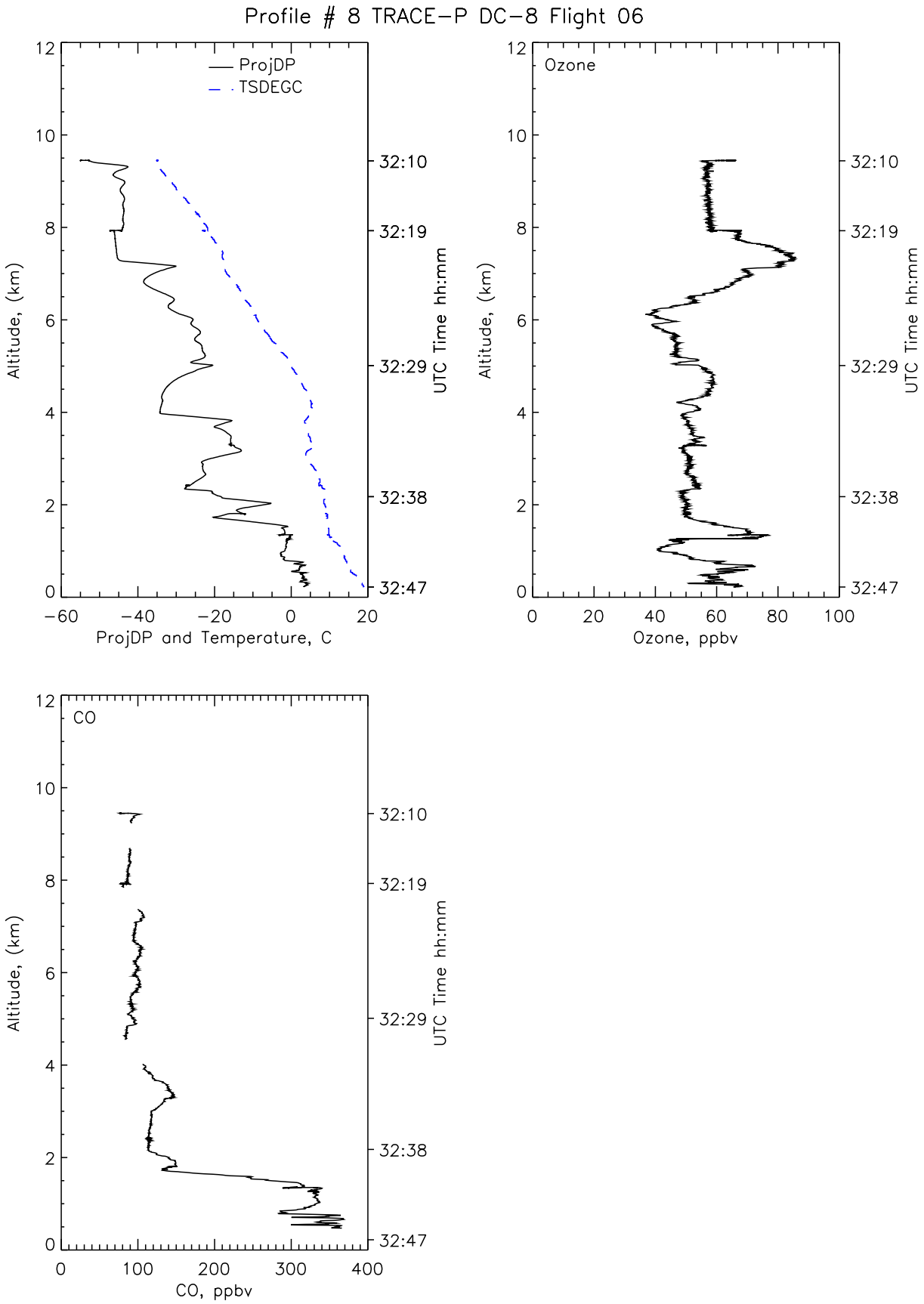

Profile # 3 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
26:38
26:04
25:47
25:30
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
28:06
28:14
28:22
28:30
28:38
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 5 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
29:43
29:34
29:25
29:16
29:07
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 6 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
30:13
30:21
30:29
30:37
30:45
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 7 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
31:40
31:29
31:17
31:05
30:53
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 8 TRACE-P DC-8 Flight 06
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
32:10
32:19
32:29
32:38
32:47
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

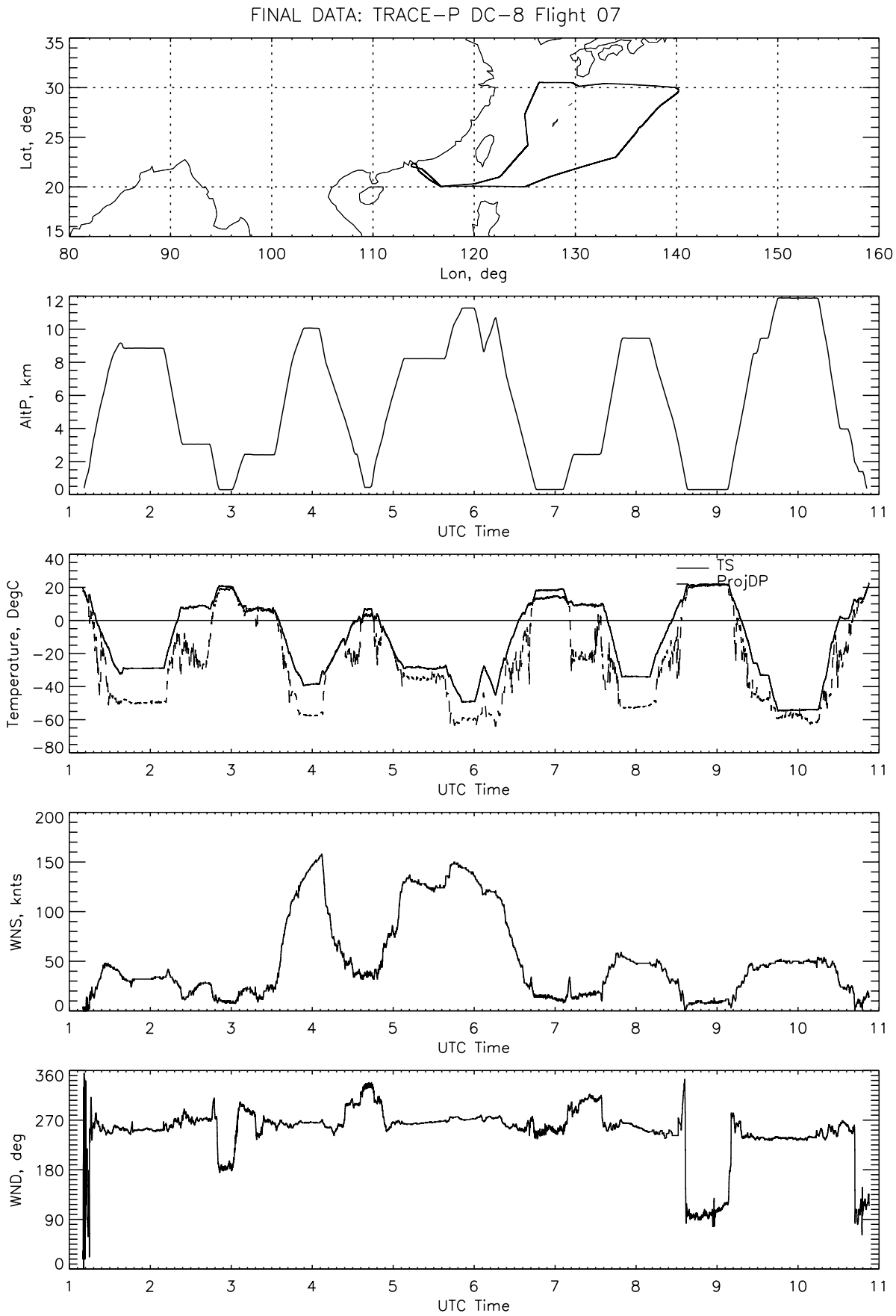
TRACE-P

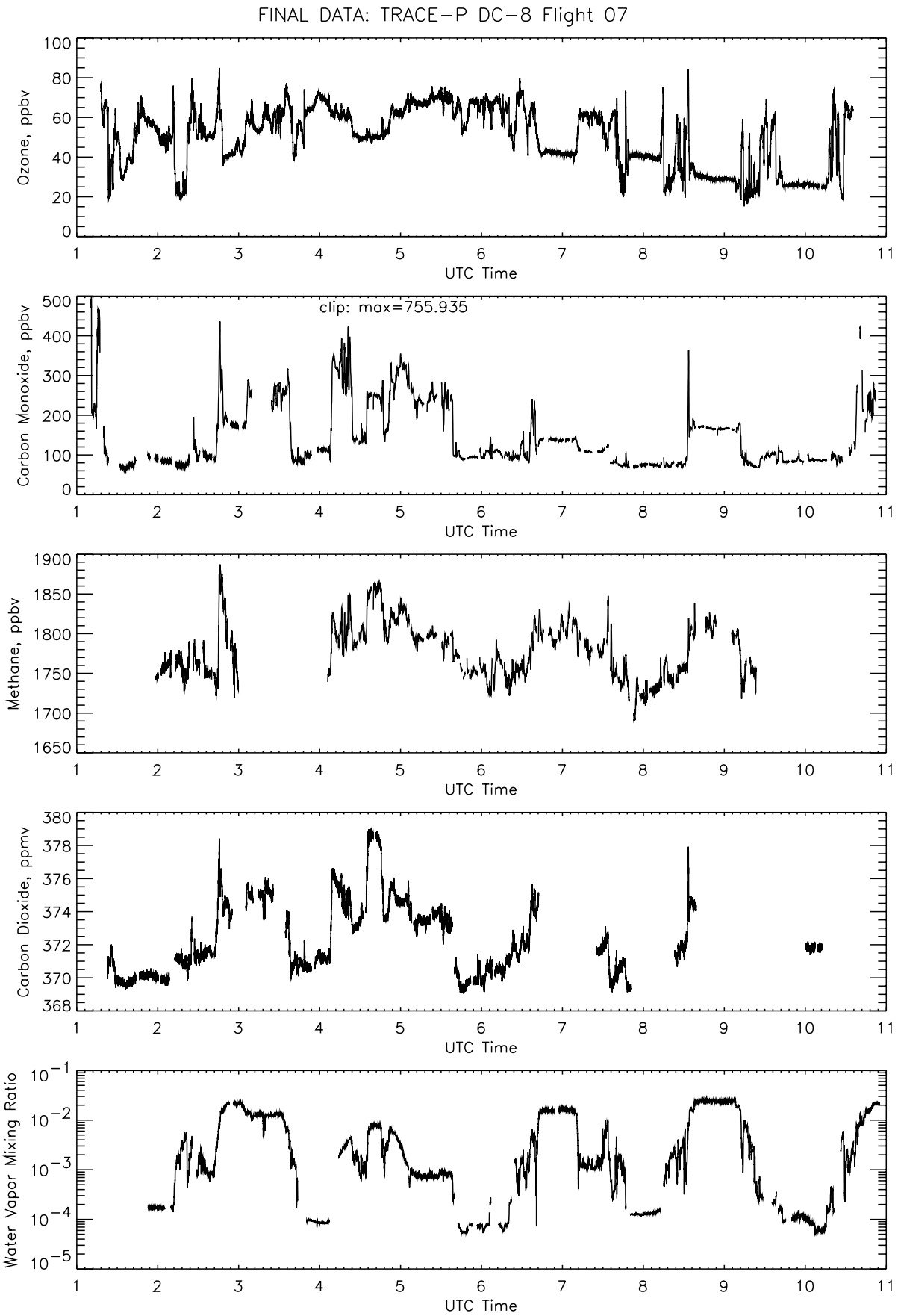
Flight 7D

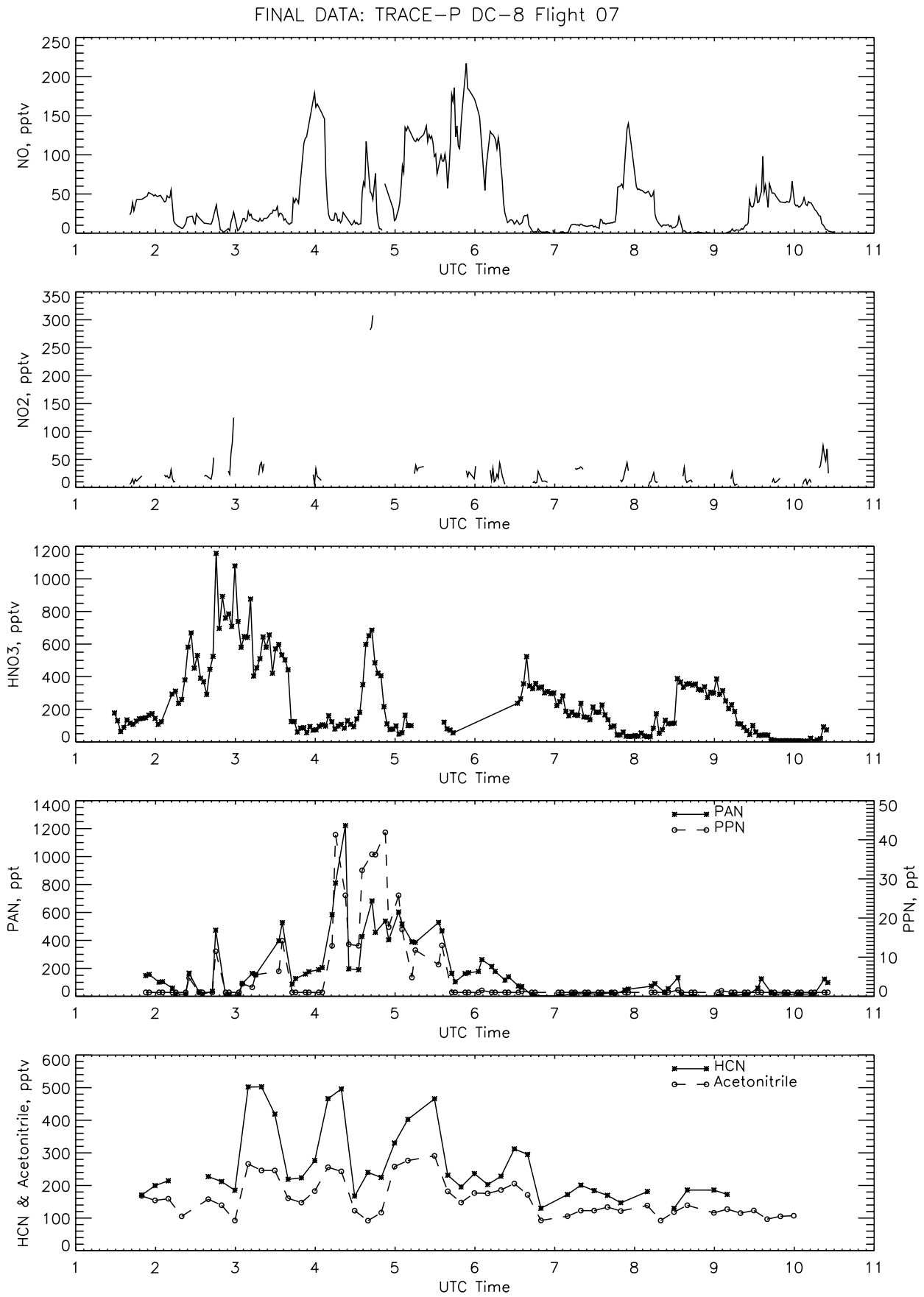
Local: Hong Kong No. 1

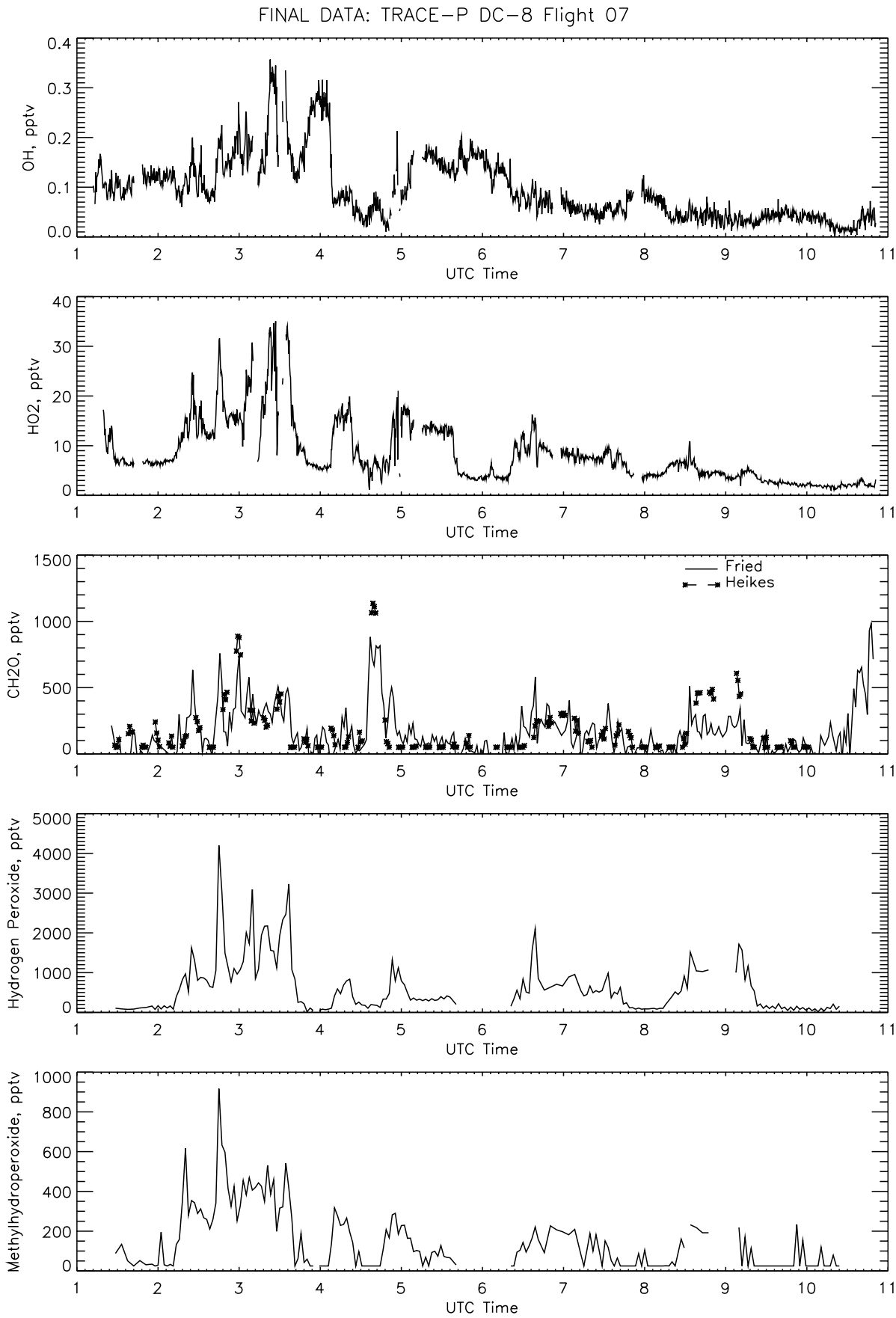
China Outflow and Frontal Crossing

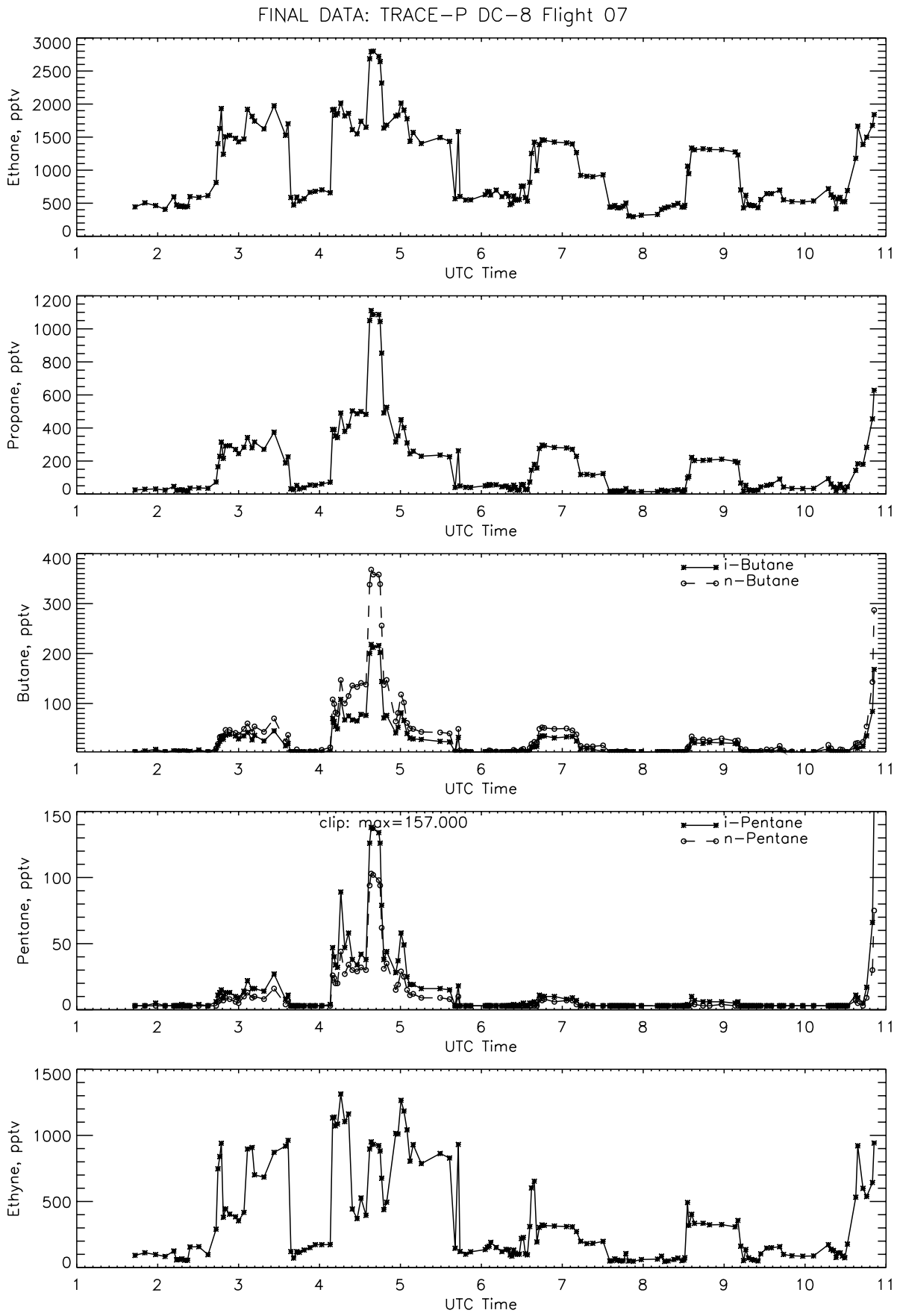
March 7, 2001

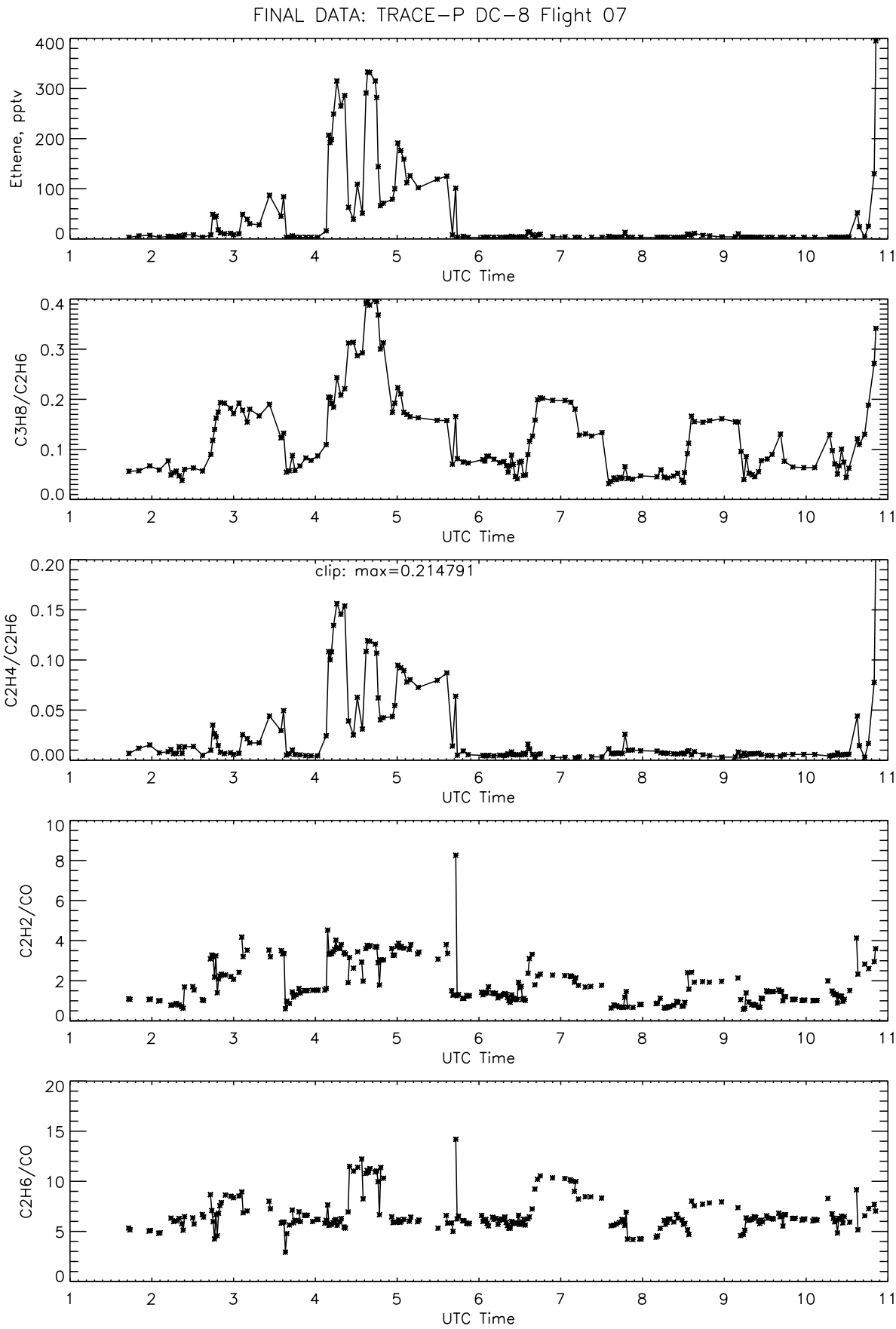

FINAL DATA: TRACE-P DC-8 Flight 07
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

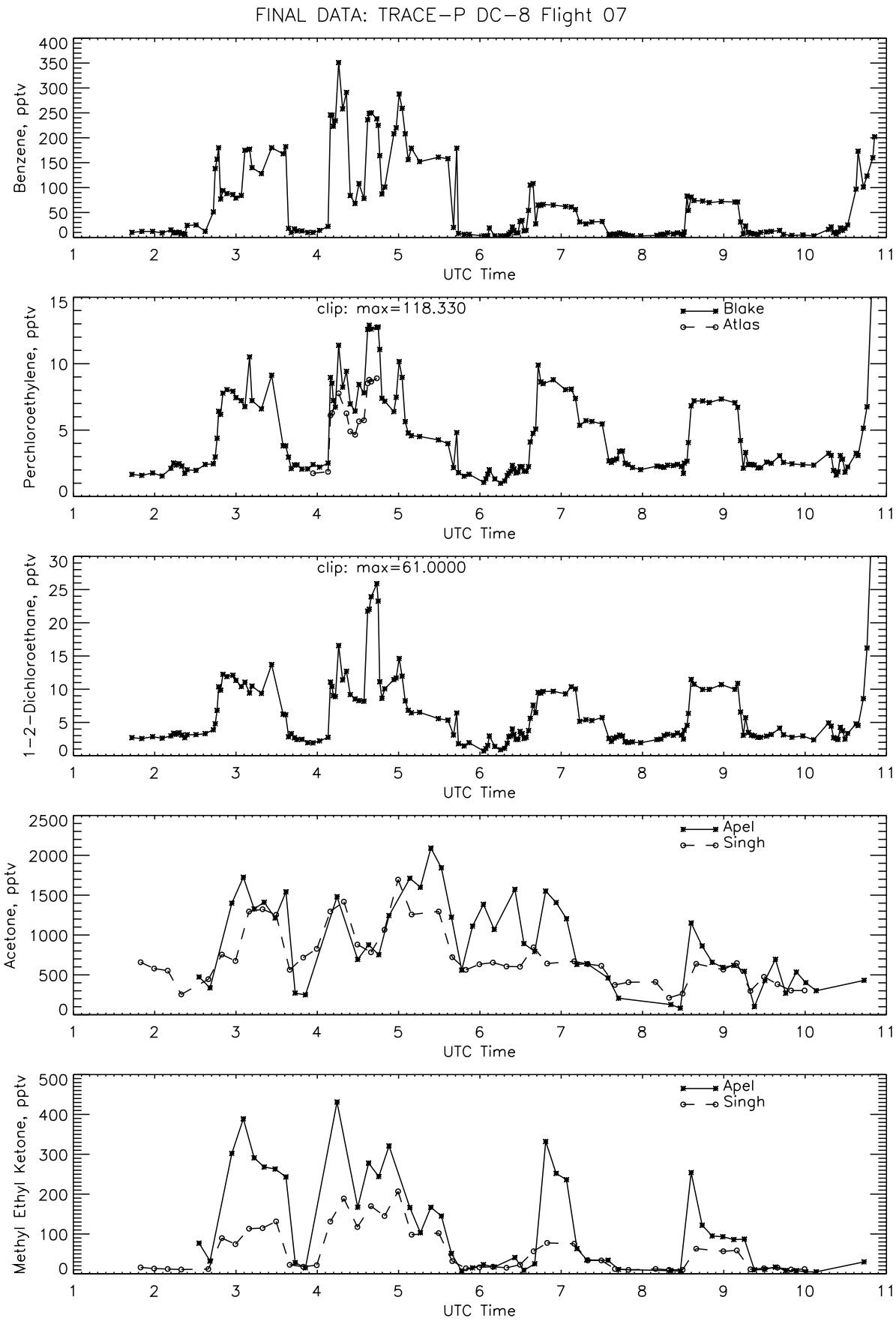

FINAL DATA: TRACE-P DC-8 Flight 07
Ozone, ppbv
UTC Time
Carbon Monoxide, ppbv
clip: max=755.935
UTC Time
Methane, ppbv
UTC Time
Carbon Dioxide, ppmv
UTC Time
Water Vapor Mixing Ratio
UTC Time

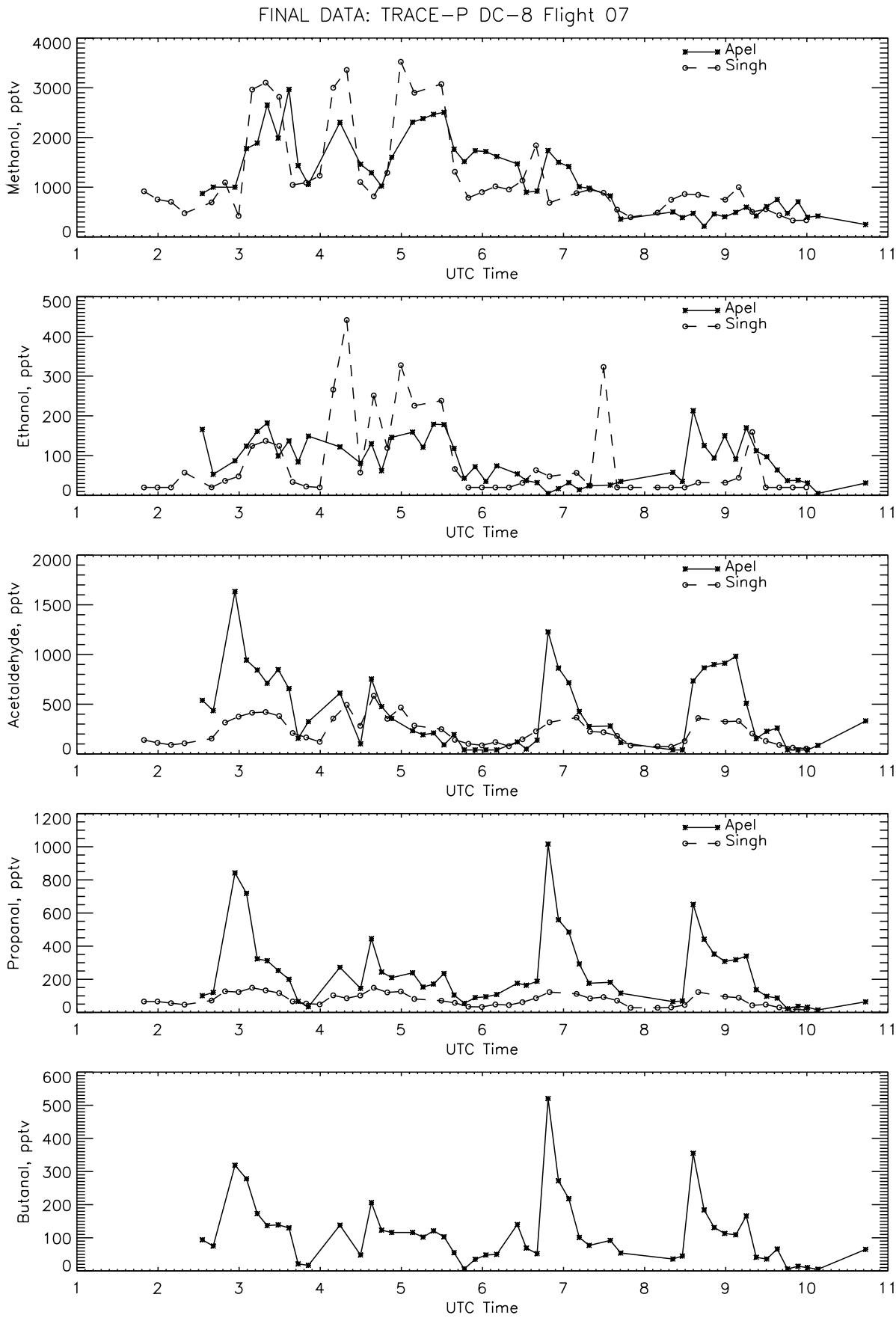

FINAL DATA: TRACE-P DC-8 Flight 07
NO, pptv
NO2, pptv
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

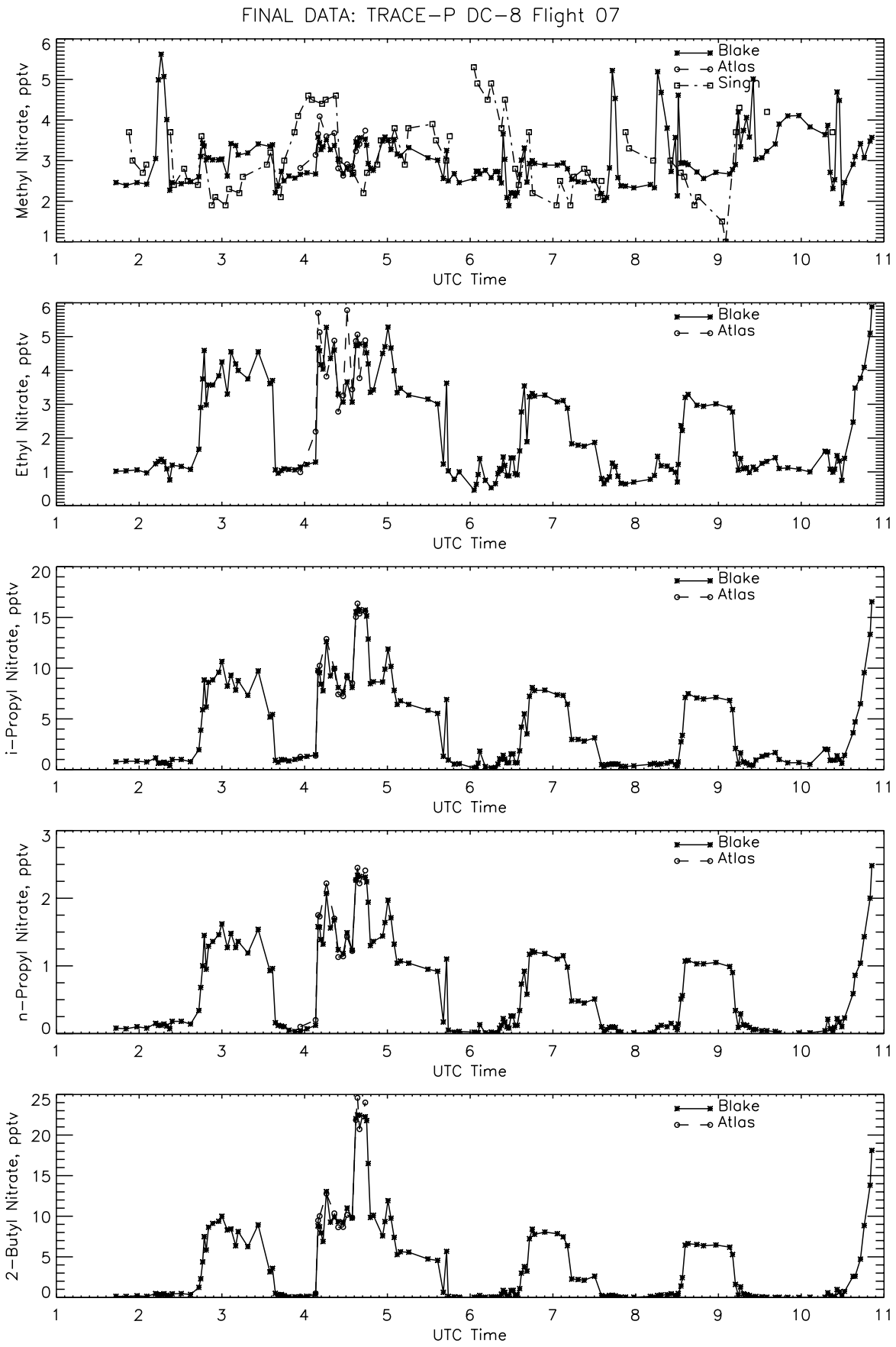

FINAL DATA: TRACE-P DC-8 Flight 07
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

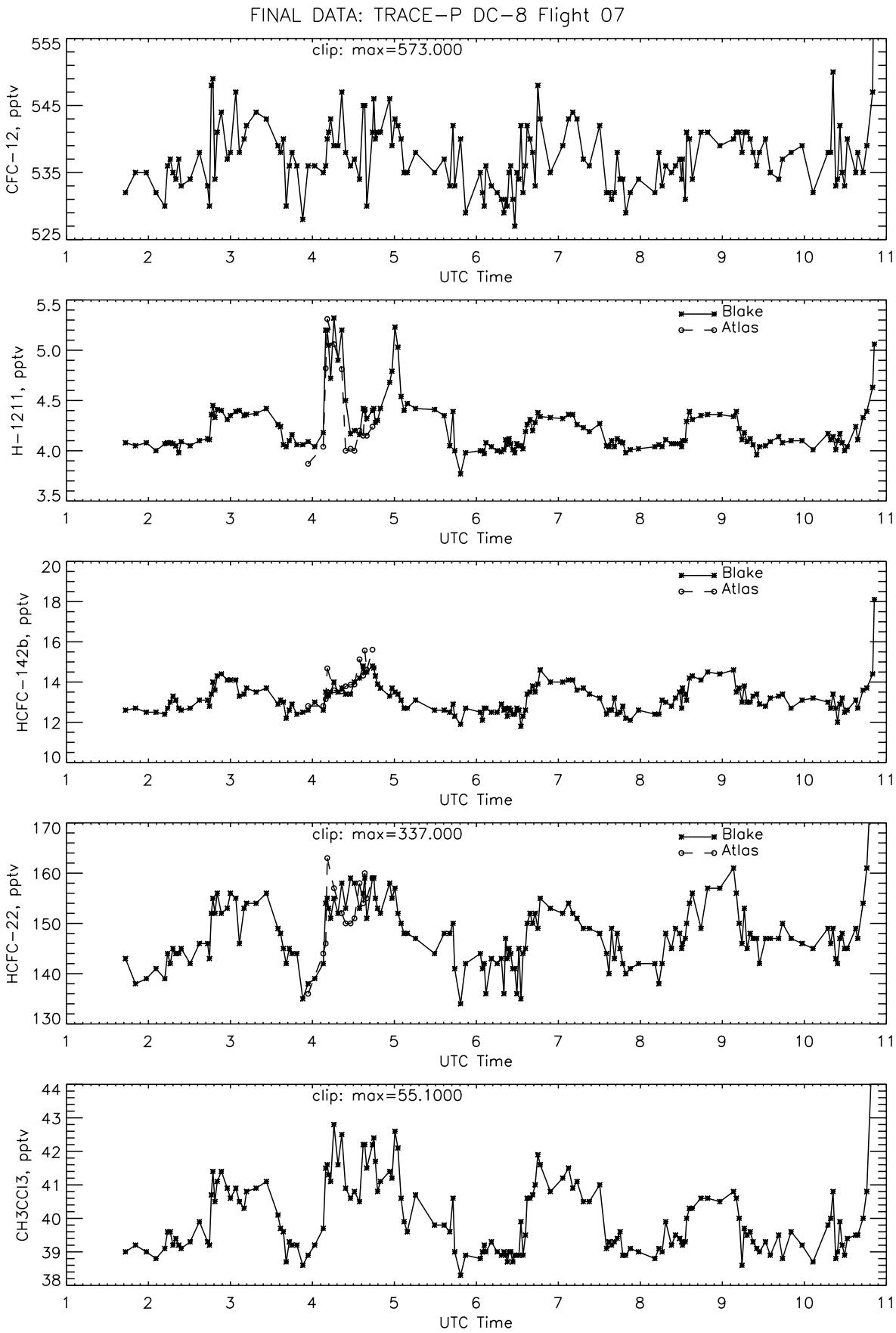

FINAL DATA: TRACE-P DC-8 Flight 07
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
clip: max=157.000
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 07
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
clip: max=0.214791
C2H2/CO
C2H6/CO
UTC Time

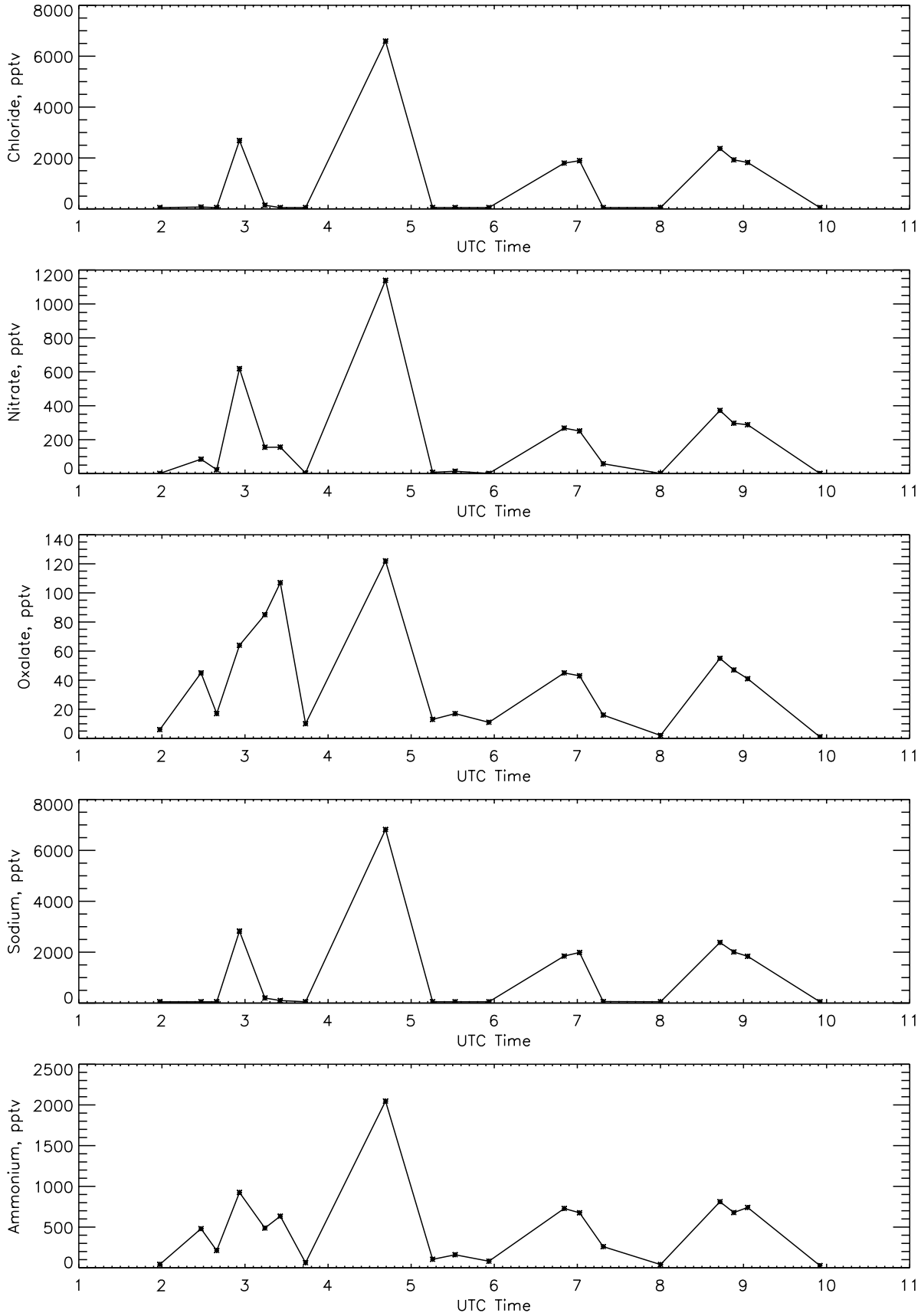

FINAL DATA: TRACE-P DC-8 Flight 07
Benzene, pptv
UTC Time
Perchloroethylene, pptv
clip: max=118.330
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
clip: max=61.0000
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 07
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh

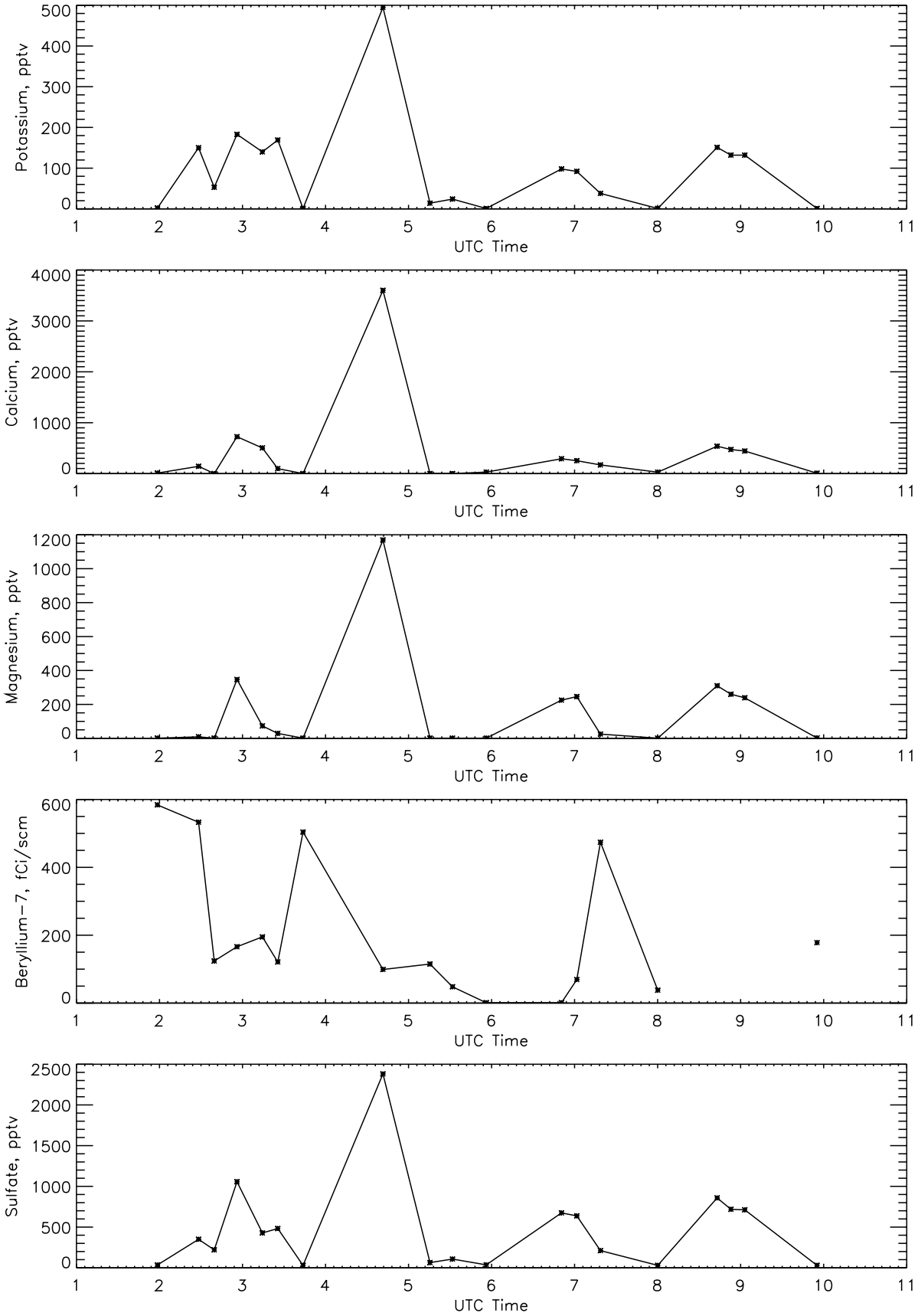

FINAL DATA: TRACE-P DC-8 Flight 07
Methyl Nitrate, pptv
Blake
Atlas
Singh
UTC Time
Ethyl Nitrate, pptv
Blake
Atlas
UTC Time
i-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
n-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
2-Butyl Nitrate, pptv
Blake
Atlas
UTC Time

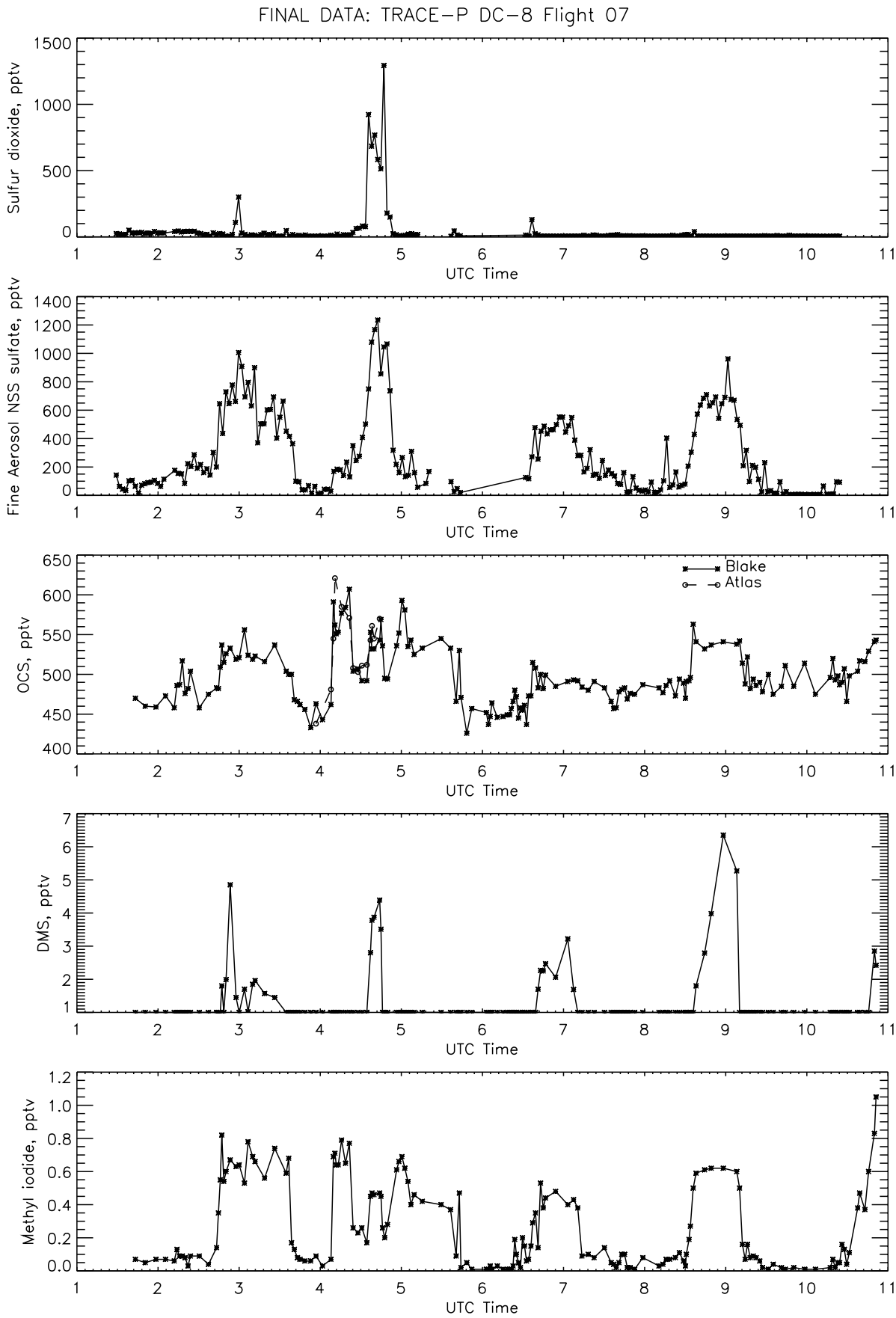

FINAL DATA: TRACE-P DC-8 Flight 07
clip: max=573.000
CFC-12, pptv
UTC Time
Blake
Atlas
H-1211, pptv
UTC Time
Blake
Atlas
HCFC-142b, pptv
UTC Time
clip: max=337.000
Blake
Atlas
HCFC-22, pptv
UTC Time
clip: max=55.1000
CH3CCl3, pptv
UTC Time

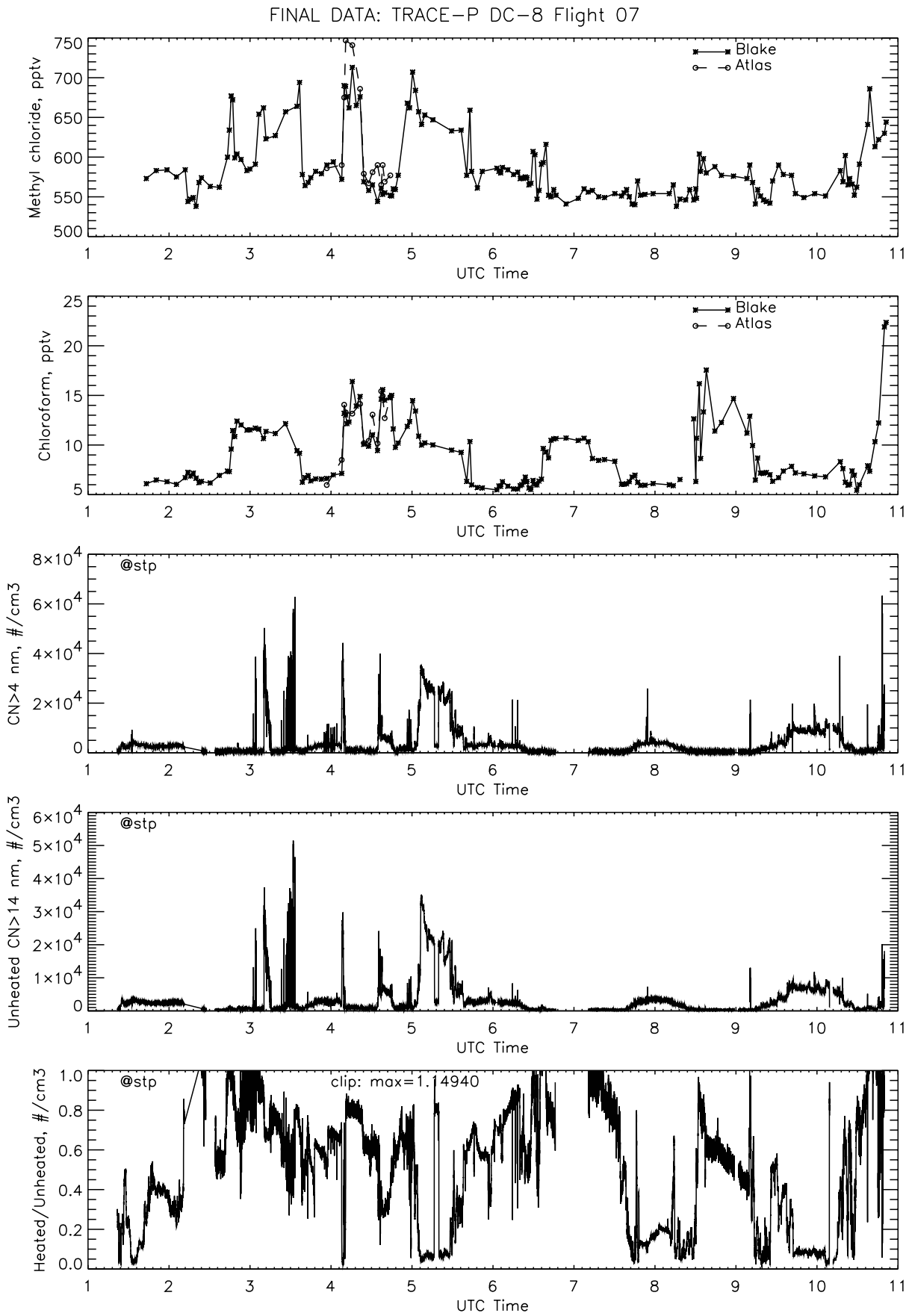
FINAL DATA: TRACE-P DC-8 Flight 07

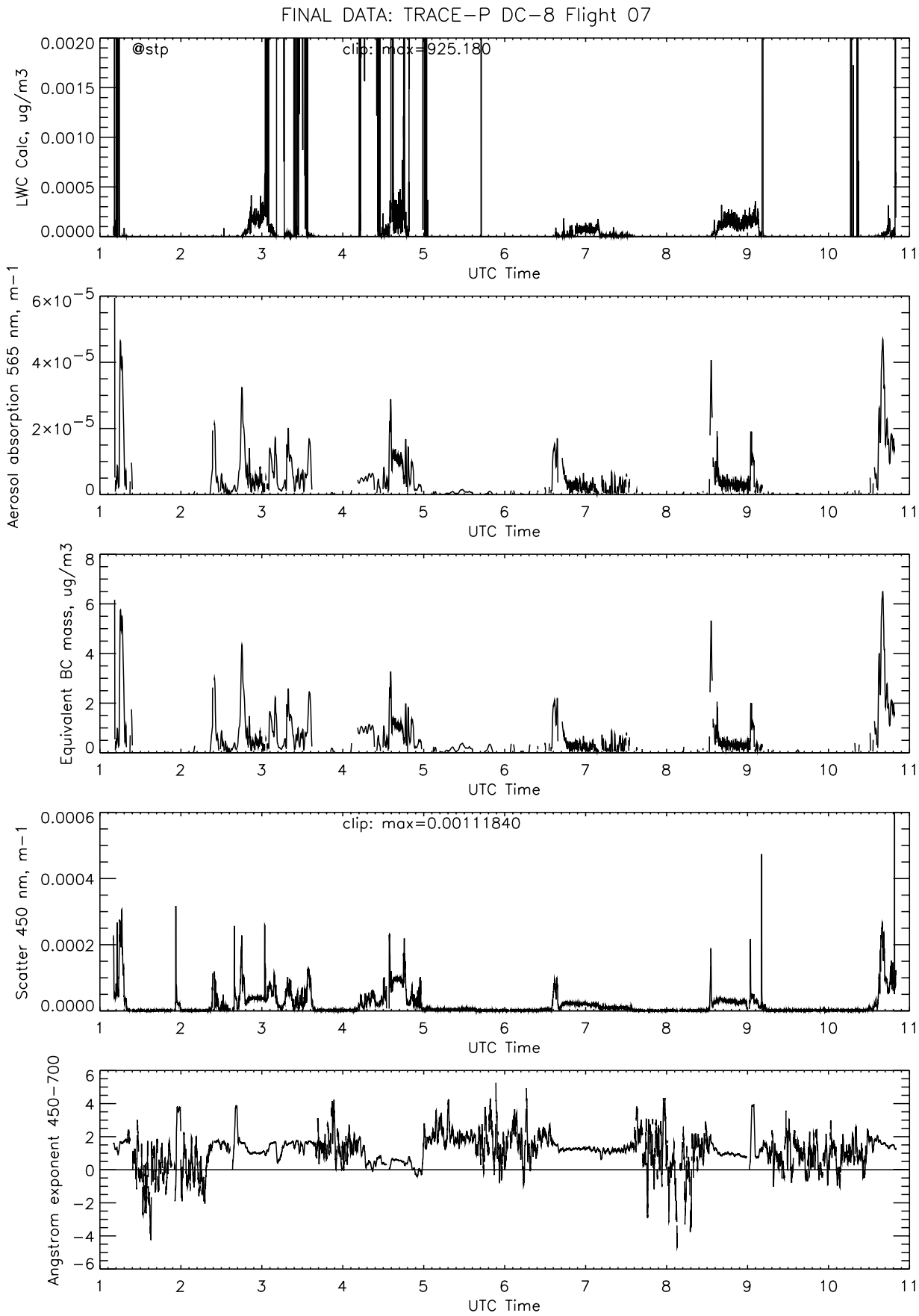


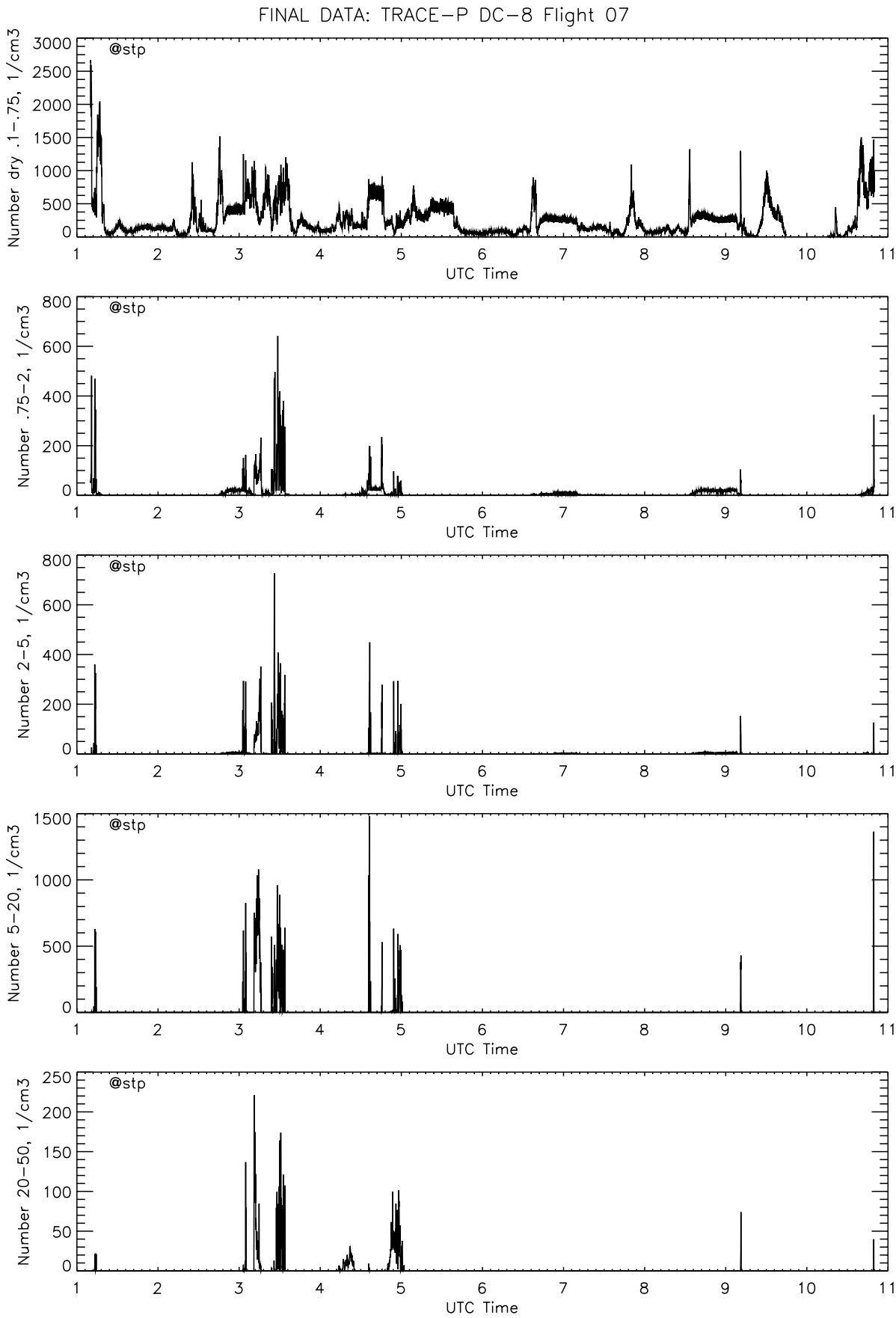
FINAL DATA: TRACE-P DC-8 Flight 07

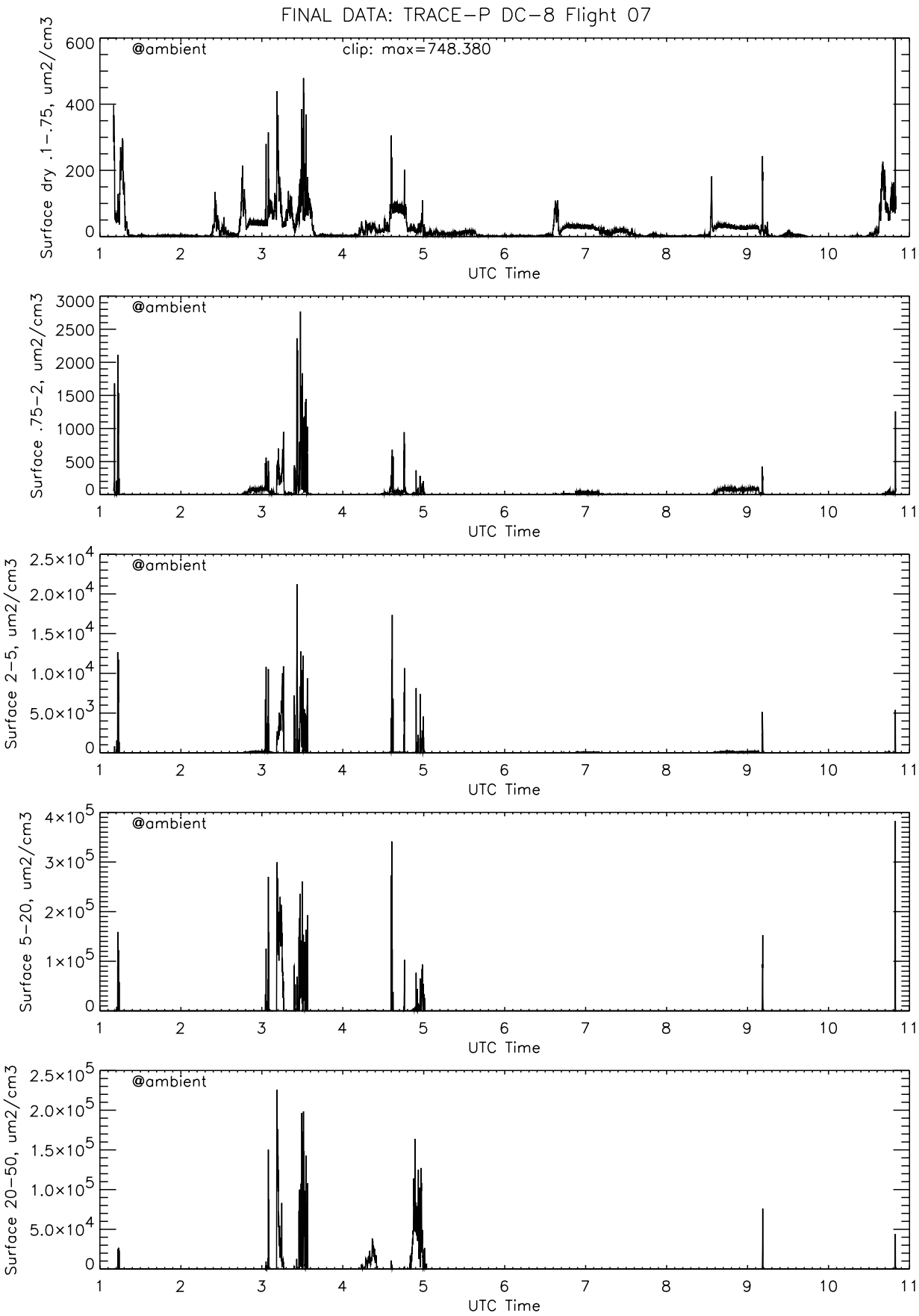


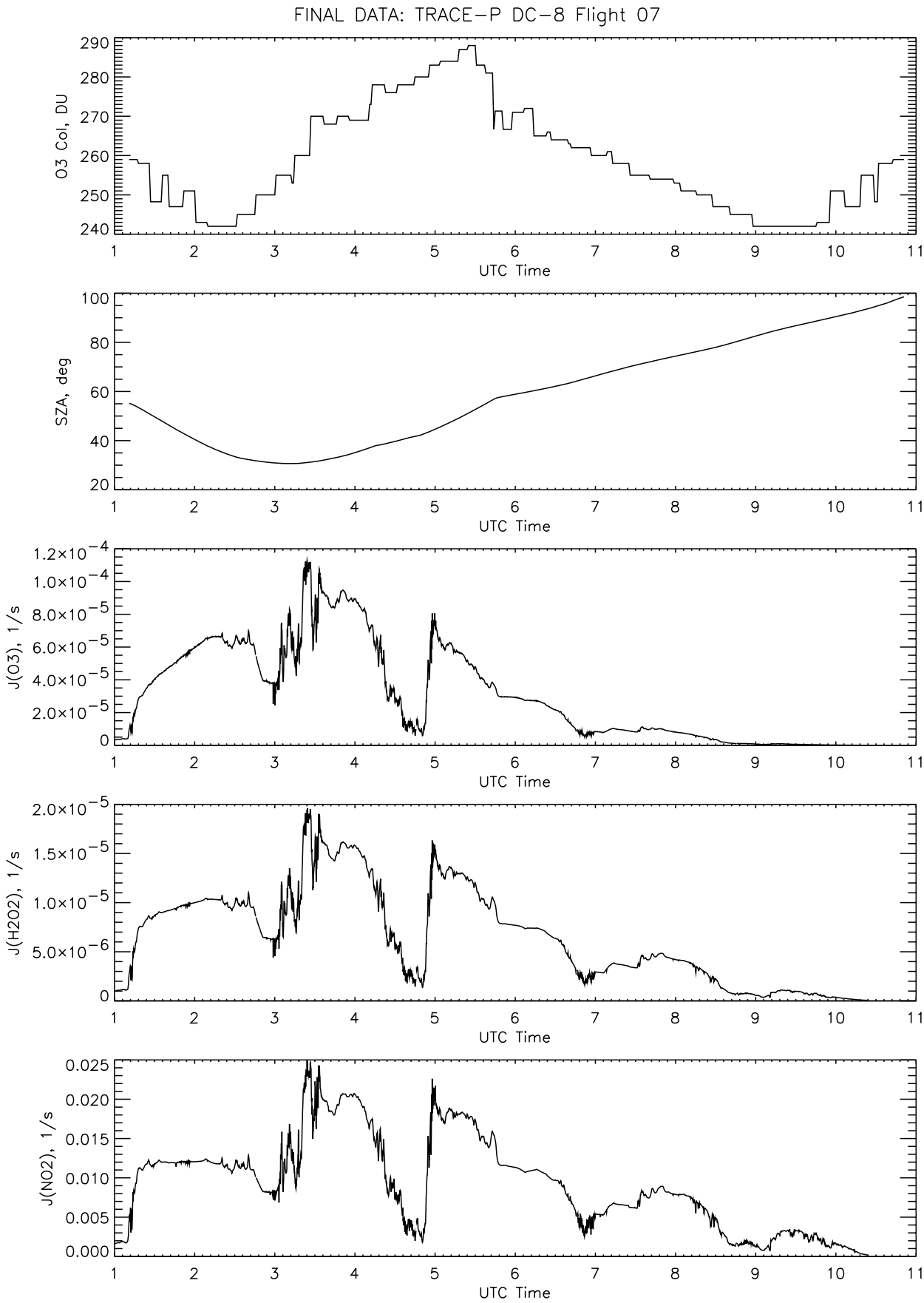

FINAL DATA: TRACE-P DC-8 Flight 07
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

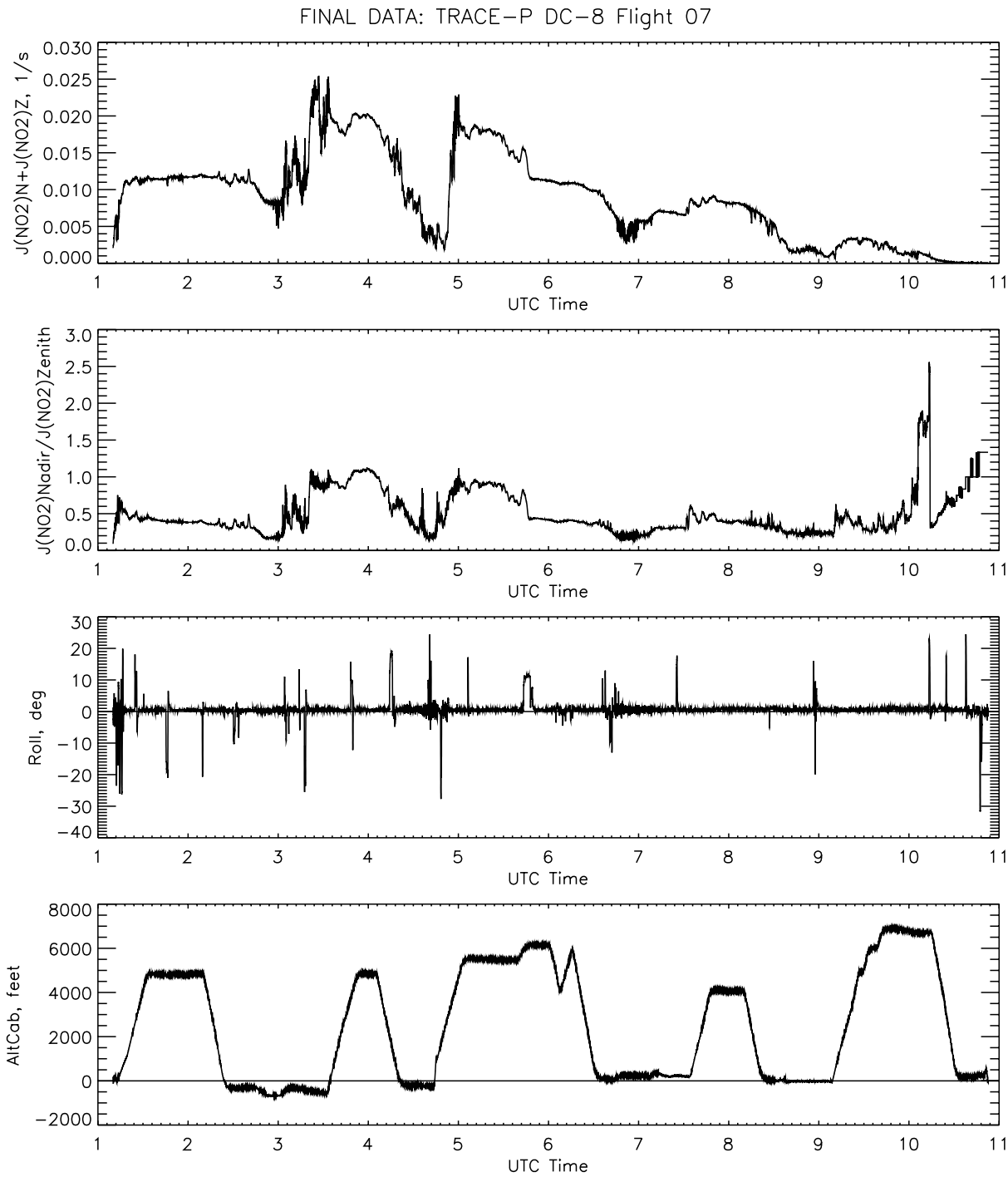

FINAL DATA: TRACE-P DC-8 Flight 07
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14940
UTC Time

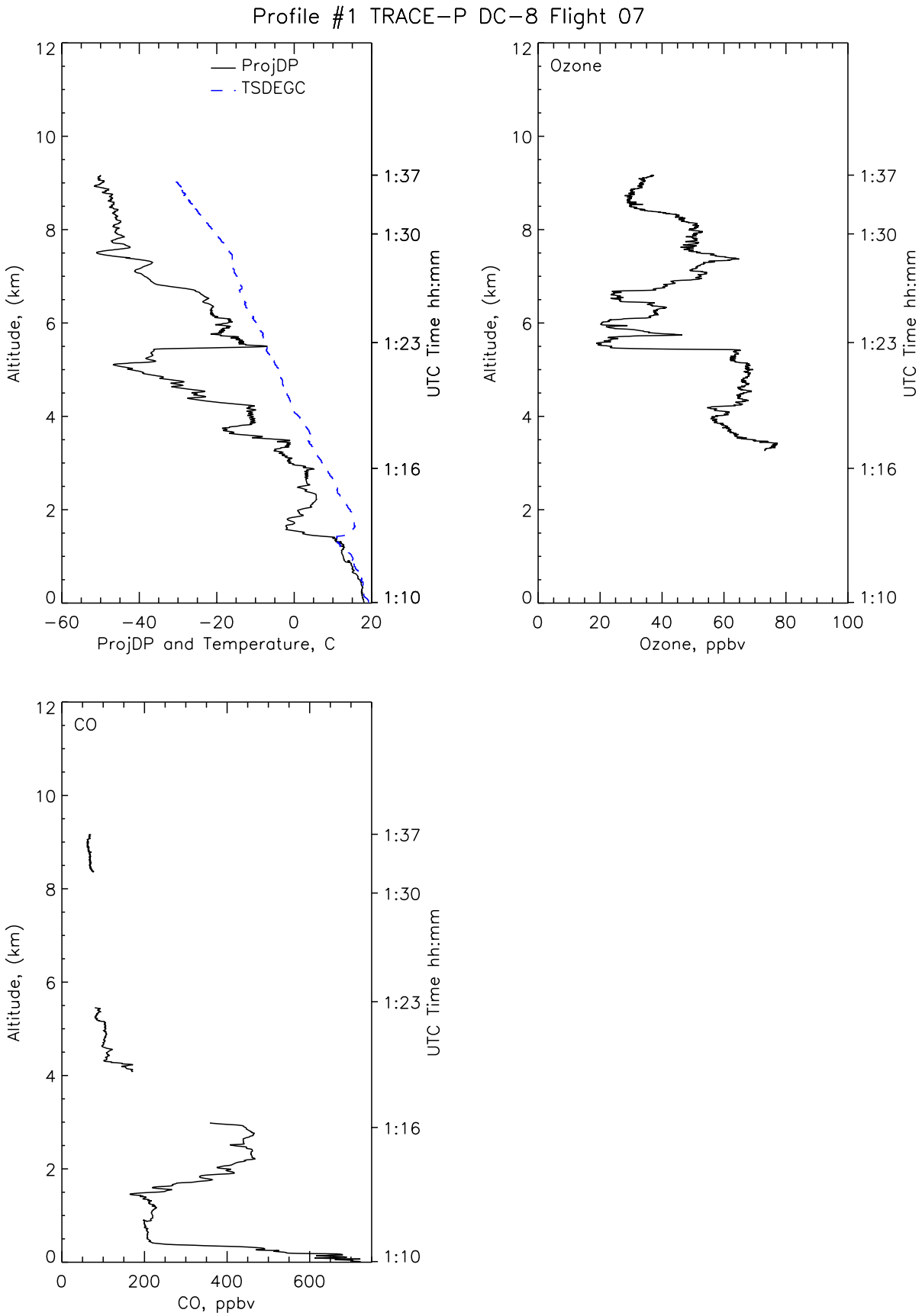

FINAL DATA: TRACE-P DC-8 Flight 07
@stp
clip: max=925.180
LWC Calc, ug/m3
UTC Time
Aerosol absorption 565 nm, m-1
UTC Time
Equivalent BC mass, ug/m3
UTC Time
clip: max=0.00111840
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

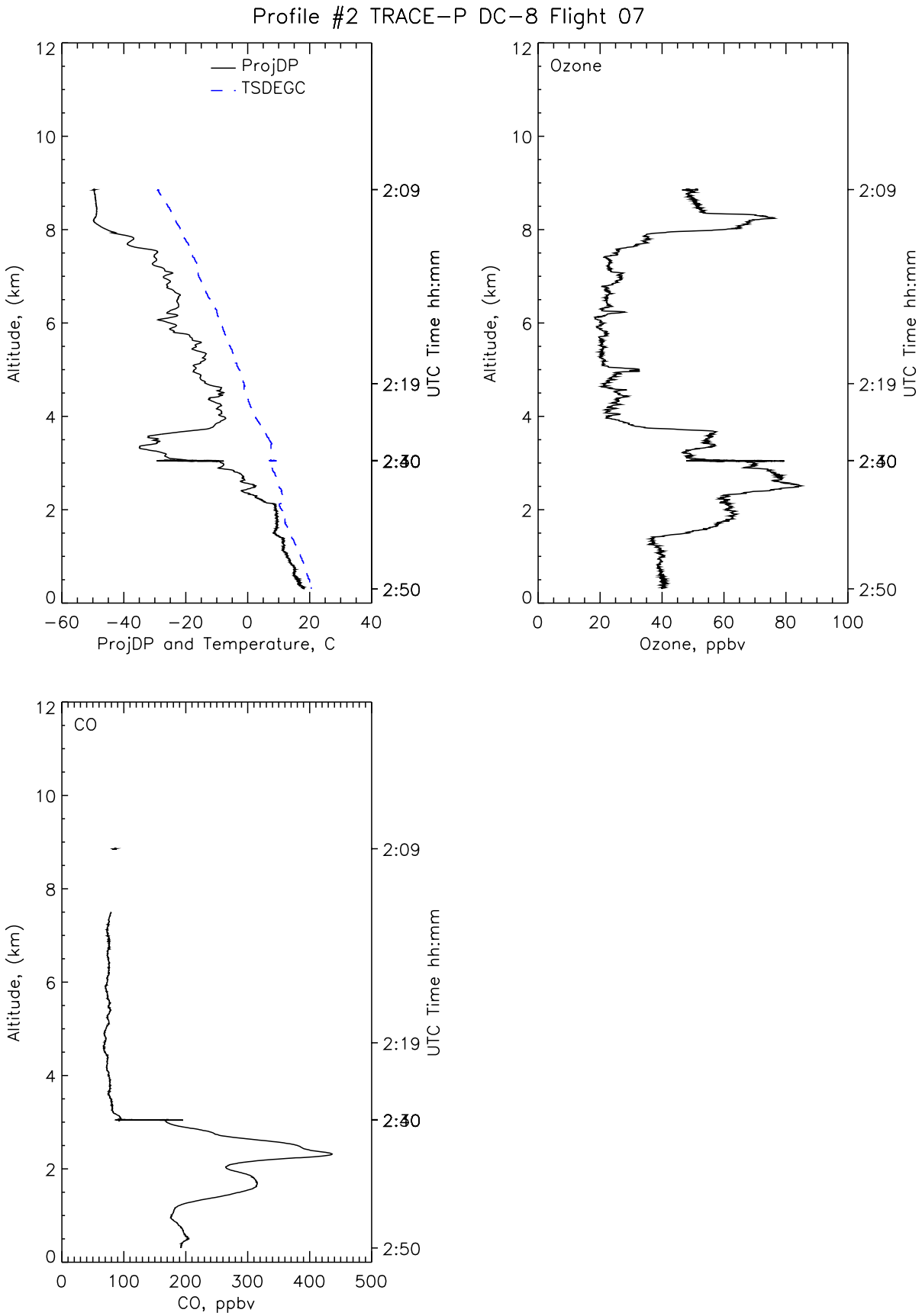

FINAL DATA: TRACE-P DC-8 Flight 07
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

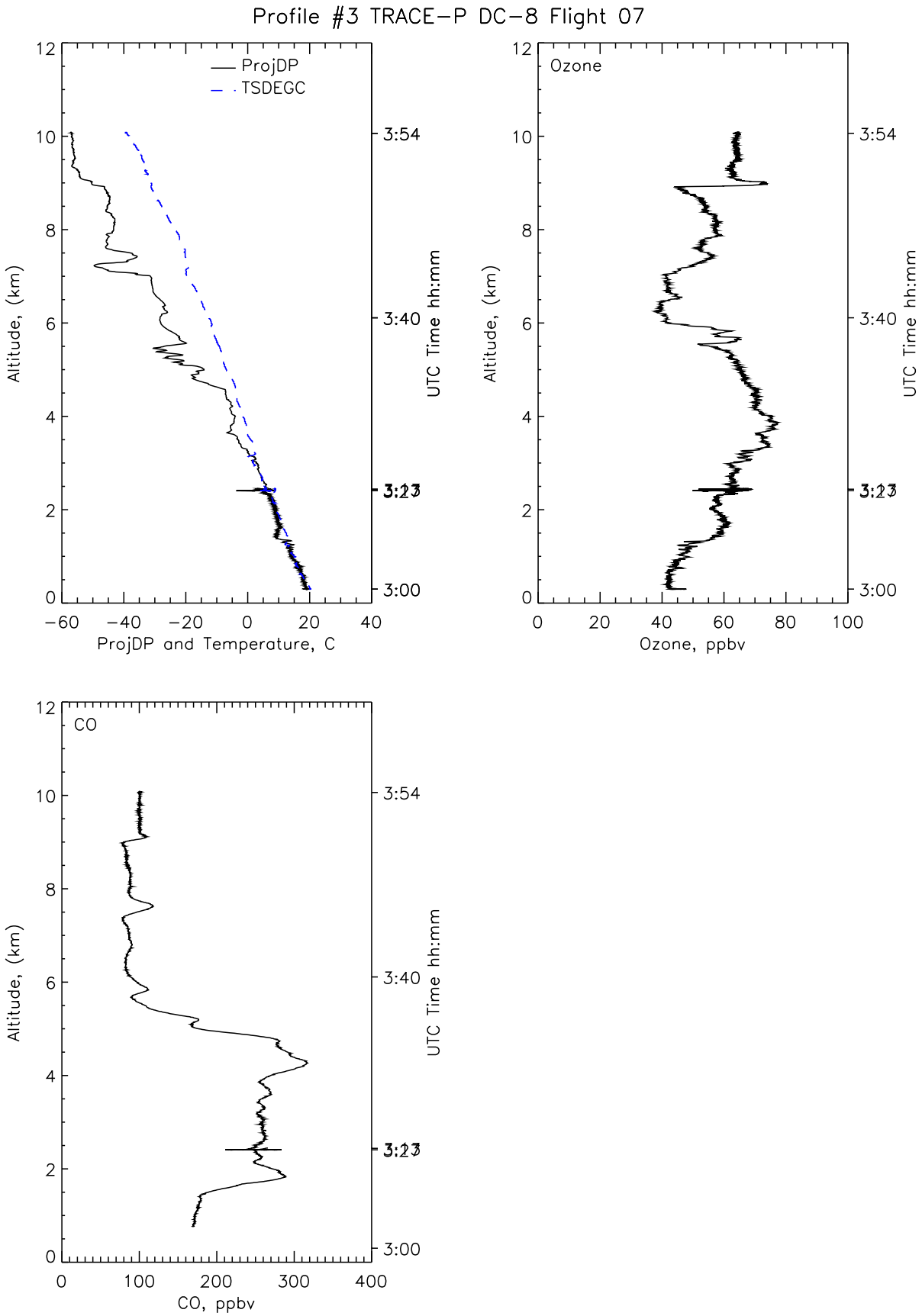

FINAL DATA: TRACE-P DC-8 Flight 07
@ambient
clip: max=748.380
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

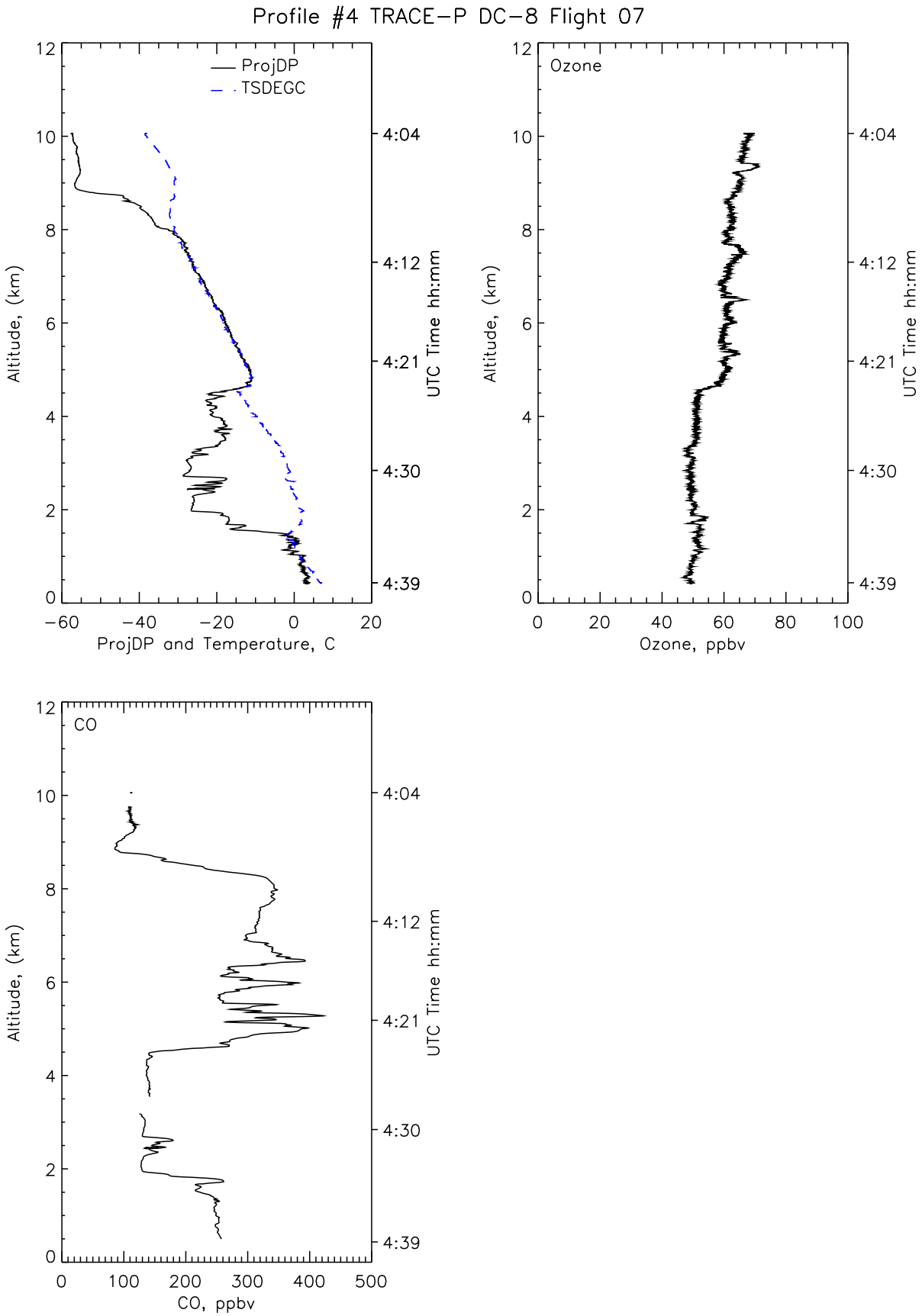

FINAL DATA: TRACE-P DC-8 Flight 07
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

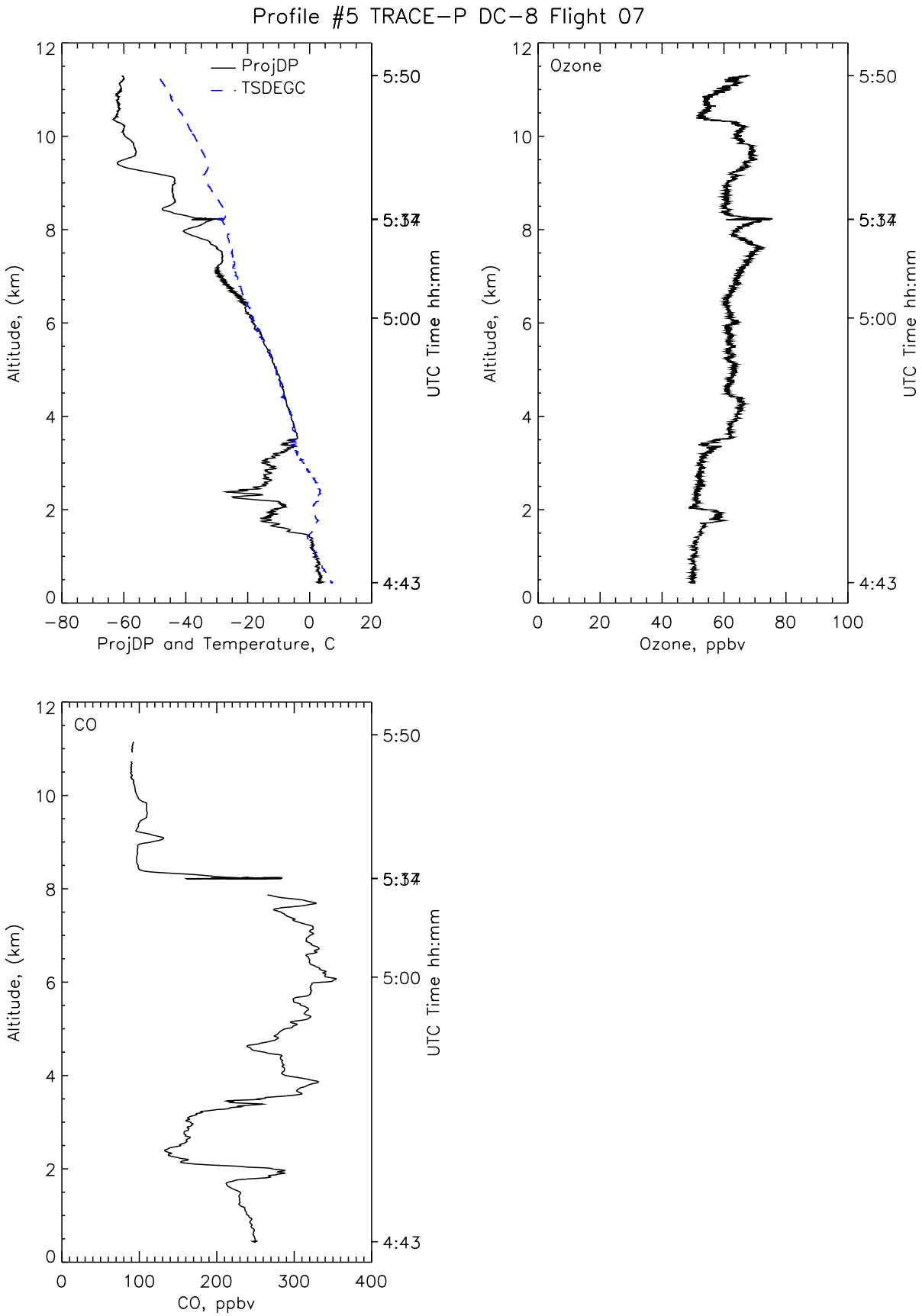

FINAL DATA: TRACE-P DC-8 Flight 07
J(NO2)N+J(NO2)Z, 1/s
0.030
0.025
0.020
0.015
0.010
0.005
0.000
1 2 3 4 5 6 7 8 9 10 11
UTC Time
J(NO2)Nadir/J(NO2)Zenith
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1 2 3 4 5 6 7 8 9 10 11
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
−40
1 2 3 4 5 6 7 8 9 10 11
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
1 2 3 4 5 6 7 8 9 10 11
UTC Time

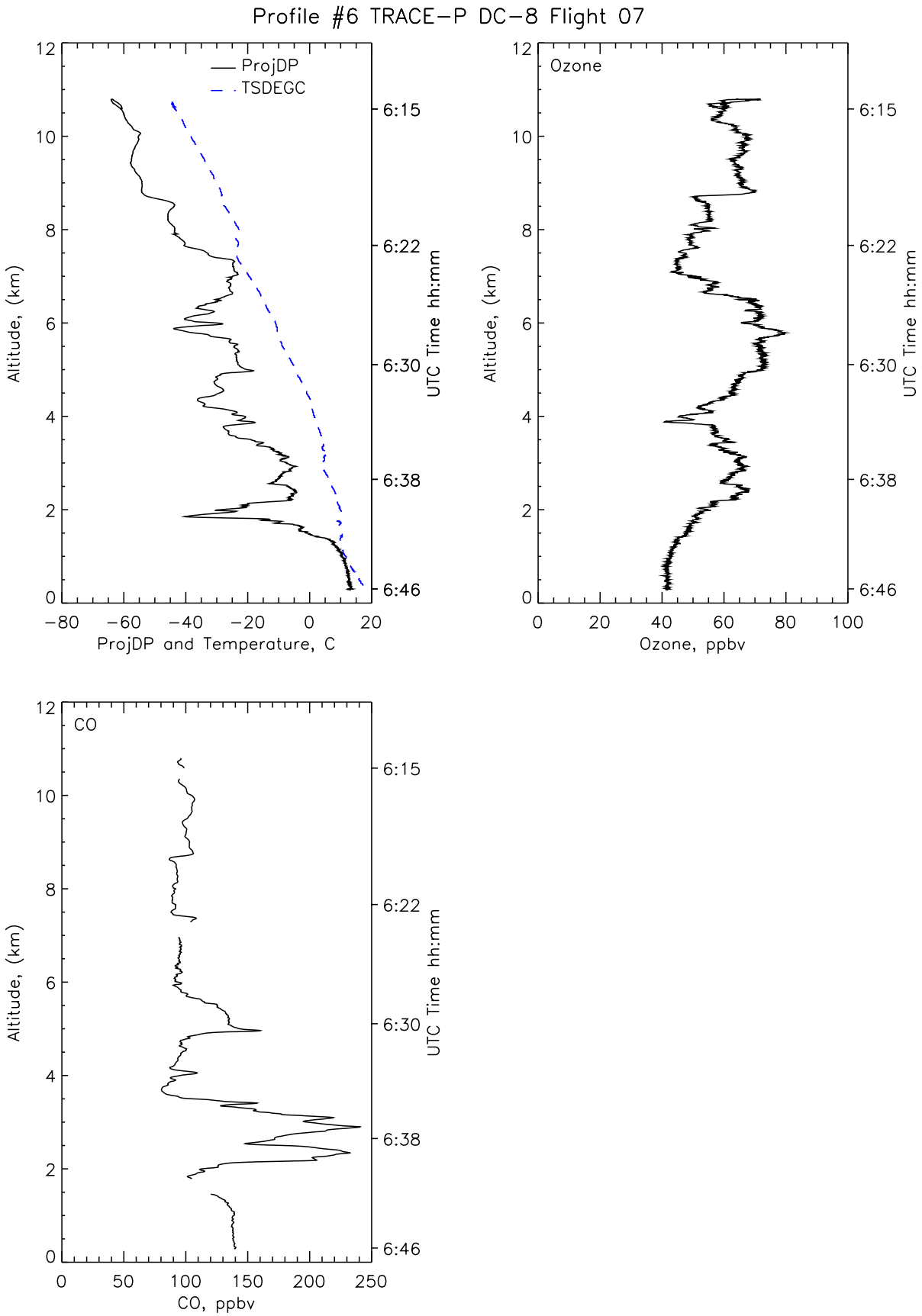

Profile #1 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

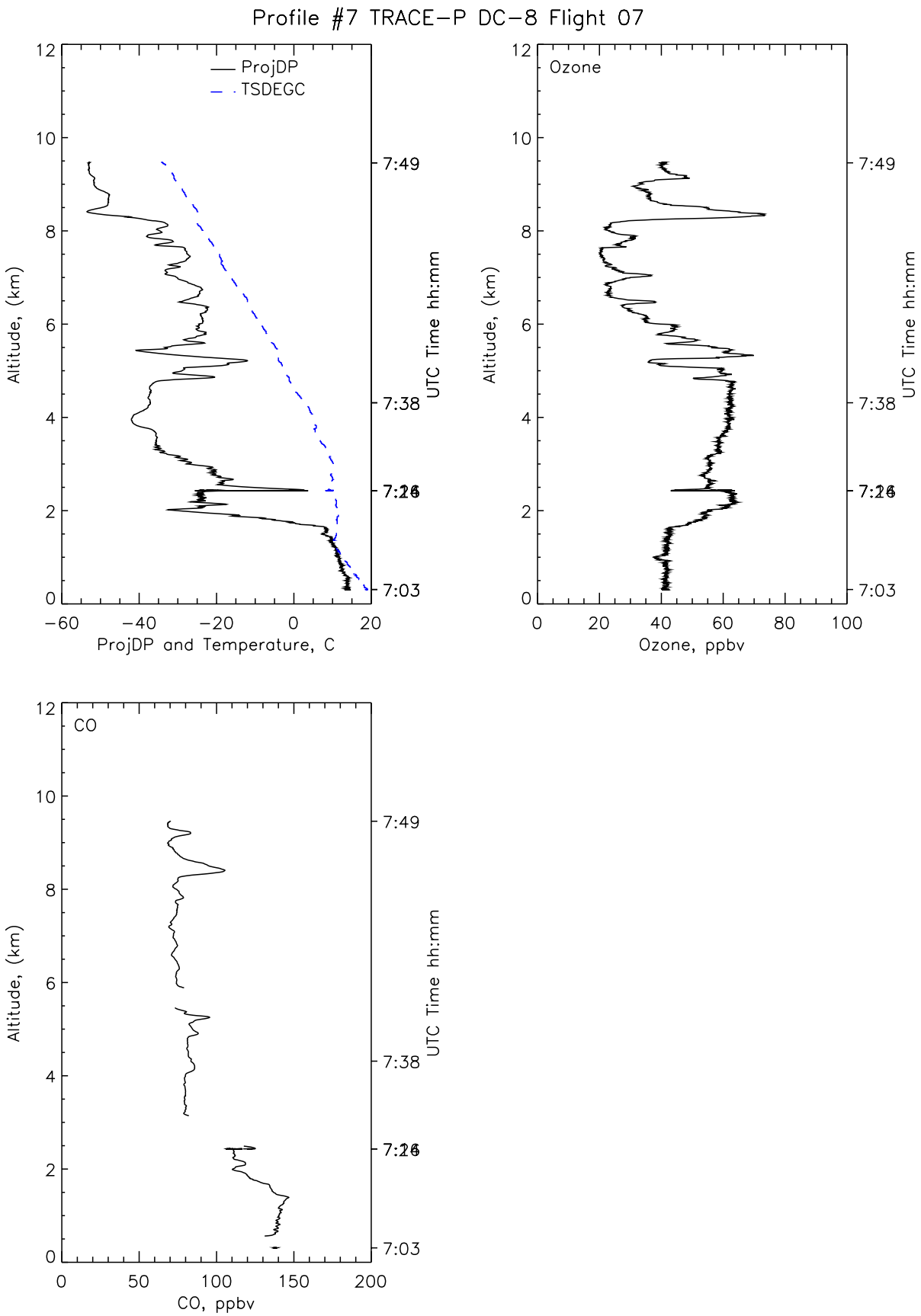

Profile #2 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
2:09
2:19
2:30
2:50
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

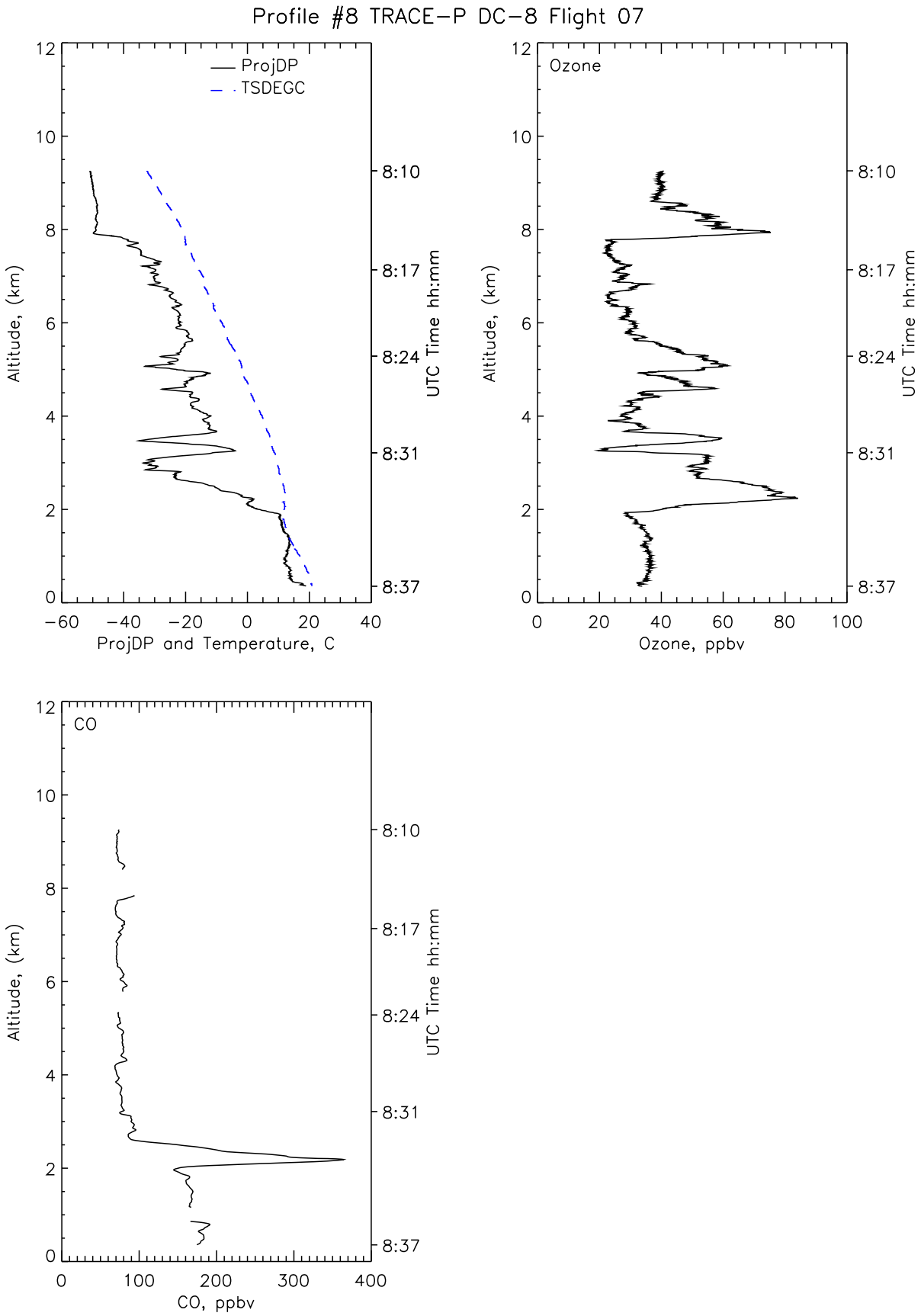

Profile #3 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv
3:00
3:23
3:40
3:54

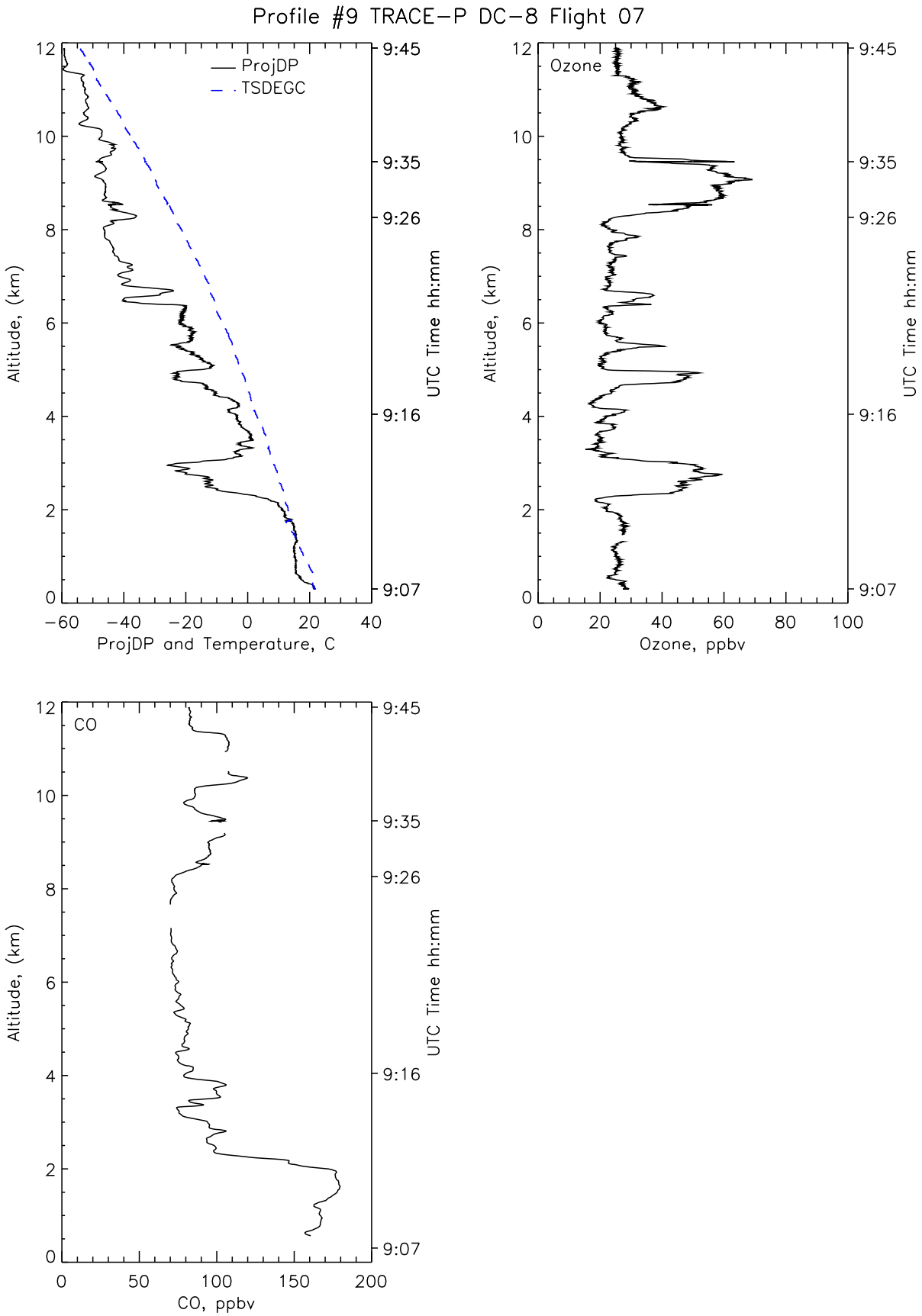

Profile #4 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

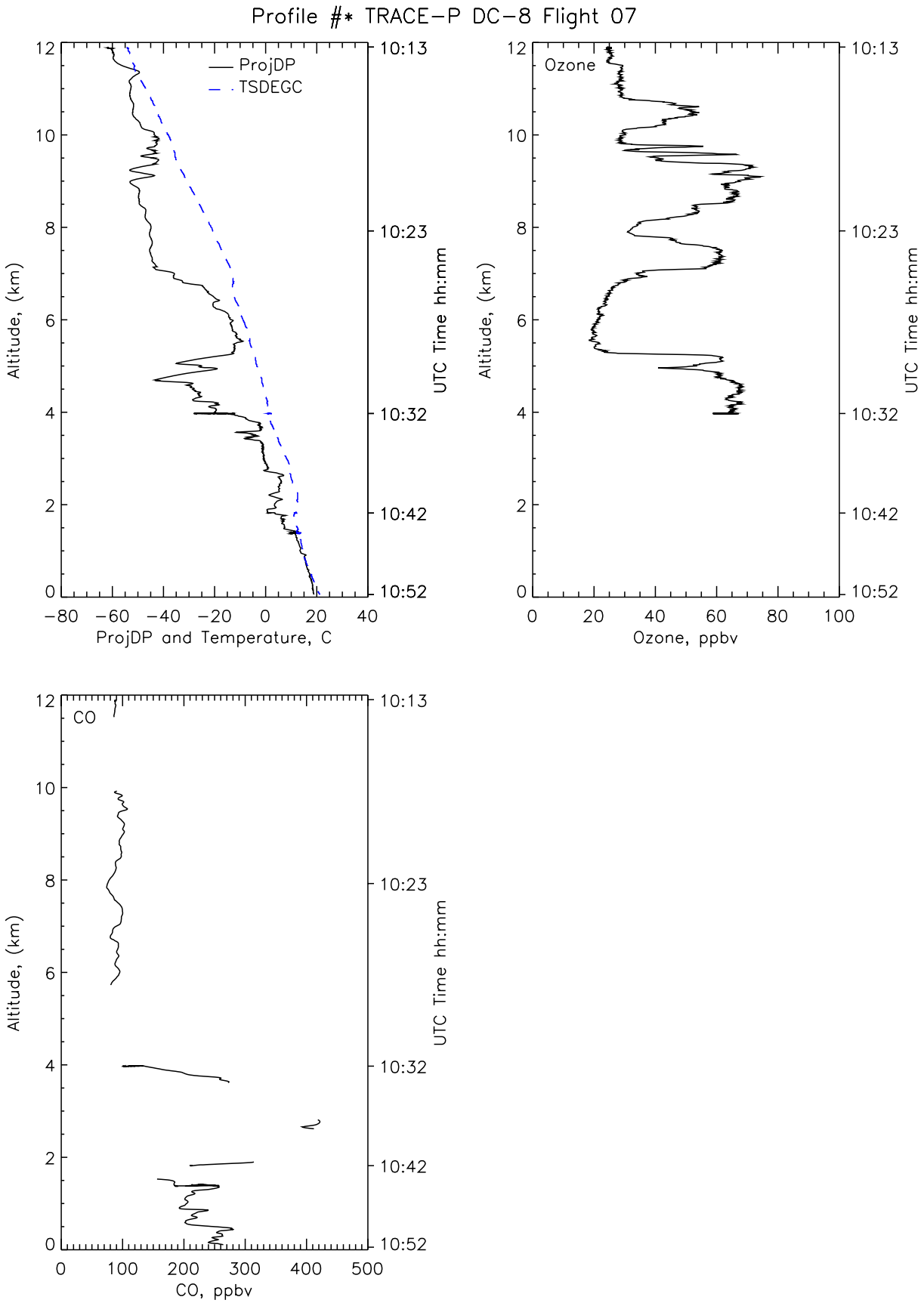

Profile #5 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
5:50
5:37
5:00
4:43
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #7 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
7:49
7:38
7:26
7:03
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #8 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
8:10
8:17
8:24
8:31
8:37
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #9 TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #* TRACE-P DC-8 Flight 07
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

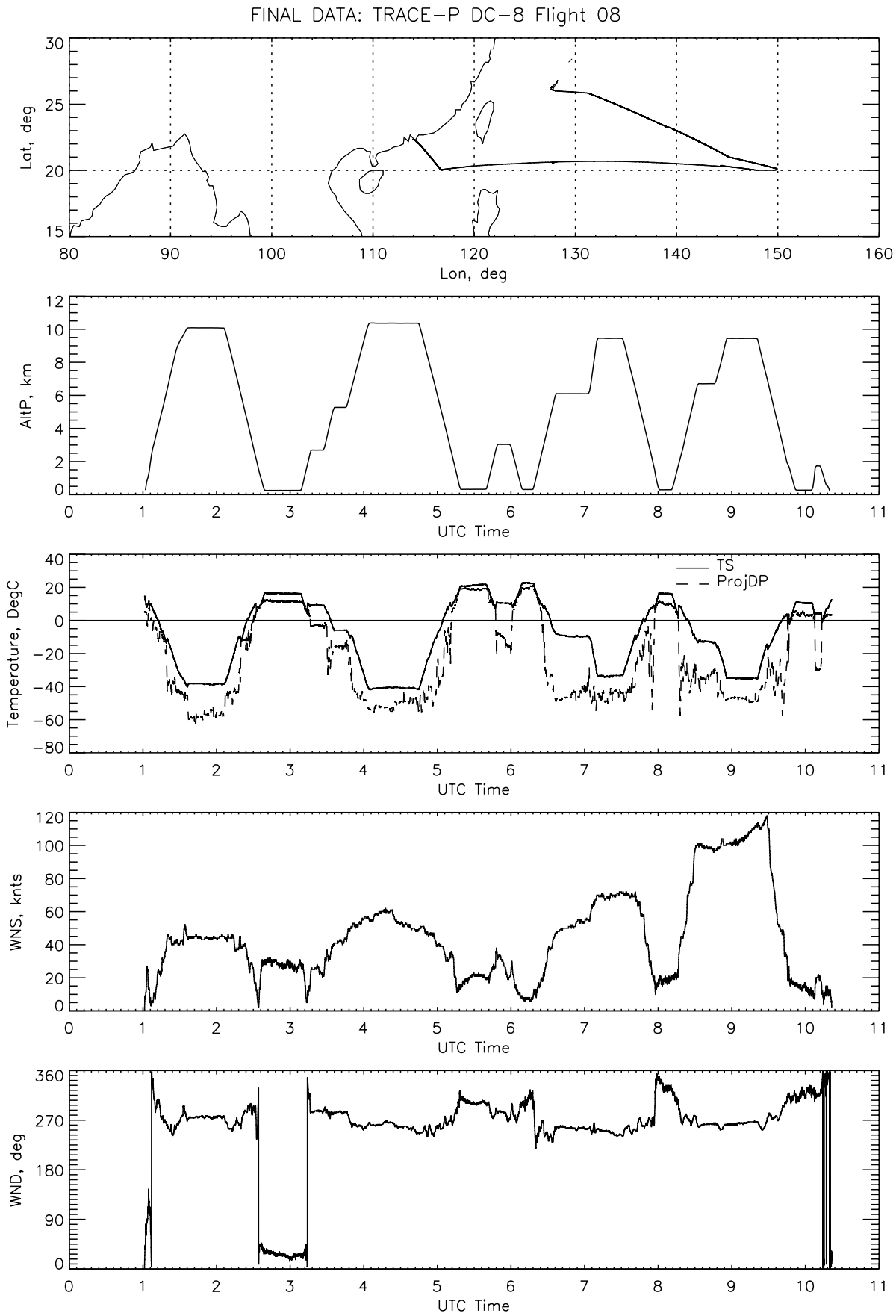
TRACE-P

Flight 8D

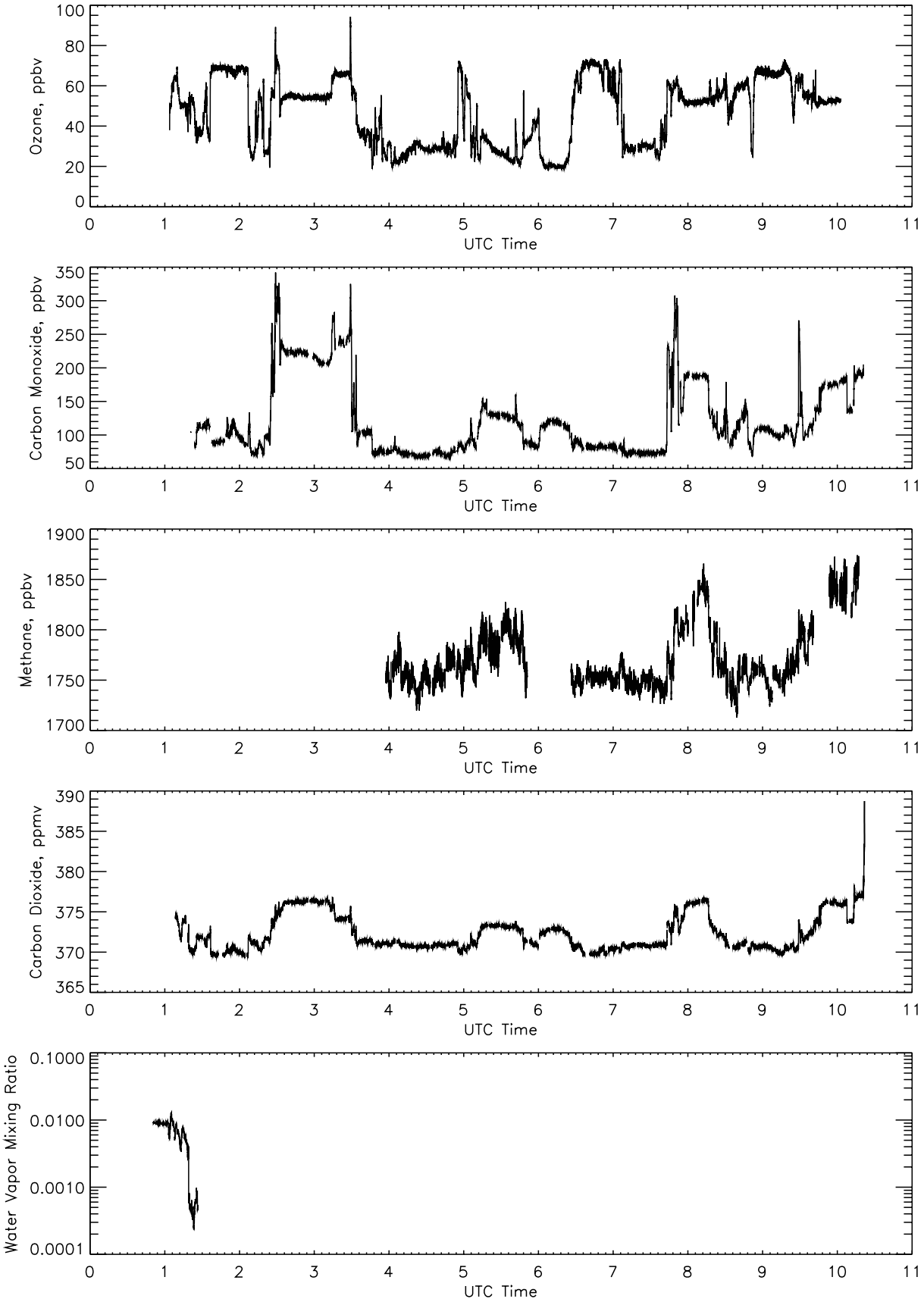
Local: Hong Kong No. 2

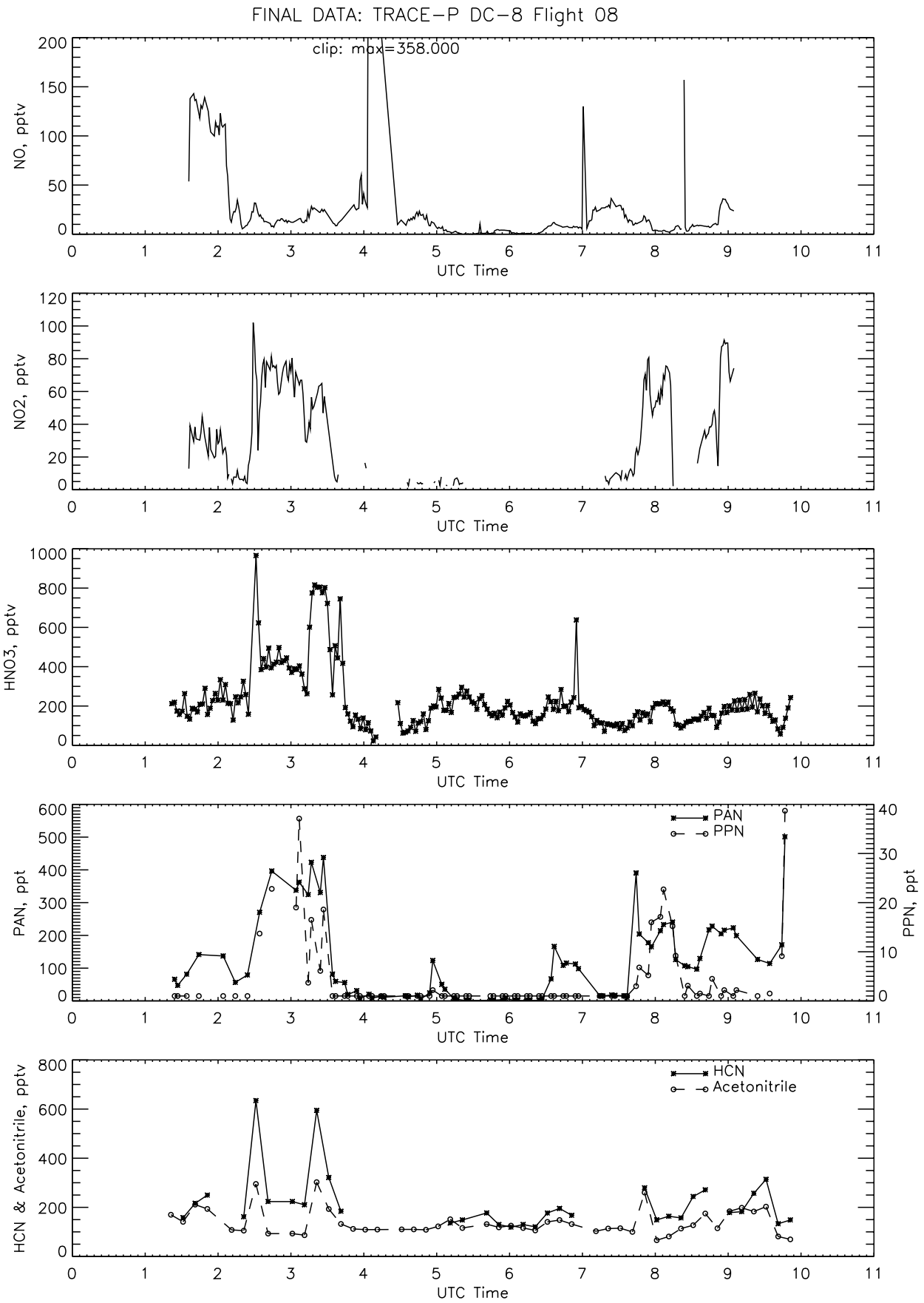
Chemical Evolution of Frontal Outflow

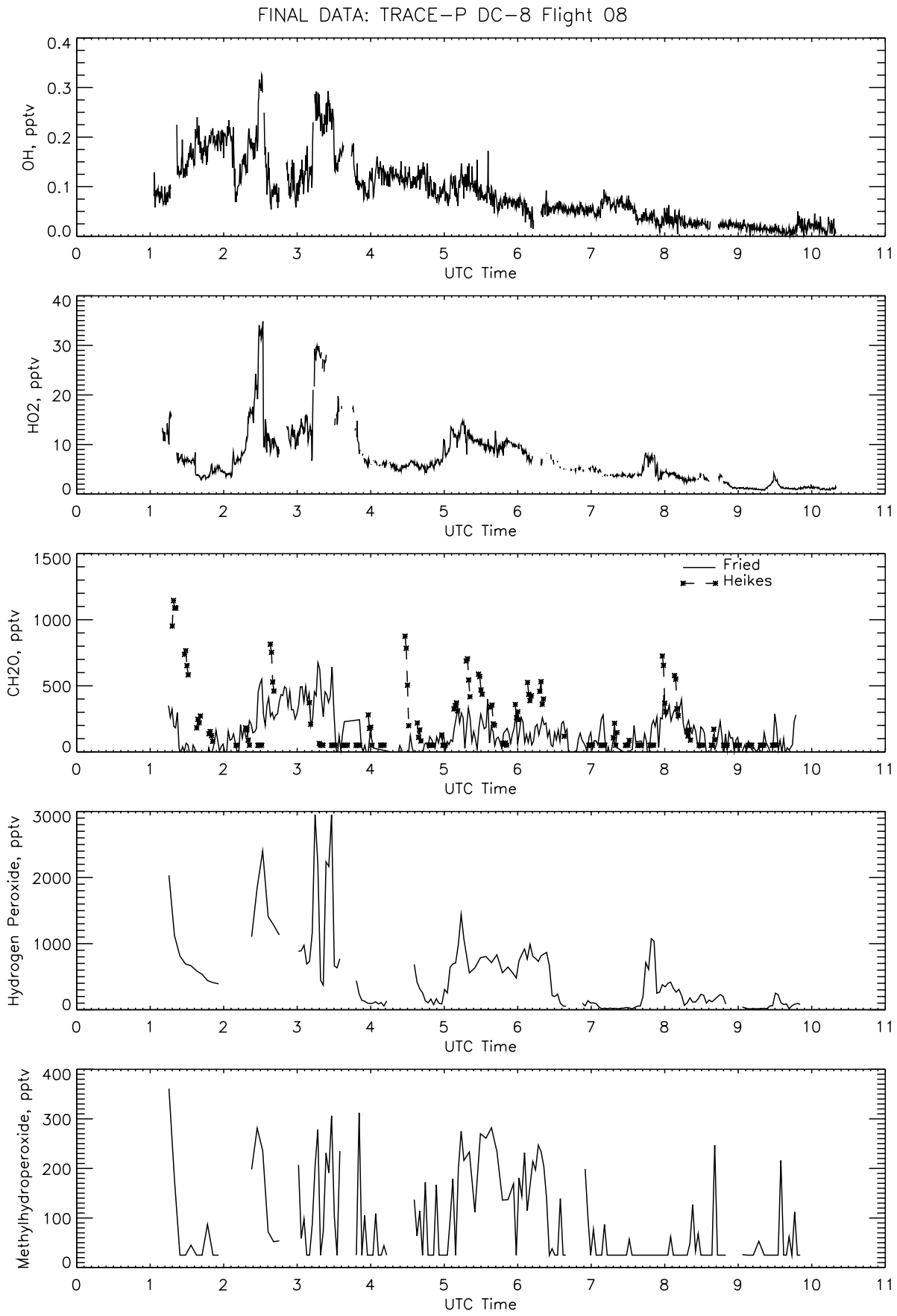
March 9, 2001

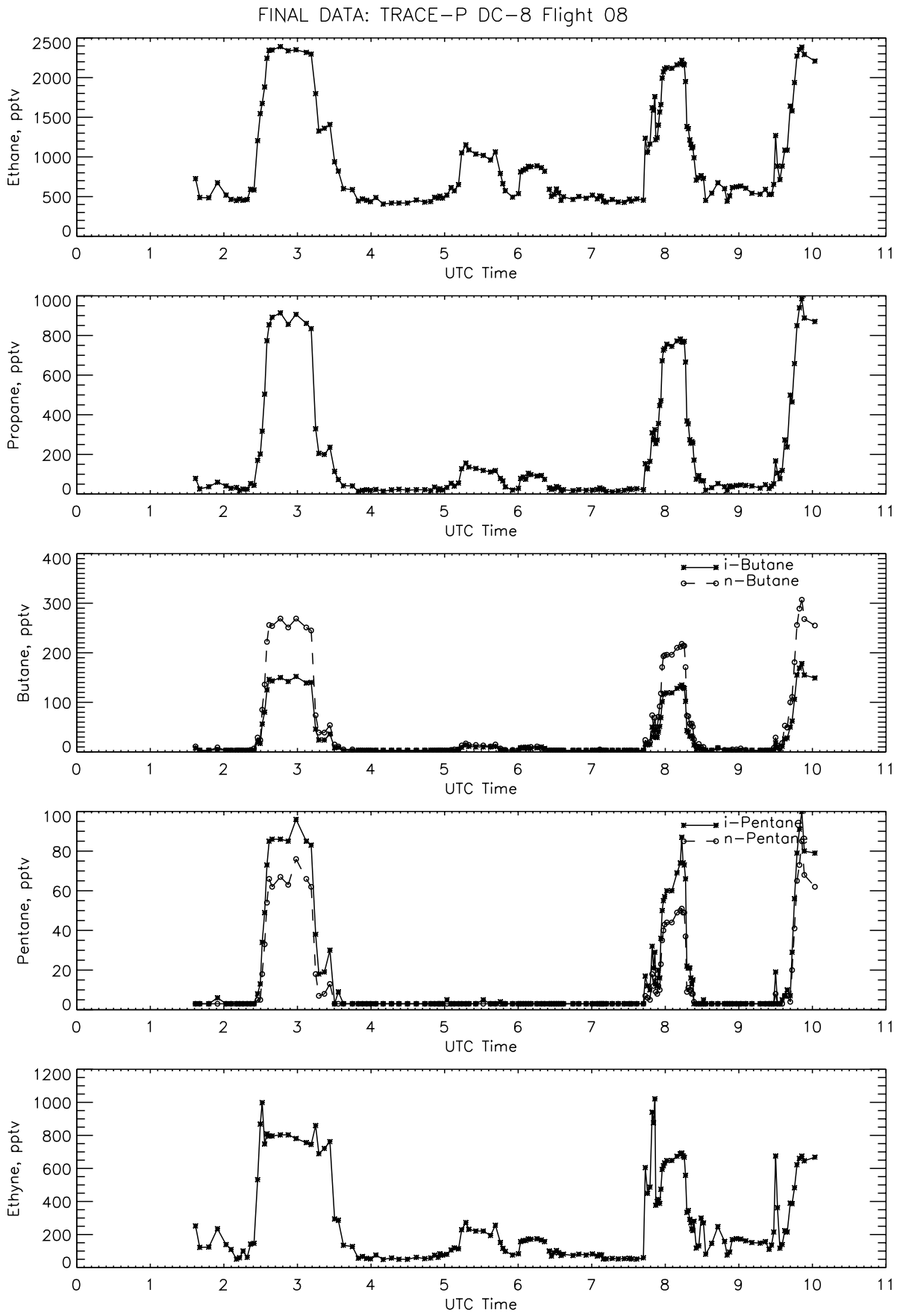

FINAL DATA: TRACE-P DC-8 Flight 08
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

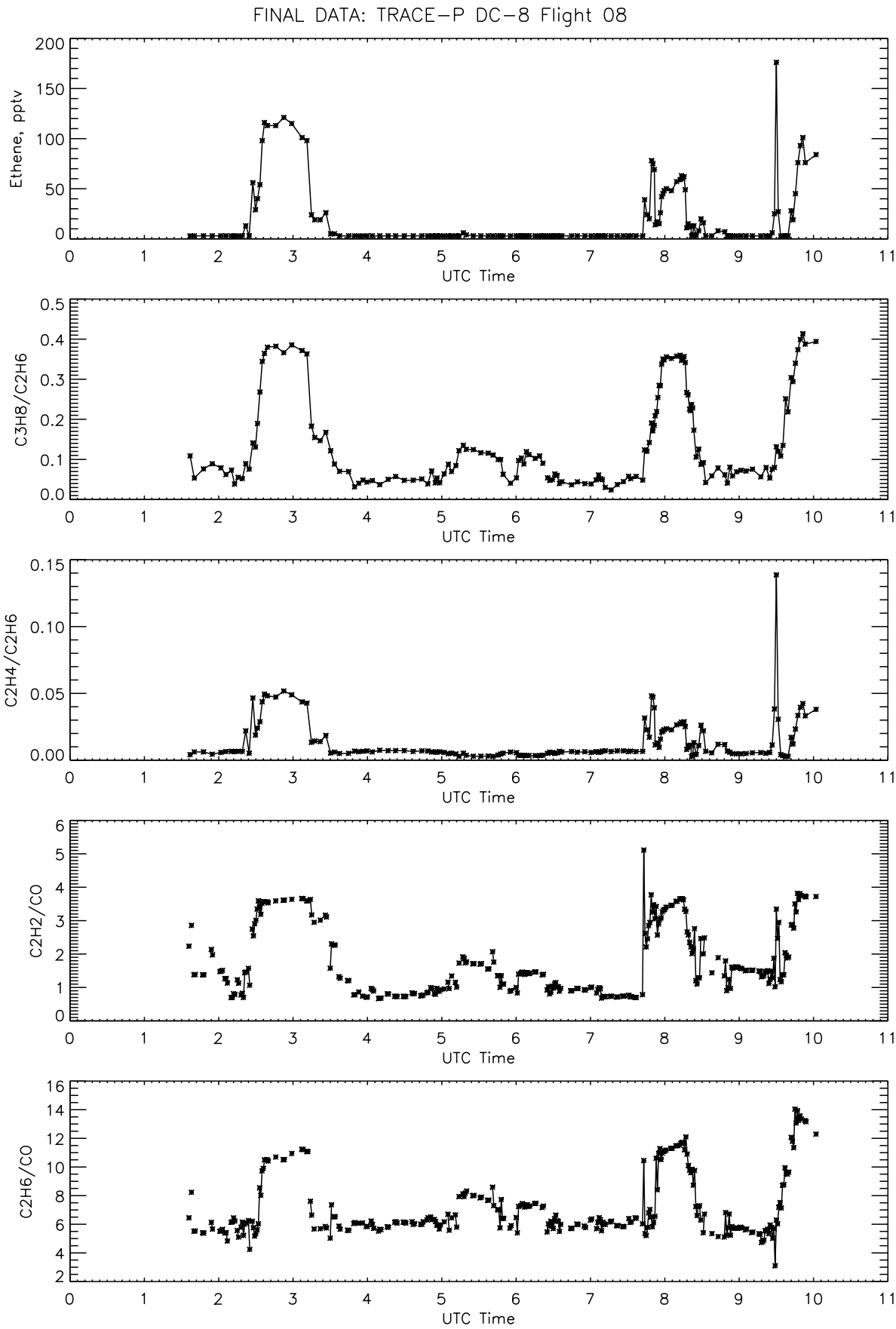
FINAL DATA: TRACE-P DC-8 Flight 08

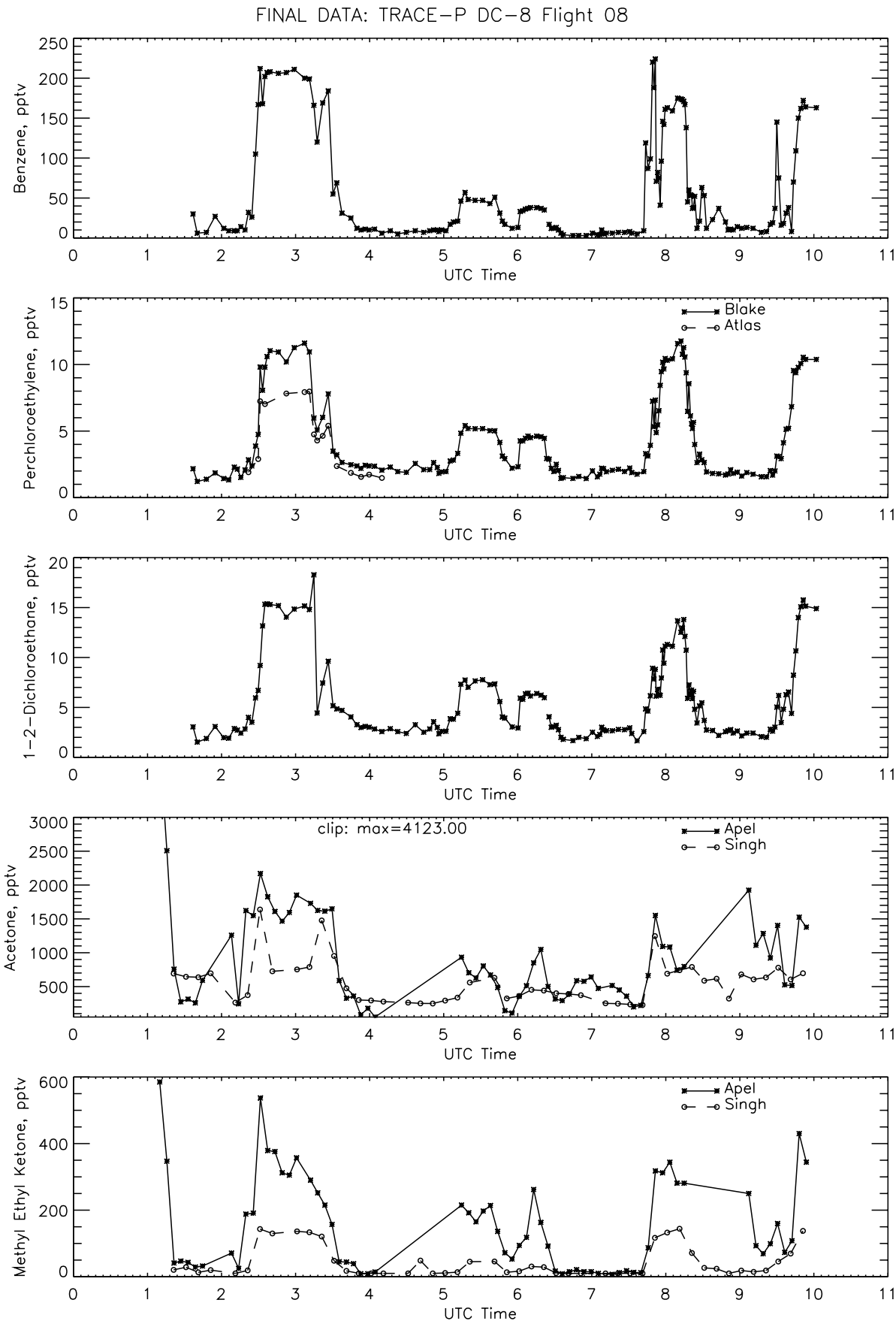


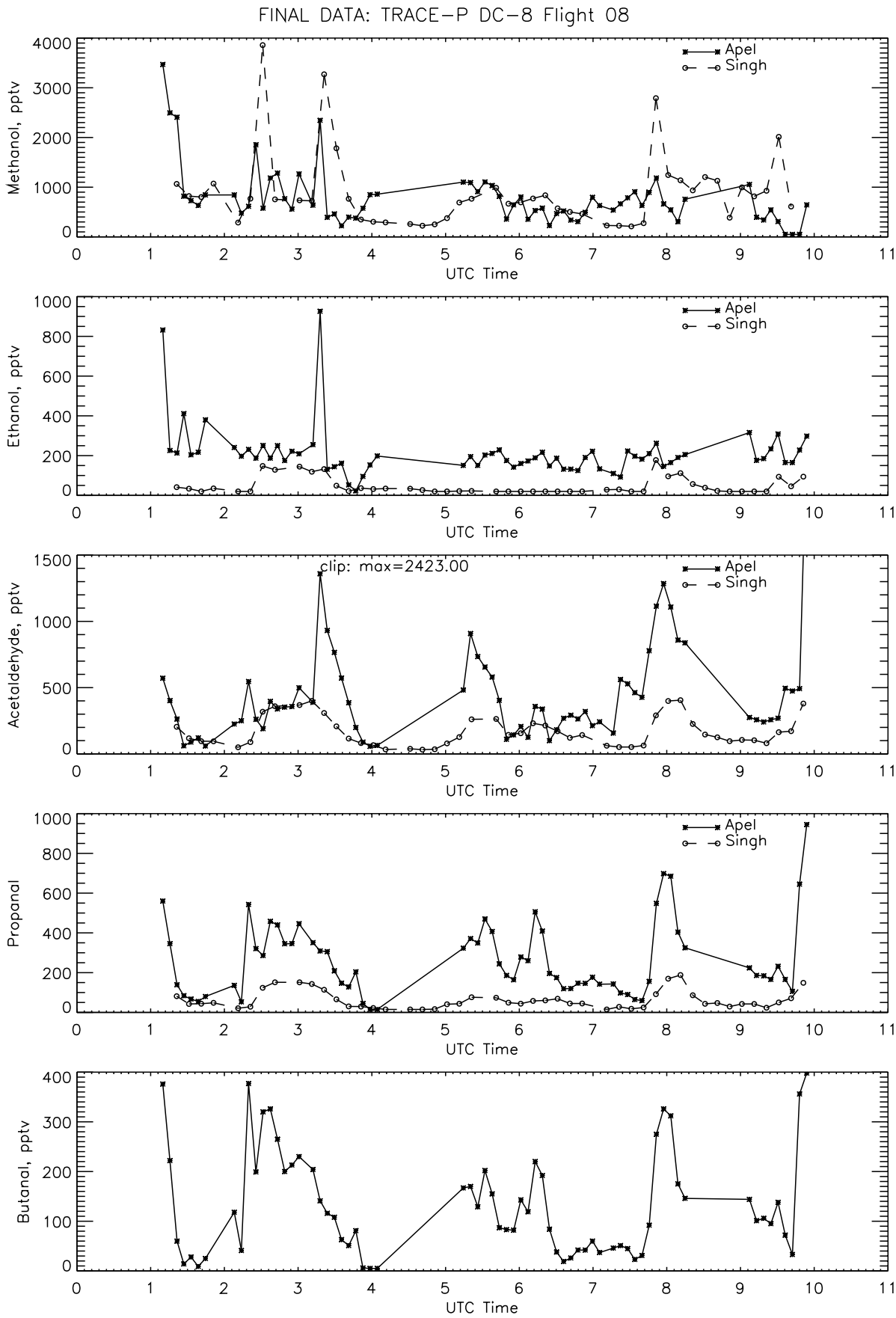

FINAL DATA: TRACE-P DC-8 Flight 08
clip: max=358.000
NO, pptv
NO2, pptv
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

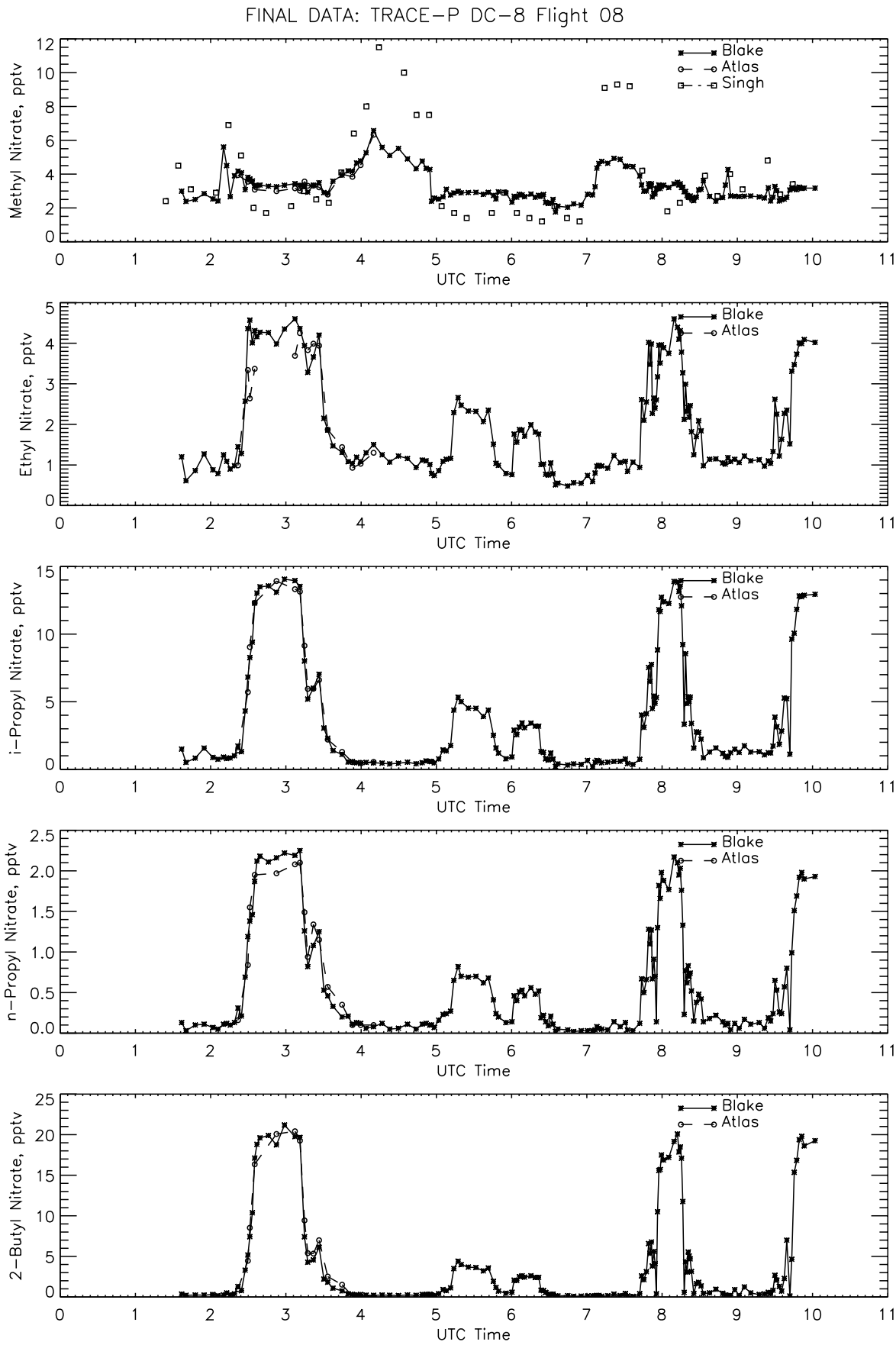

FINAL DATA: TRACE-P DC-8 Flight 08
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

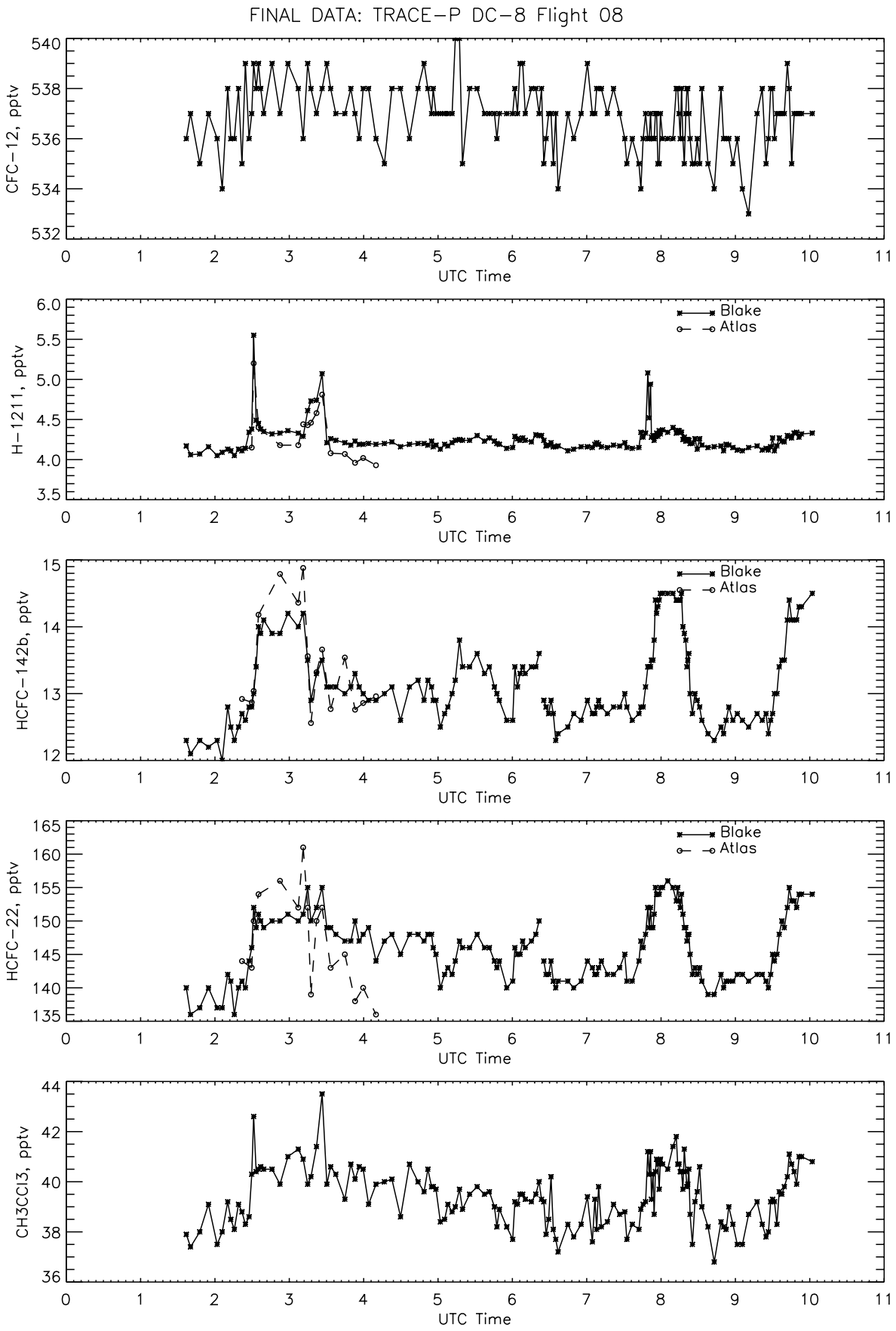

FINAL DATA: TRACE-P DC-8 Flight 08
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

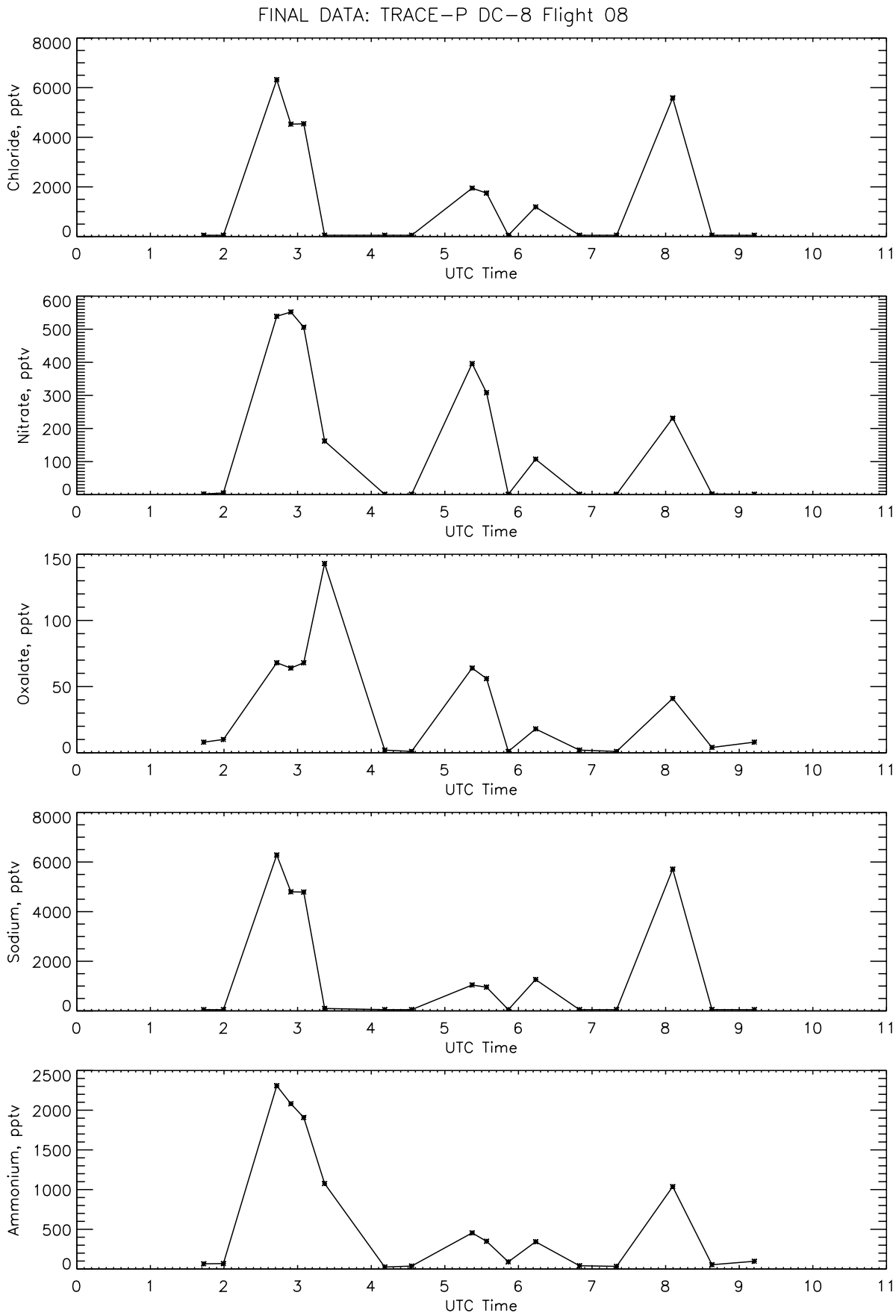

FINAL DATA: TRACE-P DC-8 Flight 08
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time

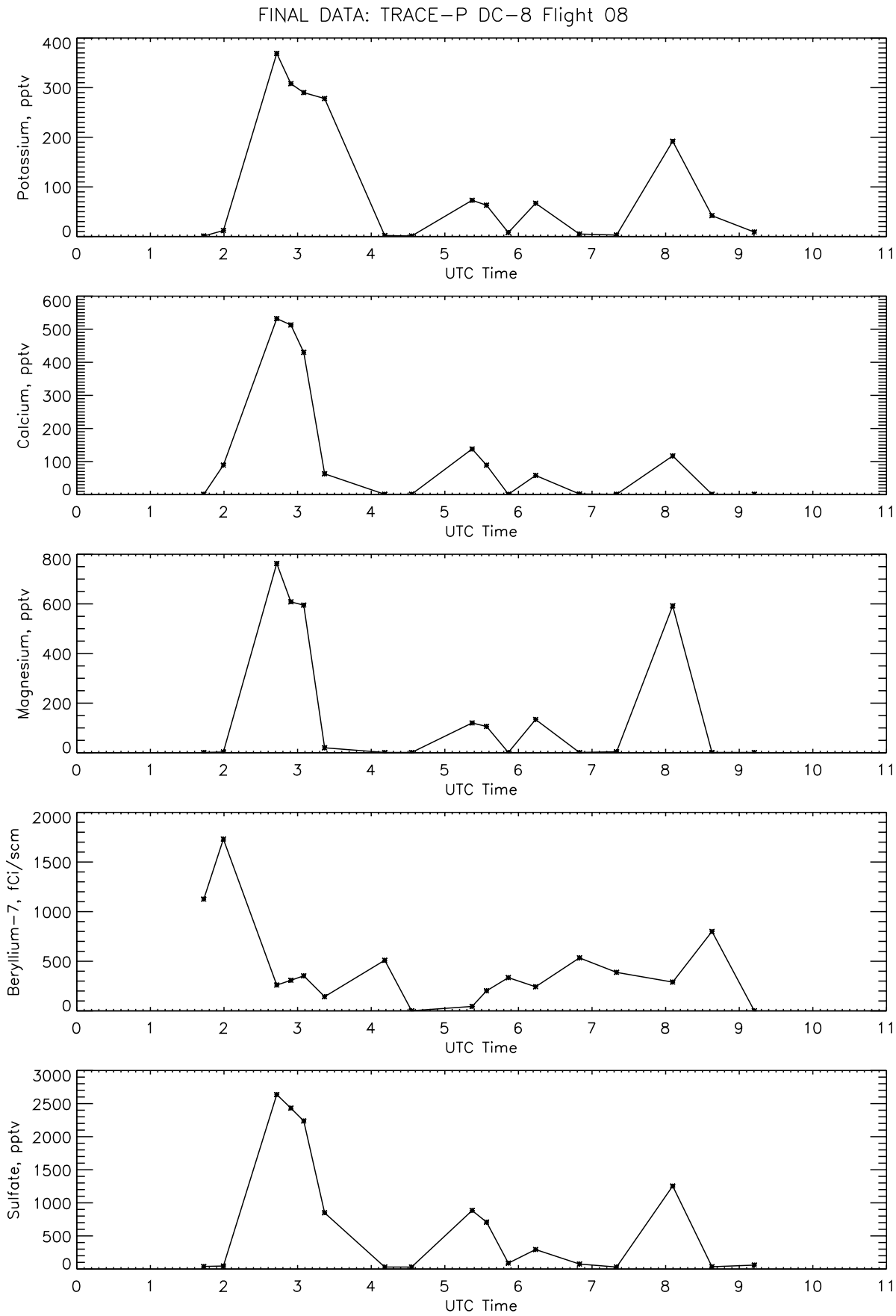

FINAL DATA: TRACE-P DC-8 Flight 08
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
clip: max=4123.00
Apel
Singh
Acetone, pptv
UTC Time
Apel
Singh
Methyl Ethyl Ketone, pptv
UTC Time

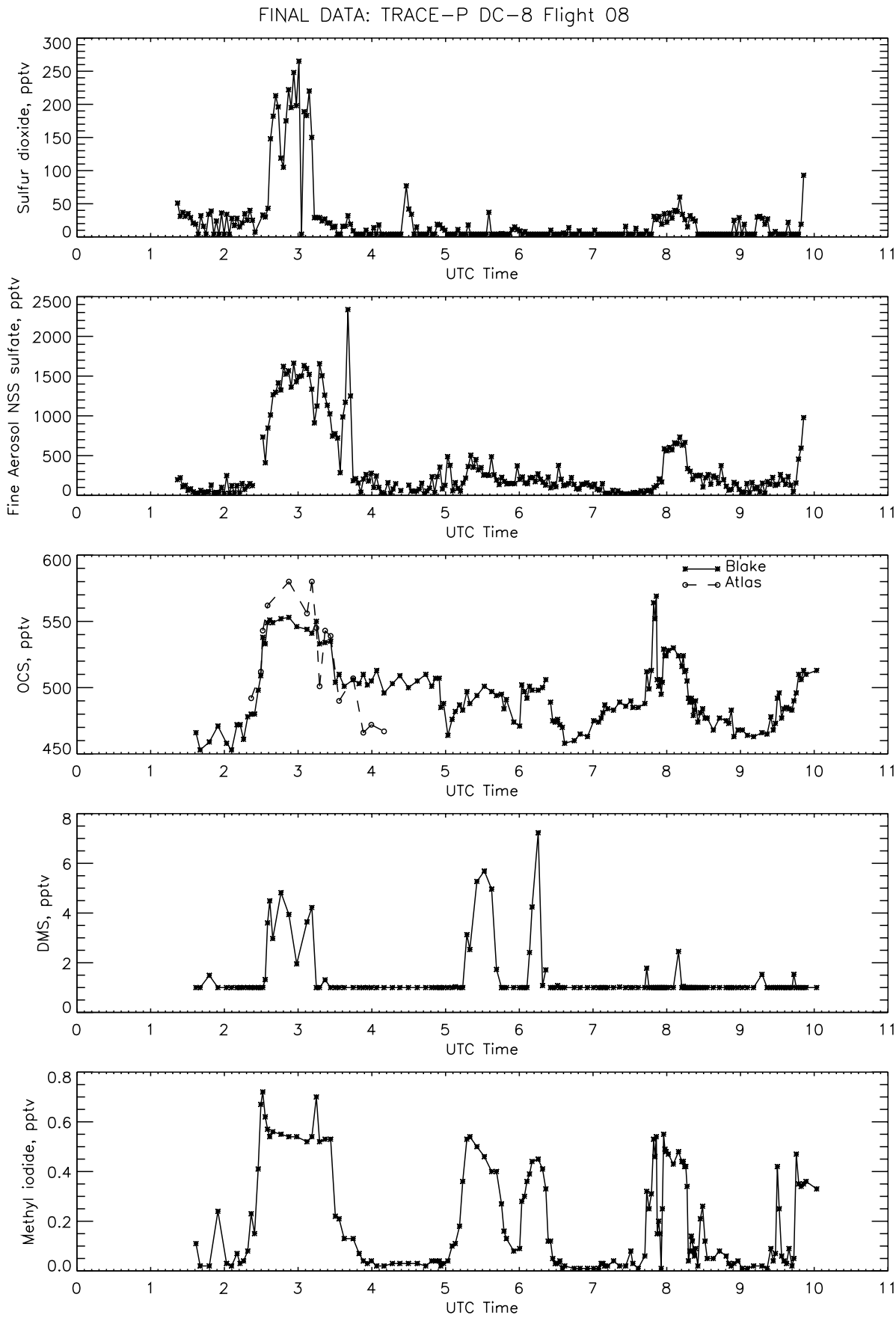

FINAL DATA: TRACE-P DC-8 Flight 08
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal
Butanal, pptv
UTC Time
Apel
Singh
clip: max=2423.00

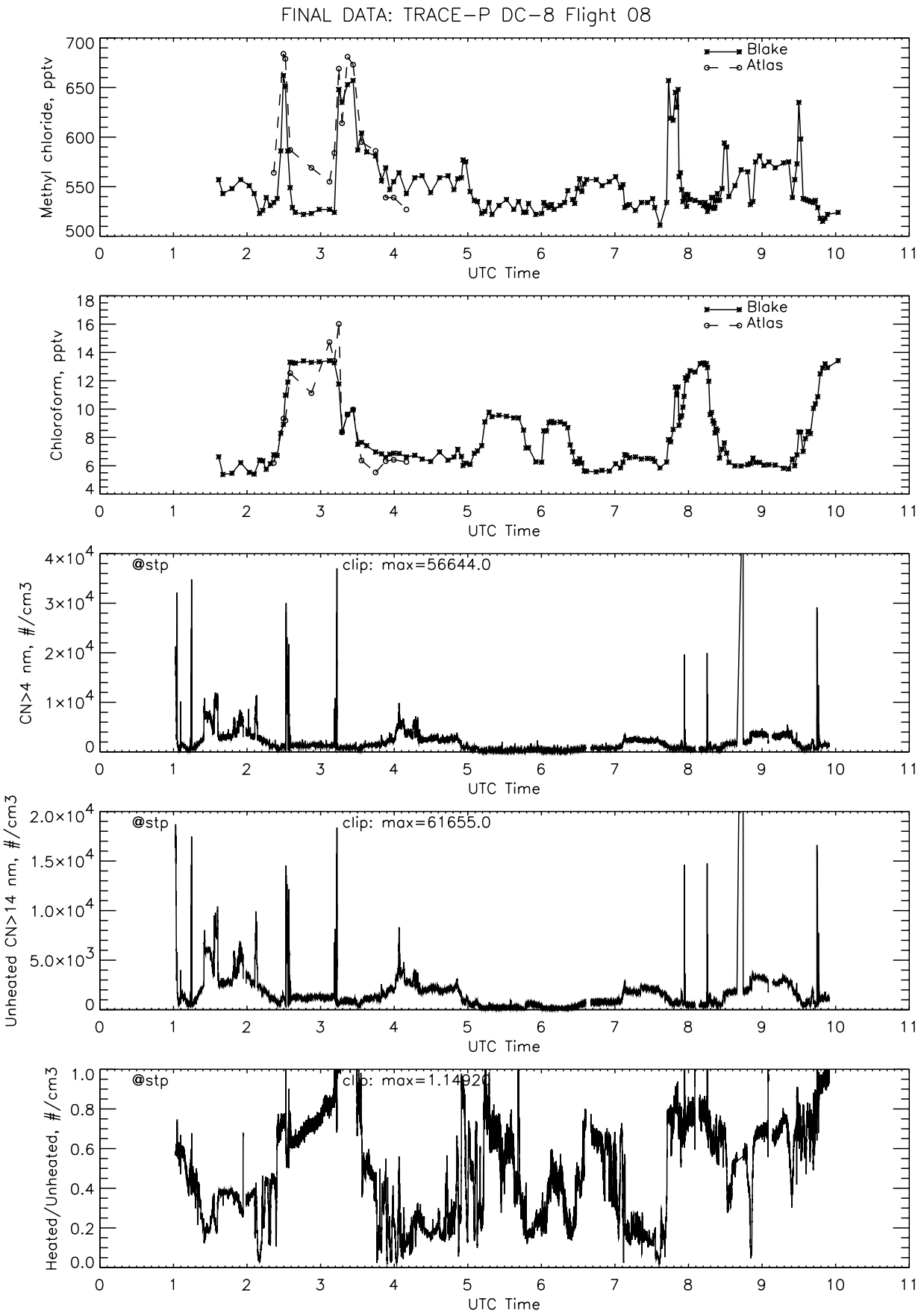

FINAL DATA: TRACE-P DC-8 Flight 08
Methyl Nitrate, pptv
Ethyl Nitrate, pptv
i-Propyl Nitrate, pptv
n-Propyl Nitrate, pptv
2-Butyl Nitrate, pptv
UTC Time
Blake
Atlas
Singh

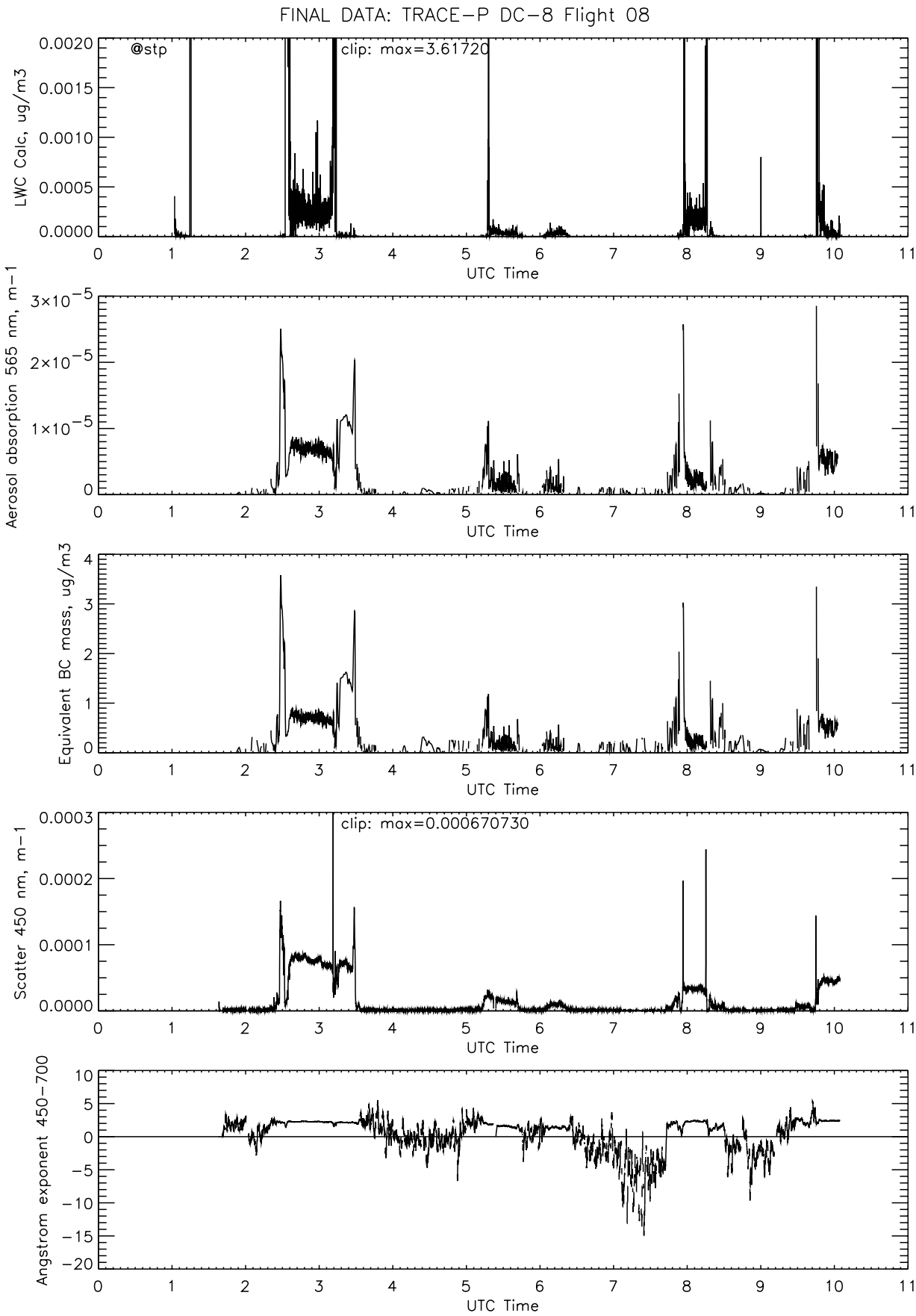

FINAL DATA: TRACE-P DC-8 Flight 08
CFC-12, pptv
UTC Time
H-1211, pptv
Blake
Atlas
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv

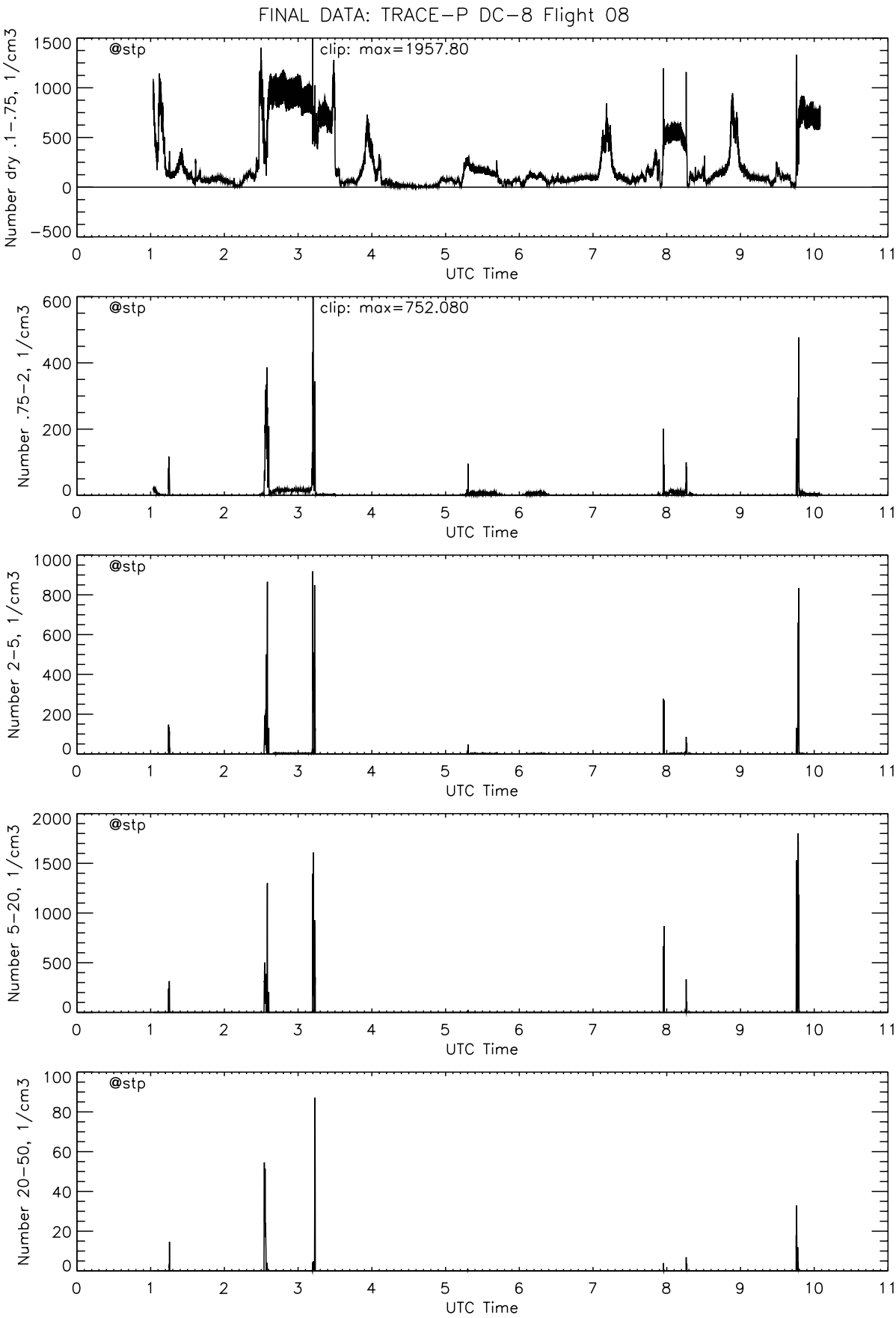

FINAL DATA: TRACE-P DC-8 Flight 08
Chloride, pptv
Nitrate, pptv
Oxalate, pptv
Sodium, pptv
Ammonium, pptv
UTC Time

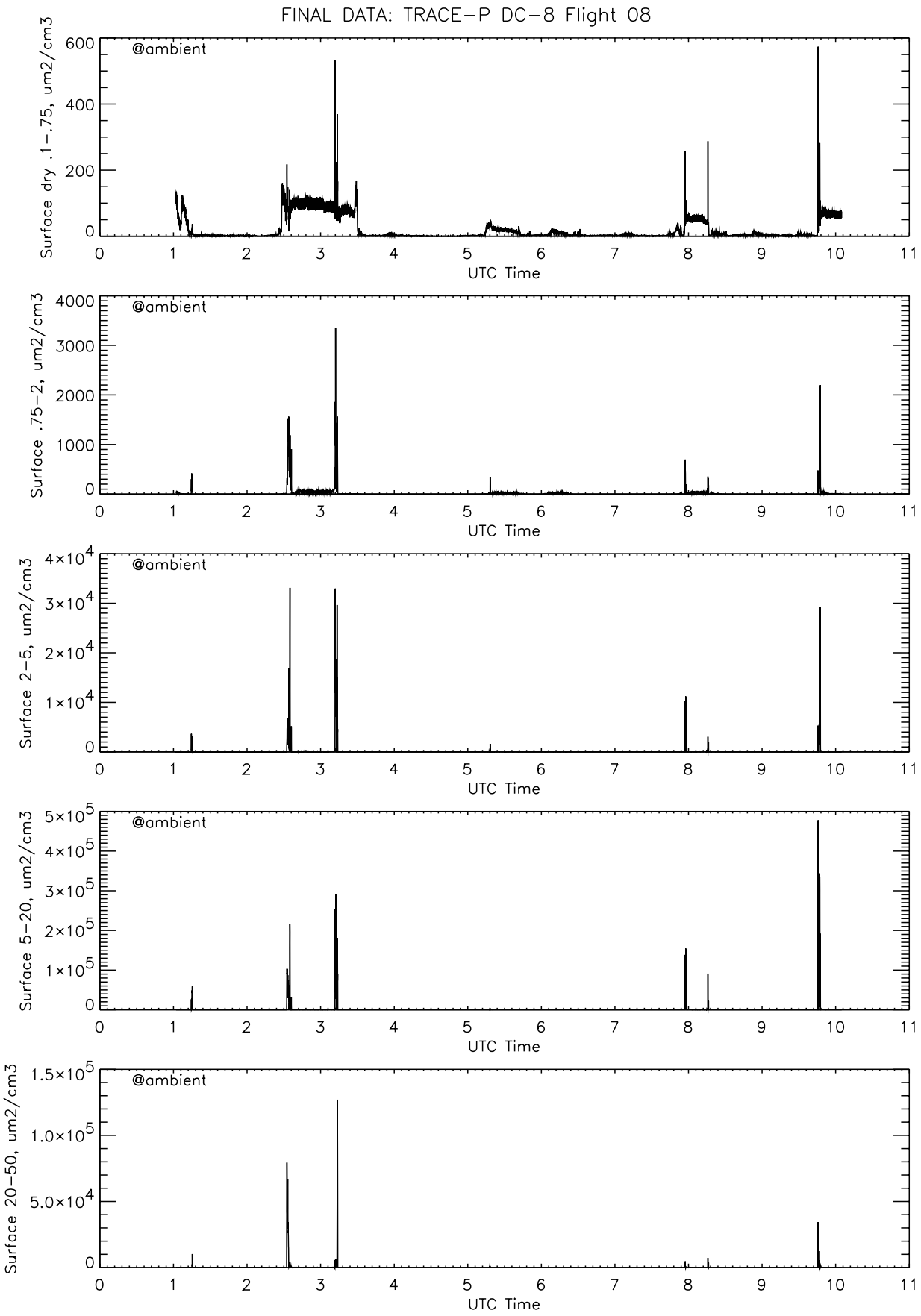

FINAL DATA: TRACE-P DC-8 Flight 08
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time

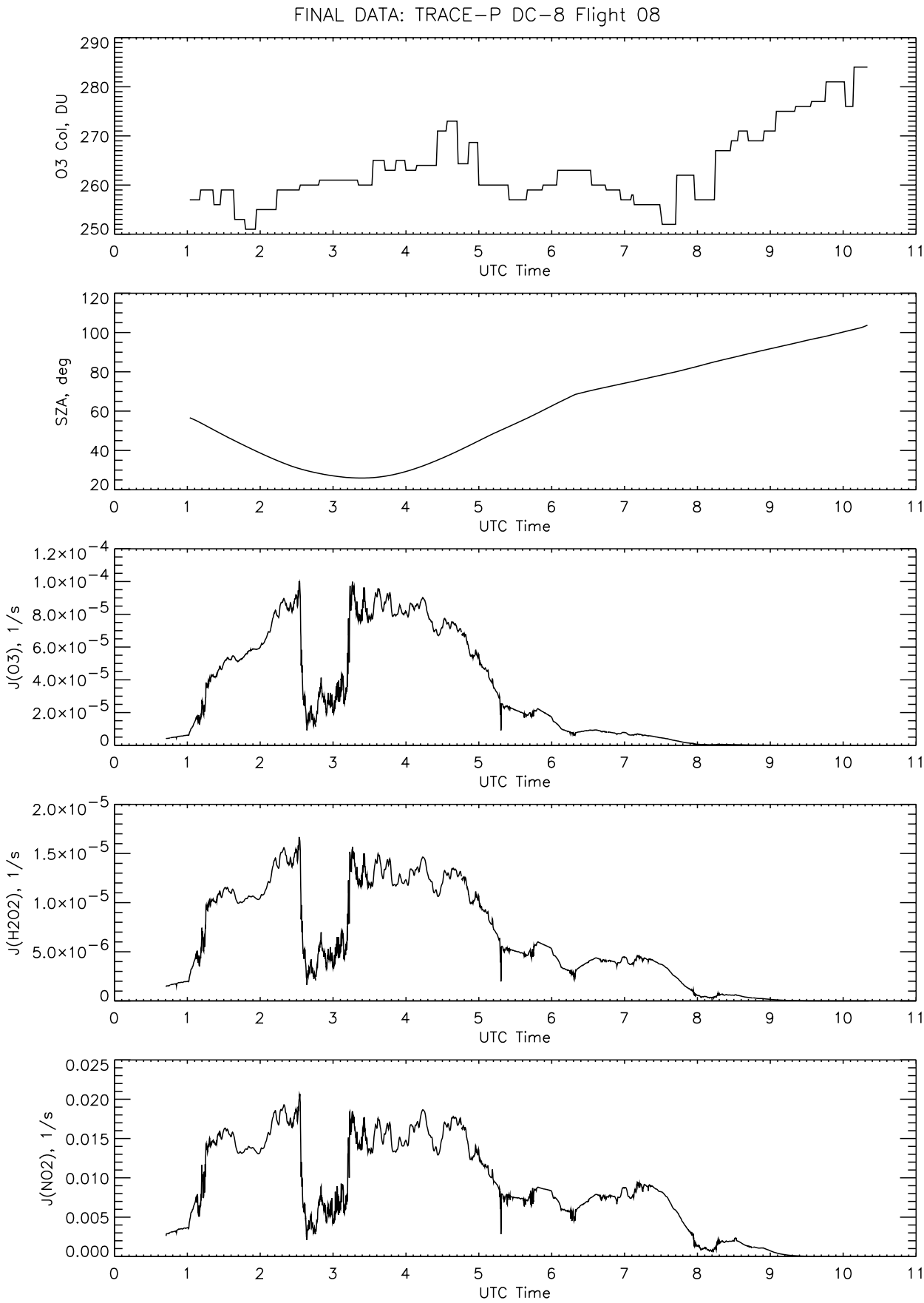

FINAL DATA: TRACE-P DC-8 Flight 08
Sulfur dioxide, pptv
UTC Time
Fine Aerosol NSS sulfate, pptv
UTC Time
OCS, pptv
Blake
Atlas
UTC Time
DMS, pptv
UTC Time
Methyl iodide, pptv
UTC Time

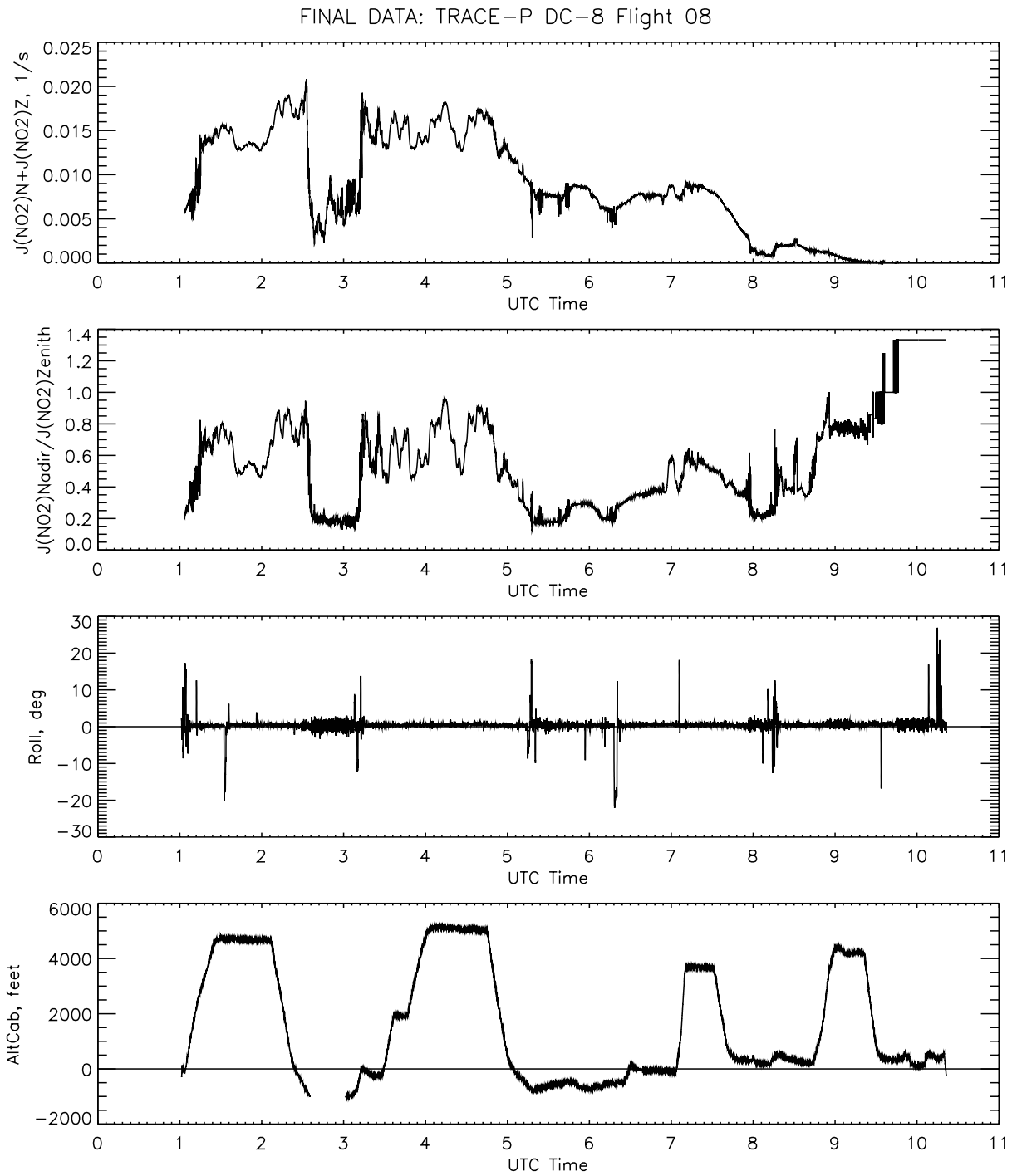

FINAL DATA: TRACE-P DC-8 Flight 08
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
clip: max=56644.0
UTC Time
Unheated CN>14 nm, #/cm3
@stp
clip: max=61655.0
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14920
UTC Time

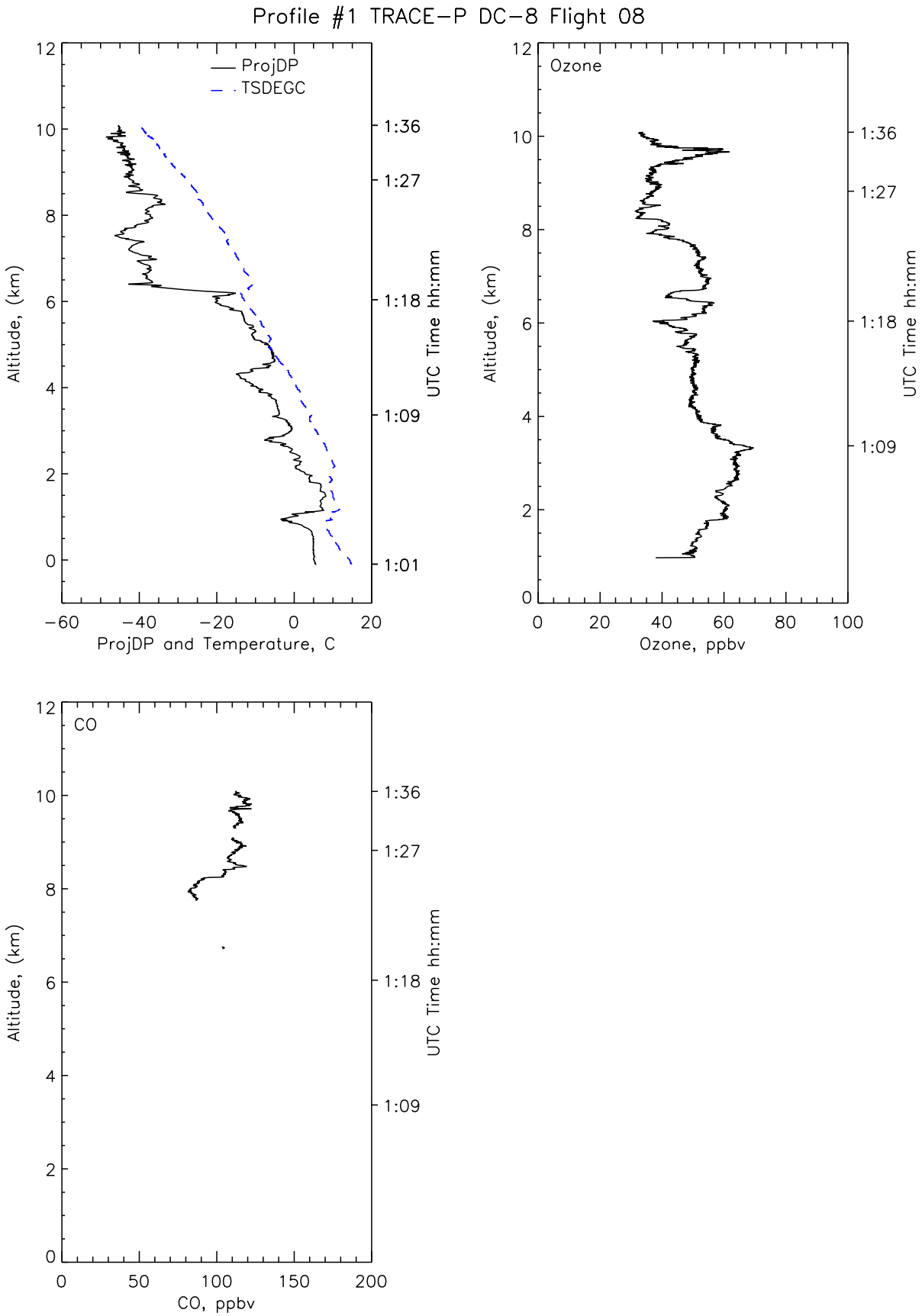

FINAL DATA: TRACE-P DC-8 Flight 08
@stp
clip: max=3.61720
LWC Calc, ug/m3
UTC Time
Aerosol absorption 565 nm, m-1
UTC Time
Equivalent BC mass, ug/m3
UTC Time
clip: max=0.000670730
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

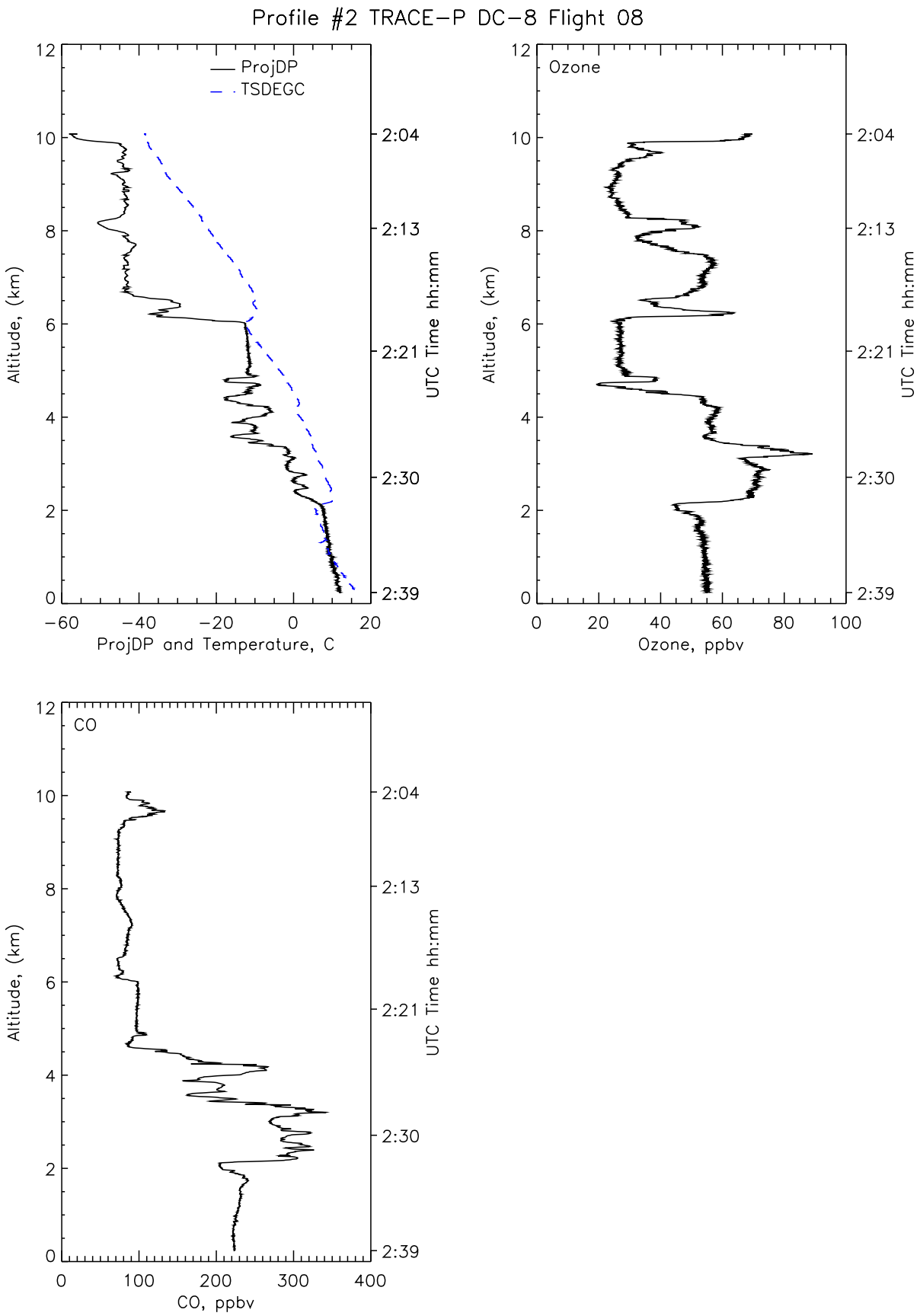

FINAL DATA: TRACE-P DC-8 Flight 08
@stp
clip: max=1957.80
Number dry .1-.75, 1/cm3
UTC Time
@stp
clip: max=752.080
Number .75-2, 1/cm3
UTC Time
@stp
Number 2-5, 1/cm3
UTC Time
@stp
Number 5-20, 1/cm3
UTC Time
@stp
Number 20-50, 1/cm3
UTC Time

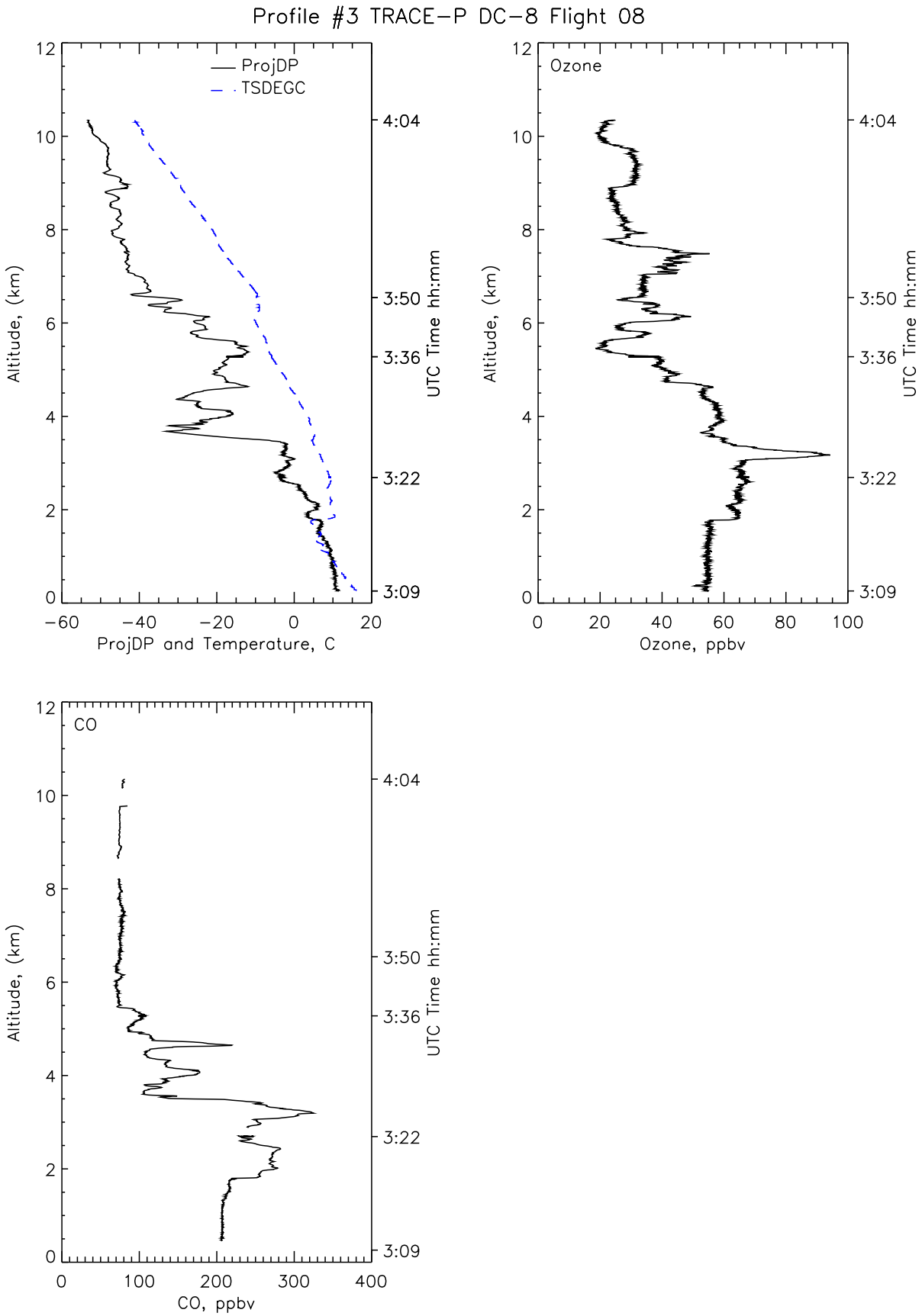

FINAL DATA: TRACE-P DC-8 Flight 08
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

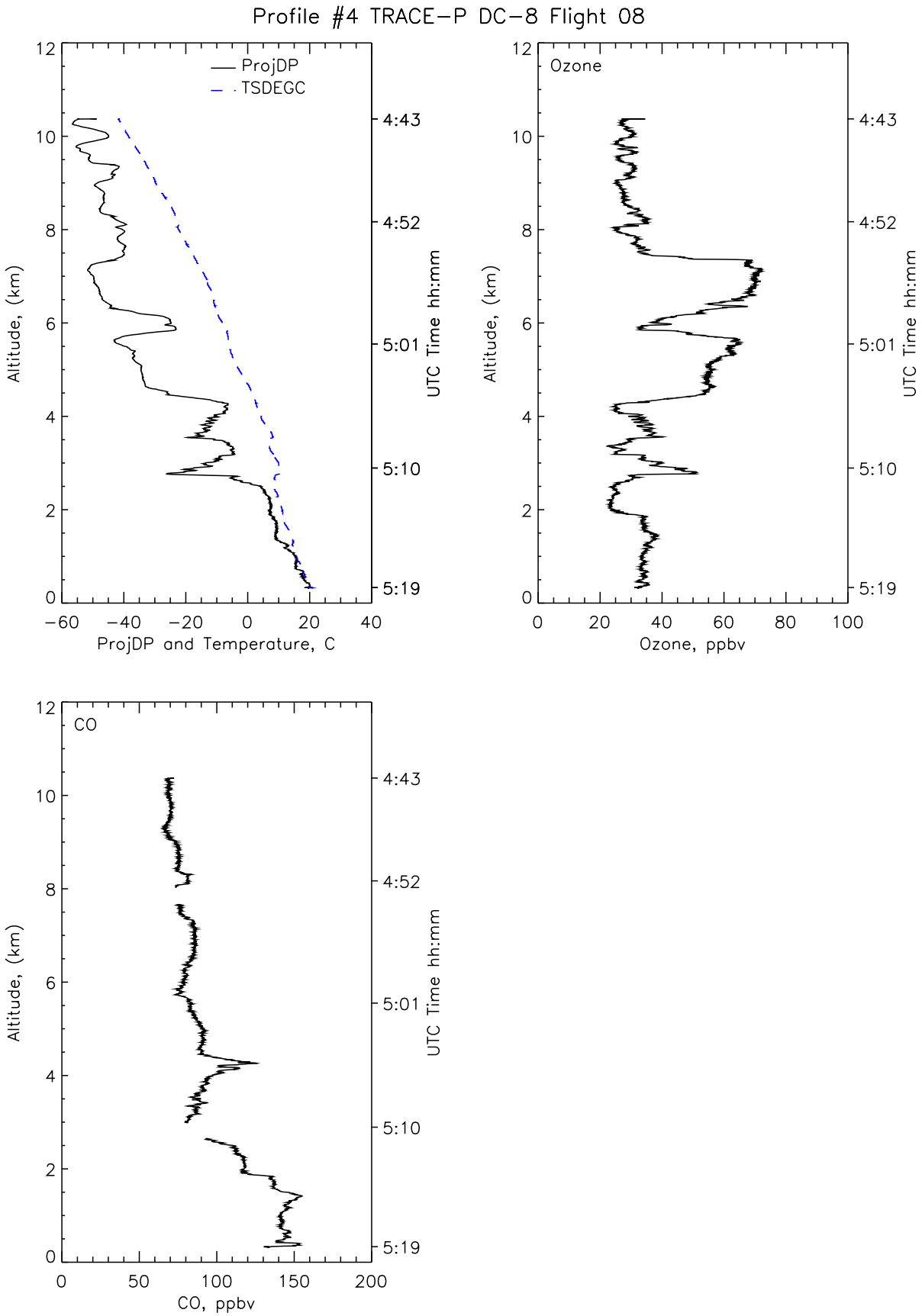

FINAL DATA: TRACE-P DC-8 Flight 08
O3 Col, DU
UTC Time
SZA, deg
UTC Time
J(O3), 1/s
UTC Time
J(H2O2), 1/s
UTC Time
J(NO2), 1/s
UTC Time

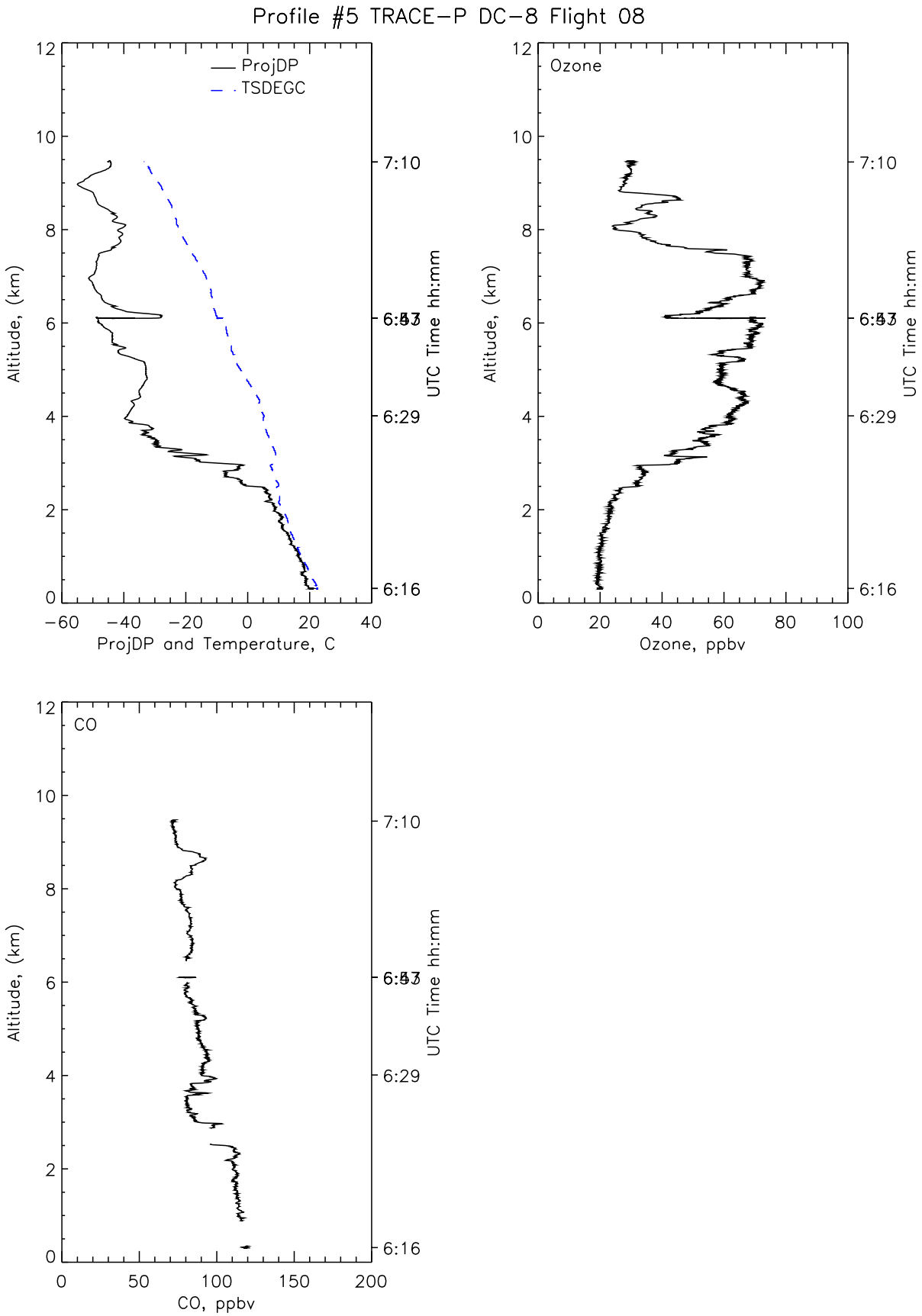

FINAL DATA: TRACE-P DC-8 Flight 08
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
6000
4000
2000
0
−2000
UTC Time
0
1
2
3
4
5
6
7
8
9
10
11

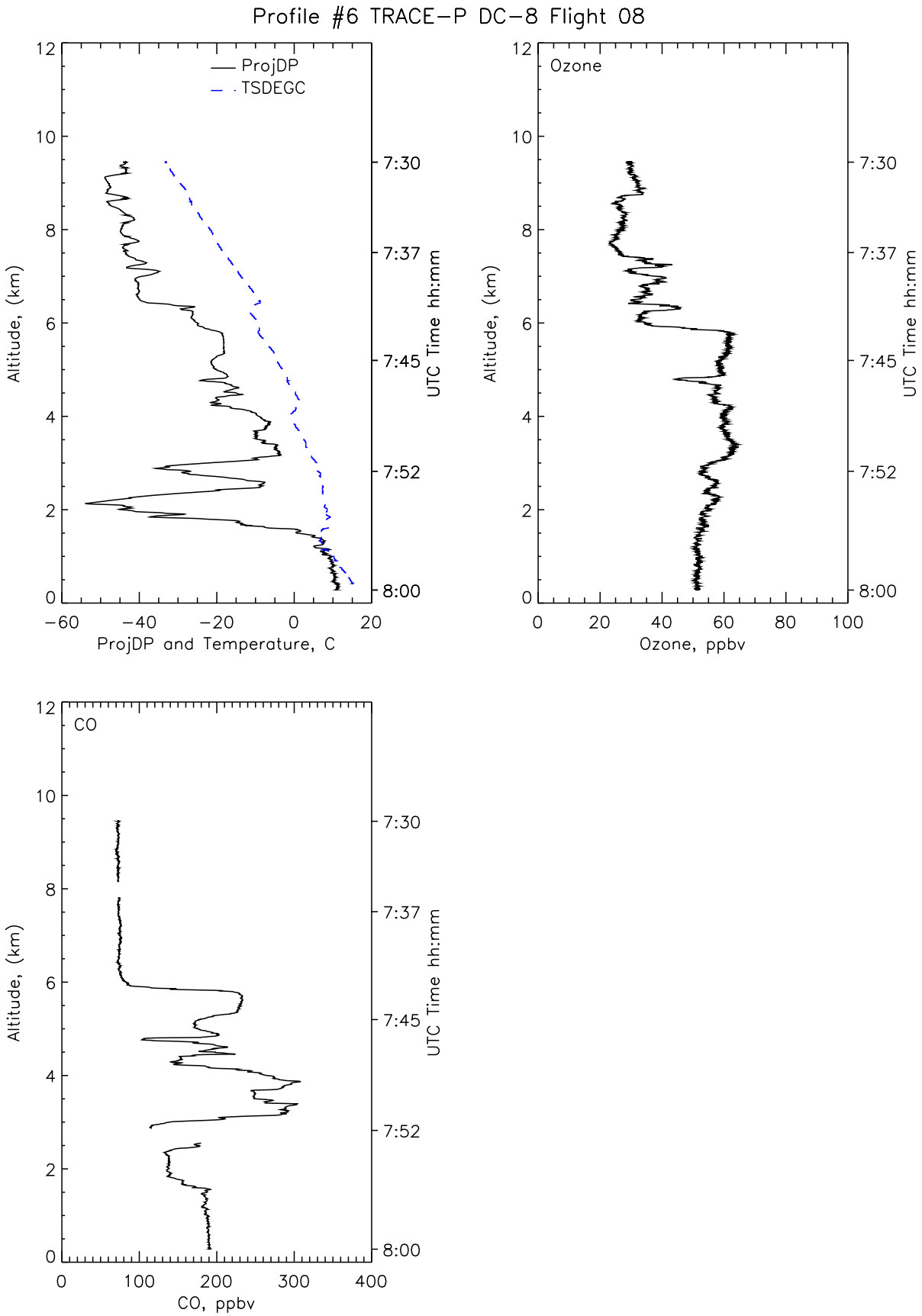

Profile #1 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
1:36
1:27
1:18
1:09
1:01
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

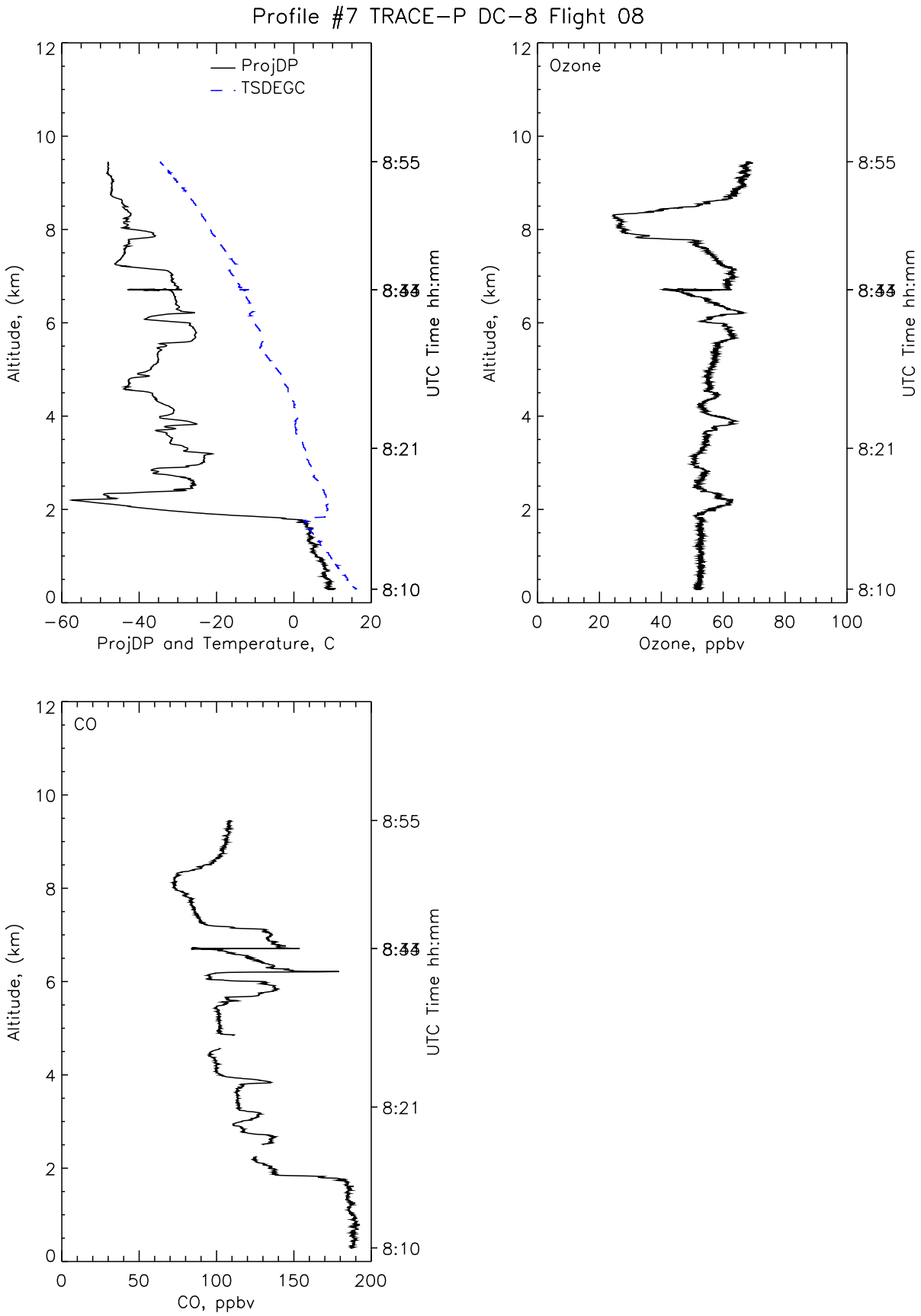

Profile #2 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

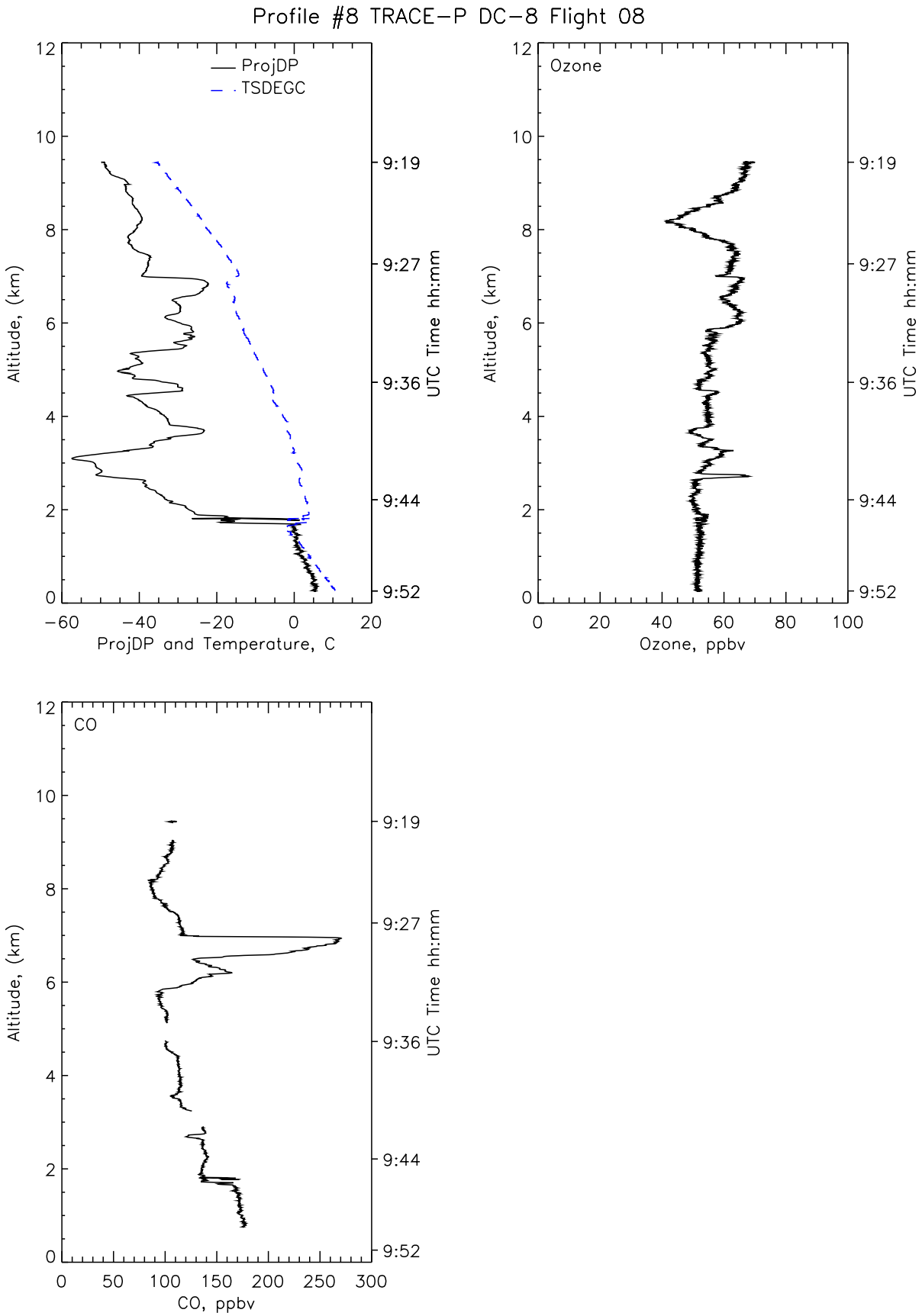

Profile #3 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #4 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
4:43
4:52
5:01
5:10
5:19
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #5 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
7:10
6:53
6:29
6:16
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #7 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
8:10
8:21
8:33
8:44
8:55
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #8 TRACE-P DC-8 Flight 08
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

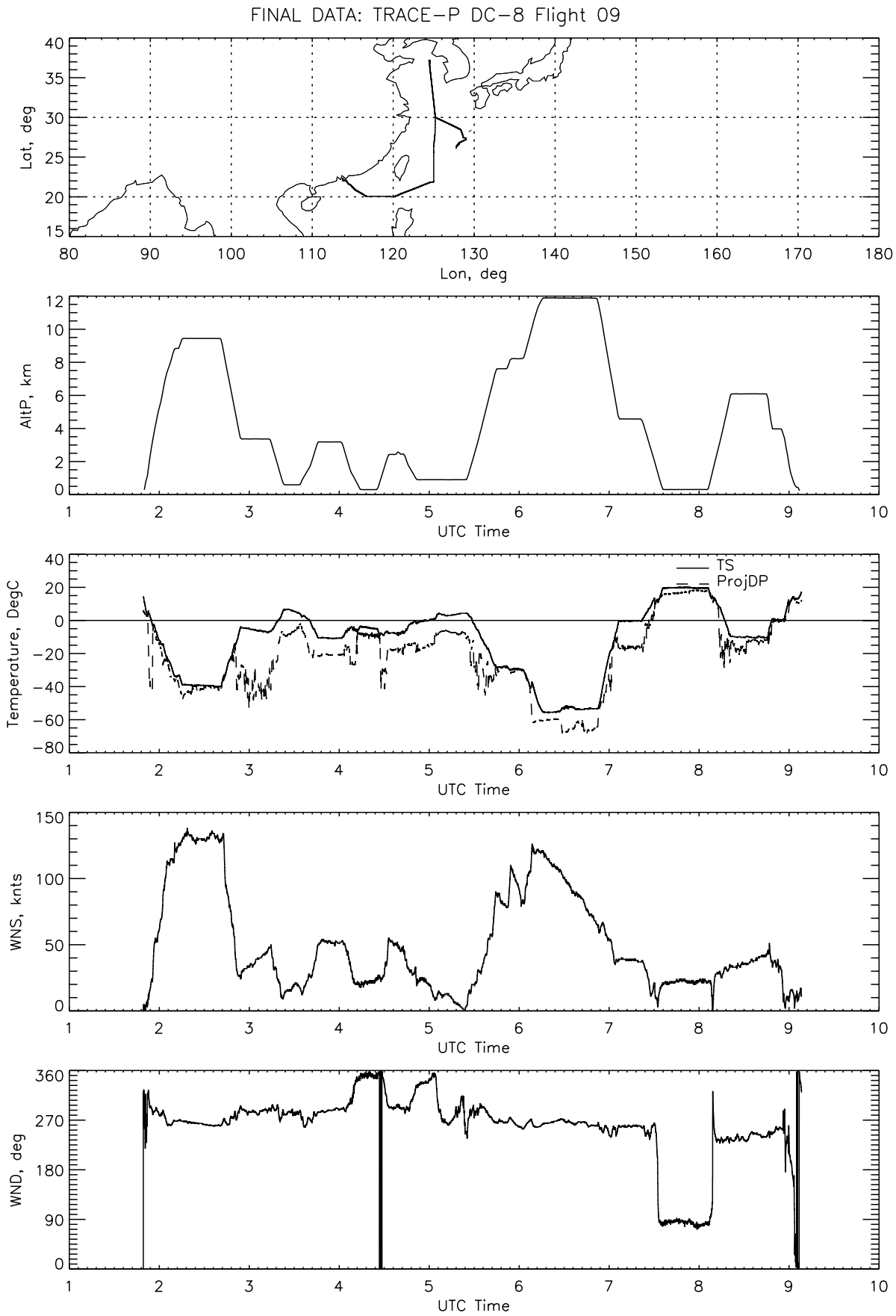
TRACE-P

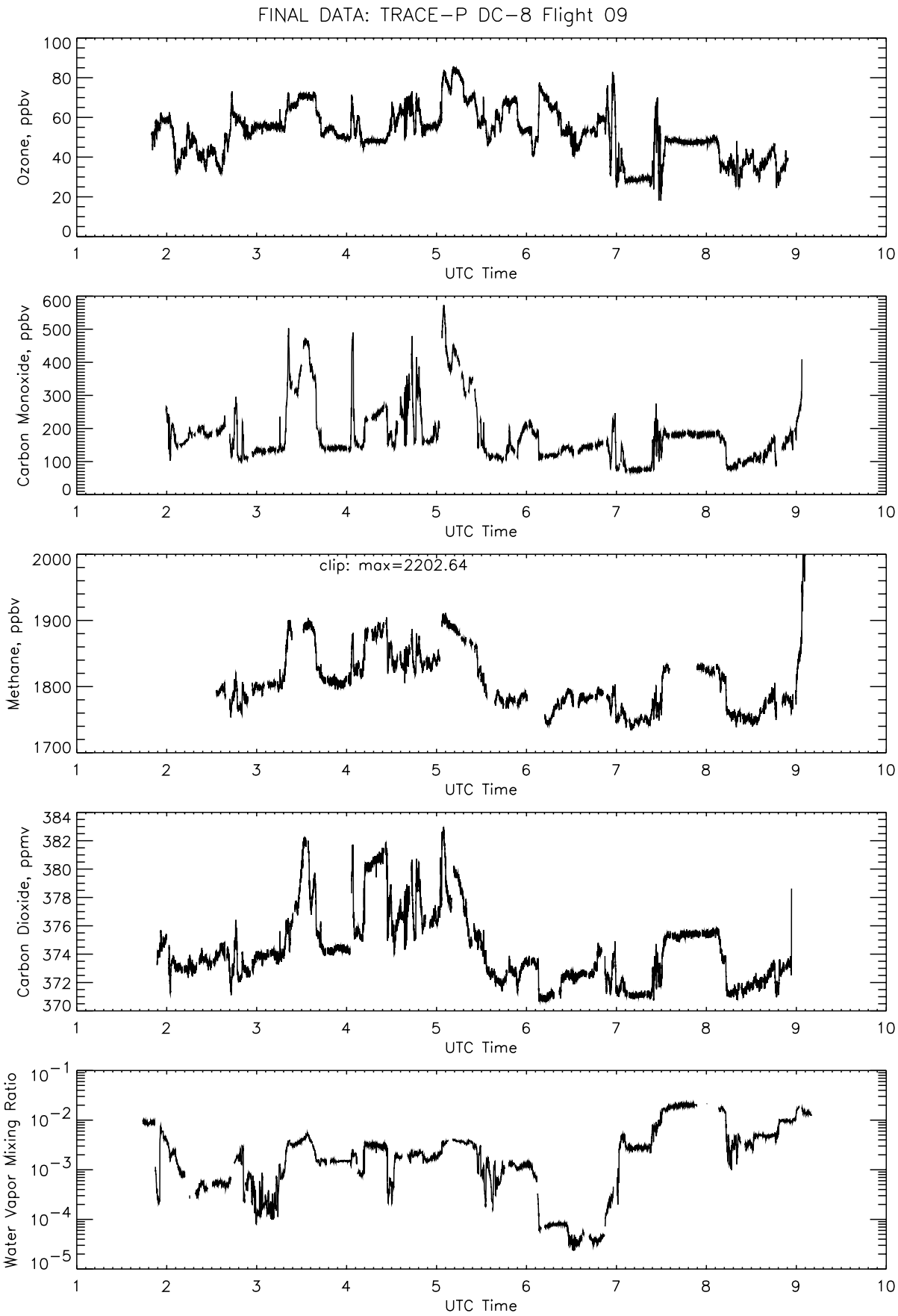
Flight 9D

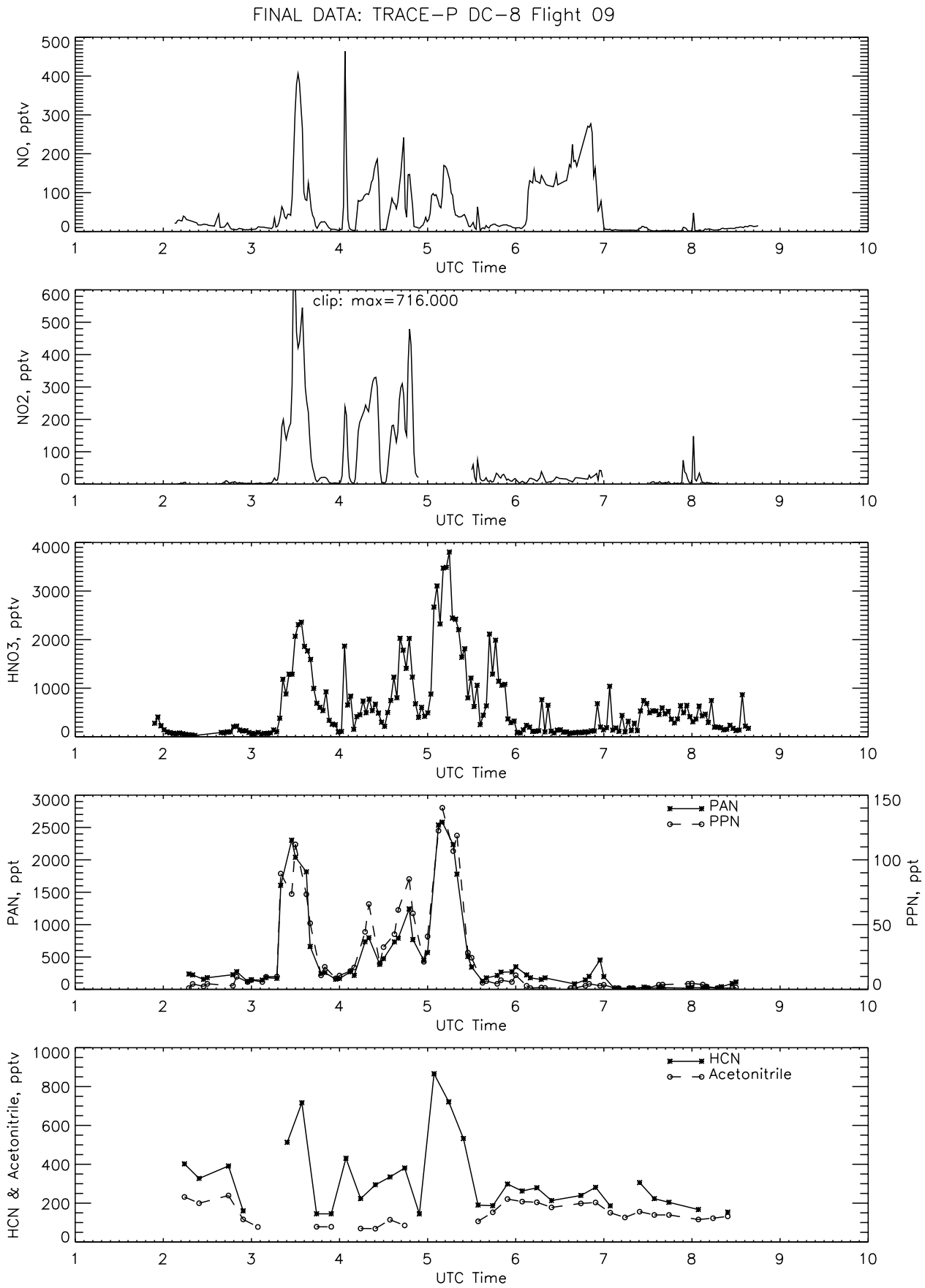
Local: Hong Kong No. 3

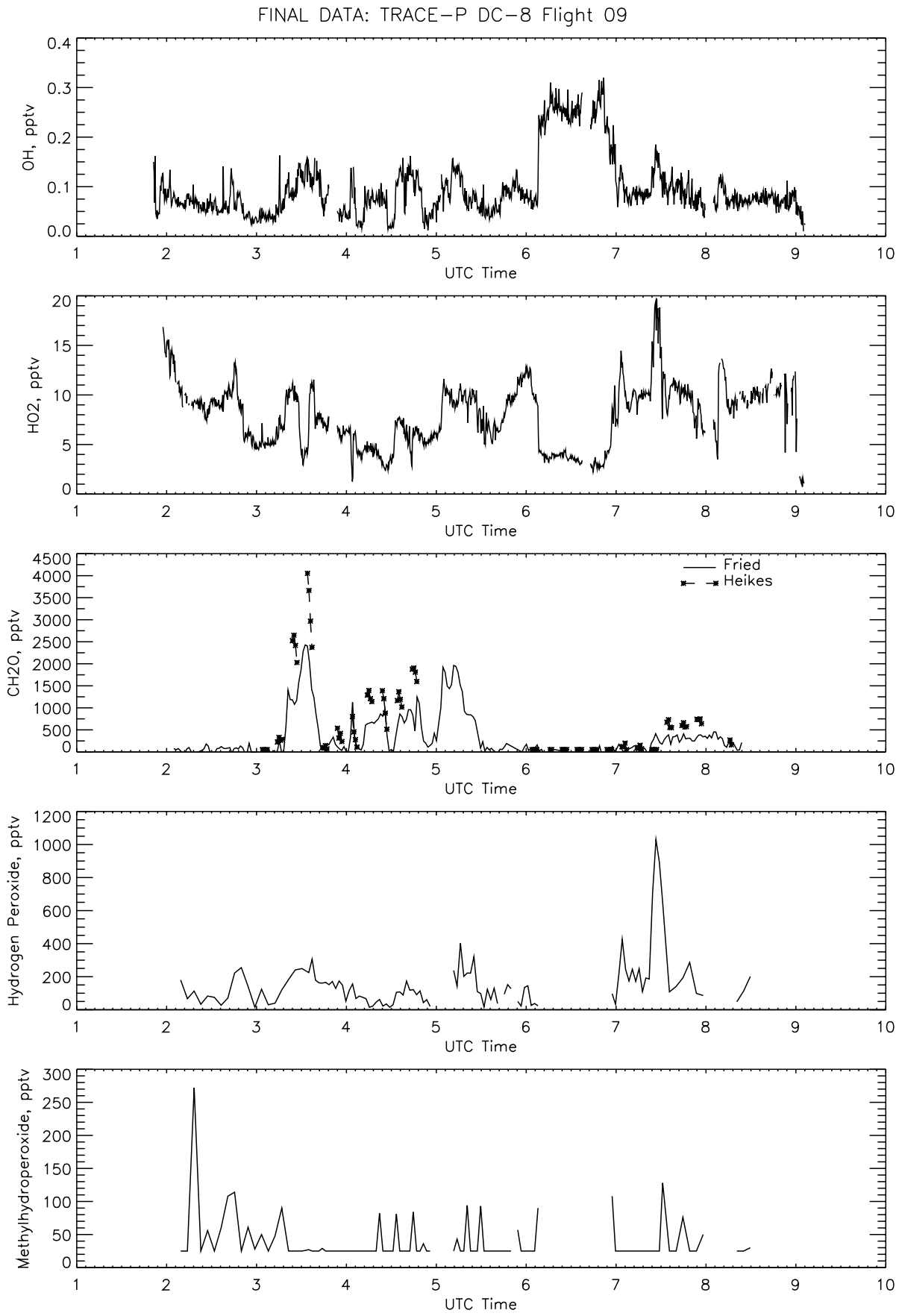
China Outflow to Yellow Sea

March 10, 2001

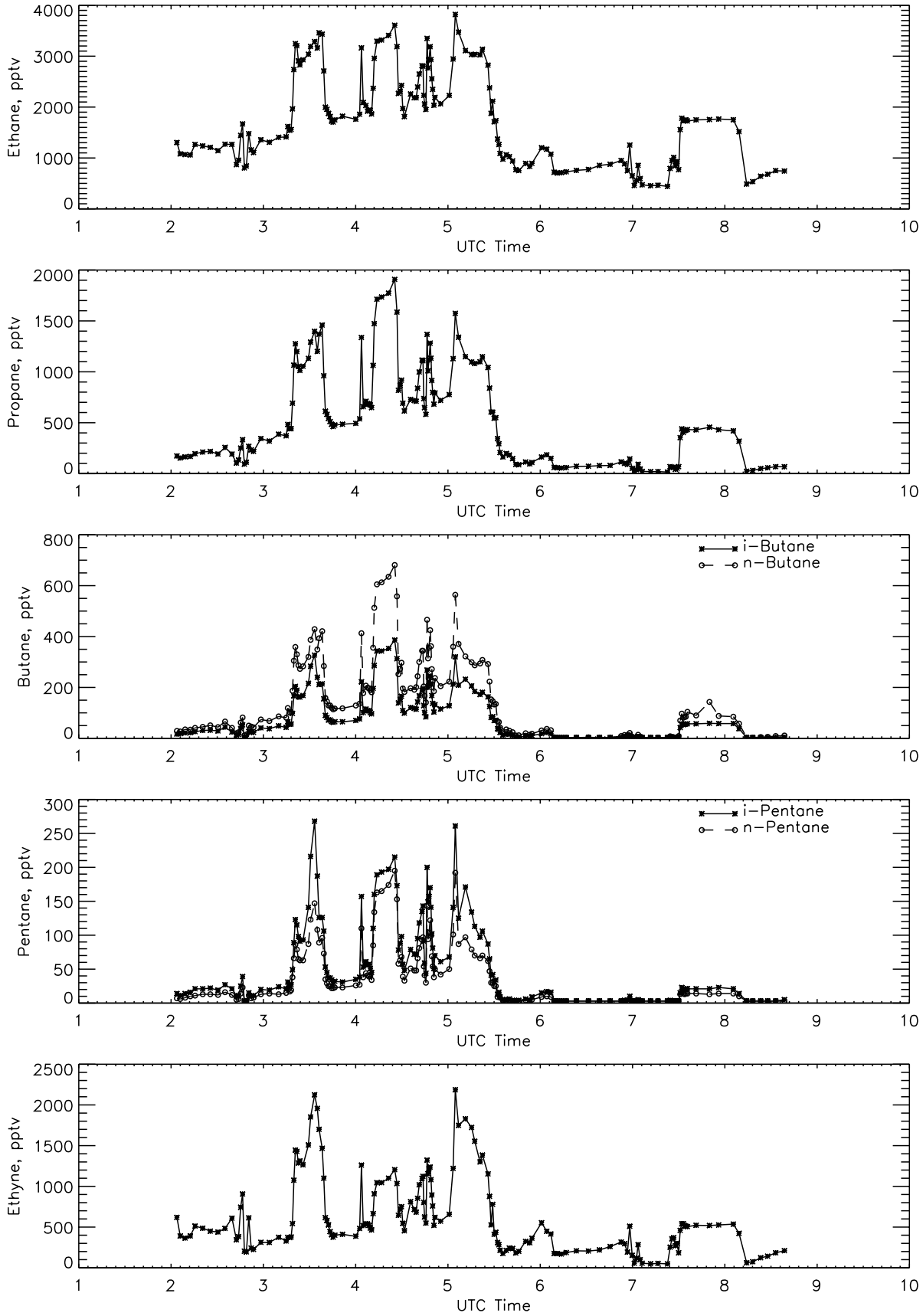

FINAL DATA: TRACE-P DC-8 Flight 09
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

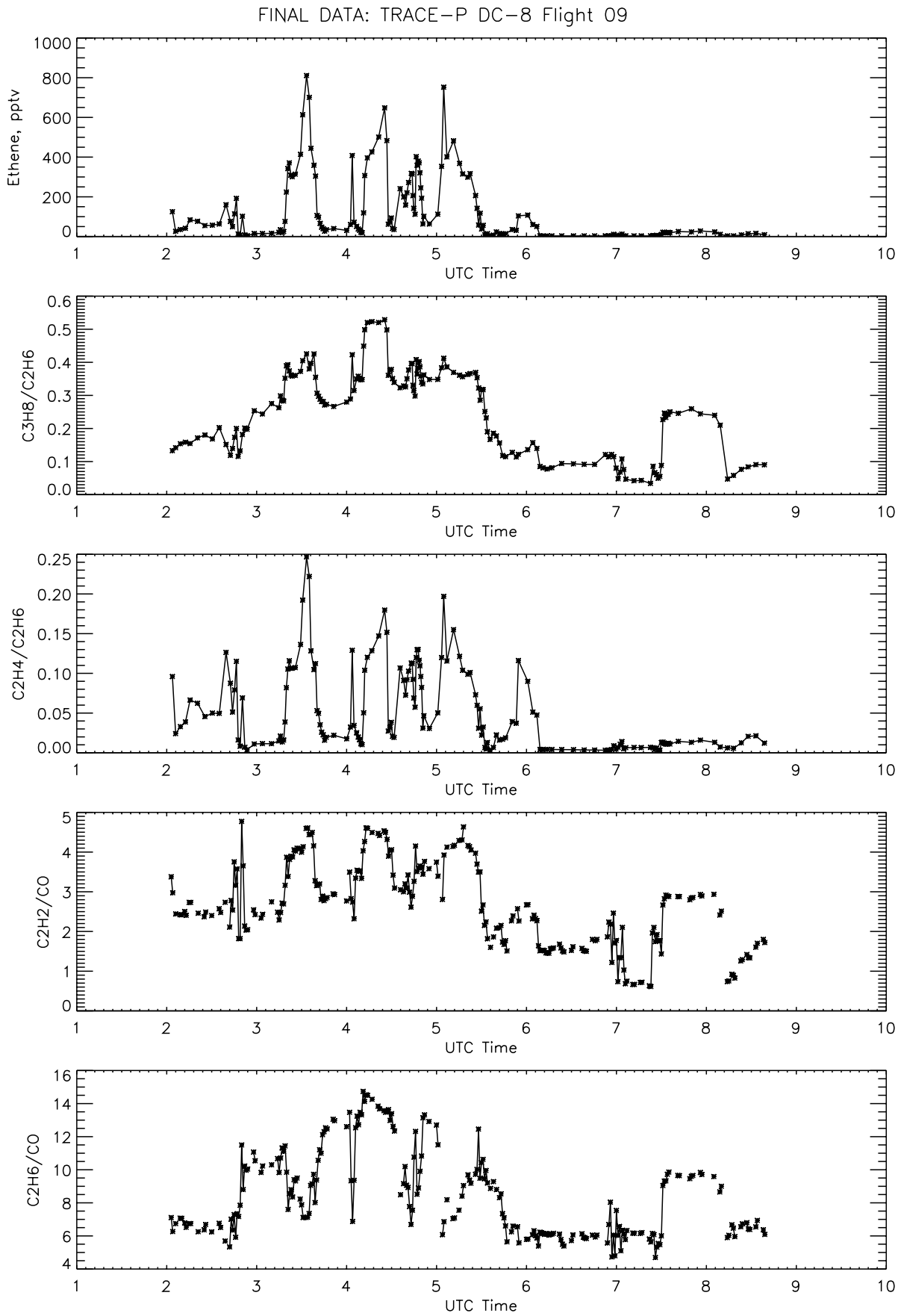

FINAL DATA: TRACE-P DC-8 Flight 09
Ozone, ppbv
UTC Time
Carbon Monoxide, ppbv
UTC Time
clip: max=2202.64
Methane, ppbv
UTC Time
Carbon Dioxide, ppmv
UTC Time
Water Vapor Mixing Ratio
UTC Time

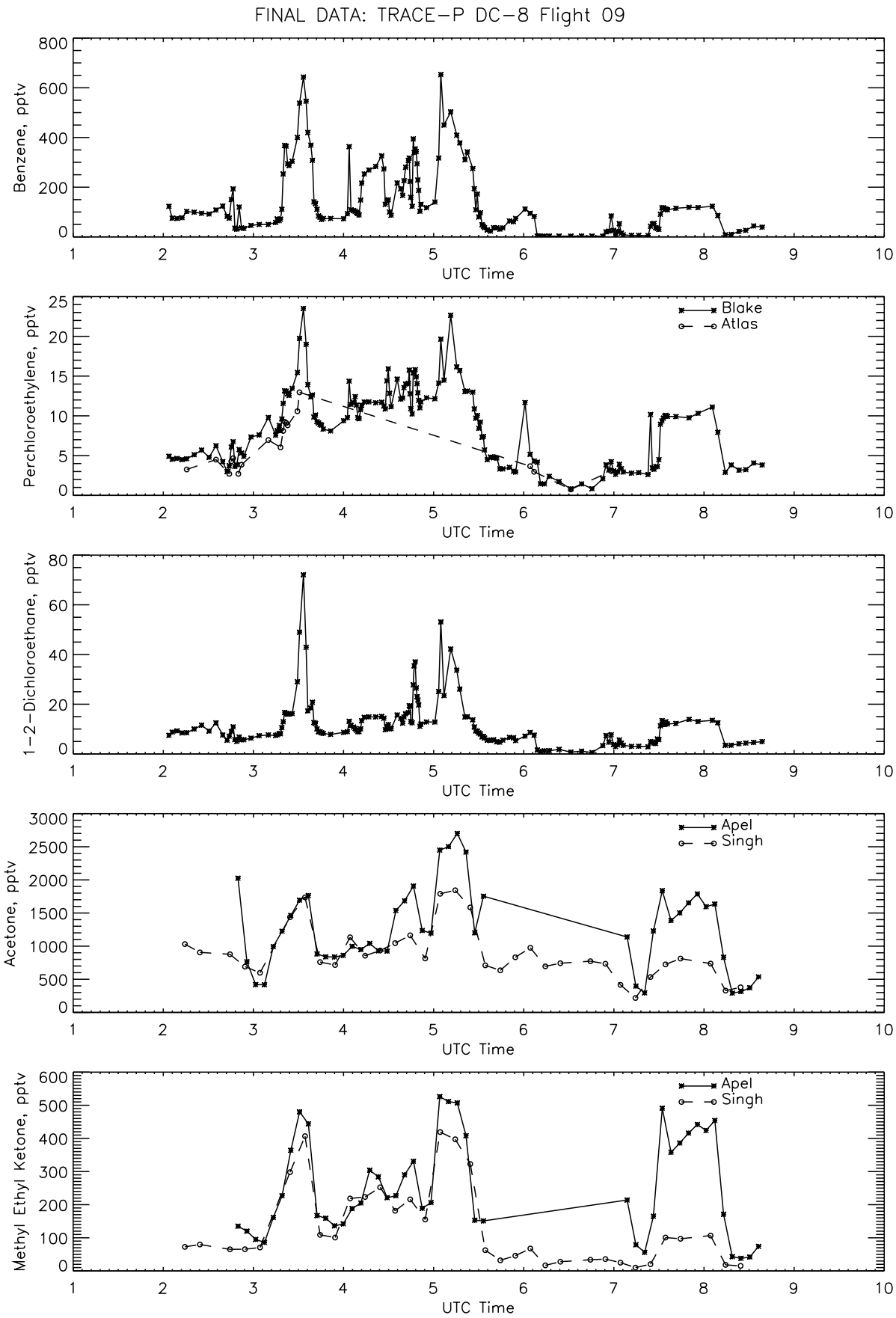

FINAL DATA: TRACE-P DC-8 Flight 09
NO, pptv
UTC Time
NO2, pptv
clip: max=716.000
UTC Time
HNO3, pptv
UTC Time
PAN, ppt
PPN, ppt
PAN
PPN
UTC Time
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

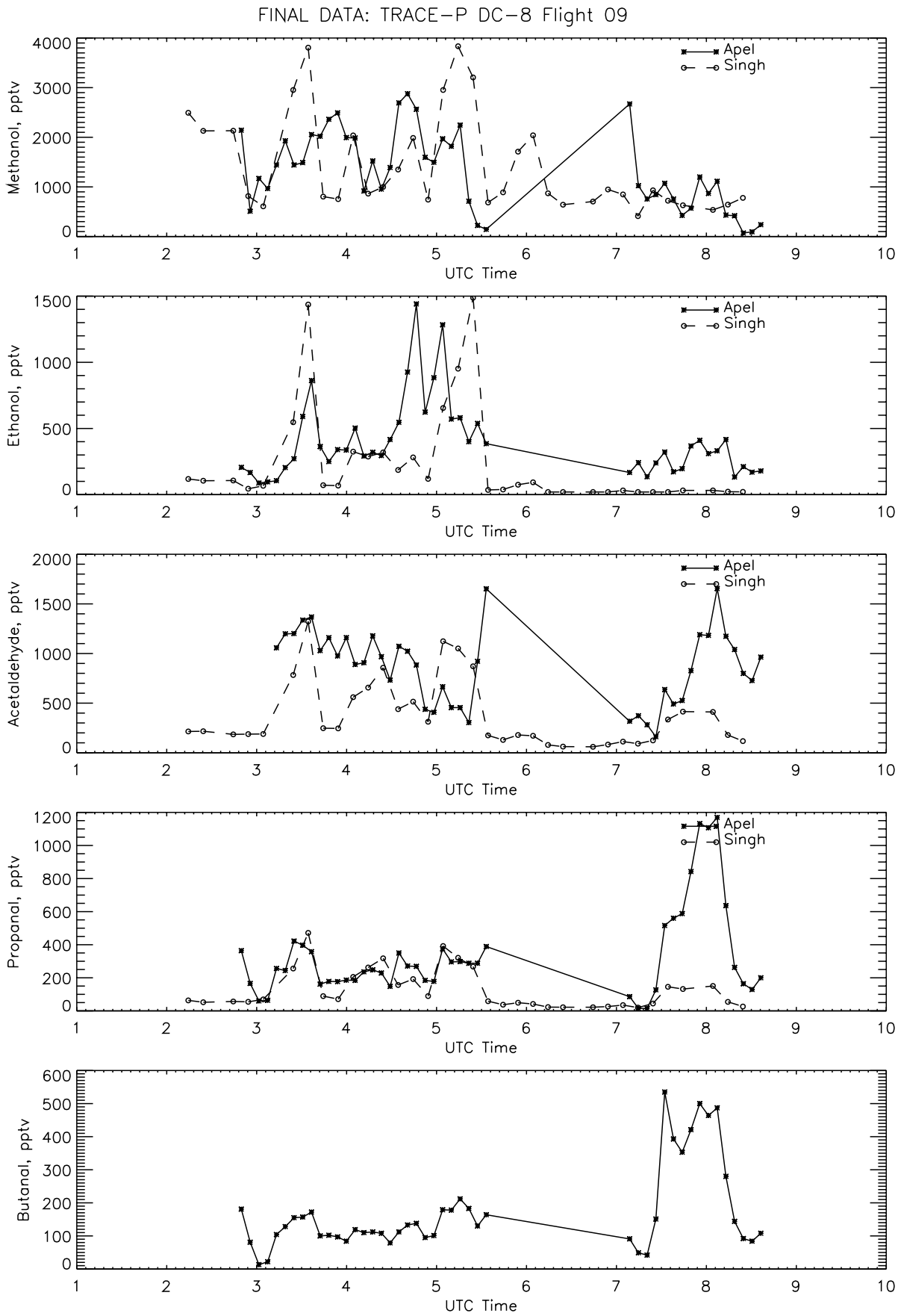

FINAL DATA: TRACE-P DC-8 Flight 09
OH, pptv
UTC Time
HO2, pptv
UTC Time
CH2O, pptv
Fried
Heikes
UTC Time
Hydrogen Peroxide, pptv
UTC Time
Methylhydroperoxide, pptv
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 09

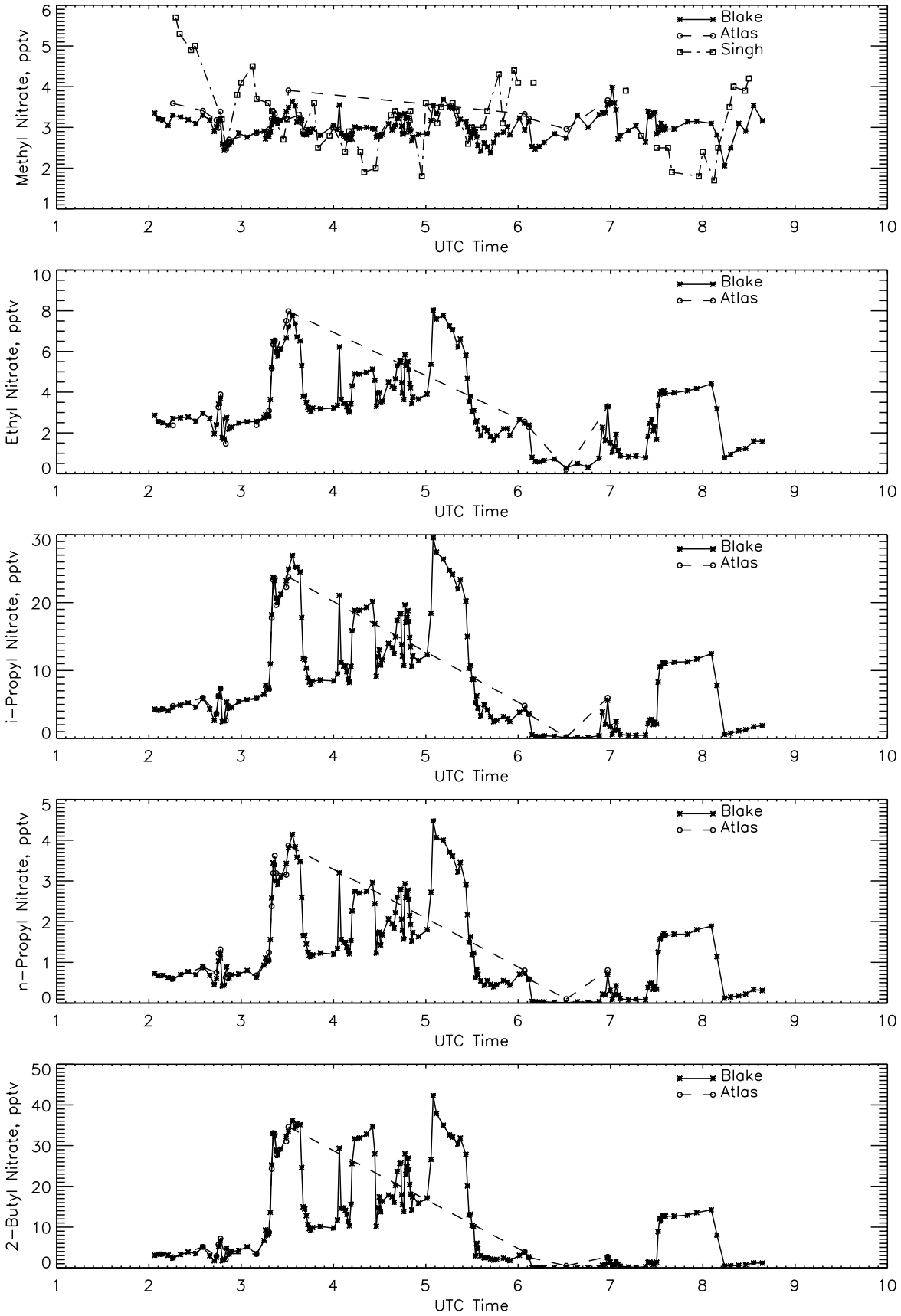


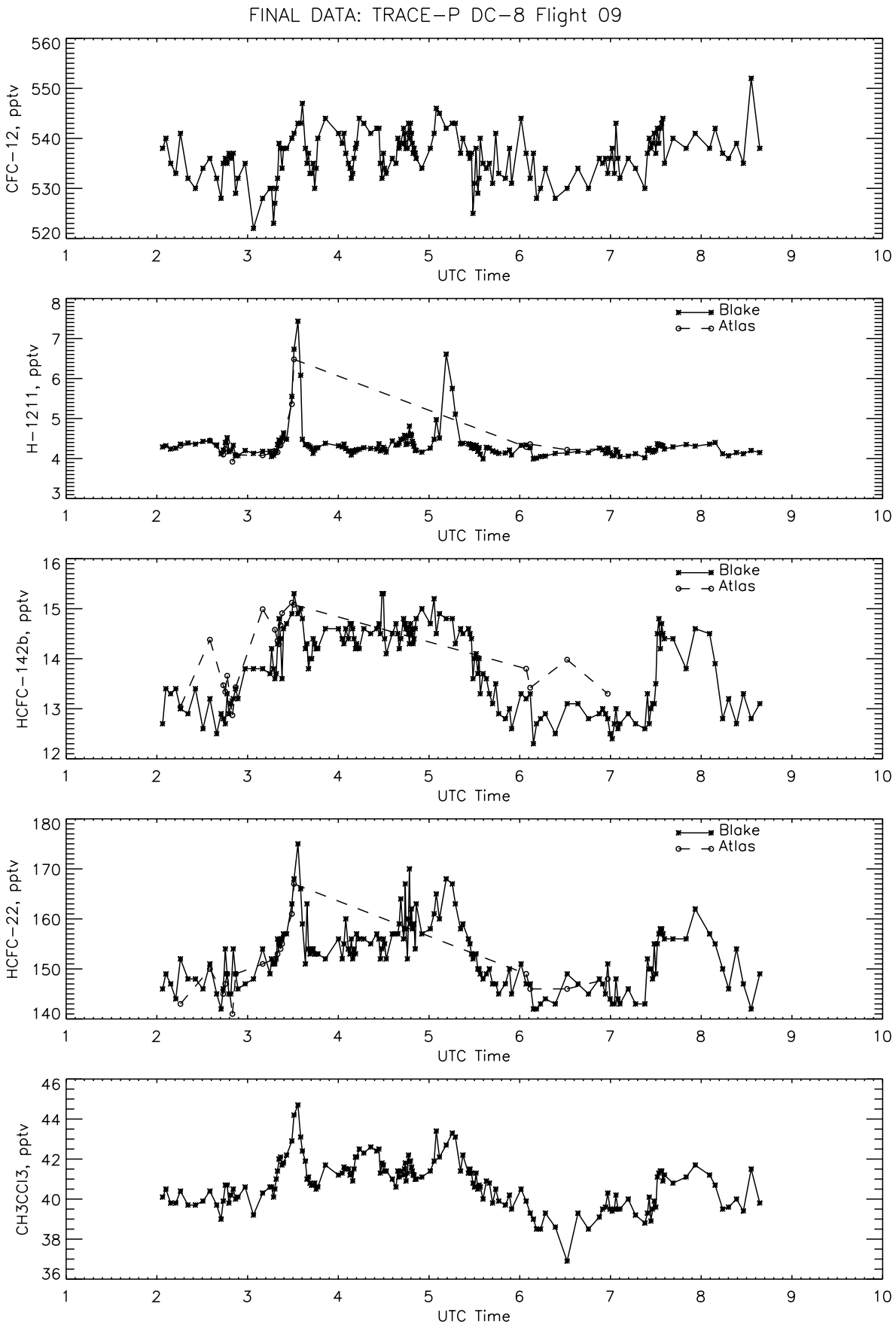

FINAL DATA: TRACE-P DC-8 Flight 09
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 09
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time

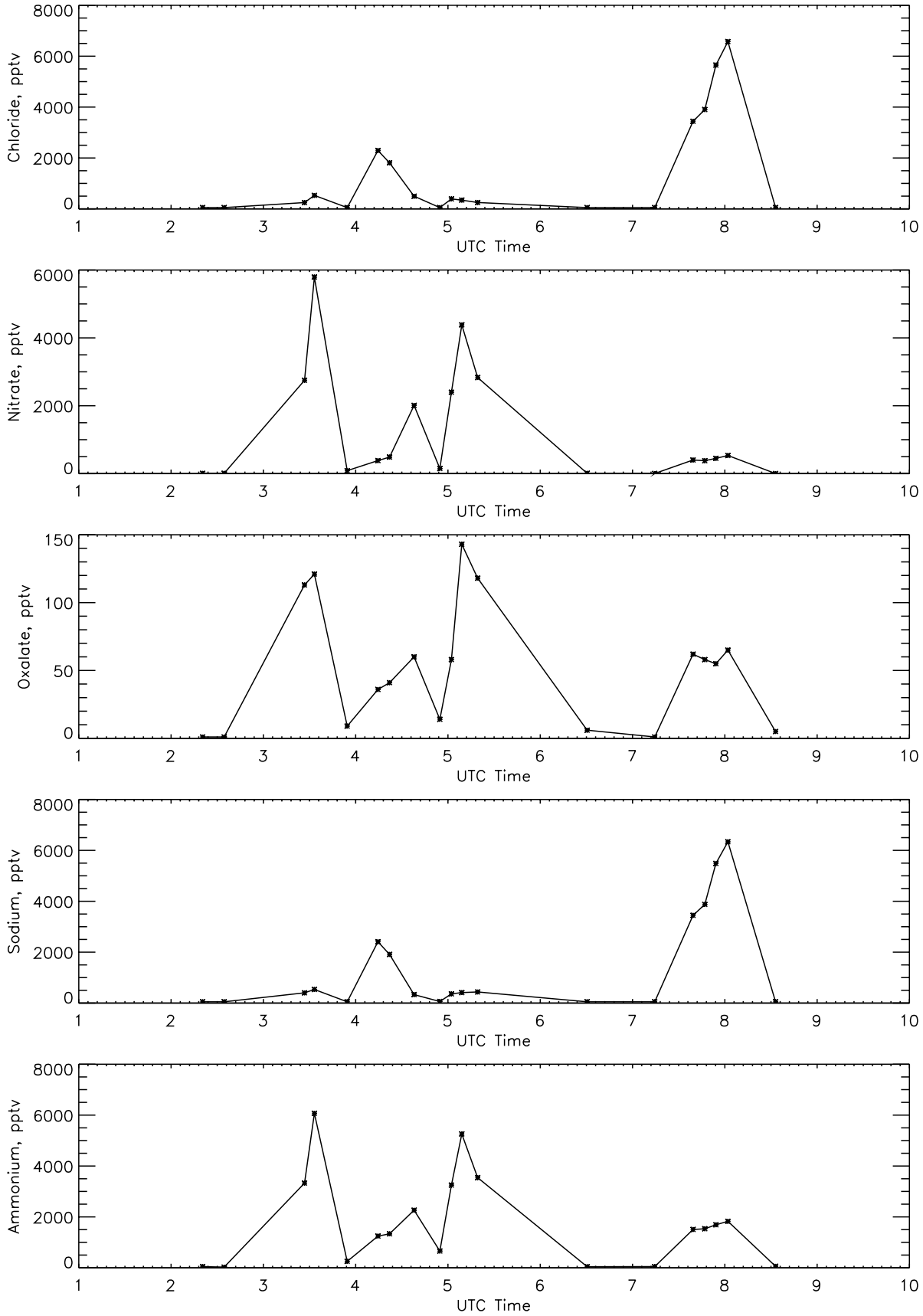

FINAL DATA: TRACE-P DC-8 Flight 09
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh

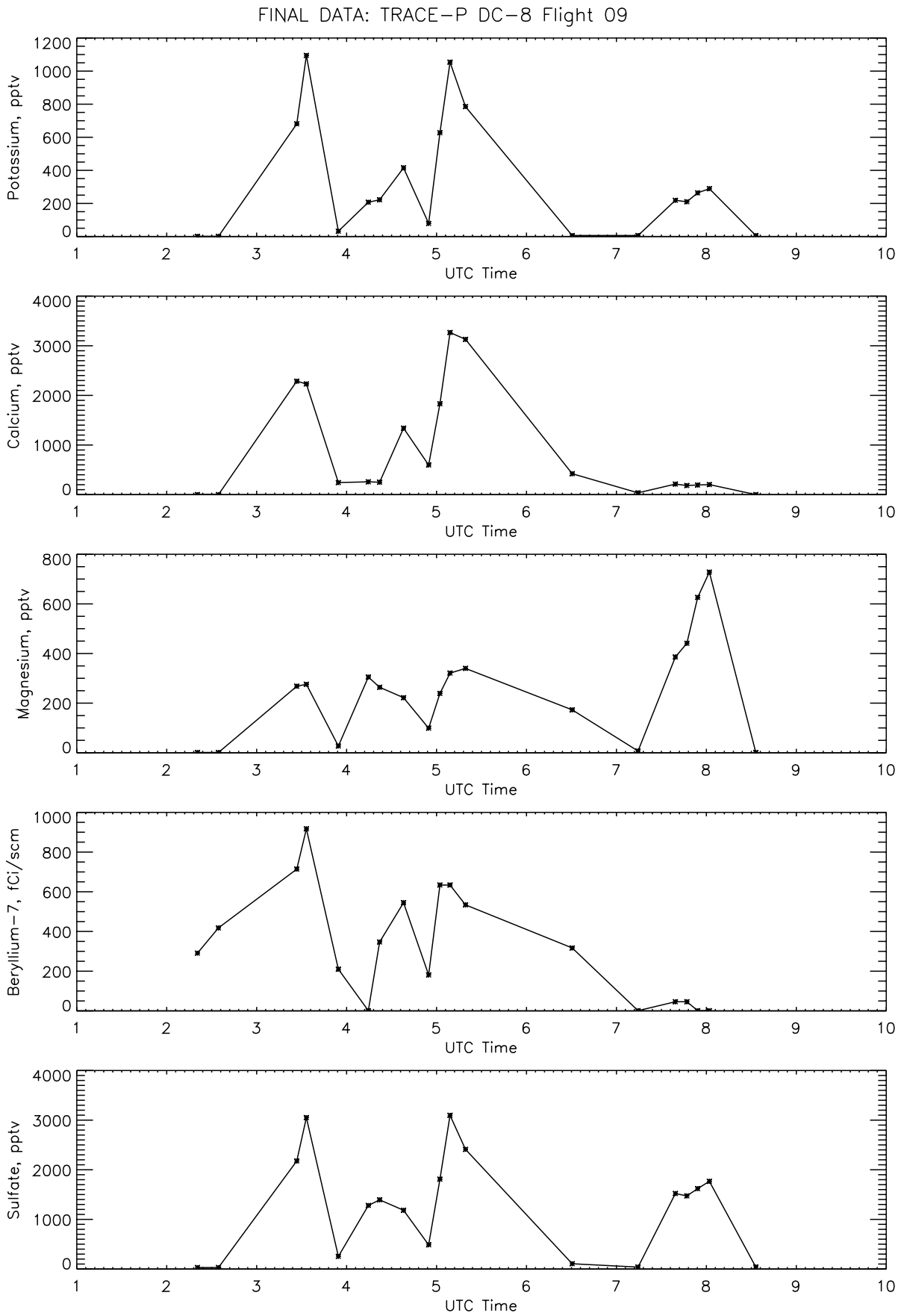
FINAL DATA: TRACE-P DC-8 Flight 09

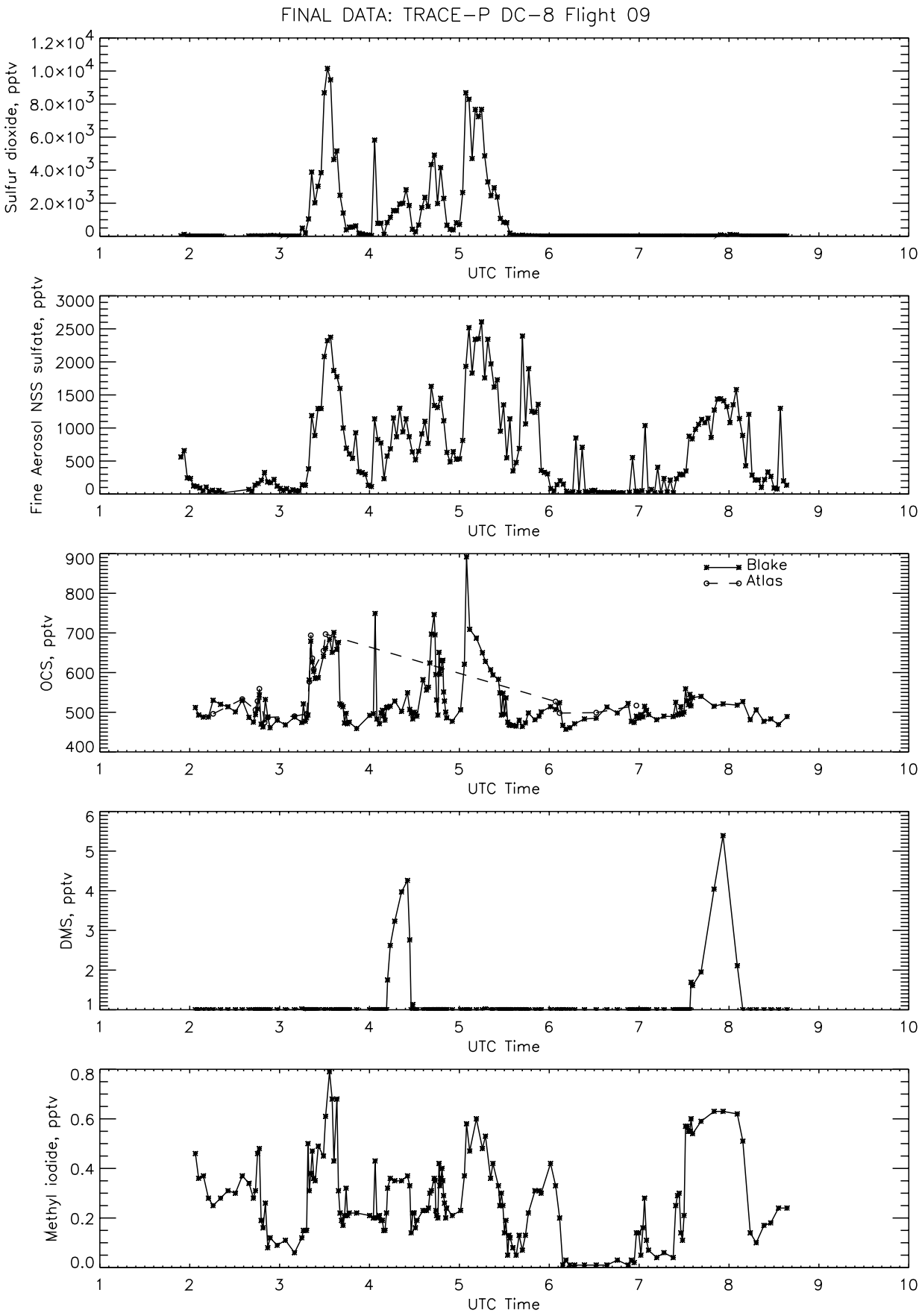


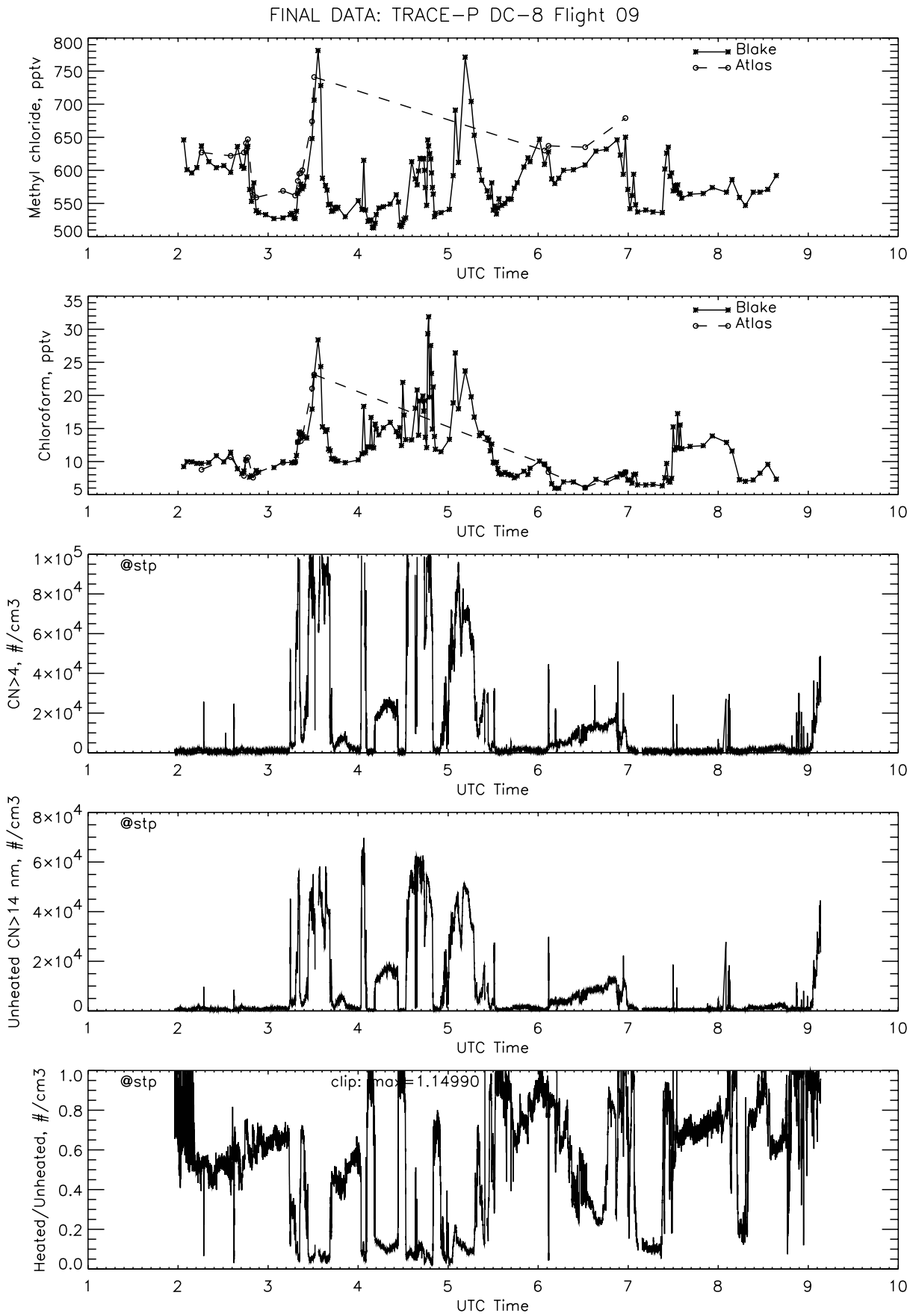

FINAL DATA: TRACE-P DC-8 Flight 09
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas

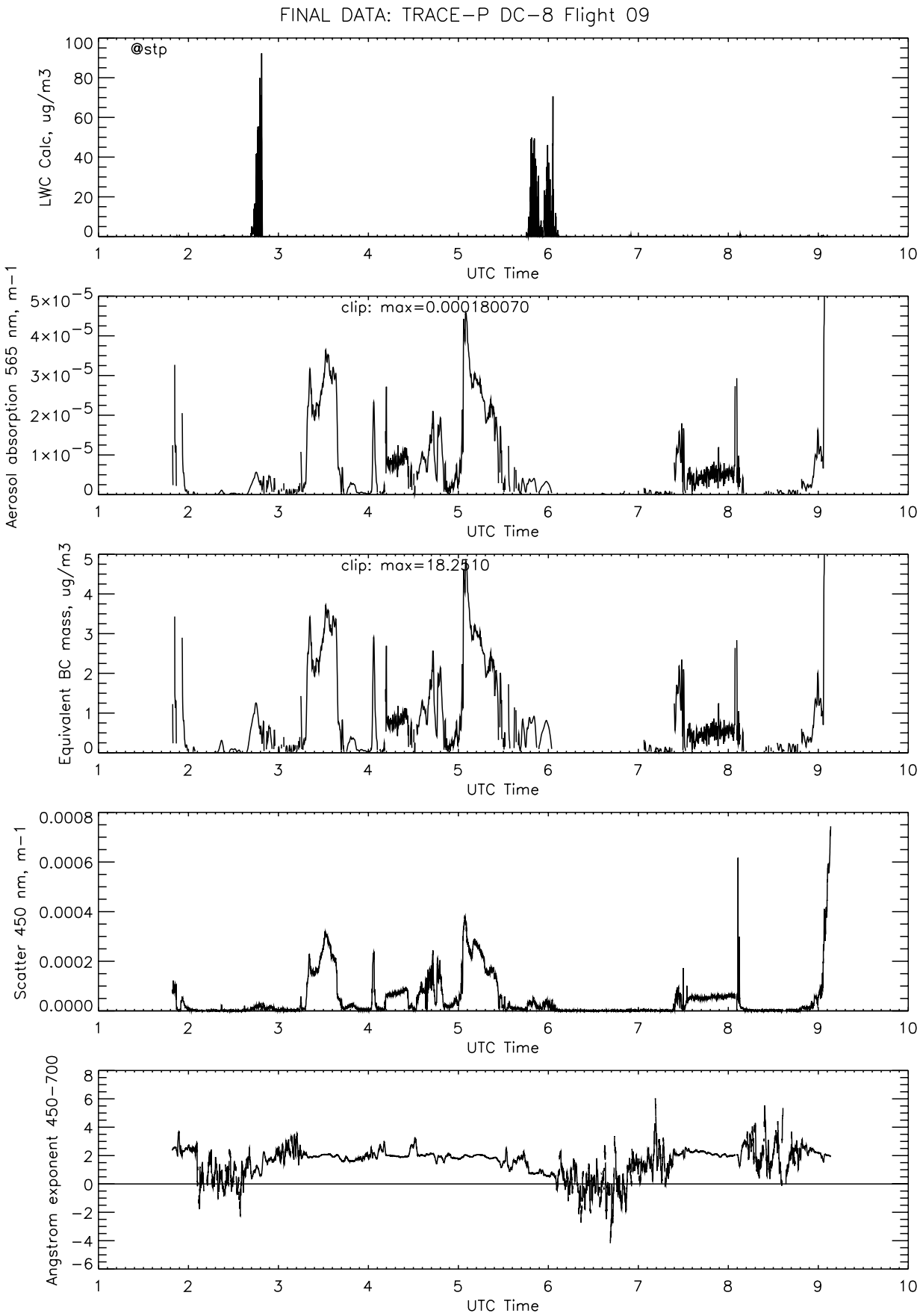
FINAL DATA: TRACE-P DC-8 Flight 09

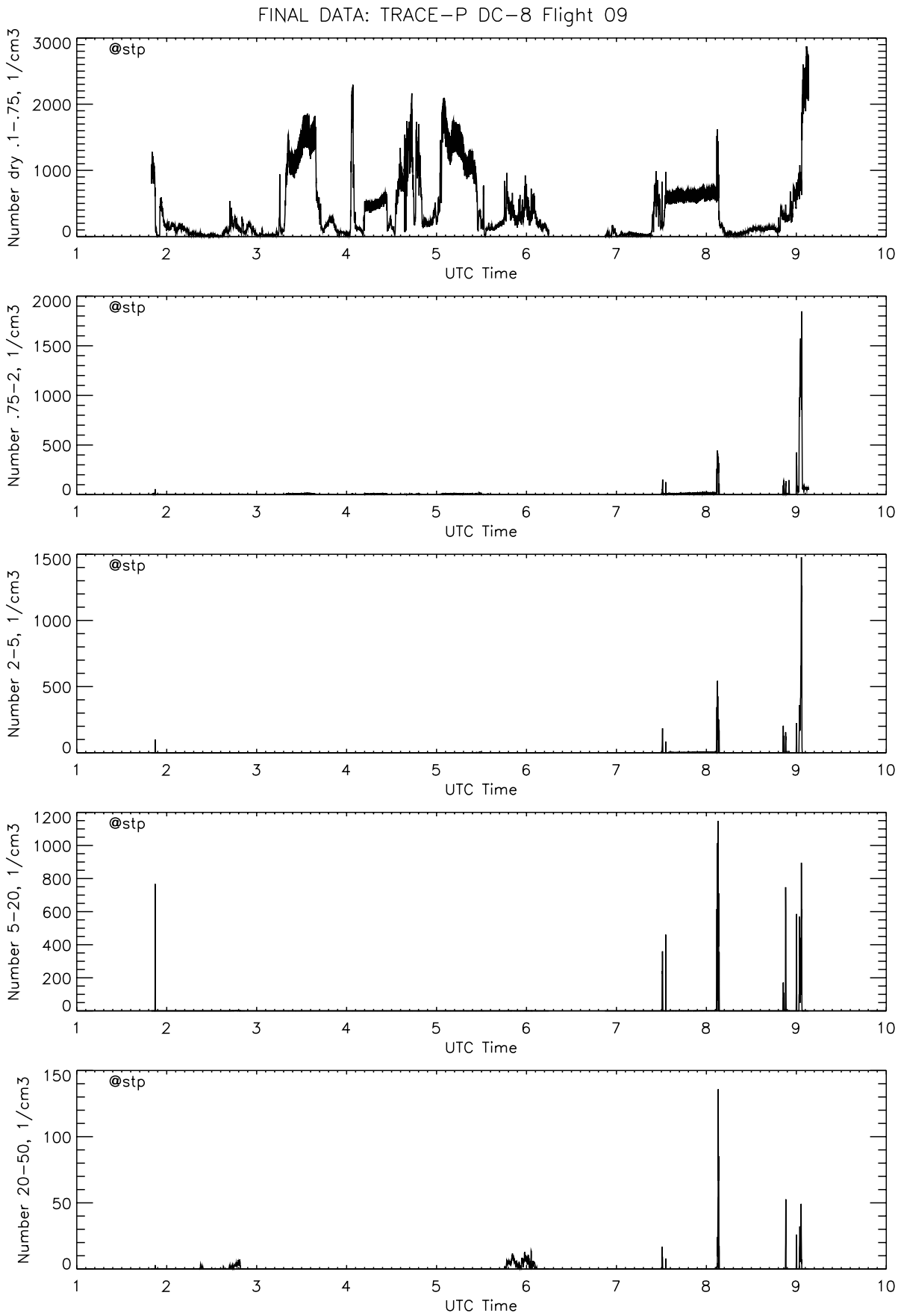


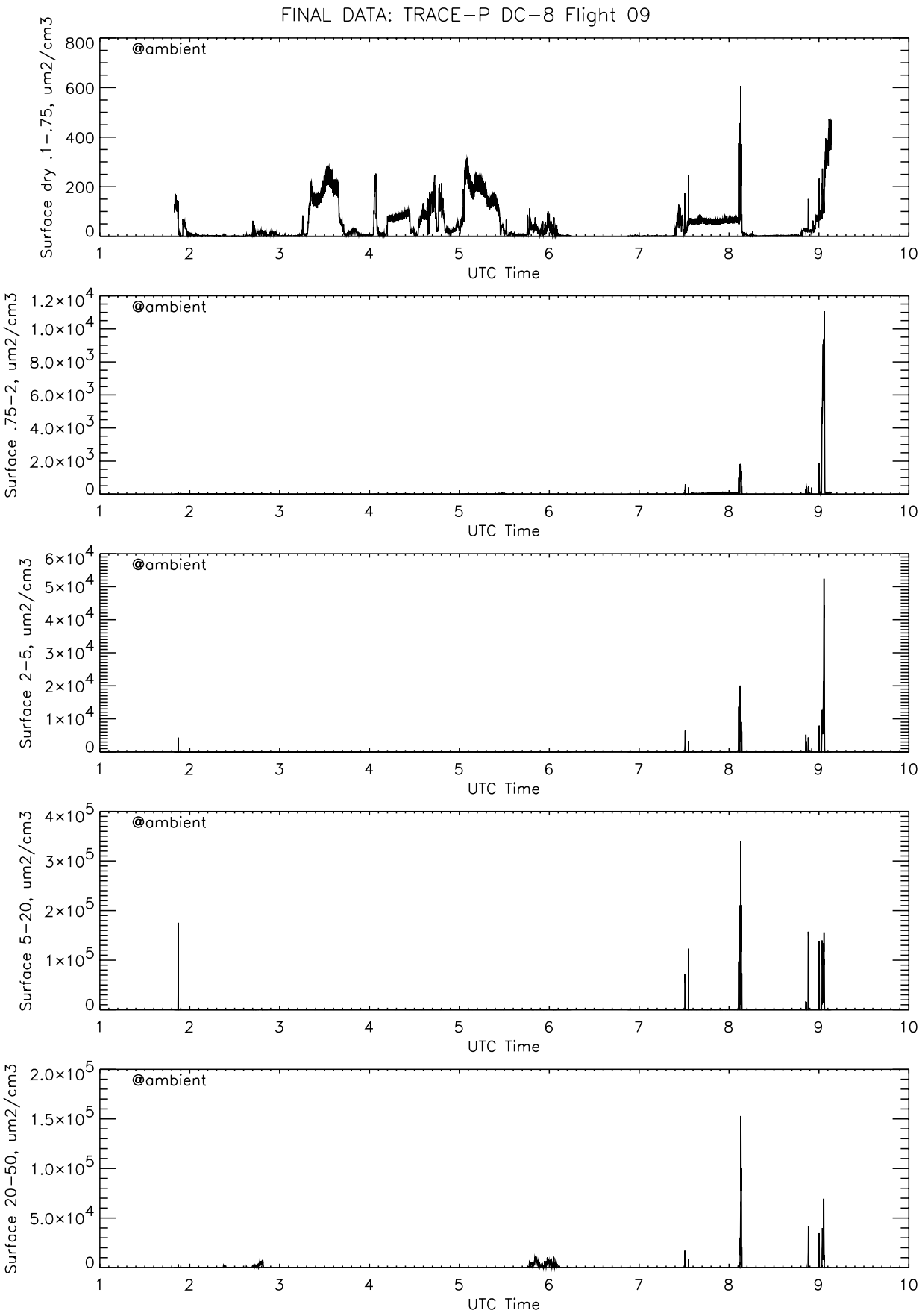

FINAL DATA: TRACE-P DC-8 Flight 09
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time

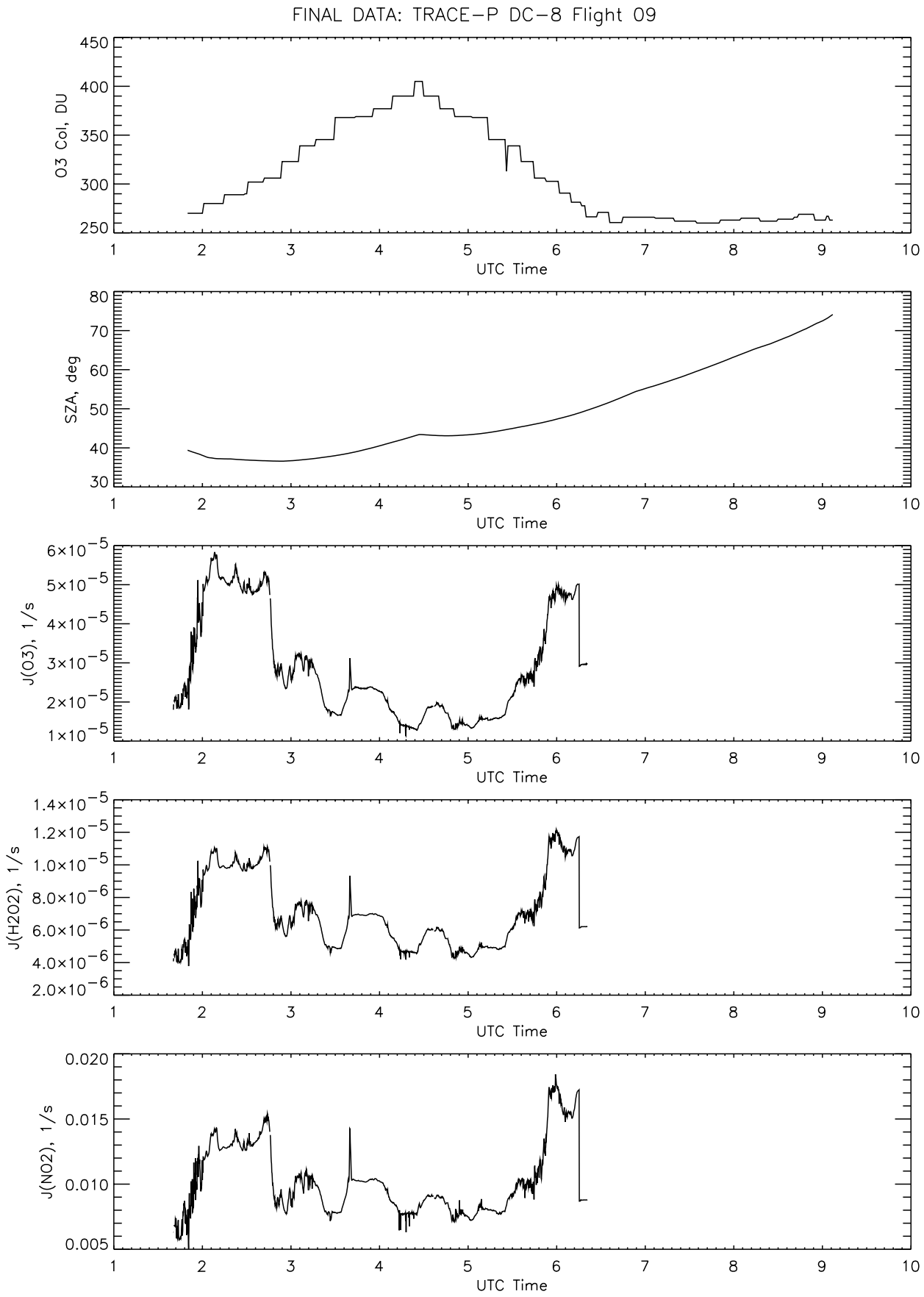

FINAL DATA: TRACE-P DC-8 Flight 09
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

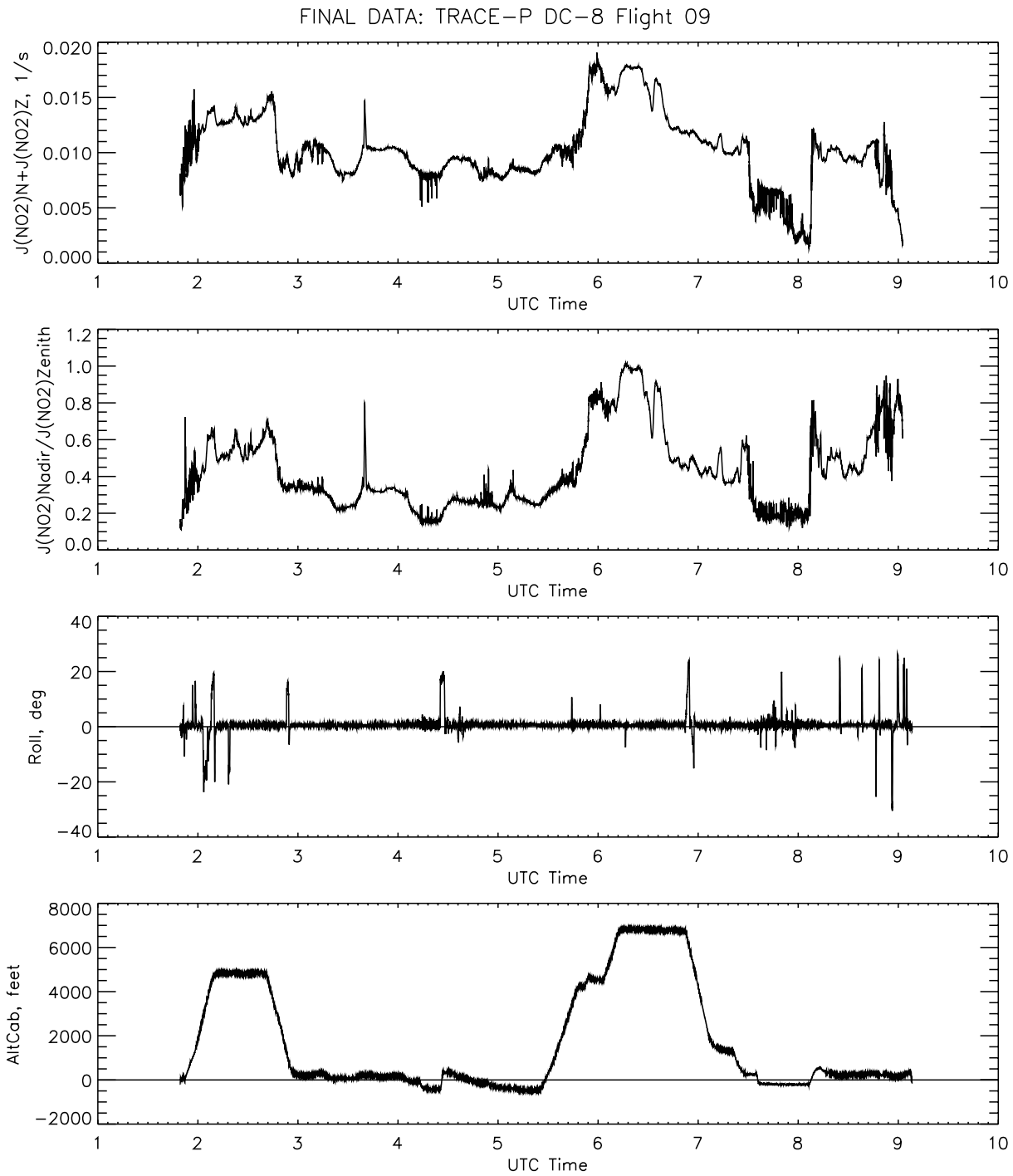

FINAL DATA: TRACE-P DC-8 Flight 09
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14990
UTC Time

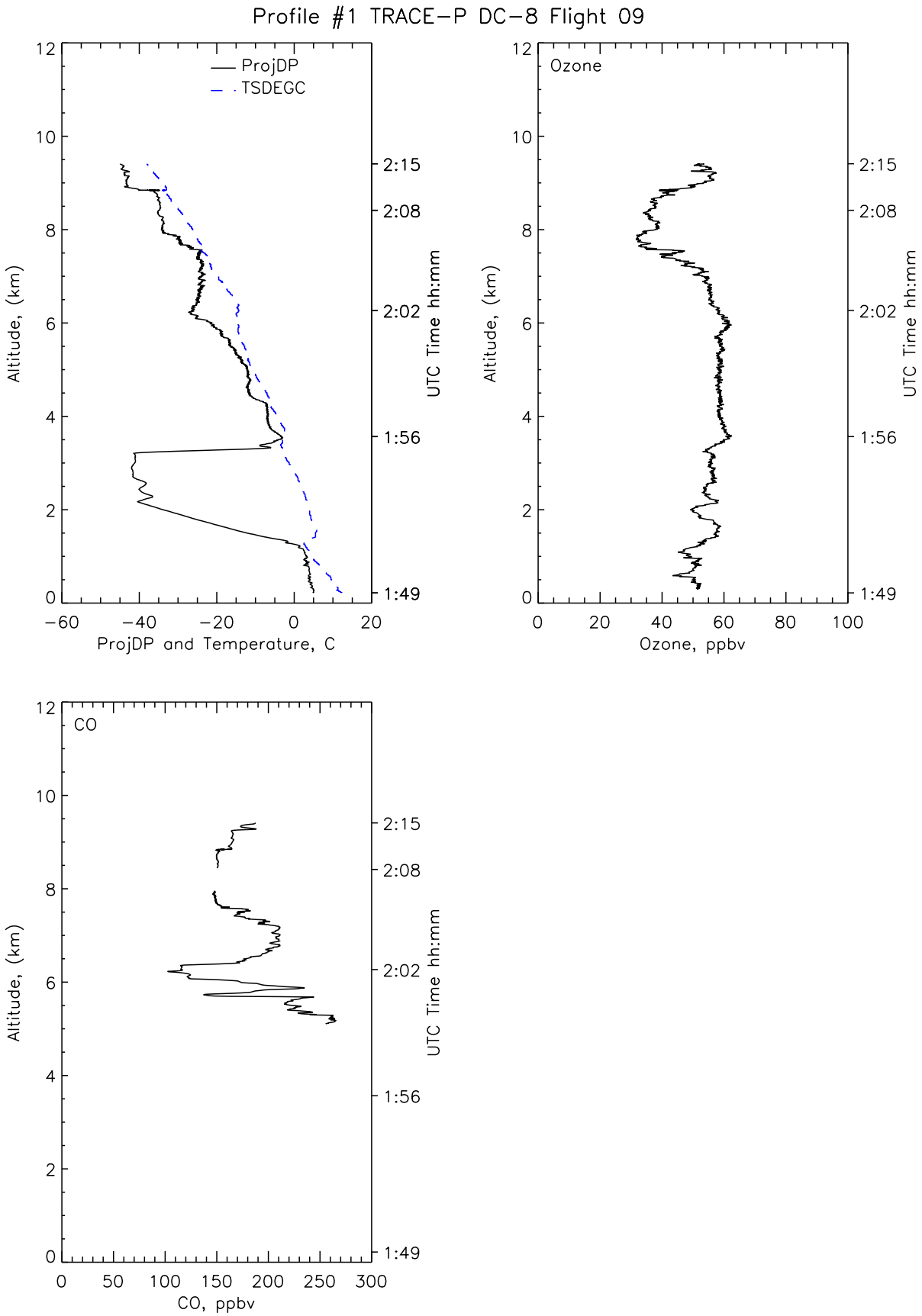

FINAL DATA: TRACE-P DC-8 Flight 09
@stp
LWC Calc, ug/m3
UTC Time
clip: max=0.000180070
Aerosol absorption 565 nm, m-1
UTC Time
clip: max=18.2510
Equivalent BC mass, ug/m3
UTC Time
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

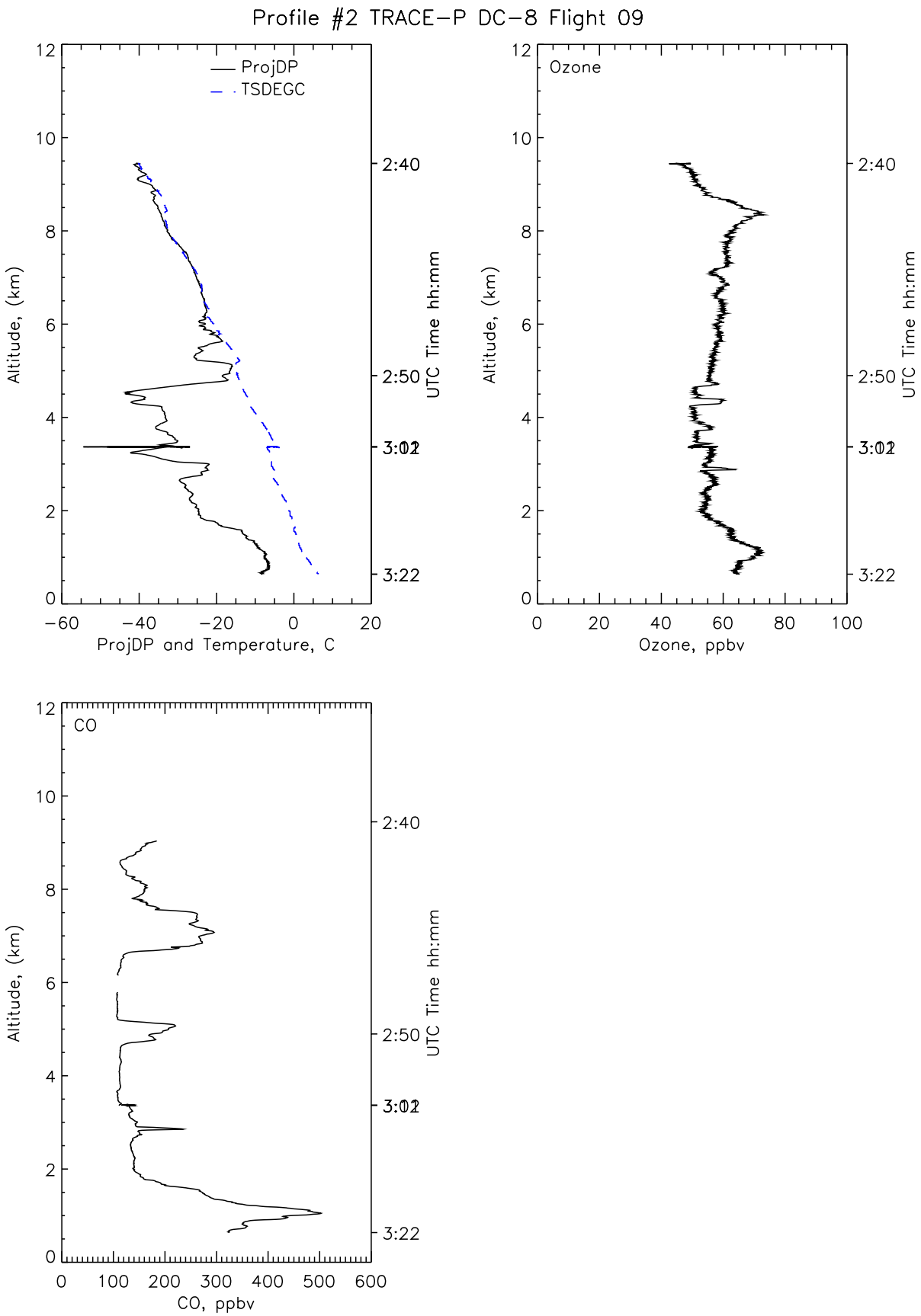

FINAL DATA: TRACE-P DC-8 Flight 09
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

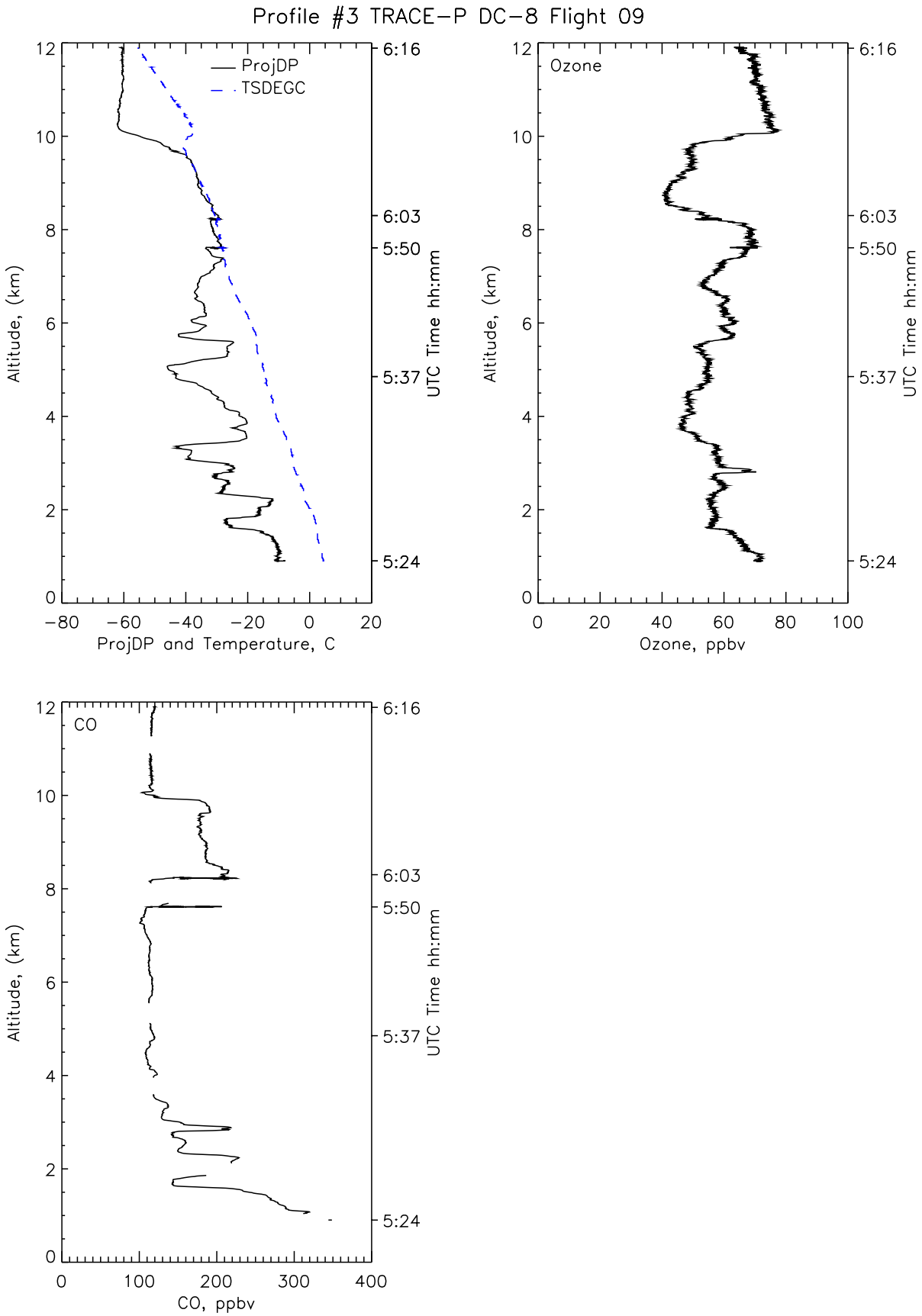

FINAL DATA: TRACE-P DC-8 Flight 09
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

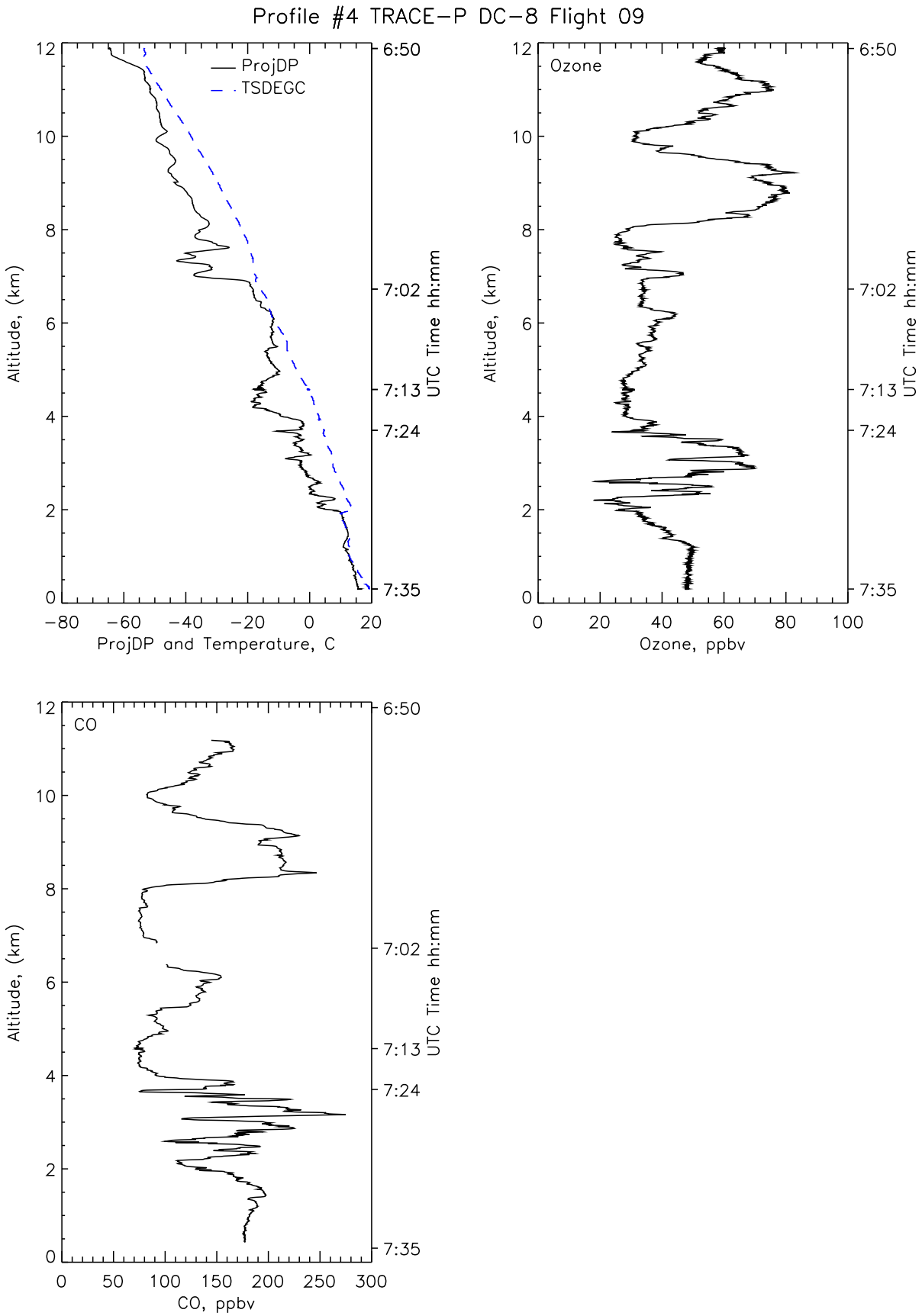

FINAL DATA: TRACE-P DC-8 Flight 09
O3 Col, DU
UTC Time
SZA, deg
UTC Time
J(O3), 1/s
UTC Time
J(H2O2), 1/s
UTC Time
J(NO2), 1/s
UTC Time

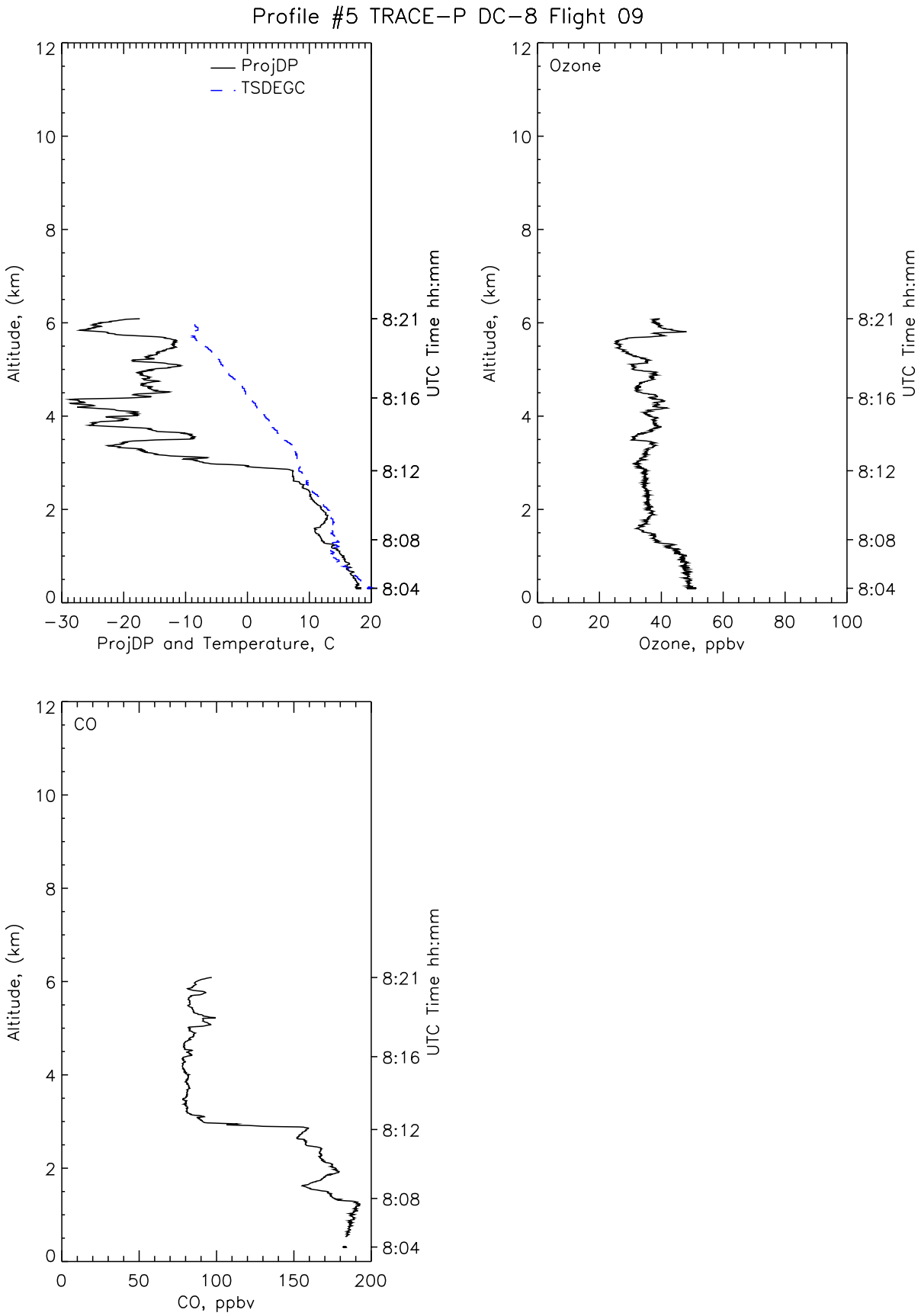

FINAL DATA: TRACE-P DC-8 Flight 09
J(NO2)N+J(NO2)Z, 1/s
0.020
0.015
0.010
0.005
0.000
1 2 3 4 5 6 7 8 9 10
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1 2 3 4 5 6 7 8 9 10
UTC Time
Roll, deg
40
20
0
−20
−40
1 2 3 4 5 6 7 8 9 10
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
1 2 3 4 5 6 7 8 9 10
UTC Time

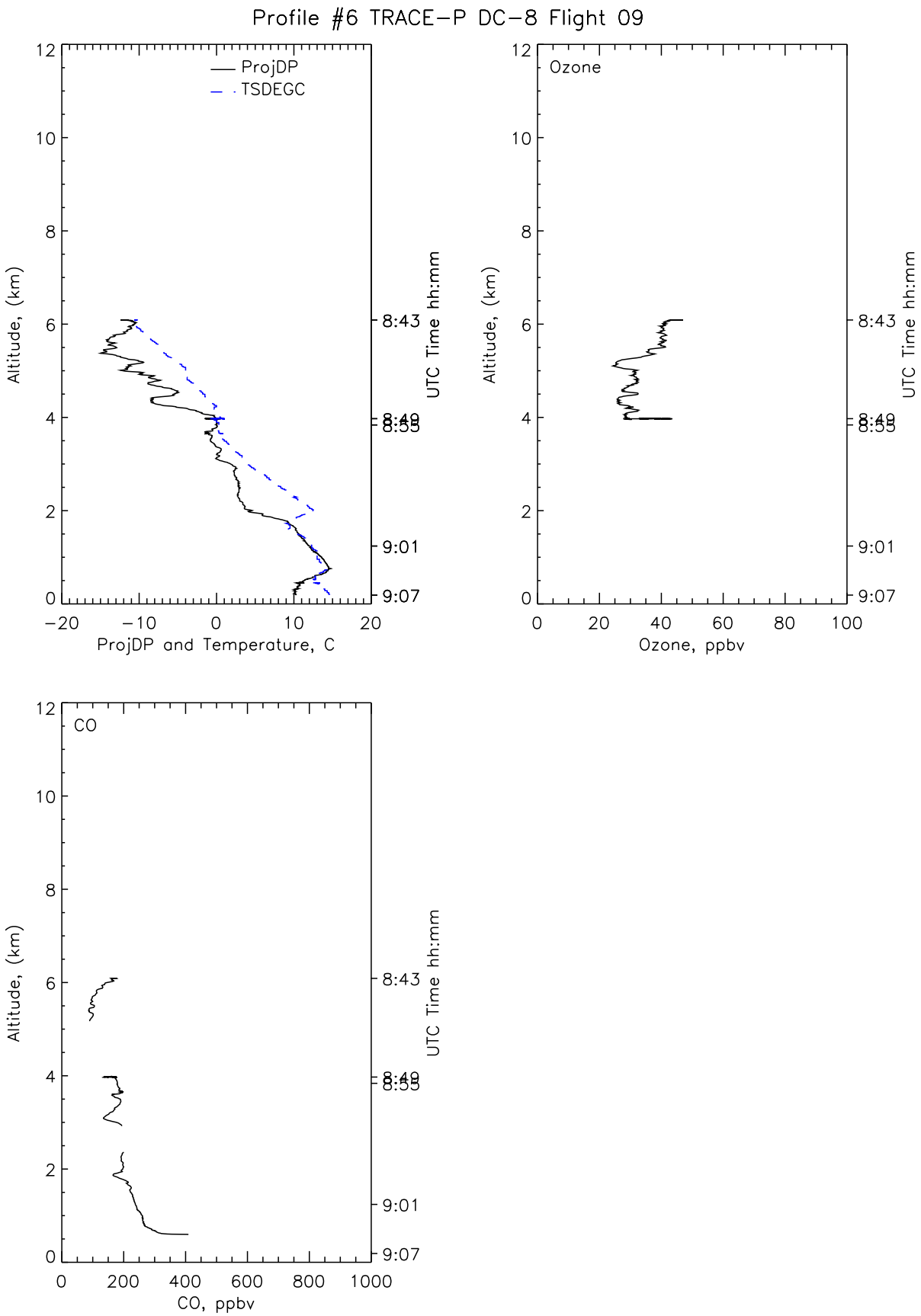

Profile #1 TRACE-P DC-8 Flight 09
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #2 TRACE-P DC-8 Flight 09
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
2:40
2:50
3:01
3:22
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #3 TRACE-P DC-8 Flight 09
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
6:16
6:03
5:50
5:37
5:24
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #4 TRACE-P DC-8 Flight 09
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
6:50
7:02
7:13
7:24
7:35
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #5 TRACE-P DC-8 Flight 09
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 09
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
8:43
8:49
8:55
9:01
9:07
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

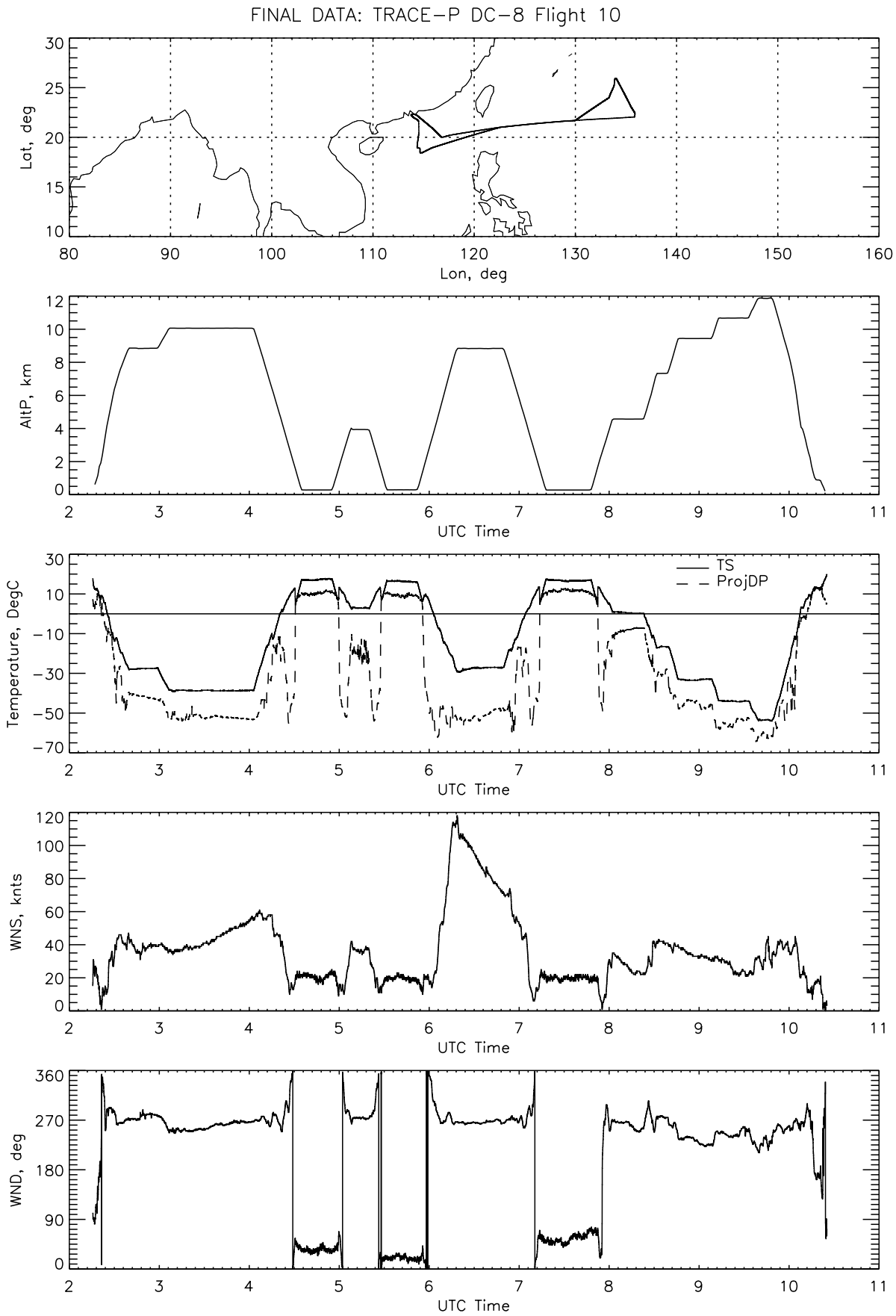
TRACE-P

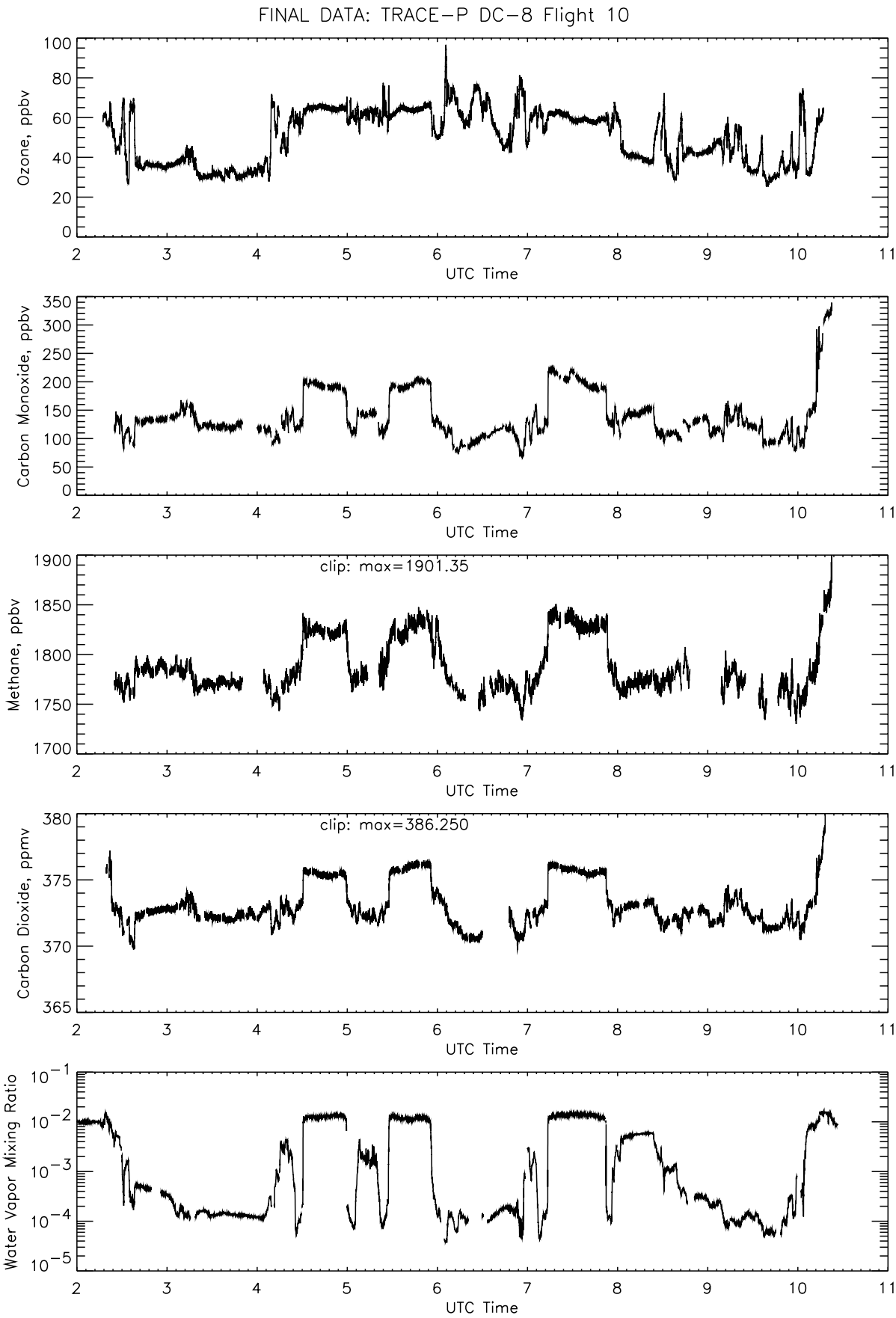
Flight 10D

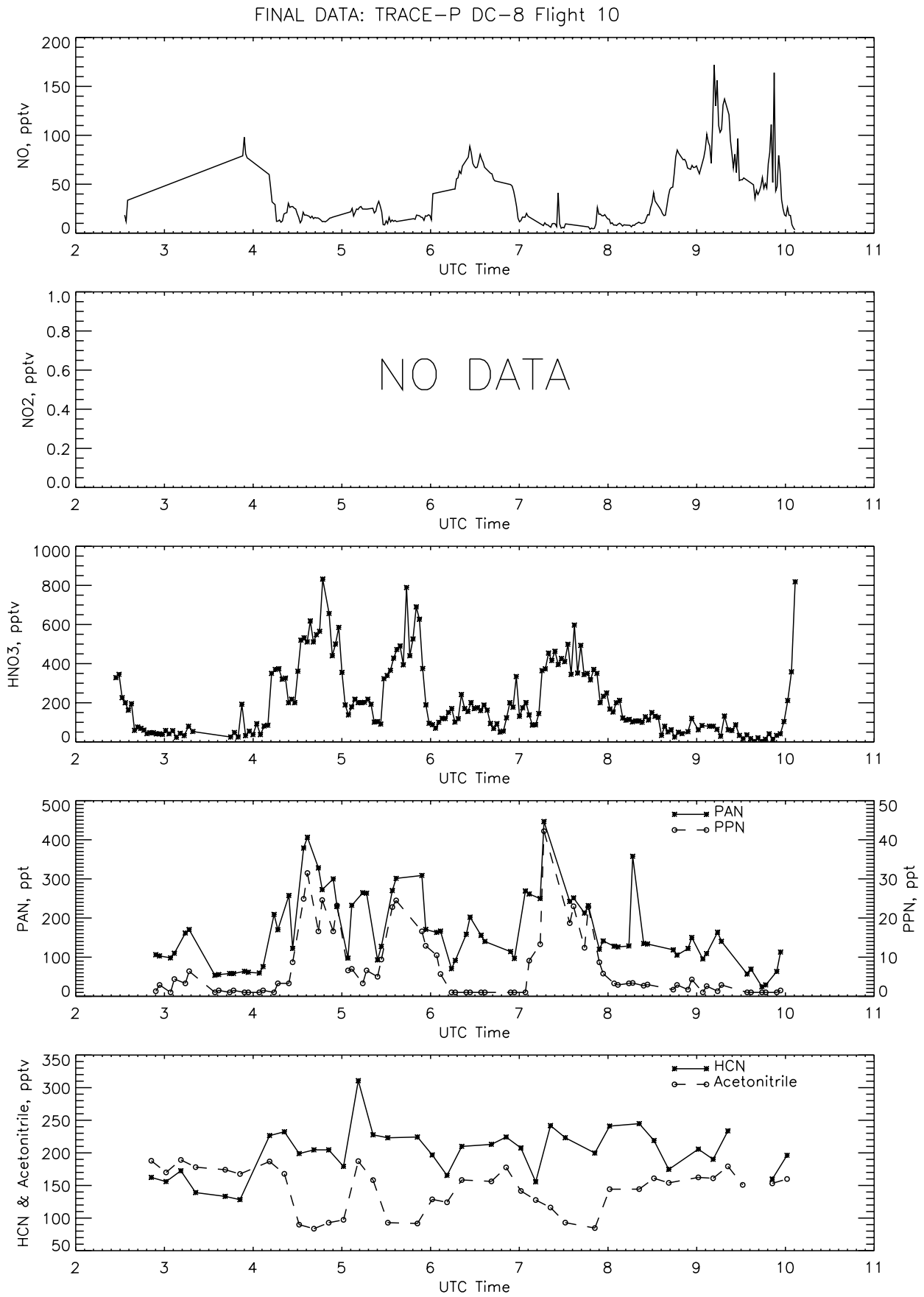
Local: Hong Kong No. 4

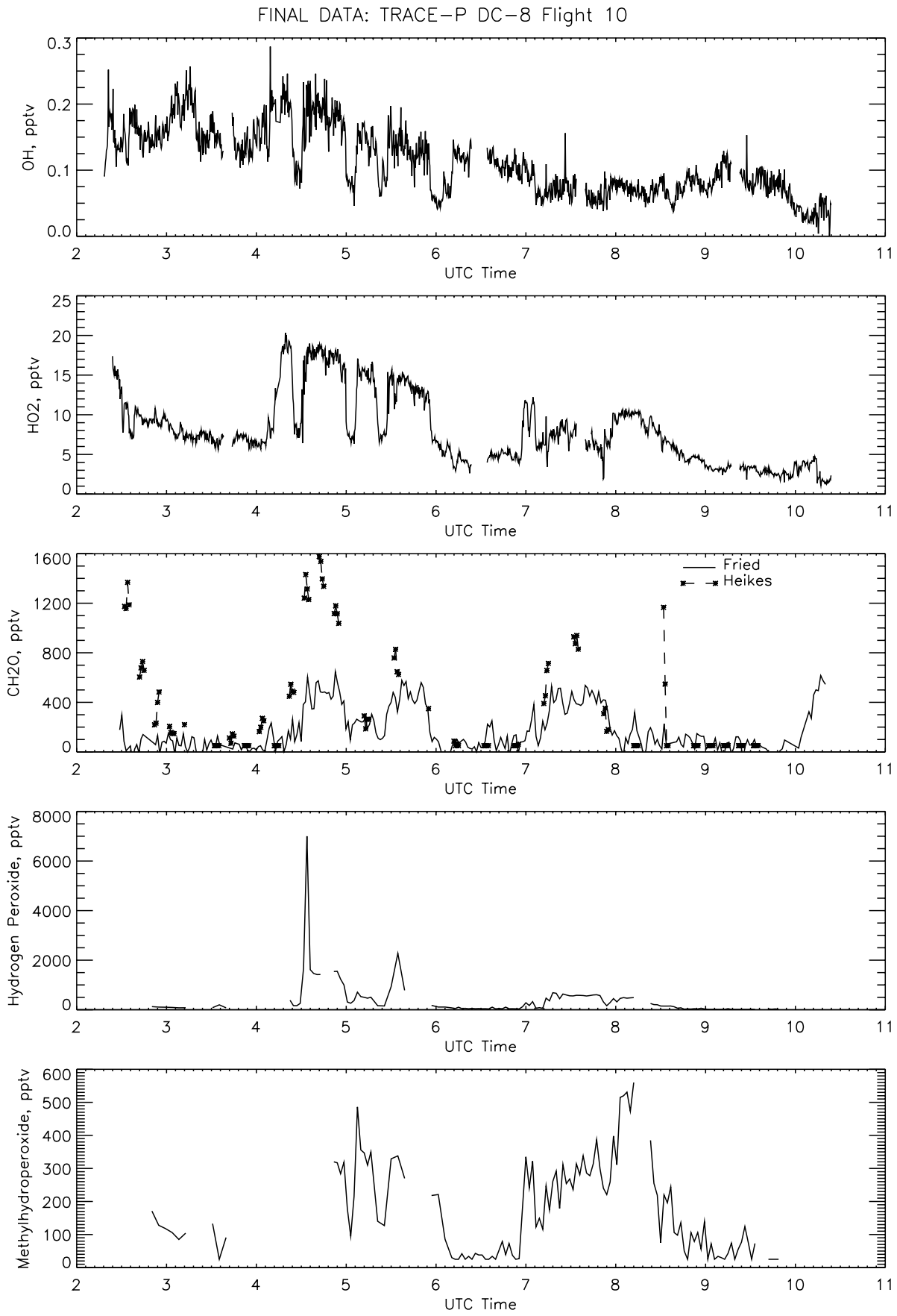
Aged Asian Outflow

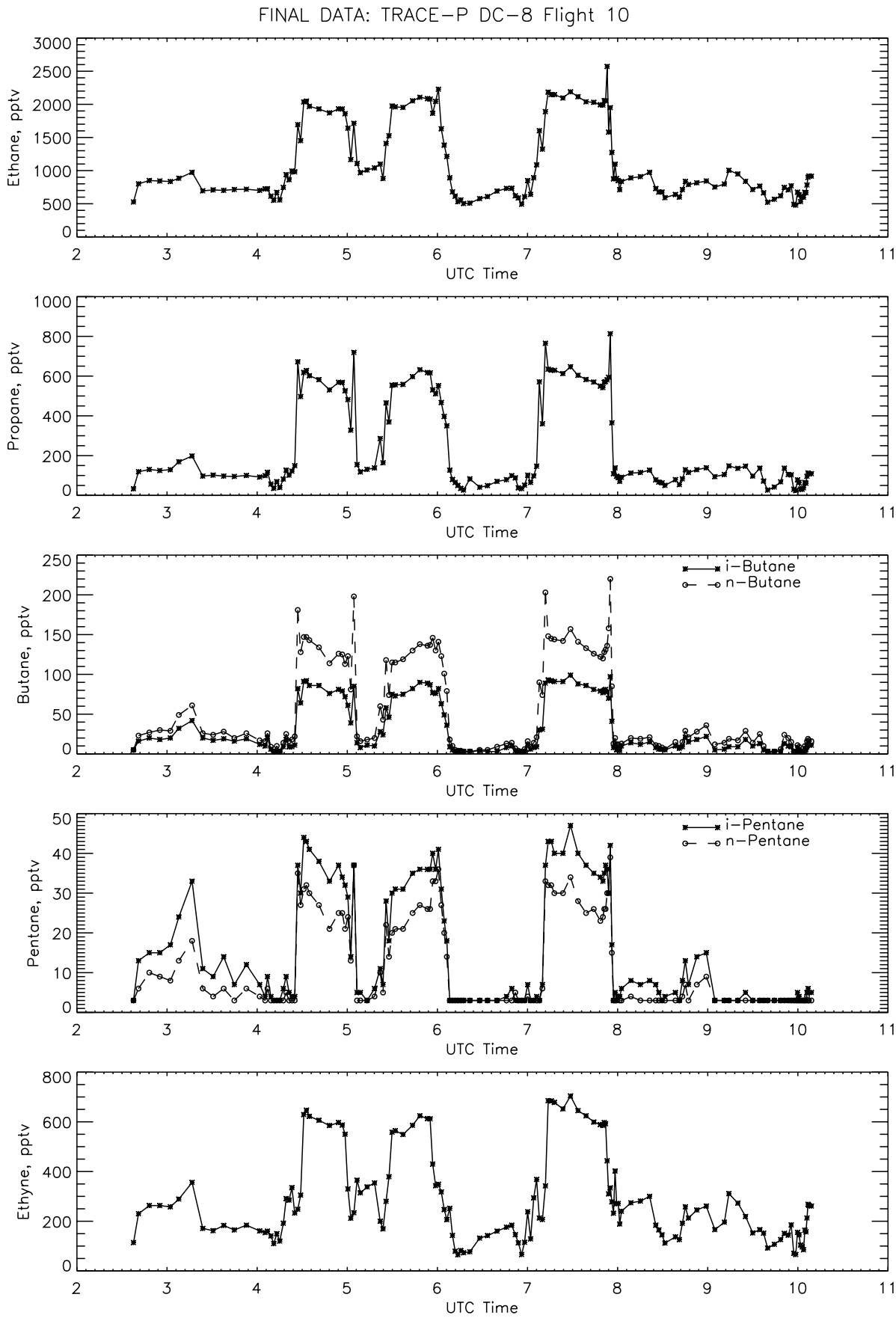
March 13, 2001

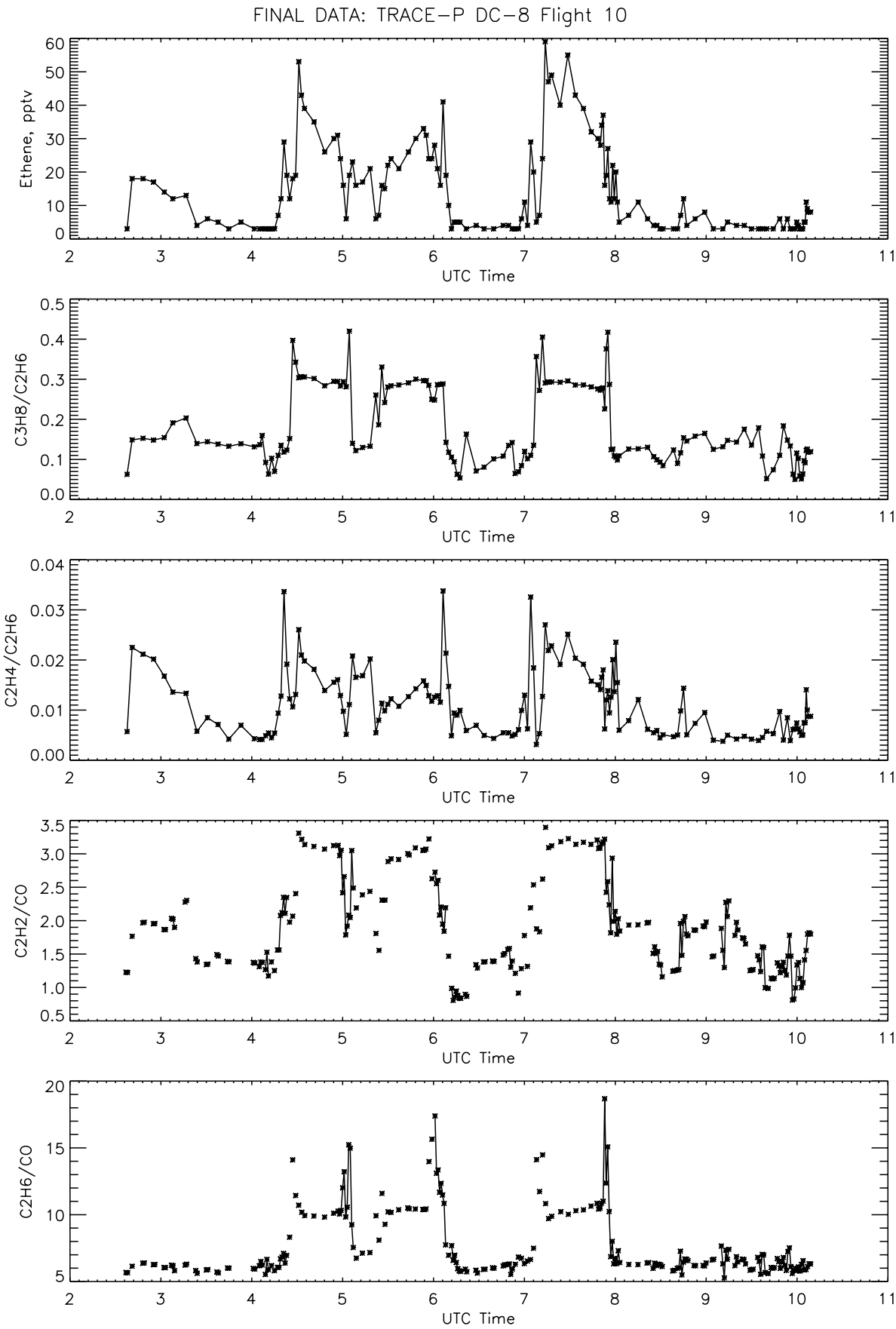

FINAL DATA: TRACE-P DC-8 Flight 10
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

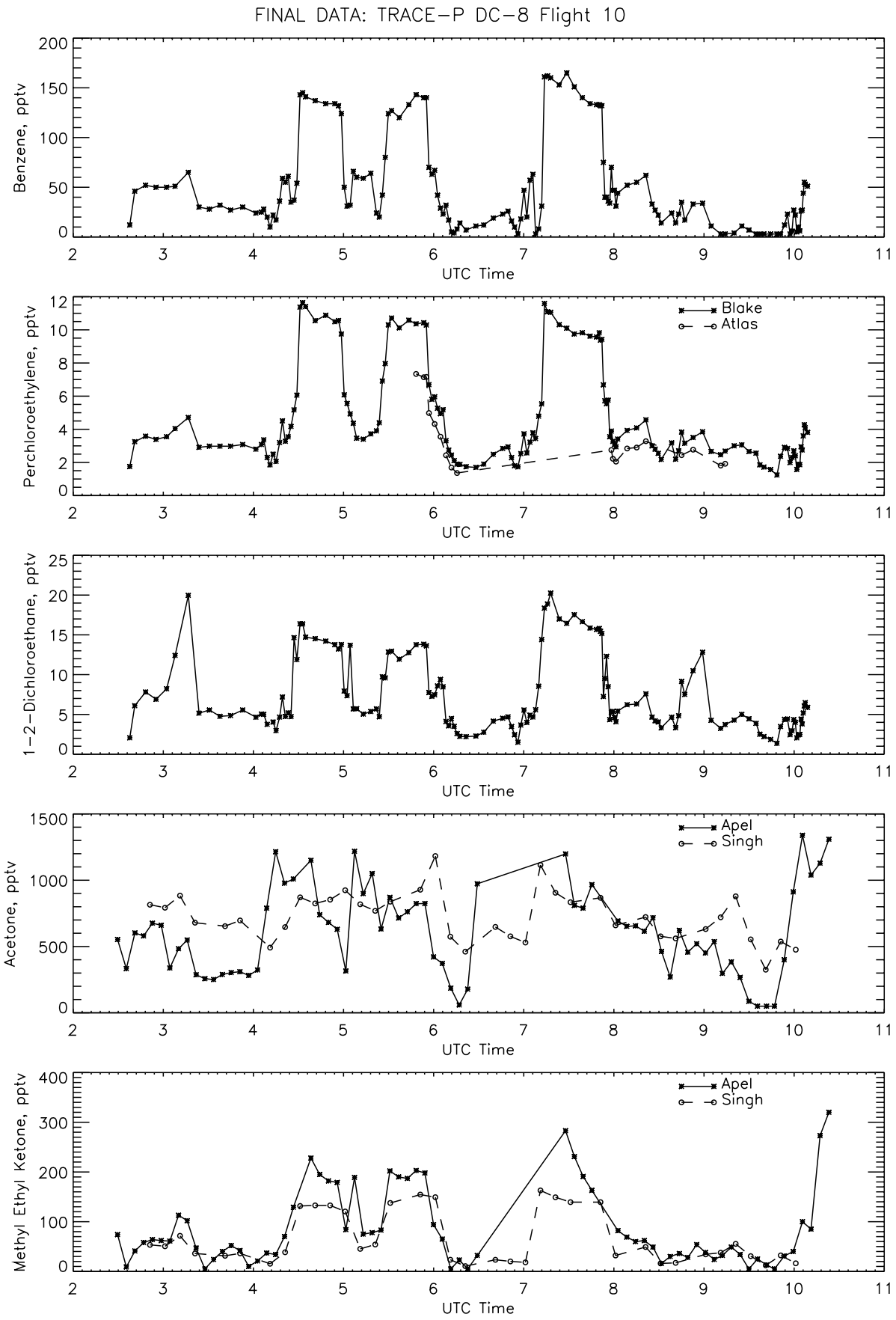

FINAL DATA: TRACE-P DC-8 Flight 10
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
clip: max=1901.35
Carbon Dioxide, ppmv
clip: max=386.250
Water Vapor Mixing Ratio
UTC Time

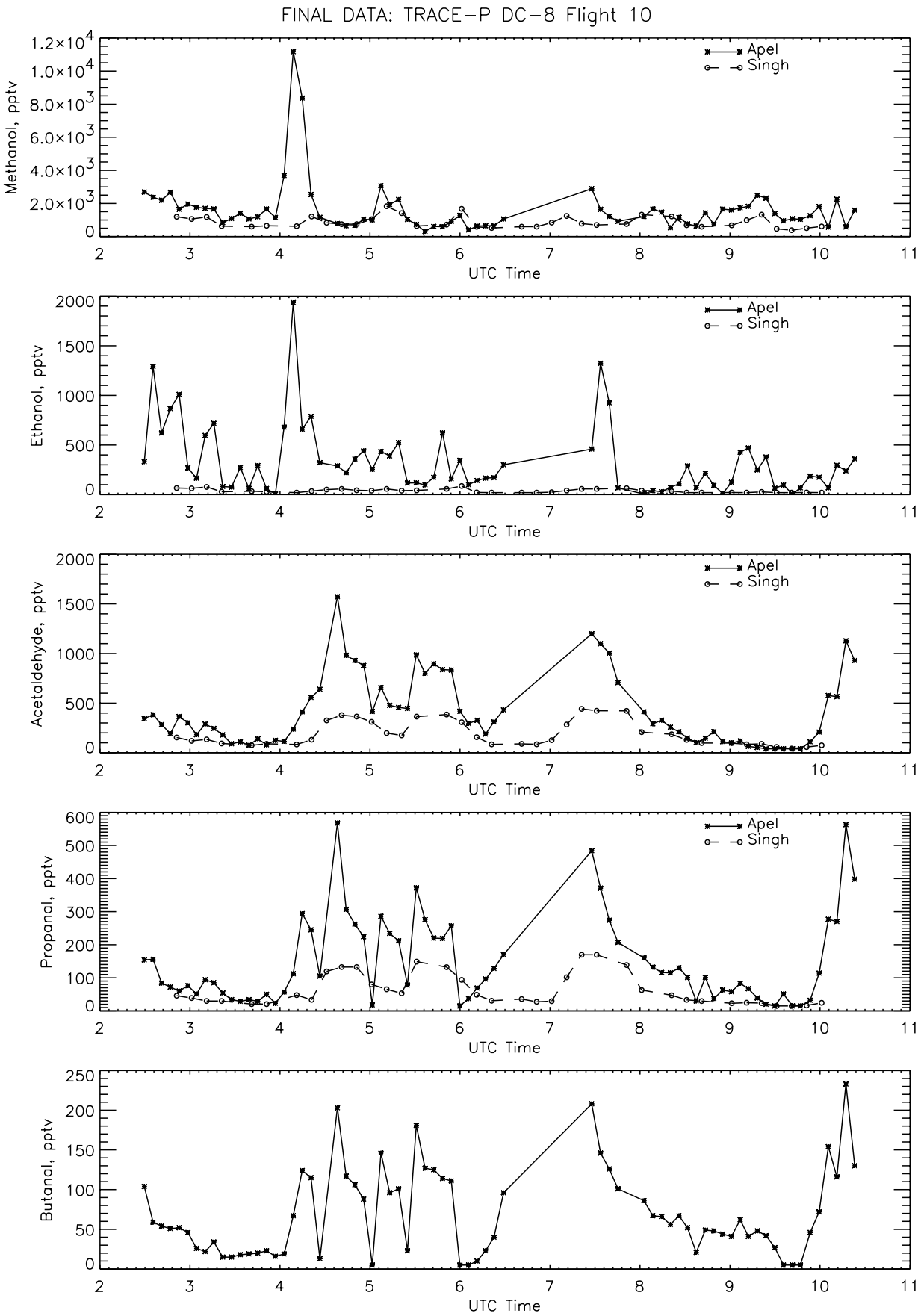

FINAL DATA: TRACE-P DC-8 Flight 10
NO, pptv
UTC Time
NO2, pptv
NO DATA
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile


FINAL DATA: TRACE-P DC-8 Flight 10
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

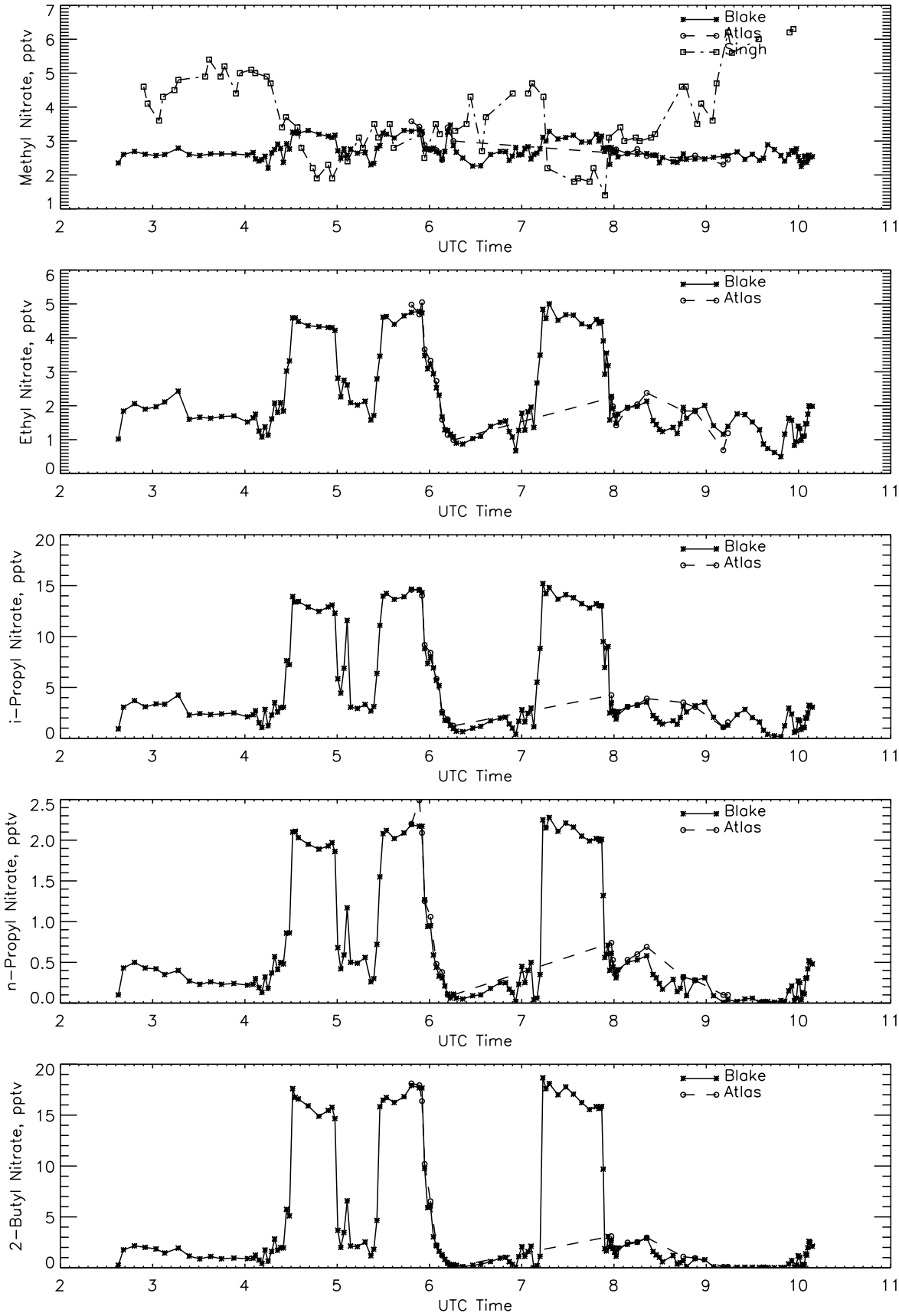

FINAL DATA: TRACE-P DC-8 Flight 10
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

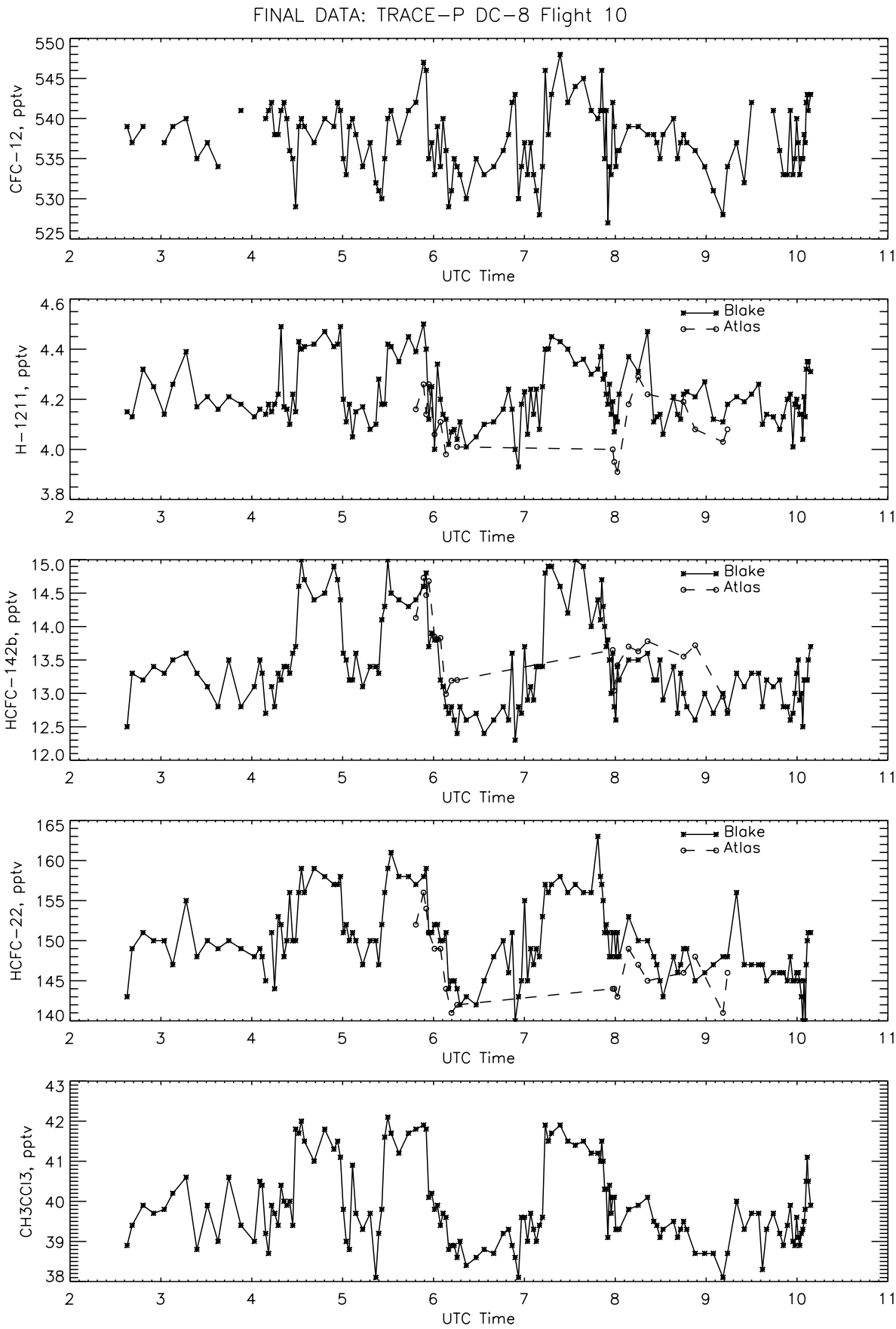

FINAL DATA: TRACE-P DC-8 Flight 10
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 10
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time

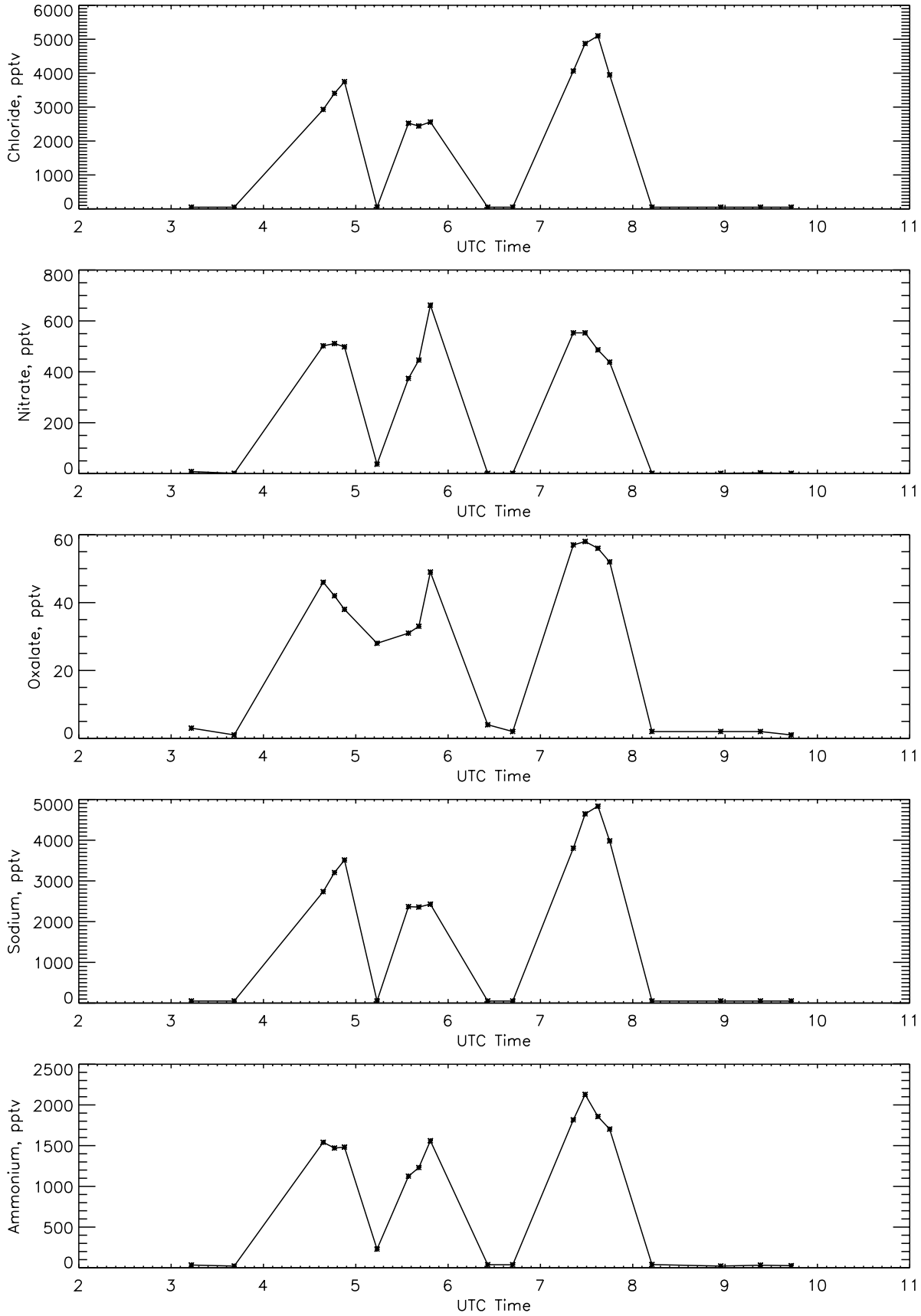

FINAL DATA: TRACE-P DC-8 Flight 10
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh

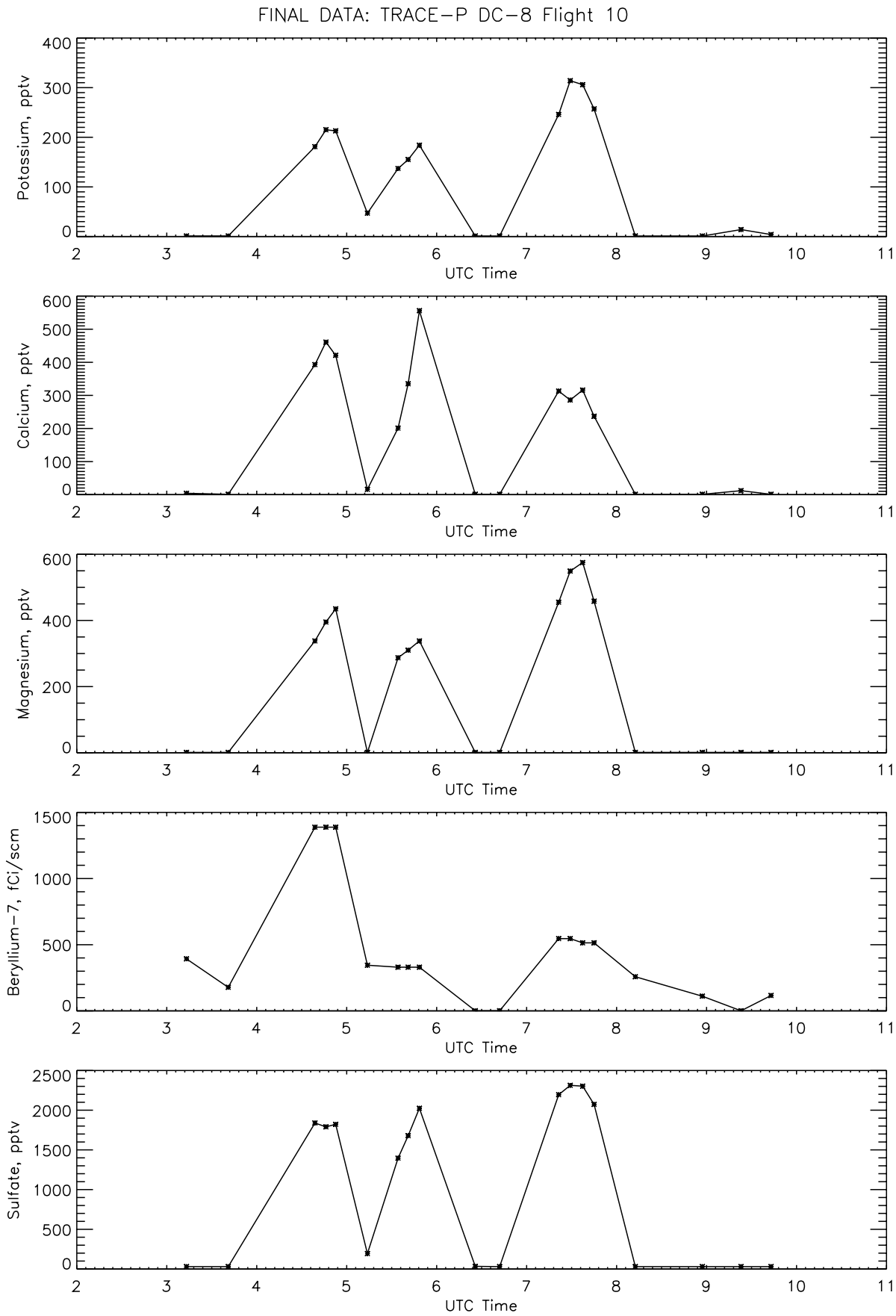
FINAL DATA: TRACE-P DC-8 Flight 10



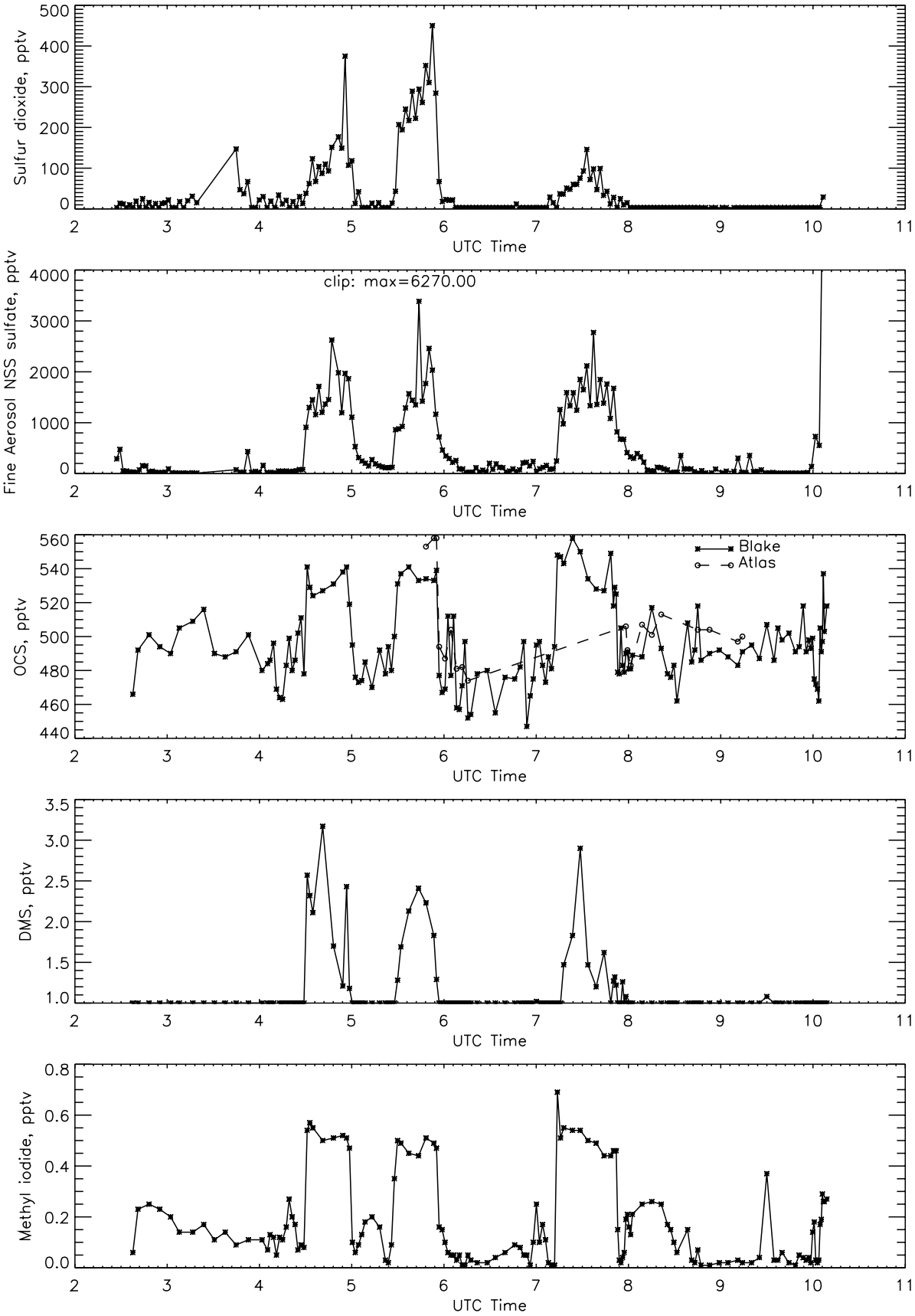

FINAL DATA: TRACE-P DC-8 Flight 10
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas

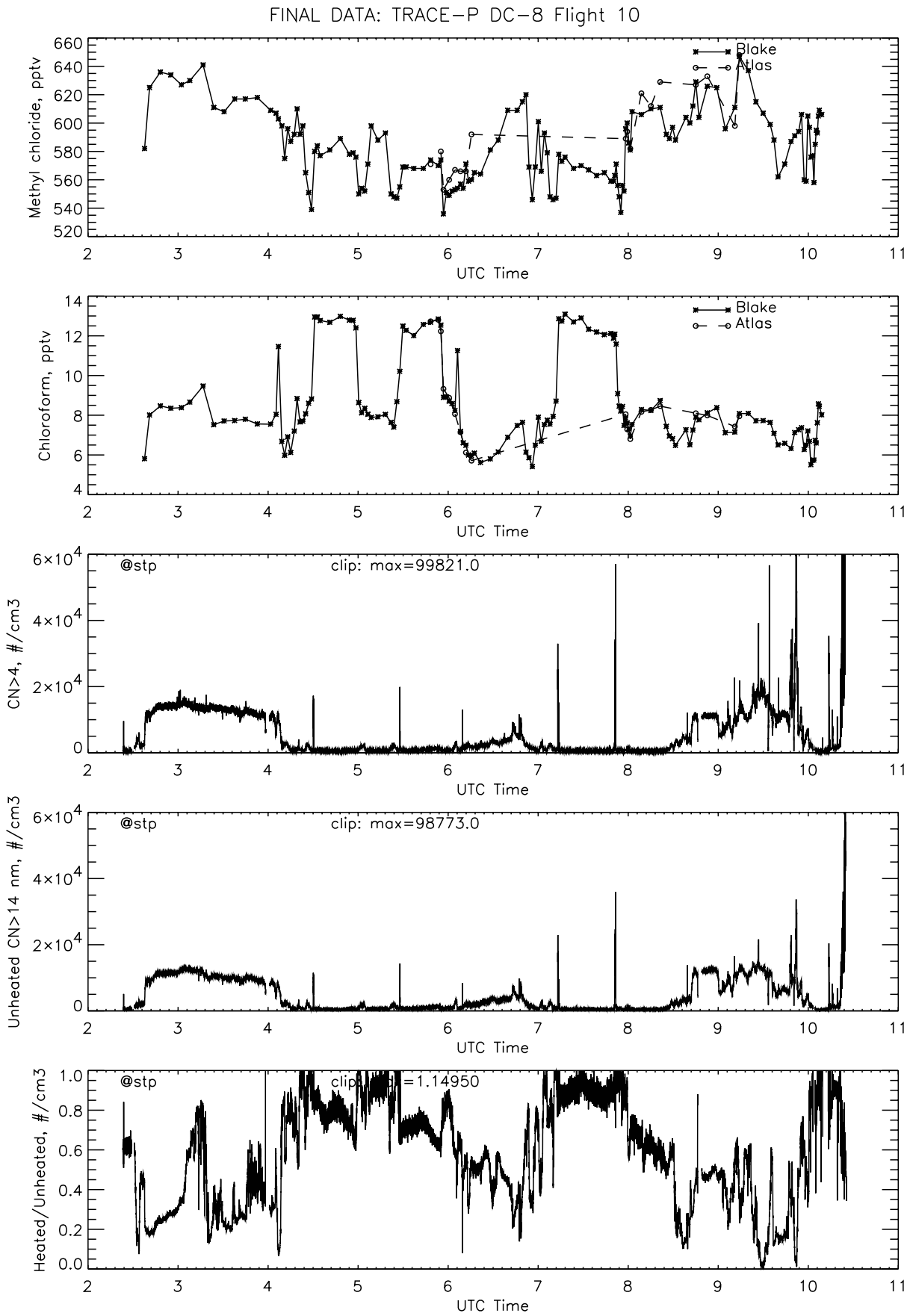
FINAL DATA: TRACE-P DC-8 Flight 10

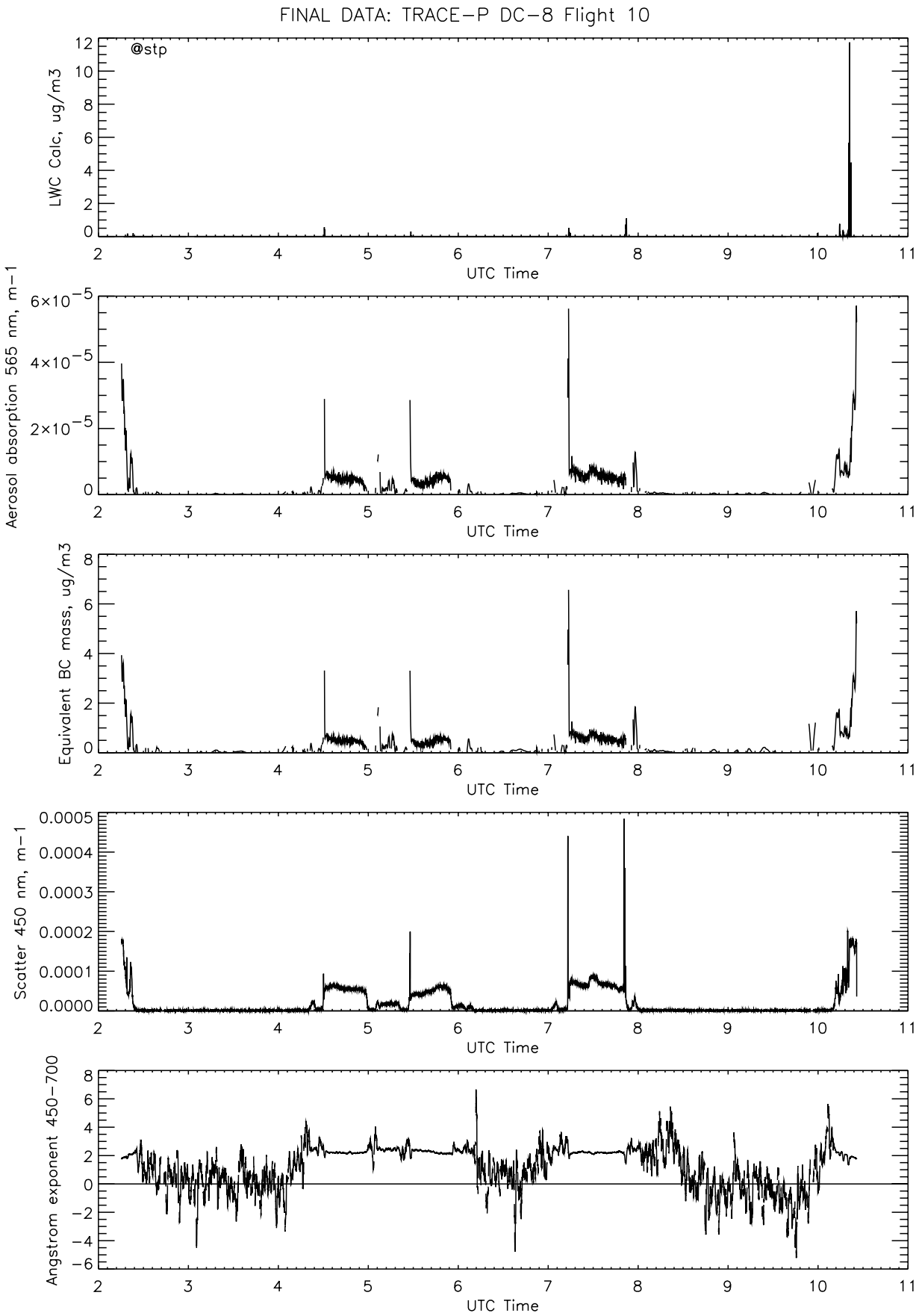


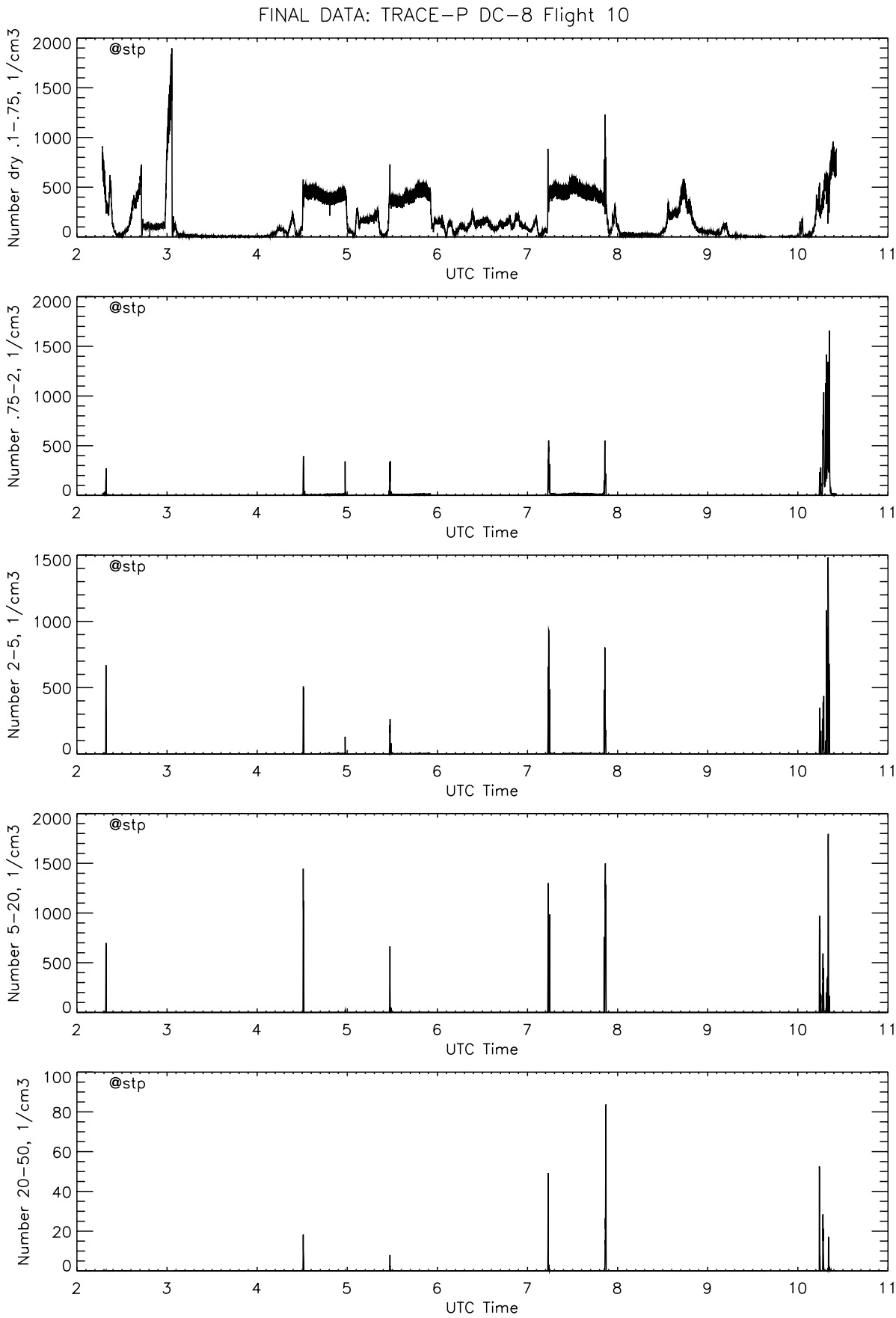

FINAL DATA: TRACE-P DC-8 Flight 10
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time

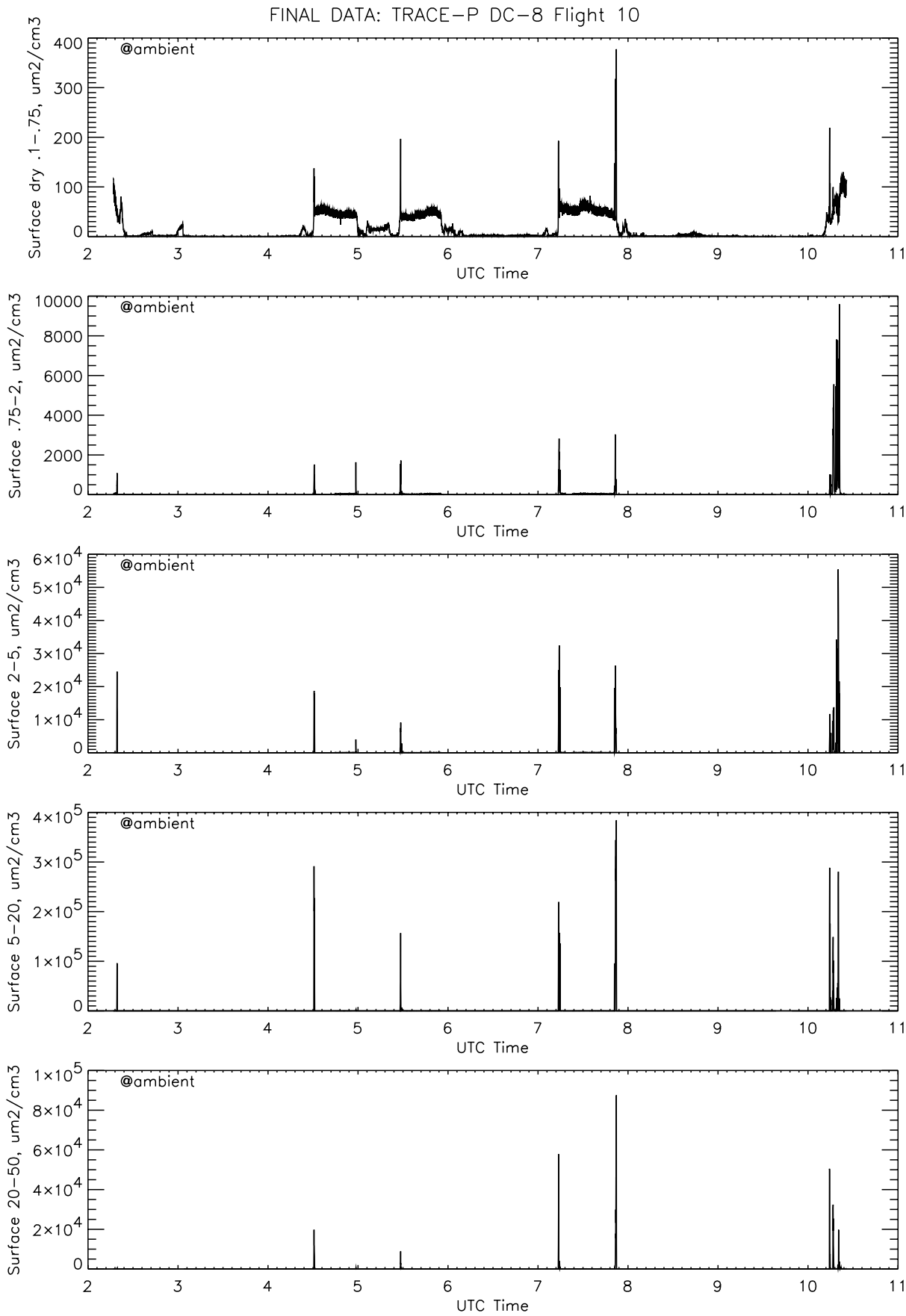
FINAL DATA: TRACE-P DC-8 Flight 10

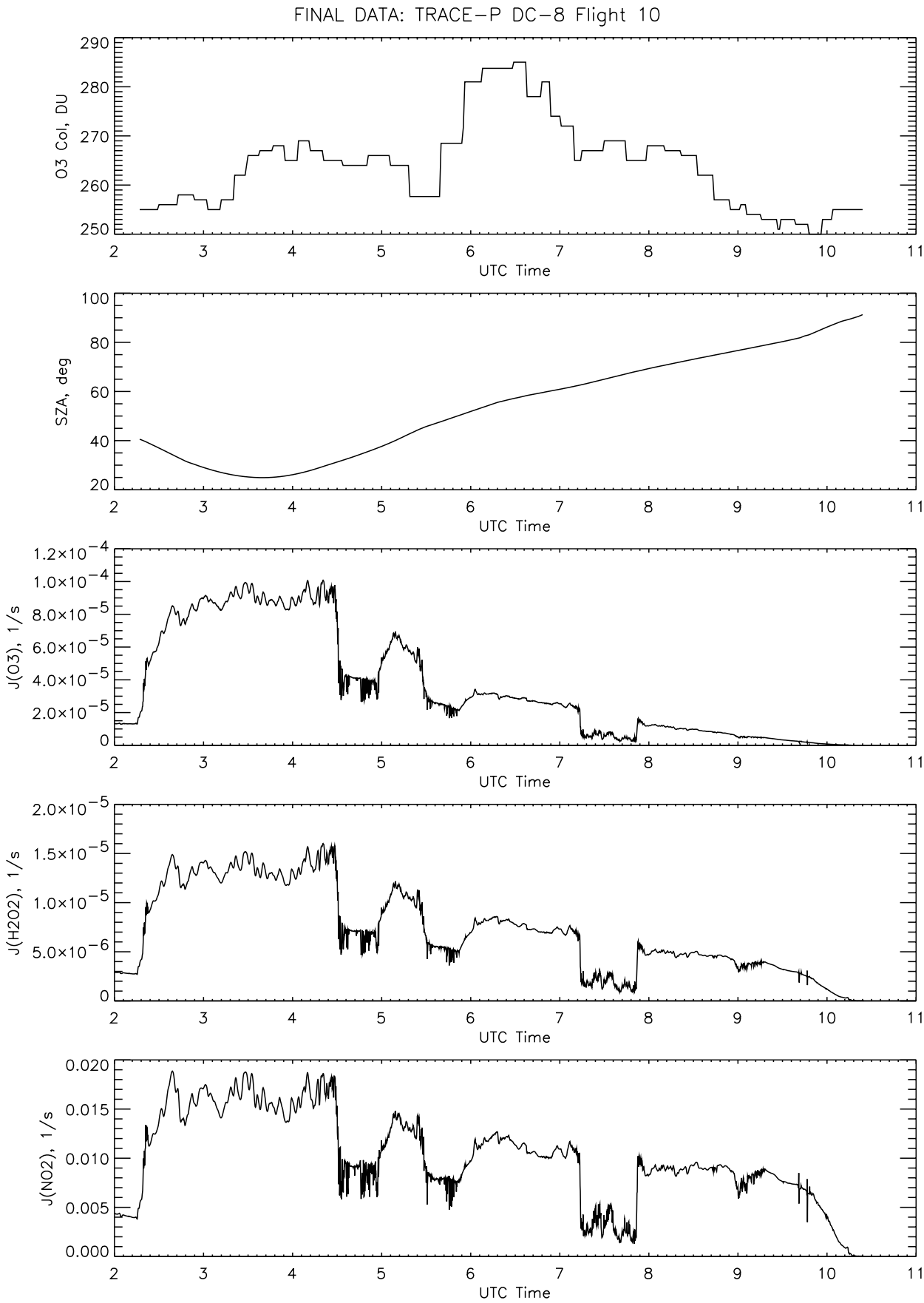


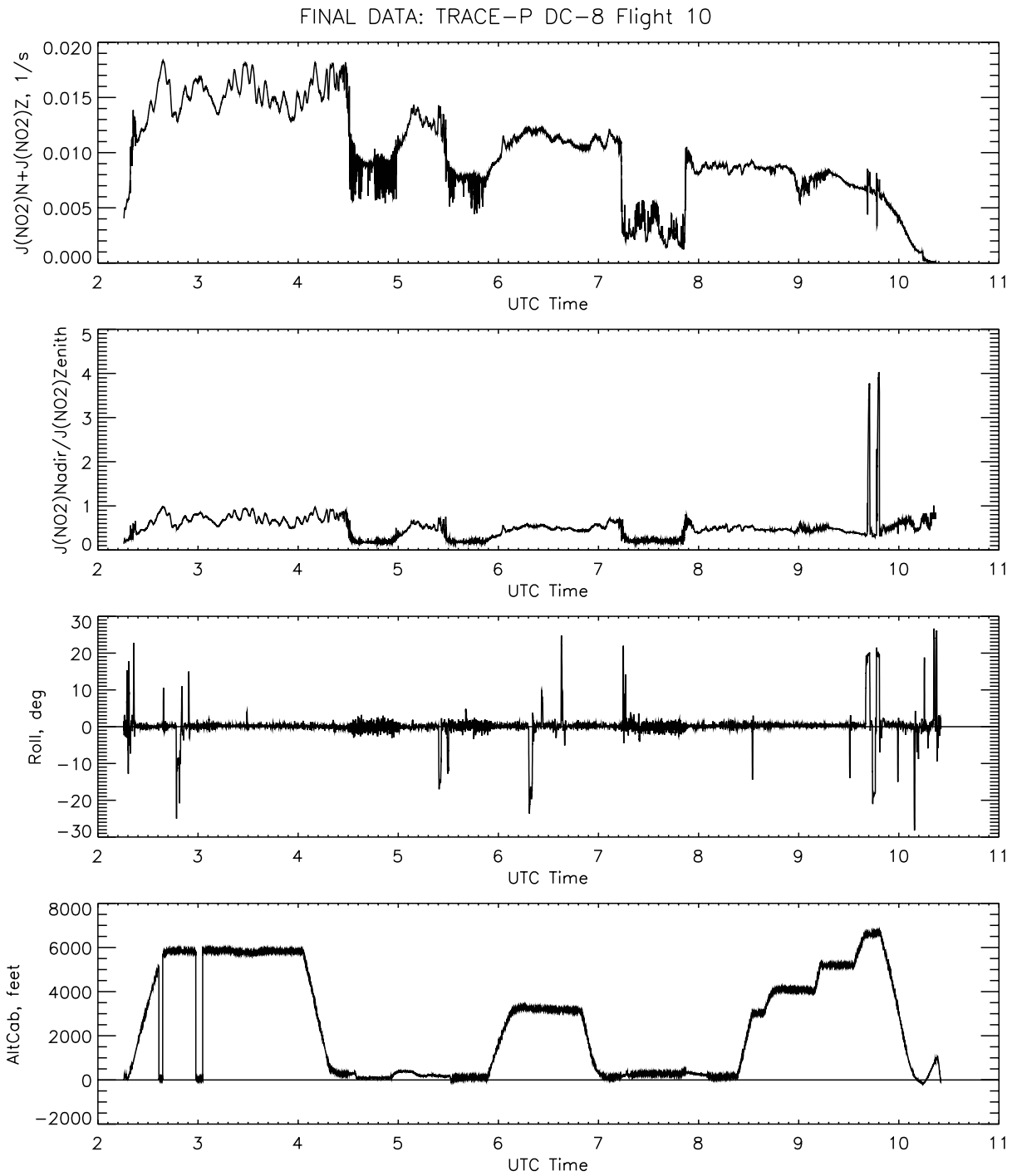

FINAL DATA: TRACE-P DC-8 Flight 10
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4, #/cm3
@stp
clip: max=99821.0
UTC Time
Unheated CN>14 nm, #/cm3
@stp
clip: max=98773.0
UTC Time
Heated/Unheated, #/cm3
@stp
=1.14950
UTC Time

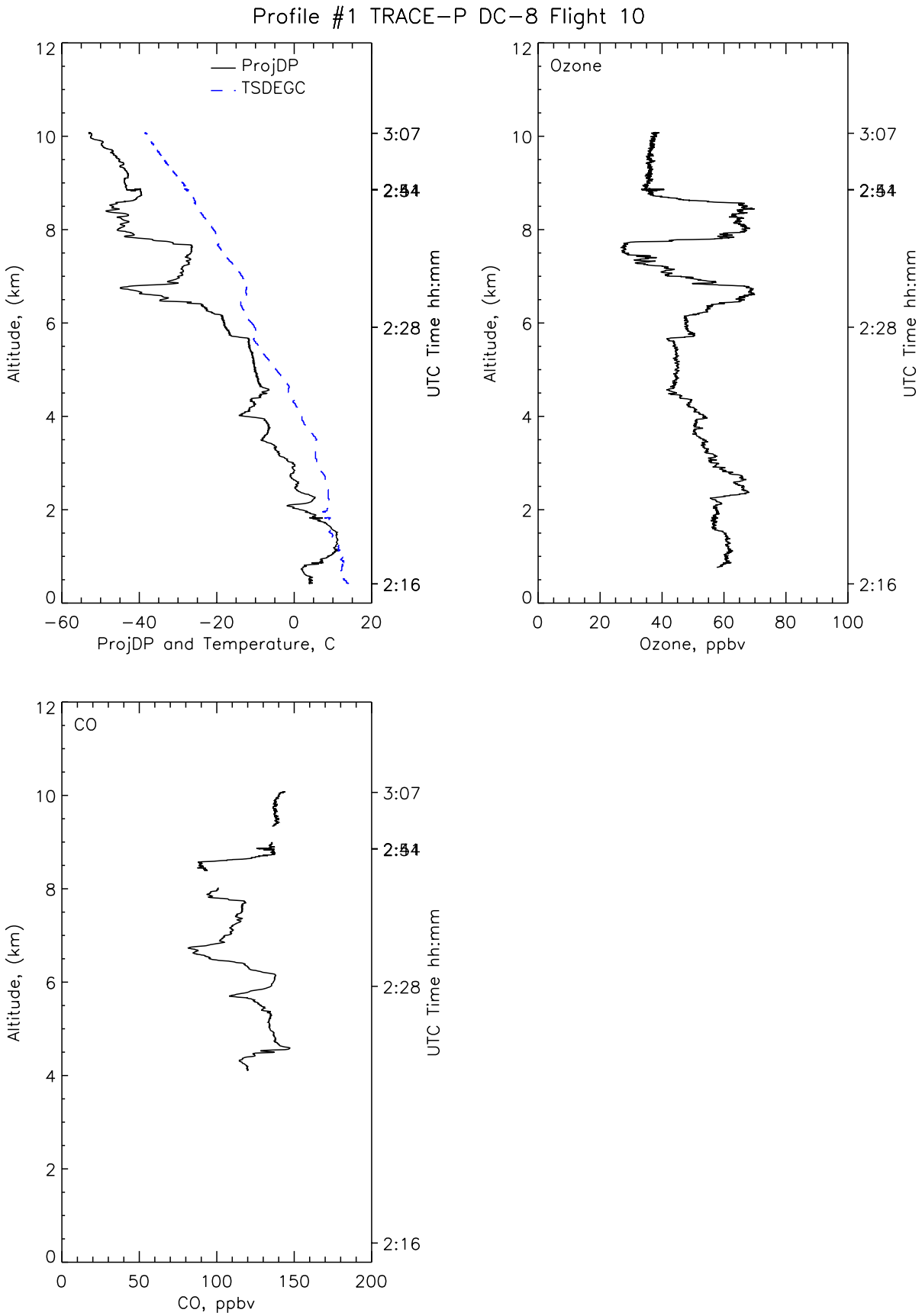

FINAL DATA: TRACE-P DC-8 Flight 10
@stp
LWC Calc, ug/m3
Aerosol absorption 565 nm, m-1
Equivalent BC mass, ug/m3
Scatter 450 nm, m-1
Angstrom exponent 450-700
UTC Time

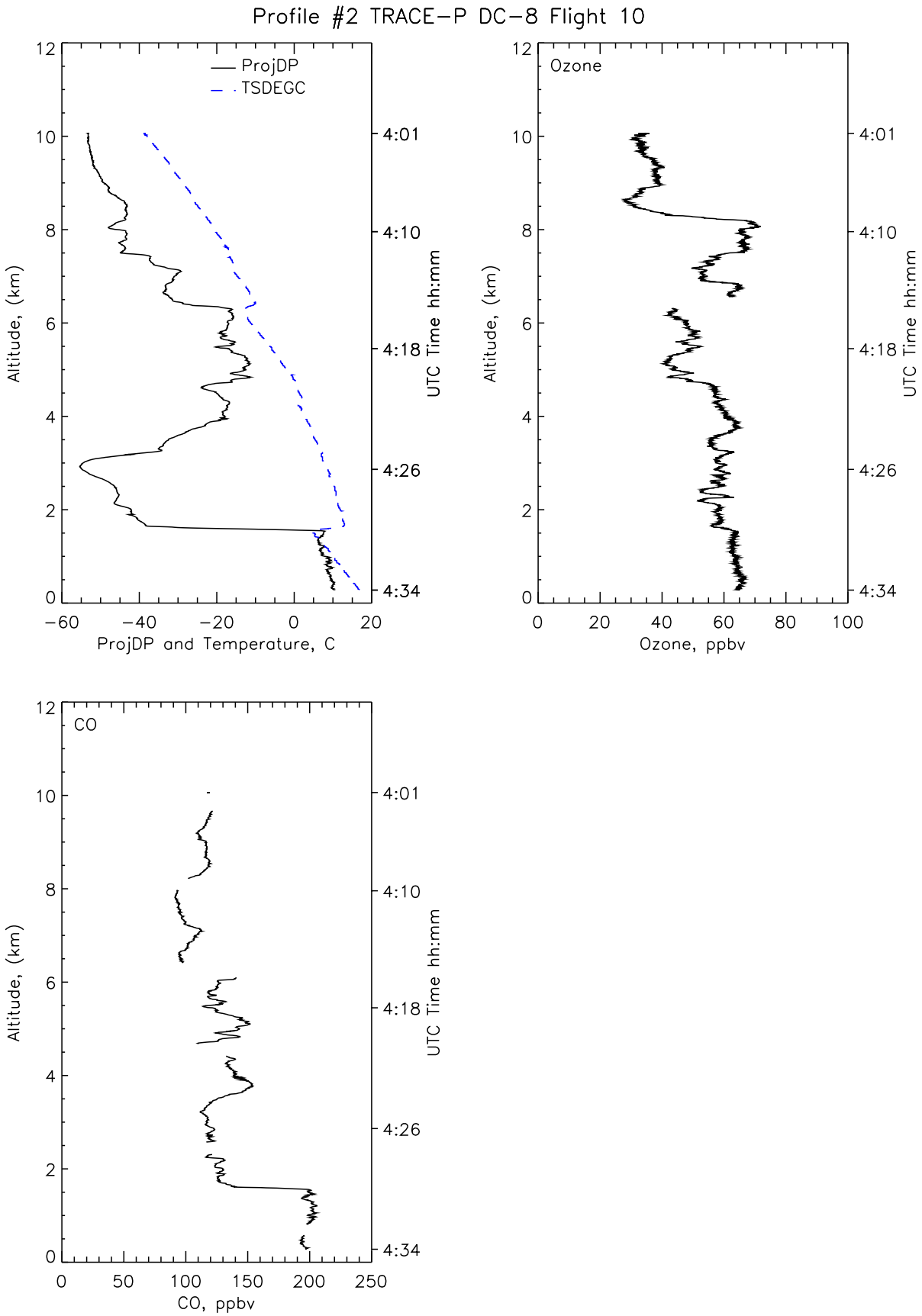

FINAL DATA: TRACE-P DC-8 Flight 10
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

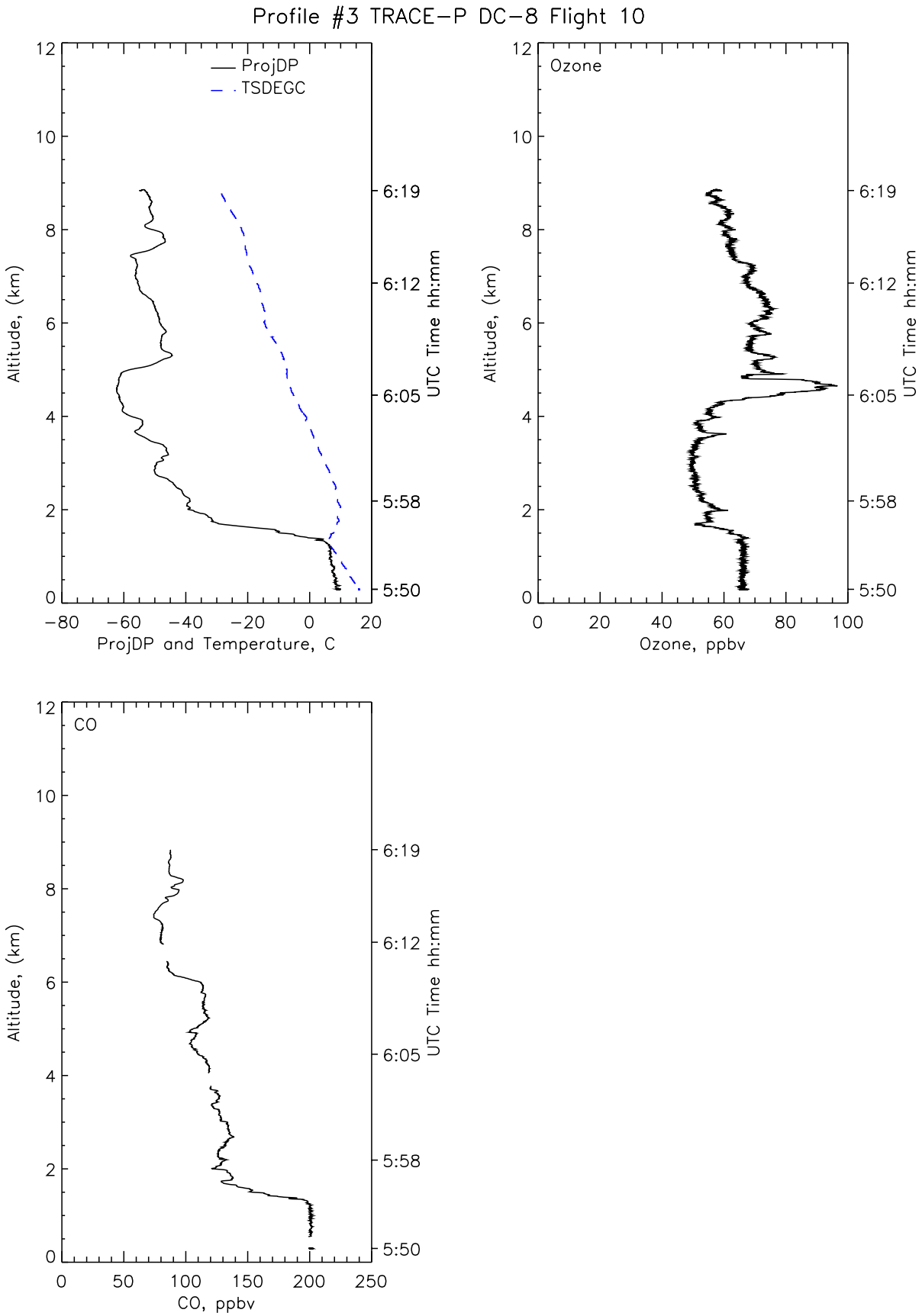

FINAL DATA: TRACE-P DC-8 Flight 10
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

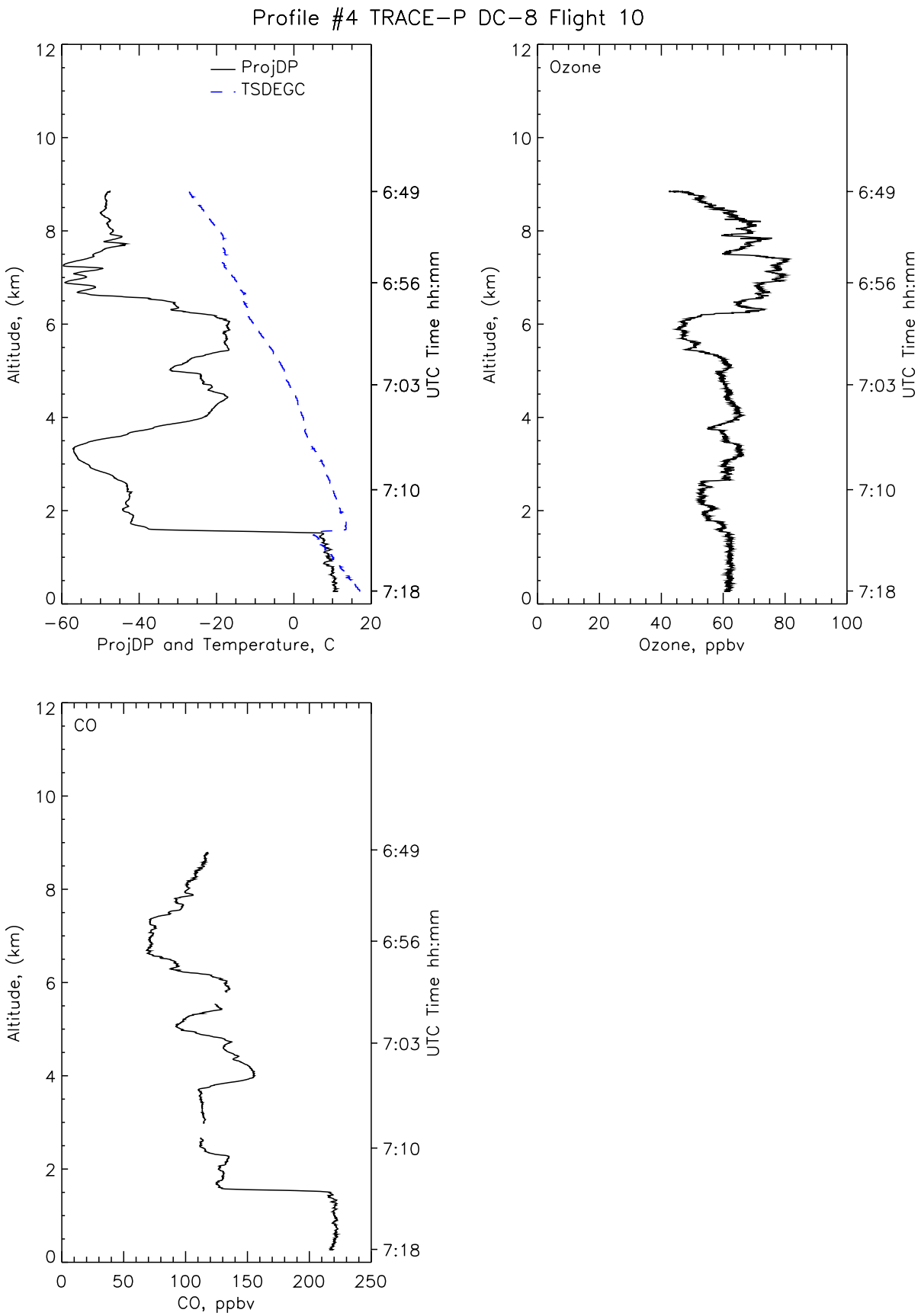

FINAL DATA: TRACE-P DC-8 Flight 10
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

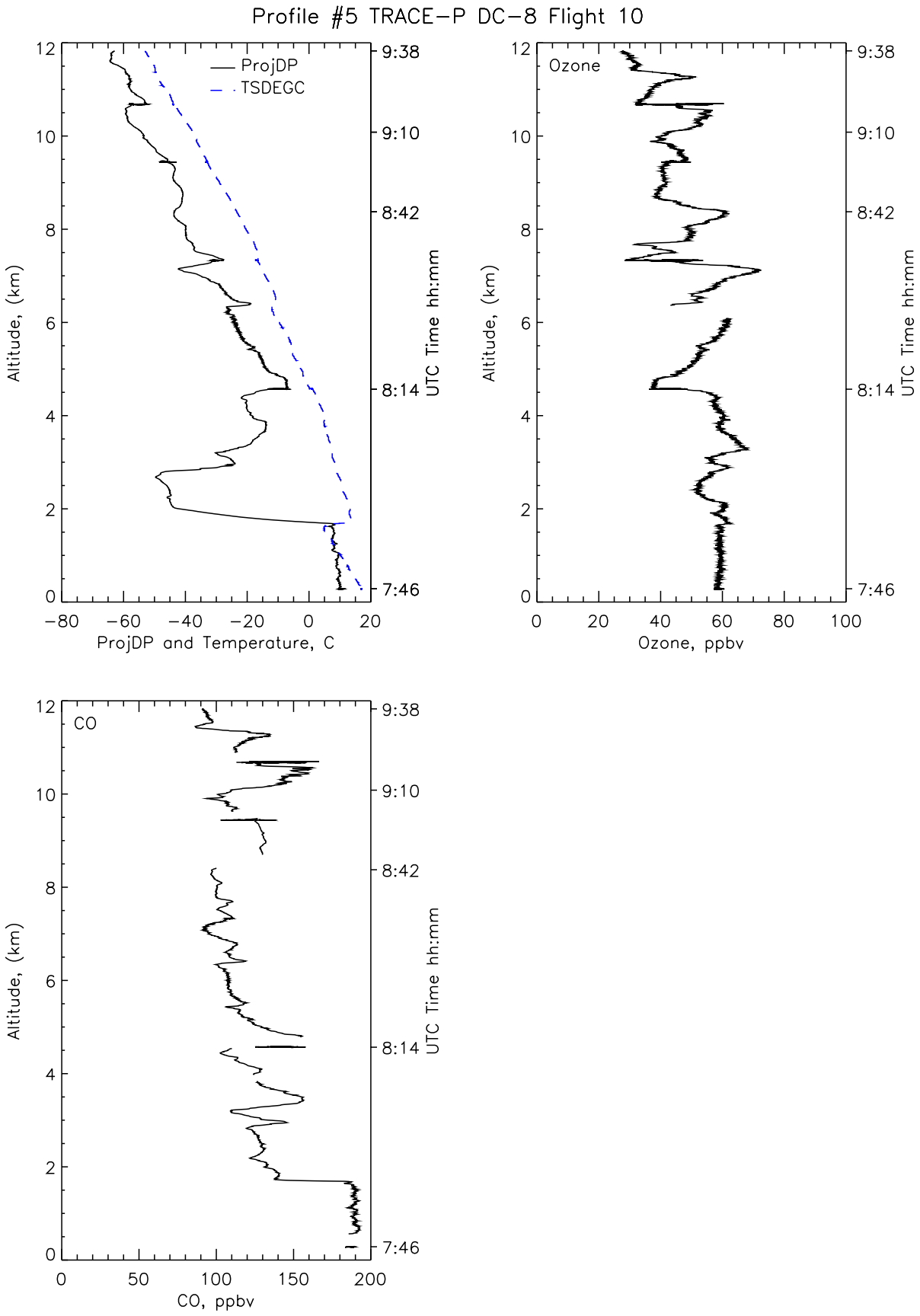

FINAL DATA: TRACE-P DC-8 Flight 10
J(NO2)N+J(NO2)Z, 1/s
0.020
0.015
0.010
0.005
0.000
2
3
4
5
6
7
8
9
10
11
UTC Time
J(NO2)Nadir/J(NO2)Zenith
5
4
3
2
1
0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
UTC Time

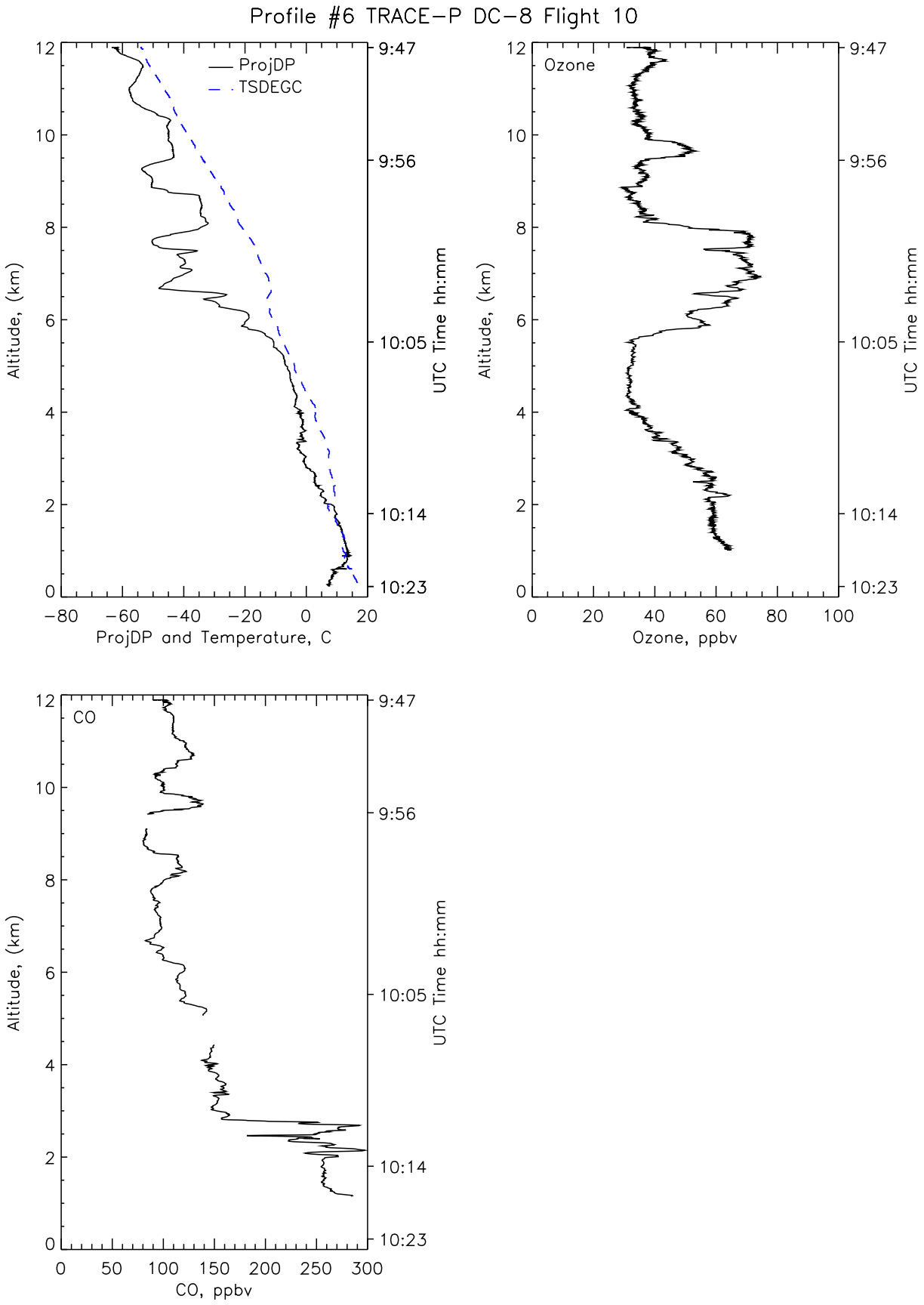

Profile #1 TRACE-P DC-8 Flight 10
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
3:07
2:54
2:28
2:16
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #2 TRACE-P DC-8 Flight 10
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #3 TRACE-P DC-8 Flight 10
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #4 TRACE-P DC-8 Flight 10
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
6:49
6:56
7:03
7:10
7:18
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #5 TRACE-P DC-8 Flight 10
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
9:38
9:10
8:42
8:14
7:46
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 10
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
9:47
9:56
10:05
10:14
10:23
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

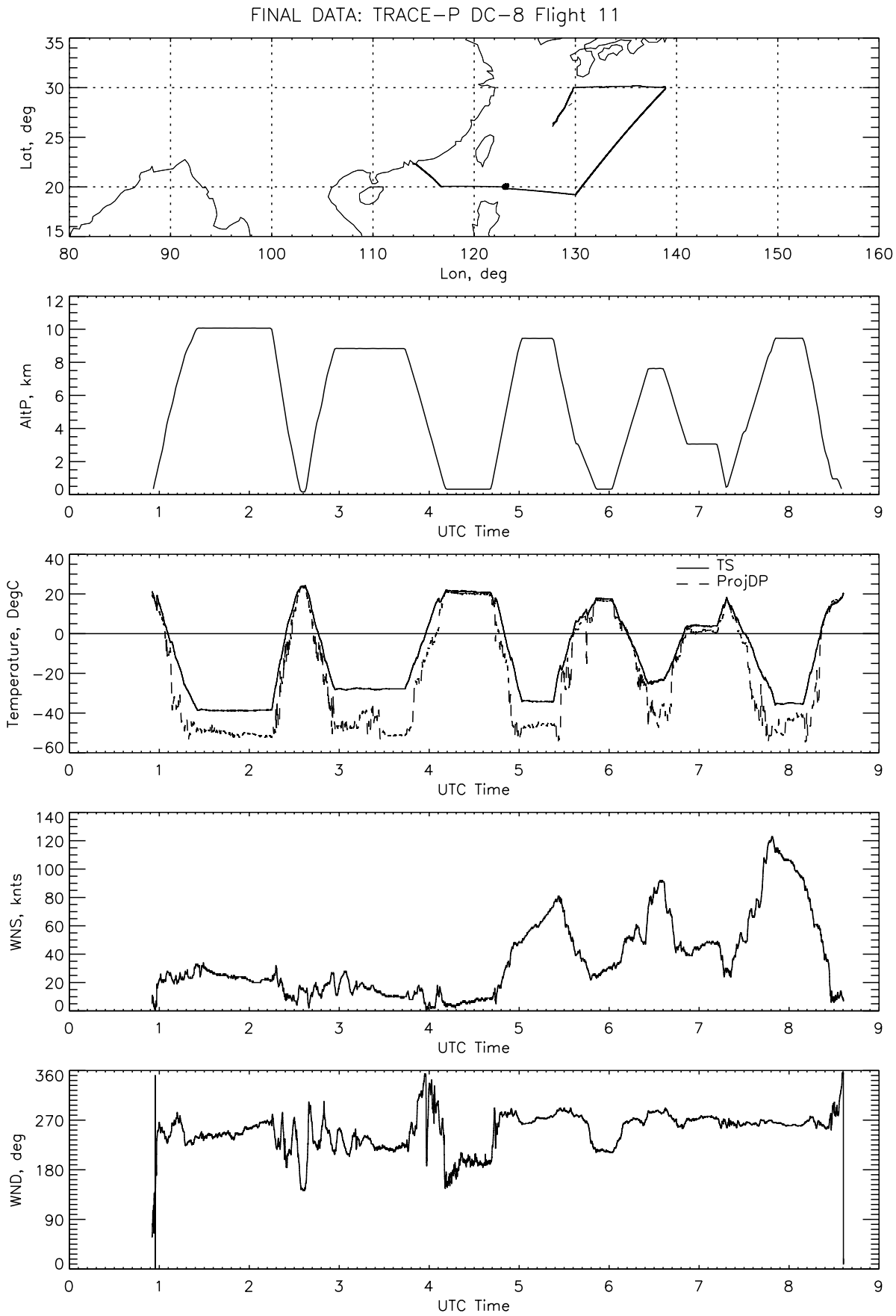
TRACE-P

Flight 11D

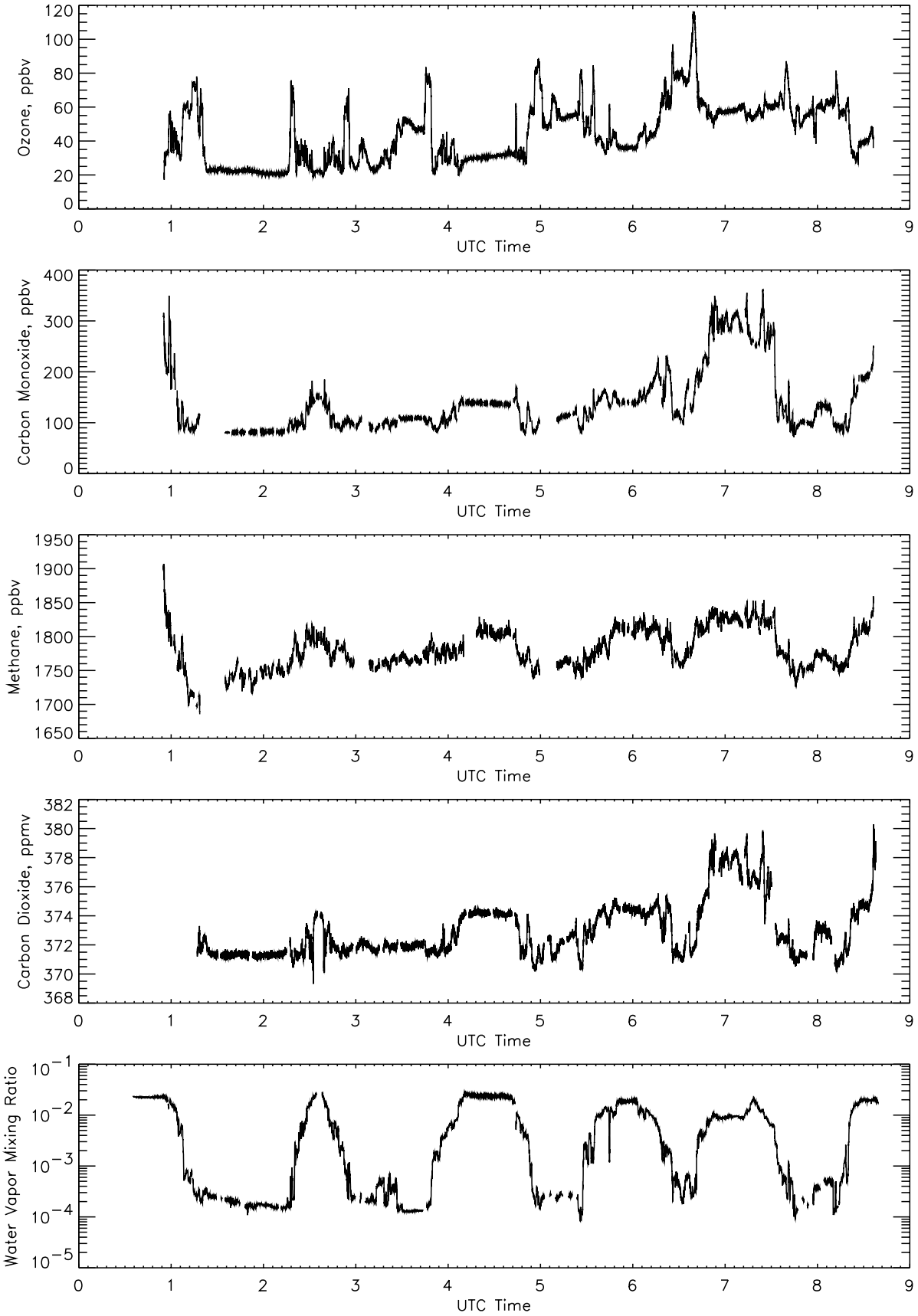
Transit: Hong Kong to Okinawa

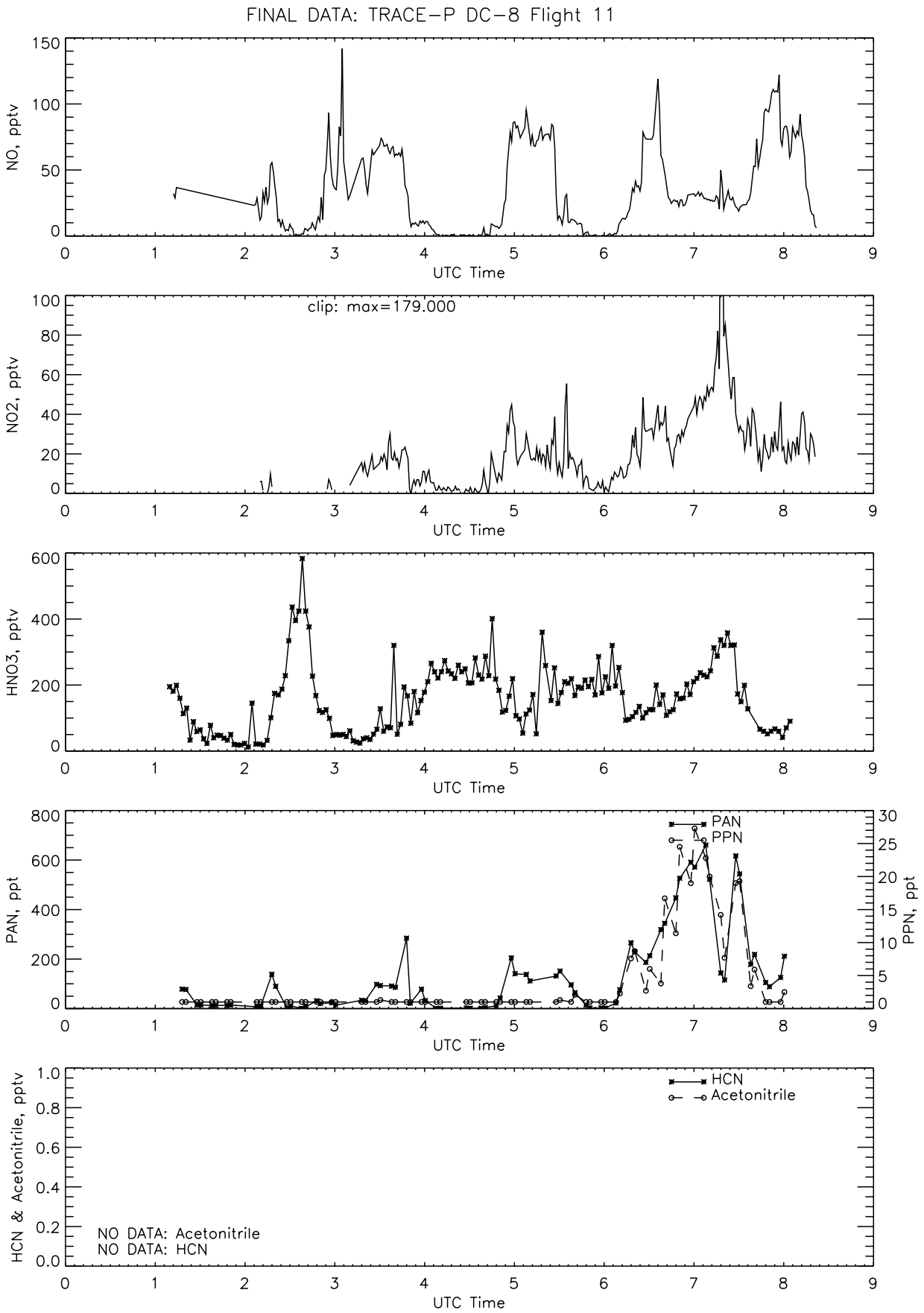
MOPITT Validation and China Outflow

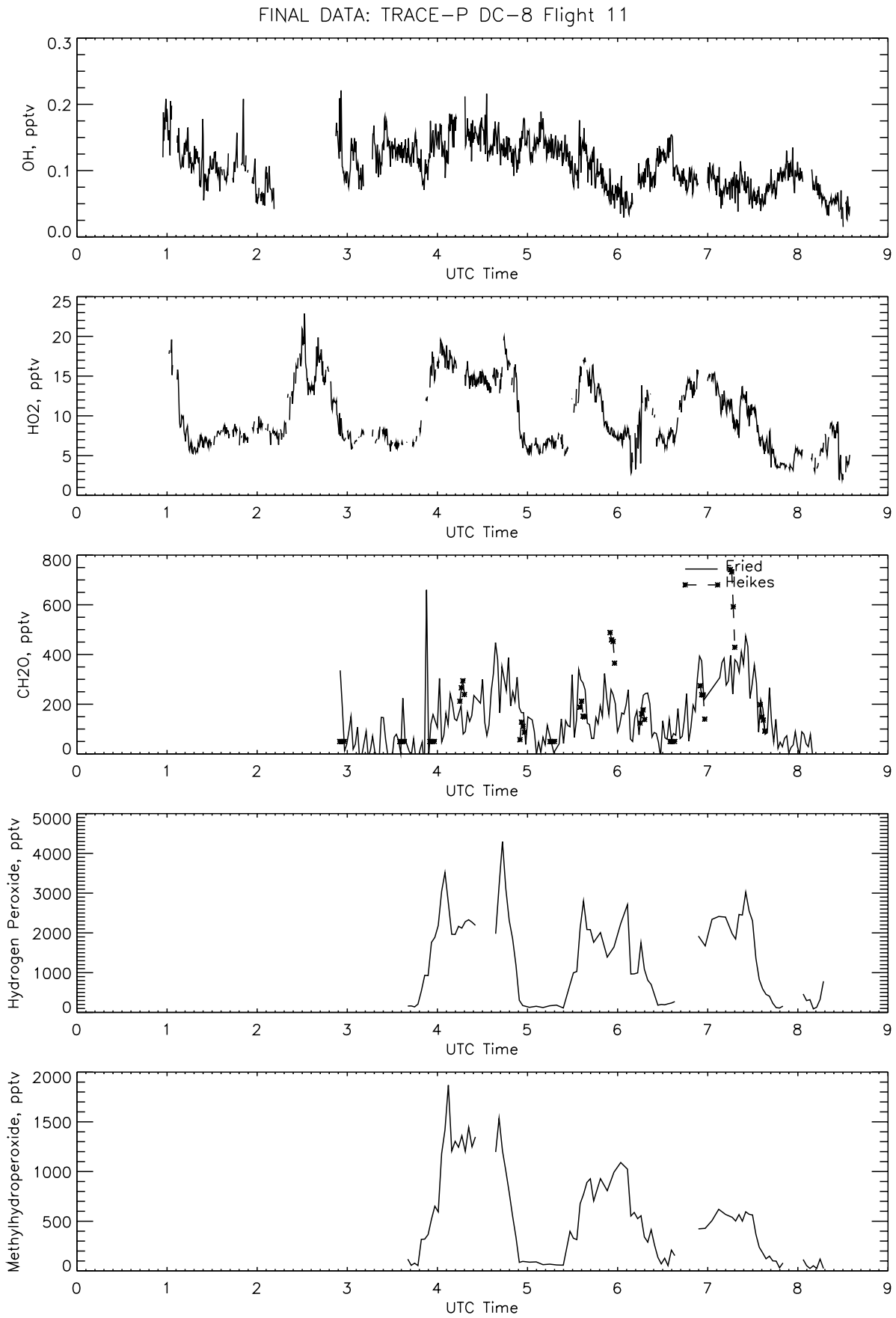
March 17, 2001


FINAL DATA: TRACE-P DC-8 Flight 11
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

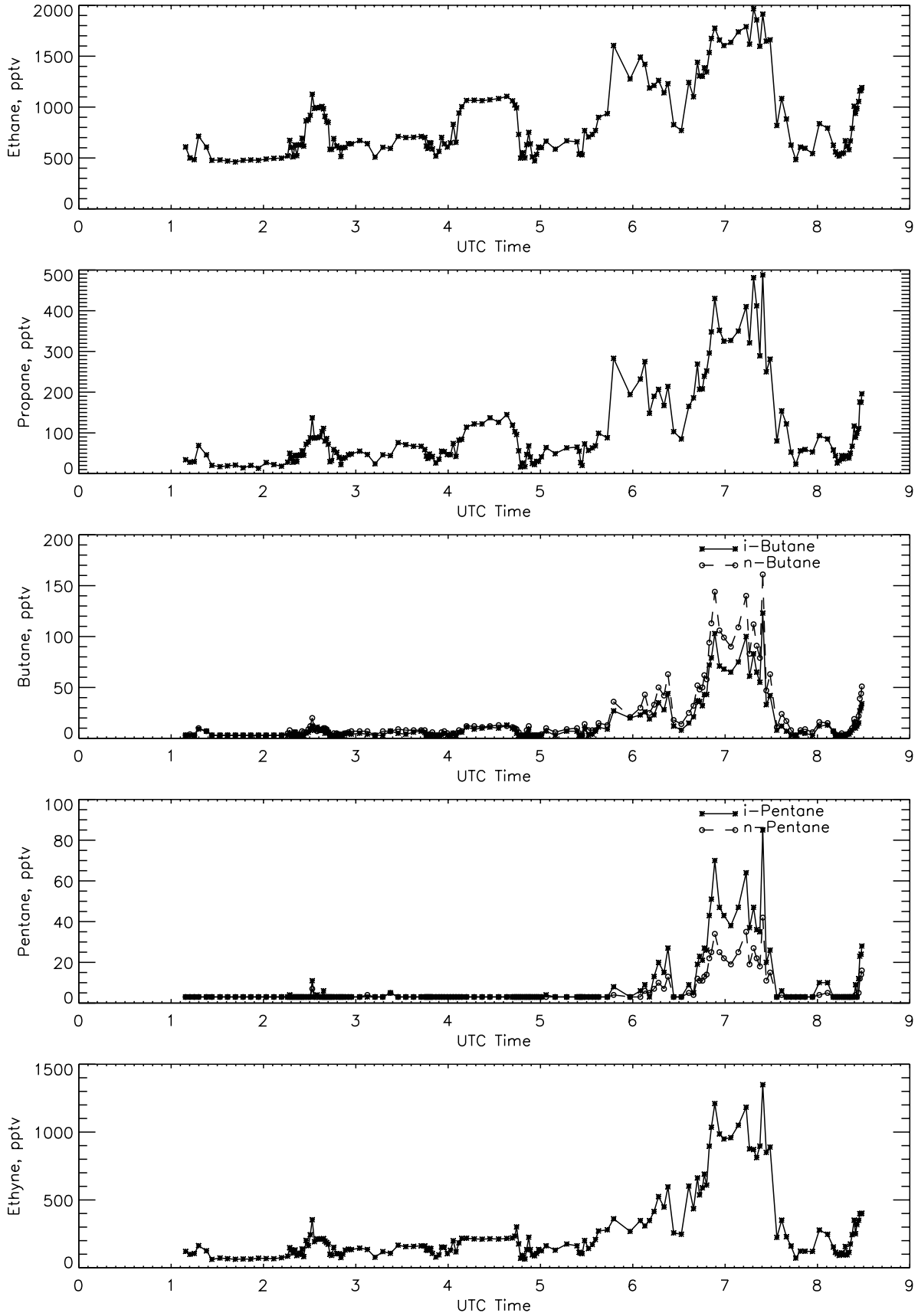
FINAL DATA: TRACE-P DC-8 Flight 11



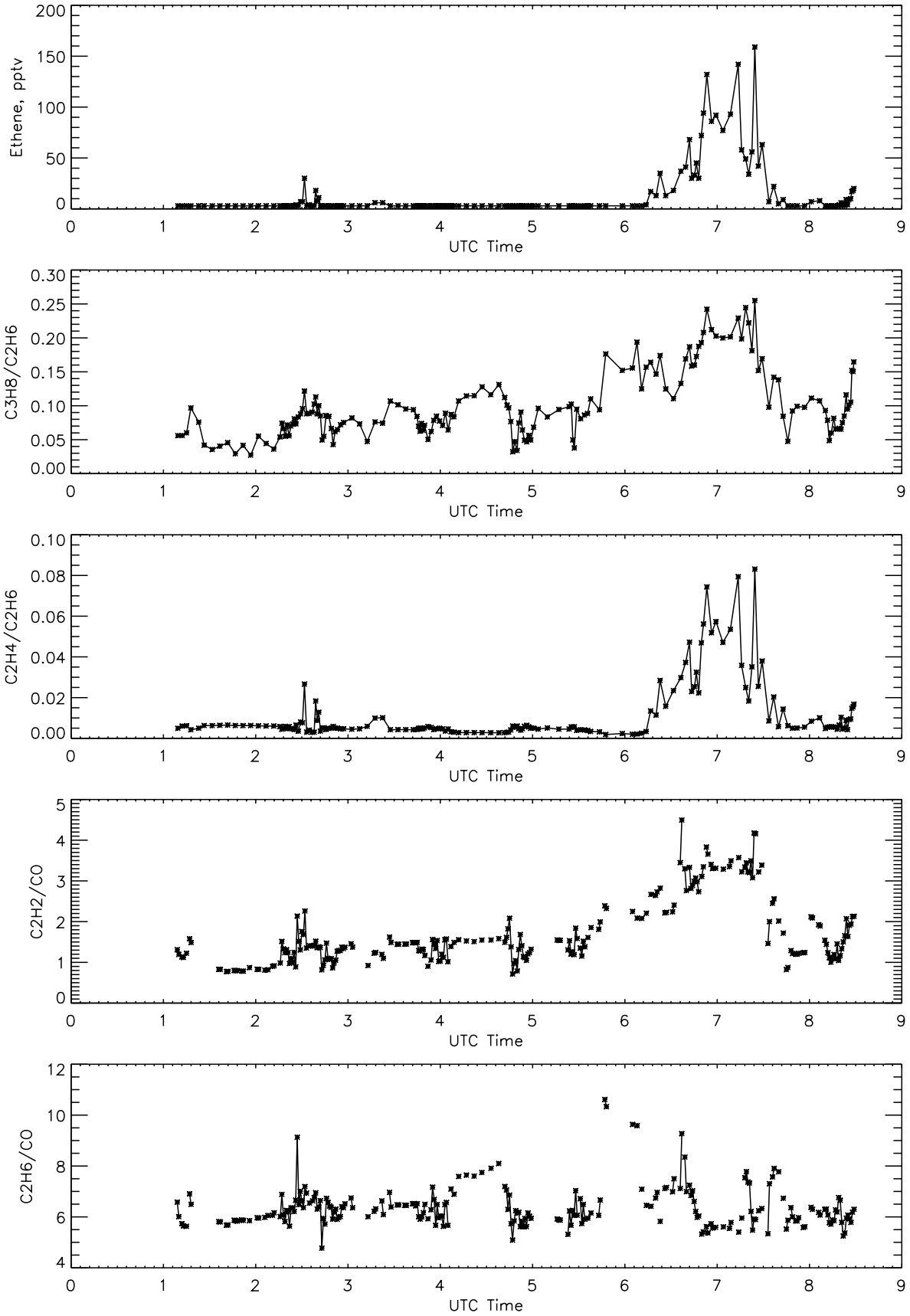

FINAL DATA: TRACE-P DC-8 Flight 11
NO, pptv
UTC Time
NO2, pptv
clip: max=179.000
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
NO DATA: Acetonitrile
NO DATA: HCN

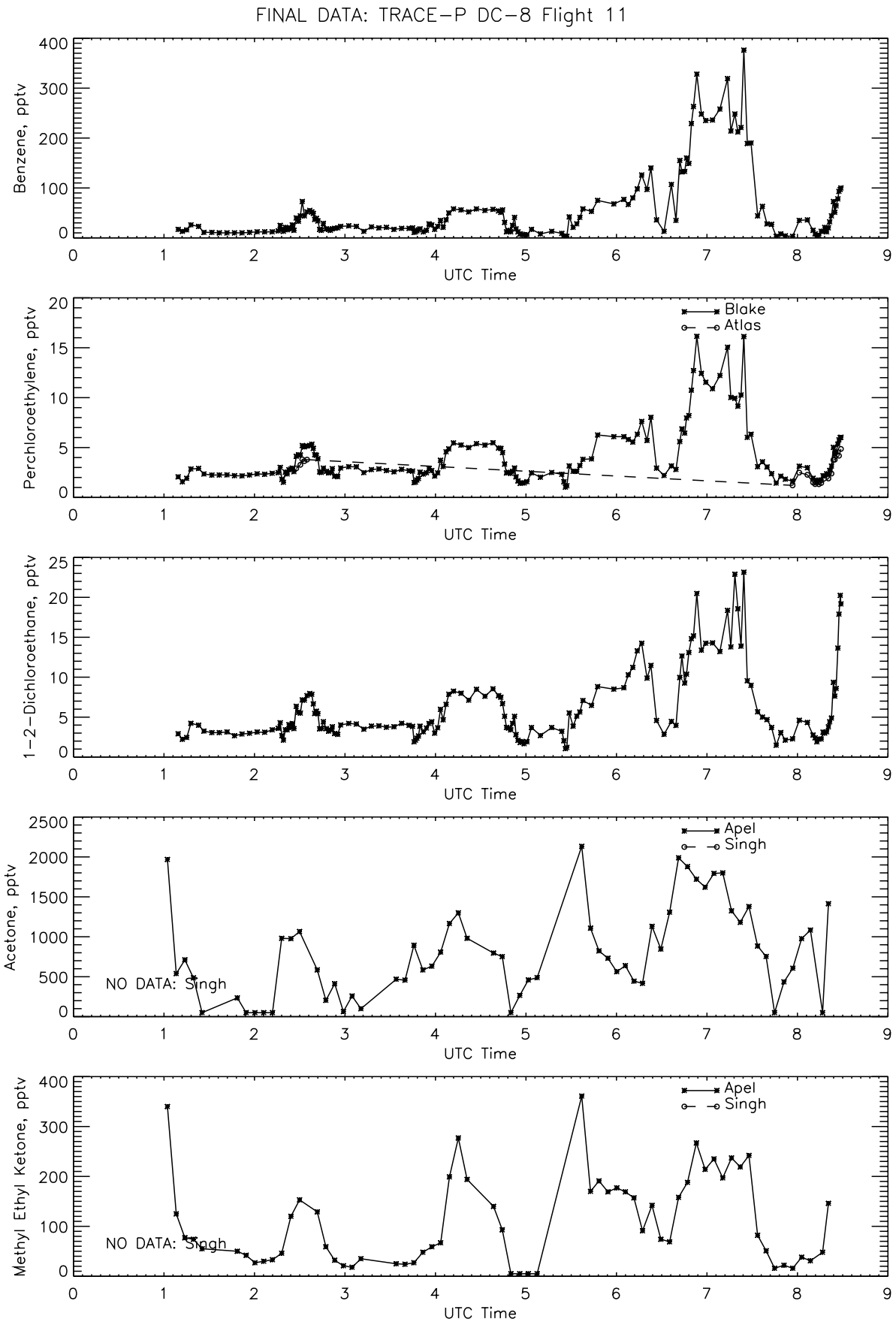

FINAL DATA: TRACE-P DC-8 Flight 11
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

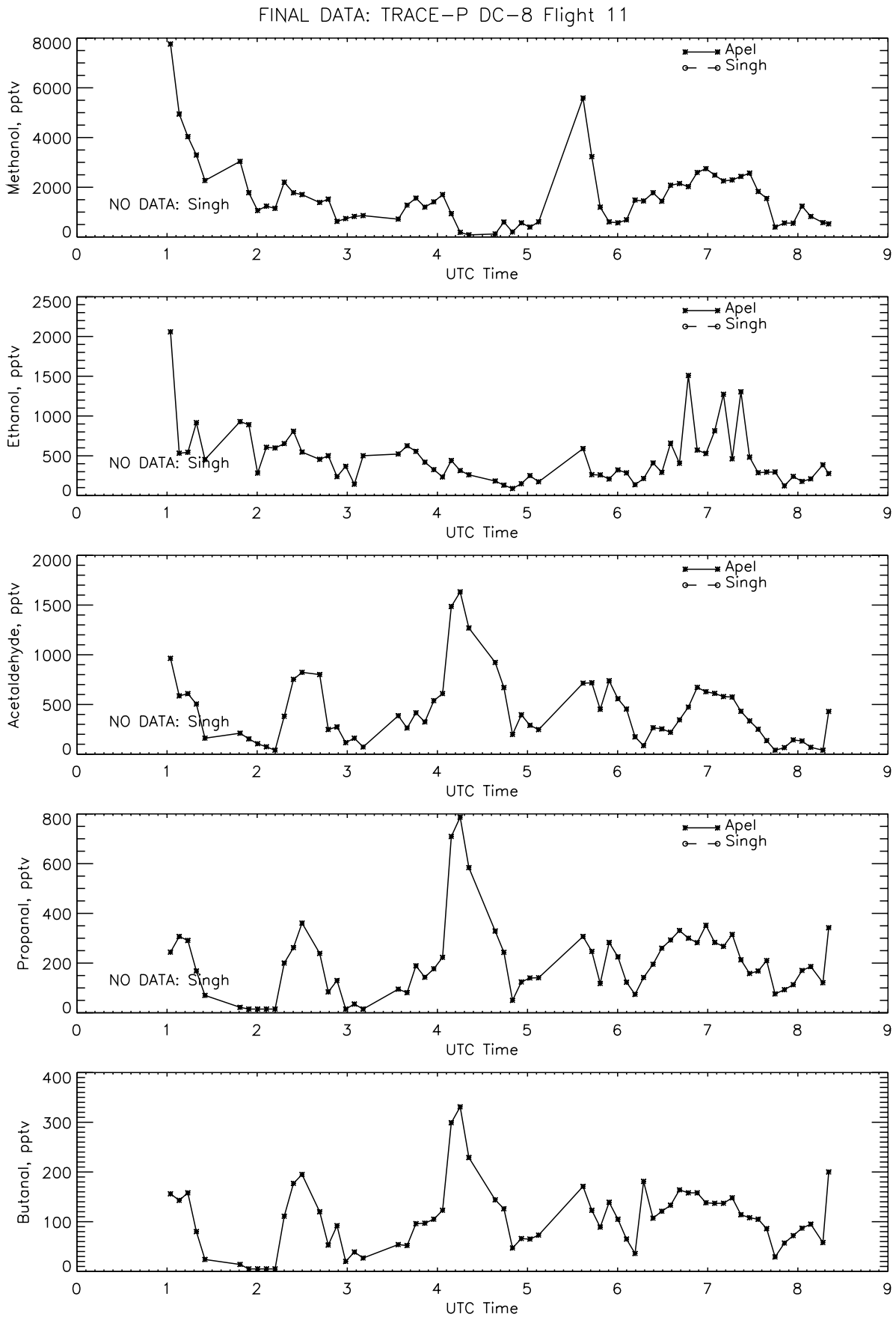
FINAL DATA: TRACE-P DC-8 Flight 11

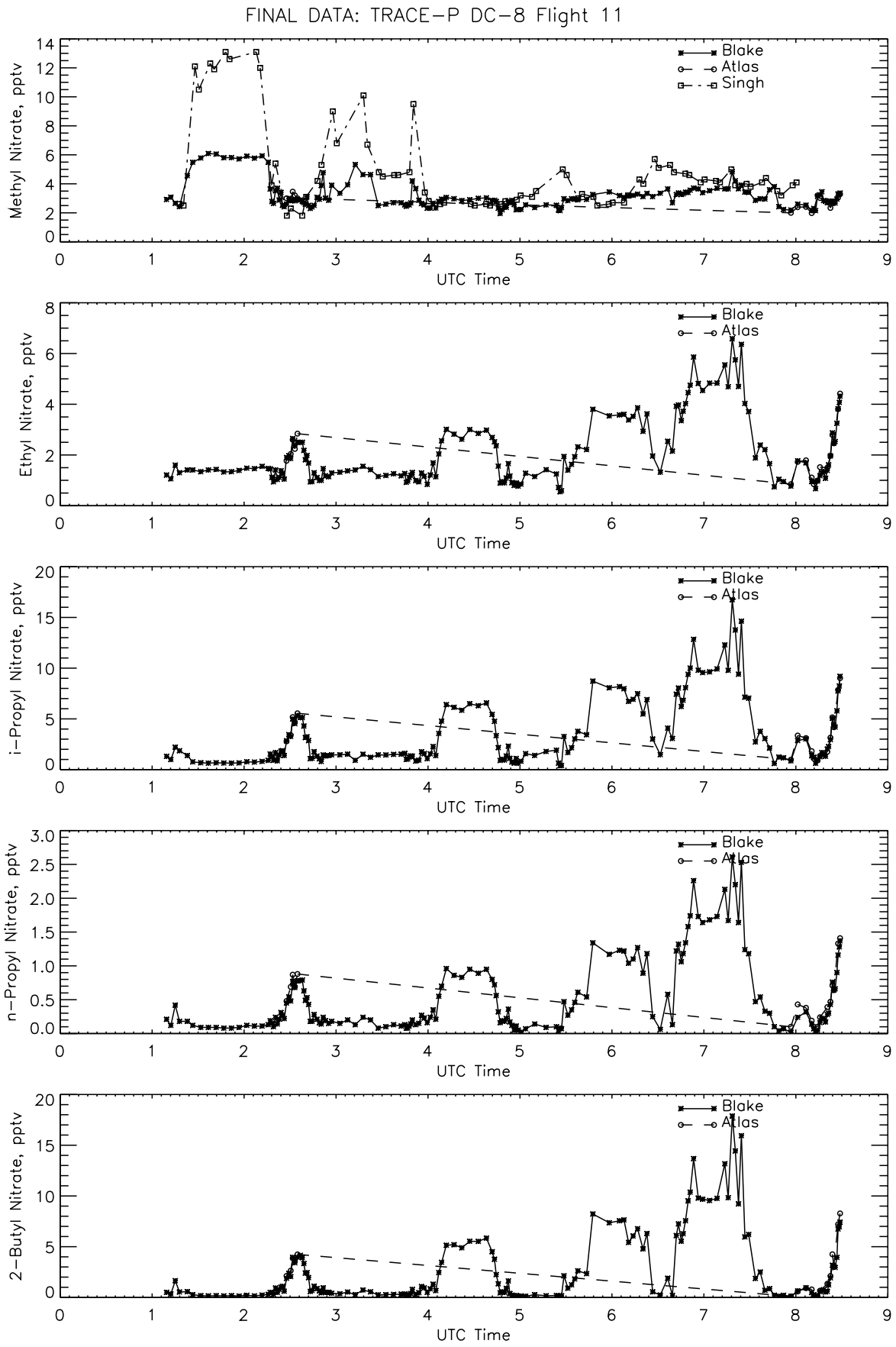


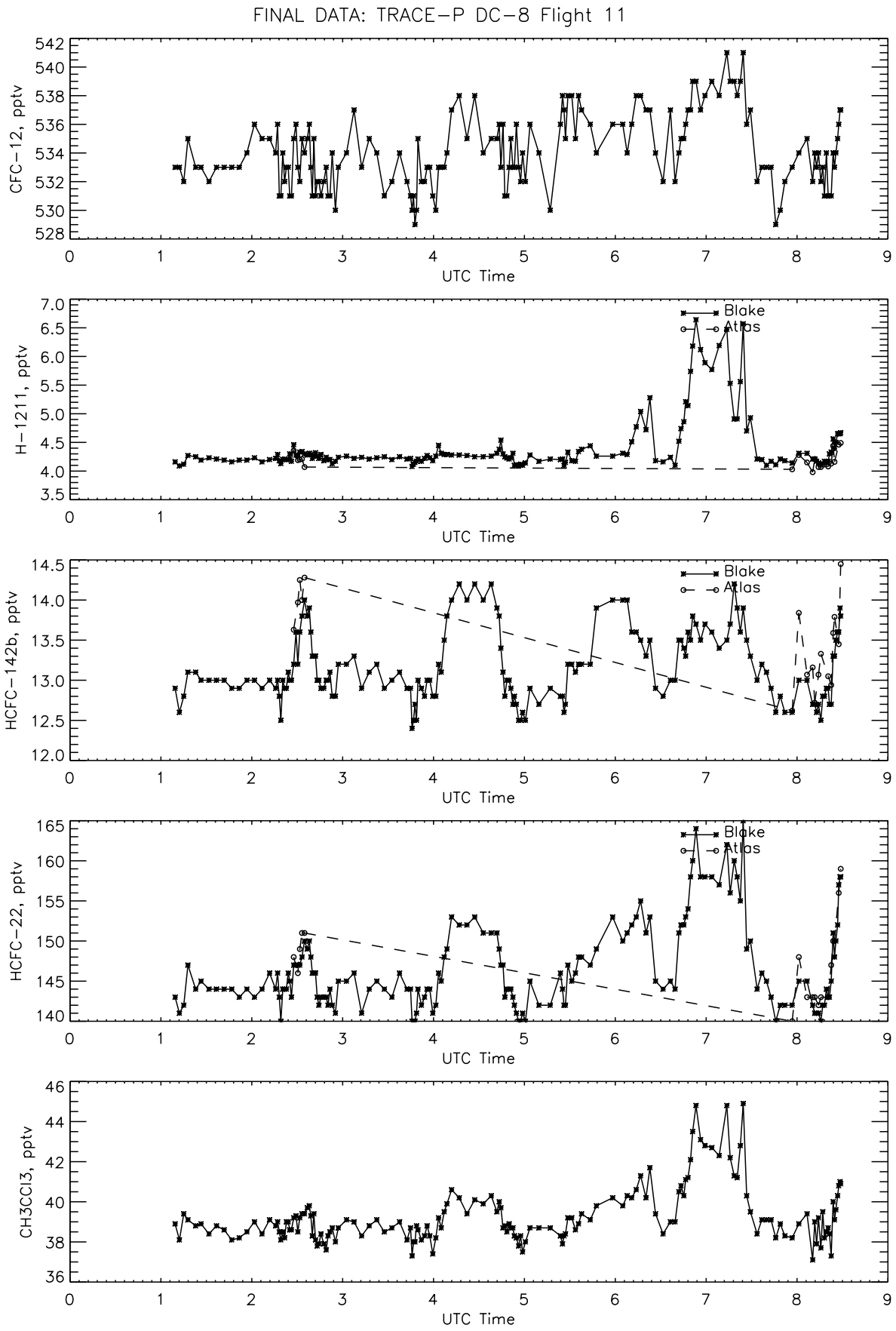
FINAL DATA: TRACE-P DC-8 Flight 11



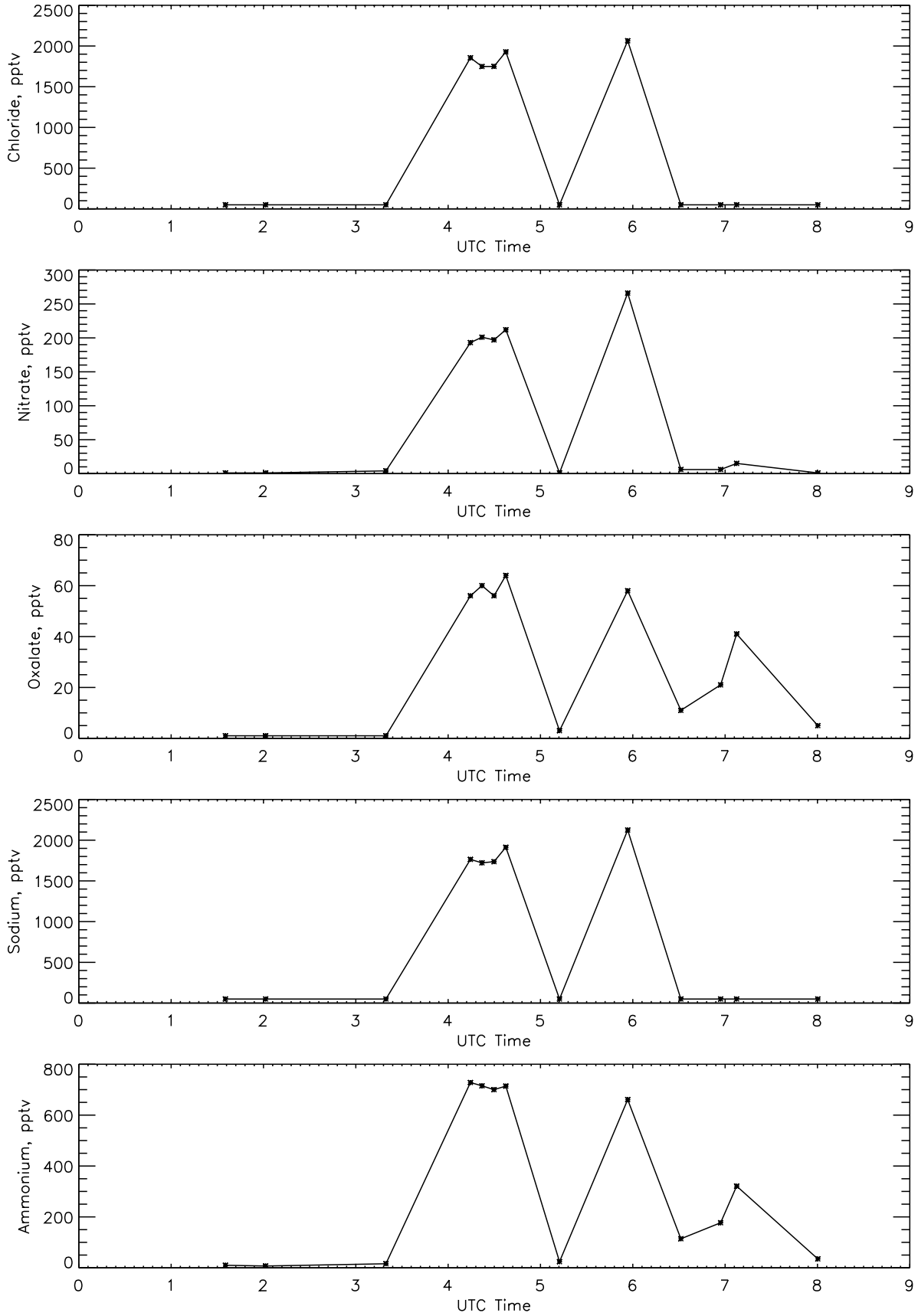

FINAL DATA: TRACE-P DC-8 Flight 11
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
NO DATA: Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
NO DATA: Singh
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 11
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh
NO DATA: Singh

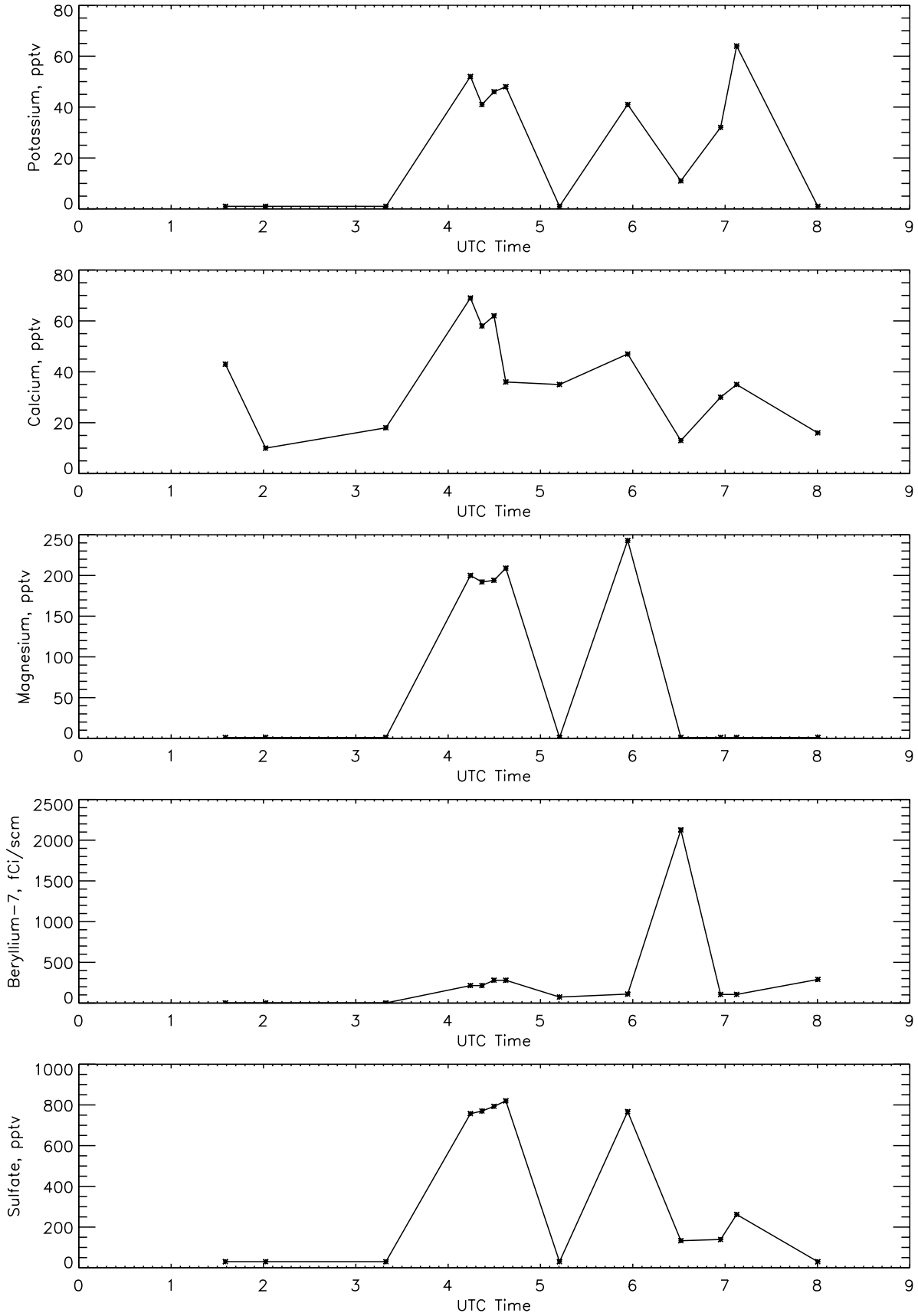

FINAL DATA: TRACE-P DC-8 Flight 11
Methyl Nitrate, pptv
Blake
Atlas
Singh
UTC Time
Ethyl Nitrate, pptv
Blake
Atlas
UTC Time
i-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
n-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
2-Butyl Nitrate, pptv
Blake
Atlas
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 11
CFC-12, pptv
UTC Time
H-1211, pptv
Blake
Atlas
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv

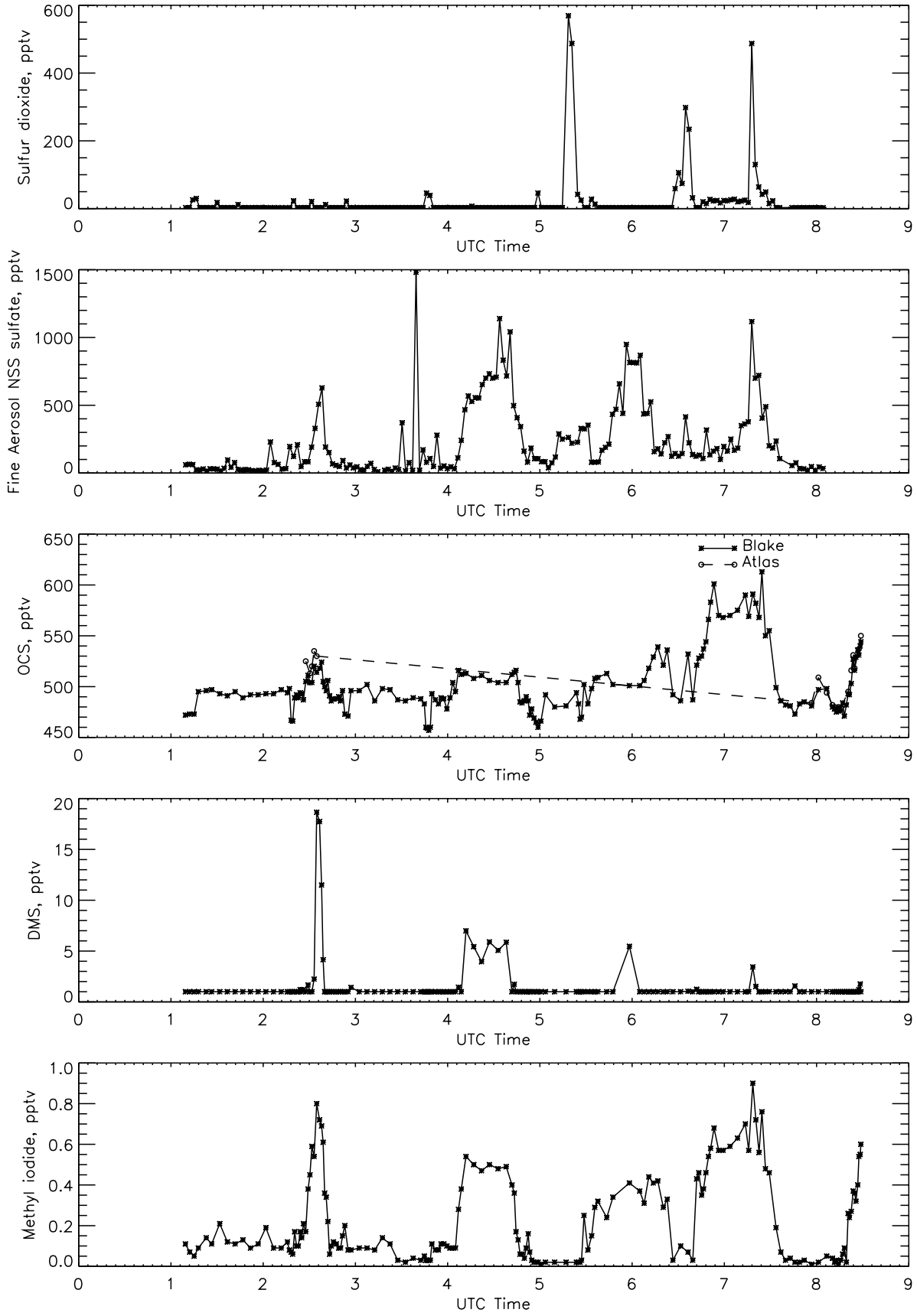
FINAL DATA: TRACE-P DC-8 Flight 11



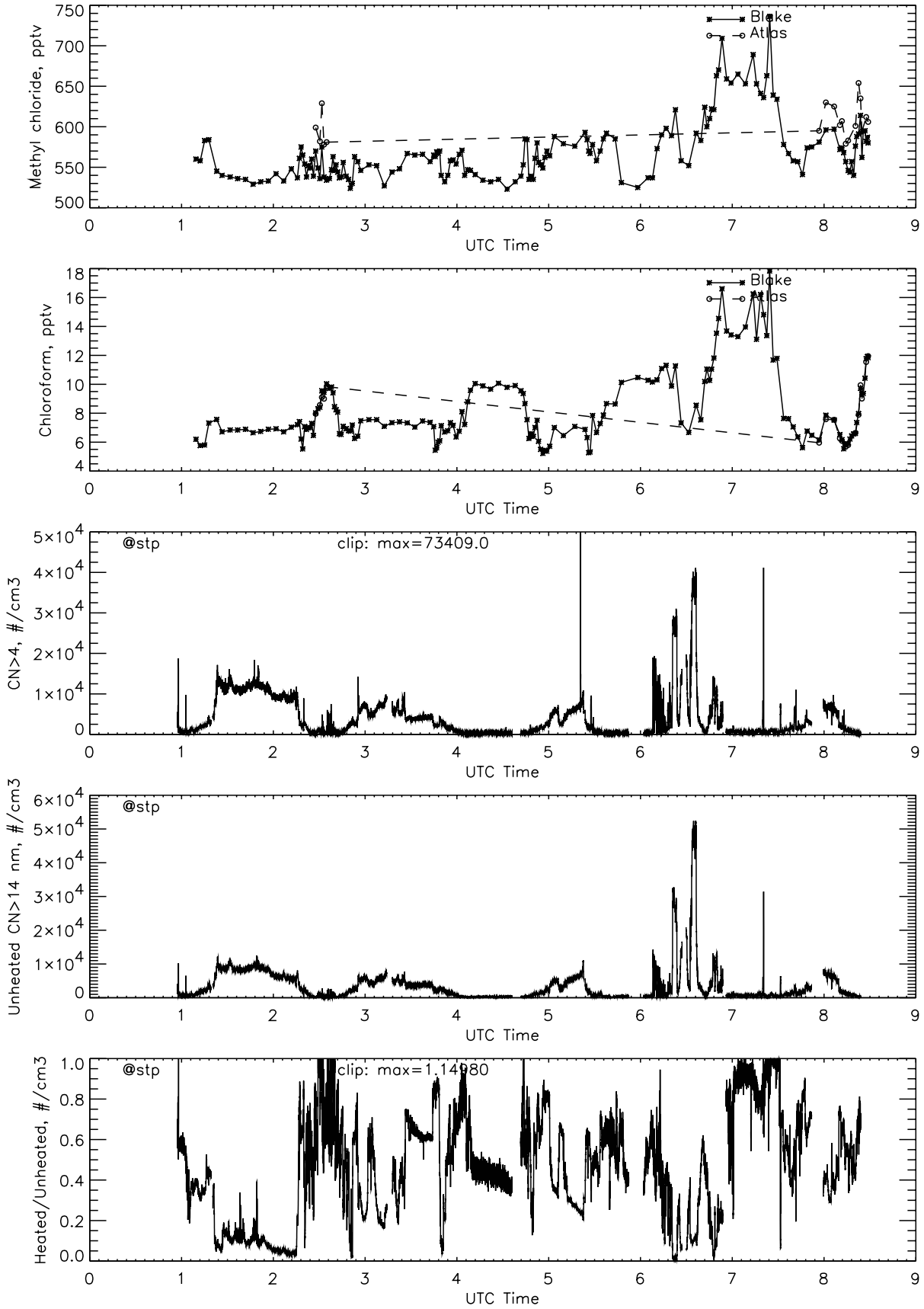
FINAL DATA: TRACE-P DC-8 Flight 11



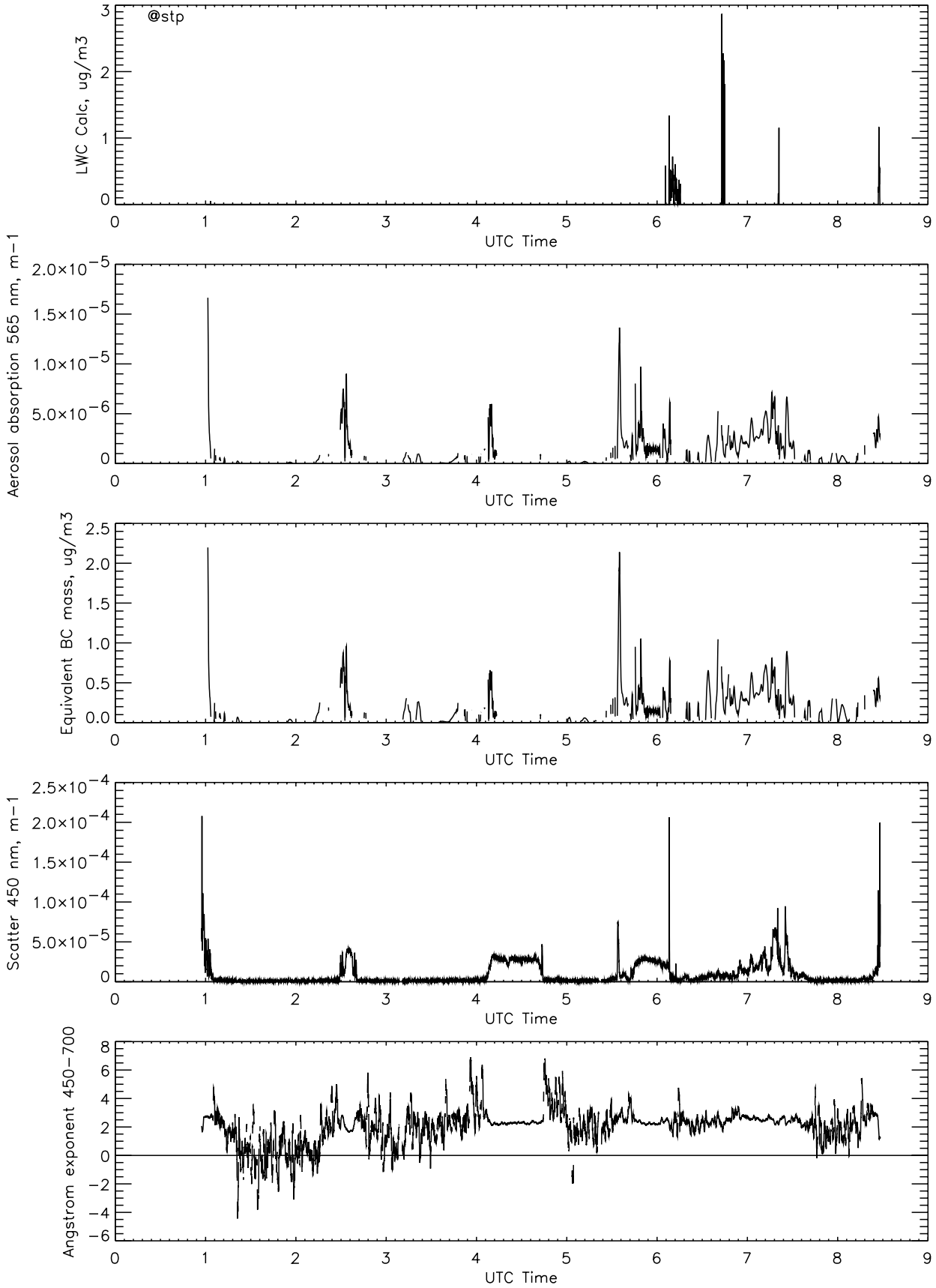
FINAL DATA: TRACE-P DC-8 Flight 11

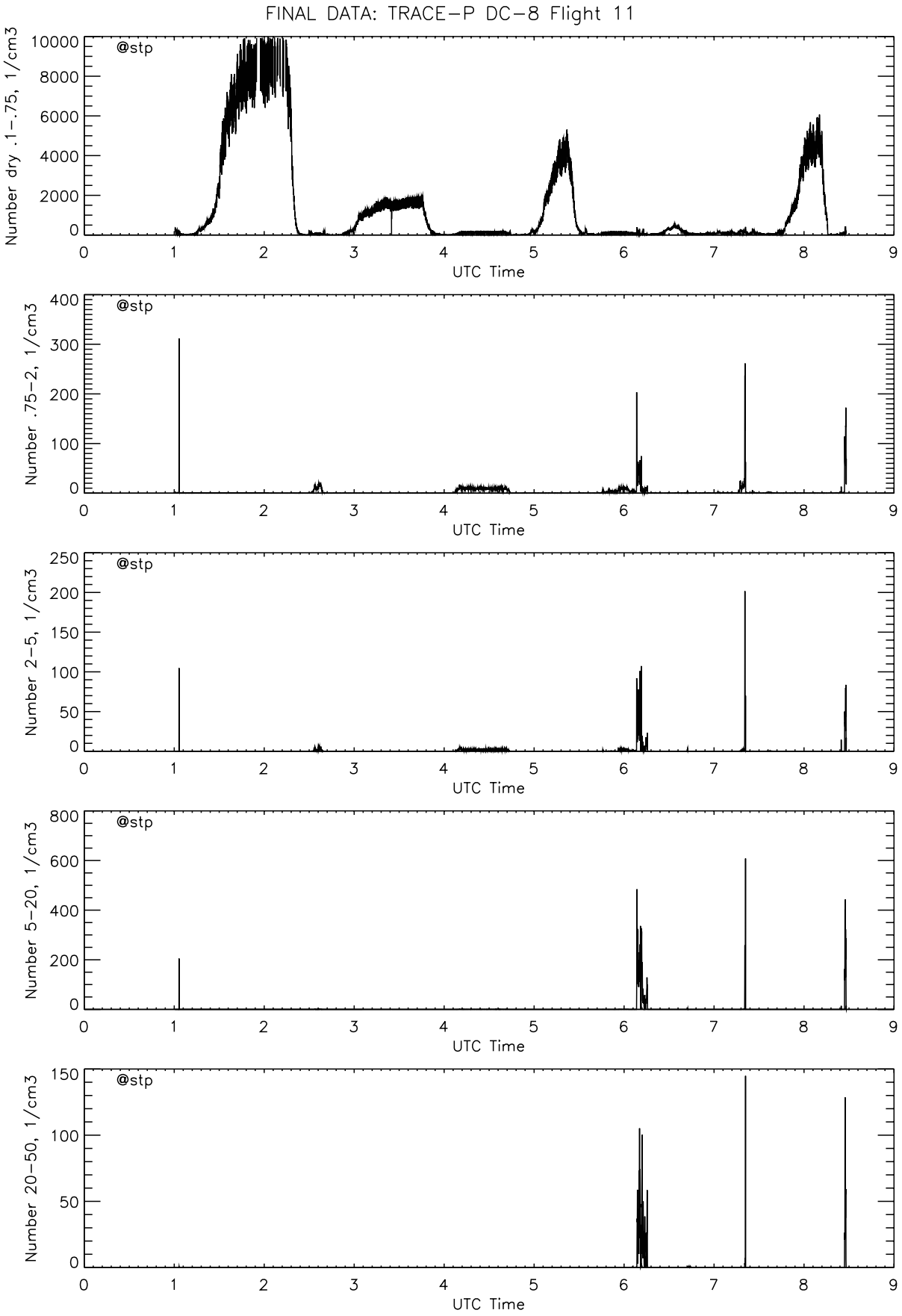


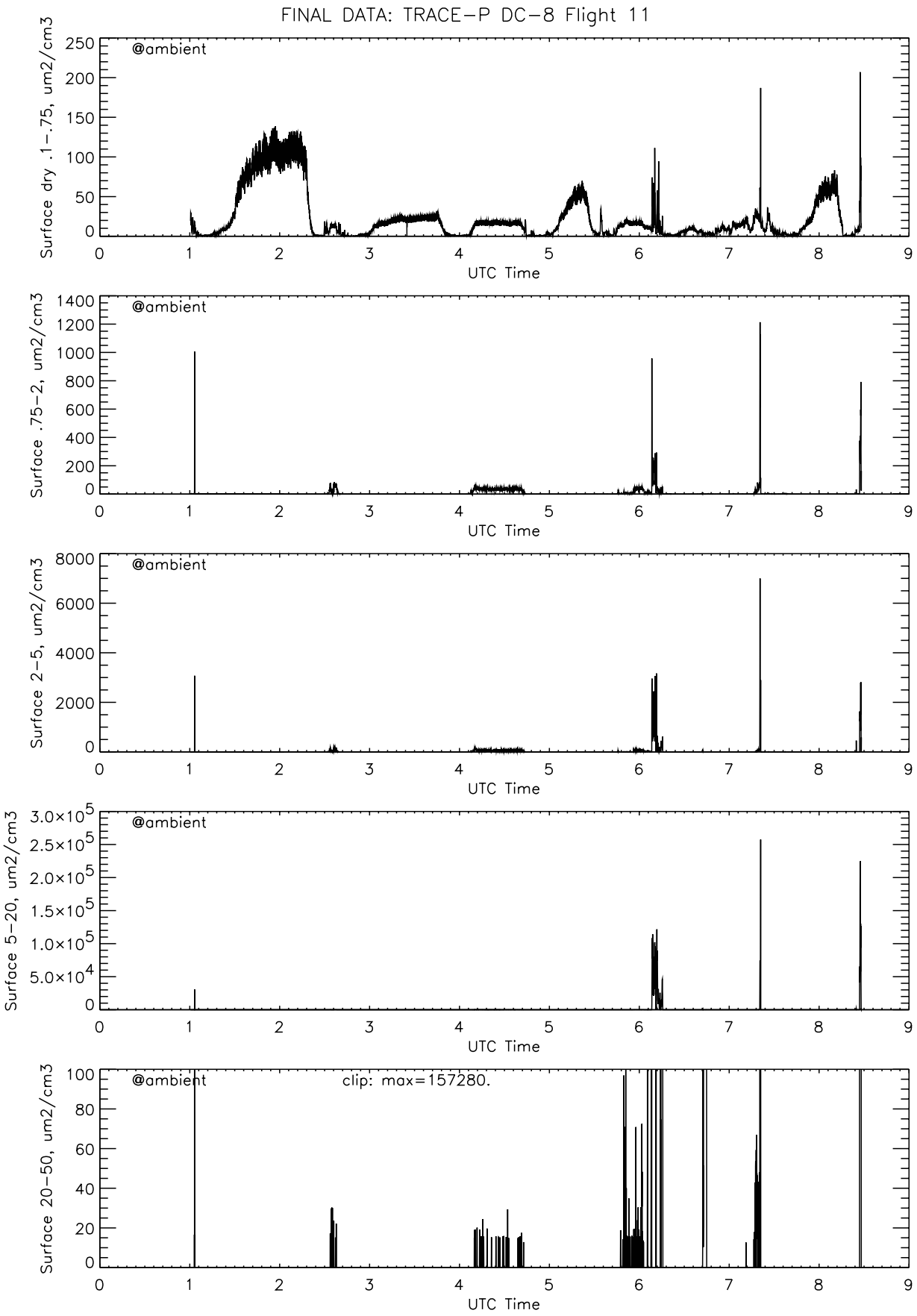
FINAL DATA: TRACE-P DC-8 Flight 11

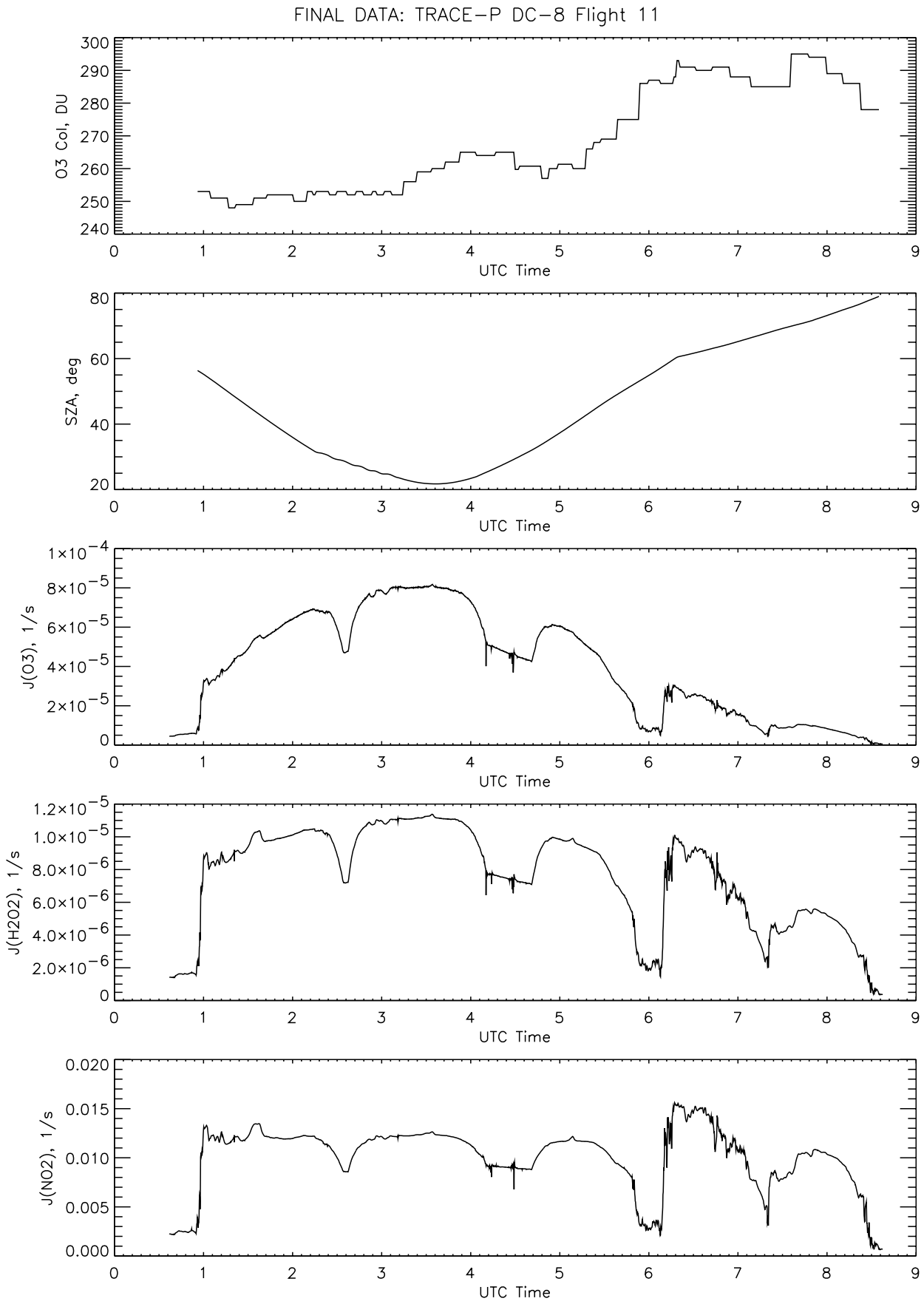


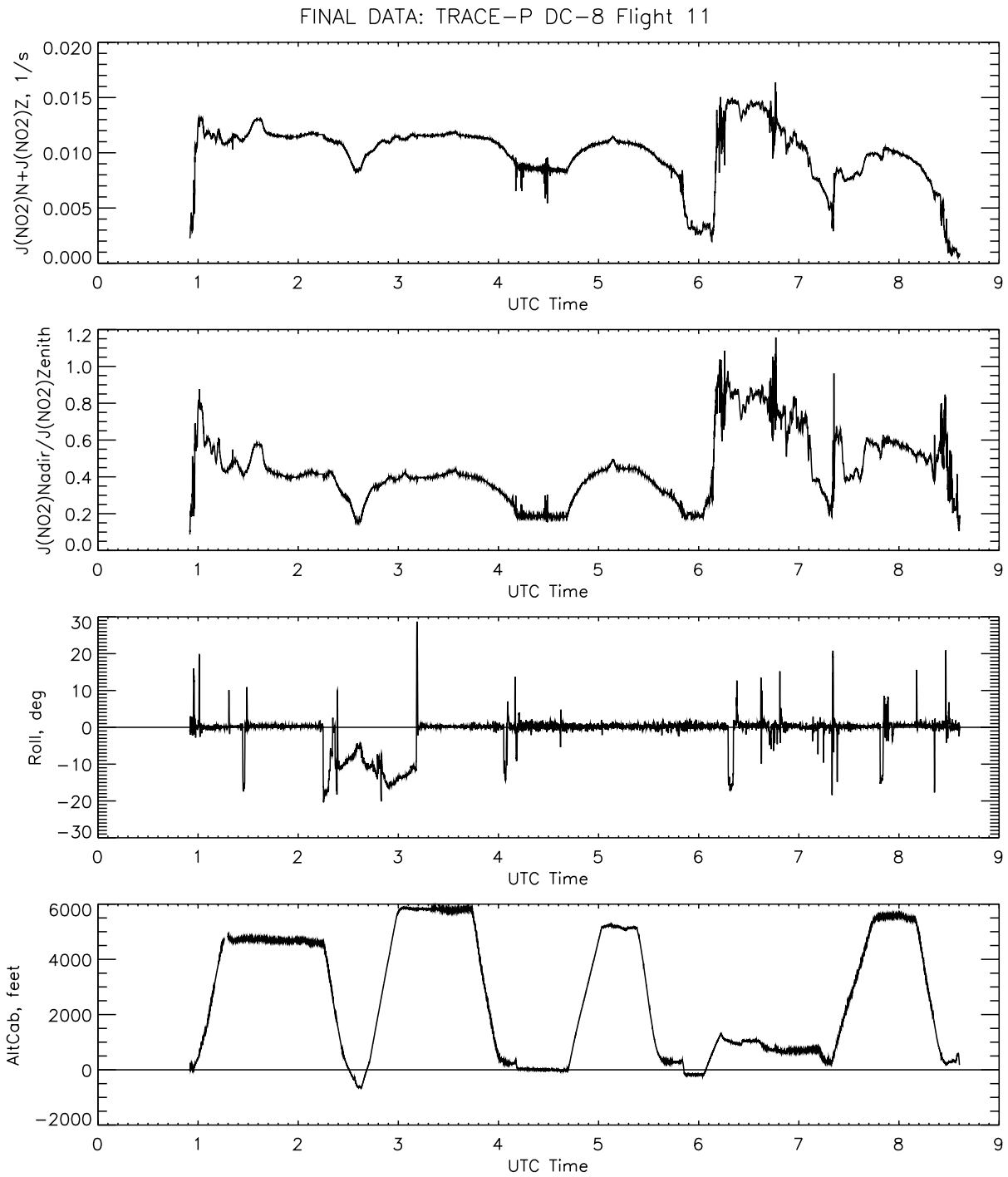
FINAL DATA: TRACE-P DC-8 Flight 11

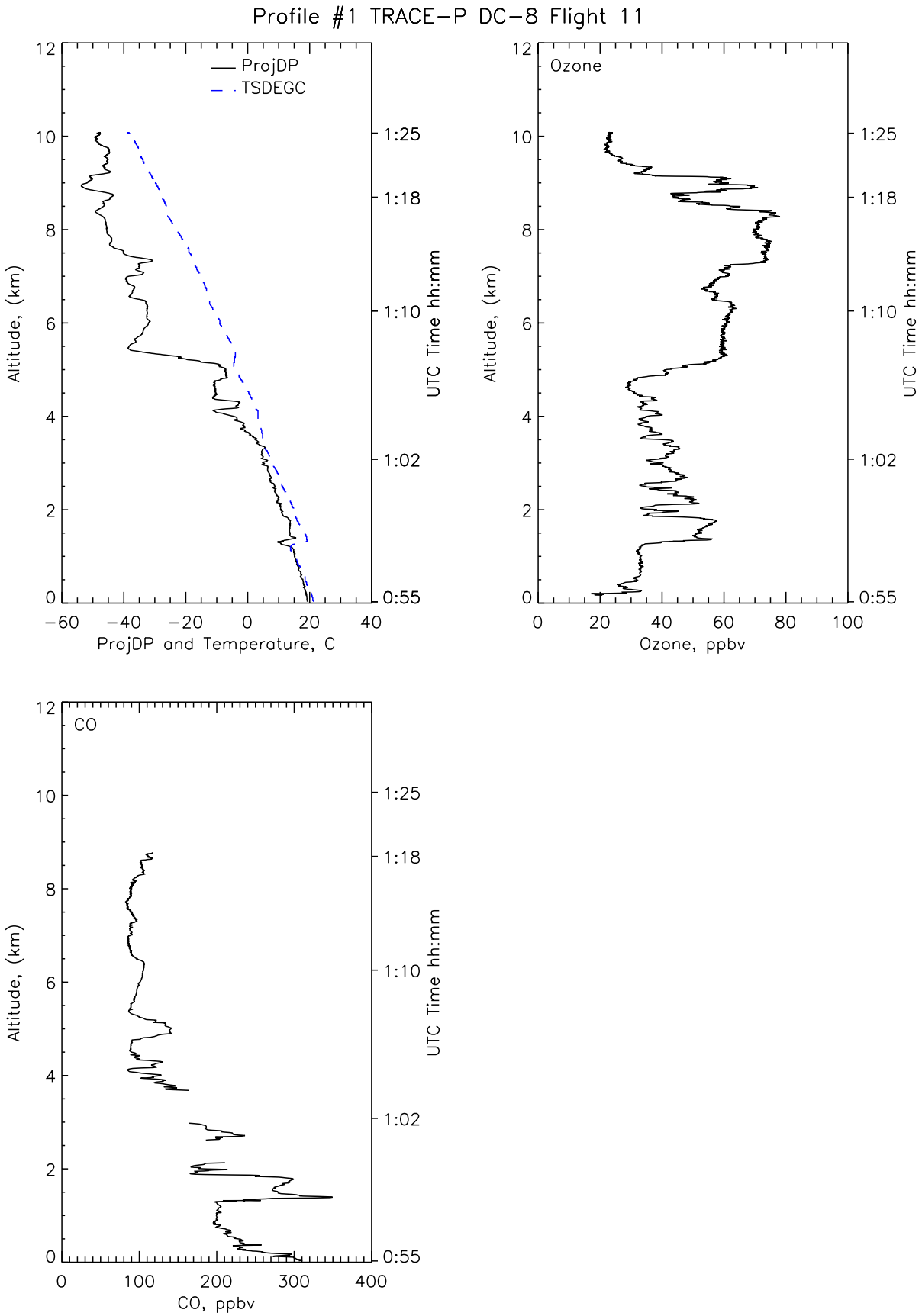


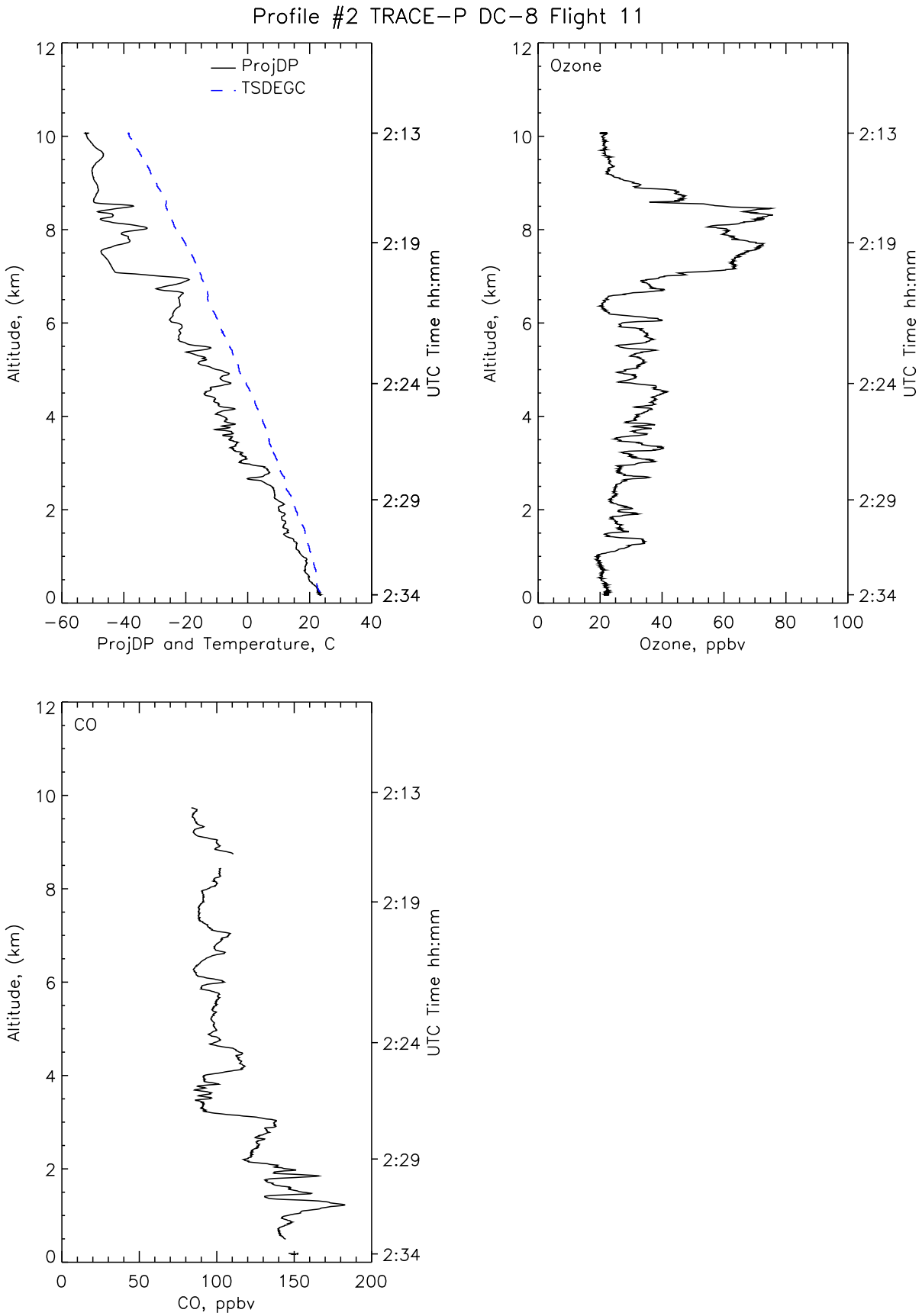

FINAL DATA: TRACE-P DC-8 Flight 11
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

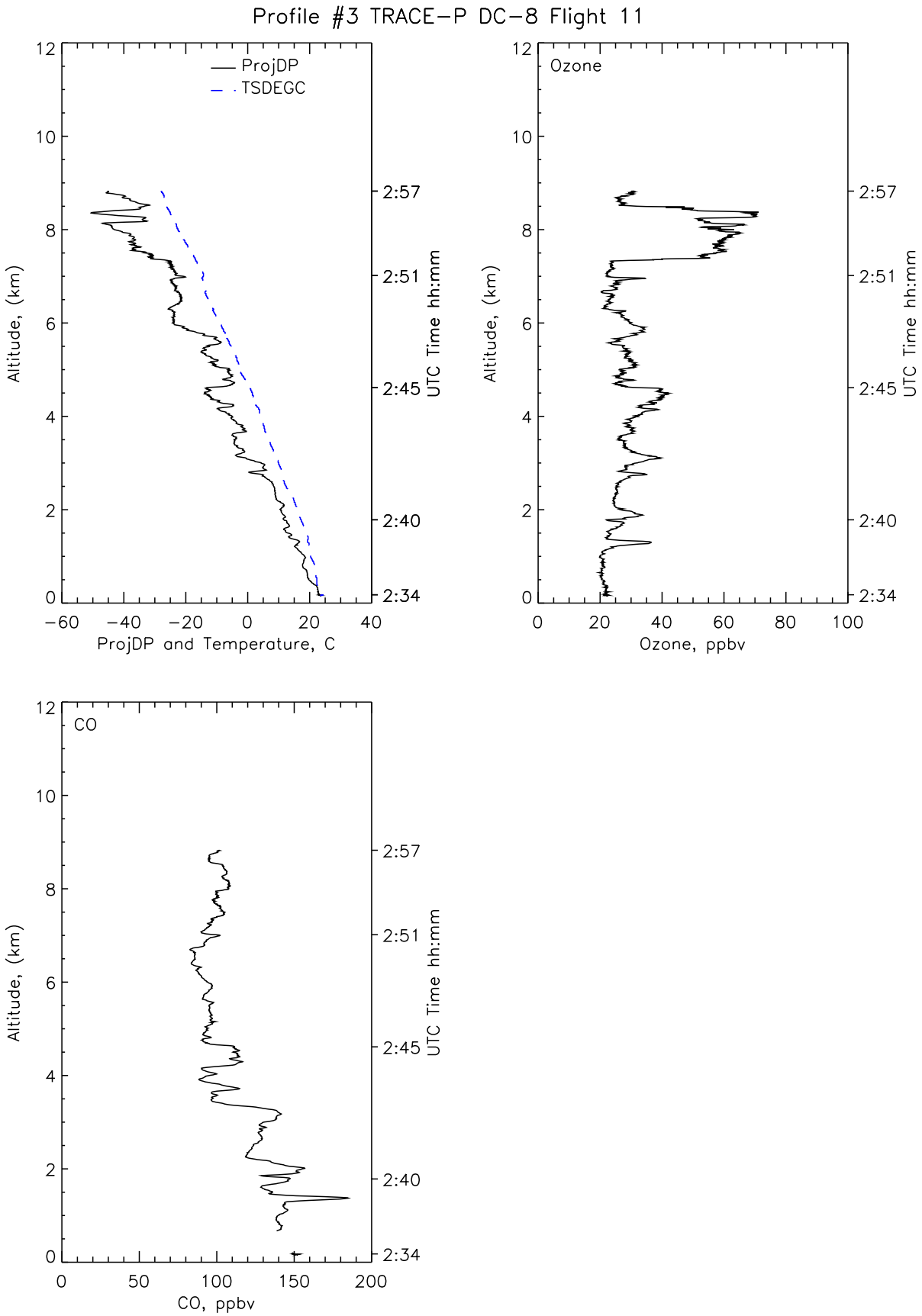

FINAL DATA: TRACE-P DC-8 Flight 11
@ambient
Surface dry .1-.75, um2/cm3
UTC Time
@ambient
Surface .75-2, um2/cm3
UTC Time
@ambient
Surface 2-5, um2/cm3
UTC Time
@ambient
Surface 5-20, um2/cm3
UTC Time
@ambient
clip: max=157280.
Surface 20-50, um2/cm3
UTC Time

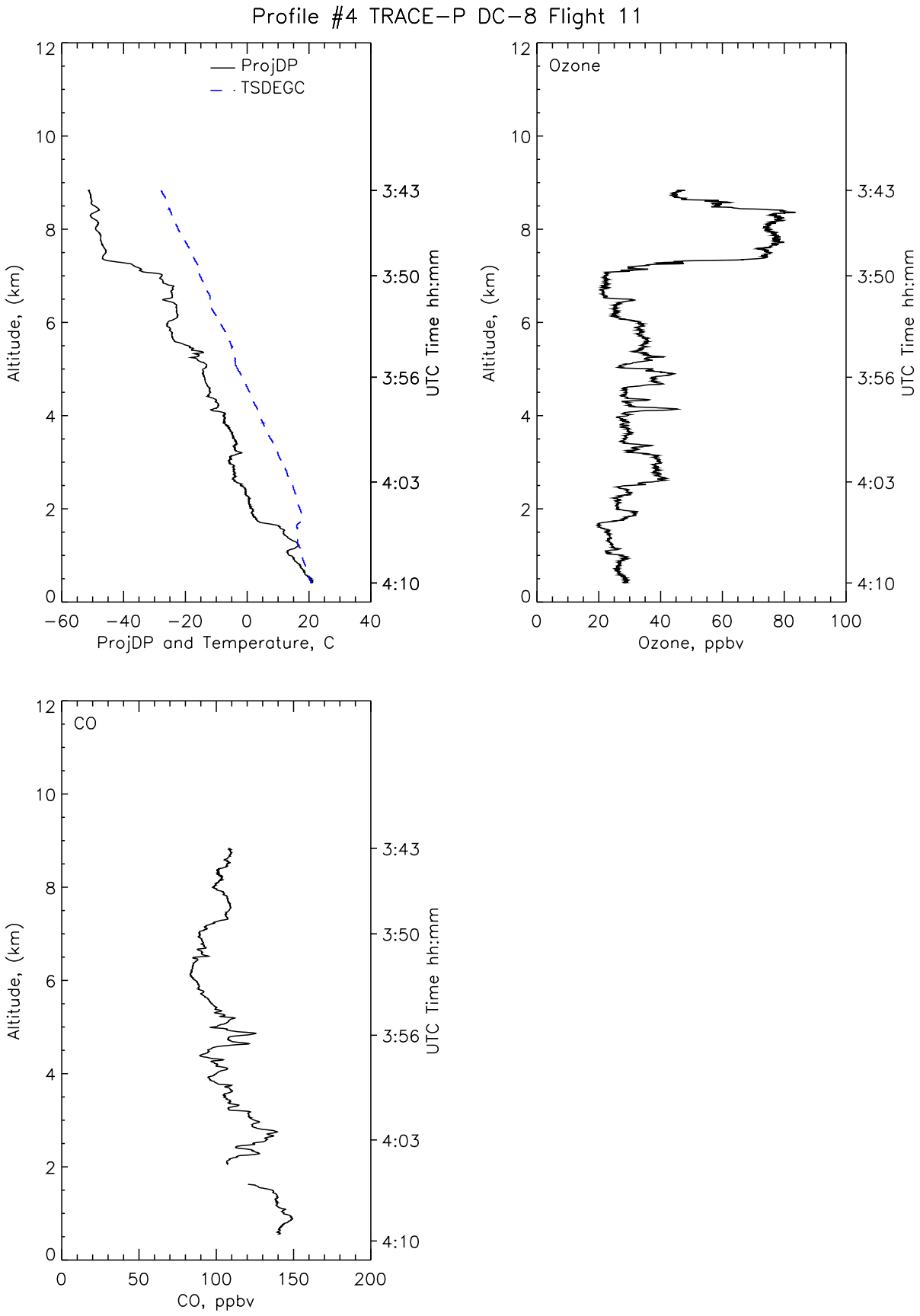

FINAL DATA: TRACE-P DC-8 Flight 11
O3 Col, DU
UTC Time
SZA, deg
UTC Time
J(O3), 1/s
UTC Time
J(H2O2), 1/s
UTC Time
J(NO2), 1/s
UTC Time

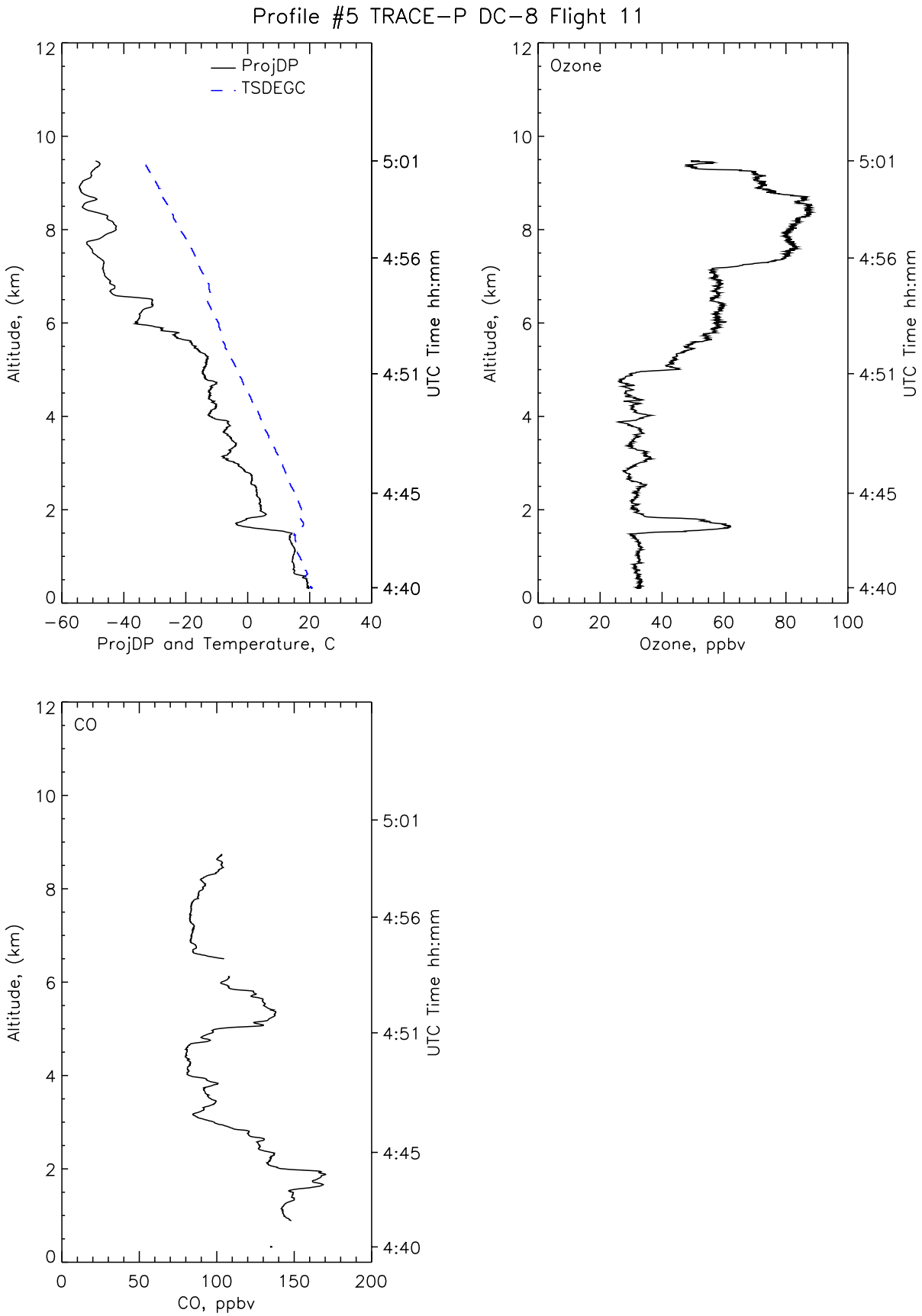

FINAL DATA: TRACE-P DC-8 Flight 11
J(NO2)N+J(NO2)Z, 1/s
0.020
0.015
0.010
0.005
0.000
0
1
2
3
4
5
6
7
8
9
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.2
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
6000
4000
2000
0
−2000
UTC Time

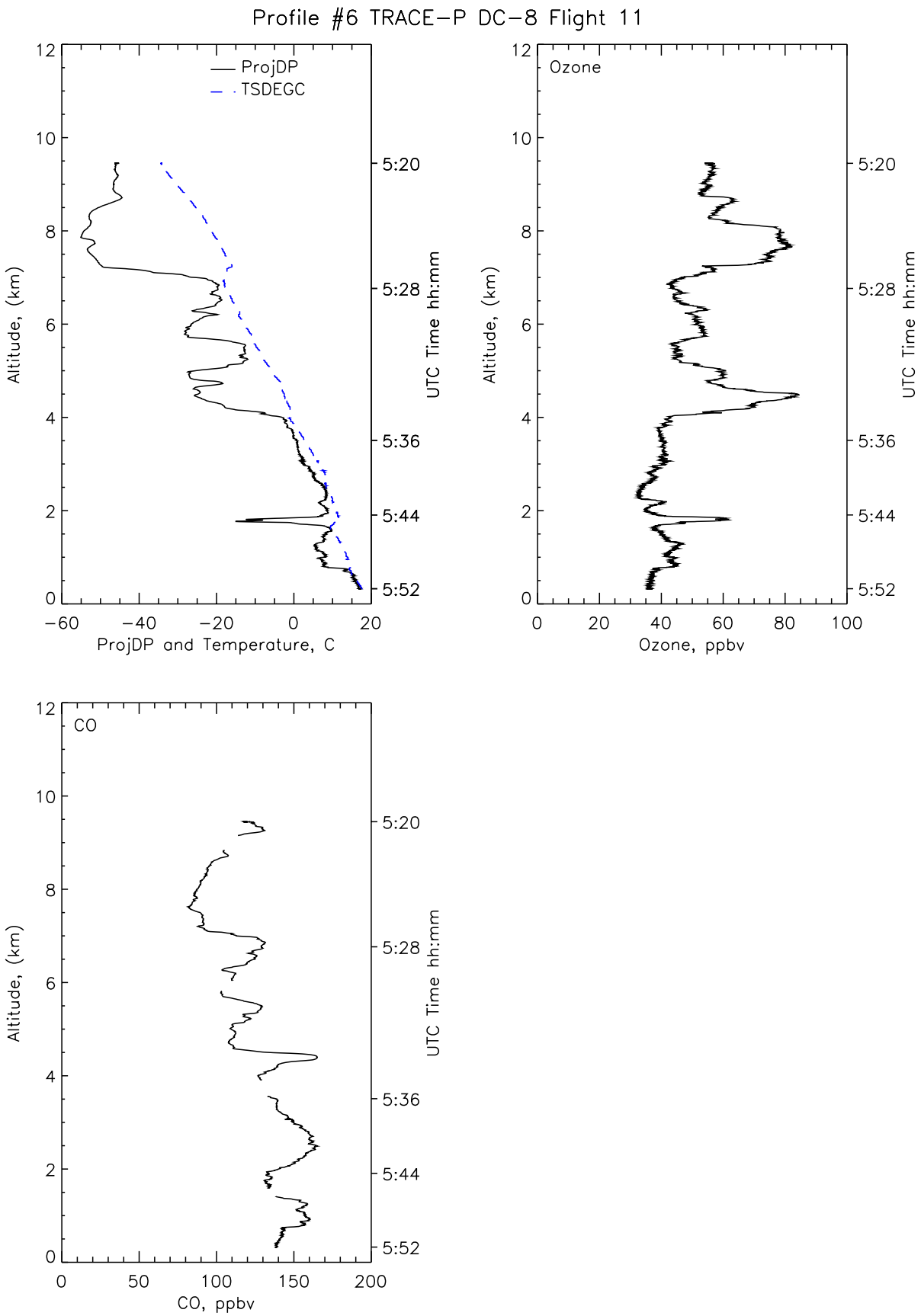

Profile #1 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

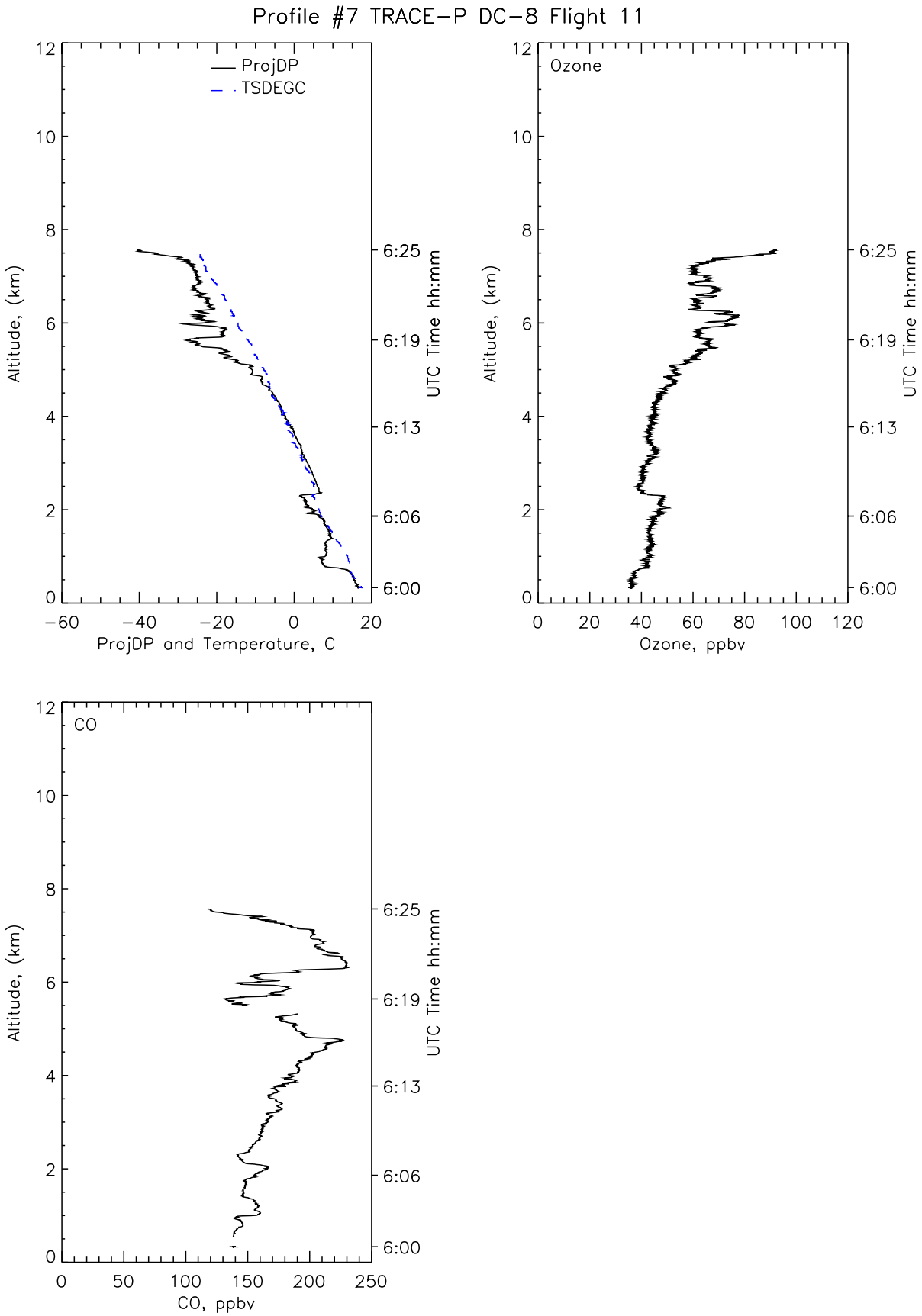

Profile #2 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

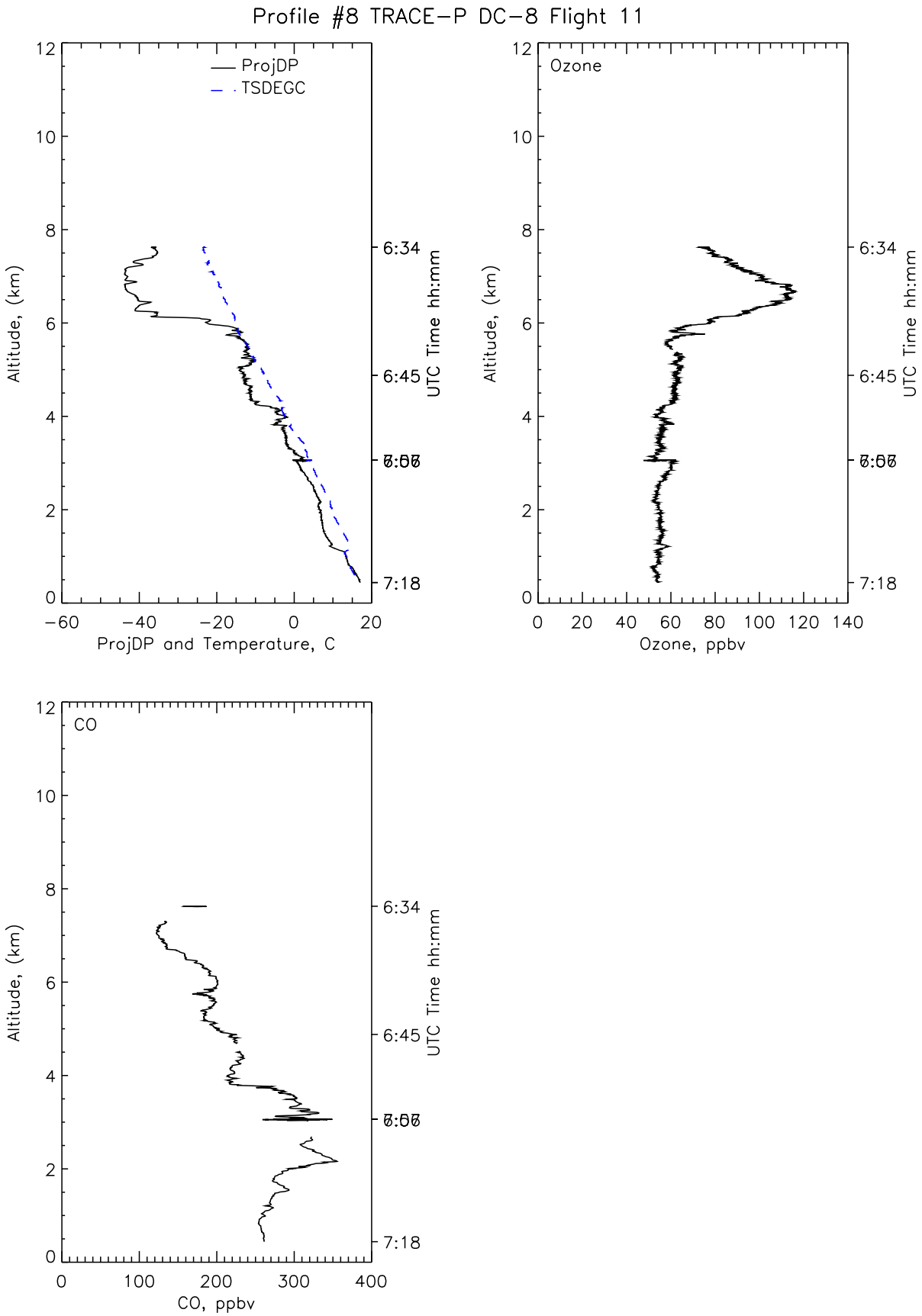

Profile #3 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

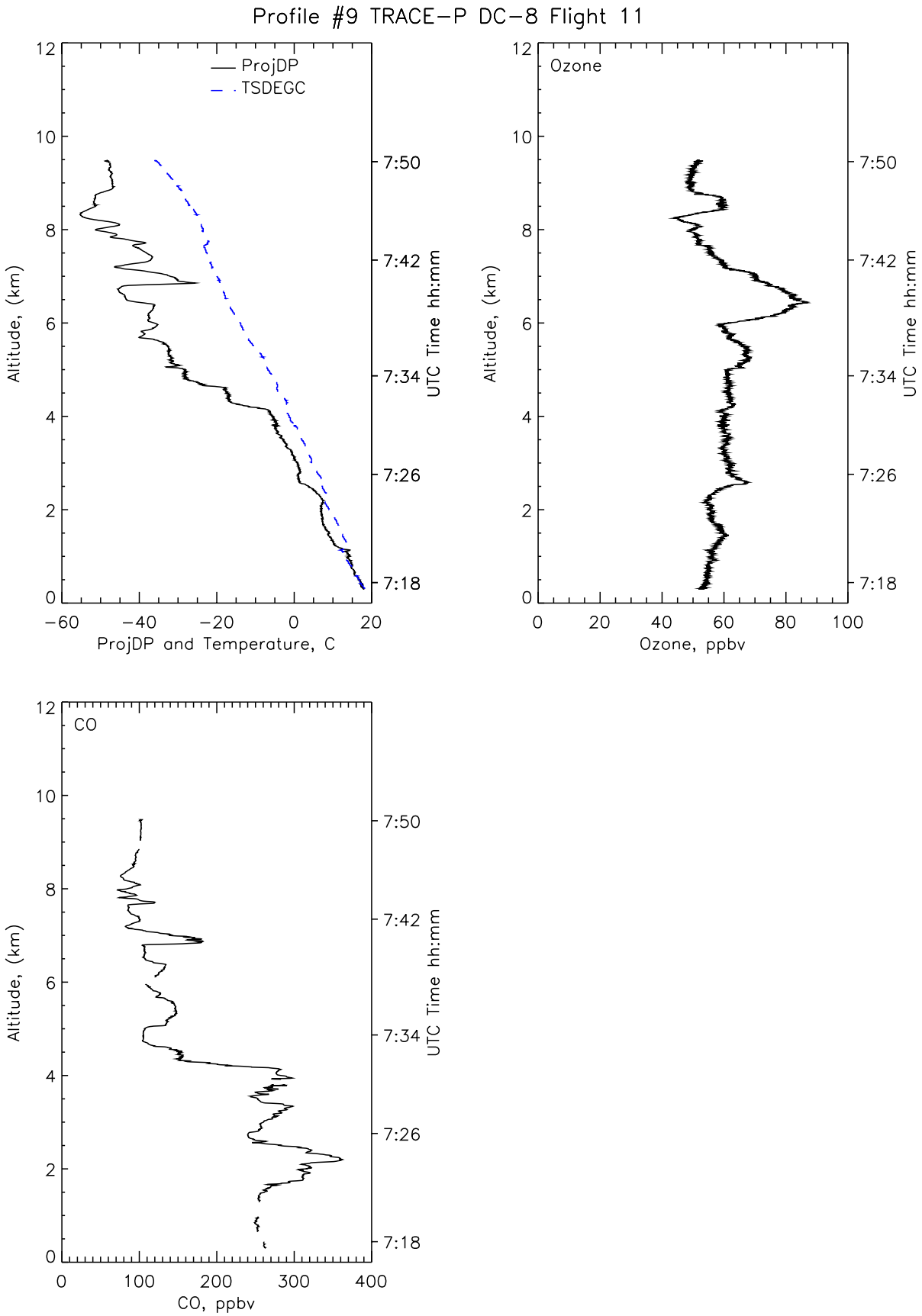

Profile #4 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
3:43
3:50
3:56
4:03
4:10
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

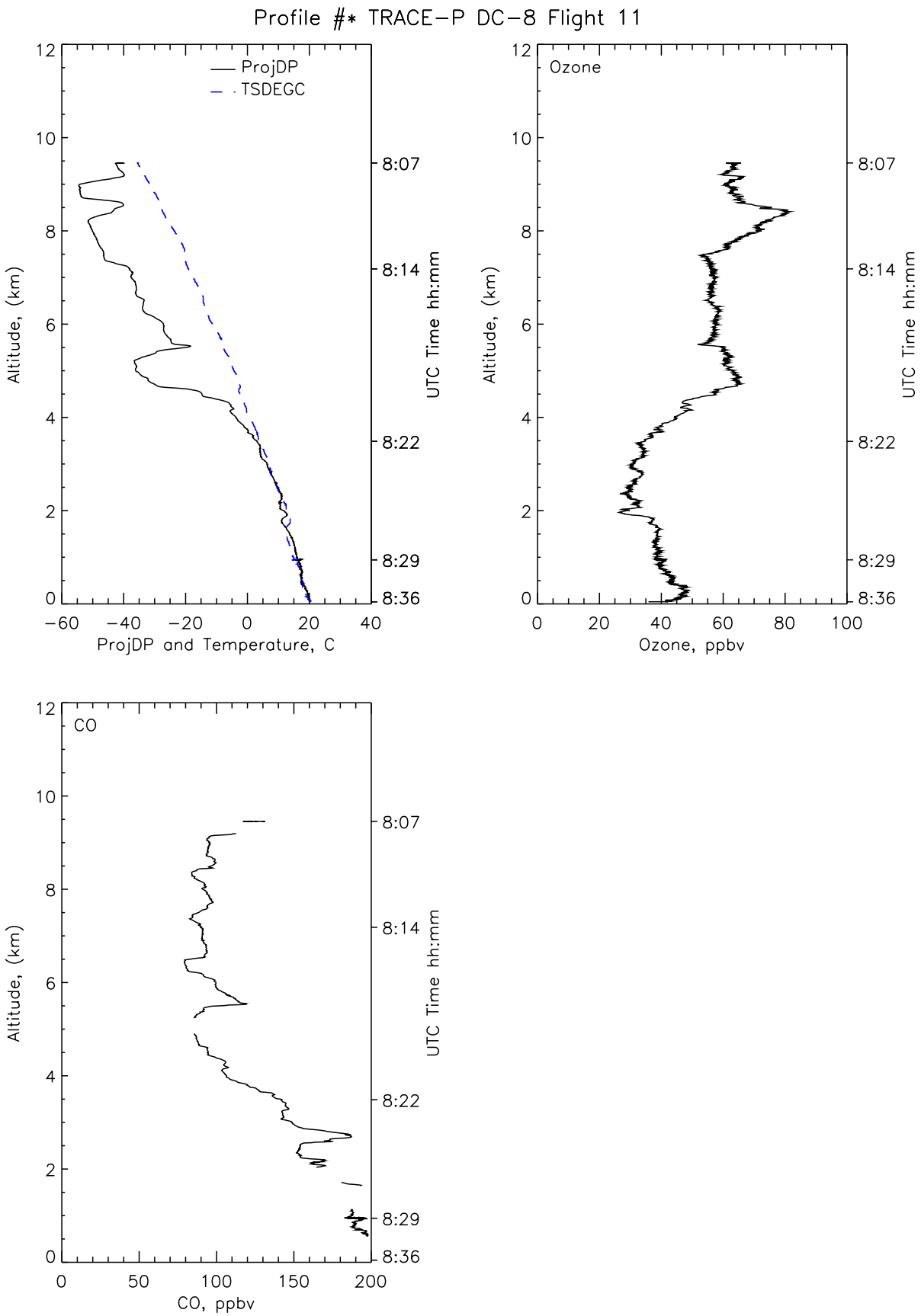

Profile #5 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #7 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #8 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
6:34
6:45
7:18
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #9 TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #* TRACE-P DC-8 Flight 11
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

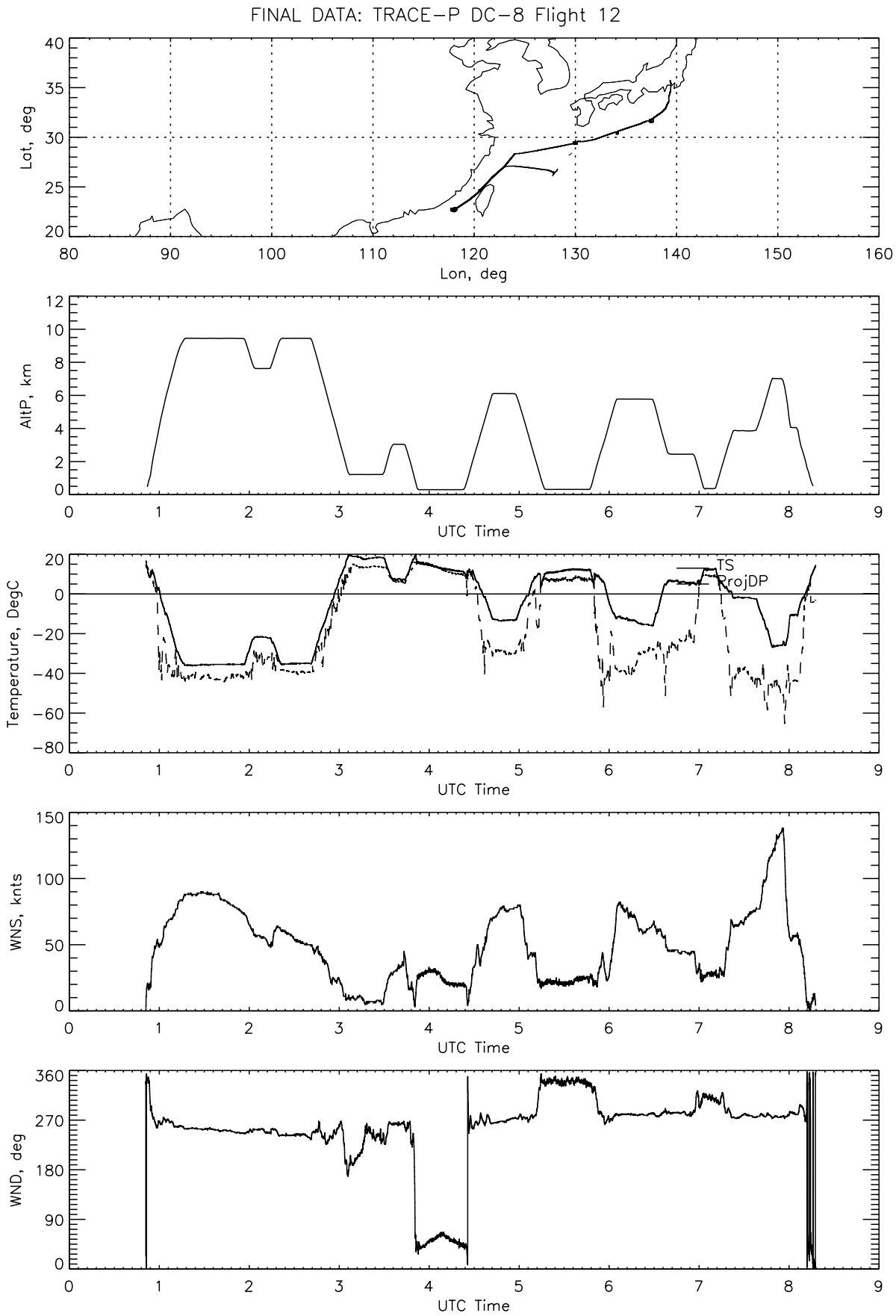
TRACE-P

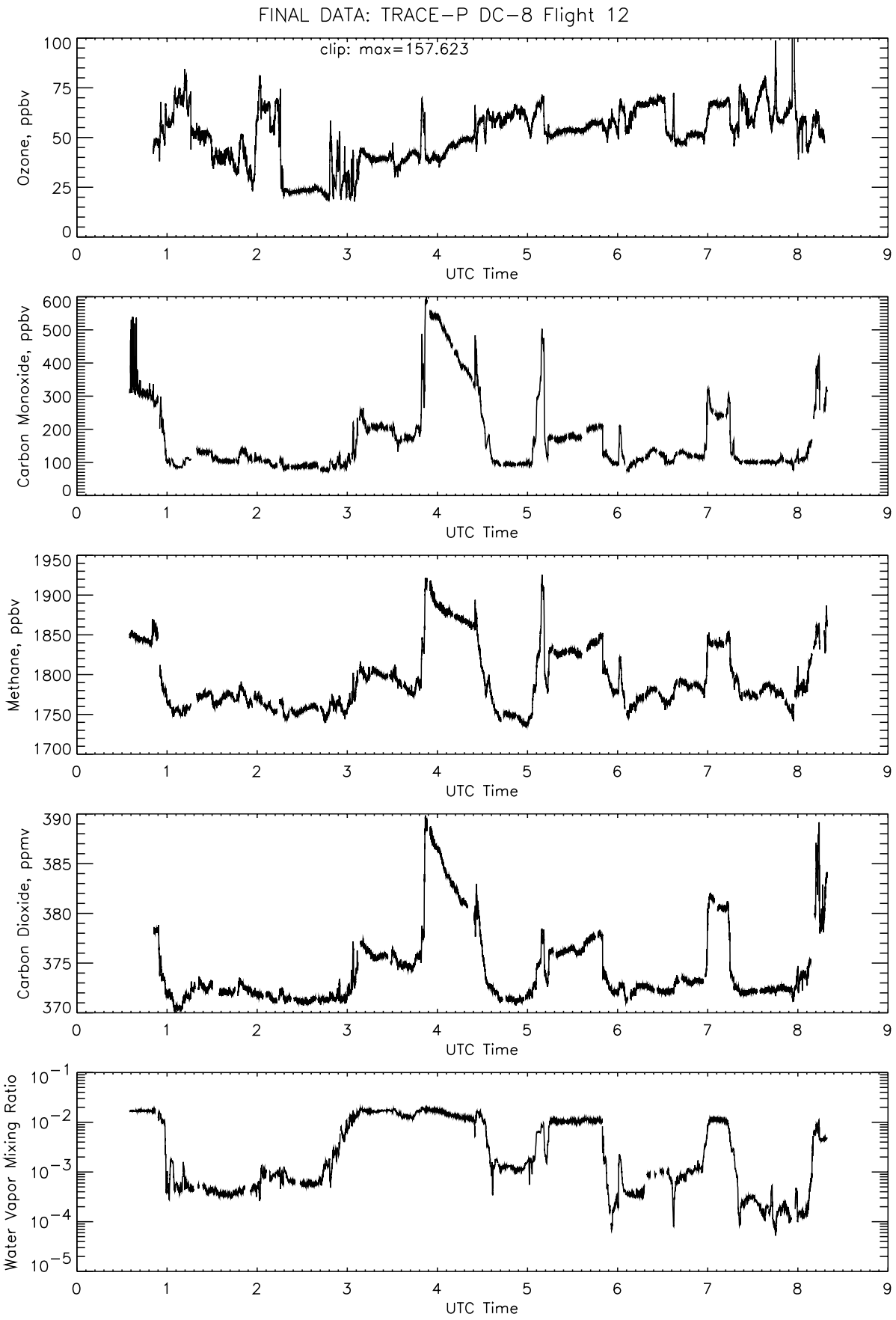
Flight 12D

Transit: Okinawa to Yokota AFB, Japan

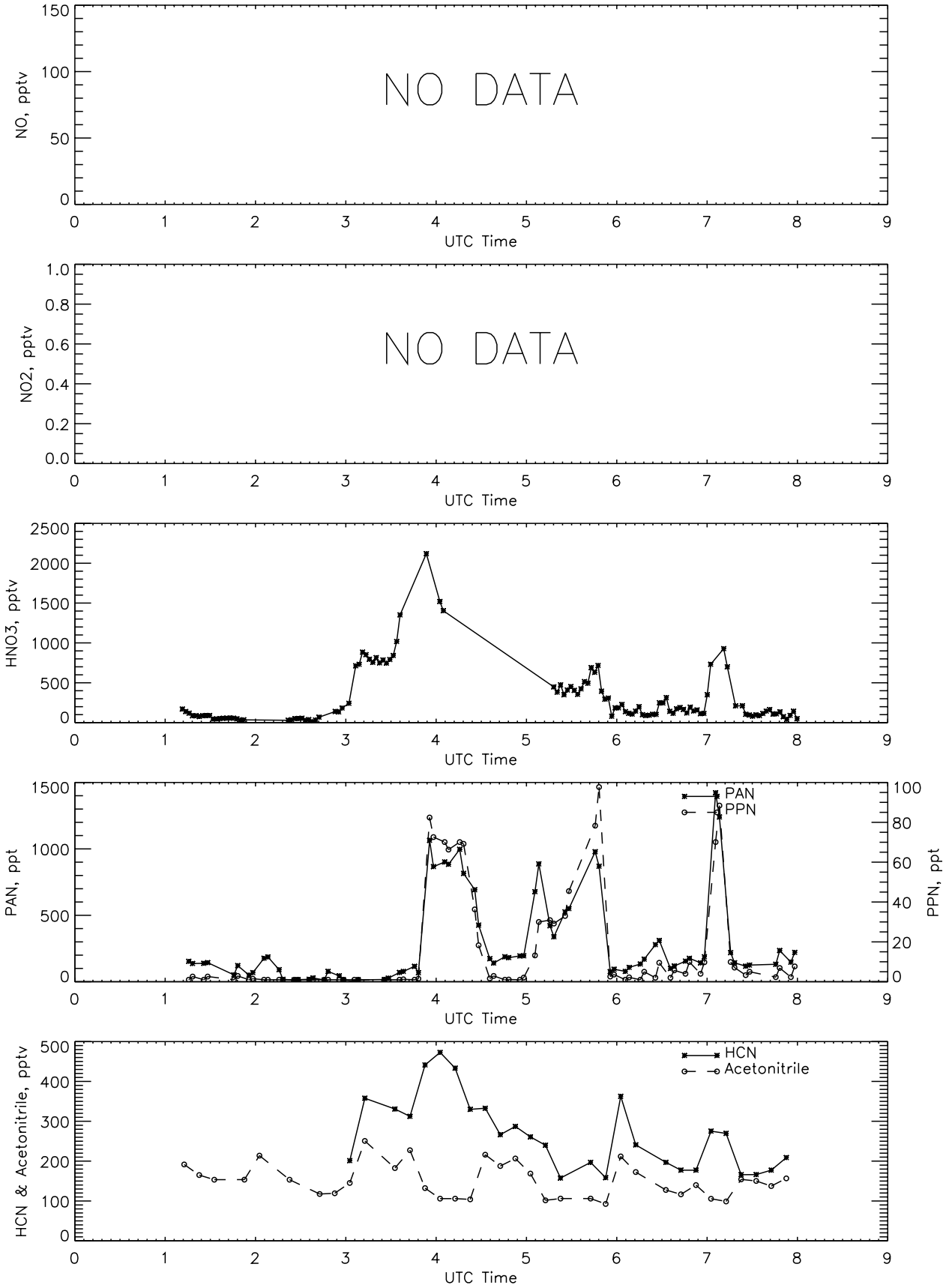
Formosa Strait and China Outflow

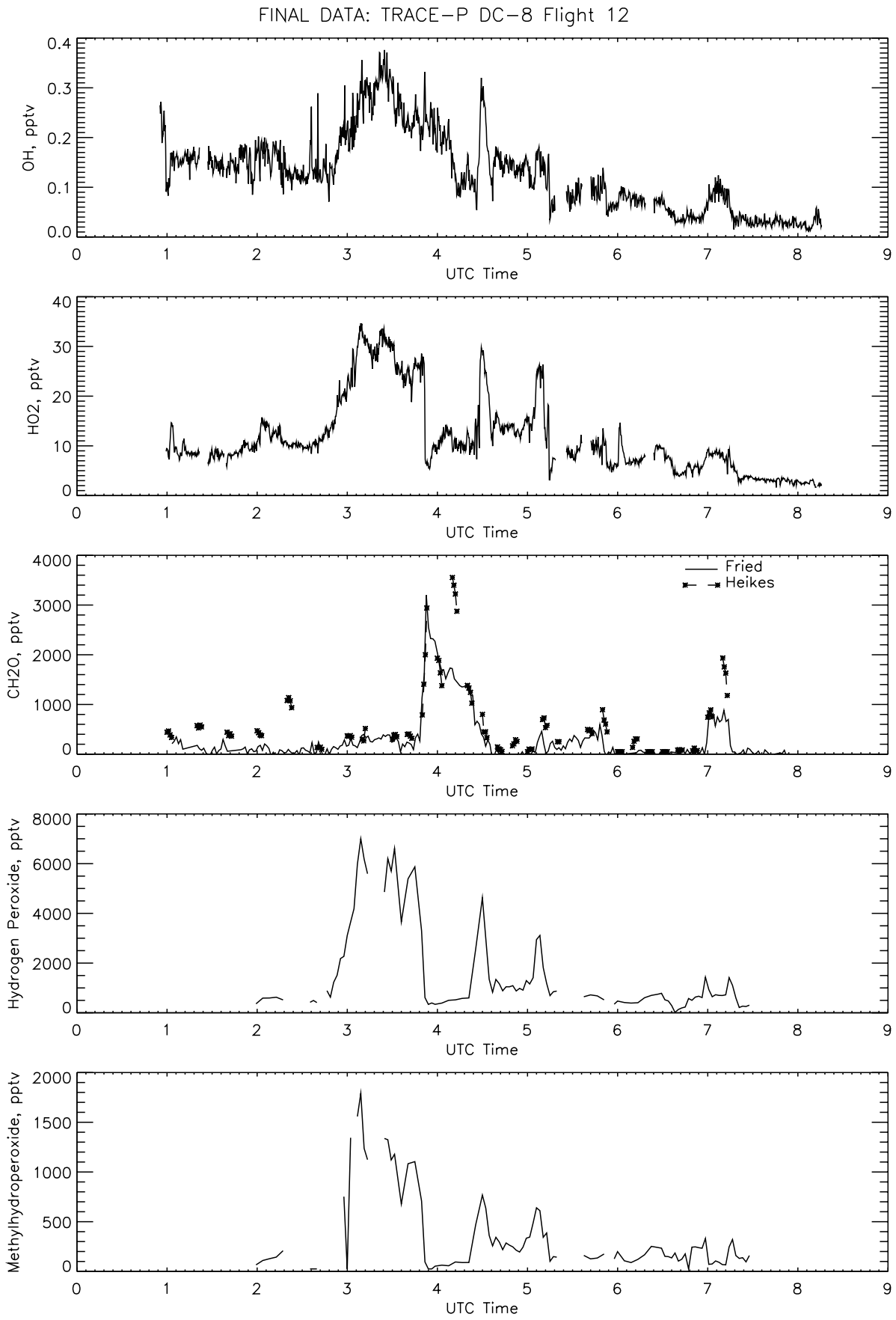
March 18, 2001


FINAL DATA: TRACE-P DC-8 Flight 12
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

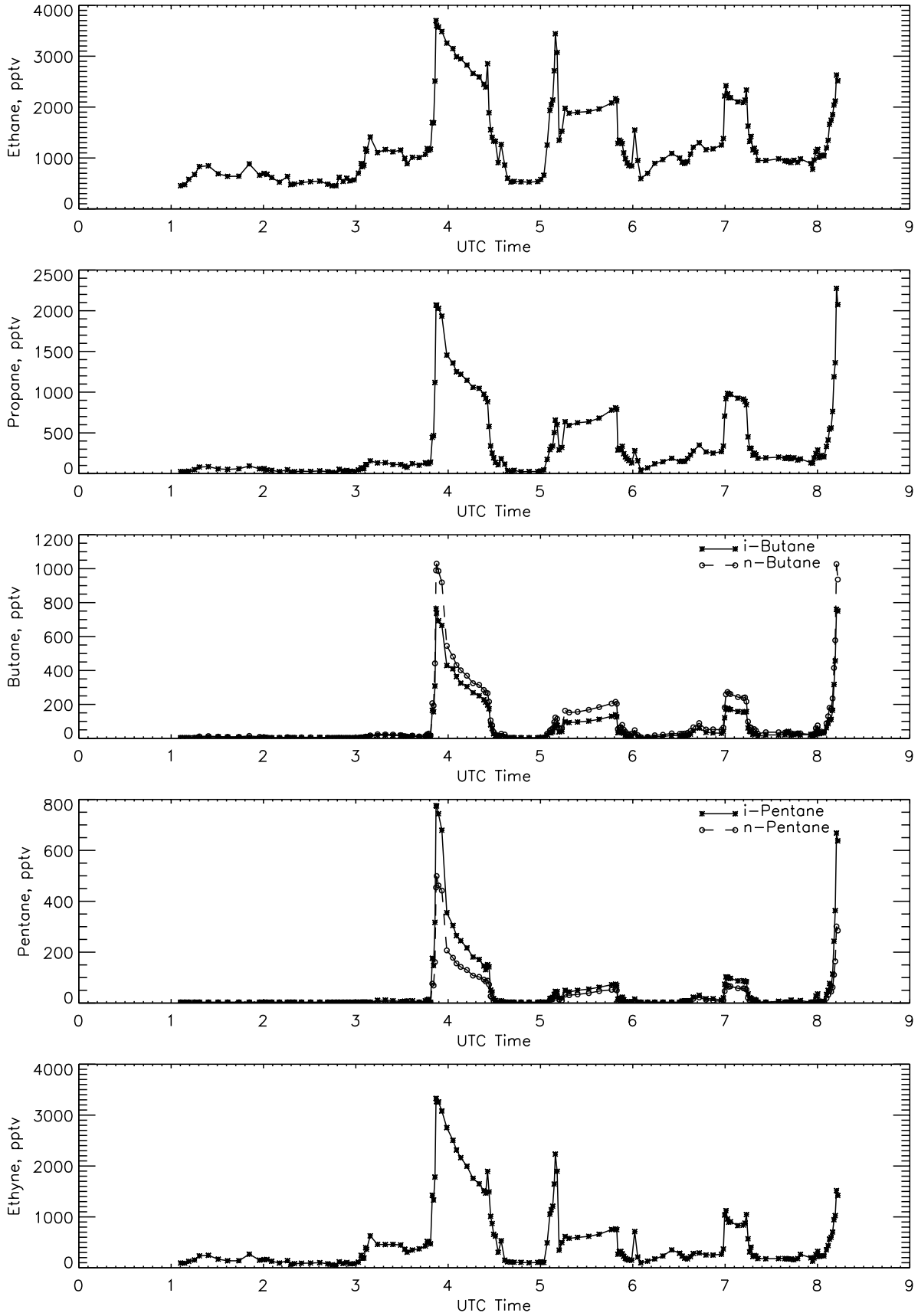

FINAL DATA: TRACE-P DC-8 Flight 12
clip: max=157.623
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
Carbon Dioxide, ppmv
Water Vapor Mixing Ratio
UTC Time

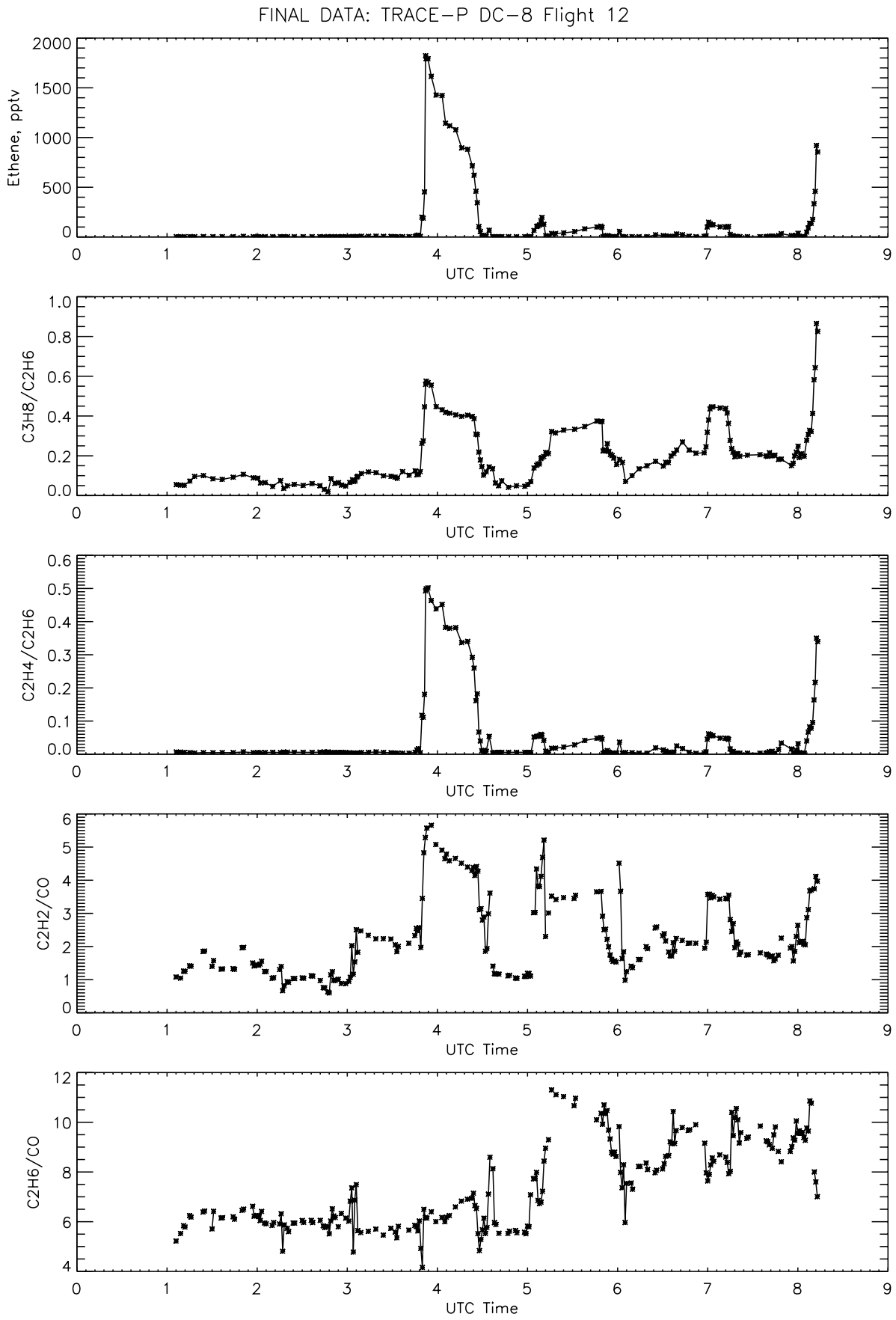
FINAL DATA: TRACE-P DC-8 Flight 12

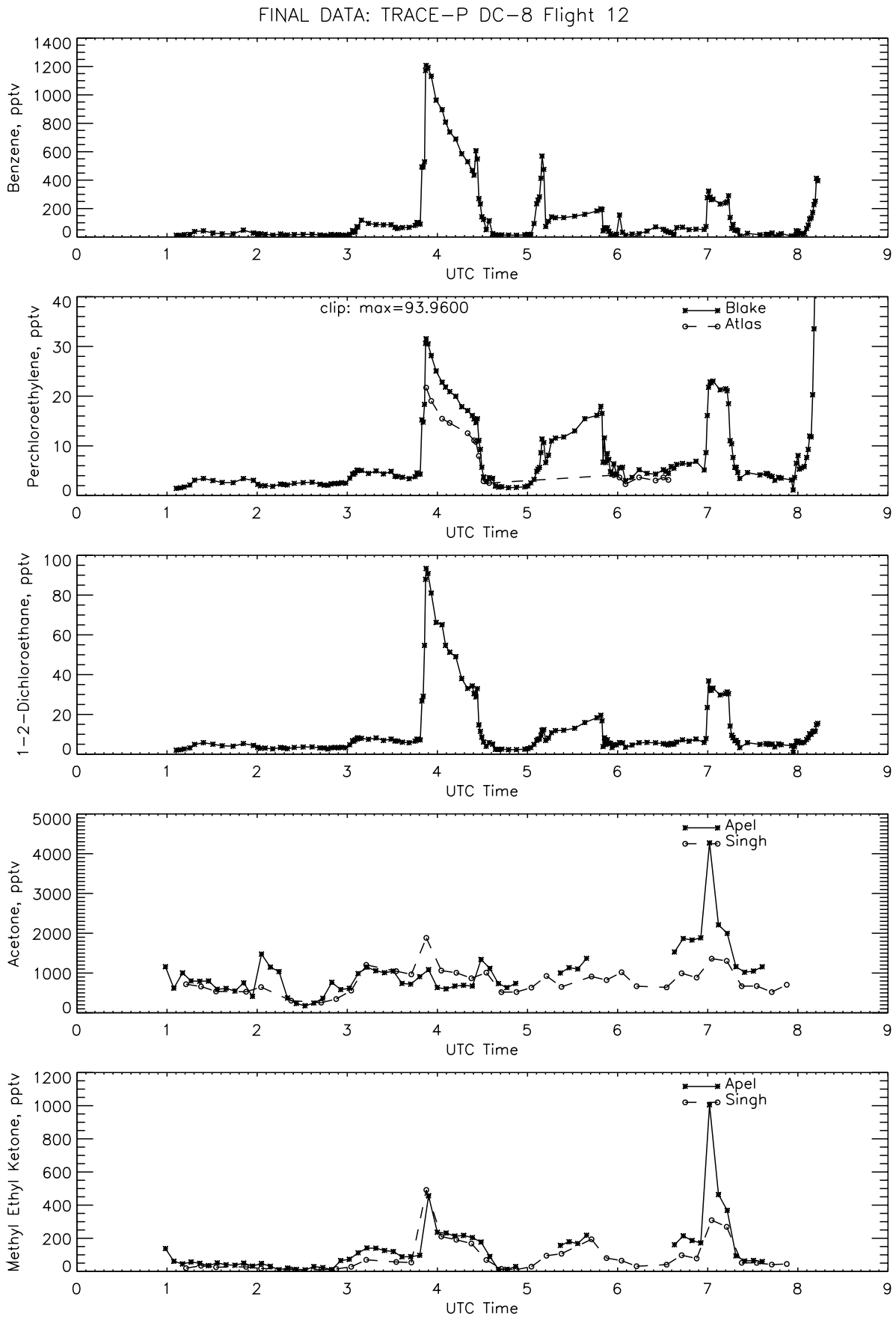



FINAL DATA: TRACE-P DC-8 Flight 12
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

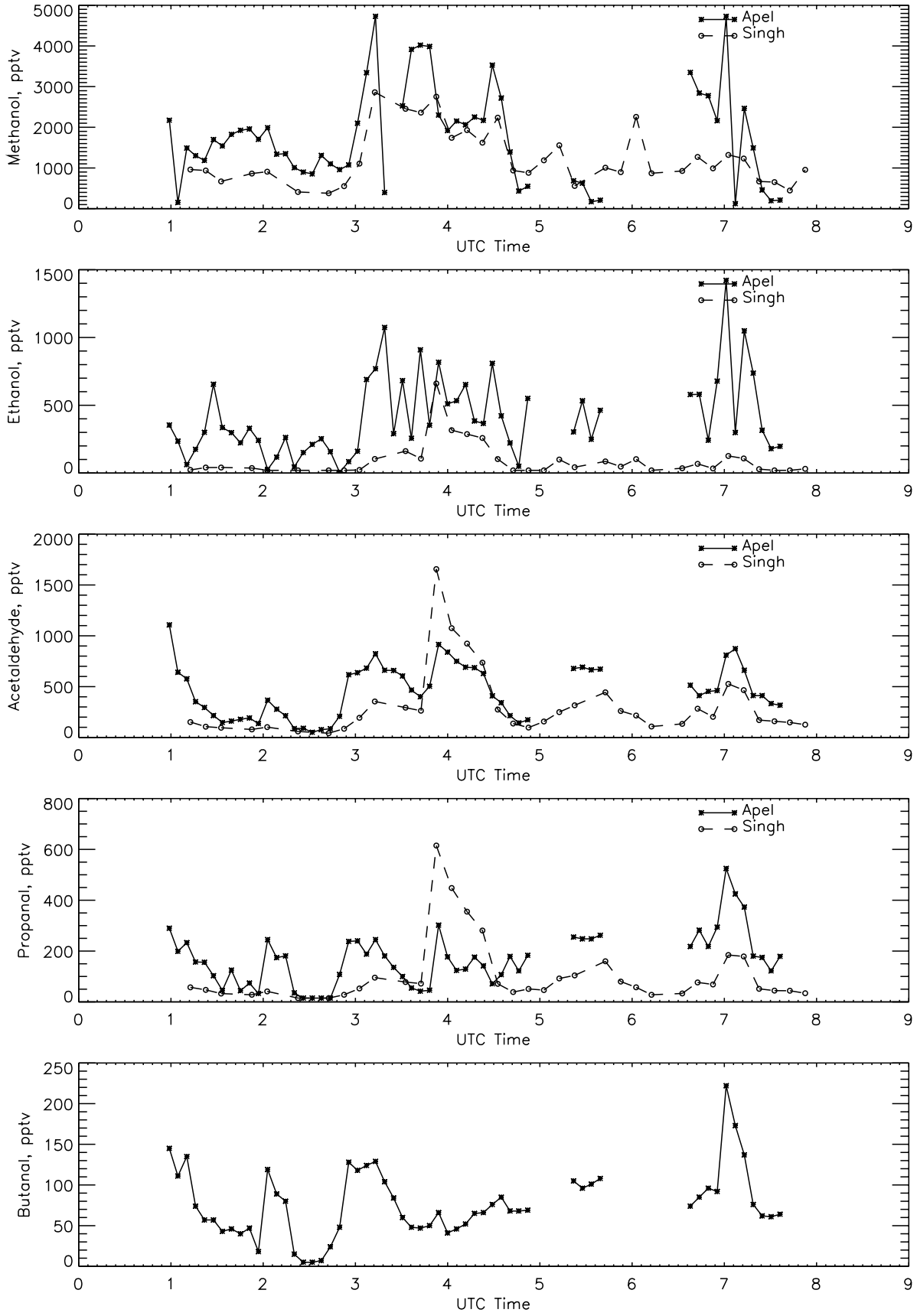
FINAL DATA: TRACE-P DC-8 Flight 12



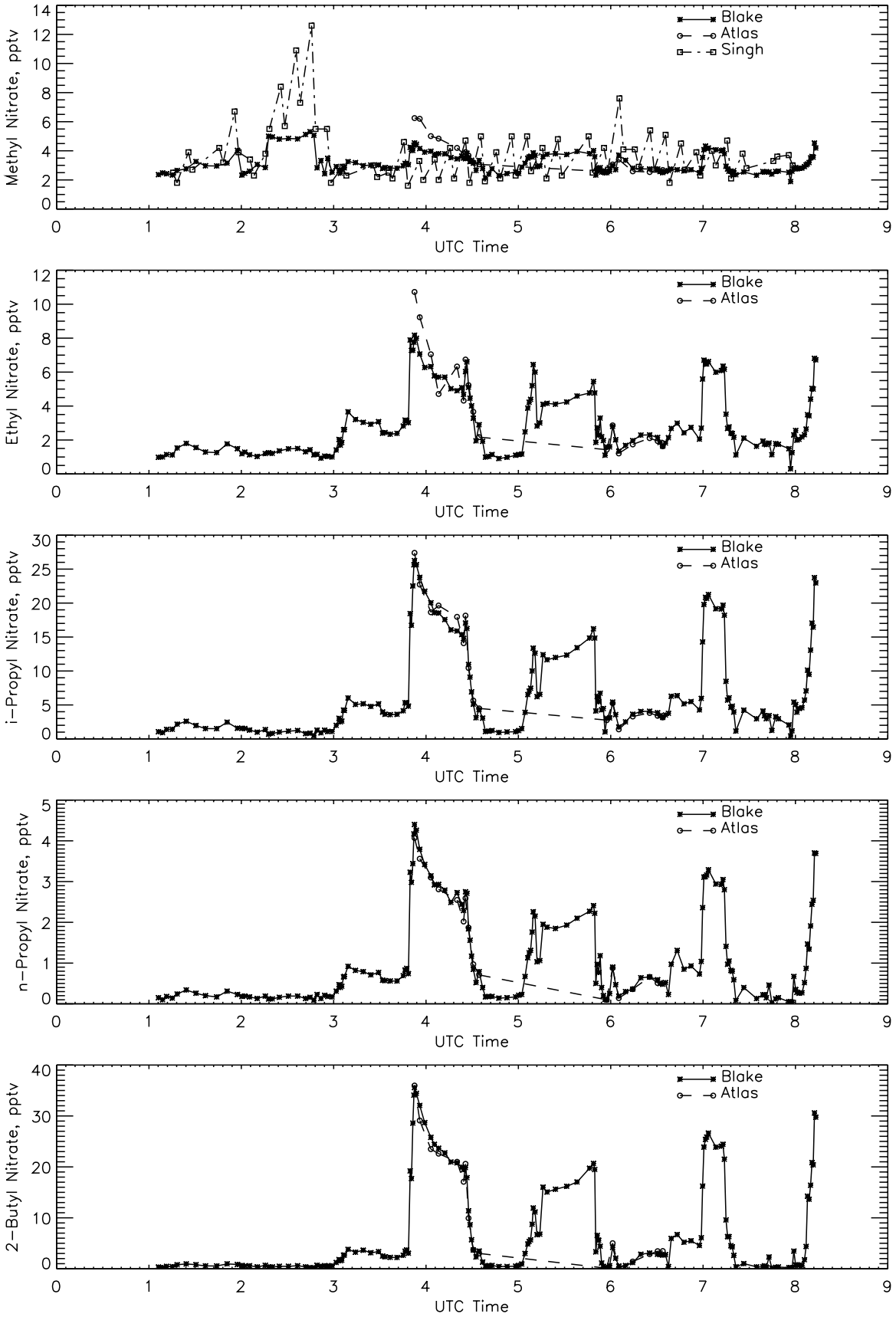

FINAL DATA: TRACE-P DC-8 Flight 12
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time

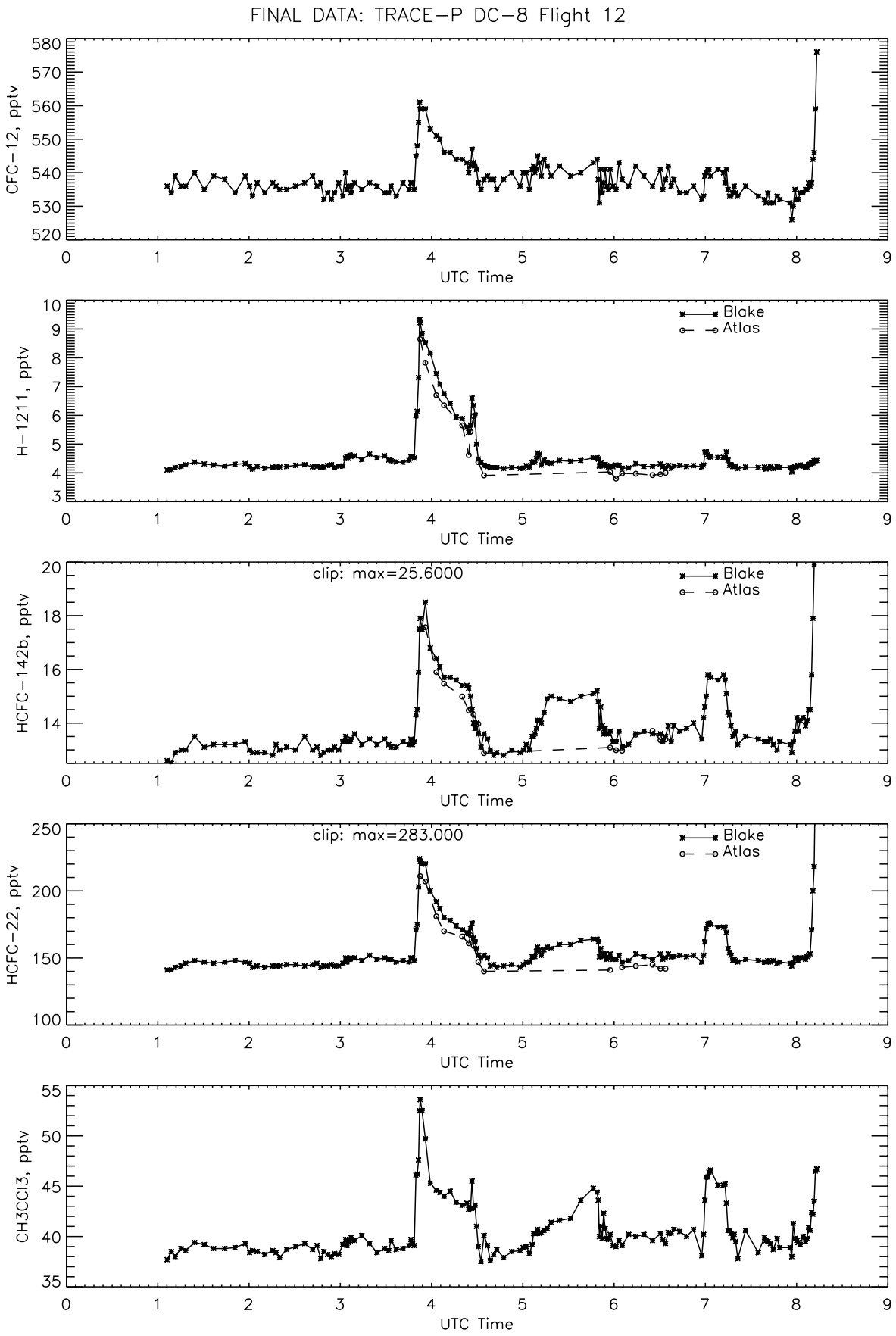

FINAL DATA: TRACE-P DC-8 Flight 12
Benzene, pptv
UTC Time
clip: max=93.9600
Blake
Atlas
Perchloroethylene, pptv
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Apel
Singh
Acetone, pptv
UTC Time
Apel
Singh
Methyl Ethyl Ketone, pptv
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 12

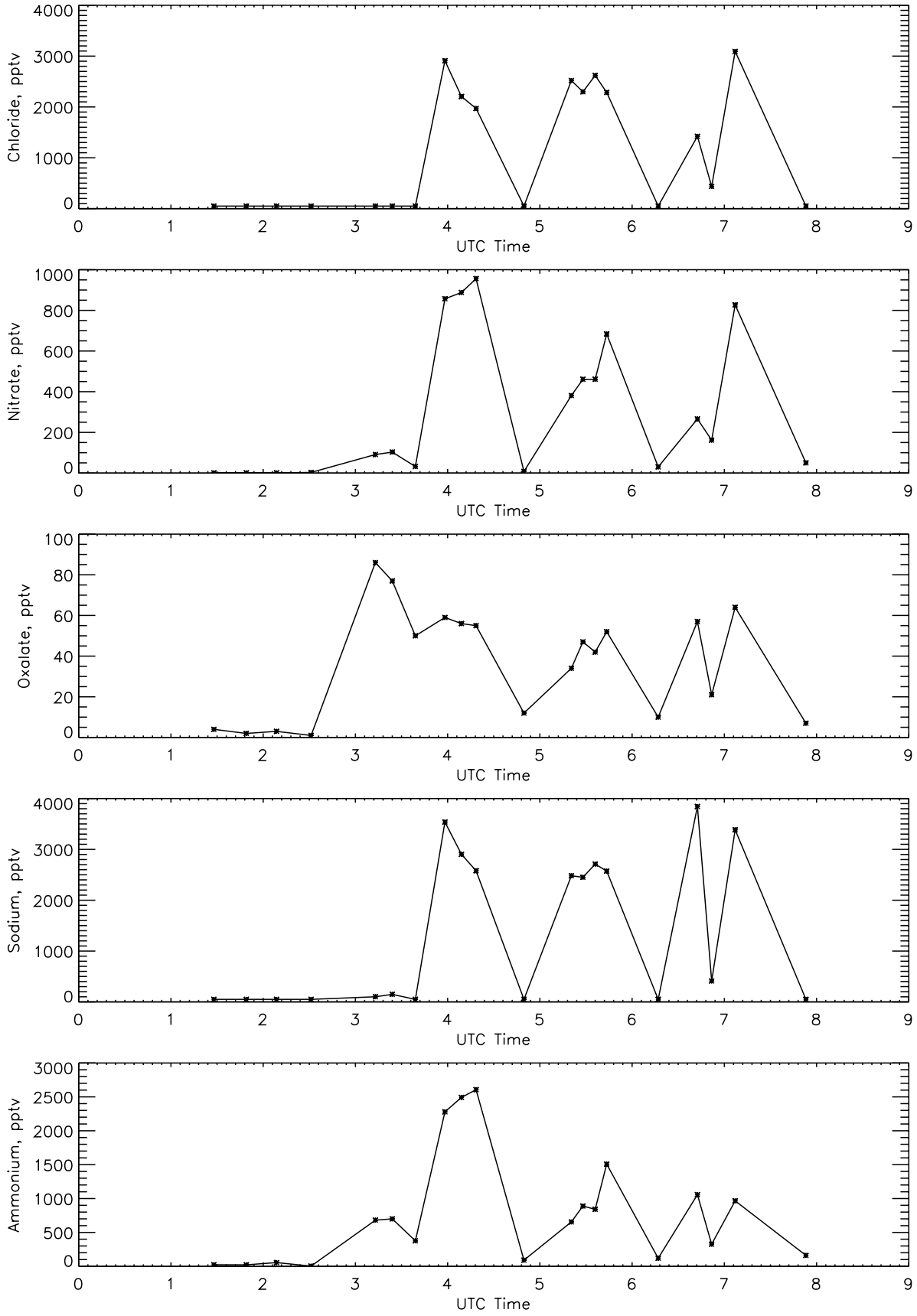


FINAL DATA: TRACE-P DC-8 Flight 12

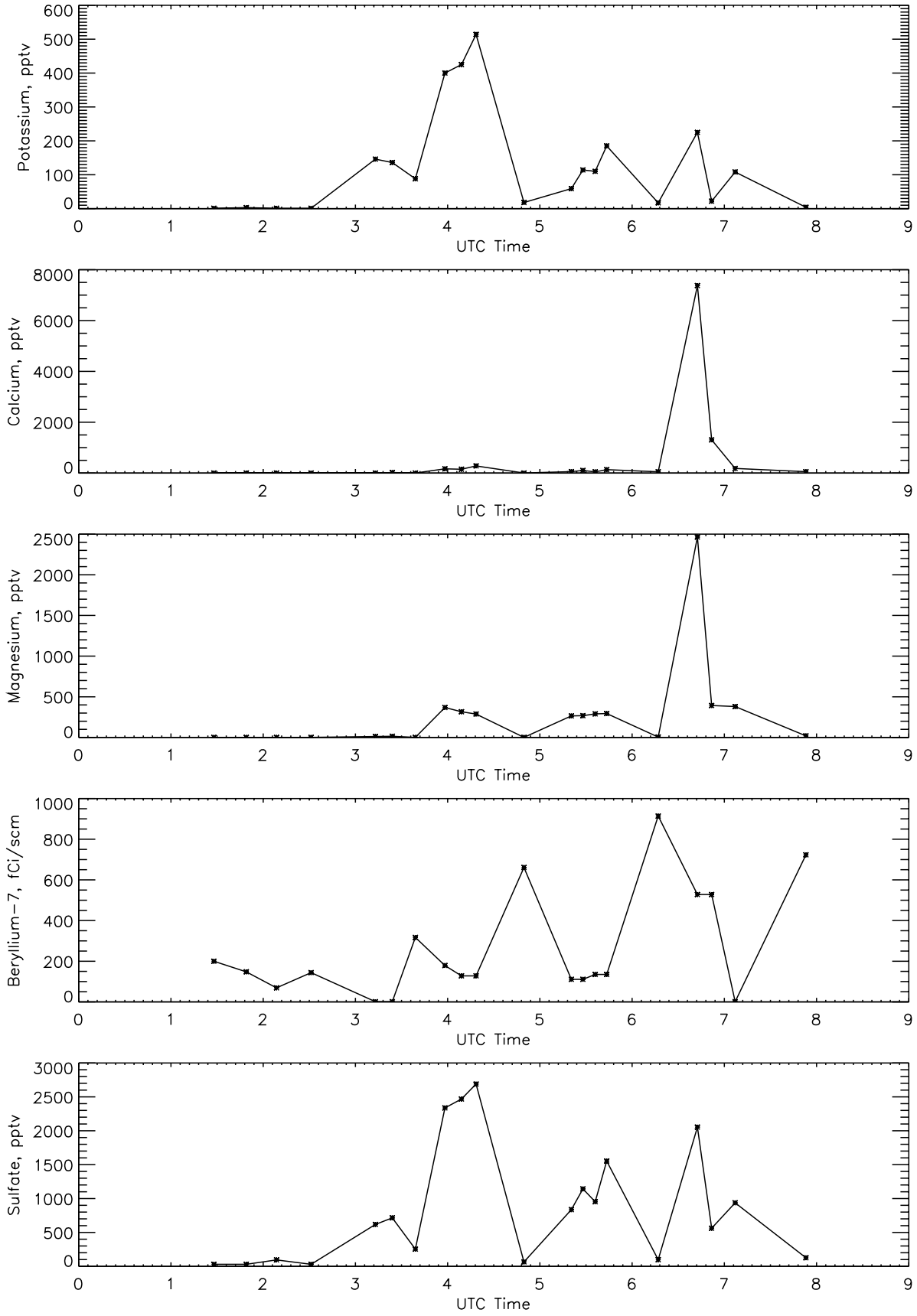


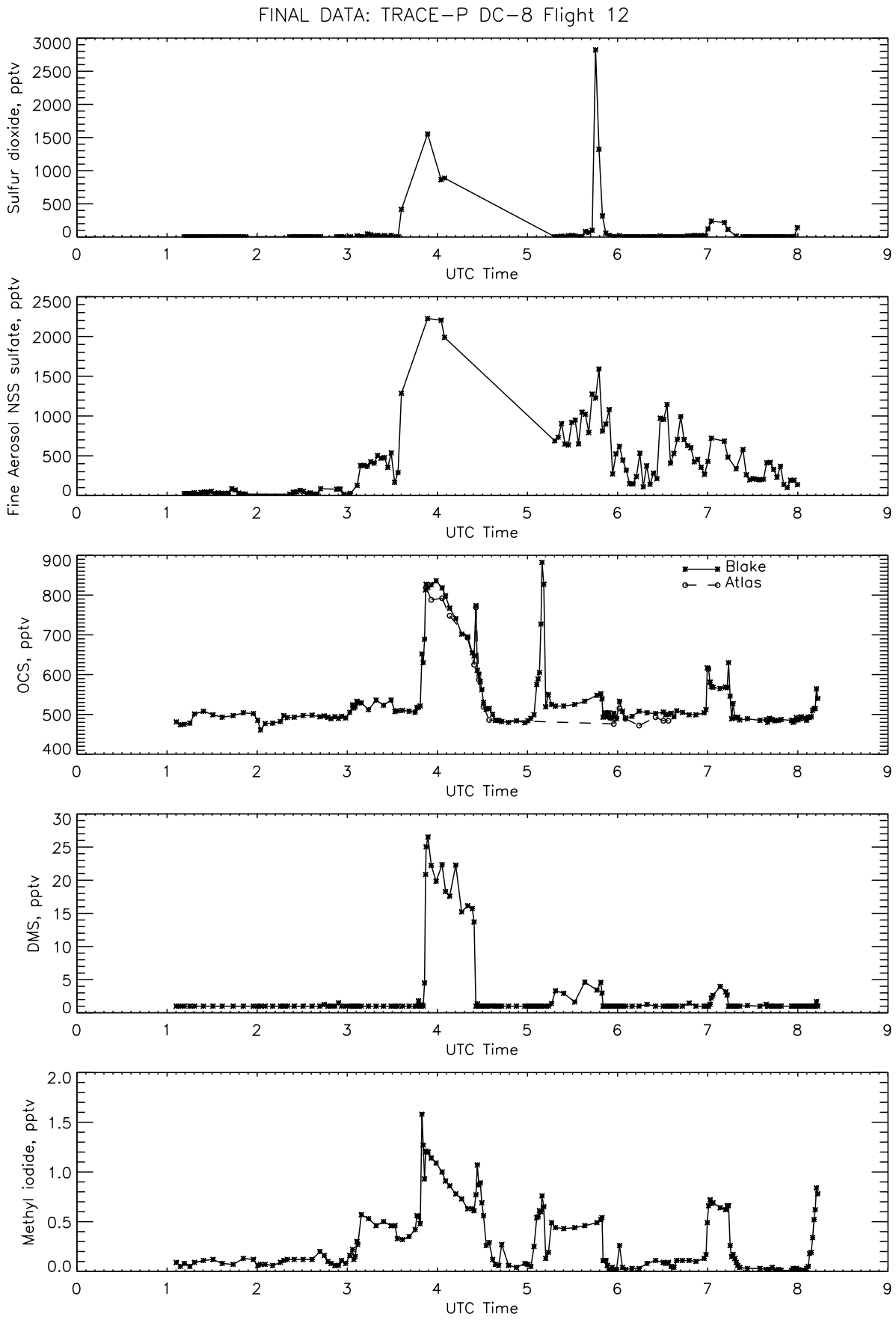

FINAL DATA: TRACE-P DC-8 Flight 12
CFC-12, pptv
UTC Time
H-1211, pptv
Blake
Atlas
HCFC-142b, pptv
clip: max=25.6000
HCFC-22, pptv
clip: max=283.000
CH3CCl3, pptv

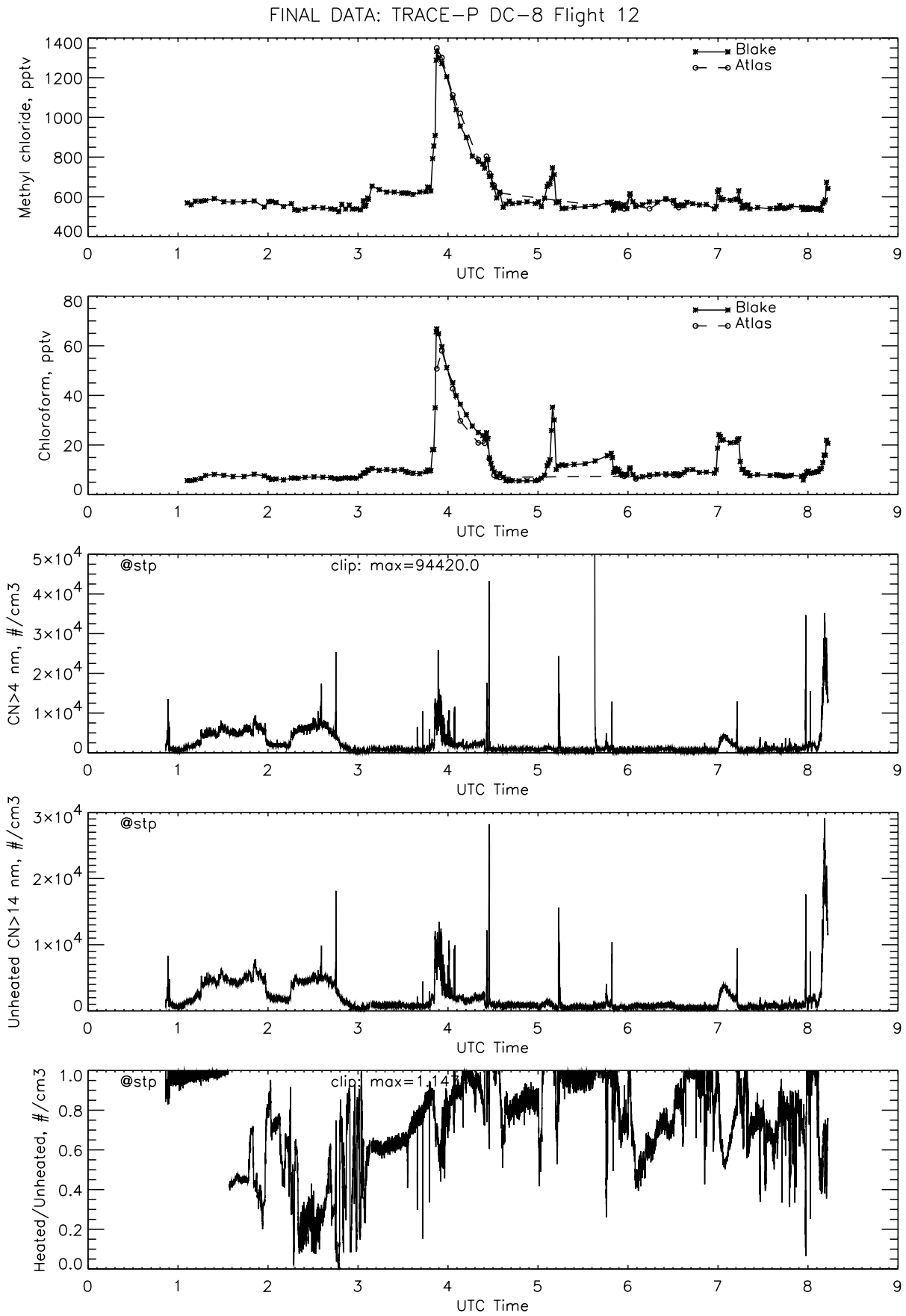
FINAL DATA: TRACE-P DC-8 Flight 12



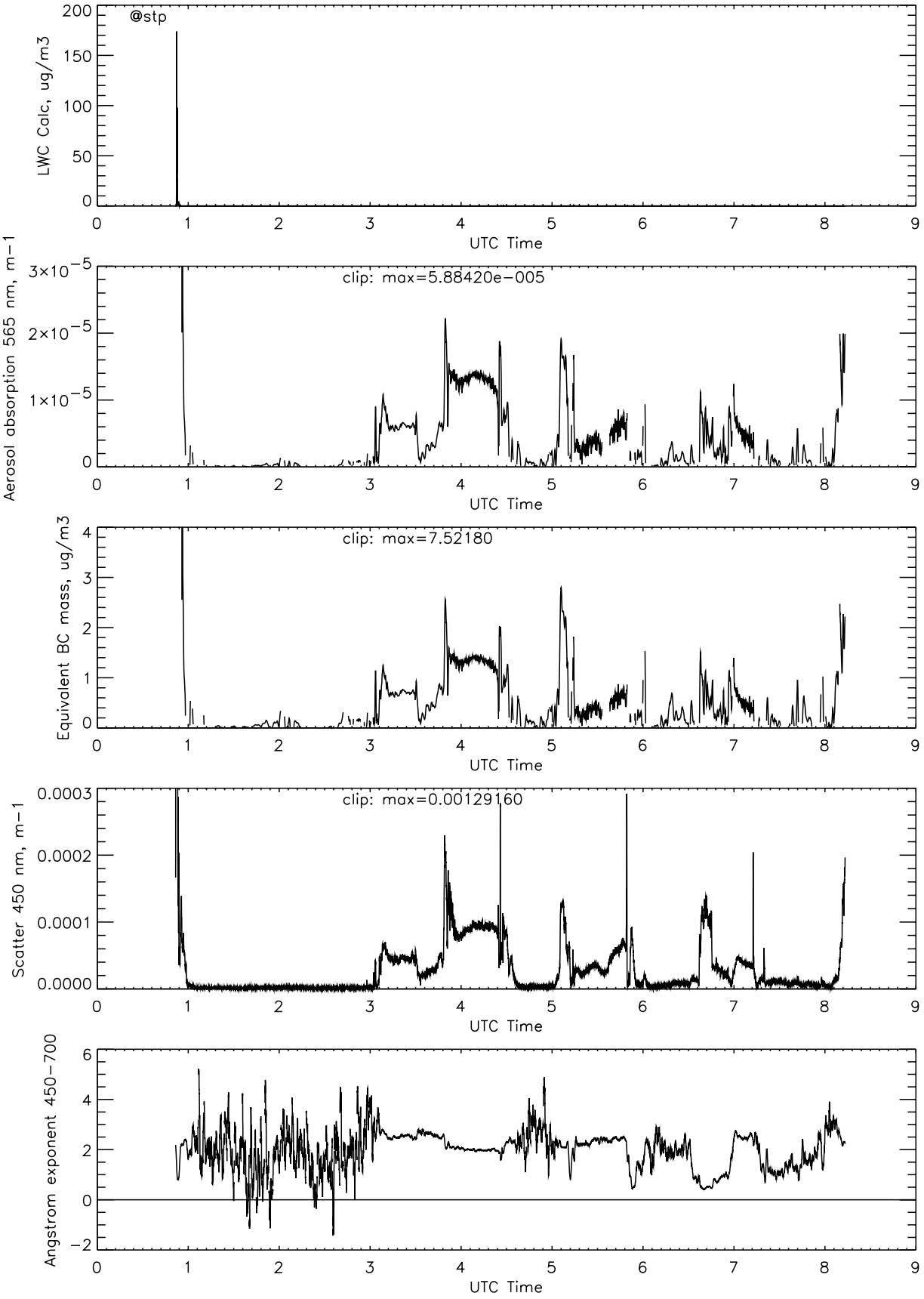
FINAL DATA: TRACE-P DC-8 Flight 12

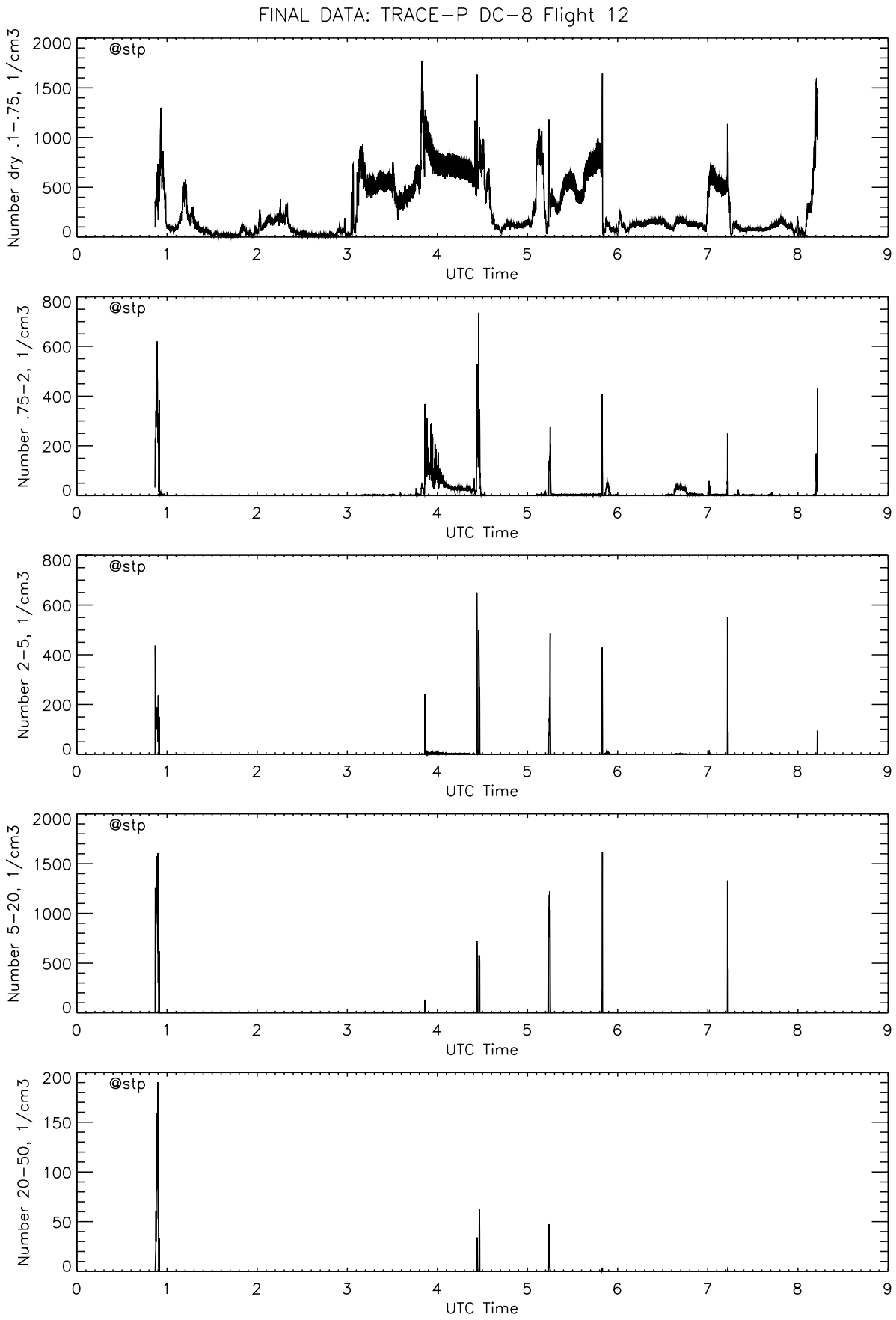


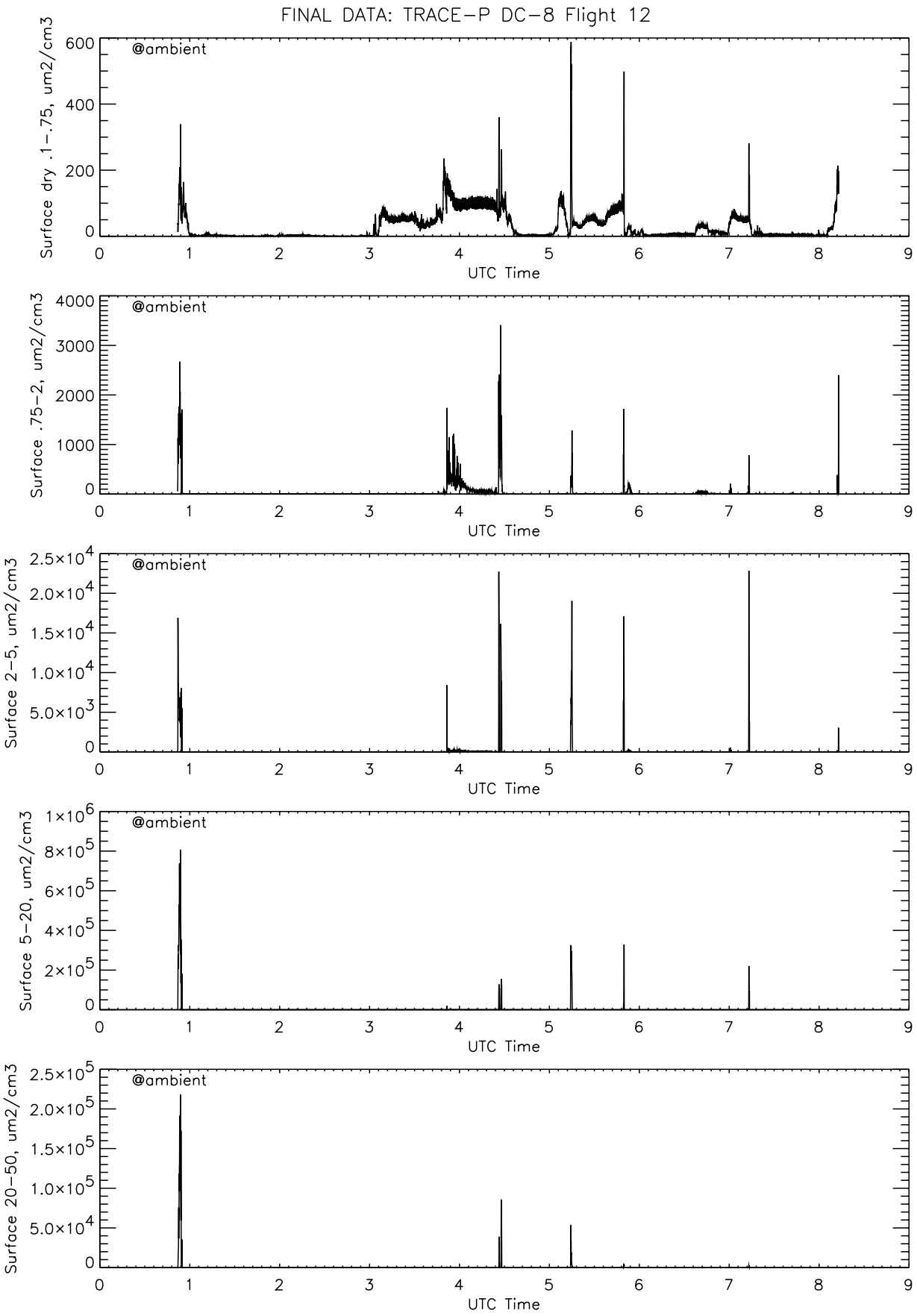

FINAL DATA: TRACE-P DC-8 Flight 12
Sulfur dioxide, pptv
UTC Time
Fine Aerosol NSS sulfate, pptv
UTC Time
OCS, pptv
Blake
Atlas
UTC Time
DMS, pptv
UTC Time
Methyl iodide, pptv
UTC Time

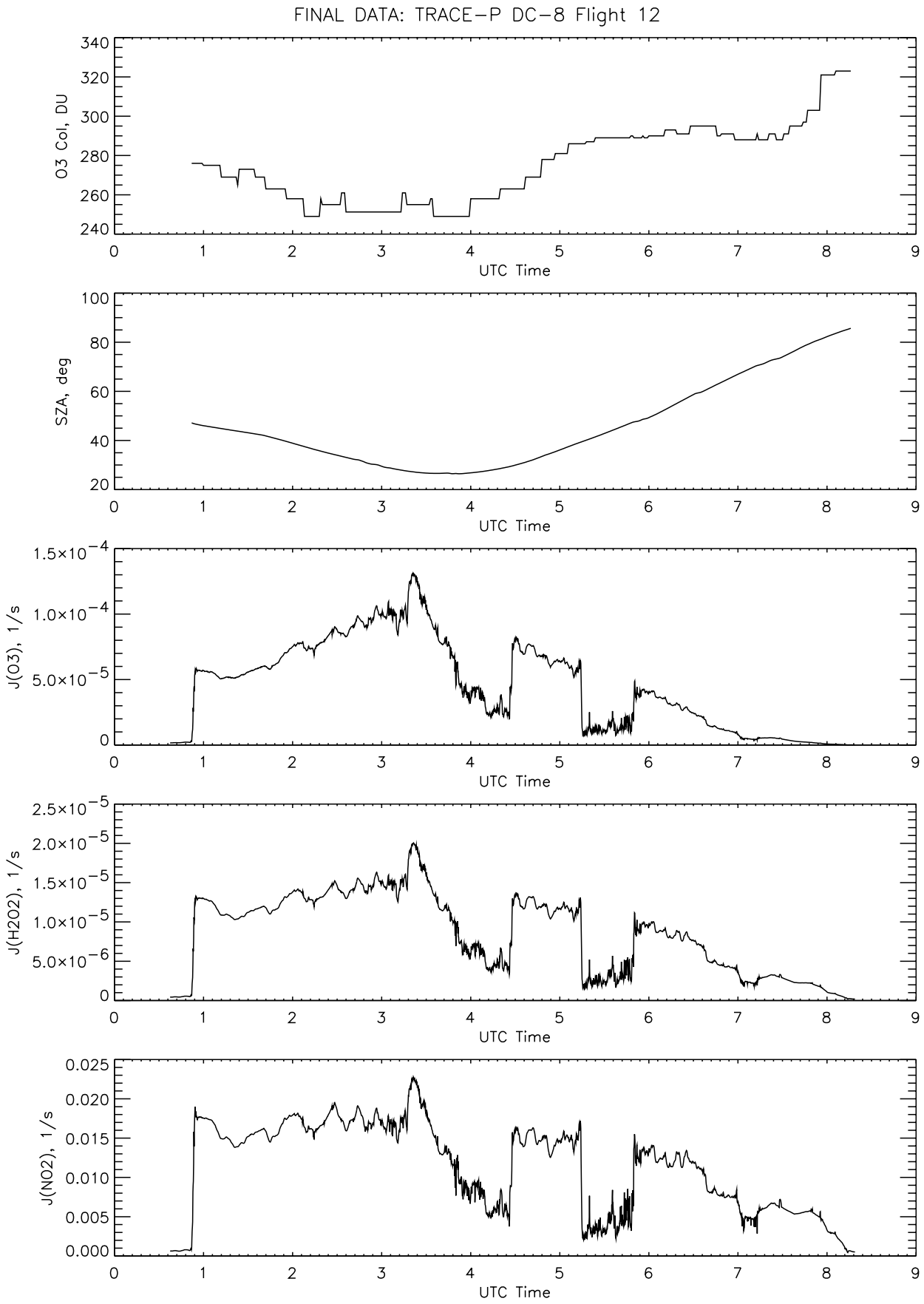

FINAL DATA: TRACE-P DC-8 Flight 12
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
clip: max=94420.0
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
UTC Time

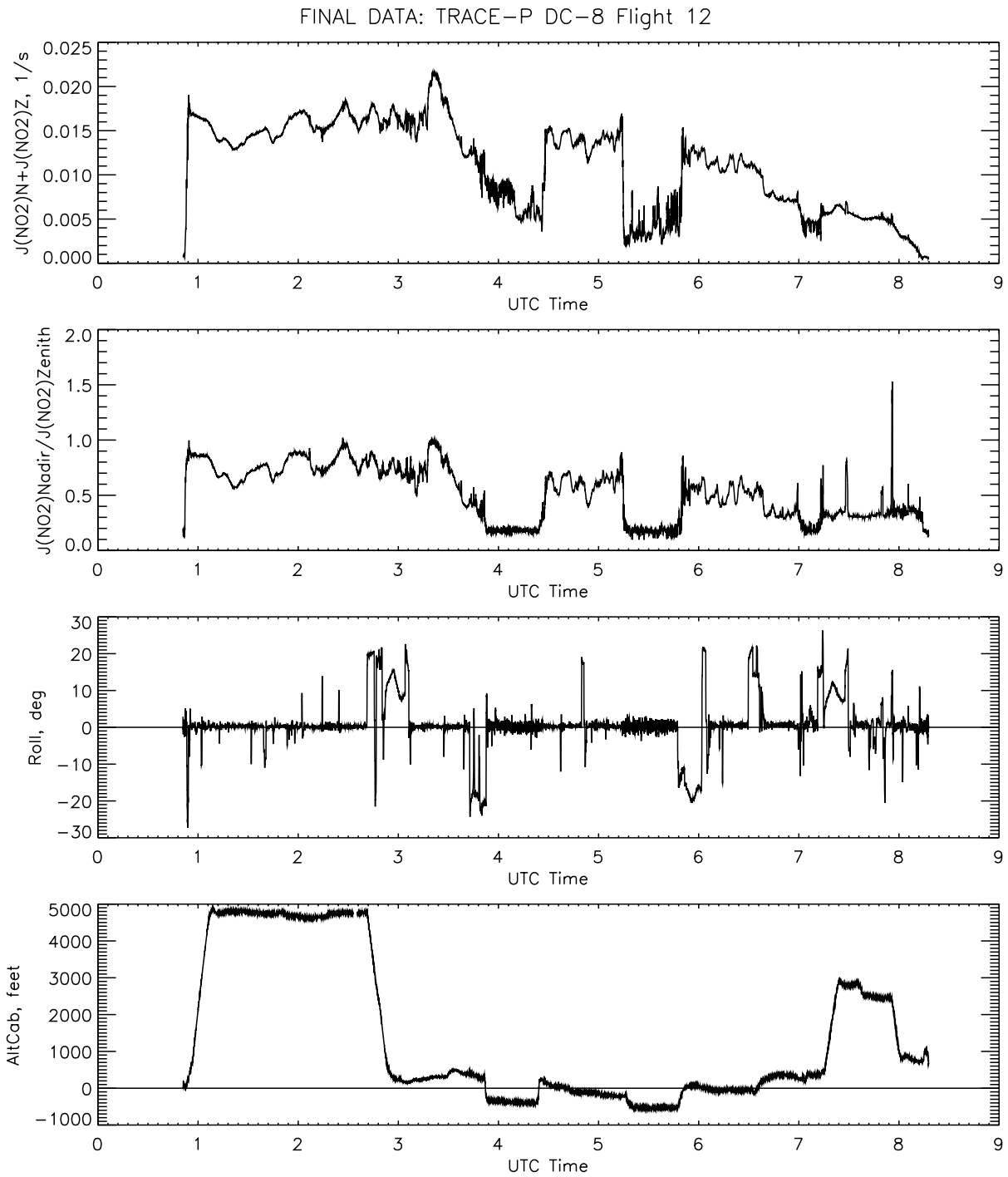
FINAL DATA: TRACE-P DC-8 Flight 12

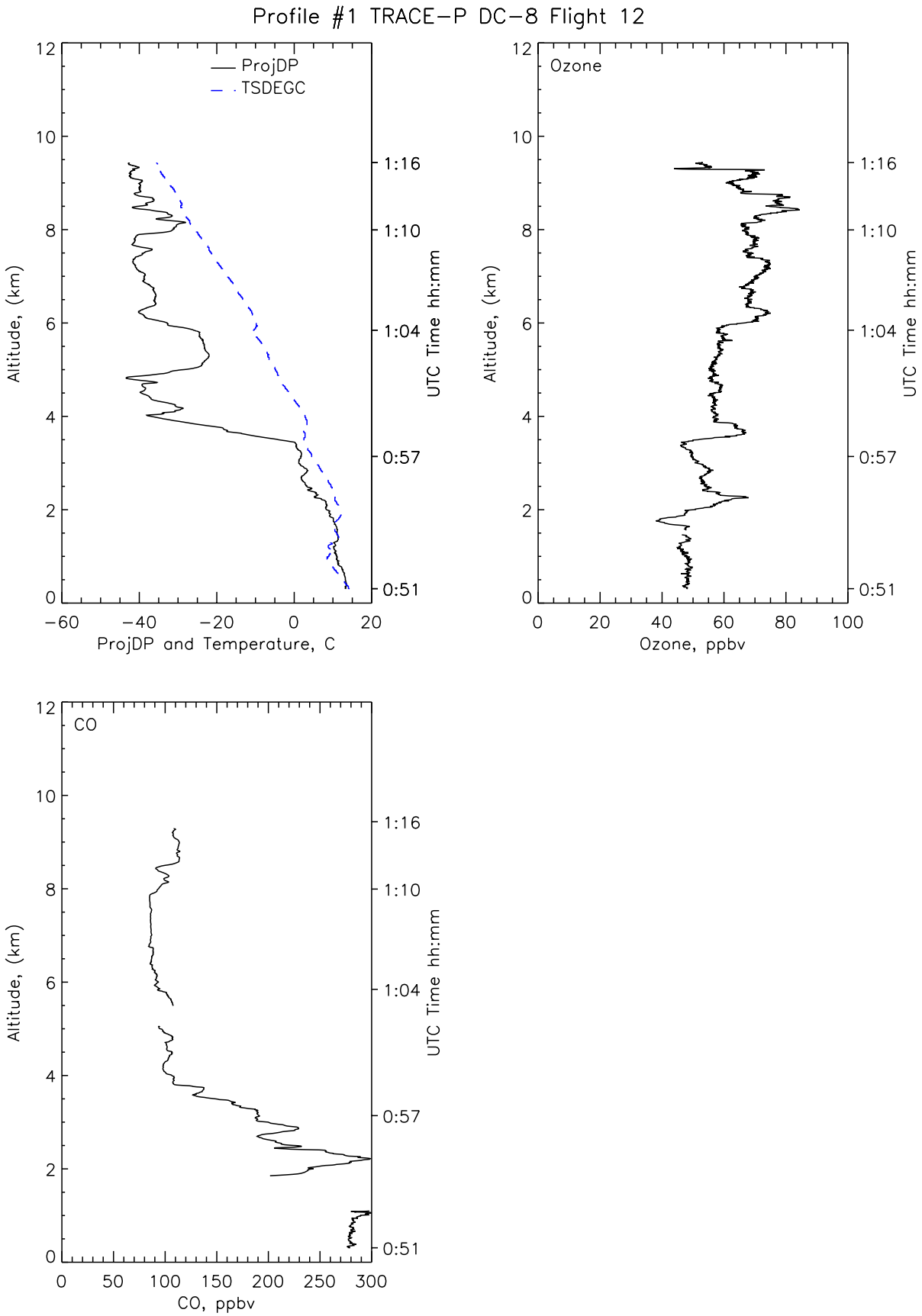


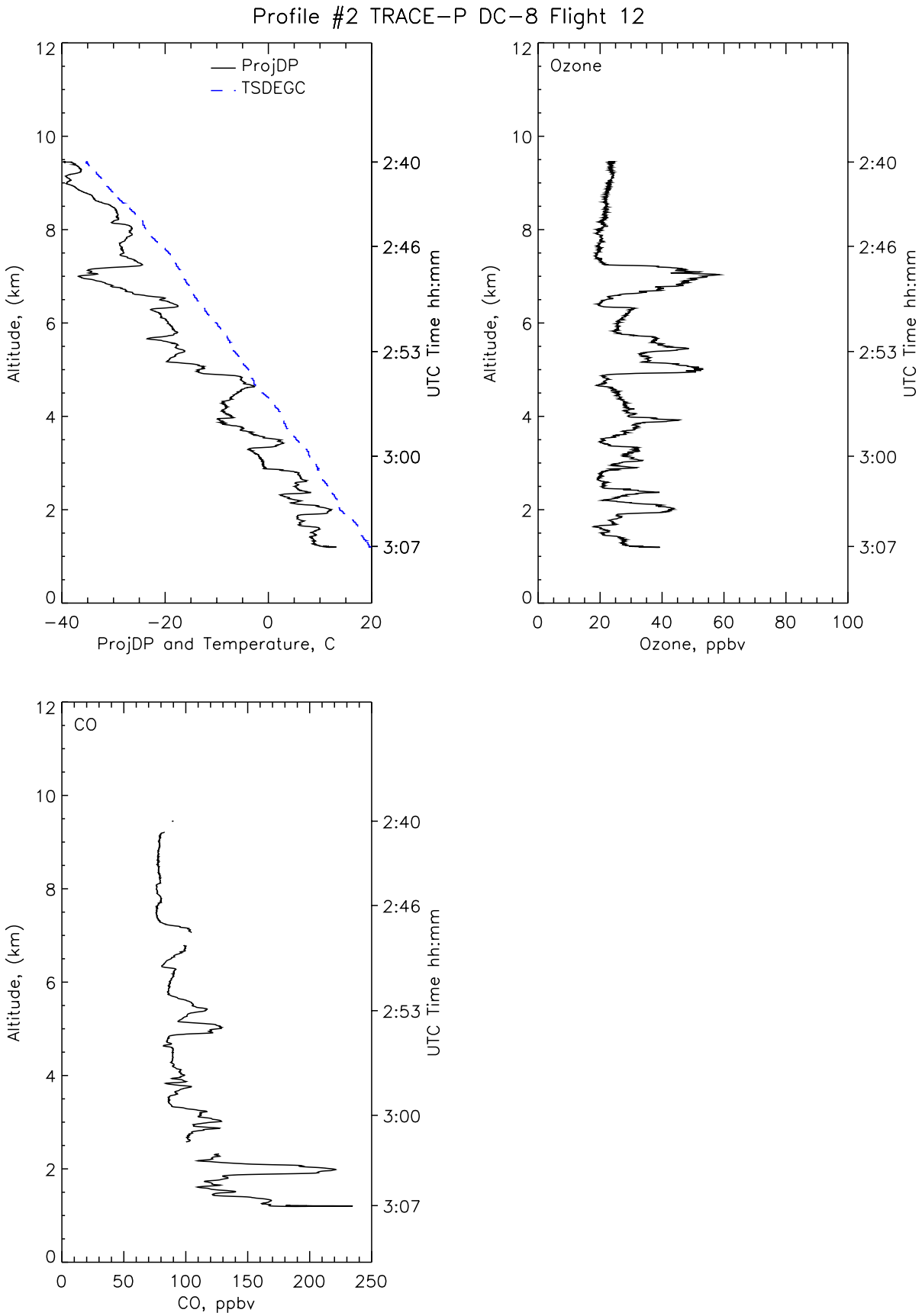

FINAL DATA: TRACE-P DC-8 Flight 12
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

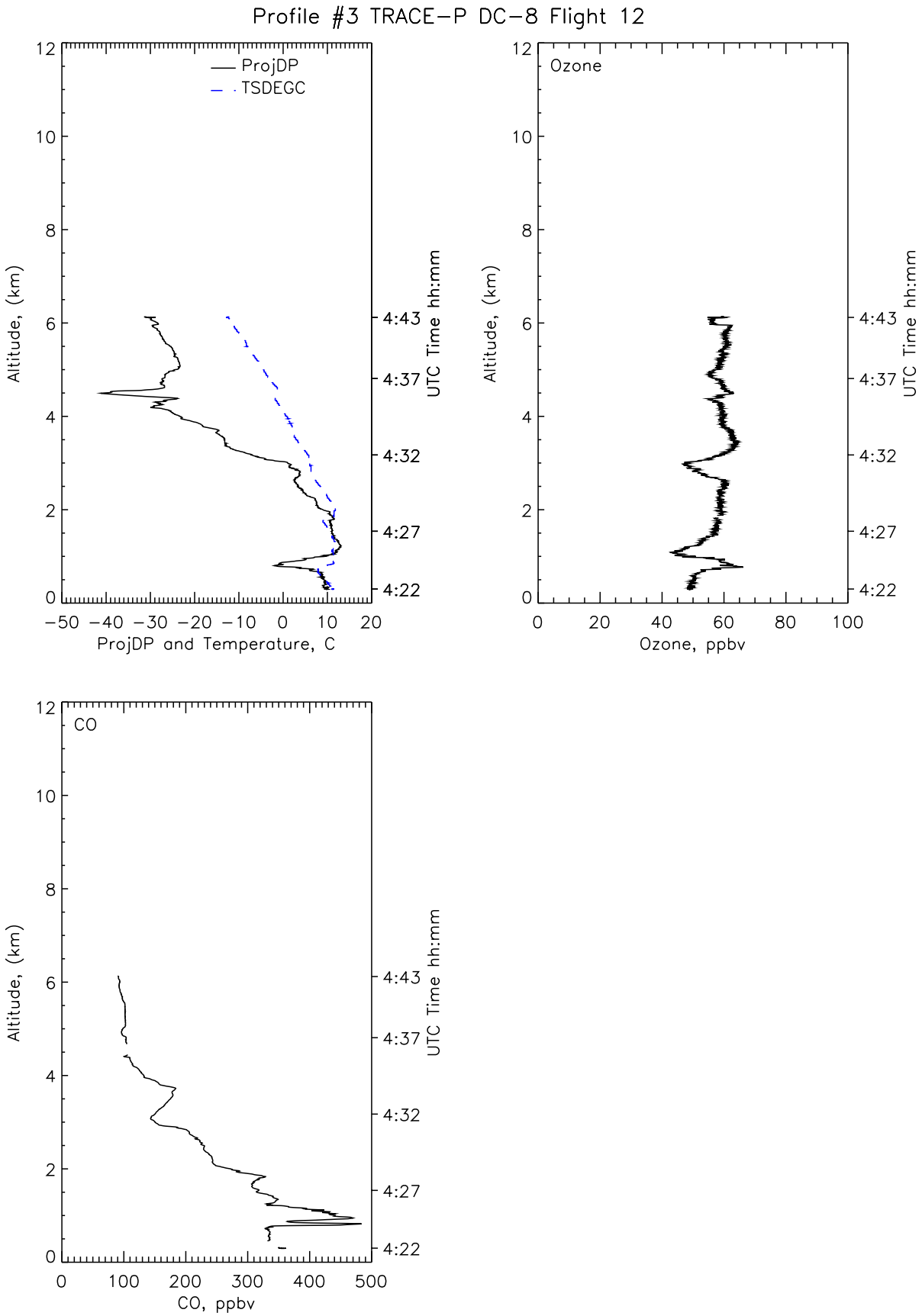

FINAL DATA: TRACE-P DC-8 Flight 12
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

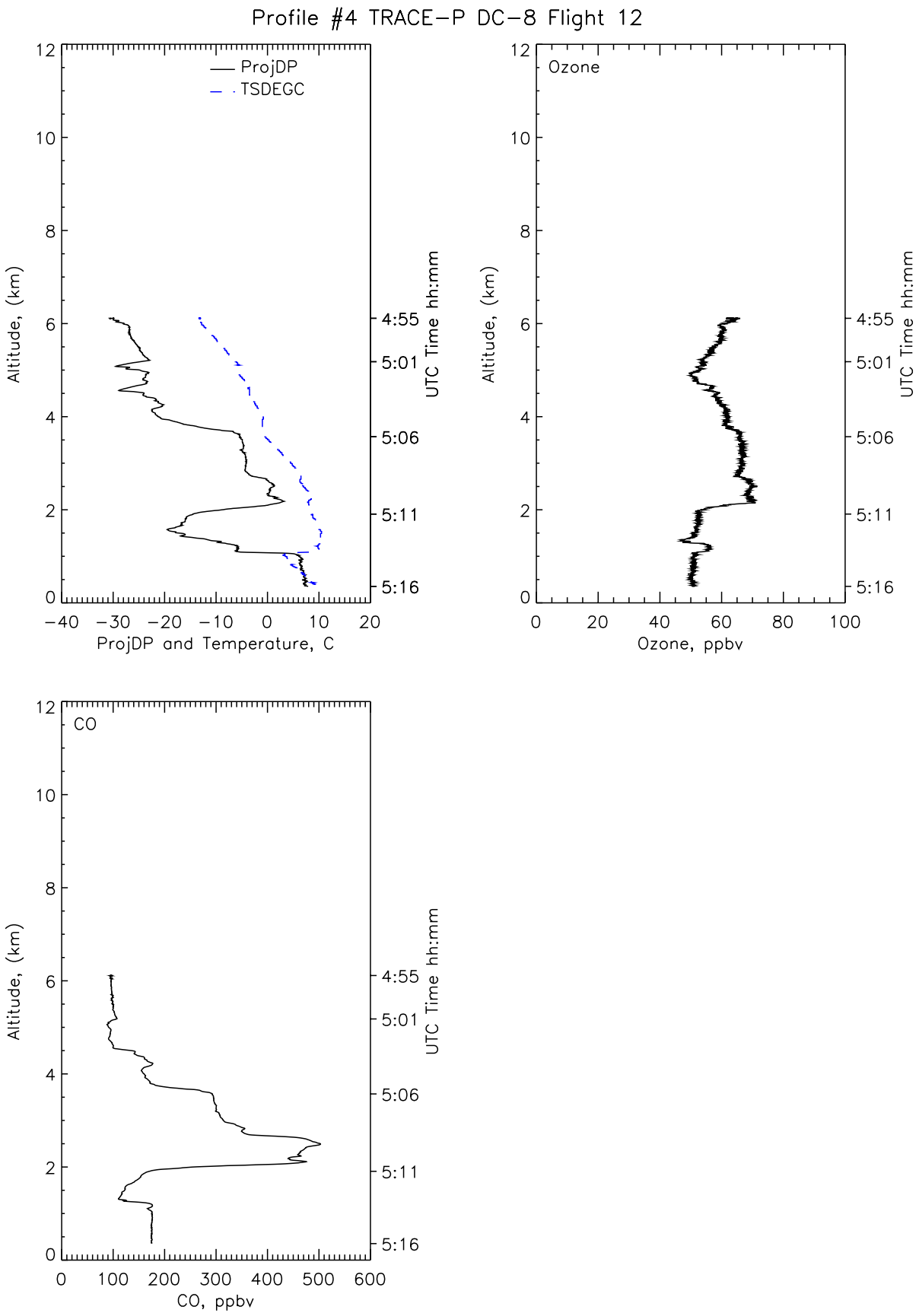

FINAL DATA: TRACE-P DC-8 Flight 12
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

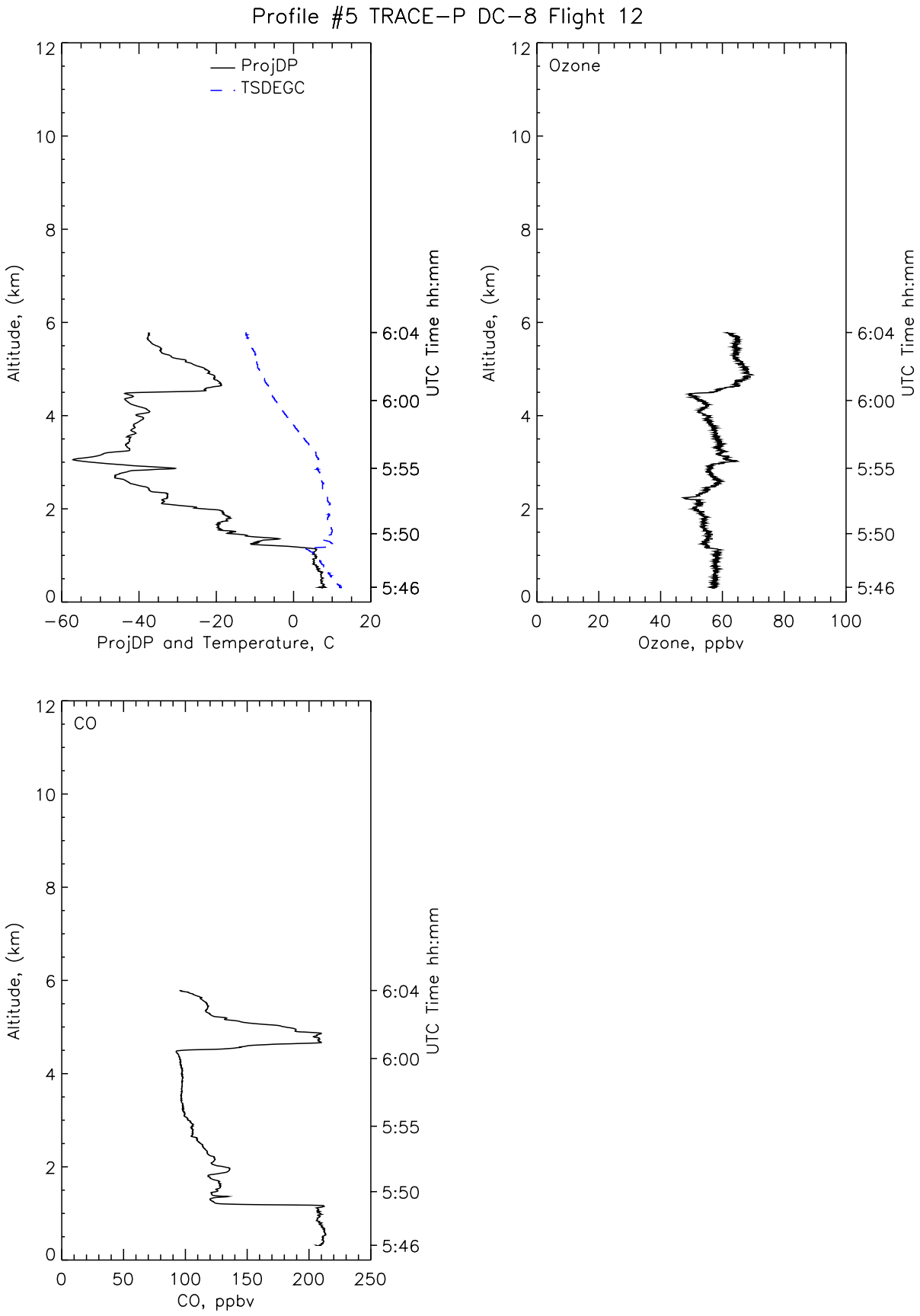

FINAL DATA: TRACE-P DC-8 Flight 12
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
0
1
2
3
4
5
6
7
8
9
UTC Time
J(NO2)Nadir/J(NO2)Zenith
2.0
1.5
1.0
0.5
0.0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
5000
4000
3000
2000
1000
0
−1000
UTC Time

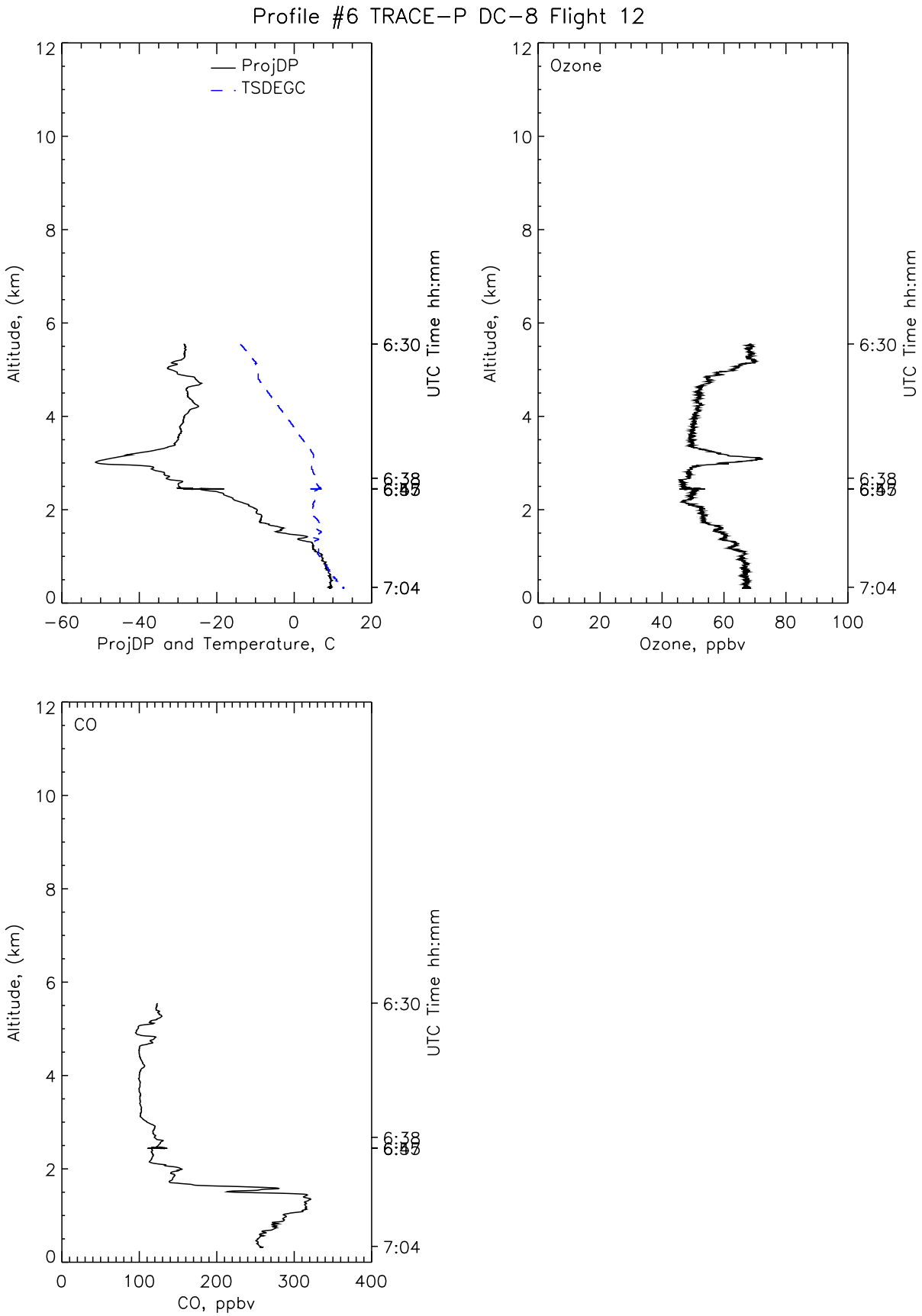

Profile #1 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

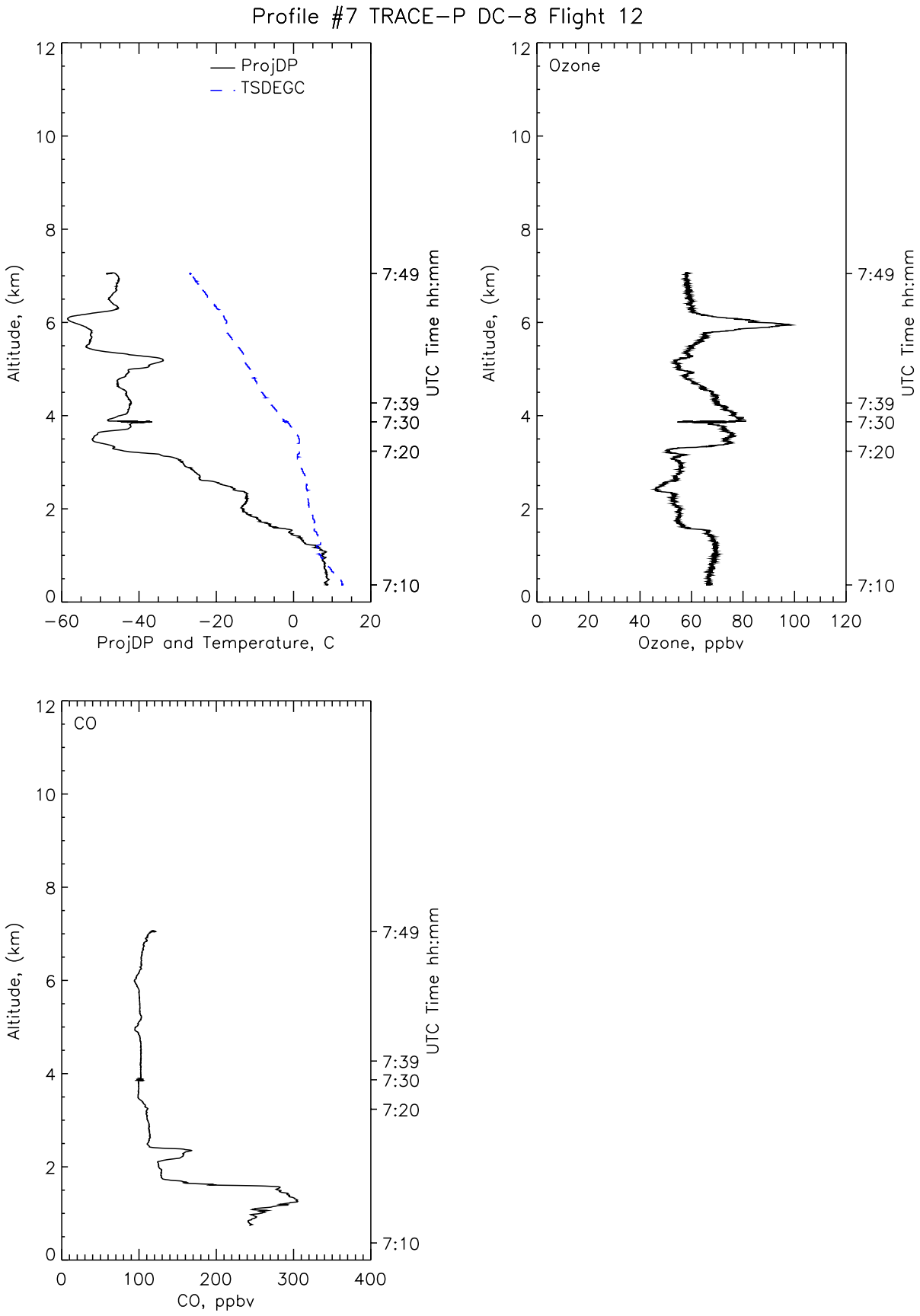

Profile #2 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

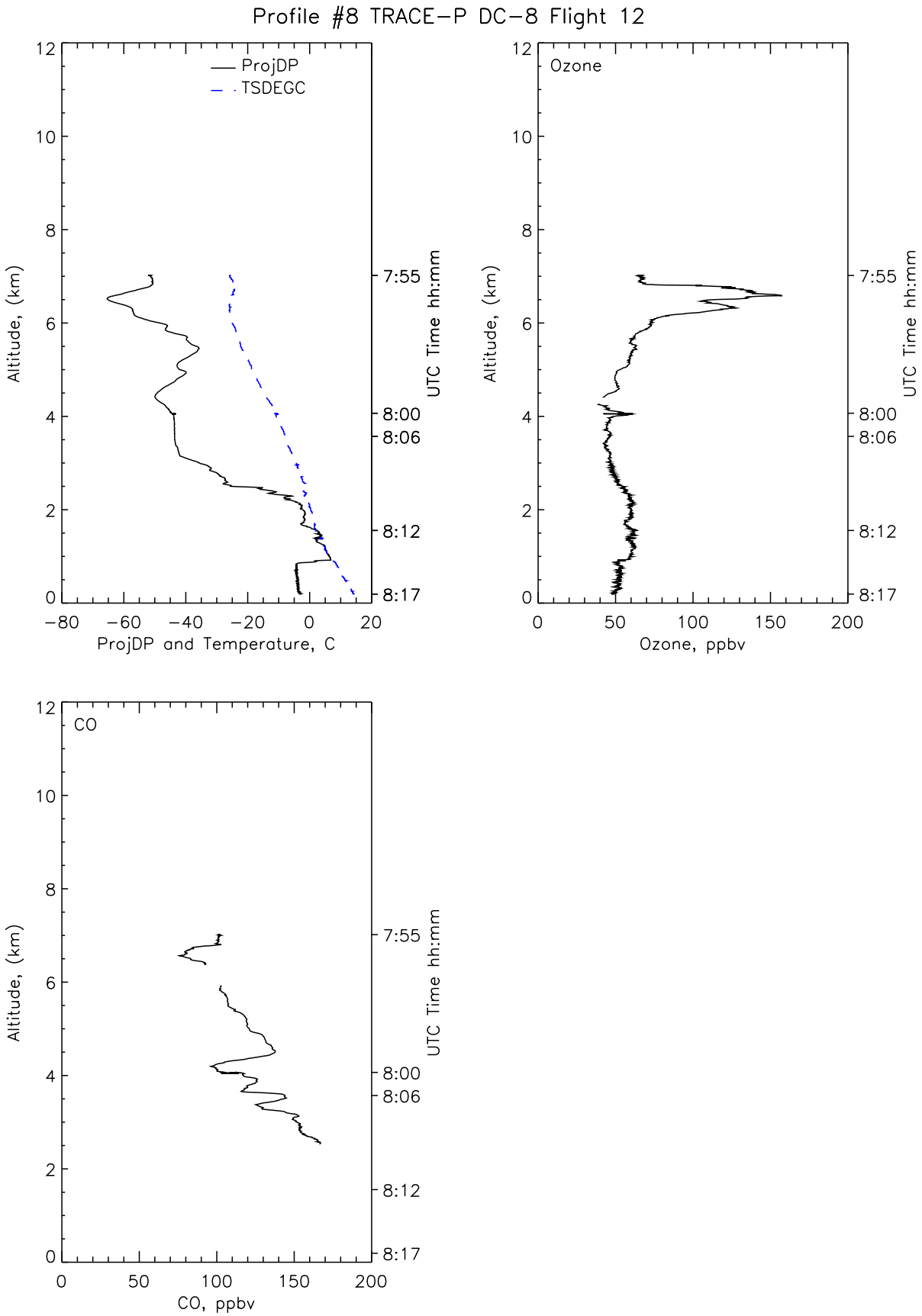

Profile #3 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #4 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
4:55
5:01
5:06
5:11
5:16
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #5 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
6:30
6:38
7:04
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #7 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
7:49
7:39
7:30
7:20
7:10
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #8 TRACE-P DC-8 Flight 12
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
7:55
8:00
8:06
8:12
8:17
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

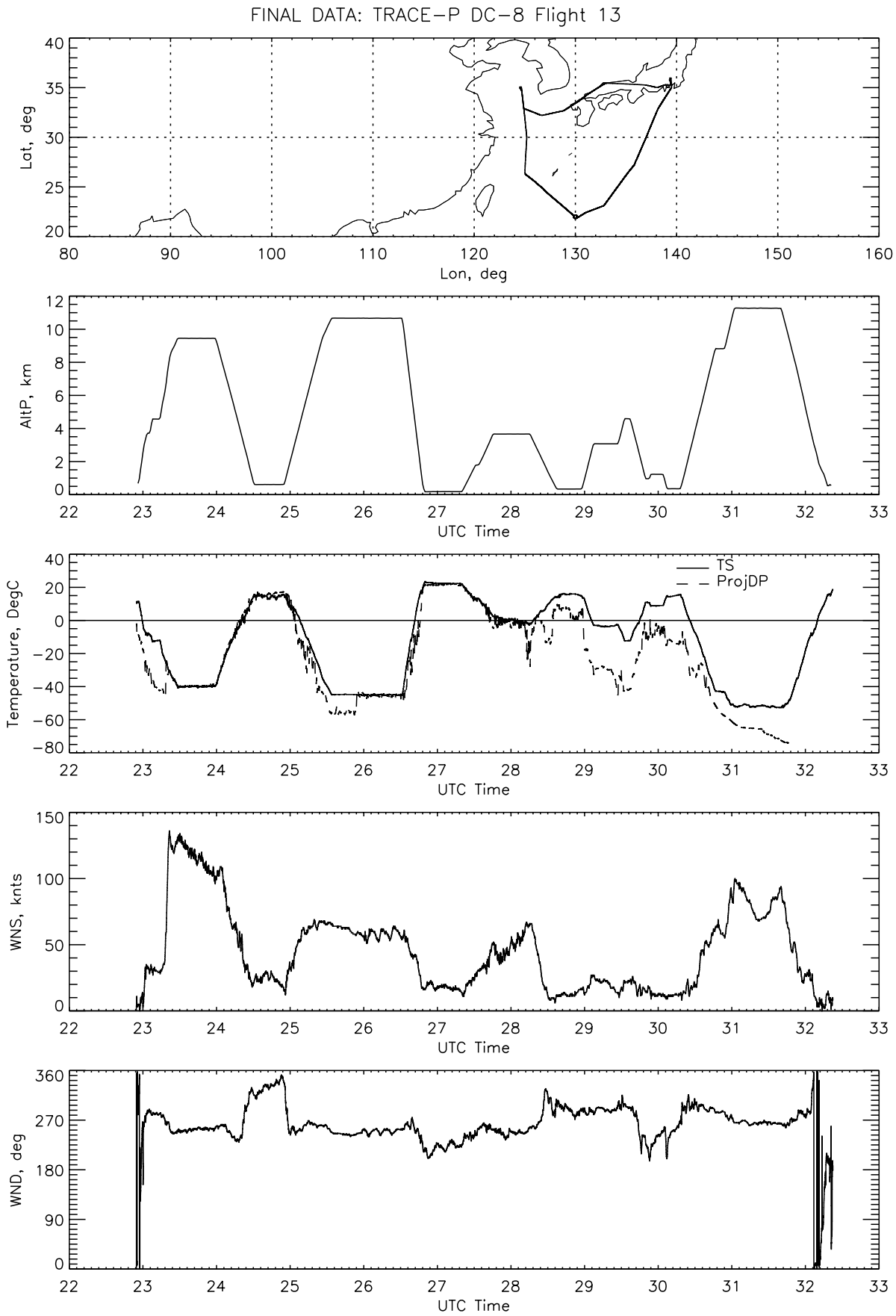
TRACE-P

Flight 13D

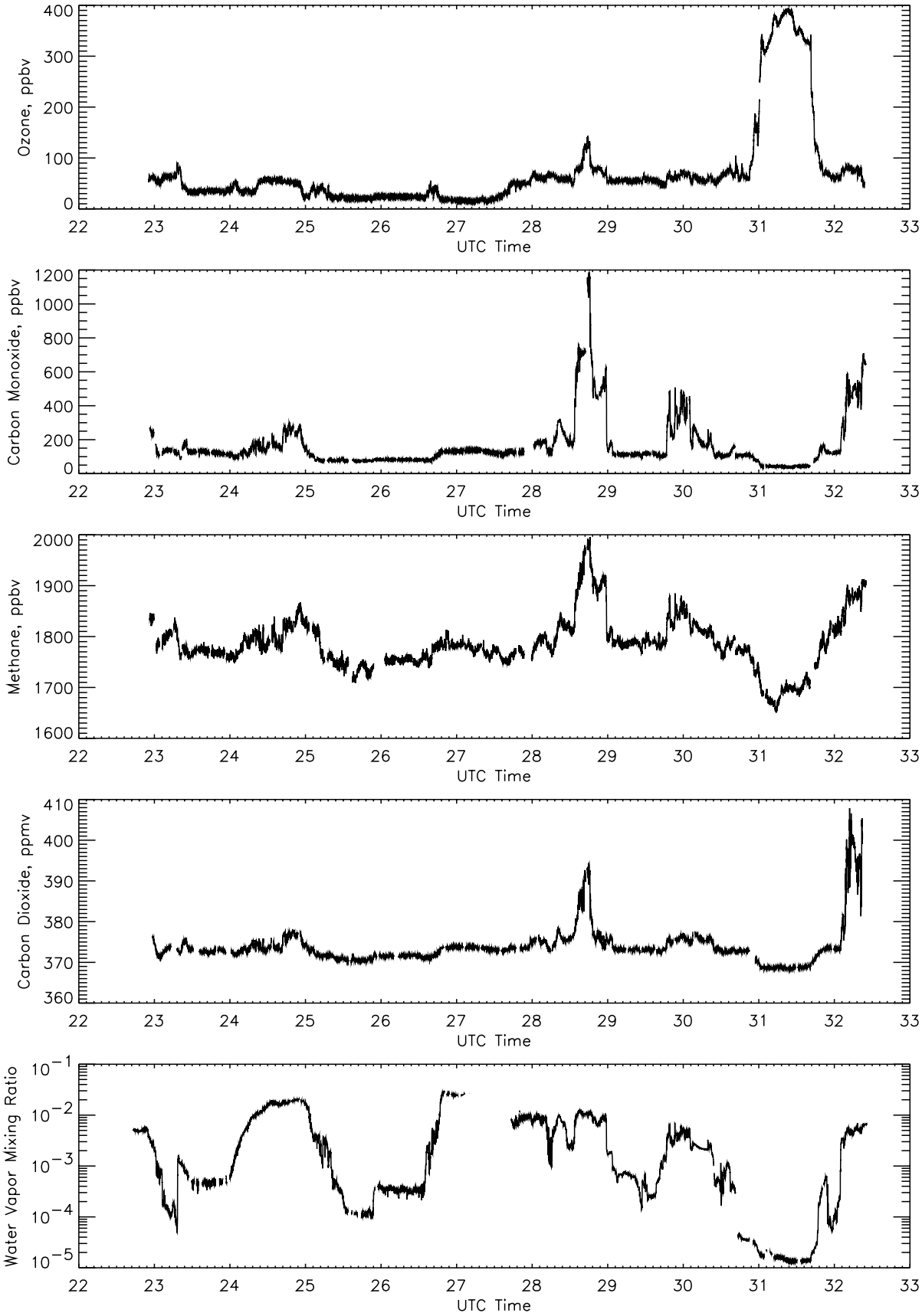
Local: Yokota No. 1

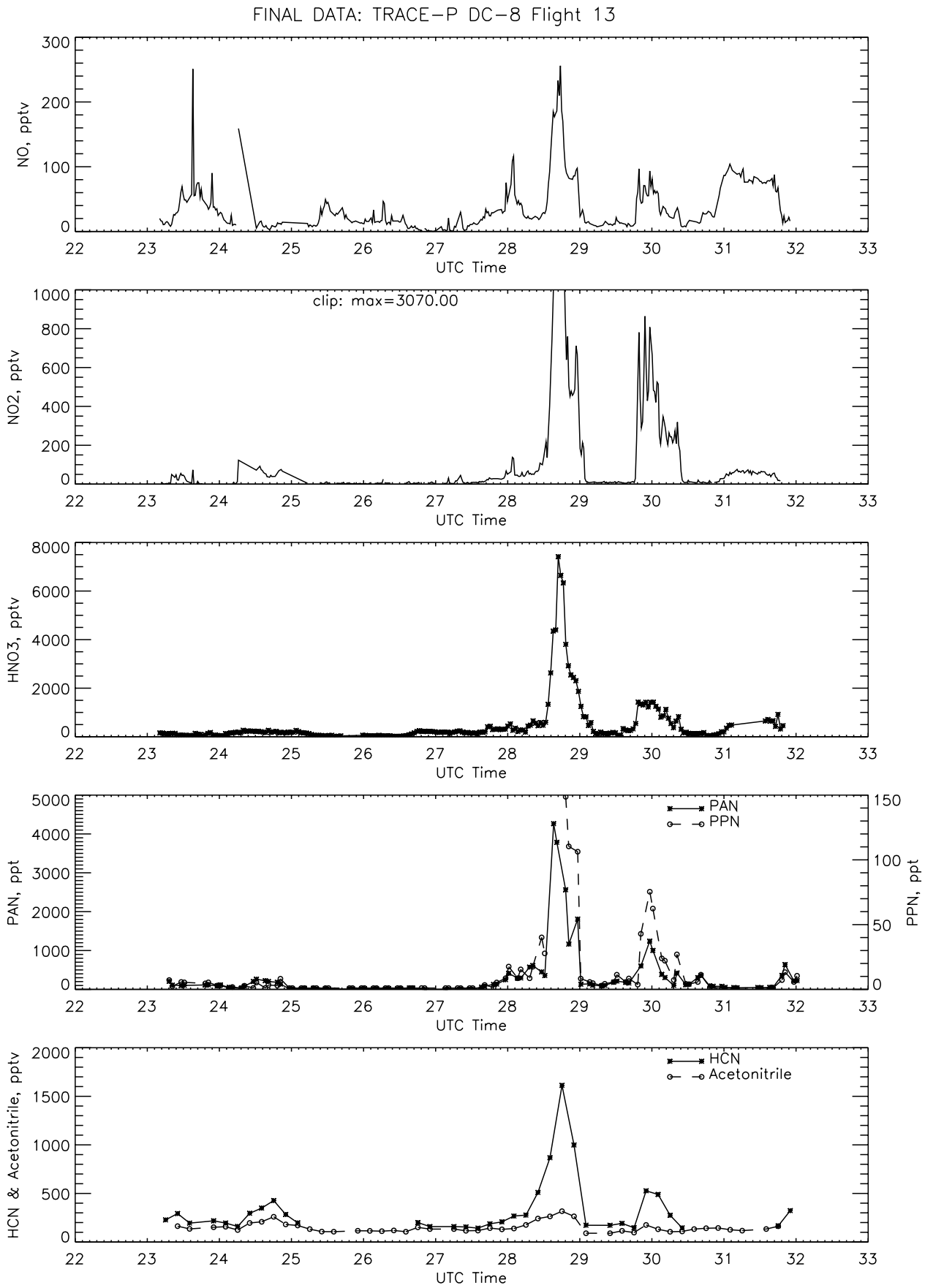
Frontal Lifting and Dust Outflow

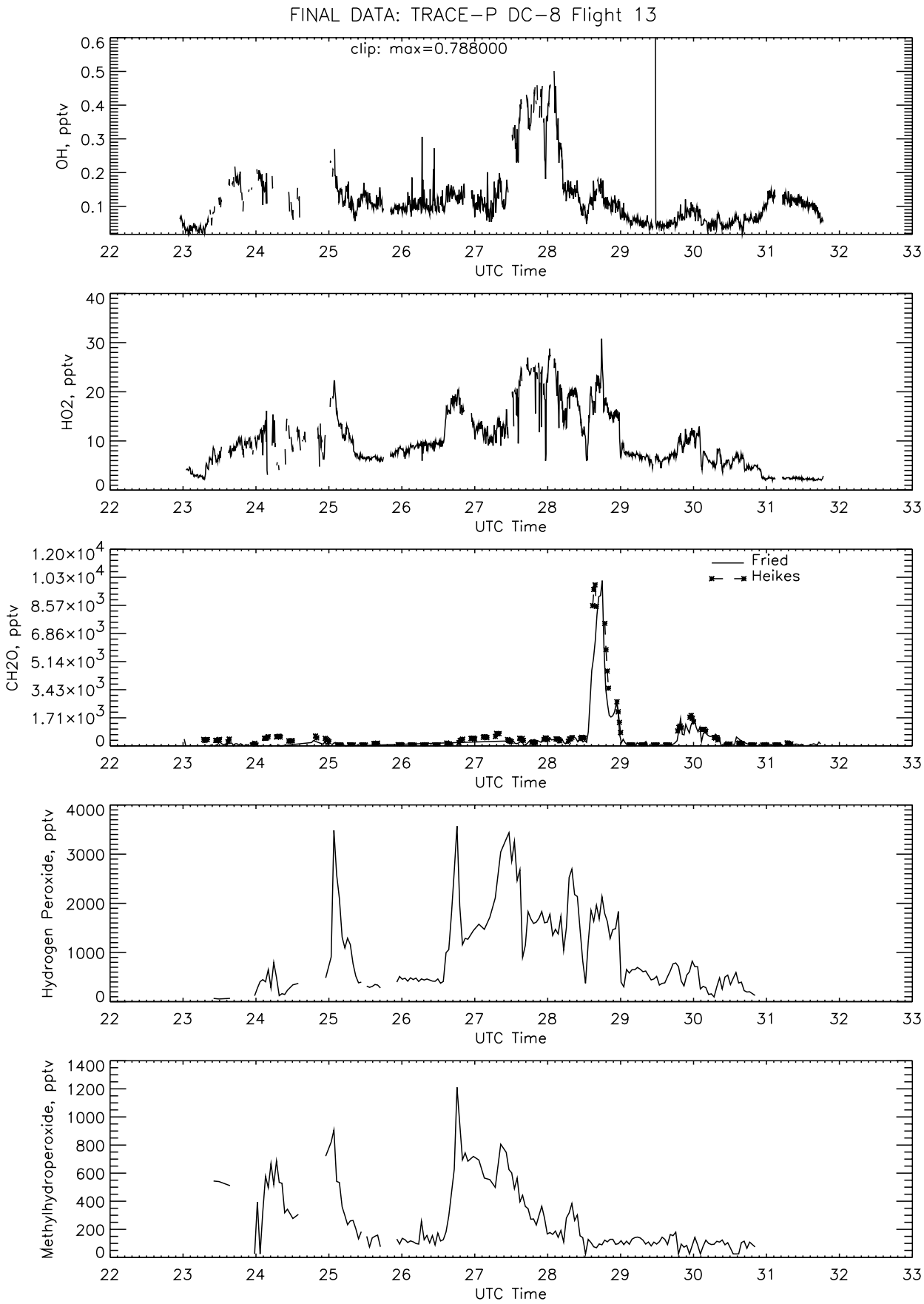
March 20, 2001

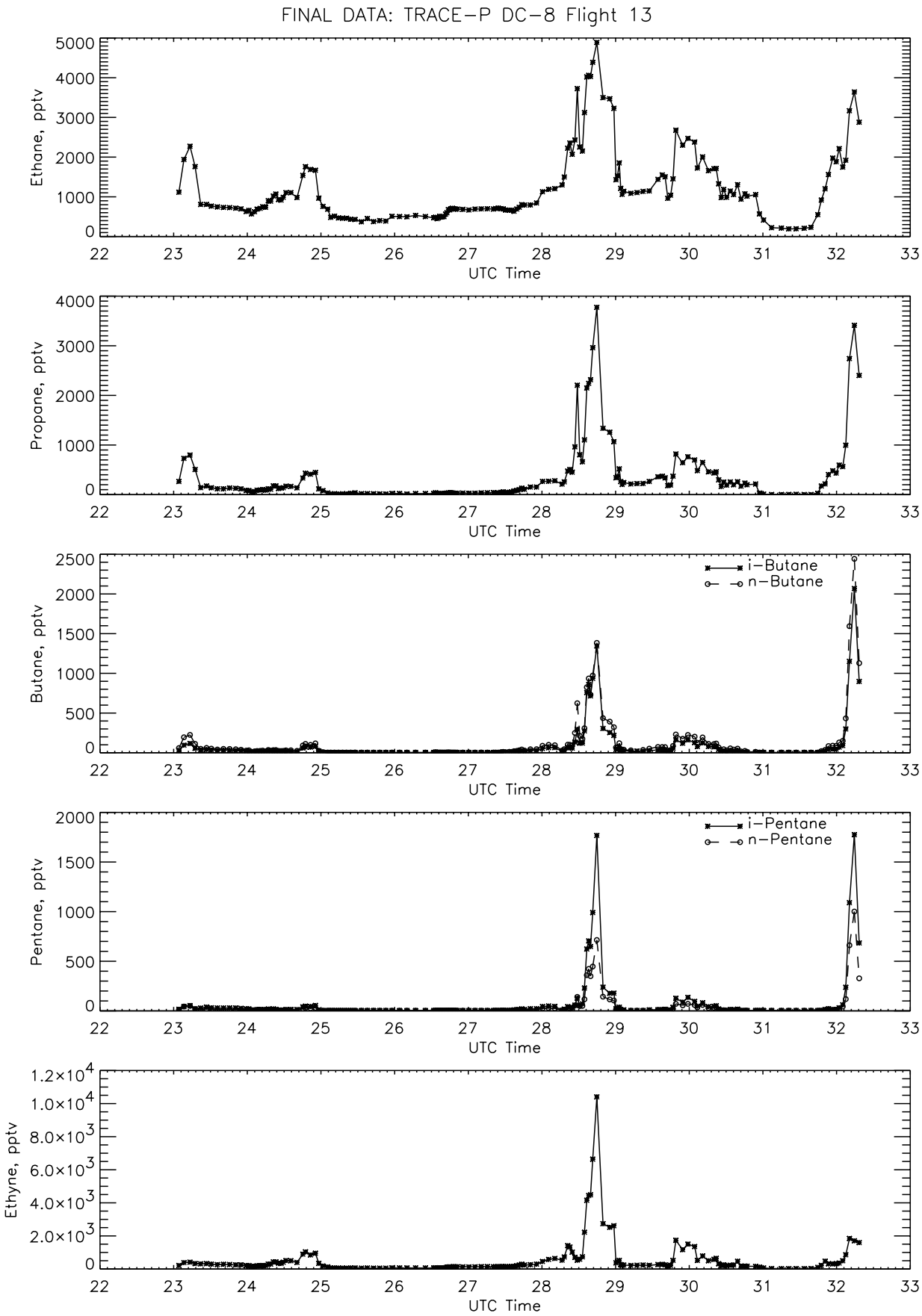

FINAL DATA: TRACE-P DC-8 Flight 13
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

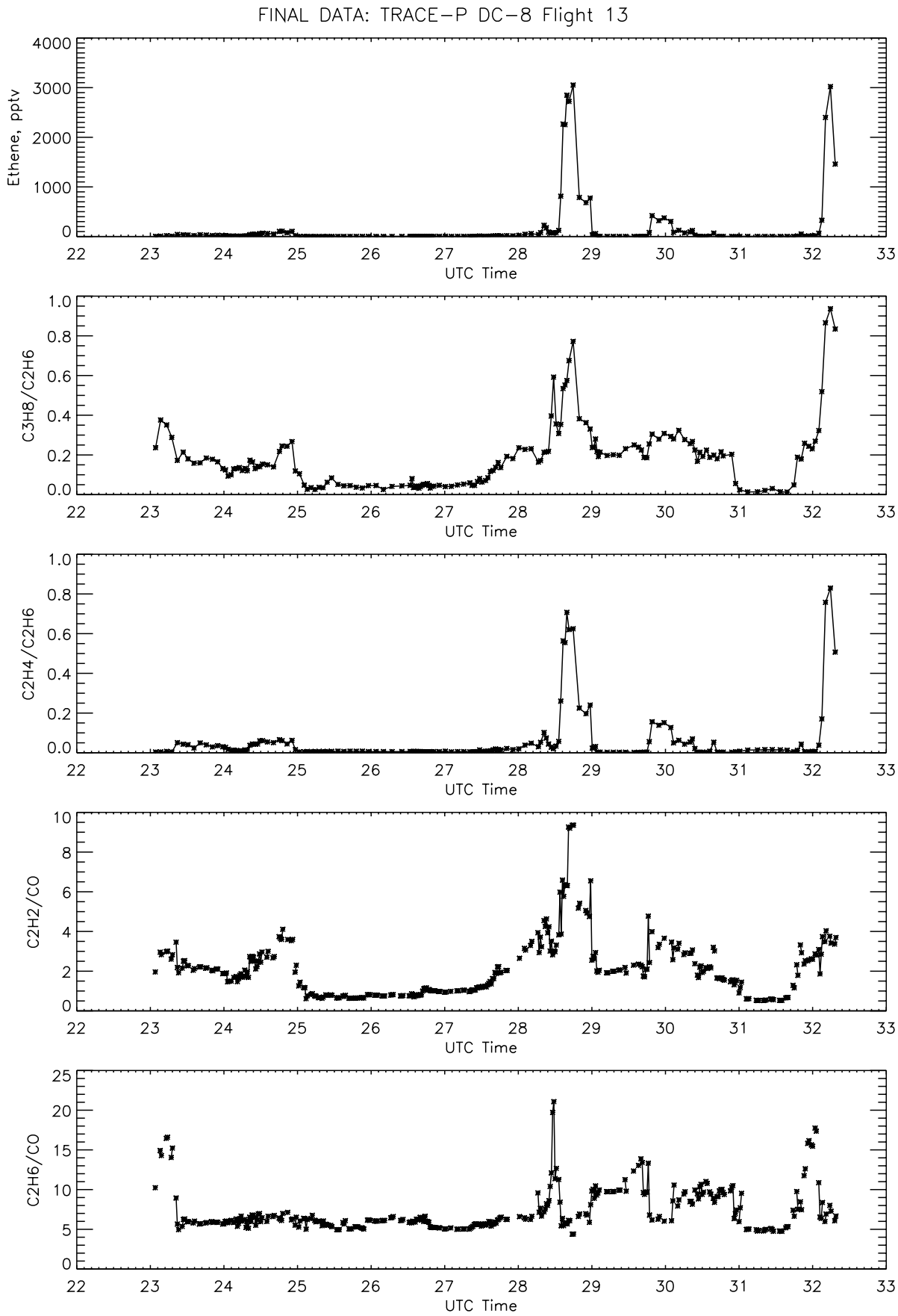
FINAL DATA: TRACE-P DC-8 Flight 13

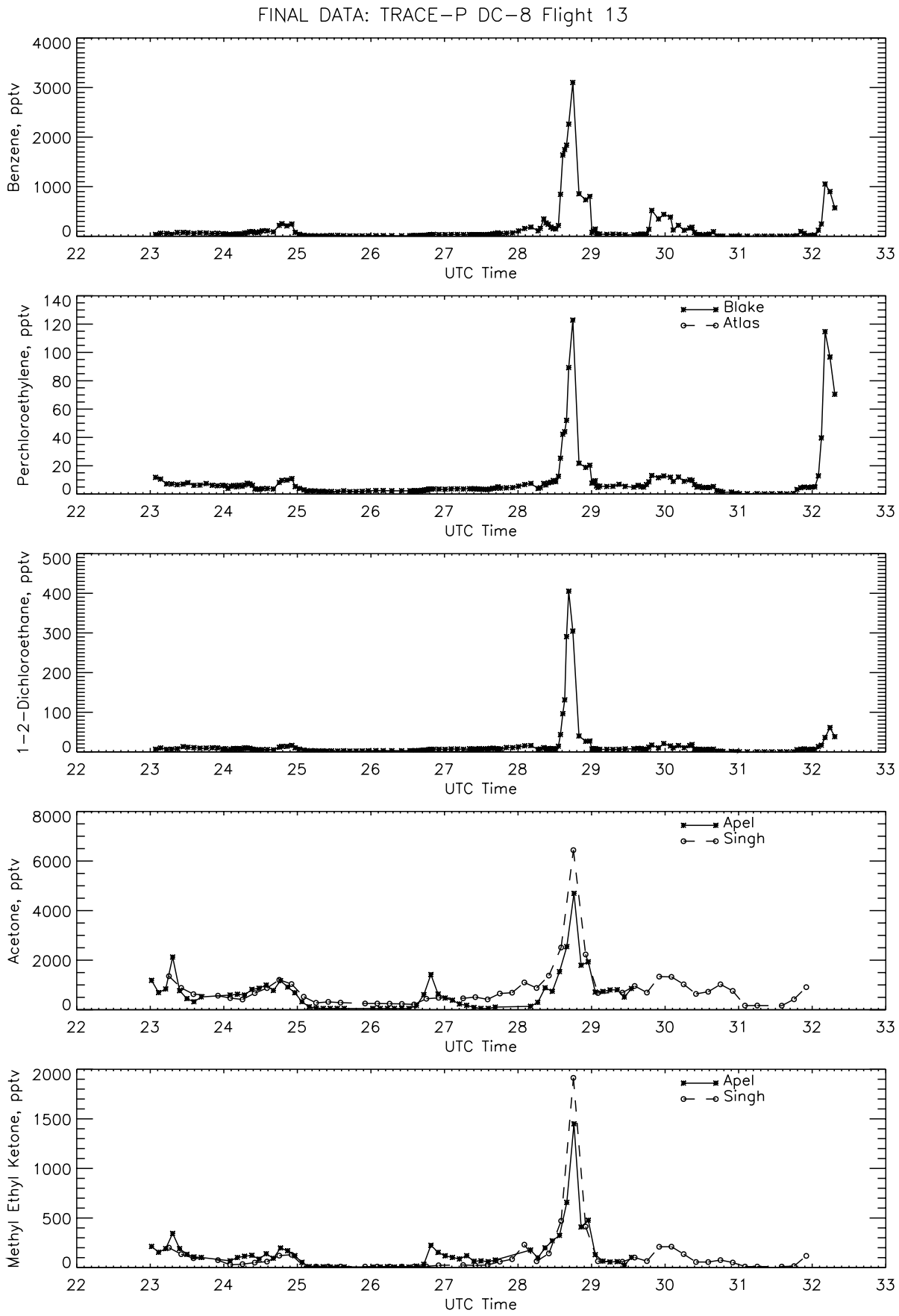



FINAL DATA: TRACE-P DC-8 Flight 13
NO, pptv
UTC Time
NO2, pptv
clip: max=3070.00
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile

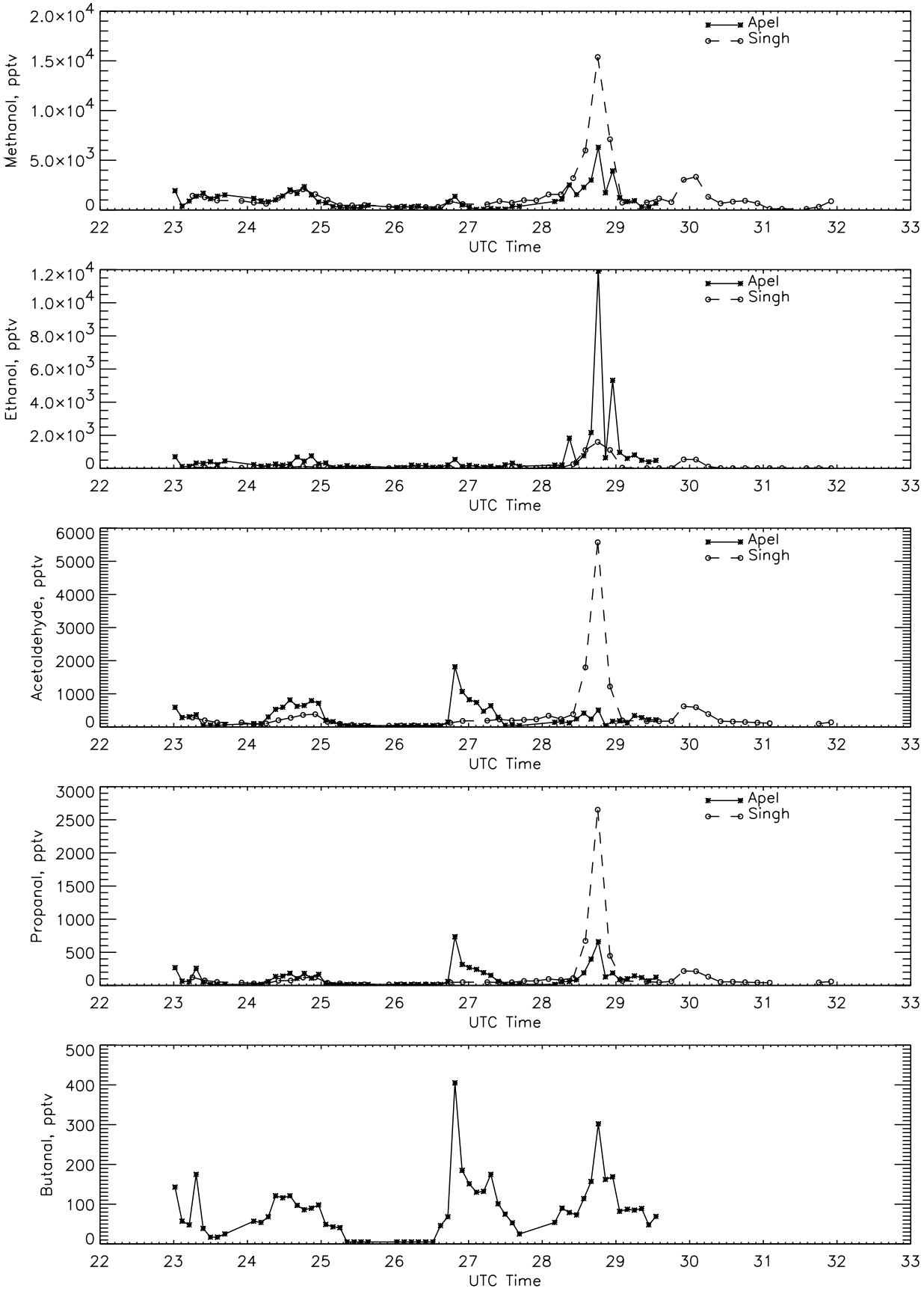

FINAL DATA: TRACE-P DC-8 Flight 13
clip: max=0.788000
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 13
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

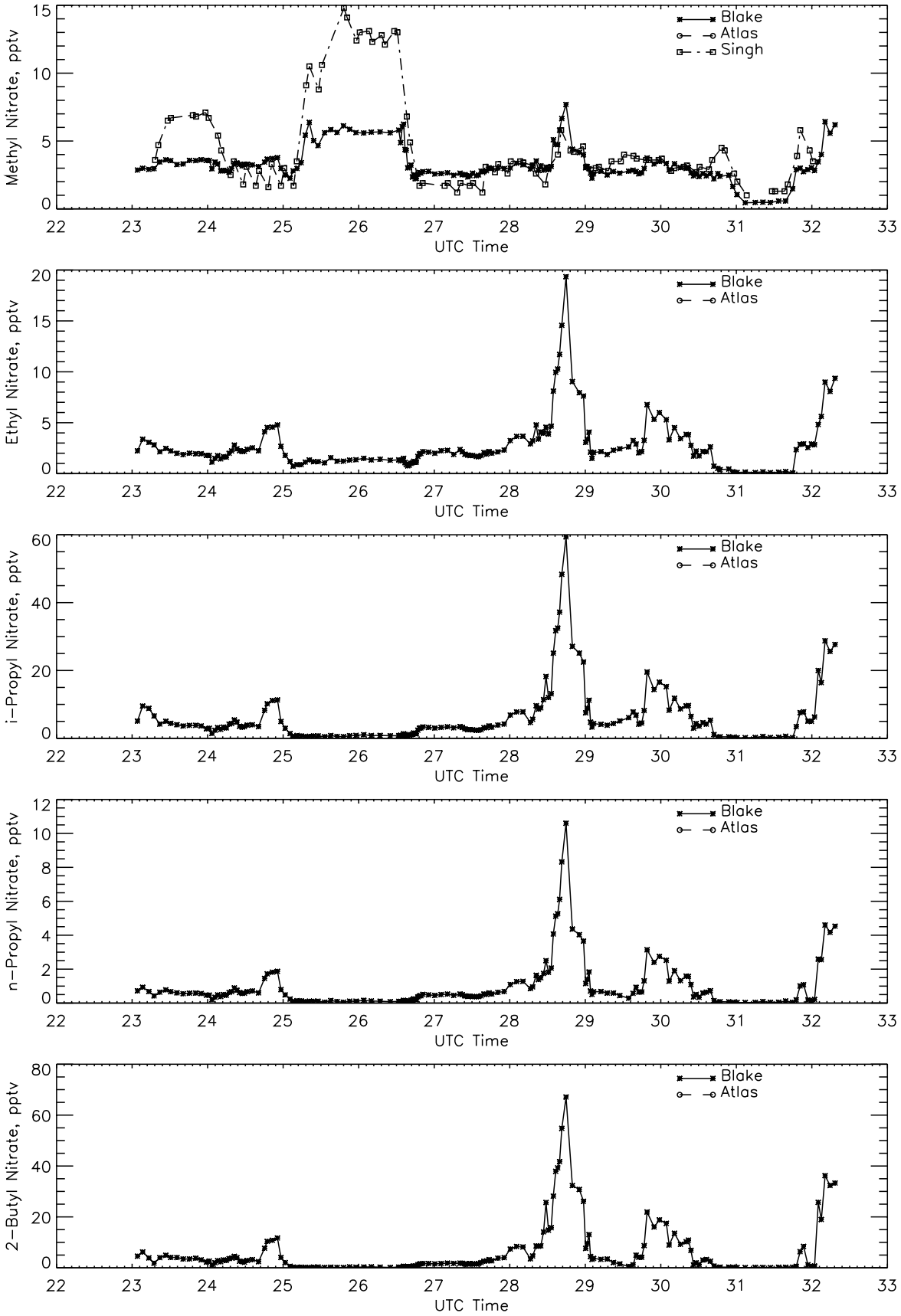

FINAL DATA: TRACE-P DC-8 Flight 13
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time

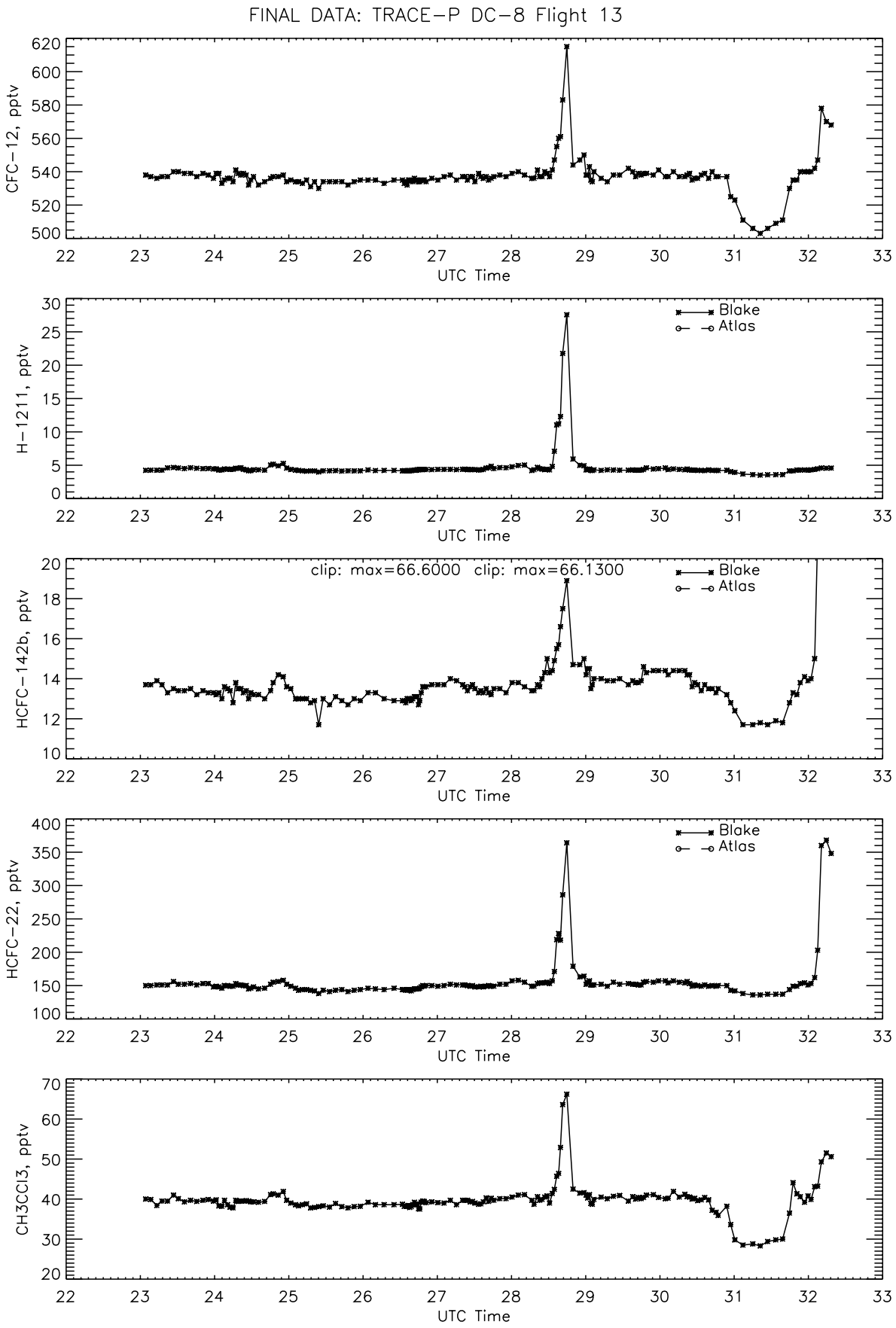

FINAL DATA: TRACE-P DC-8 Flight 13
Benzene, pptv
Perchloroethylene, pptv
Blake
Atlas
1-2-Dichloroethane, pptv
Acetone, pptv
Apel
Singh
Methyl Ethyl Ketone, pptv
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 13

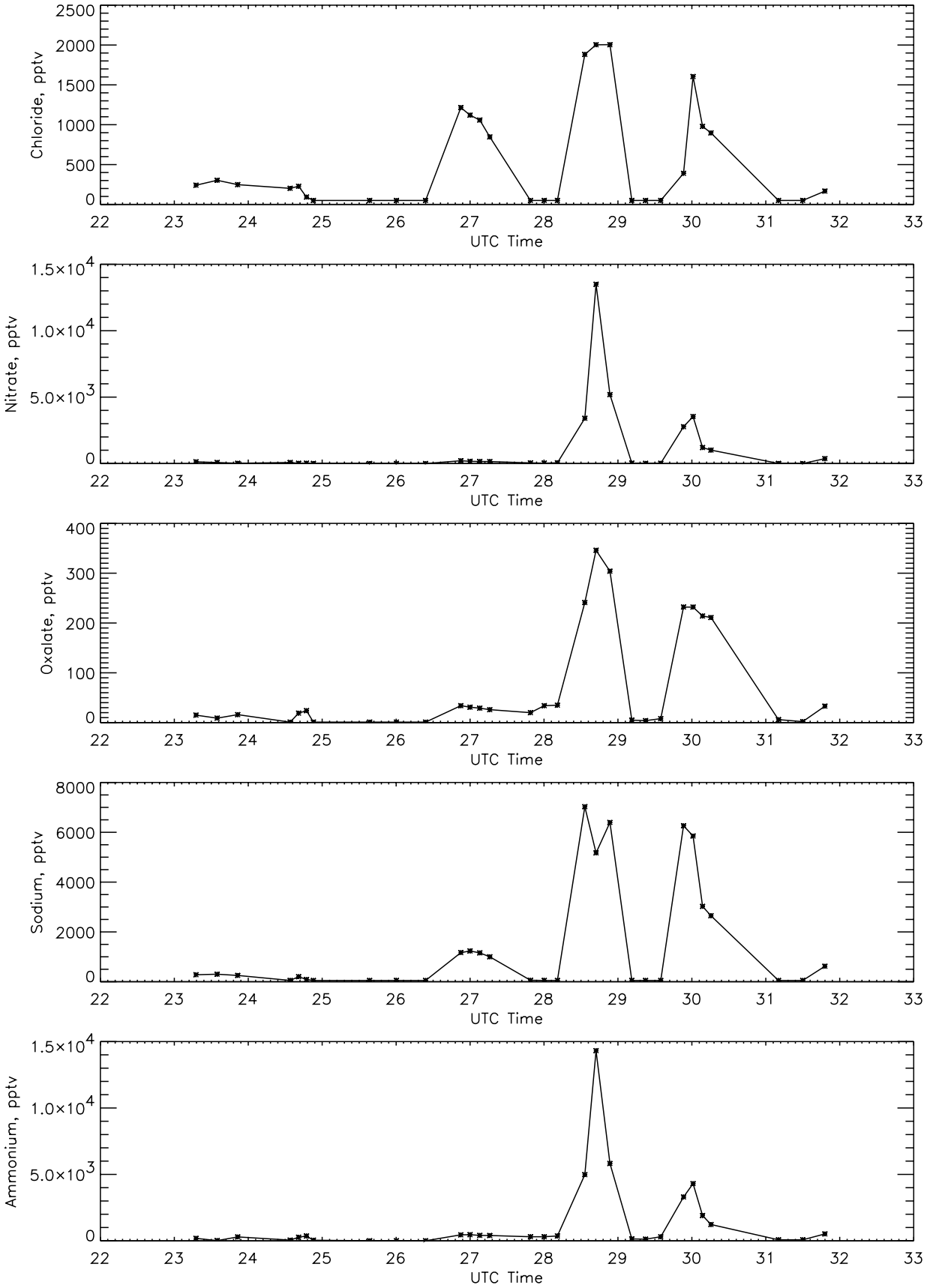


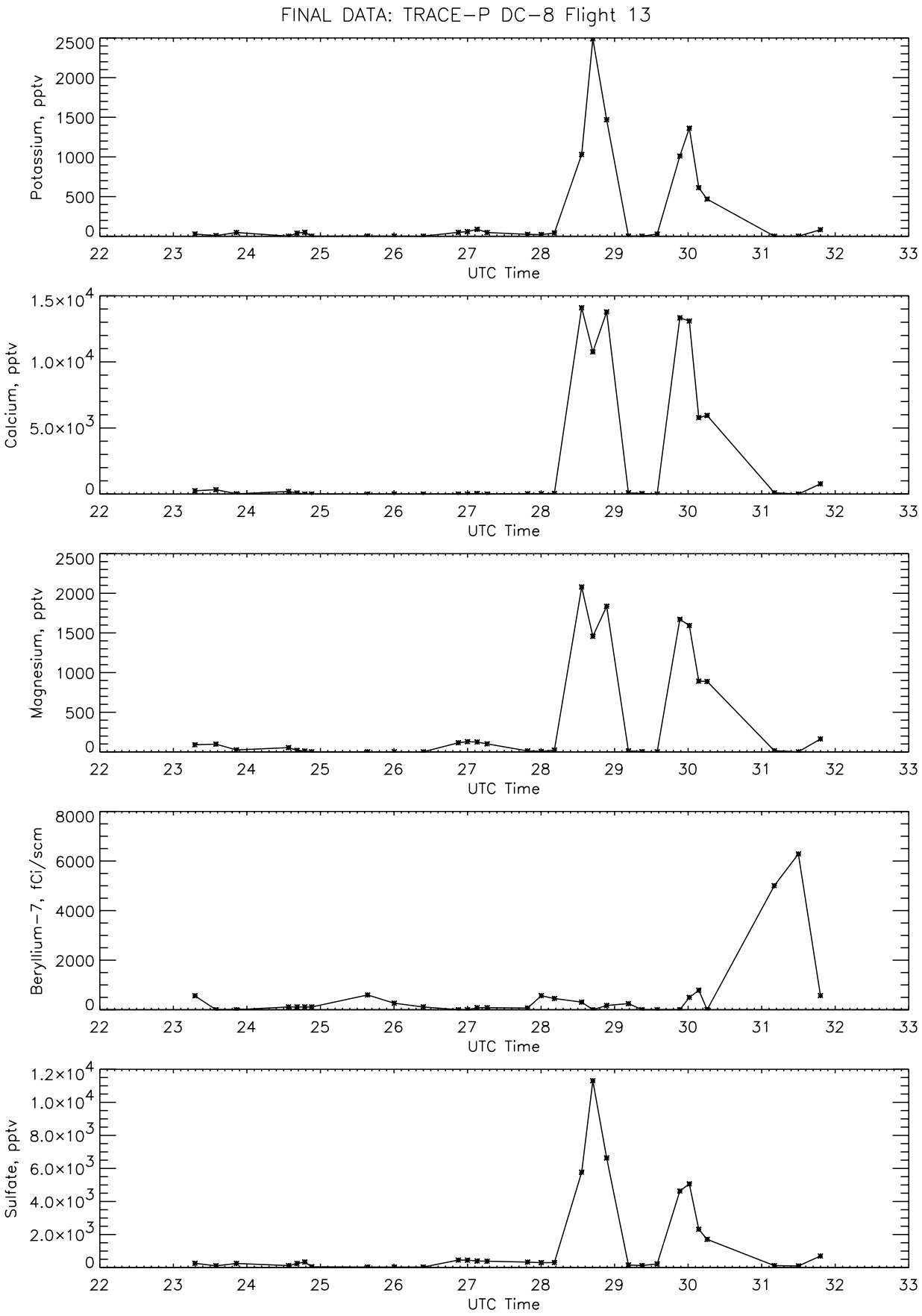
FINAL DATA: TRACE-P DC-8 Flight 13

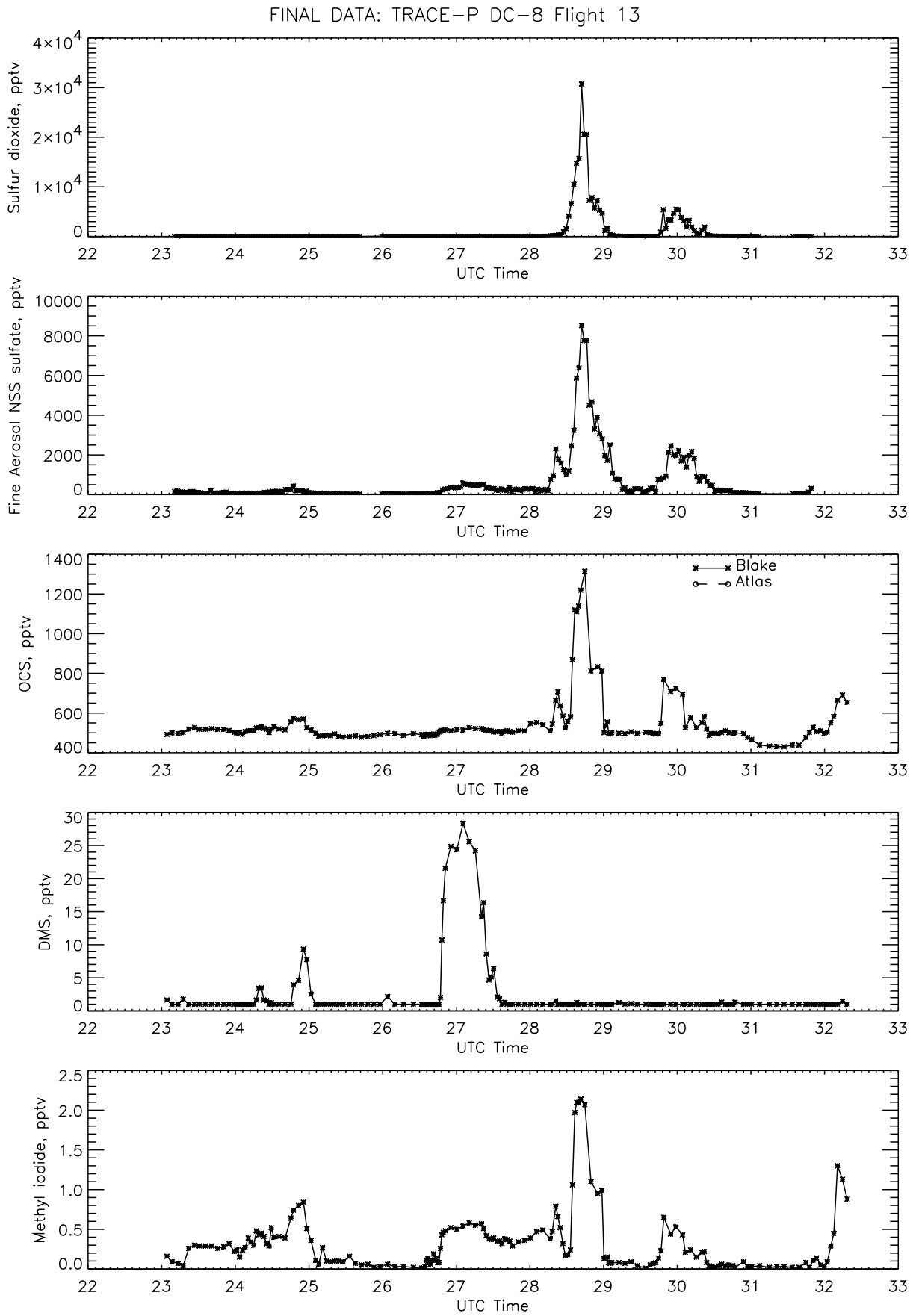


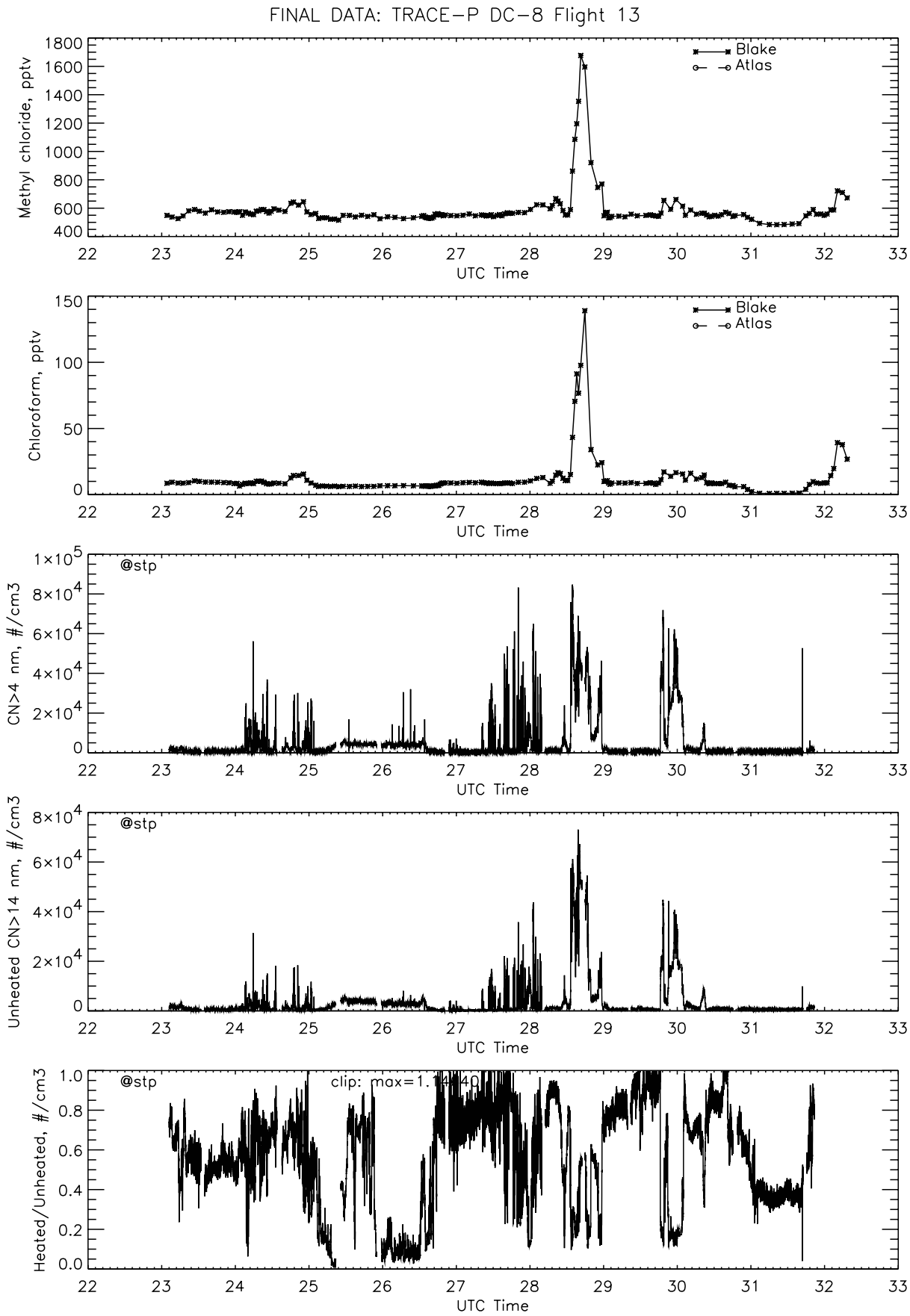

FINAL DATA: TRACE-P DC-8 Flight 13
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas
clip: max=66.6000 clip: max=66.1300

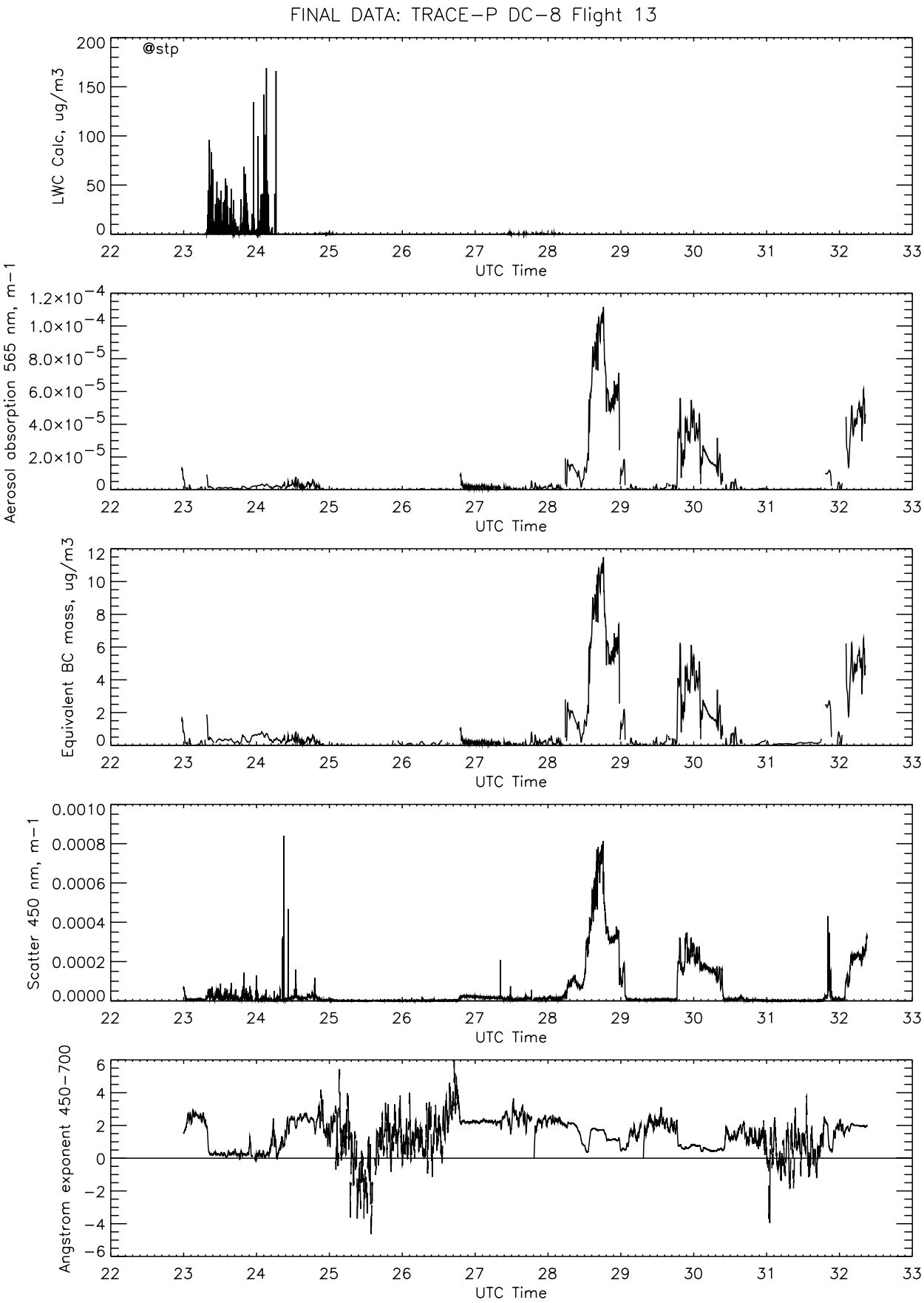
FINAL DATA: TRACE-P DC-8 Flight 13



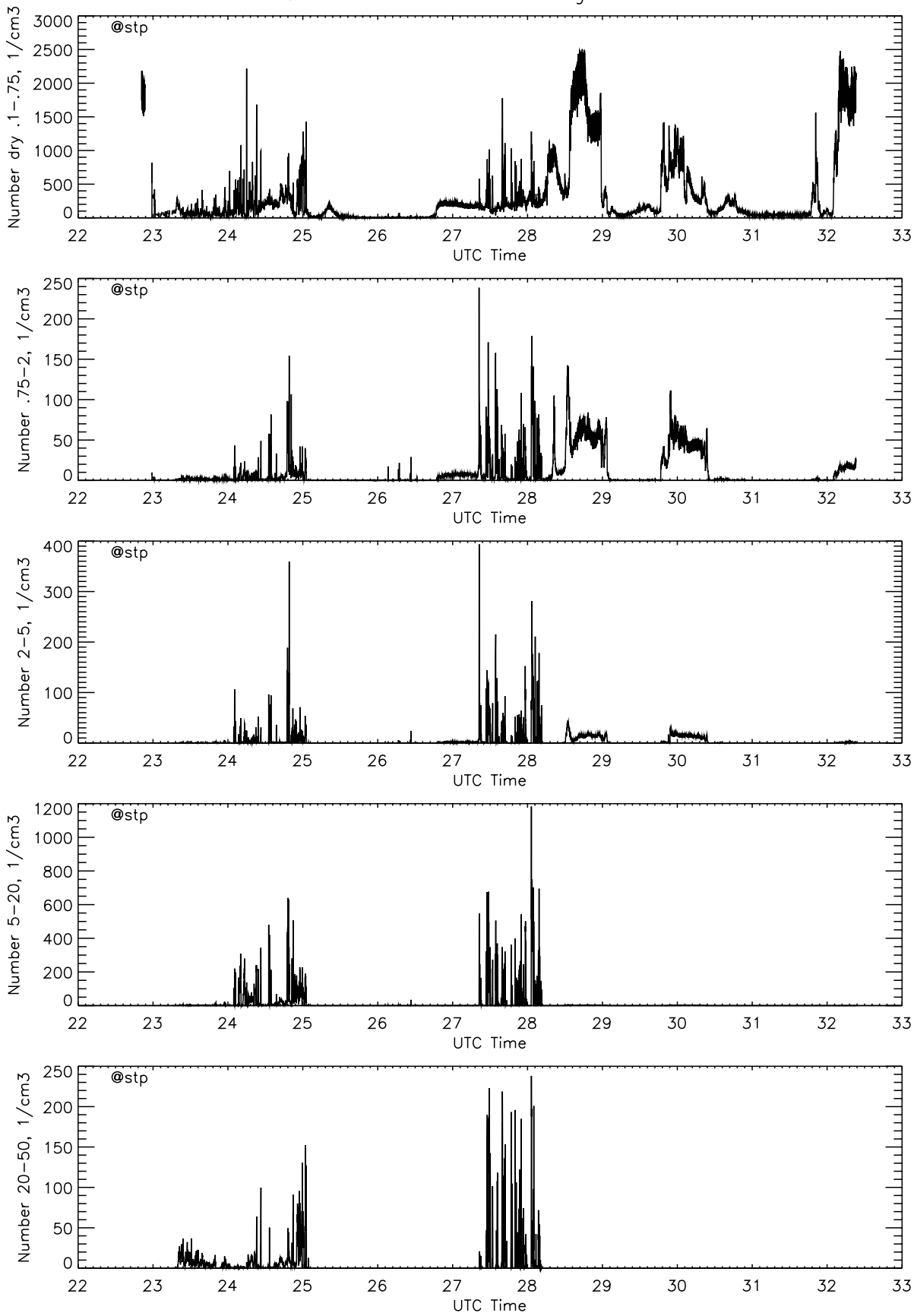

FINAL DATA: TRACE-P DC-8 Flight 13
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time

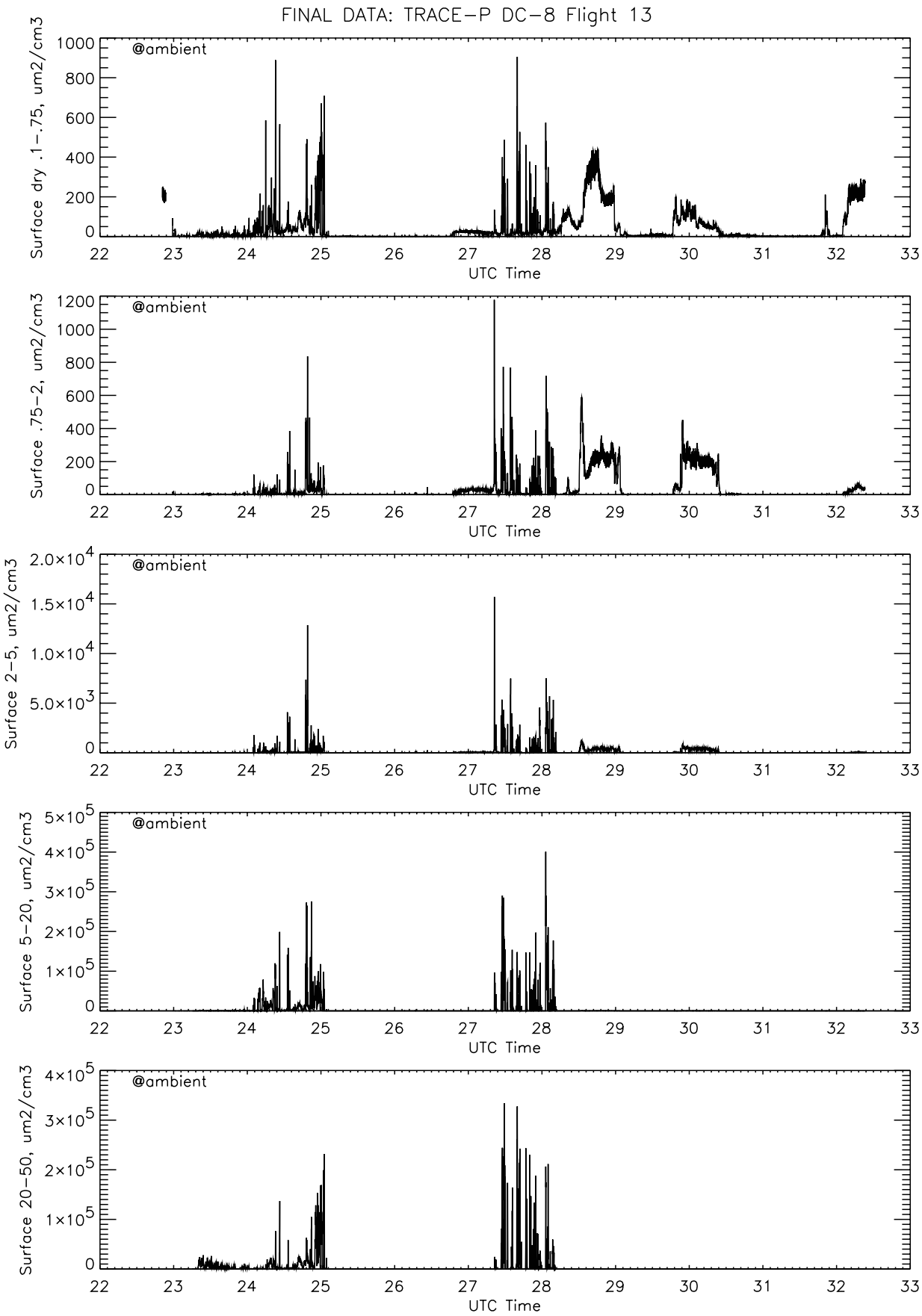

FINAL DATA: TRACE-P DC-8 Flight 13
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

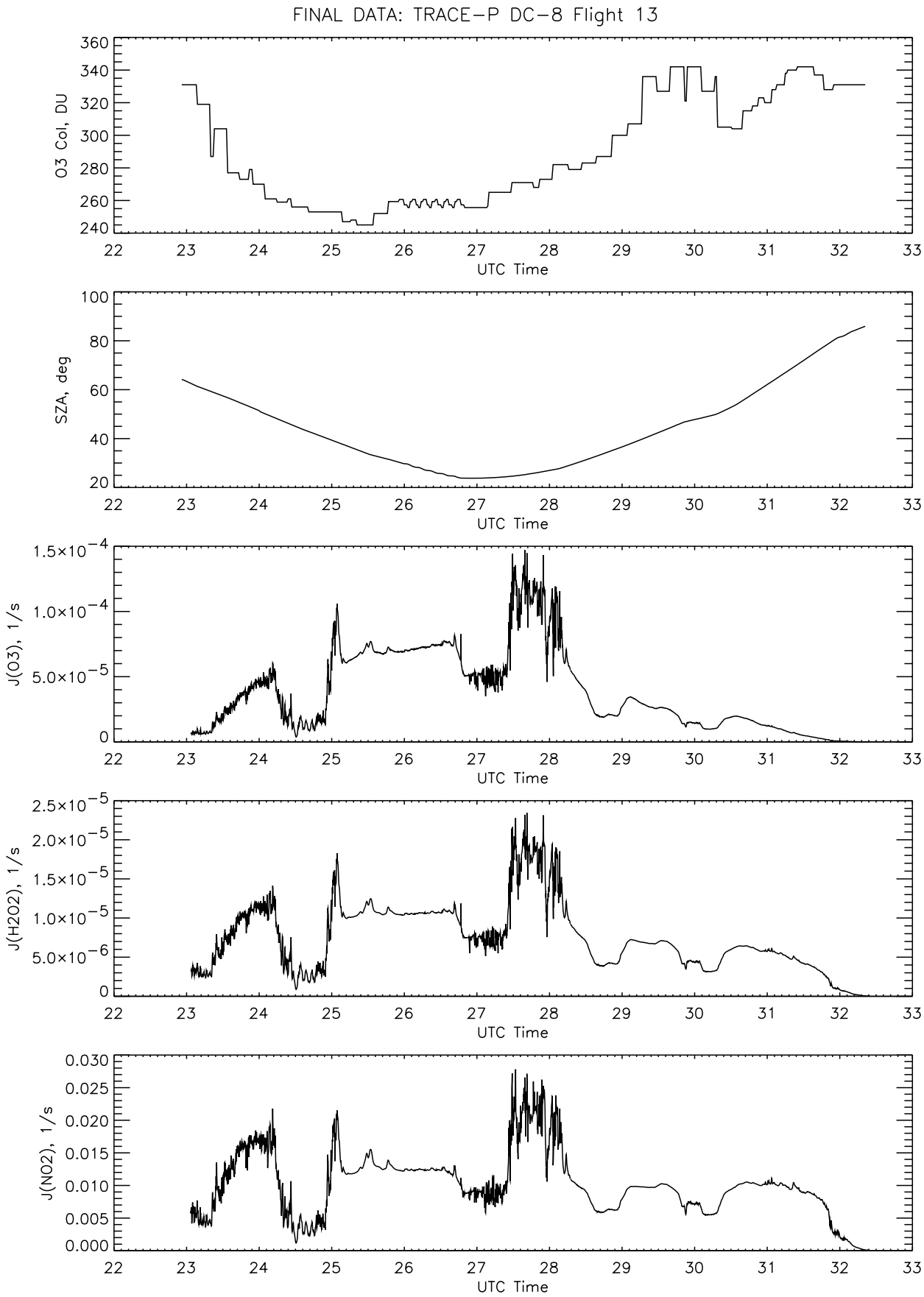

FINAL DATA: TRACE-P DC-8 Flight 13
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14E40
UTC Time

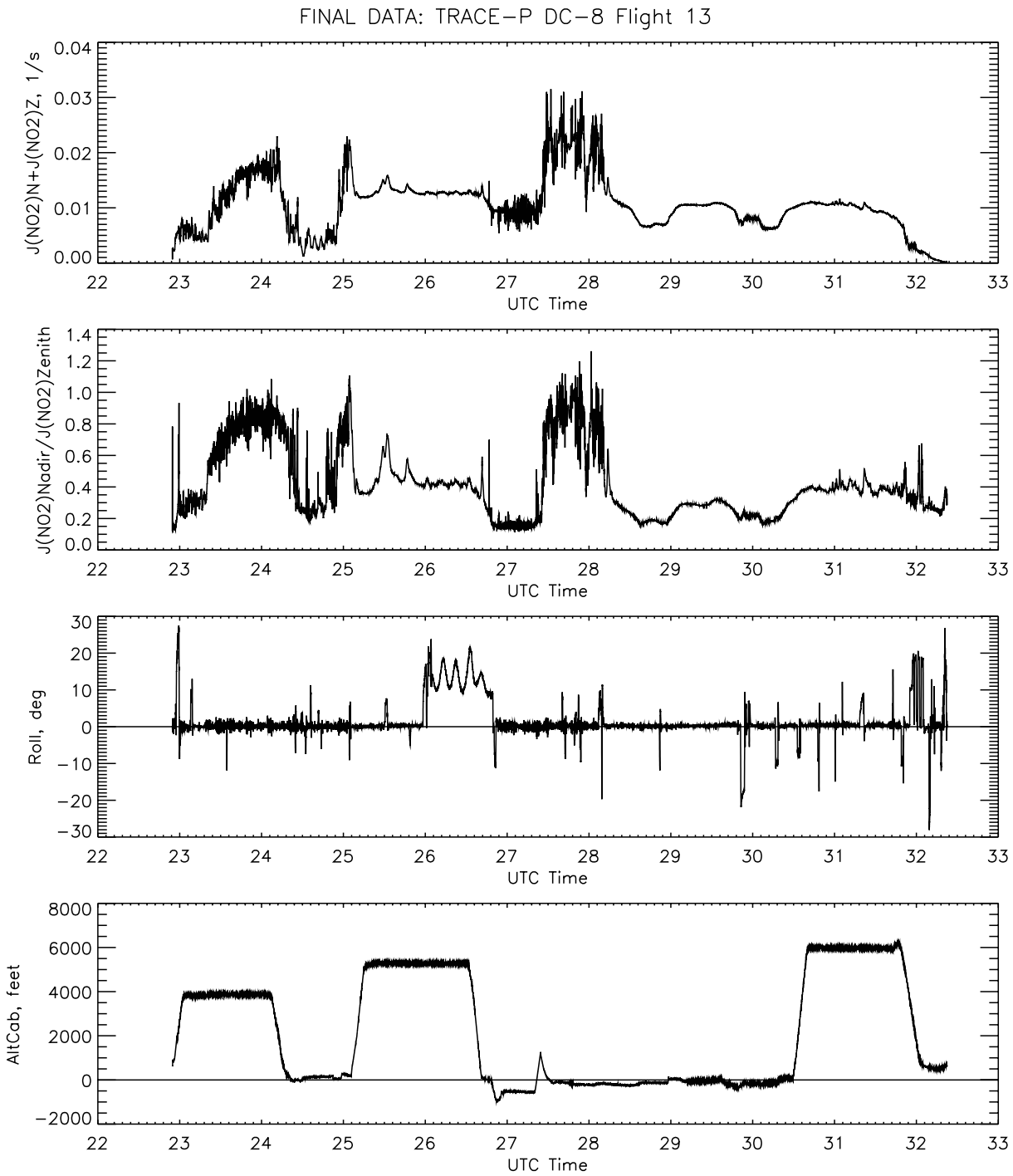

FINAL DATA: TRACE-P DC-8 Flight 13
@stp
LWC Calc, ug/m3
Aerosol absorption 565 nm, m-1
Equivalent BC mass, ug/m3
Scatter 450 nm, m-1
Angstrom exponent 450-700
UTC Time

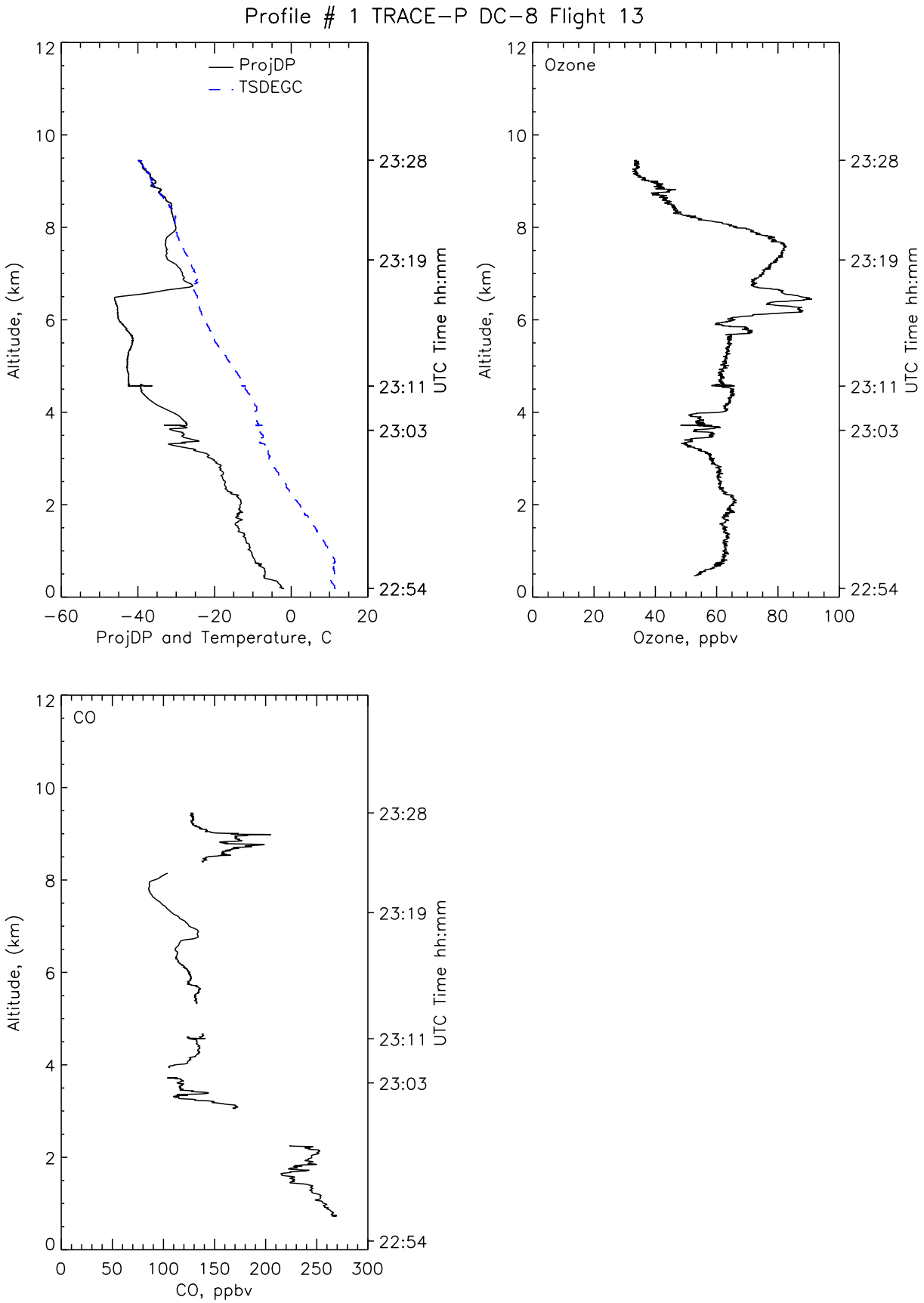
FINAL DATA: TRACE-P DC-8 Flight 13

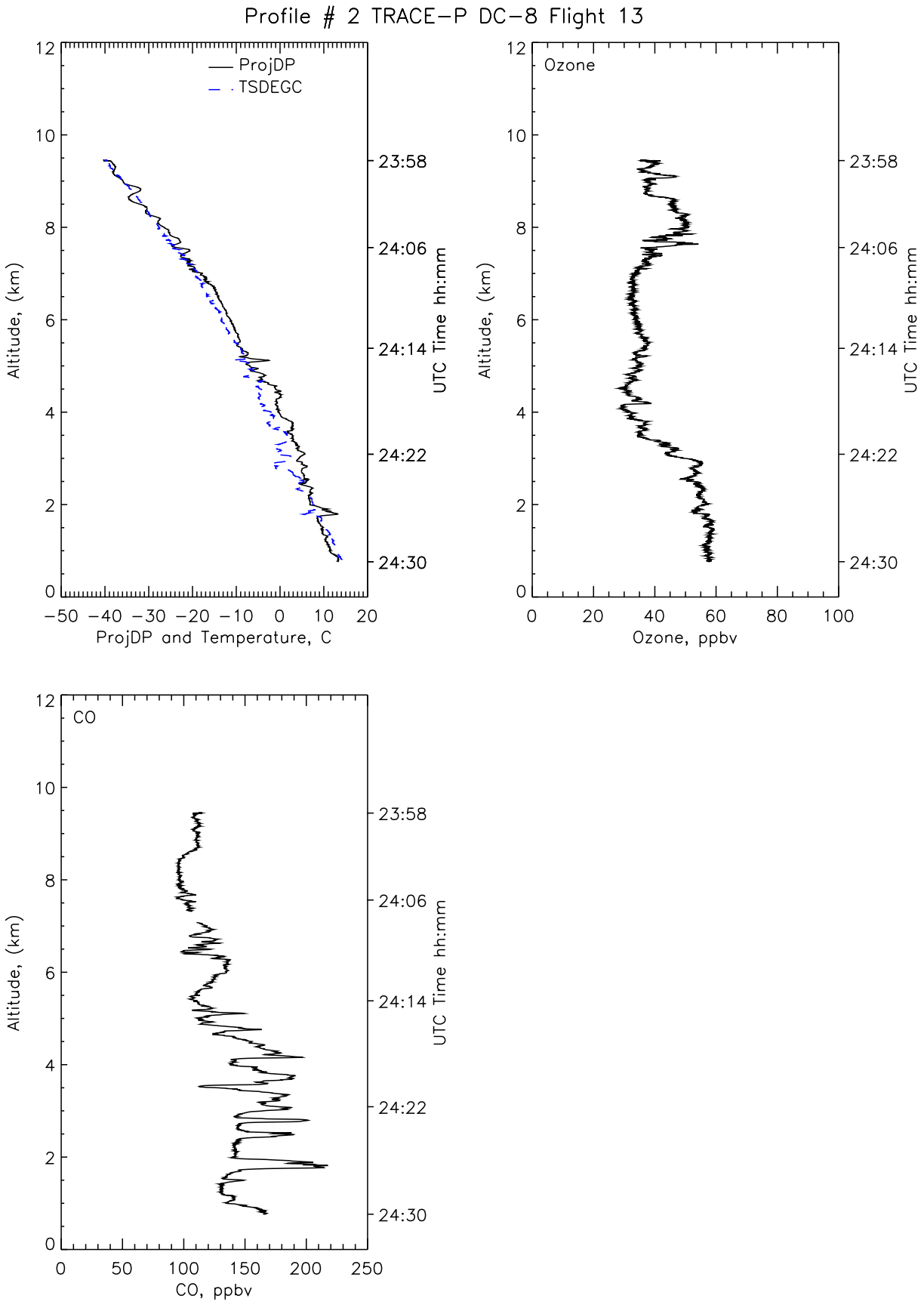


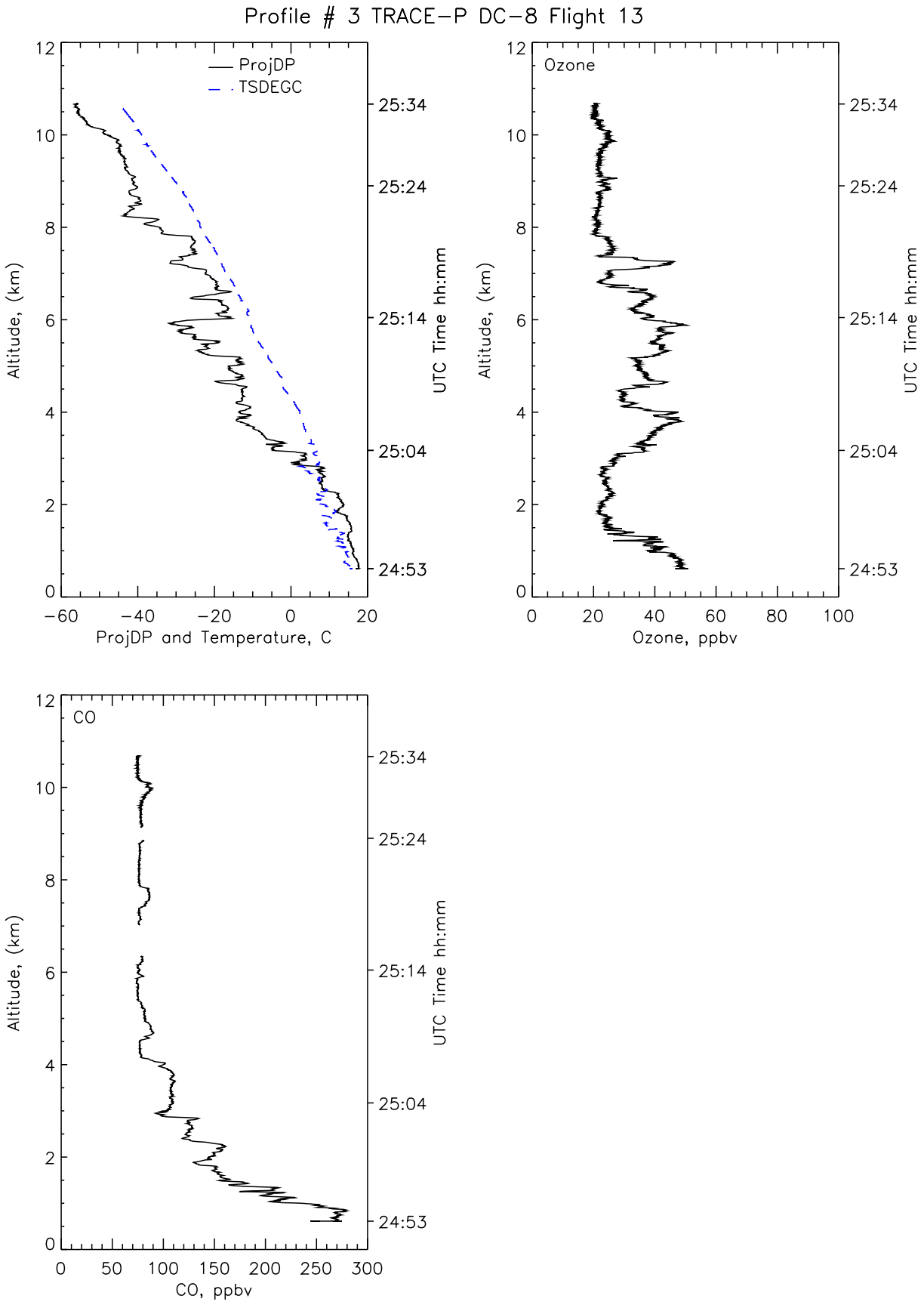

FINAL DATA: TRACE-P DC-8 Flight 13
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

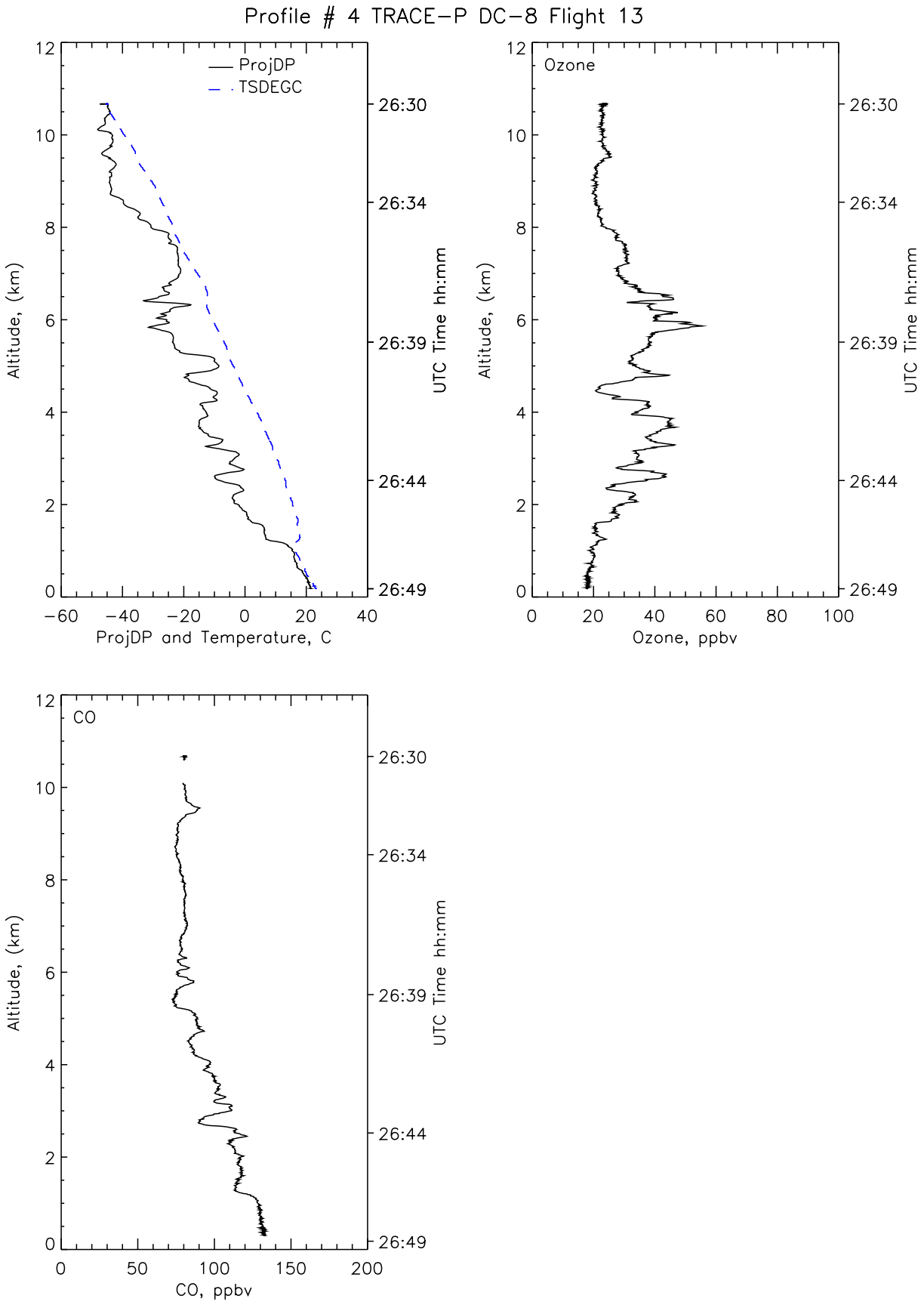

FINAL DATA: TRACE-P DC-8 Flight 13
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

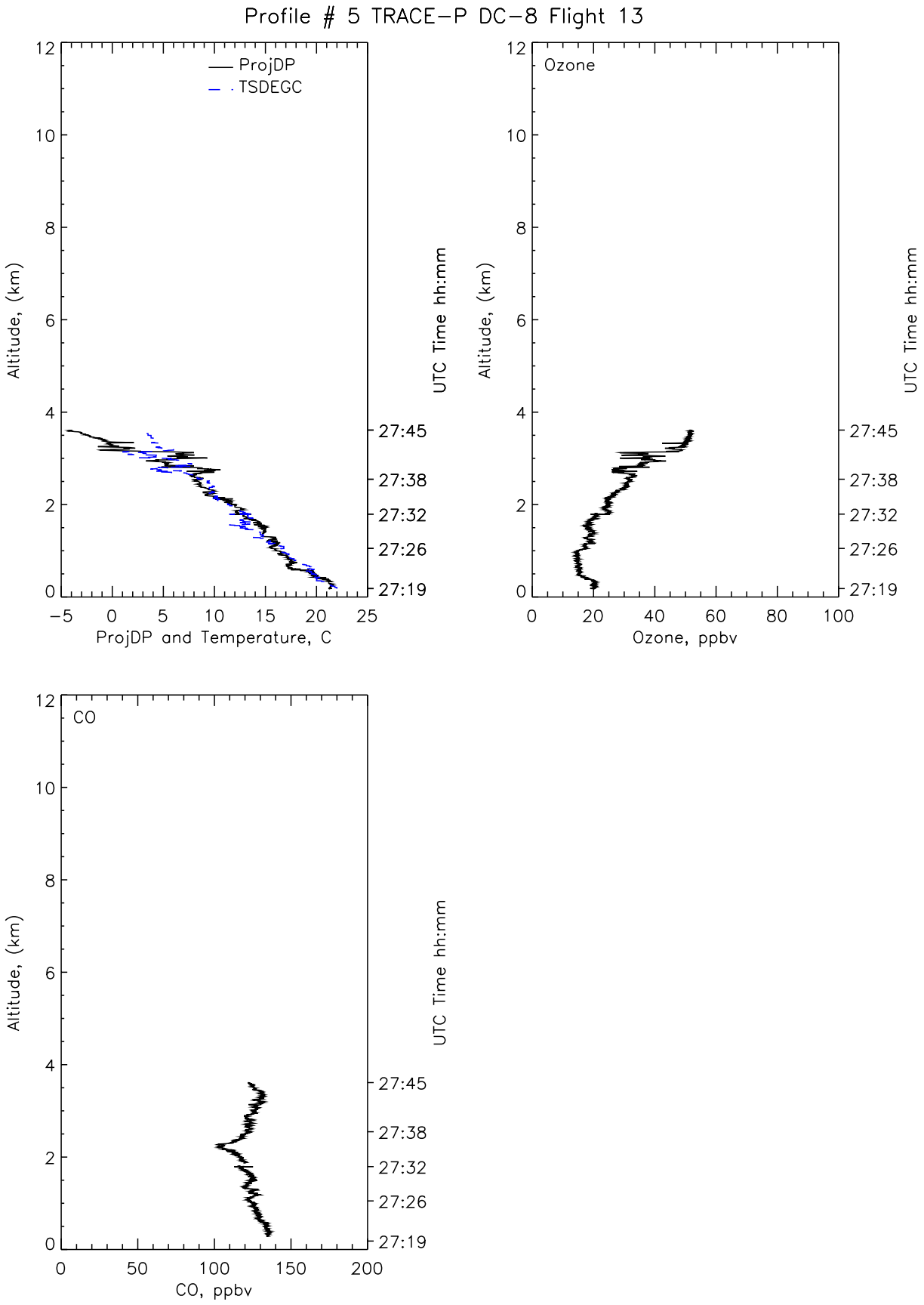

FINAL DATA: TRACE-P DC-8 Flight 13
J(NO2)N+J(NO2)Z, 1/s
0.04
0.03
0.02
0.01
0.00
22 23 24 25 26 27 28 29 30 31 32 33
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
22 23 24 25 26 27 28 29 30 31 32 33
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
22 23 24 25 26 27 28 29 30 31 32 33
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
22 23 24 25 26 27 28 29 30 31 32 33
UTC Time

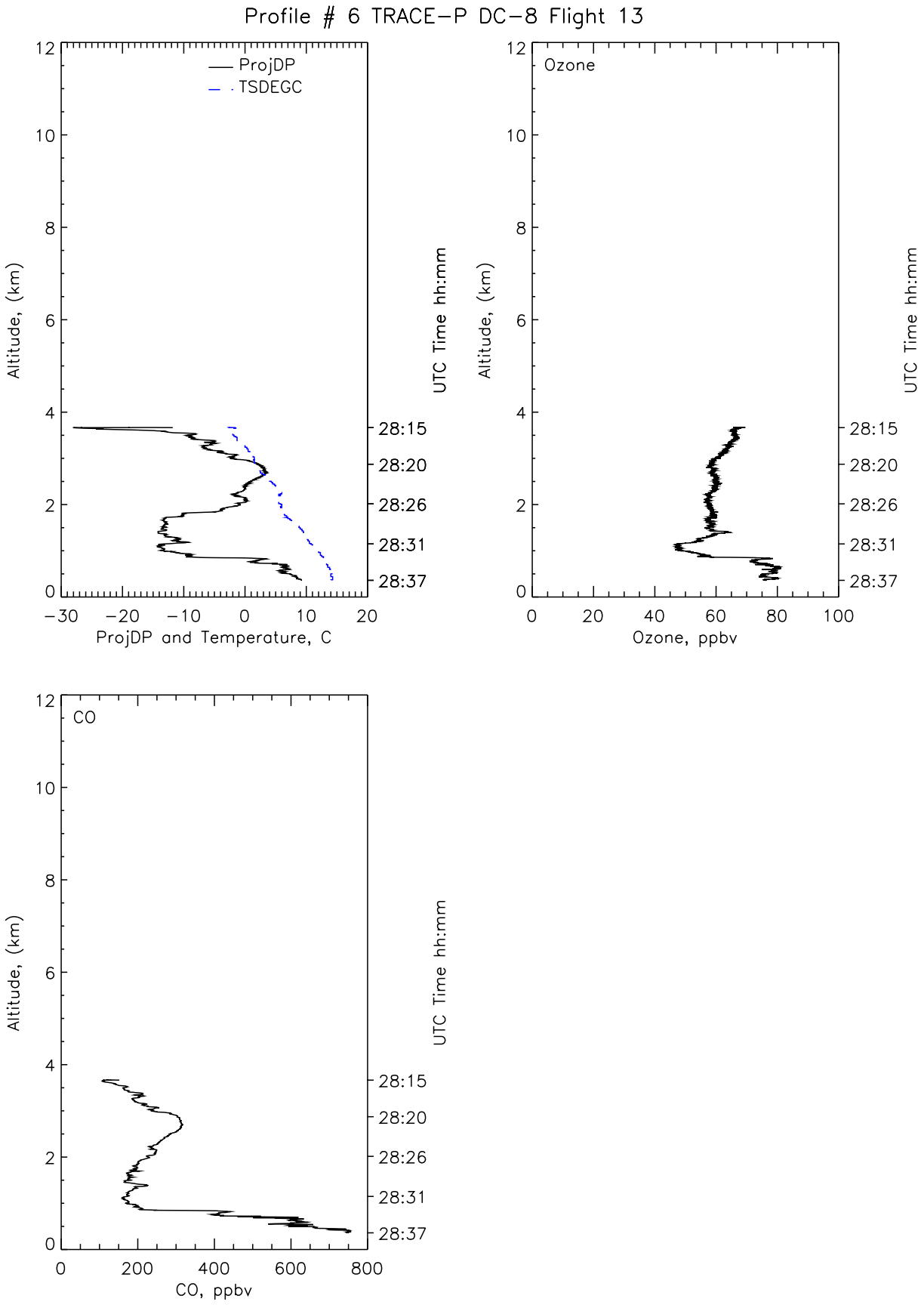

Profile # 1 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
23:28
23:19
23:11
23:03
22:54
Ozone
Ozone, ppbv
CO
CO, ppbv

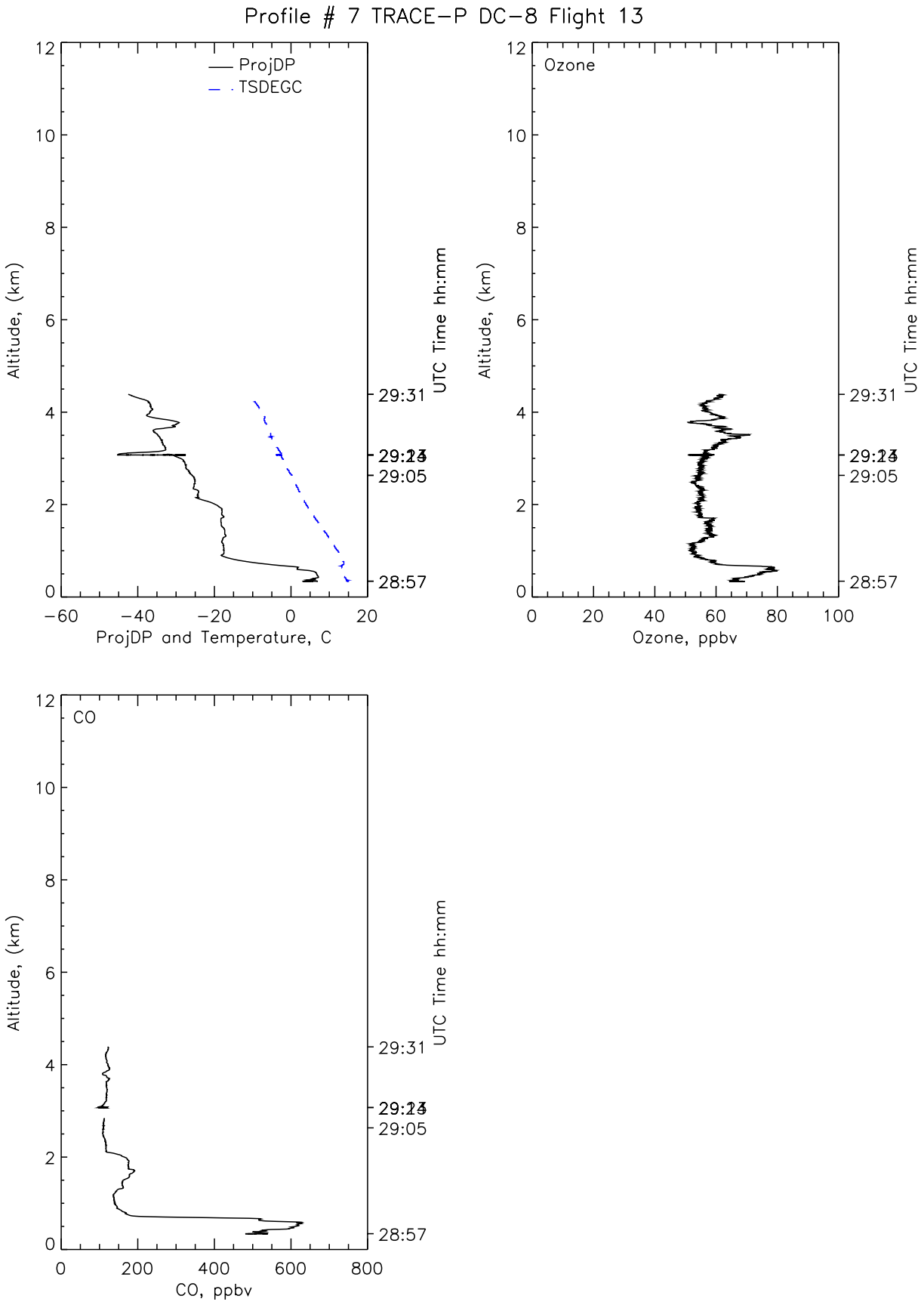

Profile # 2 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
23:58
24:06
24:14
24:22
24:30
Ozone
Ozone, ppbv
CO
CO, ppbv

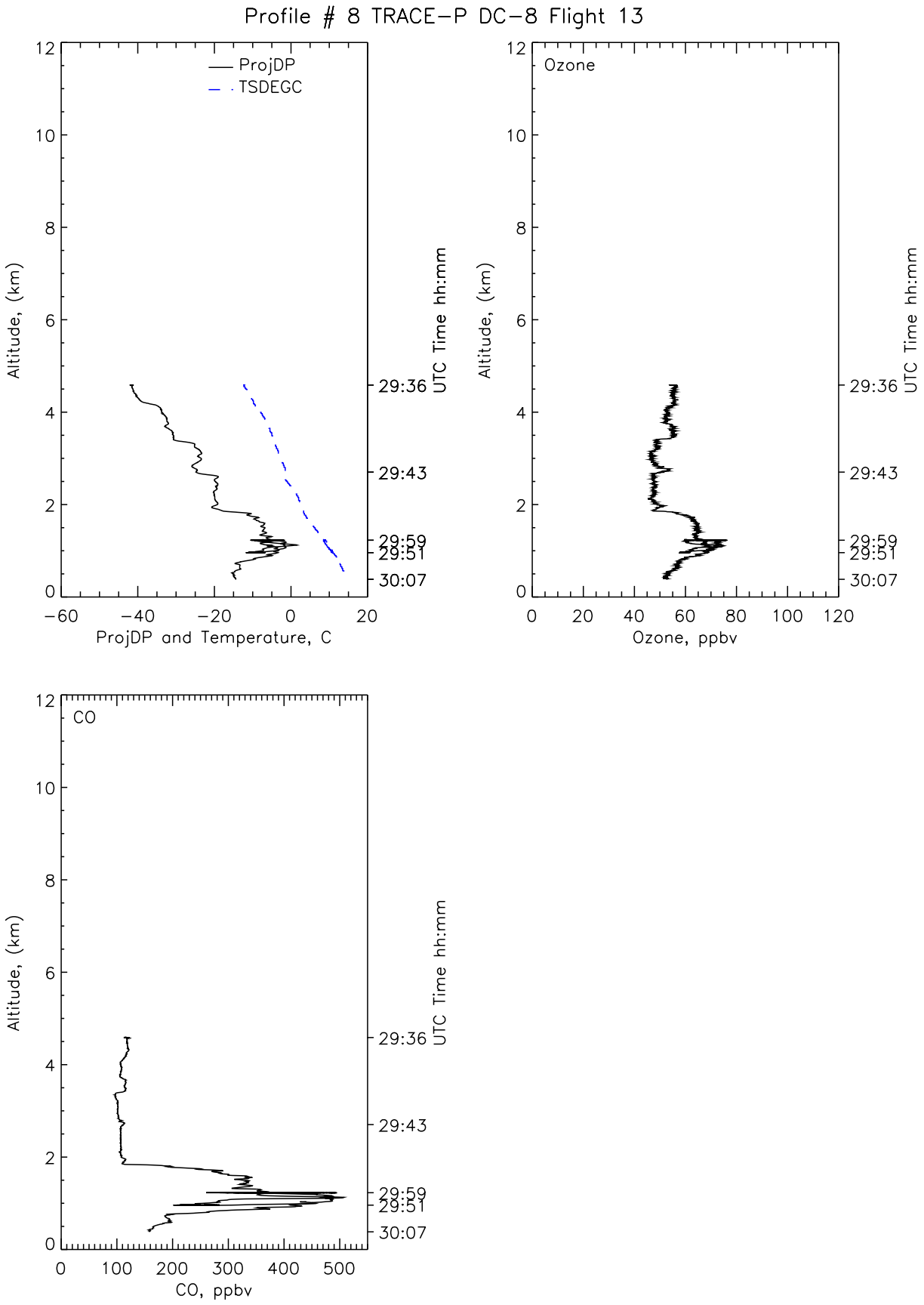

Profile # 3 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
Ozone
Ozone, ppbv
CO
CO, ppbv

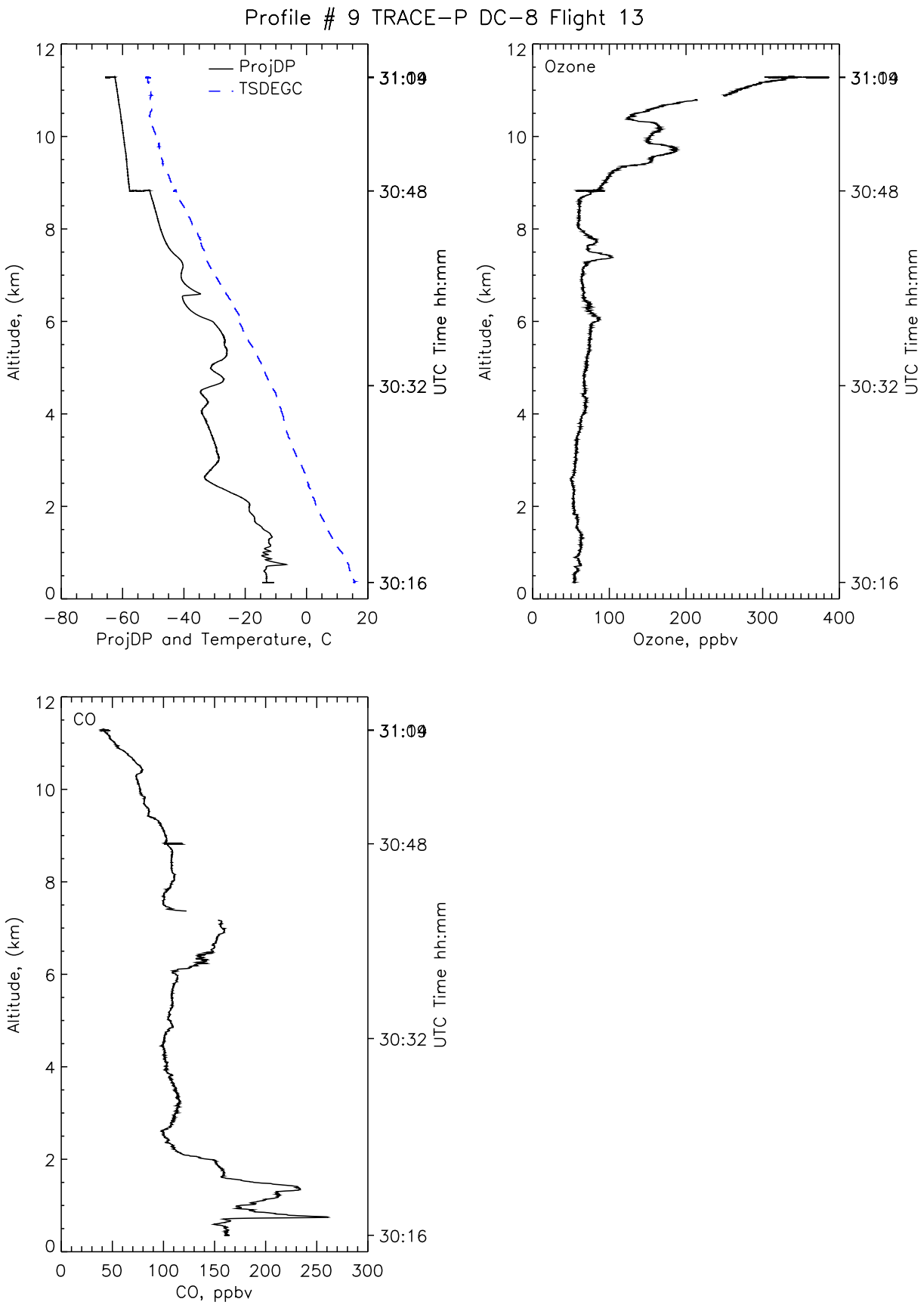

Profile # 4 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

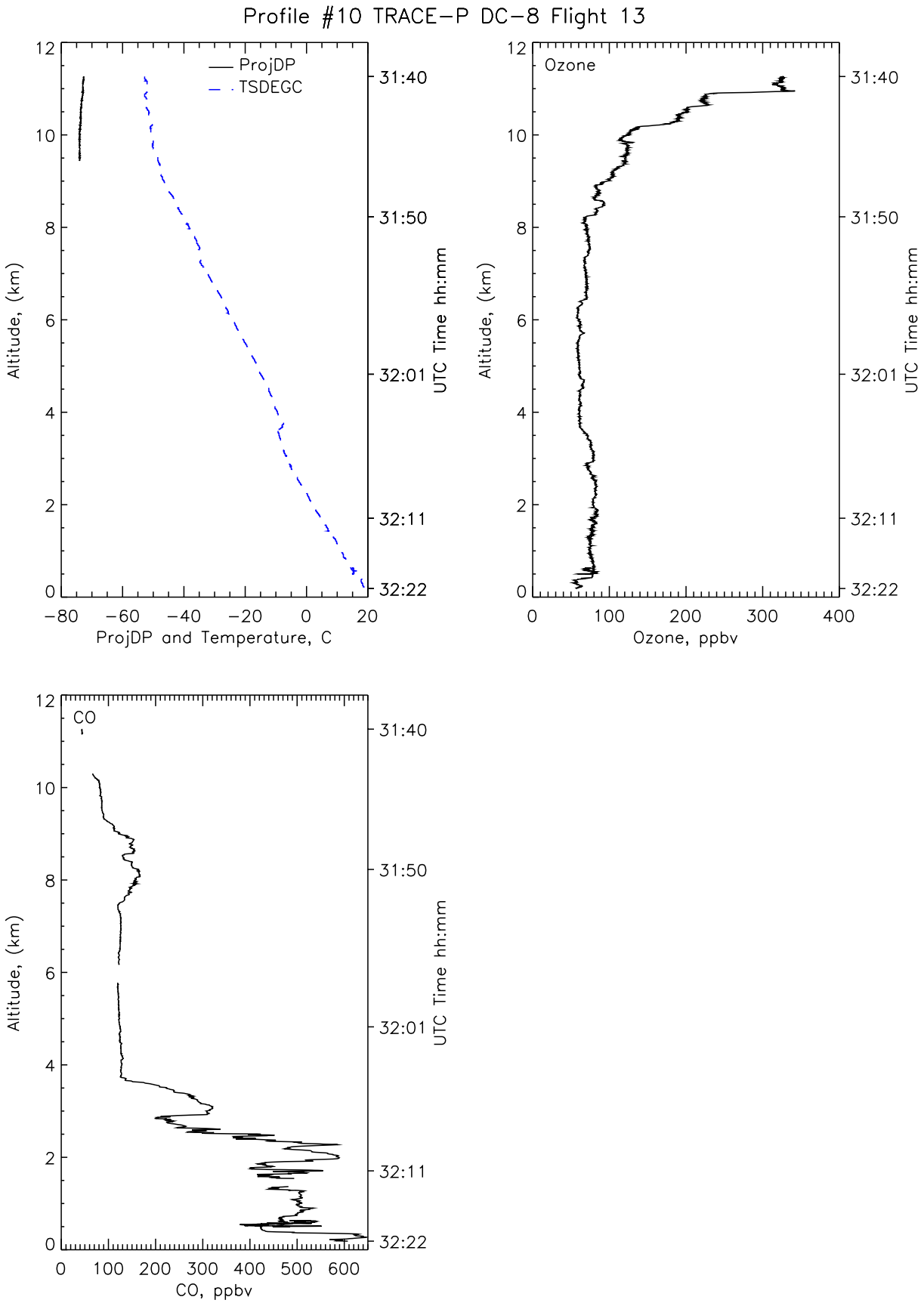

Profile # 5 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
27:45
27:38
27:32
27:26
27:19
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 6 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
28:15
28:20
28:26
28:31
28:37
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 7 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
29:31
29:23
29:05
28:57
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 8 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
29:36
29:43
29:59
29:51
30:07
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 9 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
31:04
30:48
30:32
30:16
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #10 TRACE-P DC-8 Flight 13
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

TRACE-P

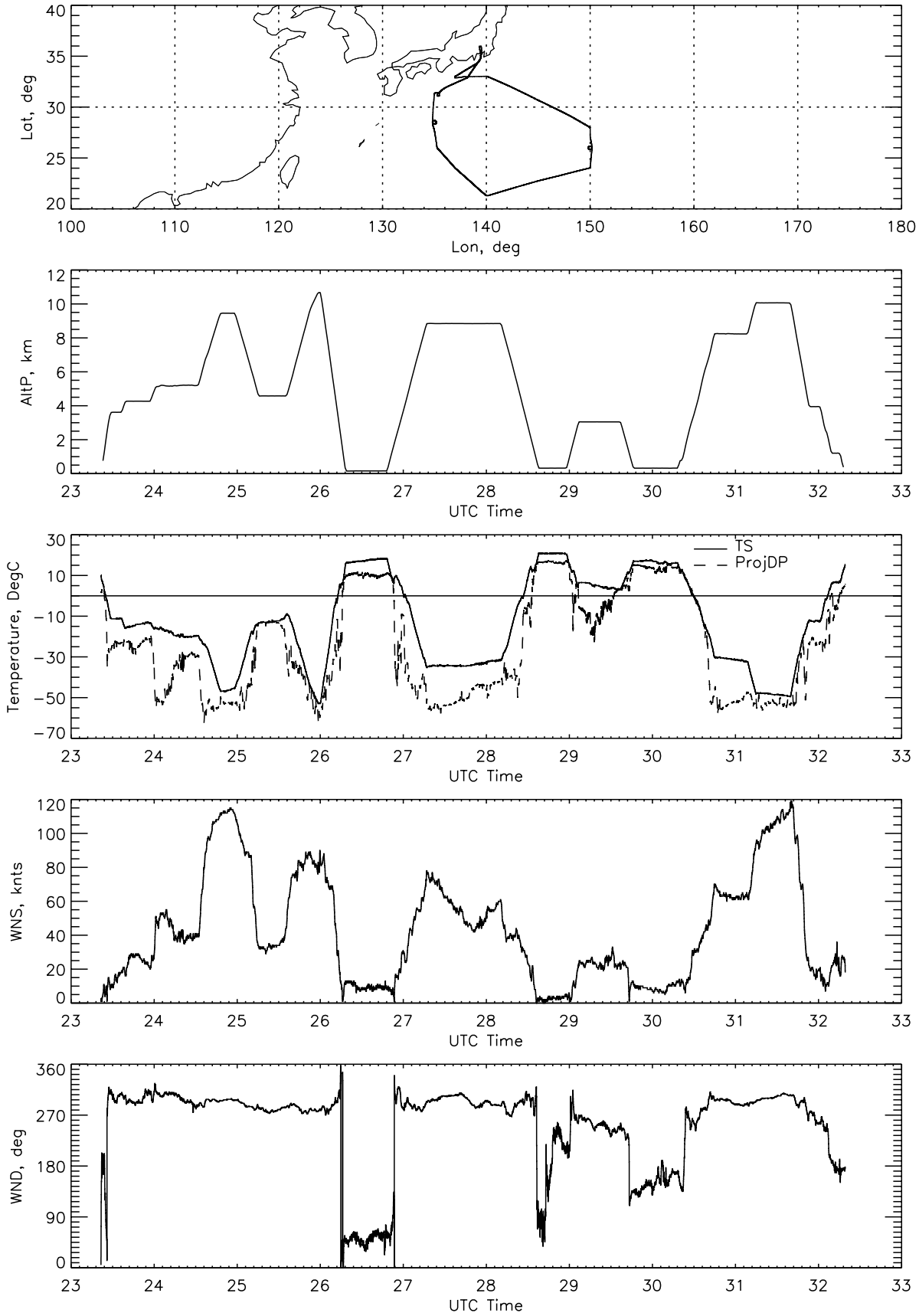
Flight 14D

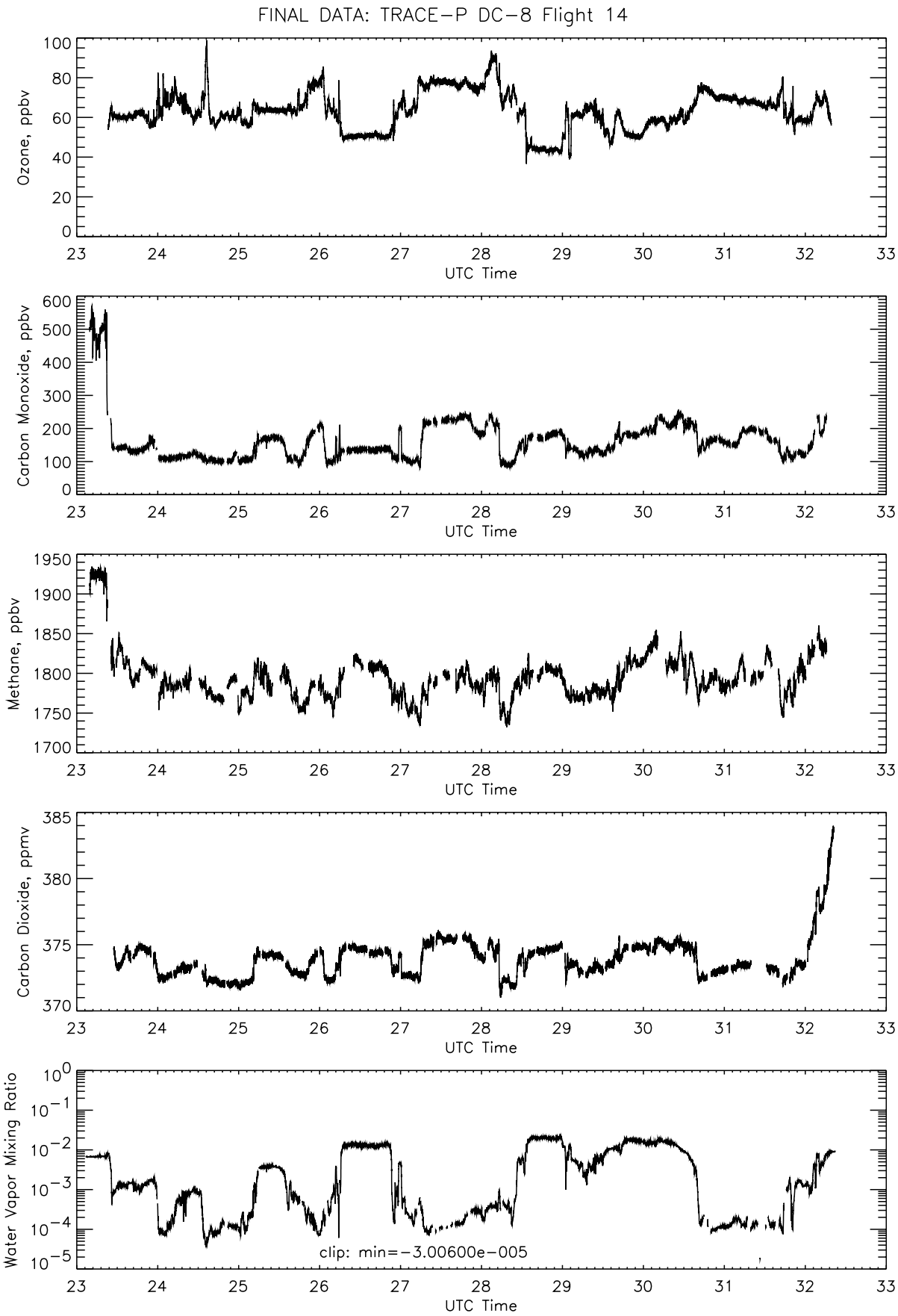
Local: Yokota No. 2

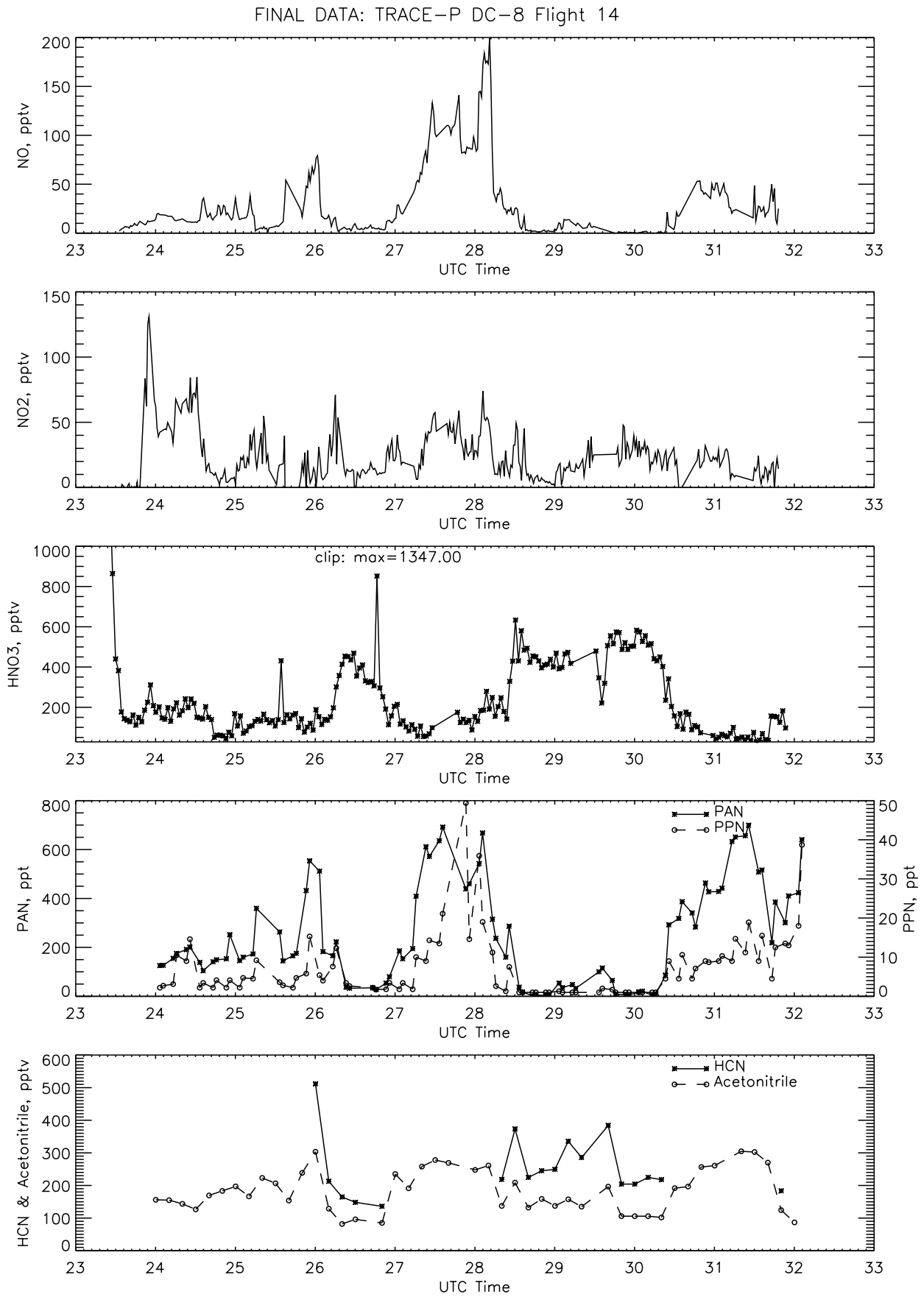
Convective Outflow

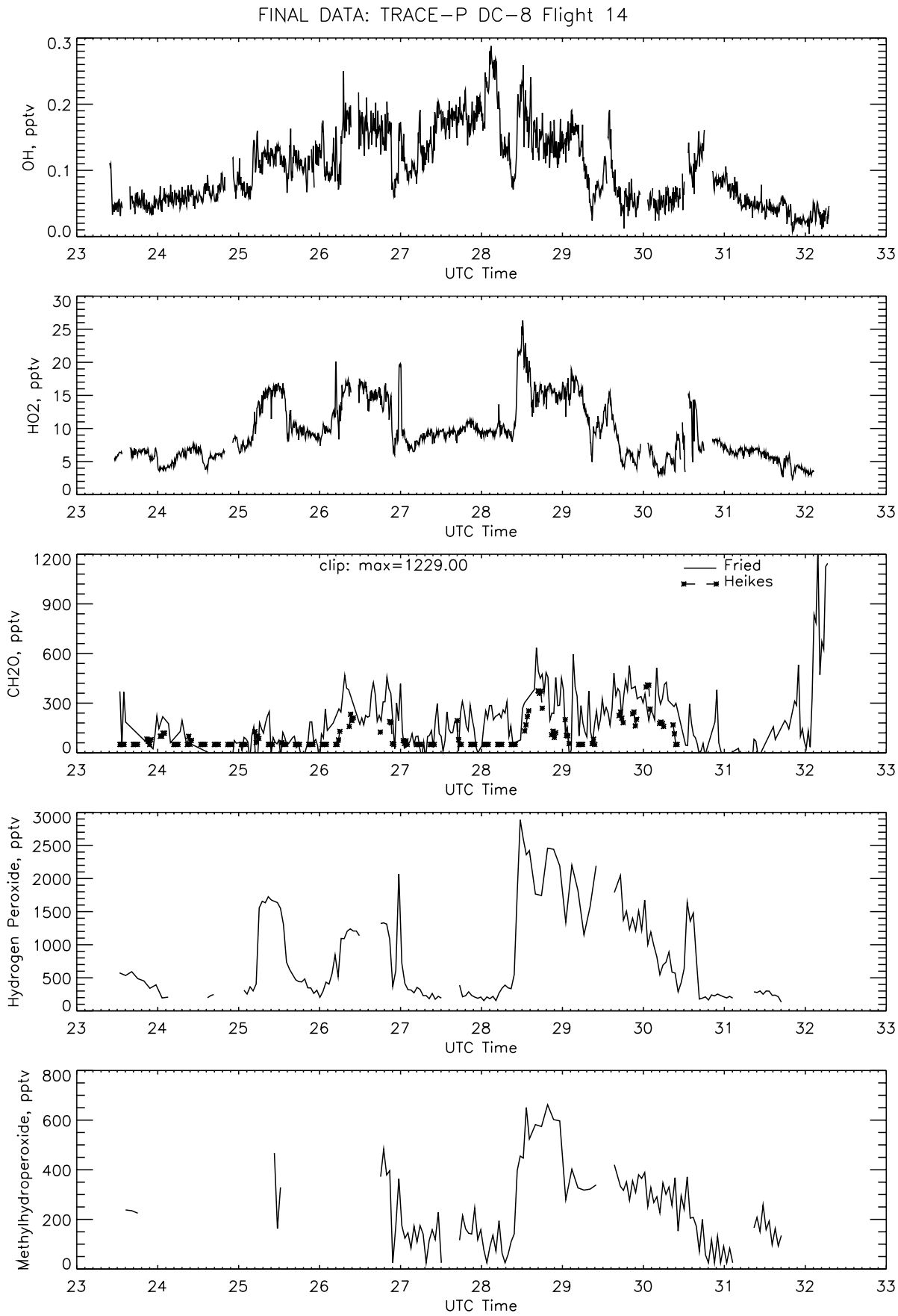
March 23, 2001

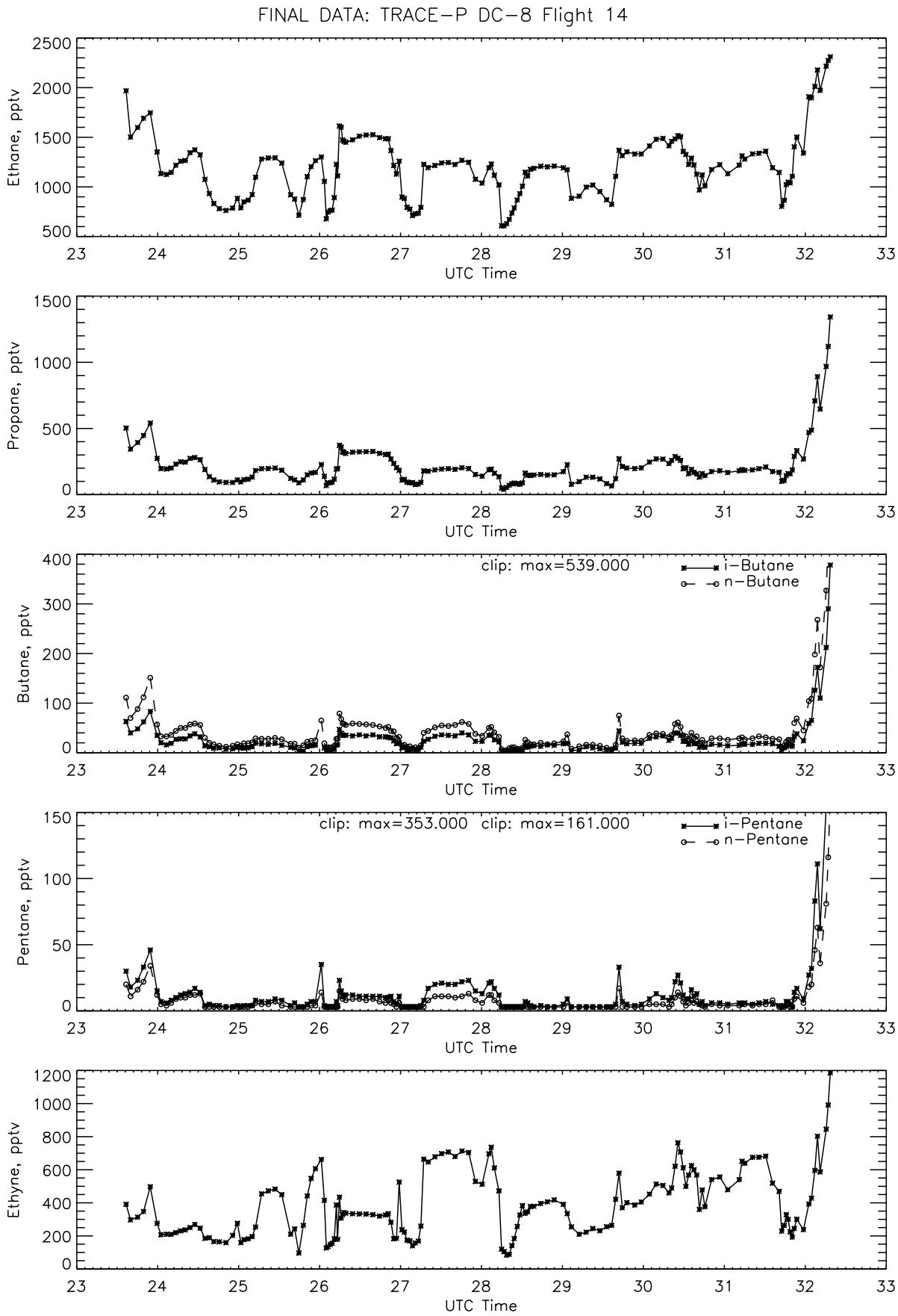
FINAL DATA: TRACE-P DC-8 Flight 14

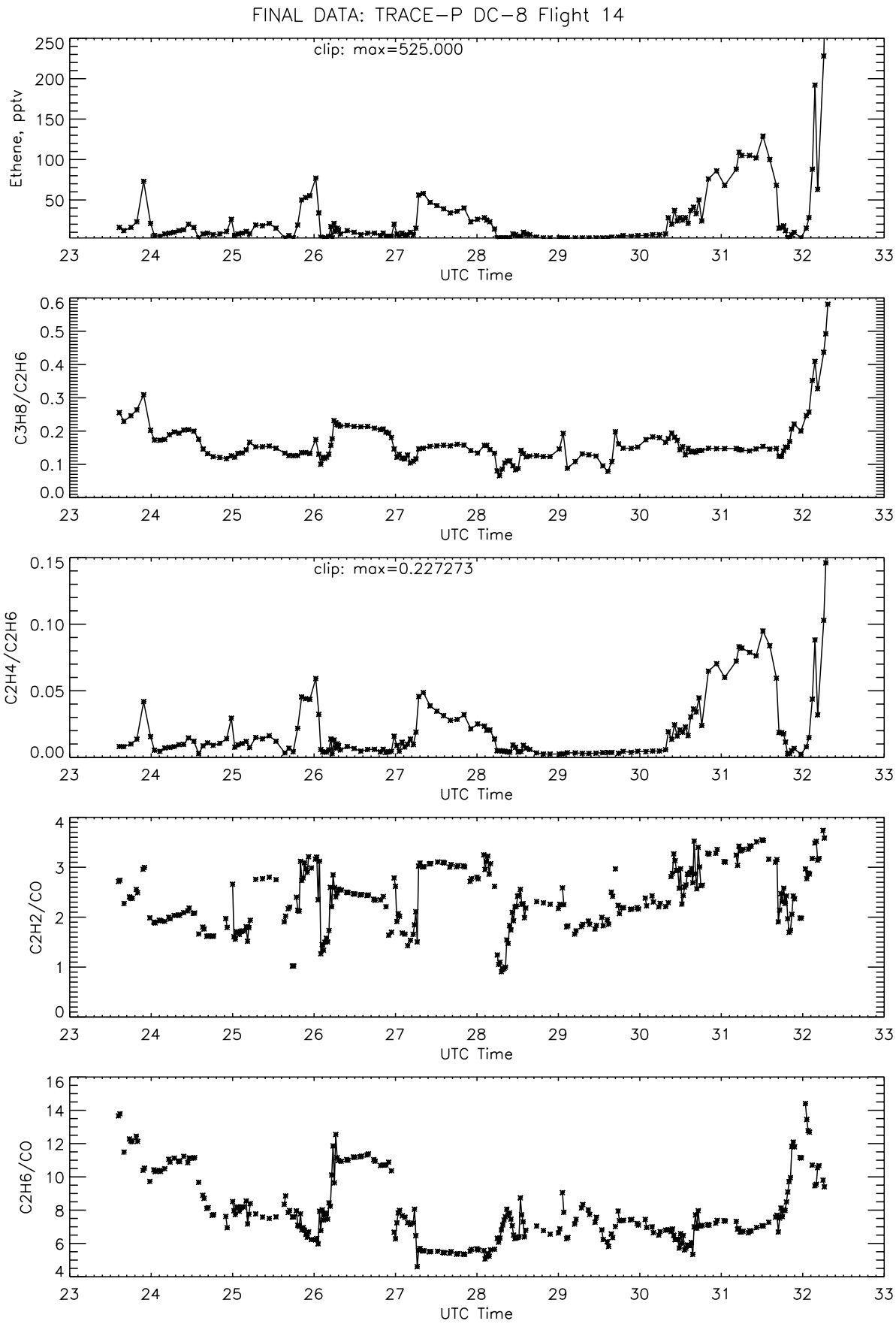


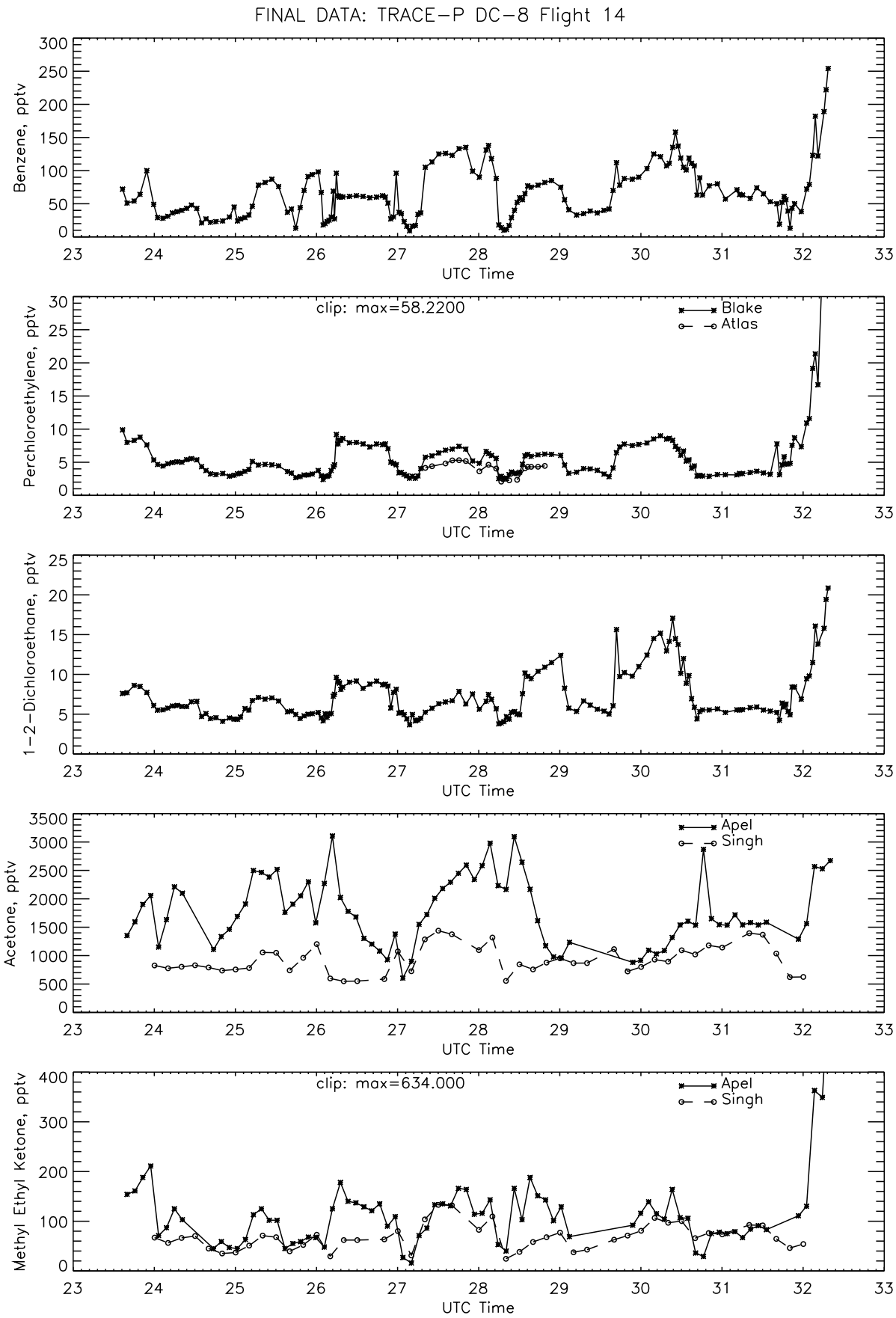

FINAL DATA: TRACE-P DC-8 Flight 14
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
Carbon Dioxide, ppmv
Water Vapor Mixing Ratio
UTC Time
clip: min=-3.00600e-005

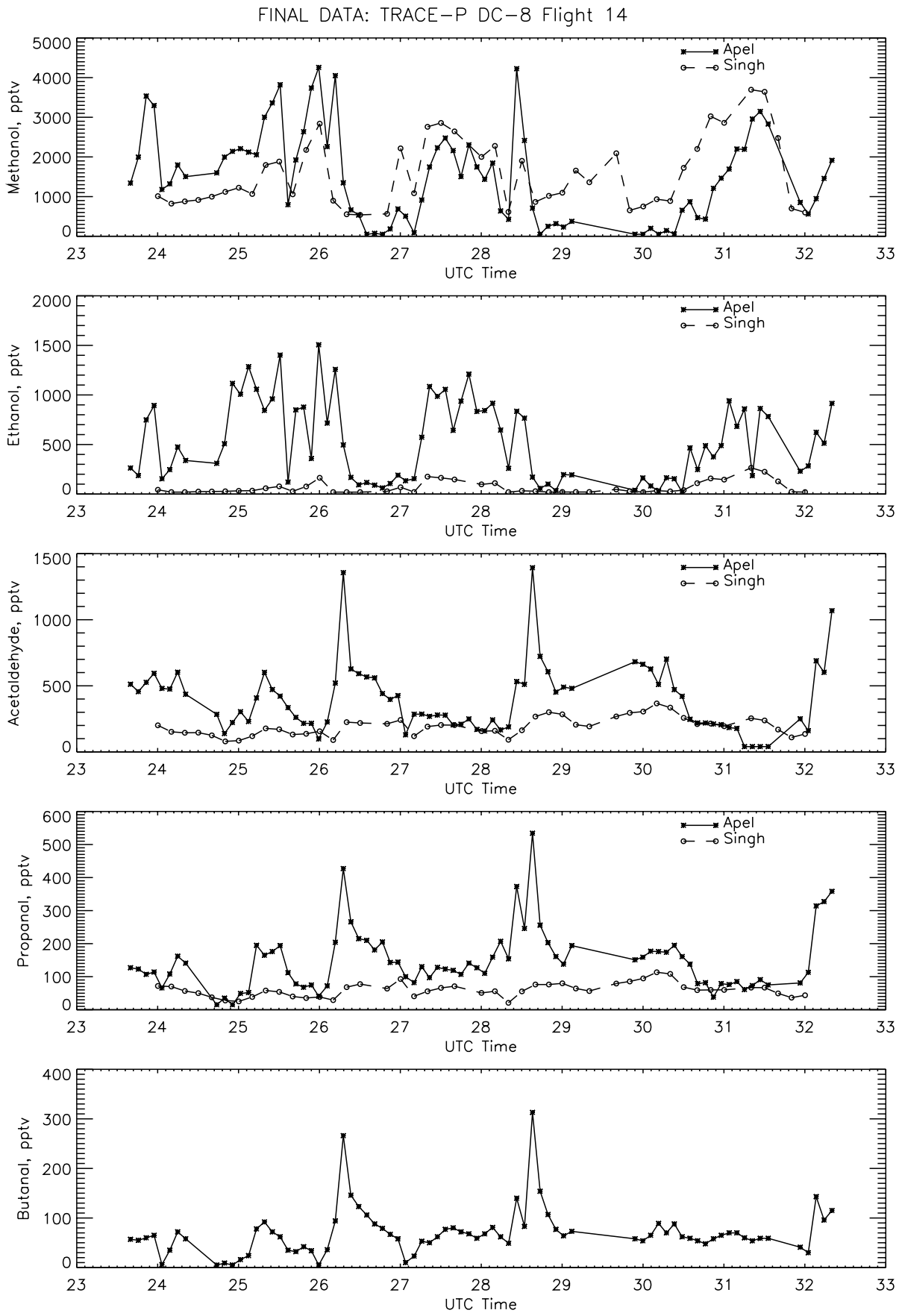

FINAL DATA: TRACE-P DC-8 Flight 14
NO, pptv
NO2, pptv
HNO3, pptv
clip: max=1347.00
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 14
OH, pptv
HO2, pptv
CH2O, pptv
clip: max=1229.00
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

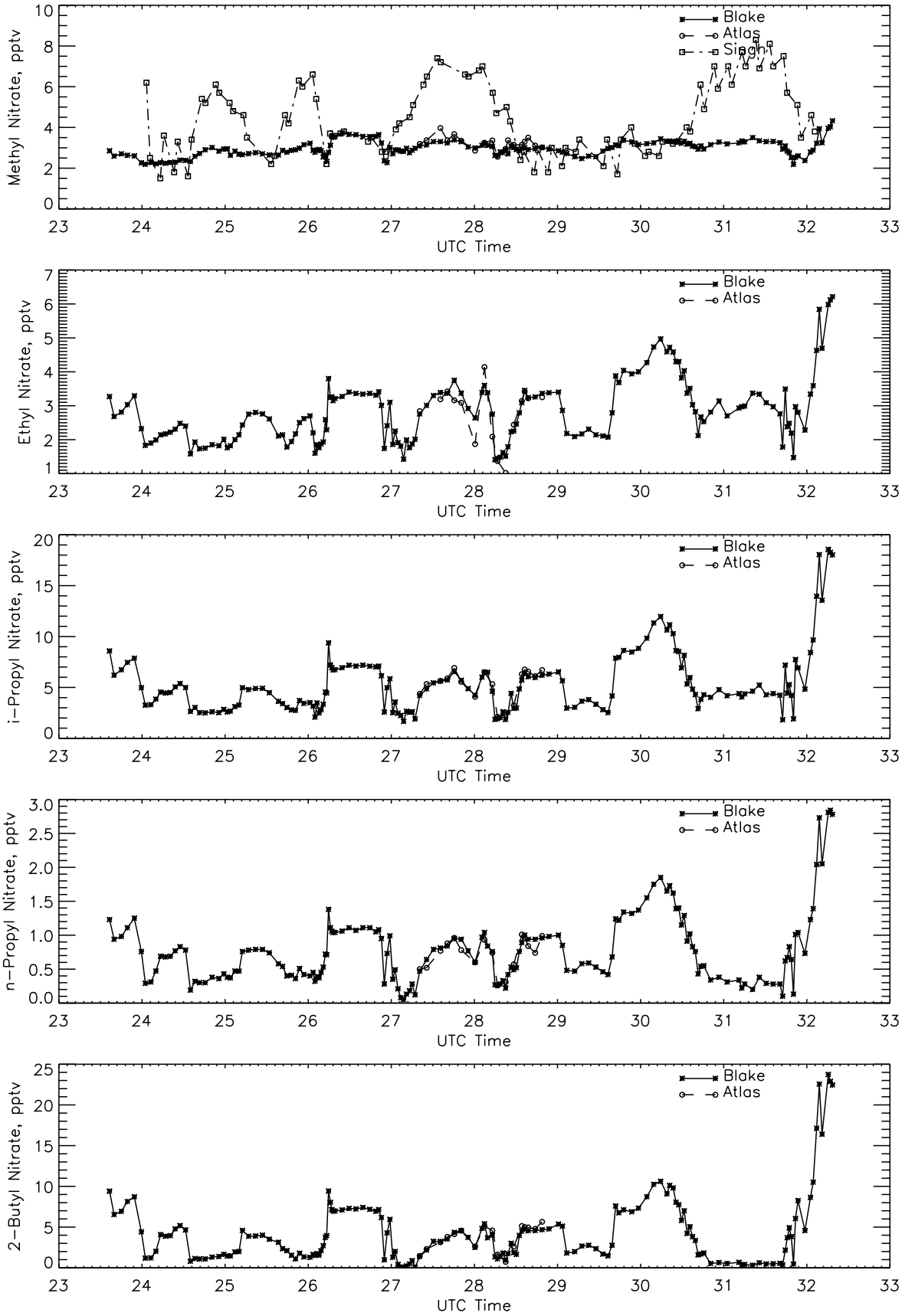

FINAL DATA: TRACE-P DC-8 Flight 14
Ethane, pptv
Propane, pptv
Butane, pptv
clip: max=539.000
i-Butane
n-Butane
Pentane, pptv
clip: max=353.000 clip: max=161.000
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 14
clip: max=525.000
Ethene, pptv
UTC Time
C3H8/C2H6
UTC Time
clip: max=0.227273
C2H4/C2H6
UTC Time
C2H2/CO
UTC Time
C2H6/CO
UTC Time

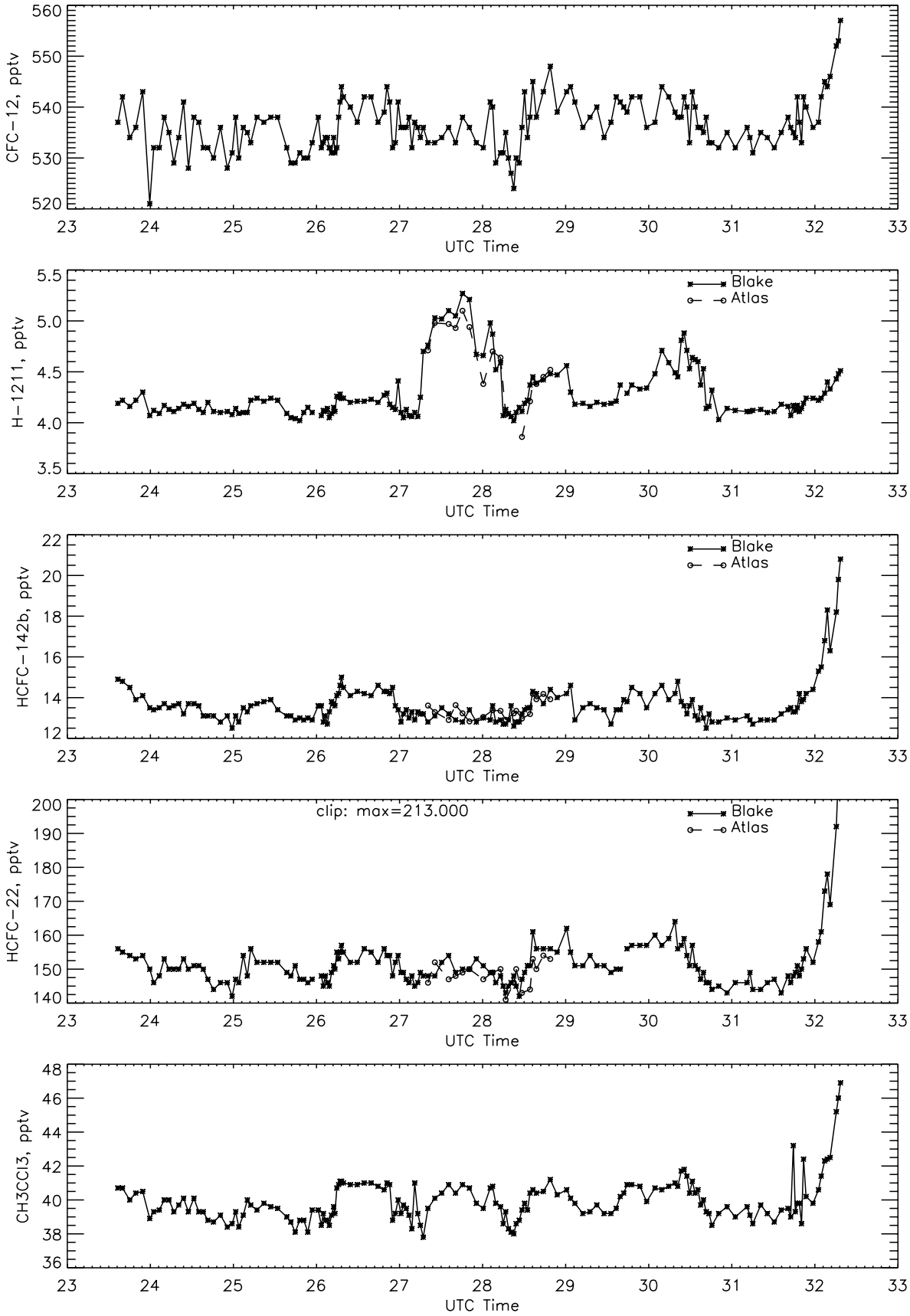

FINAL DATA: TRACE-P DC-8 Flight 14
Benzene, pptv
UTC Time
clip: max=58.2200
Blake
Atlas
Perchloroethylene, pptv
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Apel
Singh
Acetone, pptv
UTC Time
clip: max=634.000
Apel
Singh
Methyl Ethyl Ketone, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 14
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh

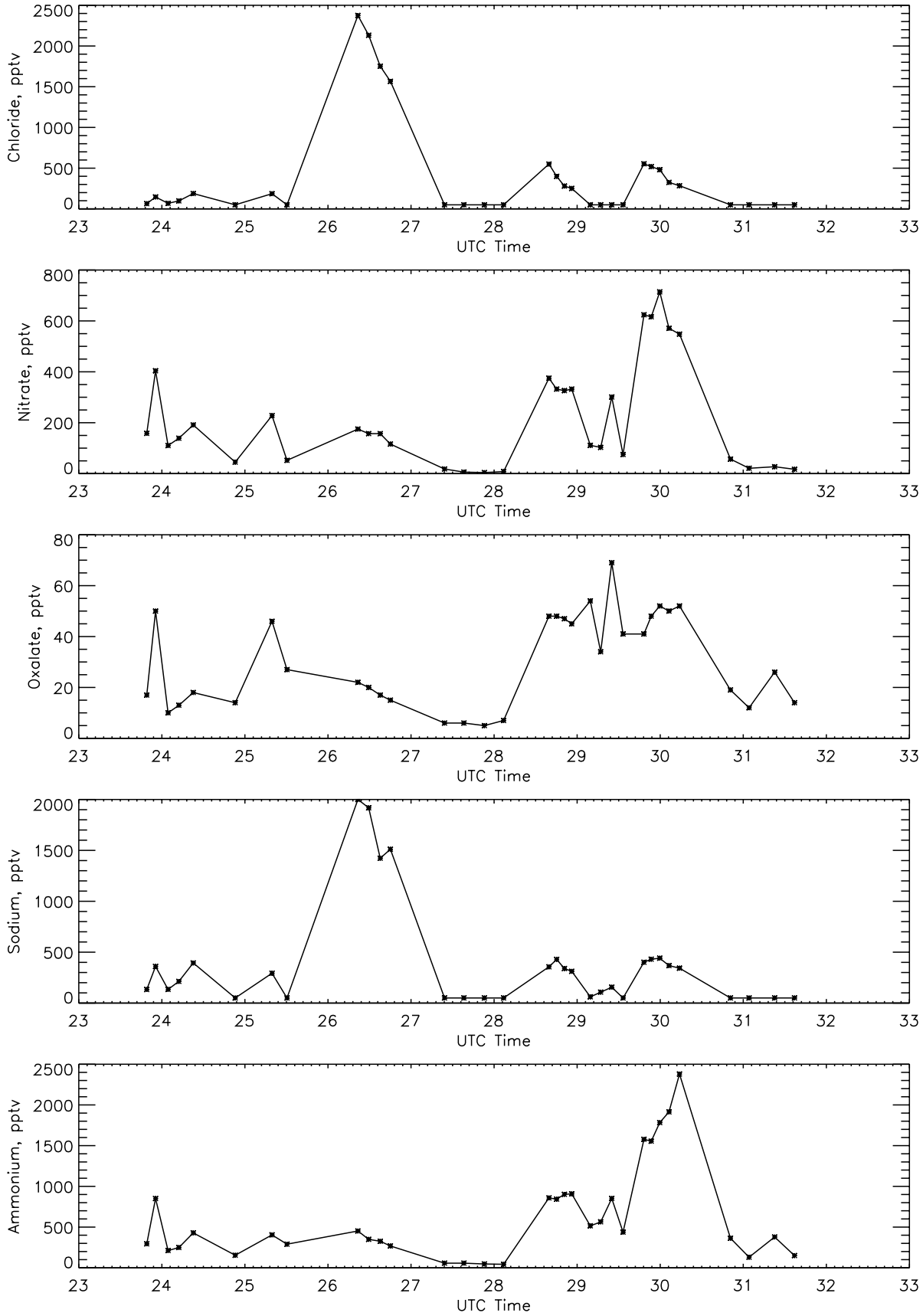
FINAL DATA: TRACE-P DC-8 Flight 14



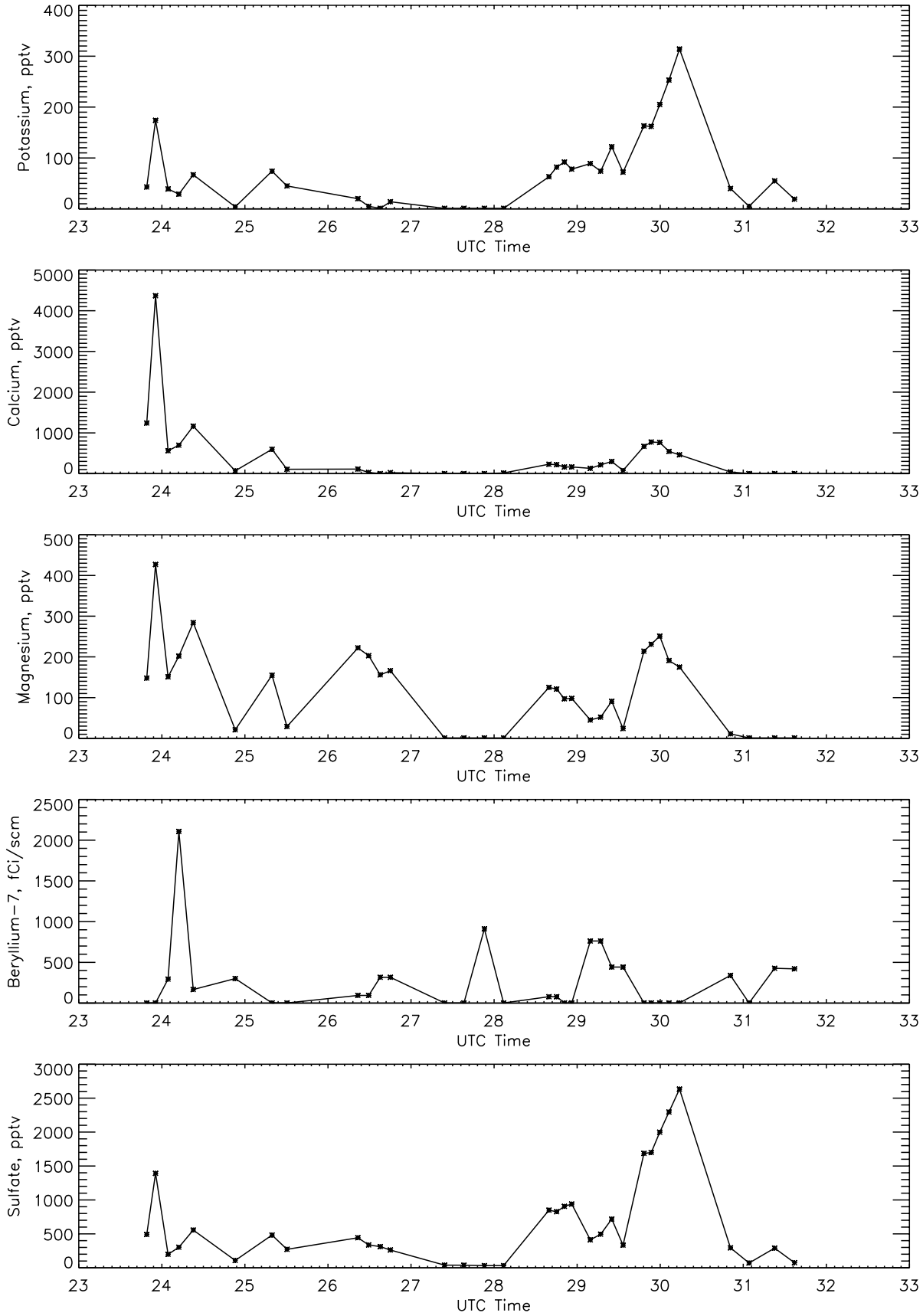
FINAL DATA: TRACE-P DC-8 Flight 14

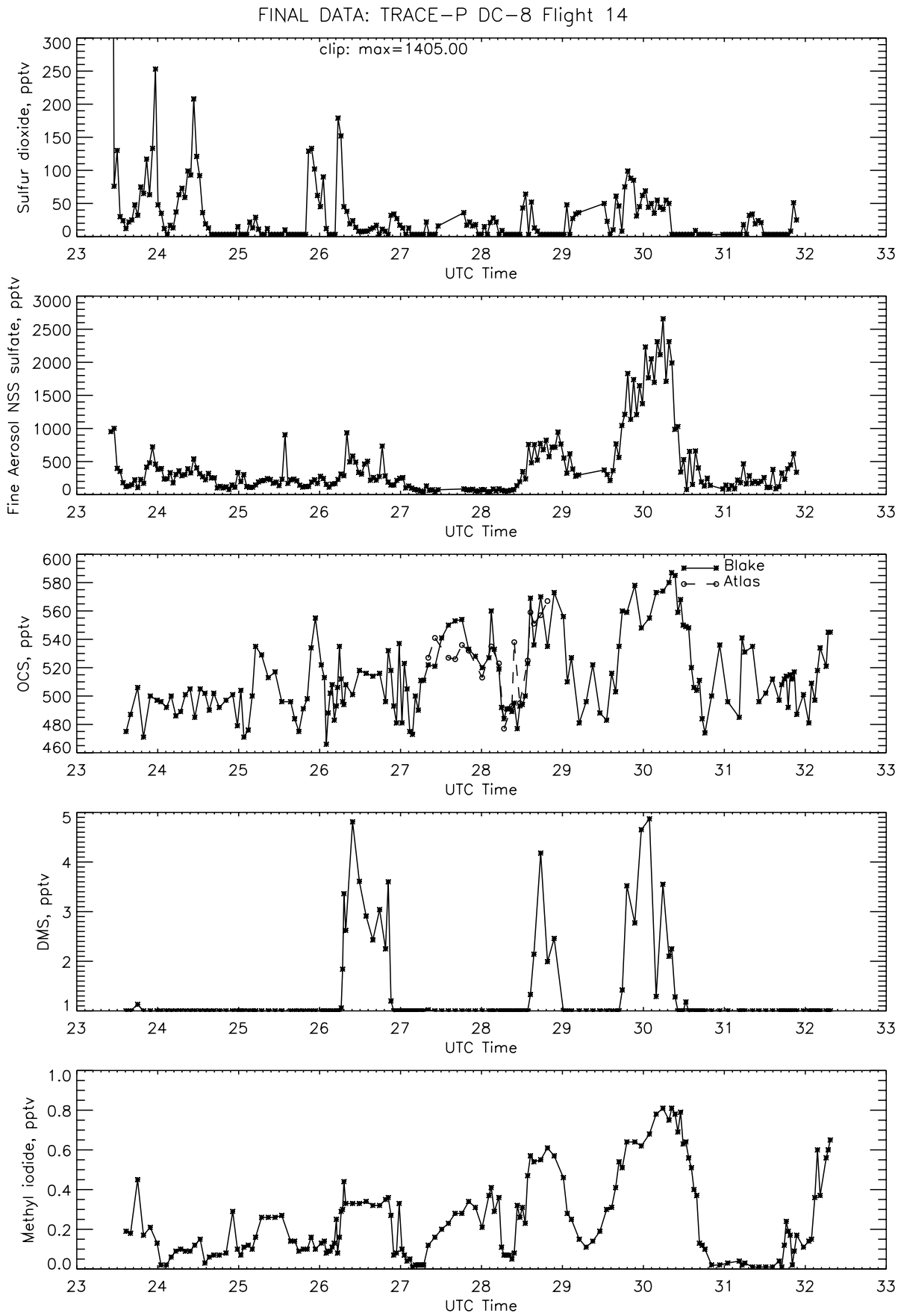


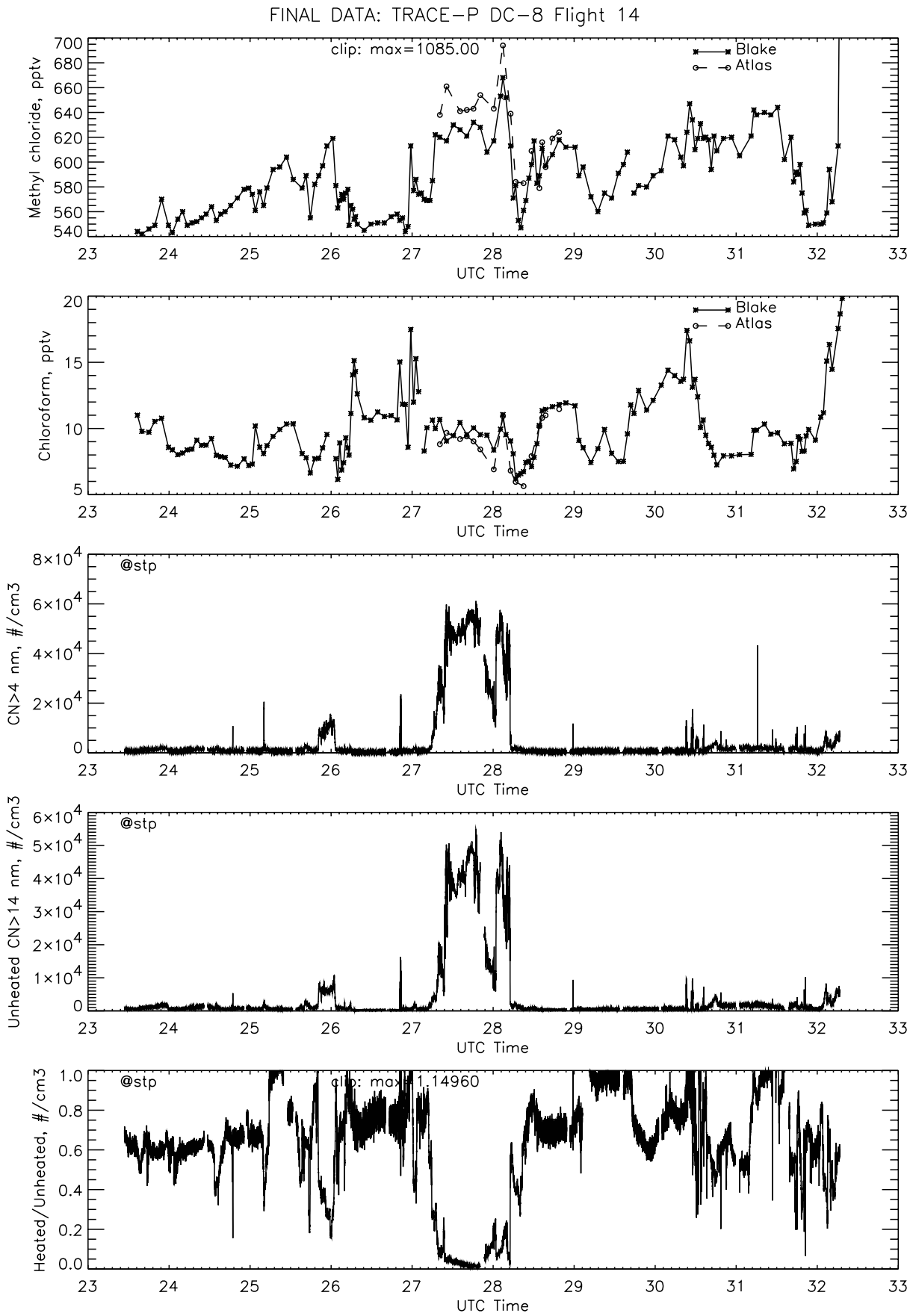
FINAL DATA: TRACE-P DC-8 Flight 14

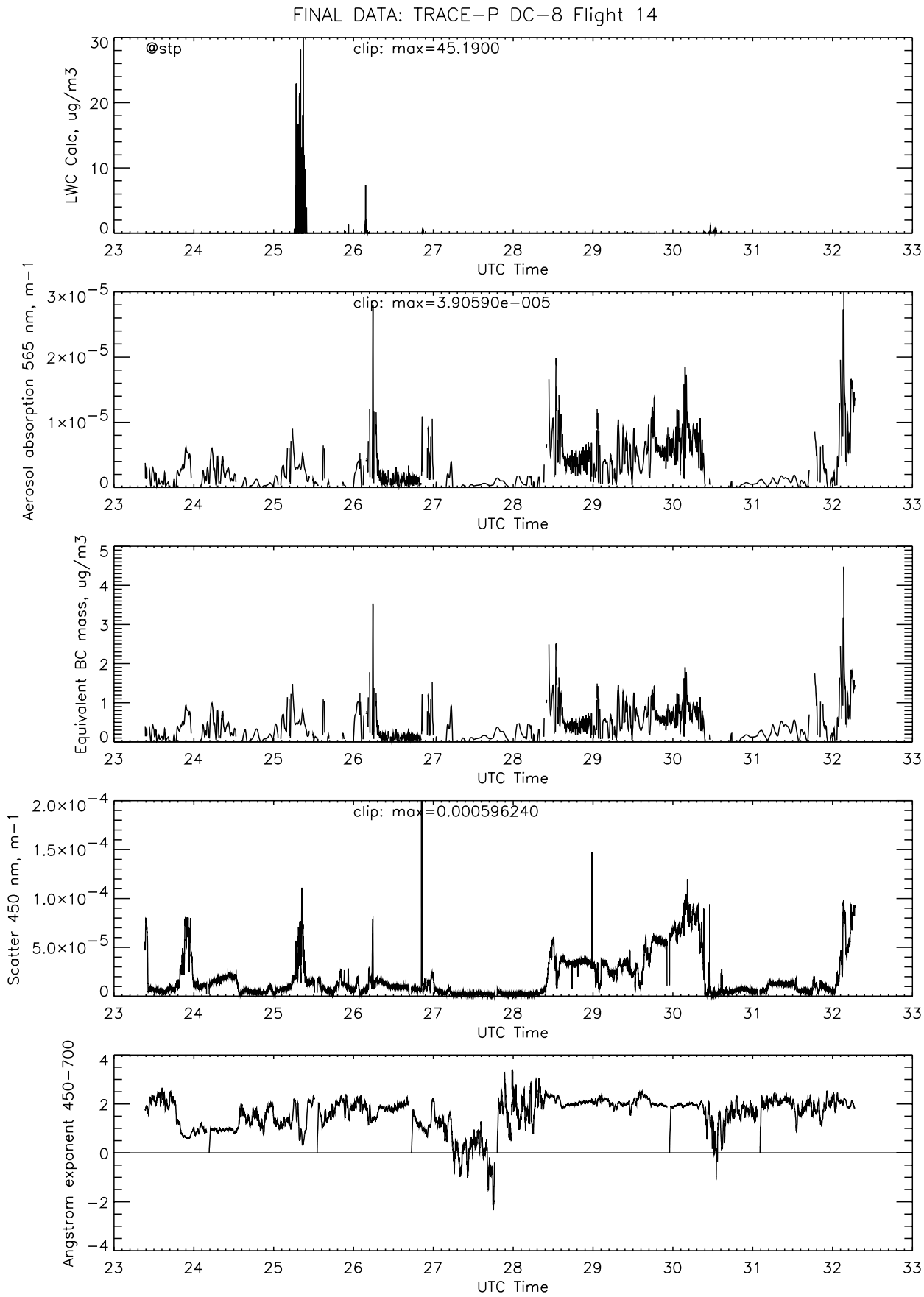


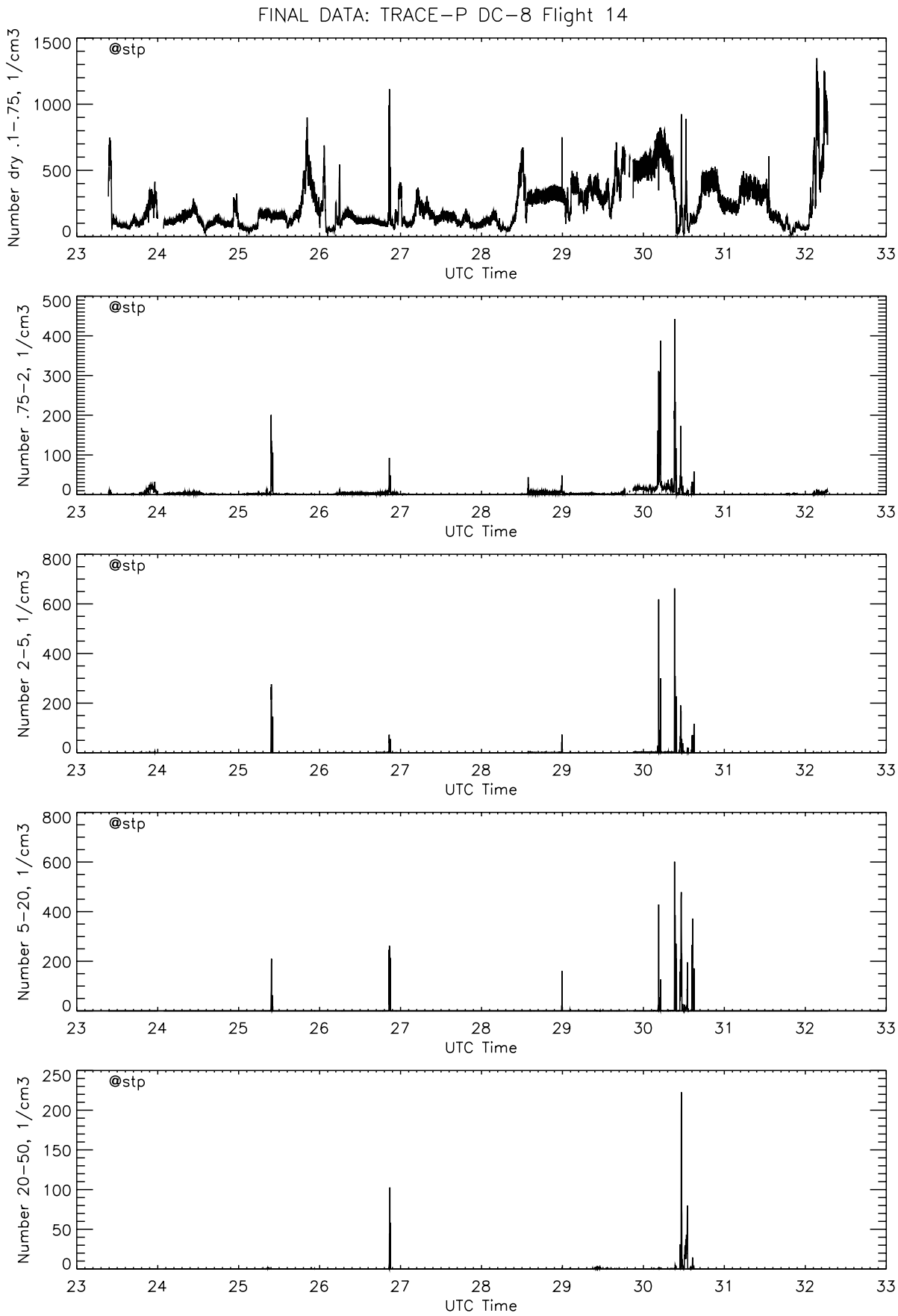
FINAL DATA: TRACE-P DC-8 Flight 14

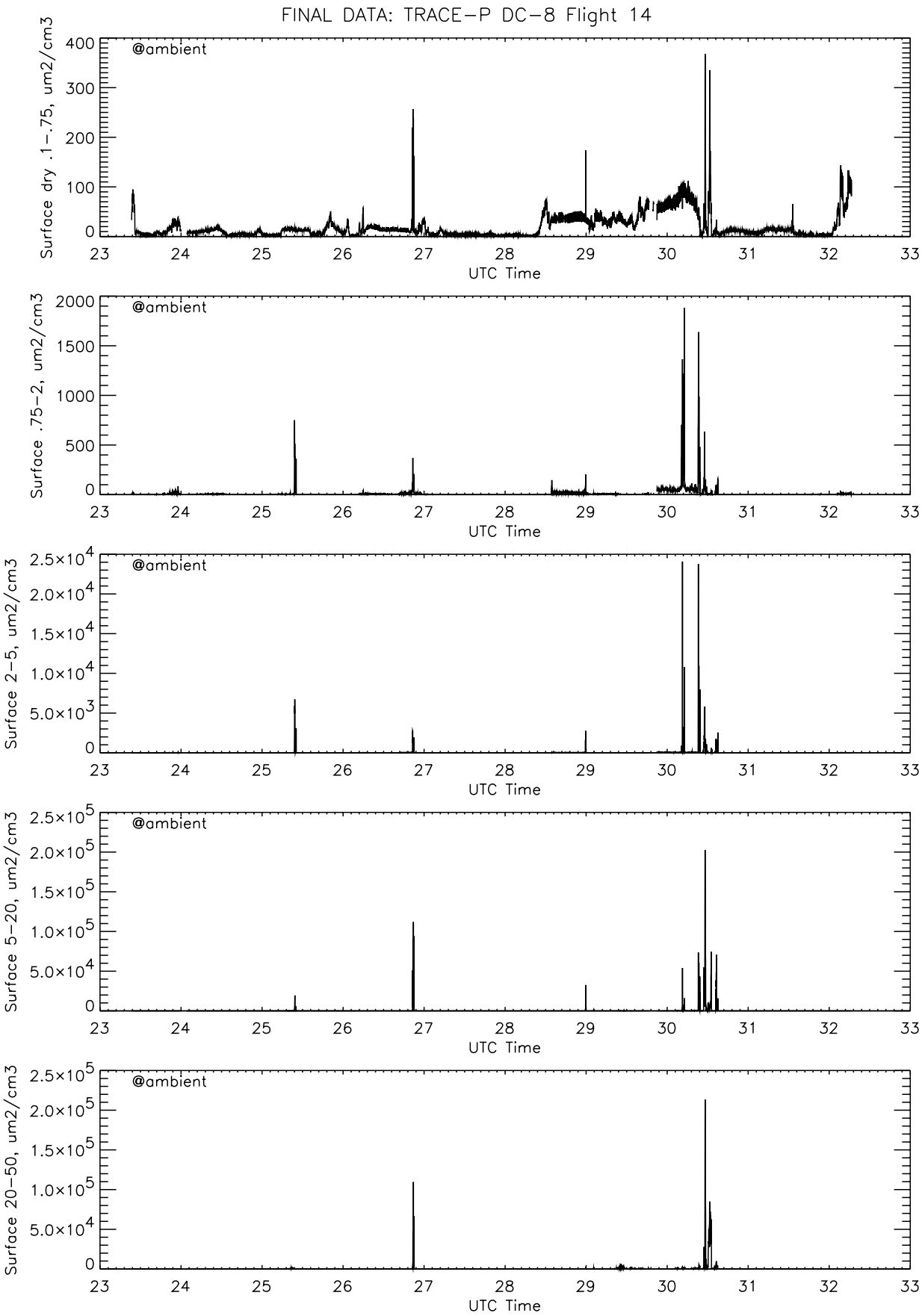


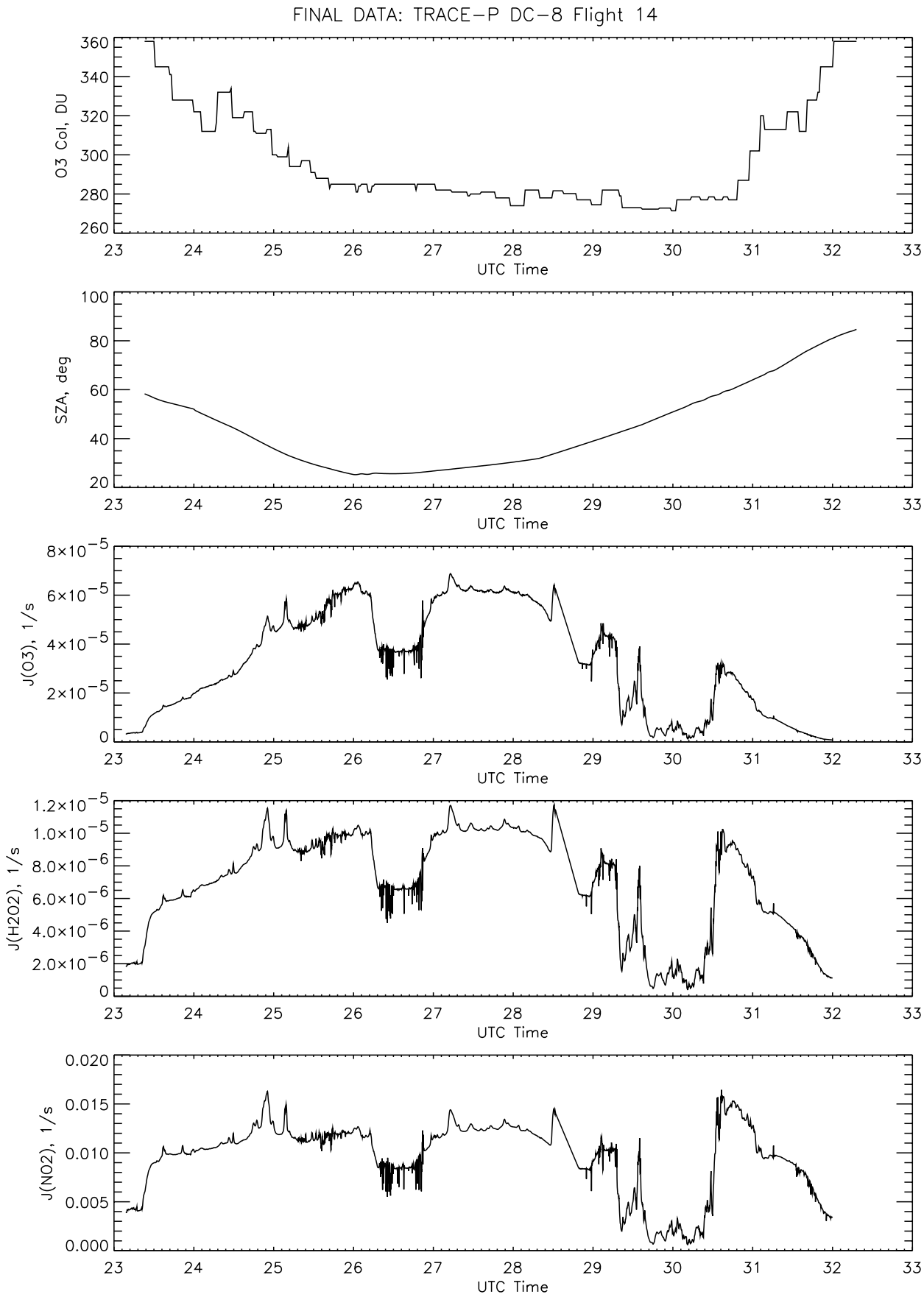

FINAL DATA: TRACE-P DC-8 Flight 14
clip: max=1405.00
Sulfur dioxide, pptv
UTC Time
Fine Aerosol NSS sulfate, pptv
UTC Time
Blake
Atlas
OCS, pptv
UTC Time
DMS, pptv
UTC Time
Methyl iodide, pptv
UTC Time

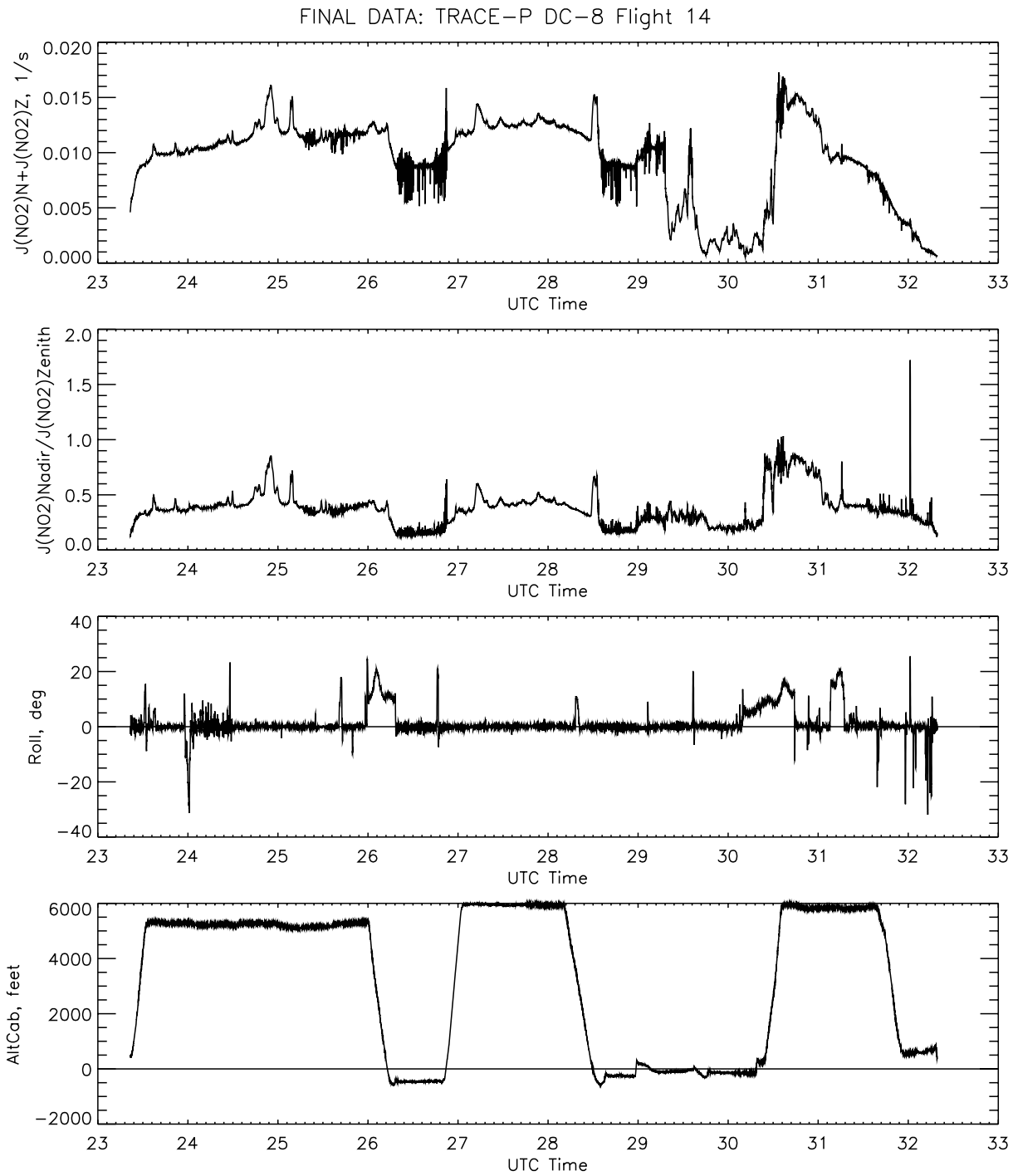

FINAL DATA: TRACE-P DC-8 Flight 14
clip: max=1085.00
Blake
Atlas
Methyl chloride, pptv
UTC Time
Chloroform, pptv
@stp
CN>4 nm, #/cm3
Unheated CN>14 nm, #/cm3
clip: max=1.14960
Heated/Unheated, #/cm3

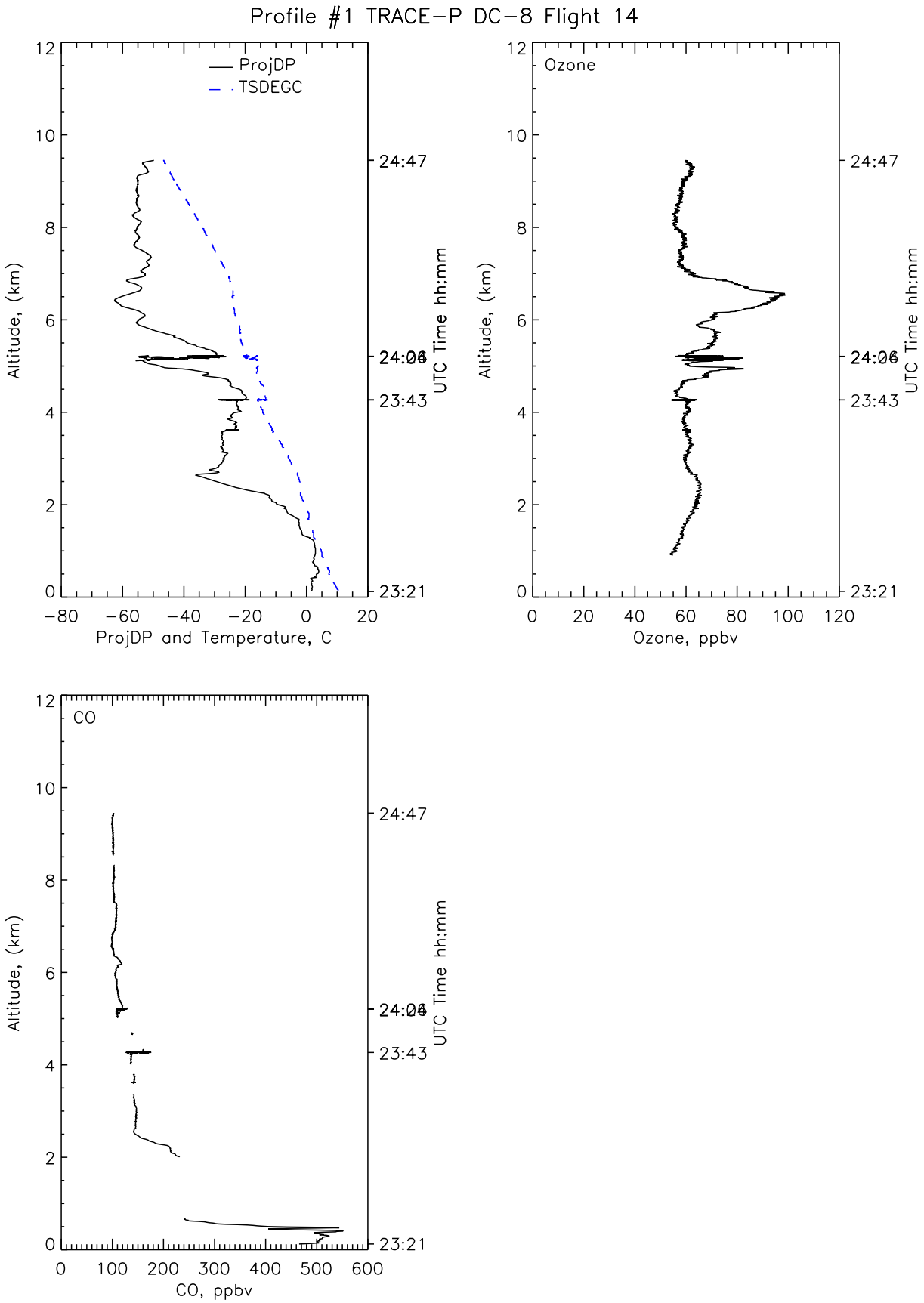

FINAL DATA: TRACE-P DC-8 Flight 14
@stp
clip: max=45.1900
LWC Calc, ug/m3
UTC Time
clip: max=3.90590e-005
Aerosol absorption 565 nm, m-1
UTC Time
Equivalent BC mass, ug/m3
UTC Time
clip: max=0.000596240
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

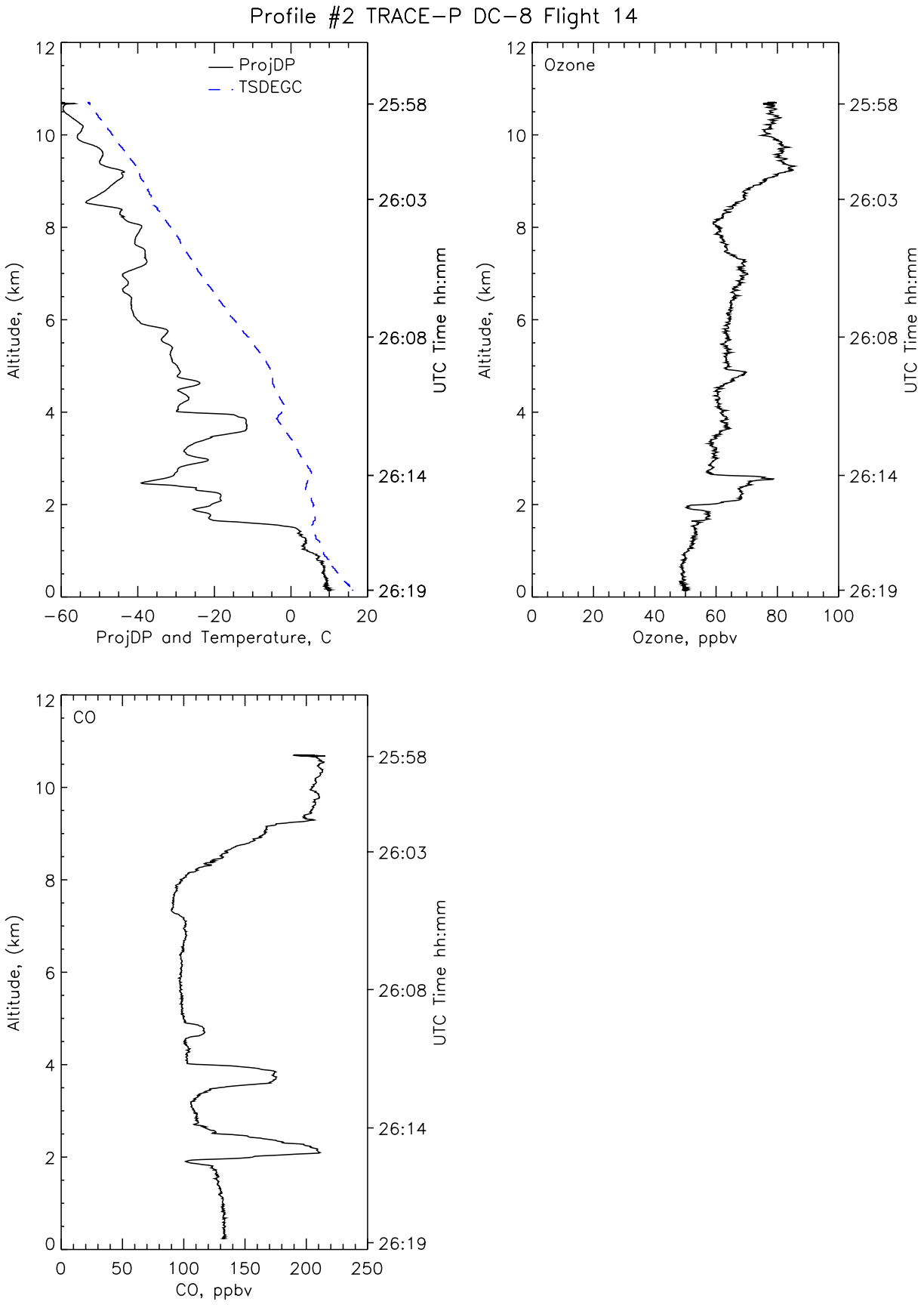

FINAL DATA: TRACE-P DC-8 Flight 14
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

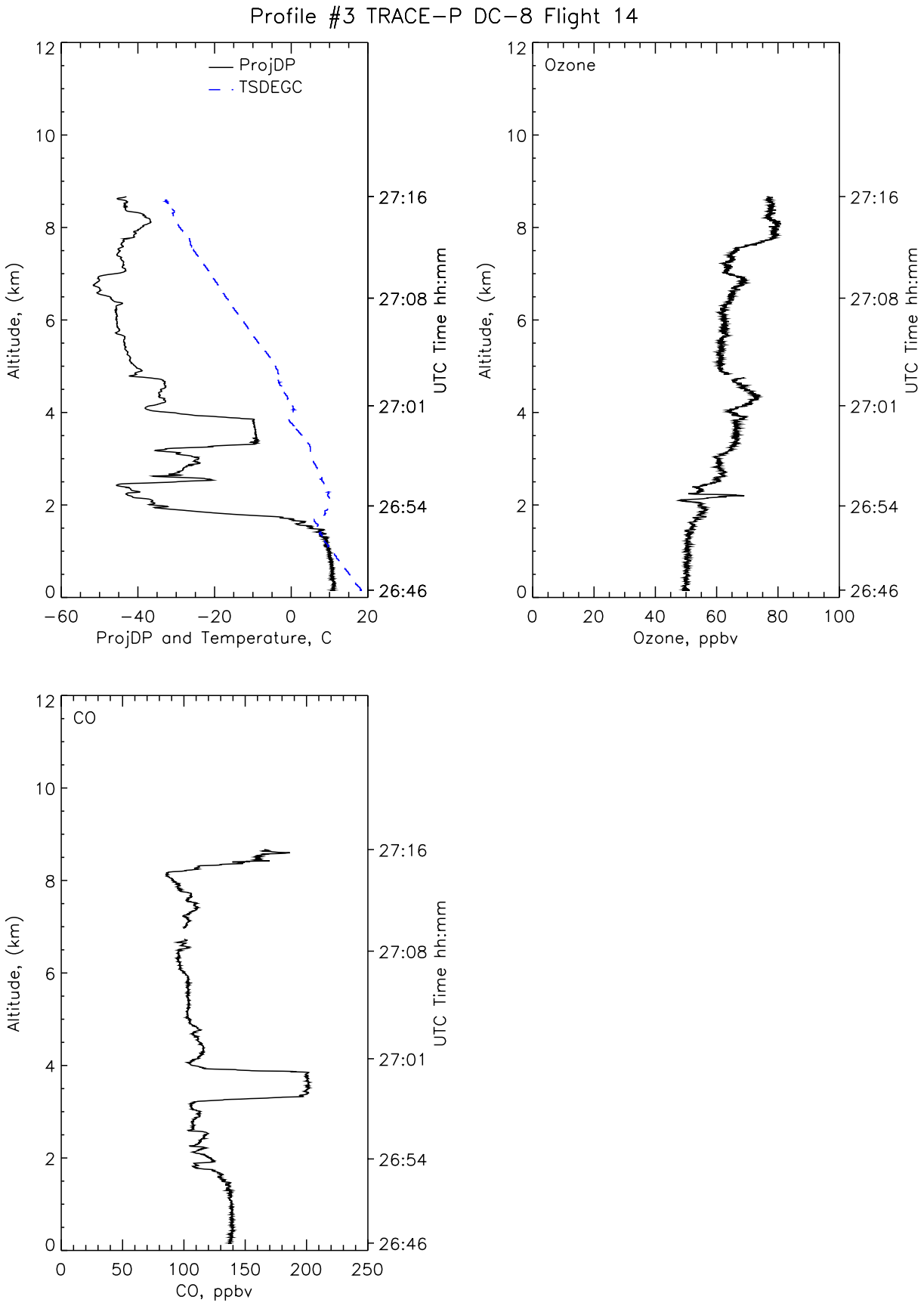

FINAL DATA: TRACE-P DC-8 Flight 14
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

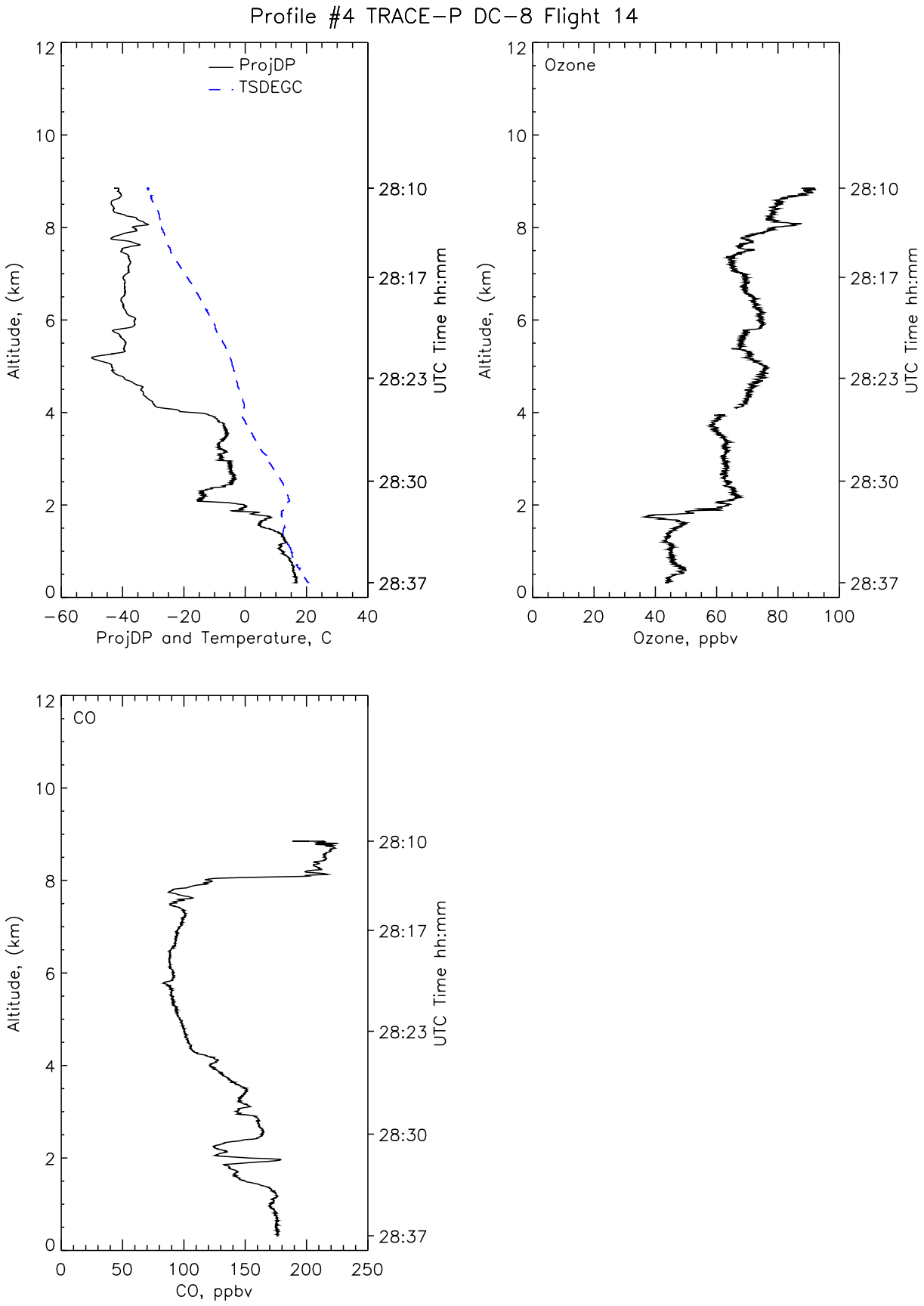

FINAL DATA: TRACE-P DC-8 Flight 14
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

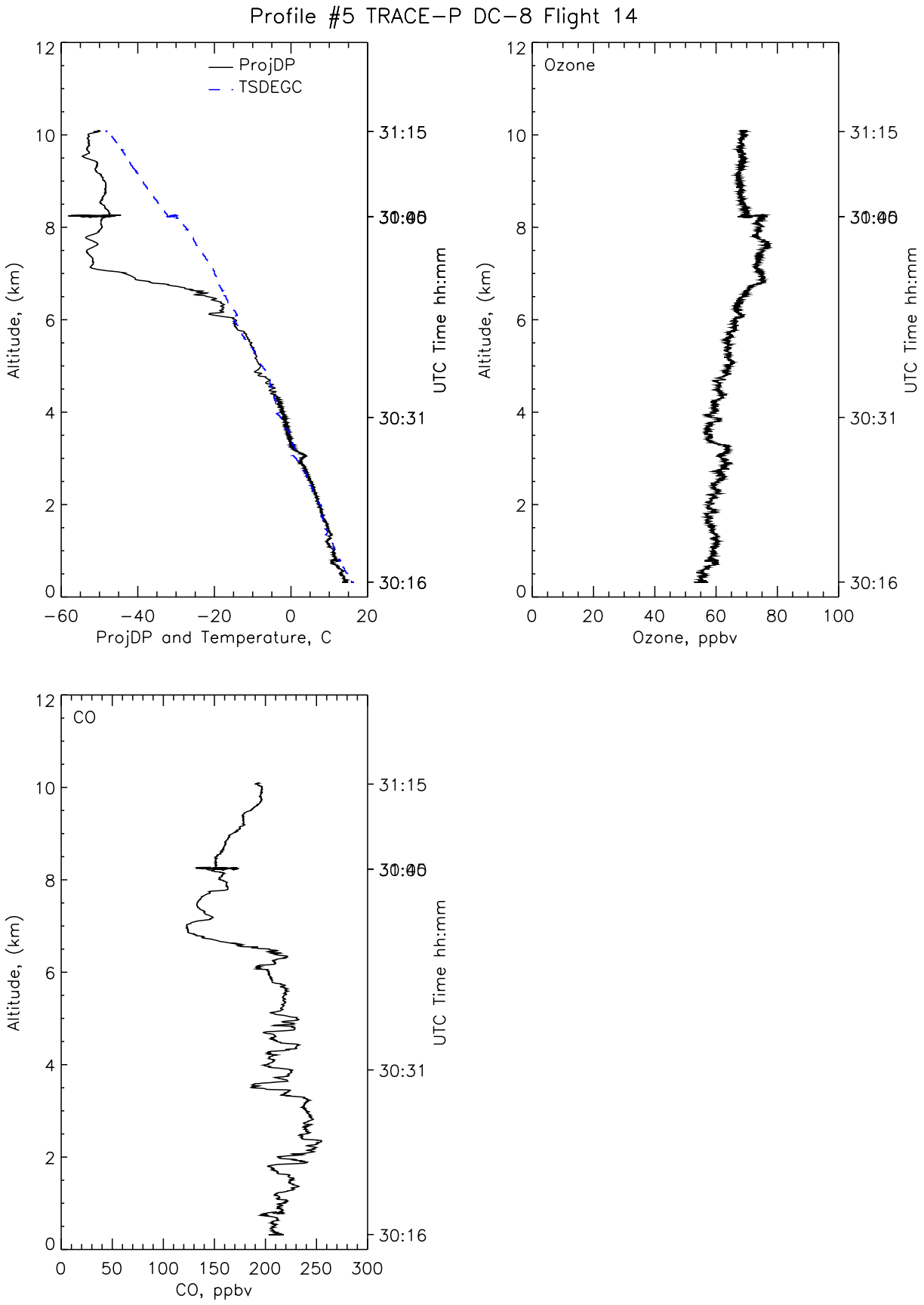

FINAL DATA: TRACE-P DC-8 Flight 14
J(NO2)N+J(NO2)Z, 1/s
0.020
0.015
0.010
0.005
0.000
23
24
25
26
27
28
29
30
31
32
33
UTC Time
J(NO2)Nadir/J(NO2)Zenith
2.0
1.5
1.0
0.5
0.0
UTC Time
Roll, deg
40
20
0
−20
−40
UTC Time
AltCab, feet
6000
4000
2000
0
−2000
UTC Time

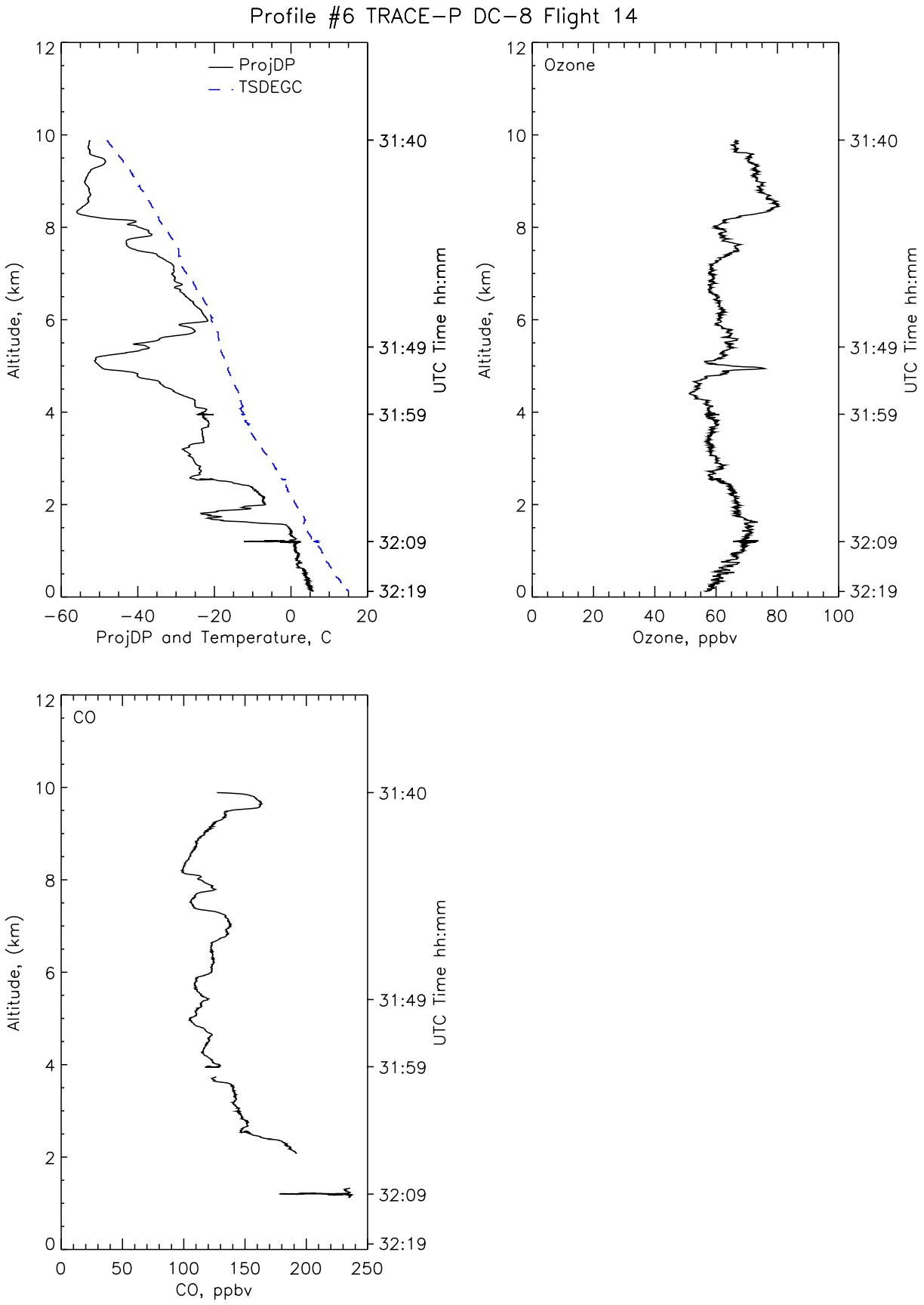

Profile #1 TRACE-P DC-8 Flight 14
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
24:47
24:06
23:43
23:21
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #2 TRACE-P DC-8 Flight 14
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
Ozone
Ozone, ppbv
CO
CO, ppbv
25:58
26:03
26:08
26:14
26:19


Profile #3 TRACE-P DC-8 Flight 14
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
27:16
27:08
27:01
26:54
26:46
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #4 TRACE-P DC-8 Flight 14
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
28:10
28:17
28:23
28:30
28:37
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #5 TRACE-P DC-8 Flight 14
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
31:15
30:46
30:31
30:16
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #6 TRACE-P DC-8 Flight 14
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
31:40
31:49
31:59
32:09
32:19
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

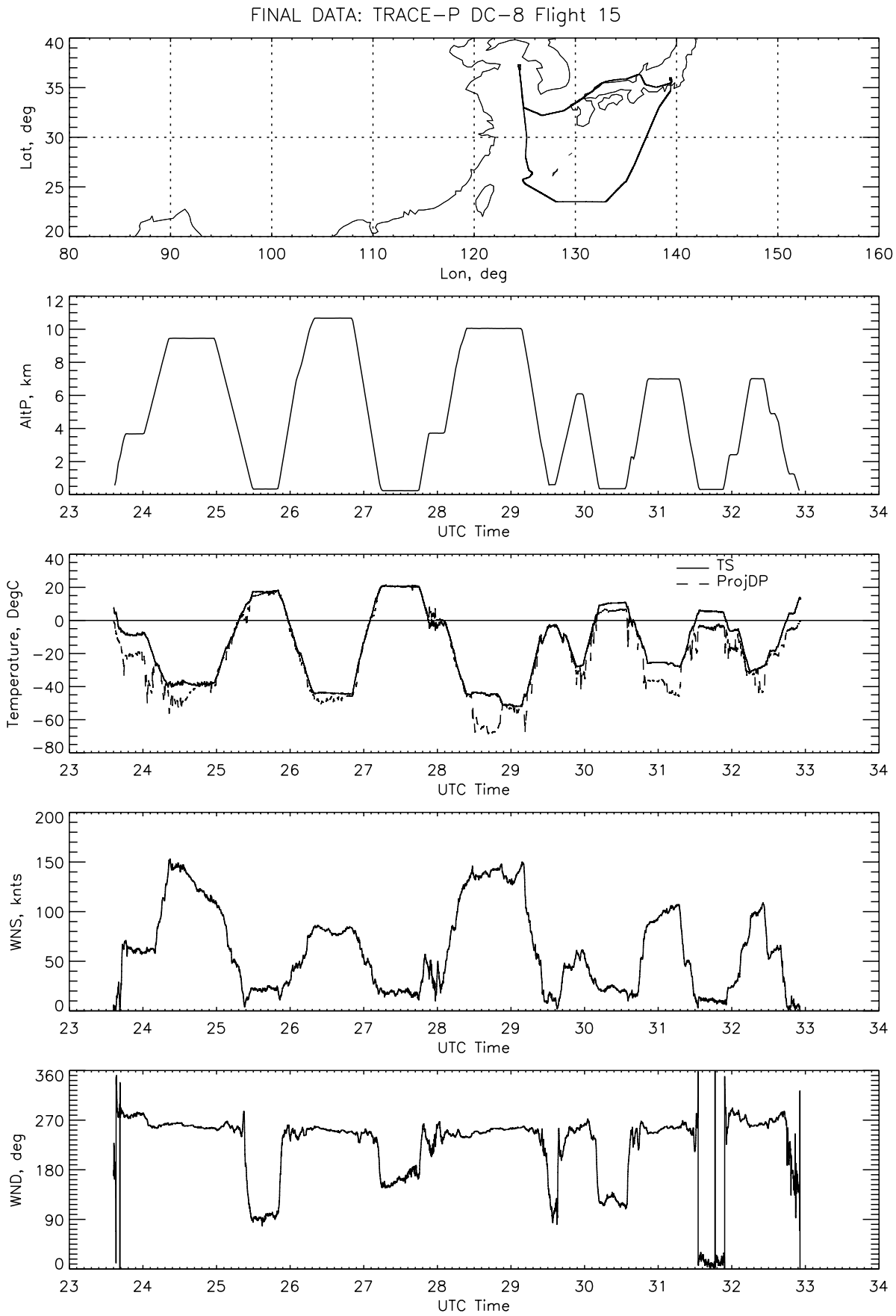
TRACE-P

Flight 15D

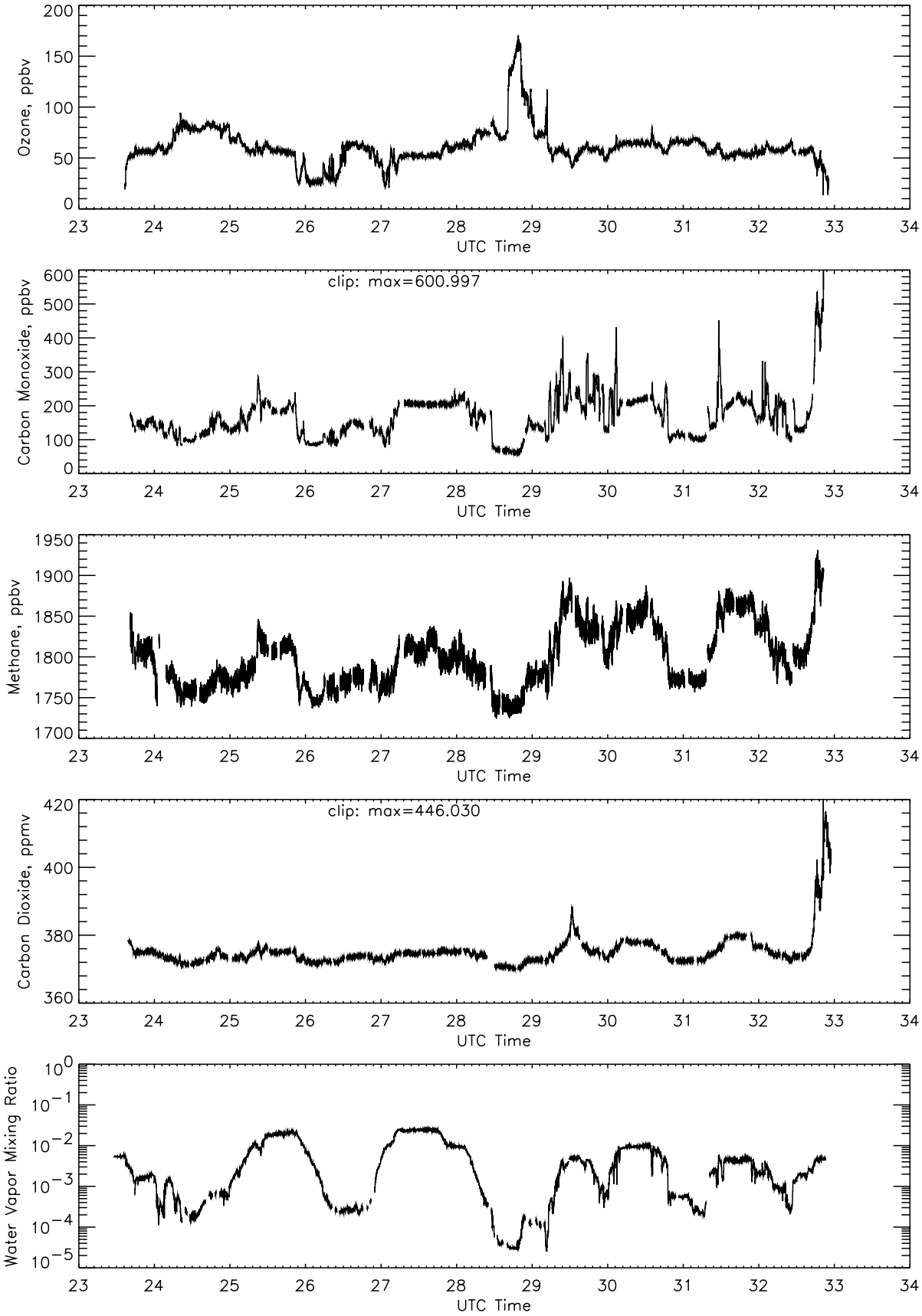
Local: Yokota No. 3

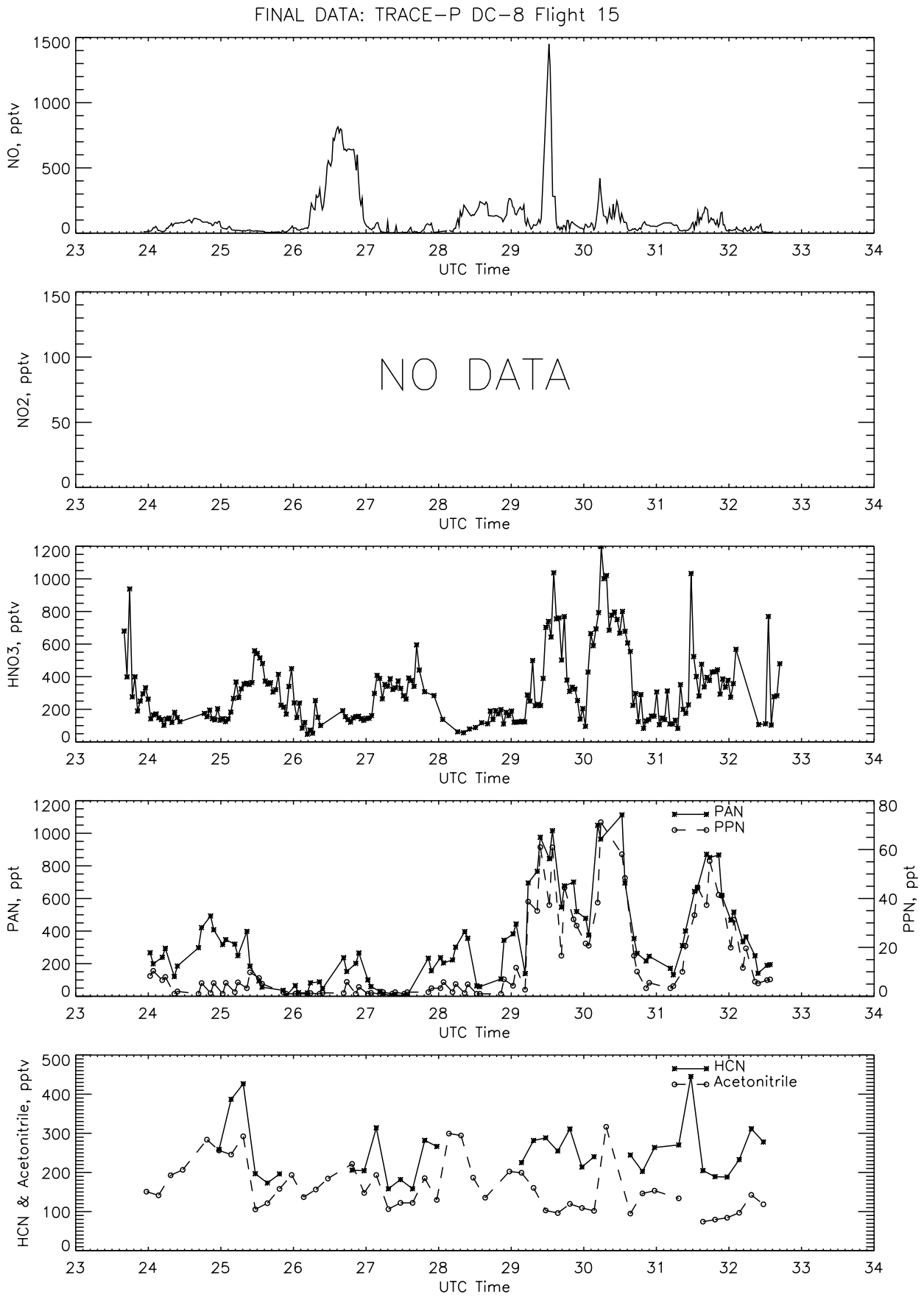
Convective Outflow
and Stratospheric Influence

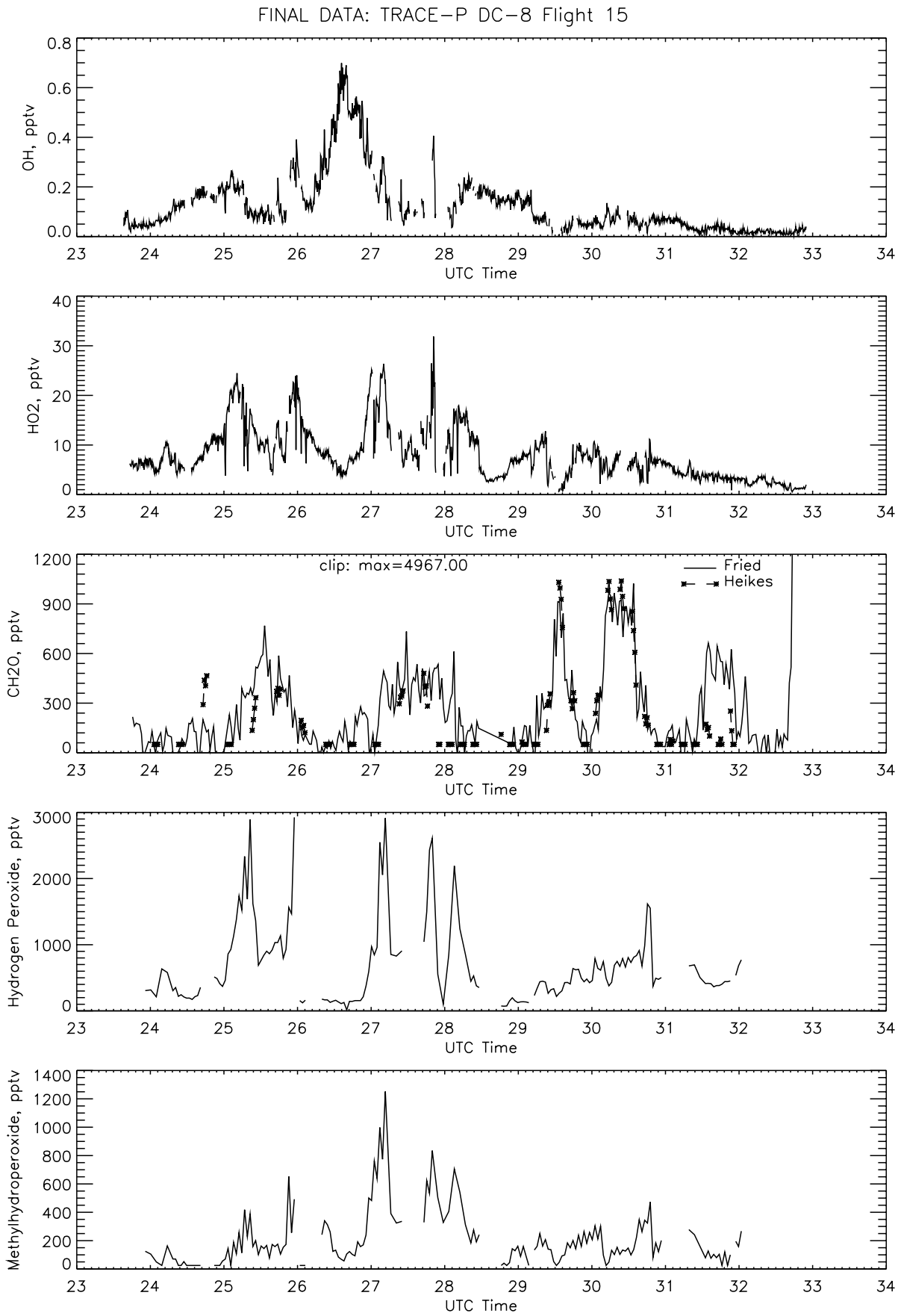
March 26, 2001


FINAL DATA: TRACE-P DC-8 Flight 15
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

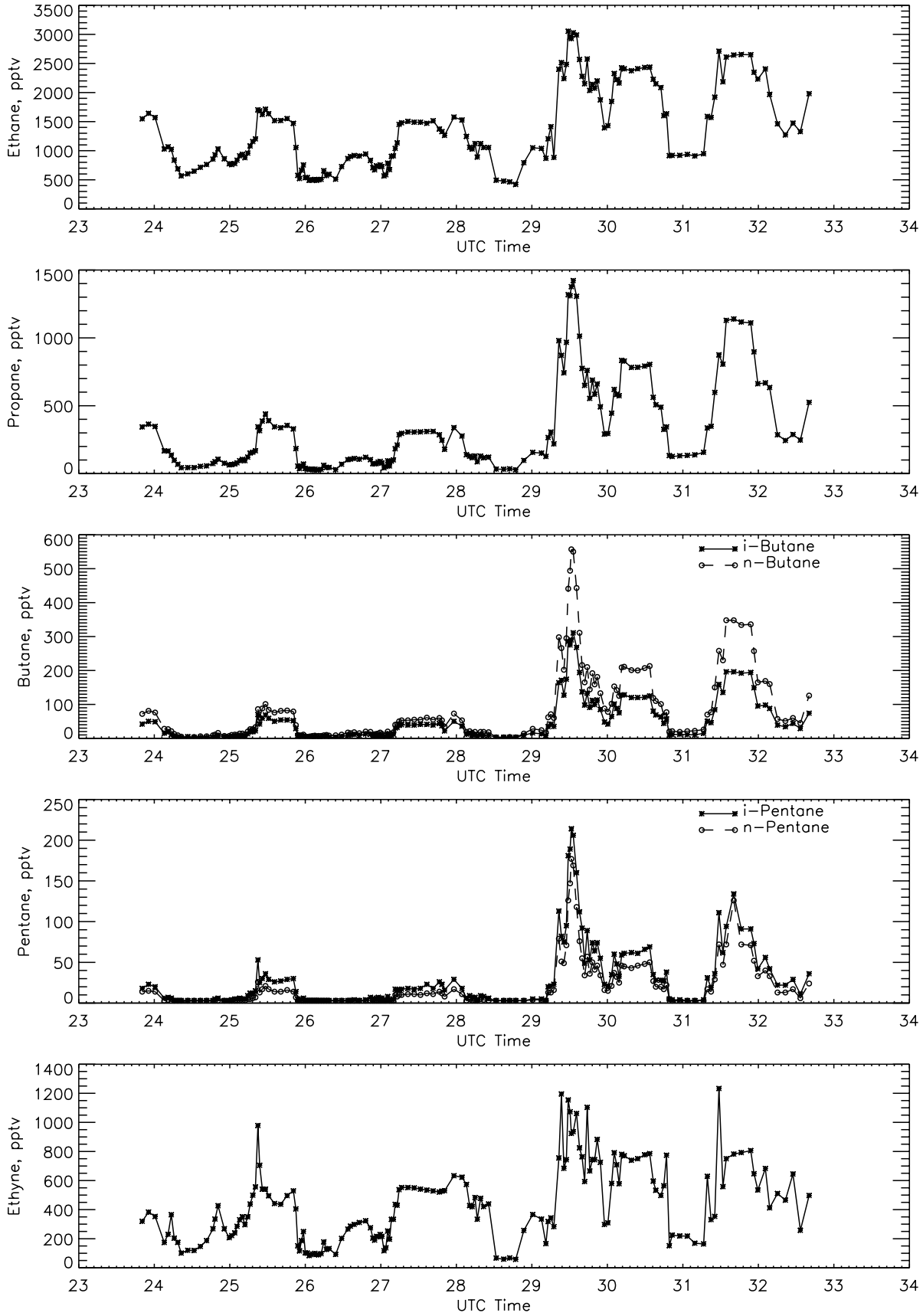
FINAL DATA: TRACE-P DC-8 Flight 15

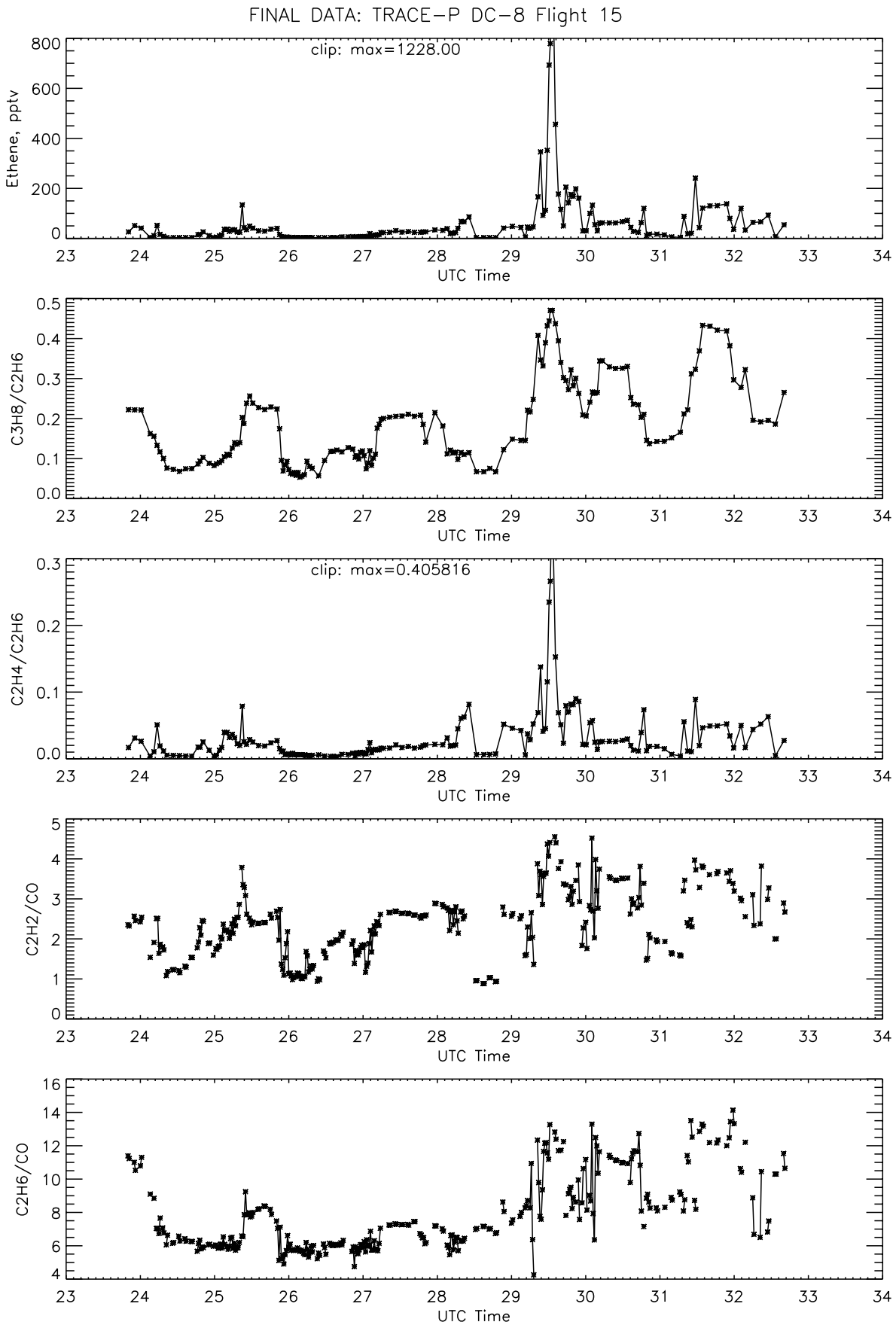


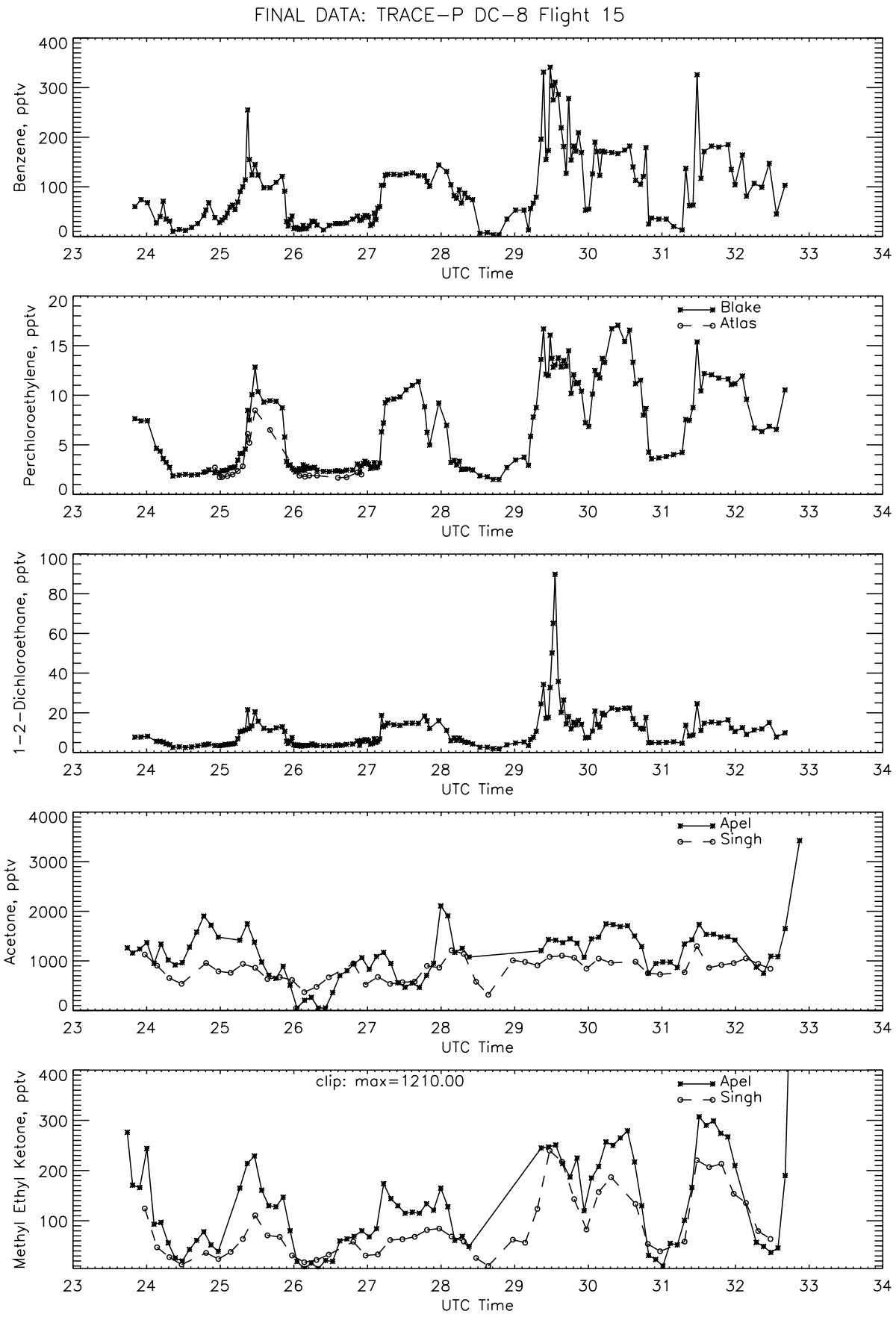

FINAL DATA: TRACE-P DC-8 Flight 15
NO, pptv
NO2, pptv
NO DATA
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

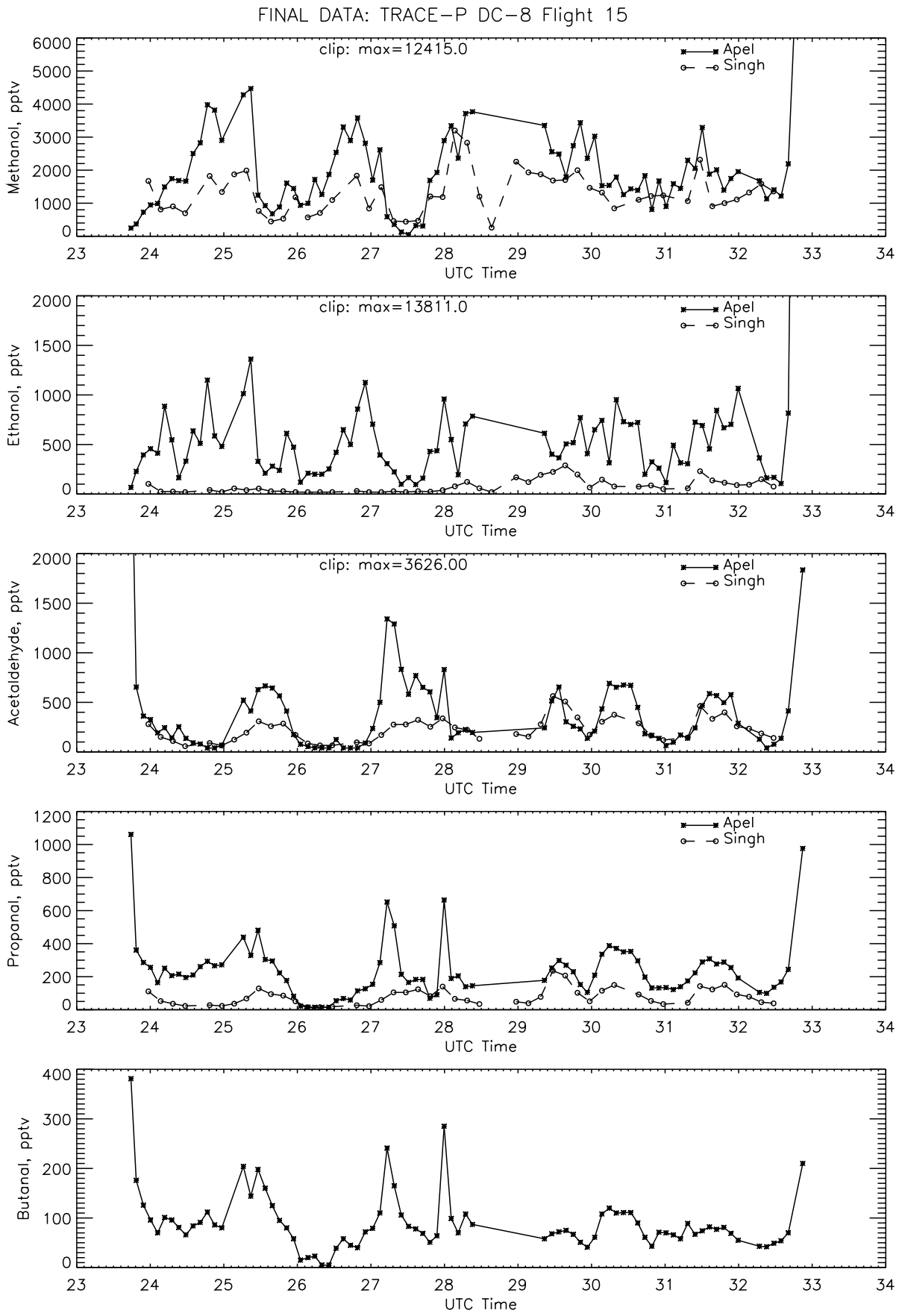

FINAL DATA: TRACE-P DC-8 Flight 15
OH, pptv
HO2, pptv
CH2O, pptv
clip: max=4967.00
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 15

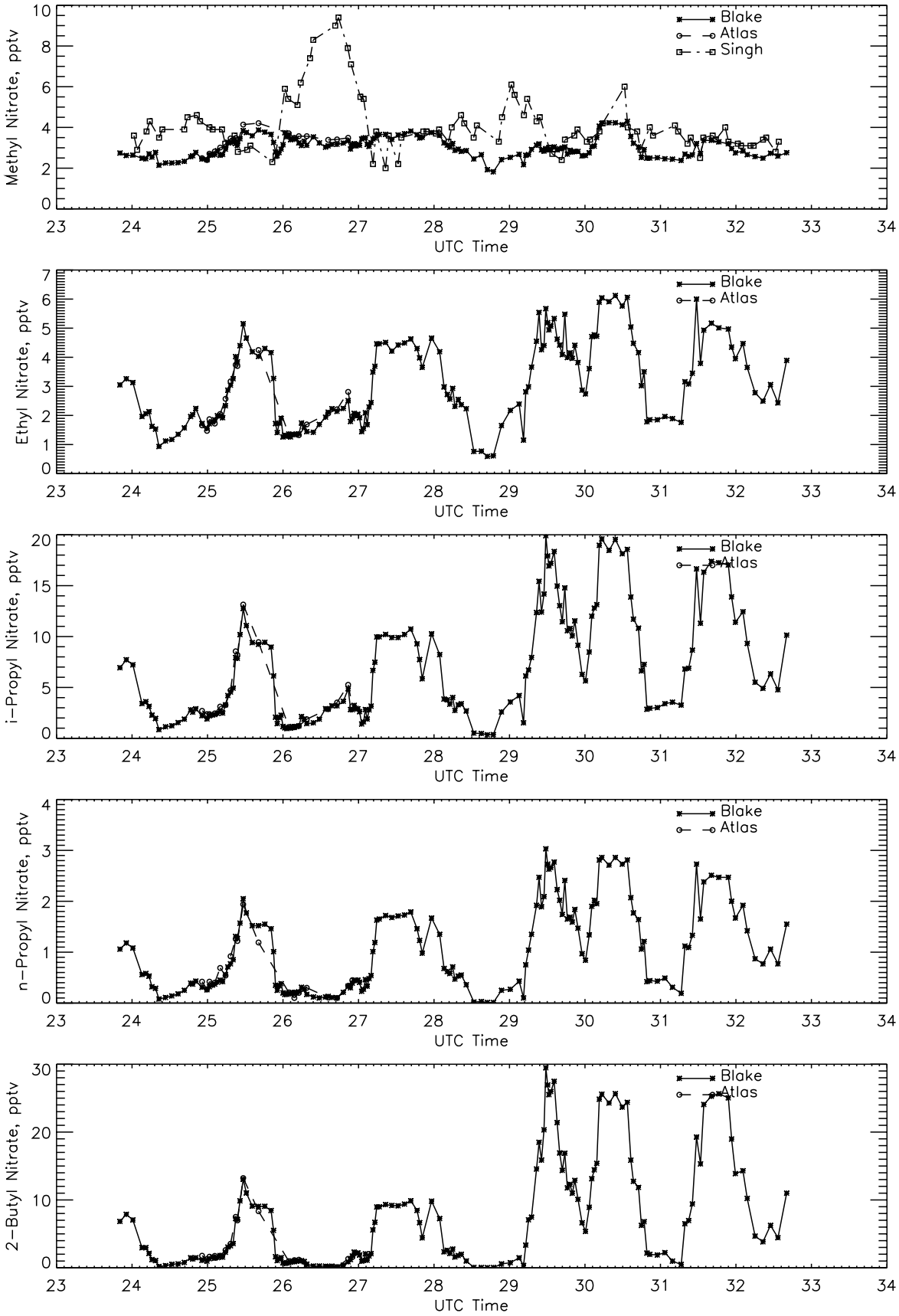



FINAL DATA: TRACE-P DC-8 Flight 15
clip: max=1228.00
Ethene, pptv
UTC Time
C3H8/C2H6
UTC Time
clip: max=0.405816
C2H4/C2H6
UTC Time
C2H2/CO
UTC Time
C2H6/CO
UTC Time

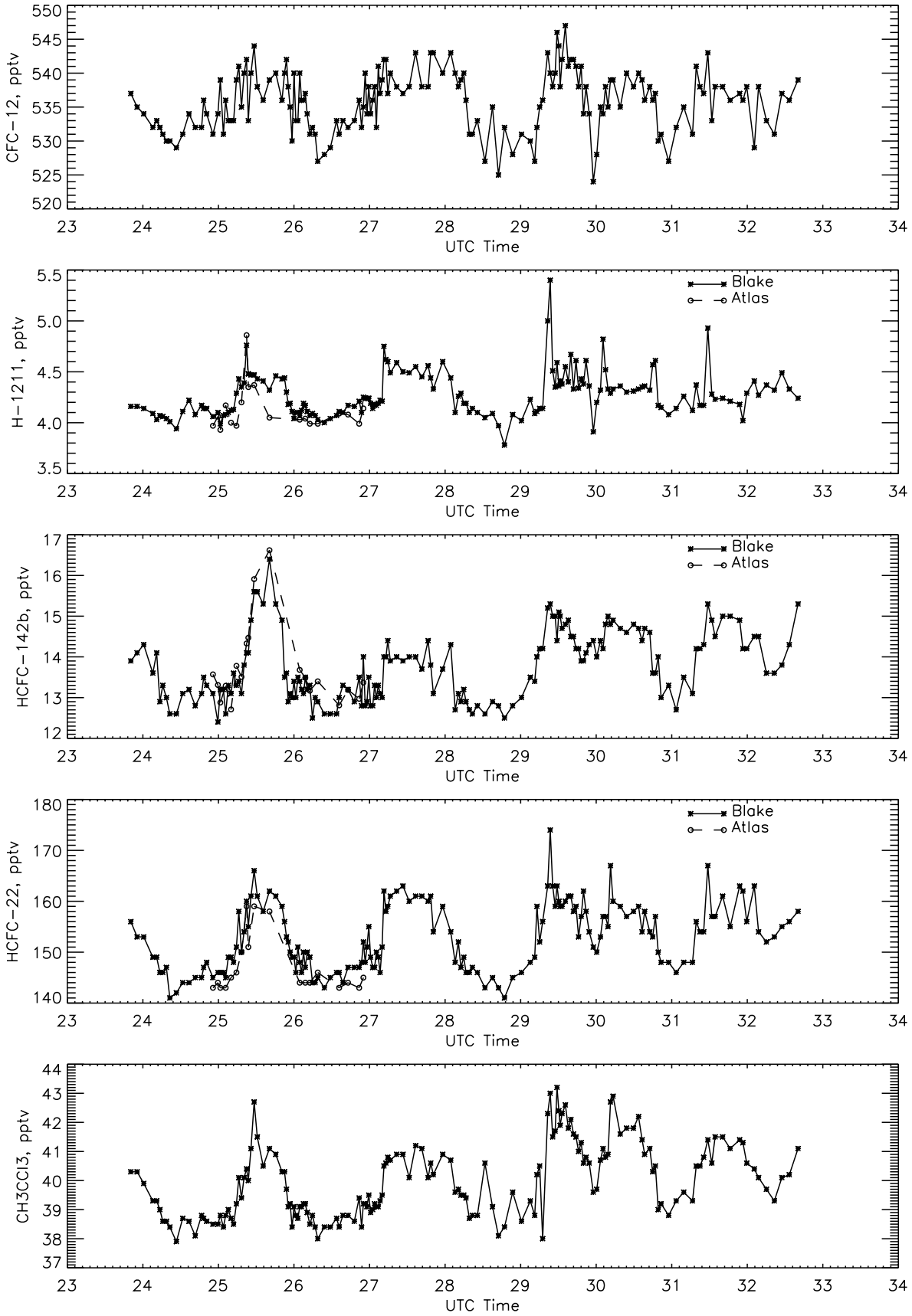

FINAL DATA: TRACE-P DC-8 Flight 15
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
clip: max=1210.00
Apel
Singh
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 15
clip: max=12415.0
Apel
Singh
Methanol, pptv
UTC Time
clip: max=13811.0
Ethanol, pptv
clip: max=3626.00
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv

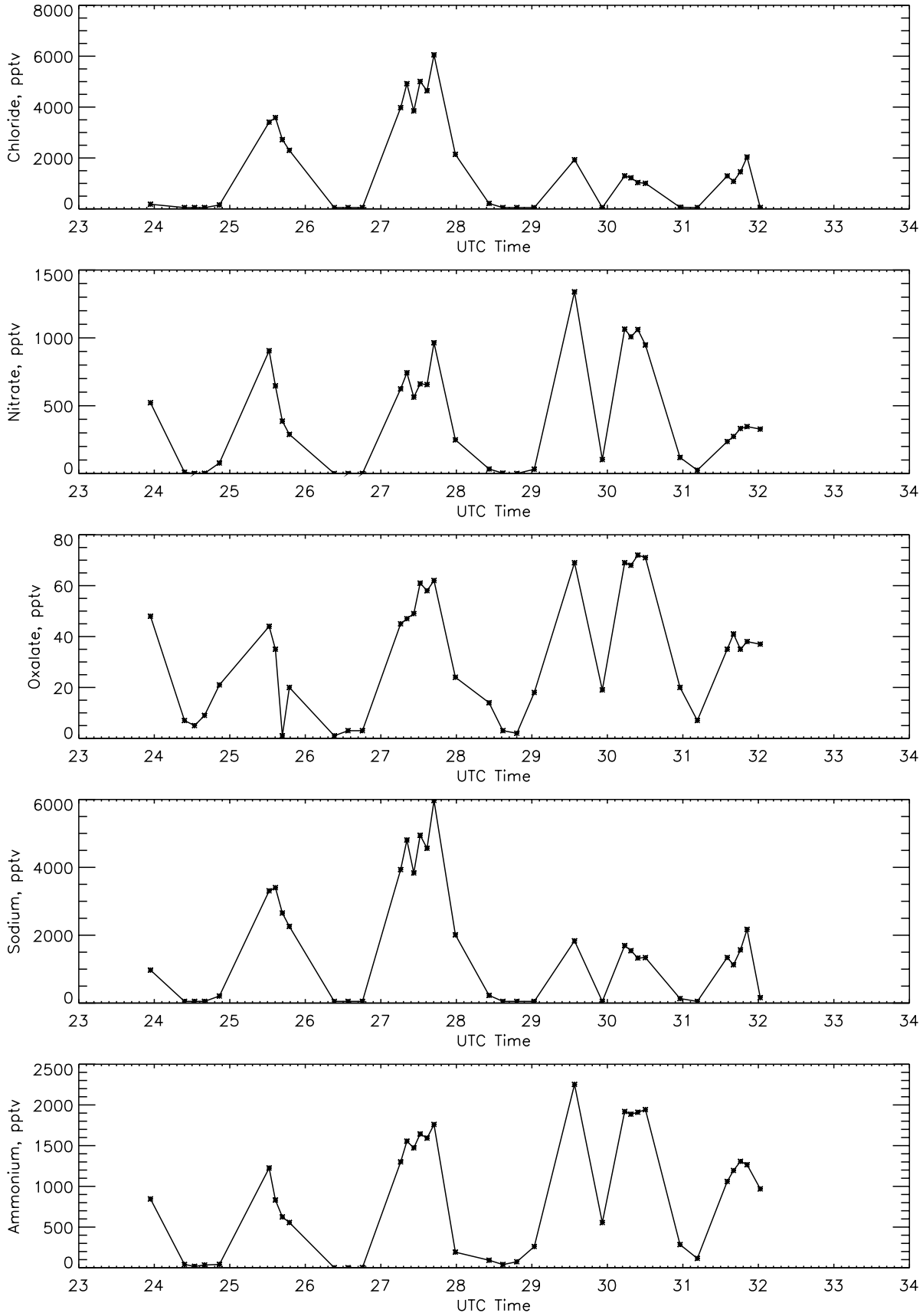
FINAL DATA: TRACE-P DC-8 Flight 15



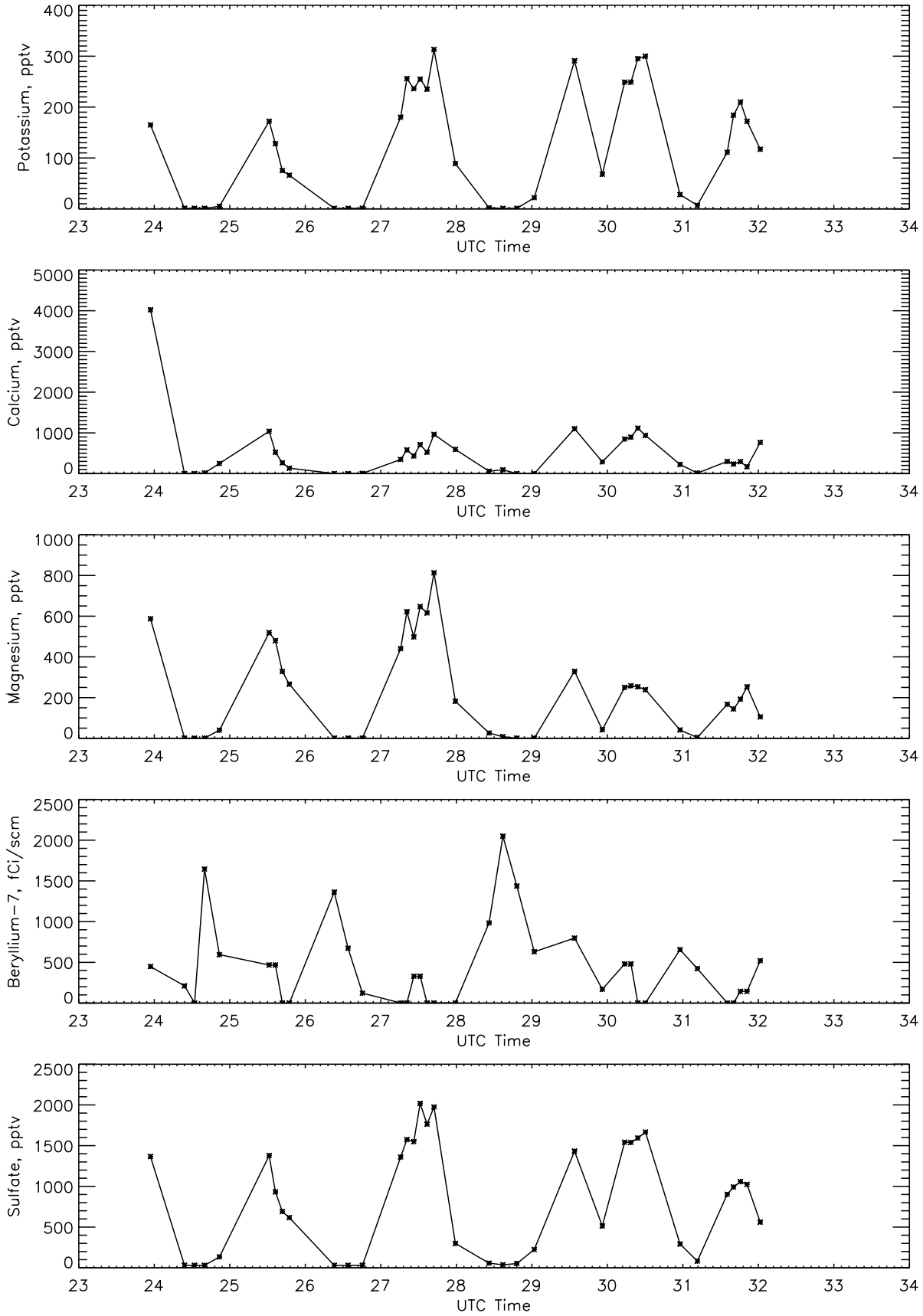
FINAL DATA: TRACE-P DC-8 Flight 15



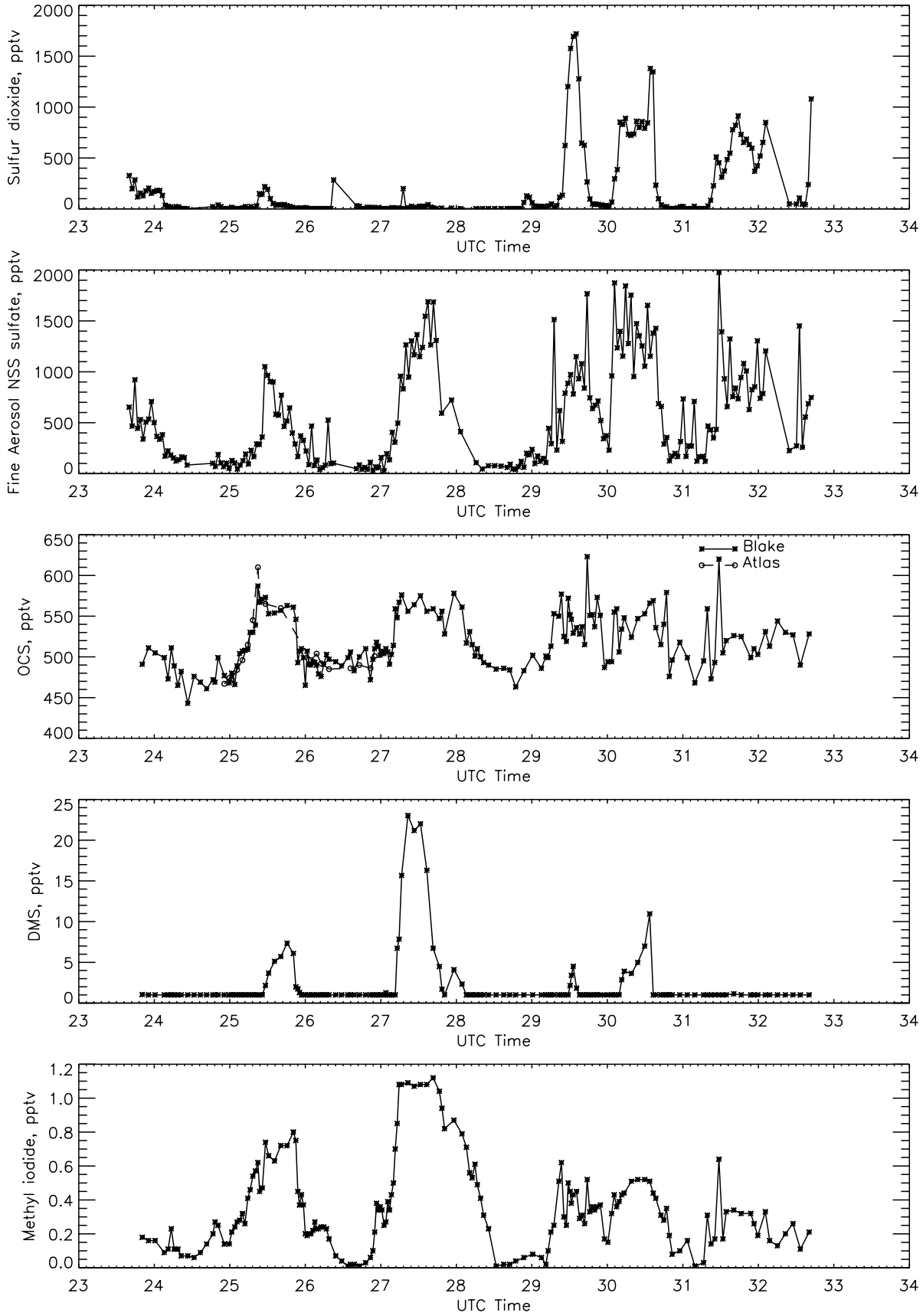
FINAL DATA: TRACE-P DC-8 Flight 15



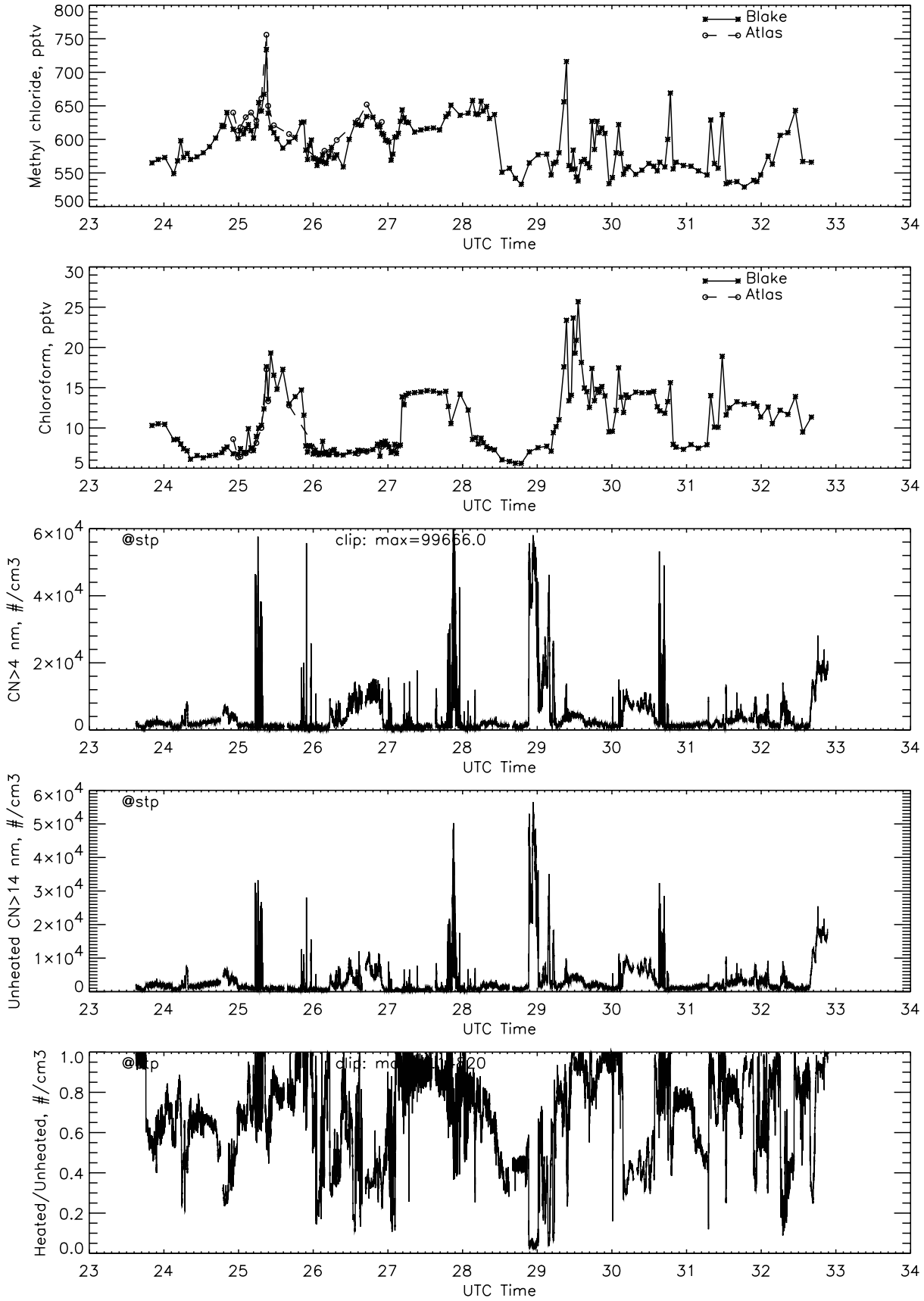
FINAL DATA: TRACE-P DC-8 Flight 15

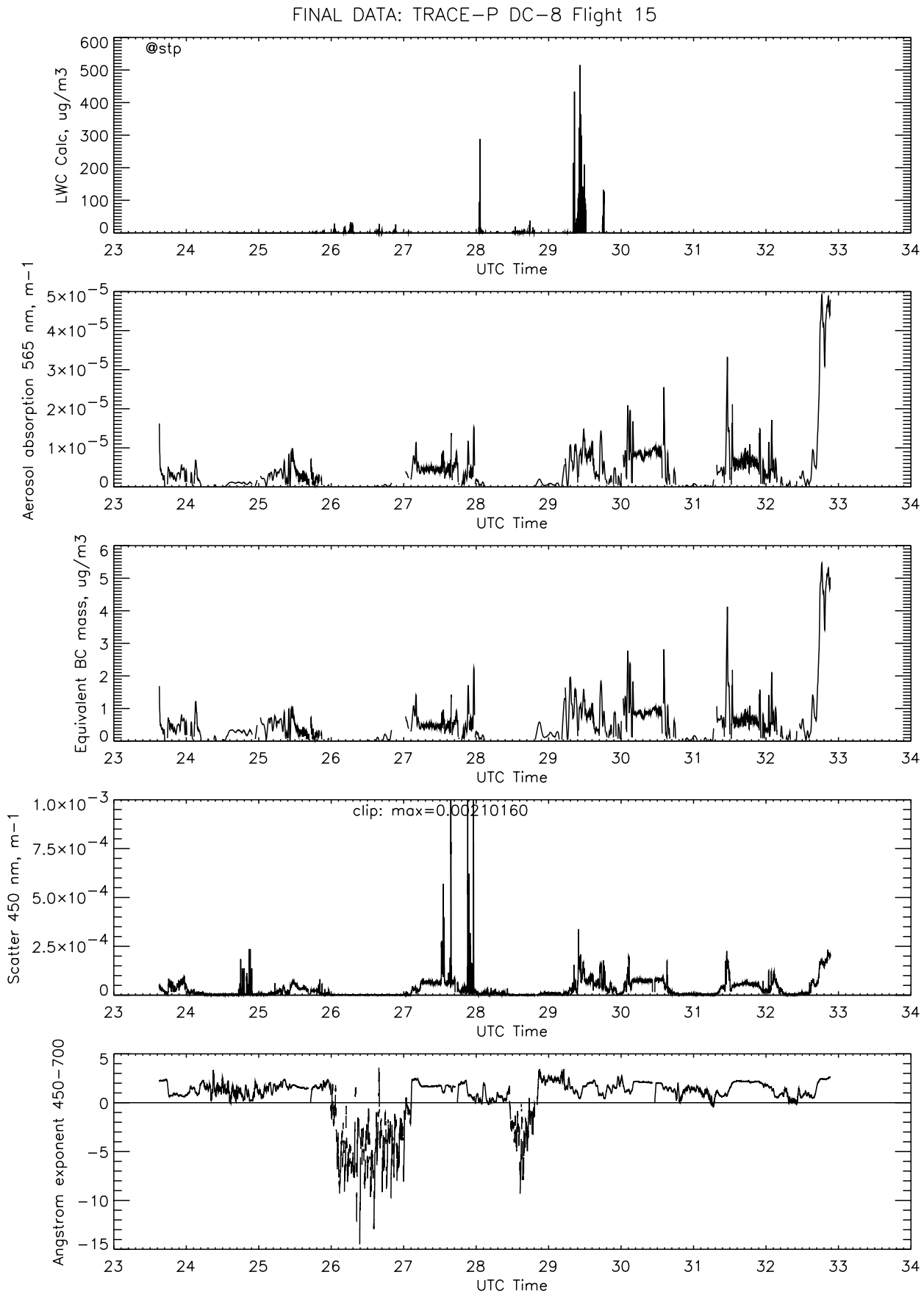


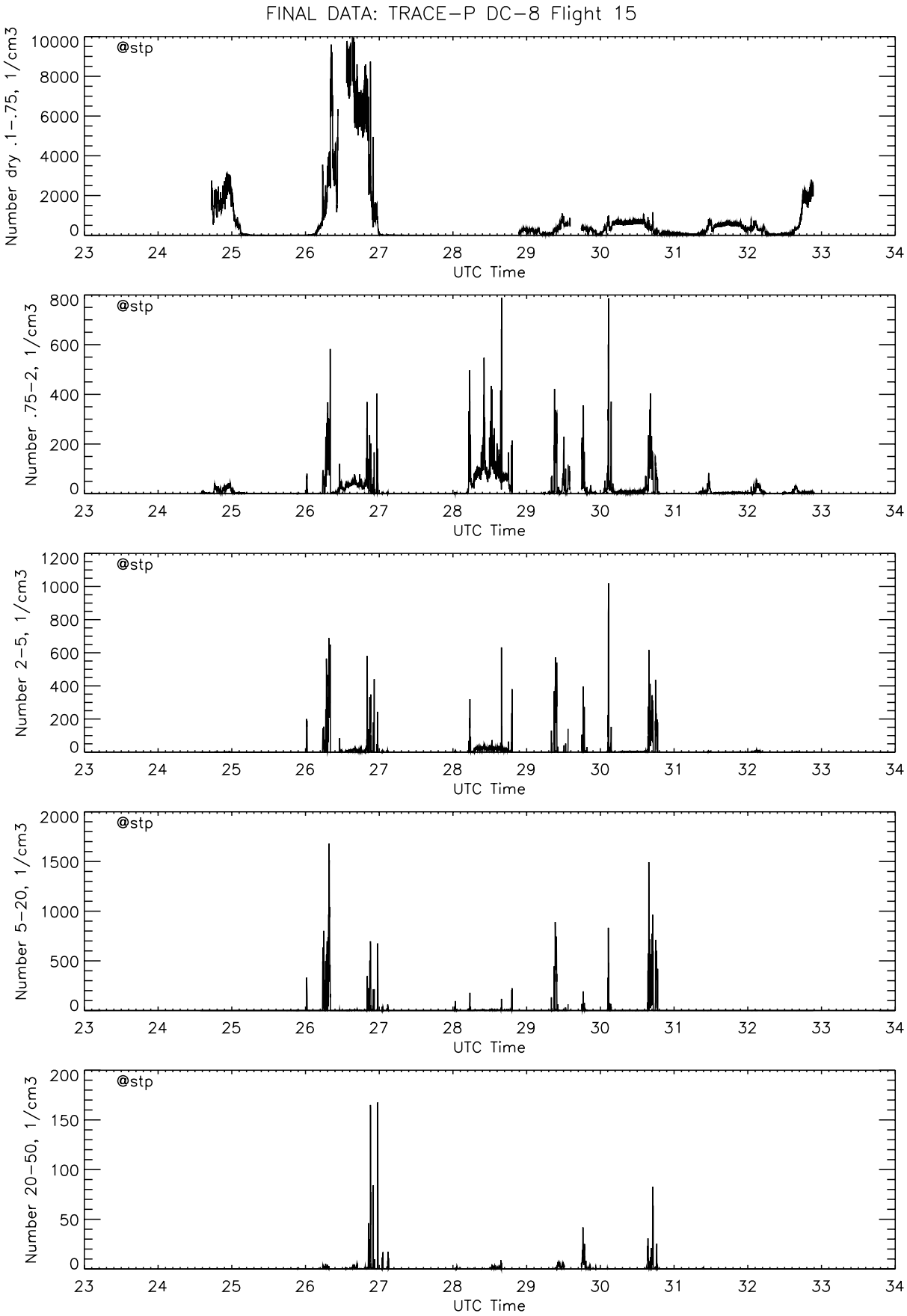
FINAL DATA: TRACE-P DC-8 Flight 15

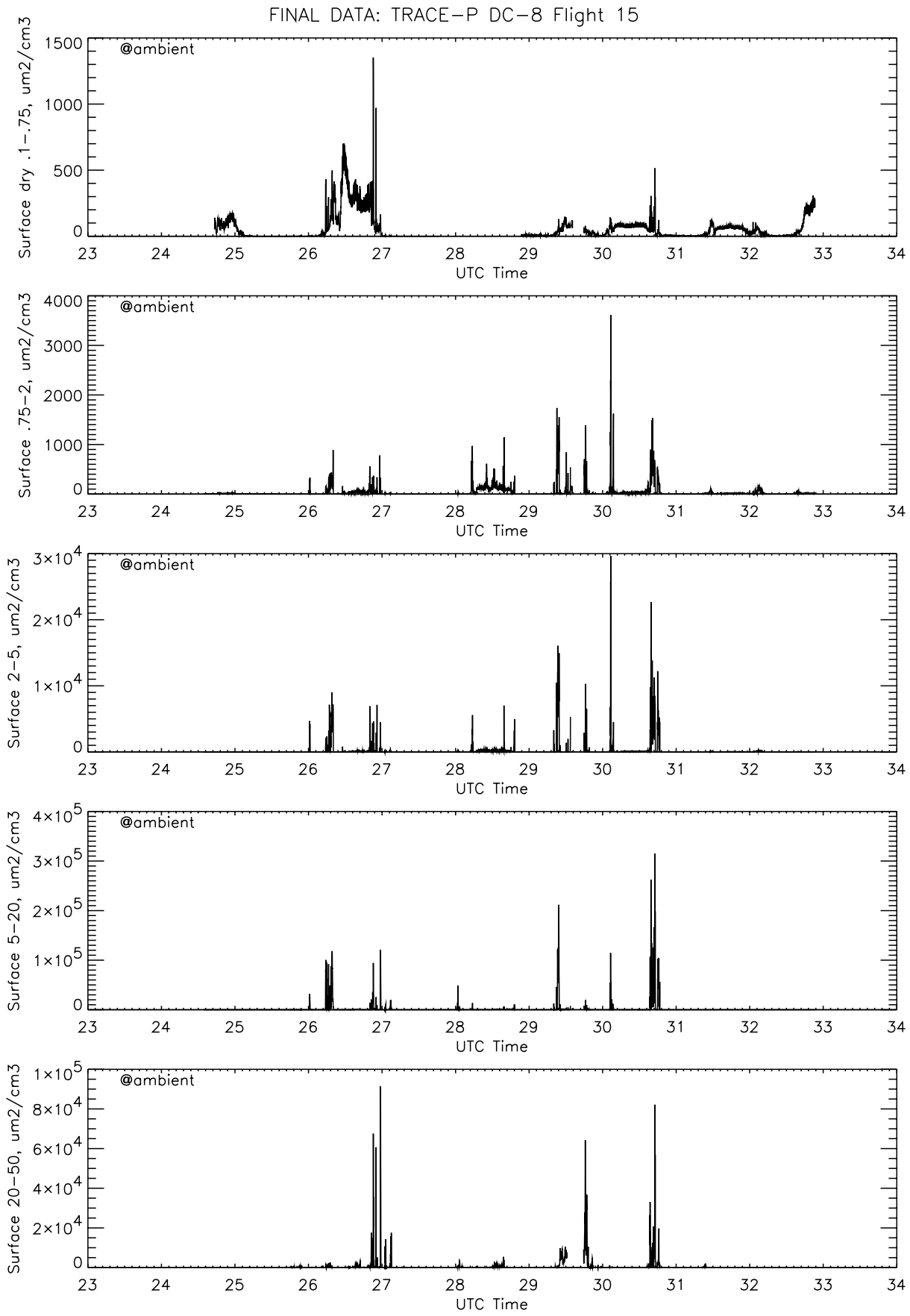


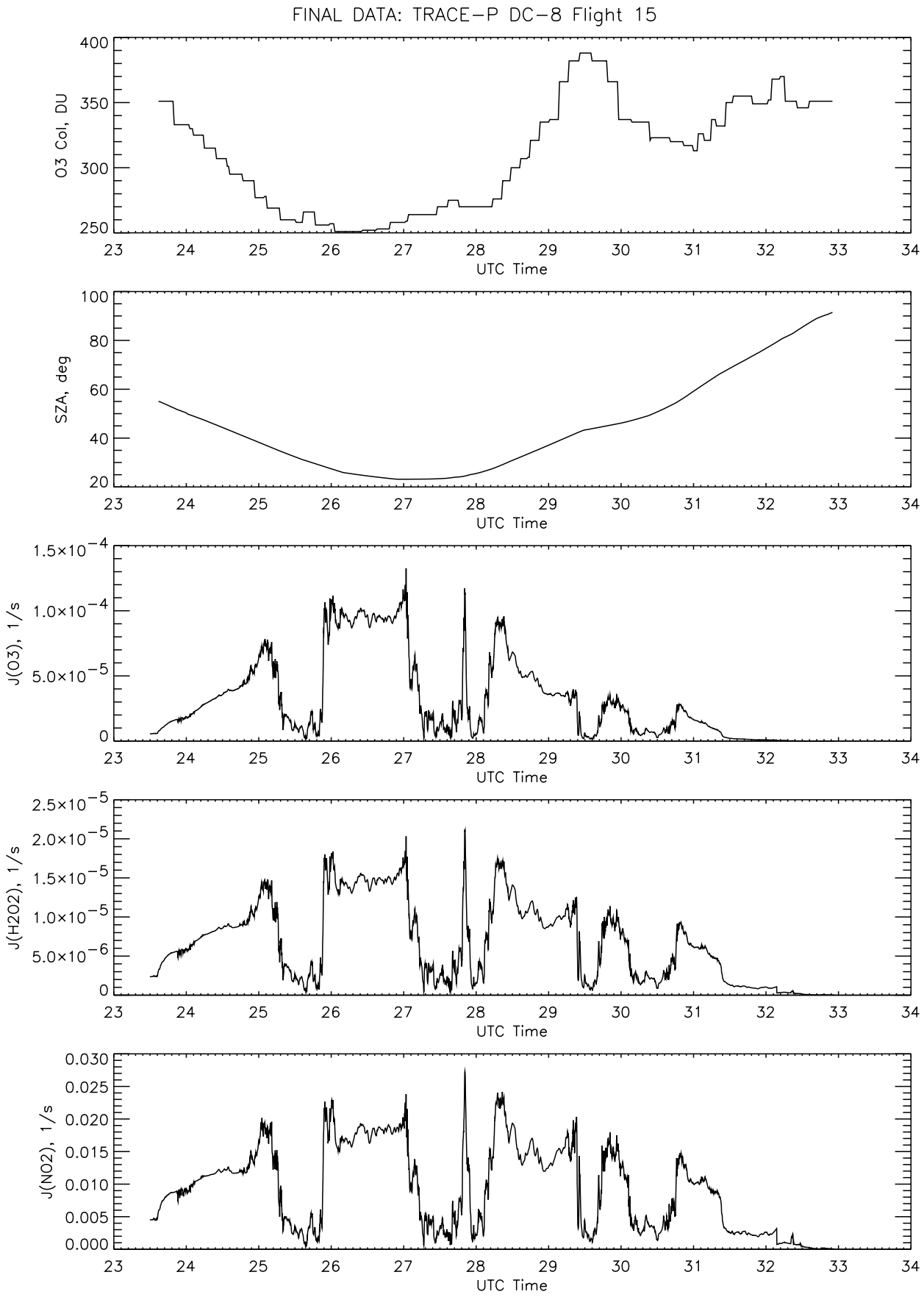
FINAL DATA: TRACE-P DC-8 Flight 15

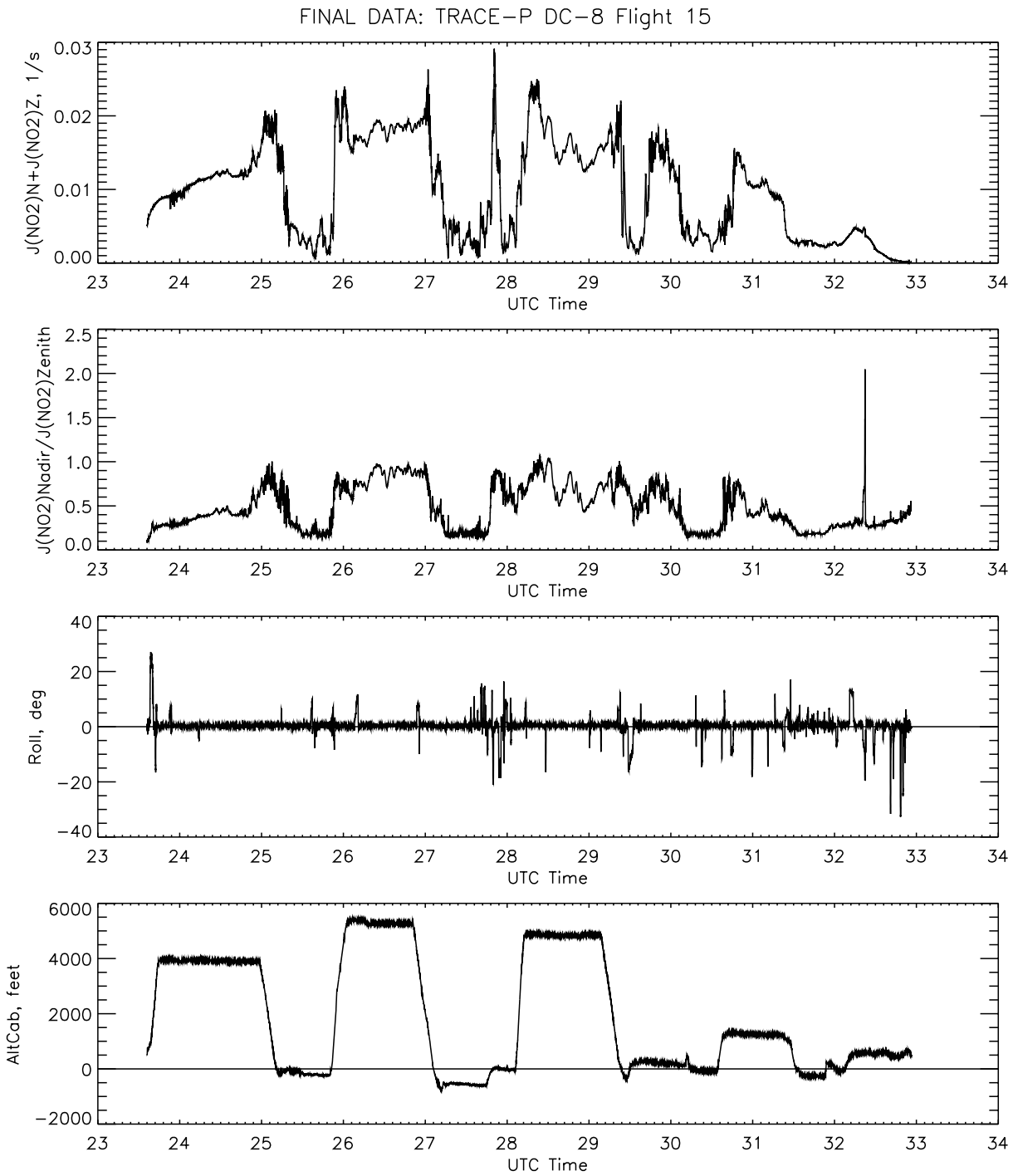


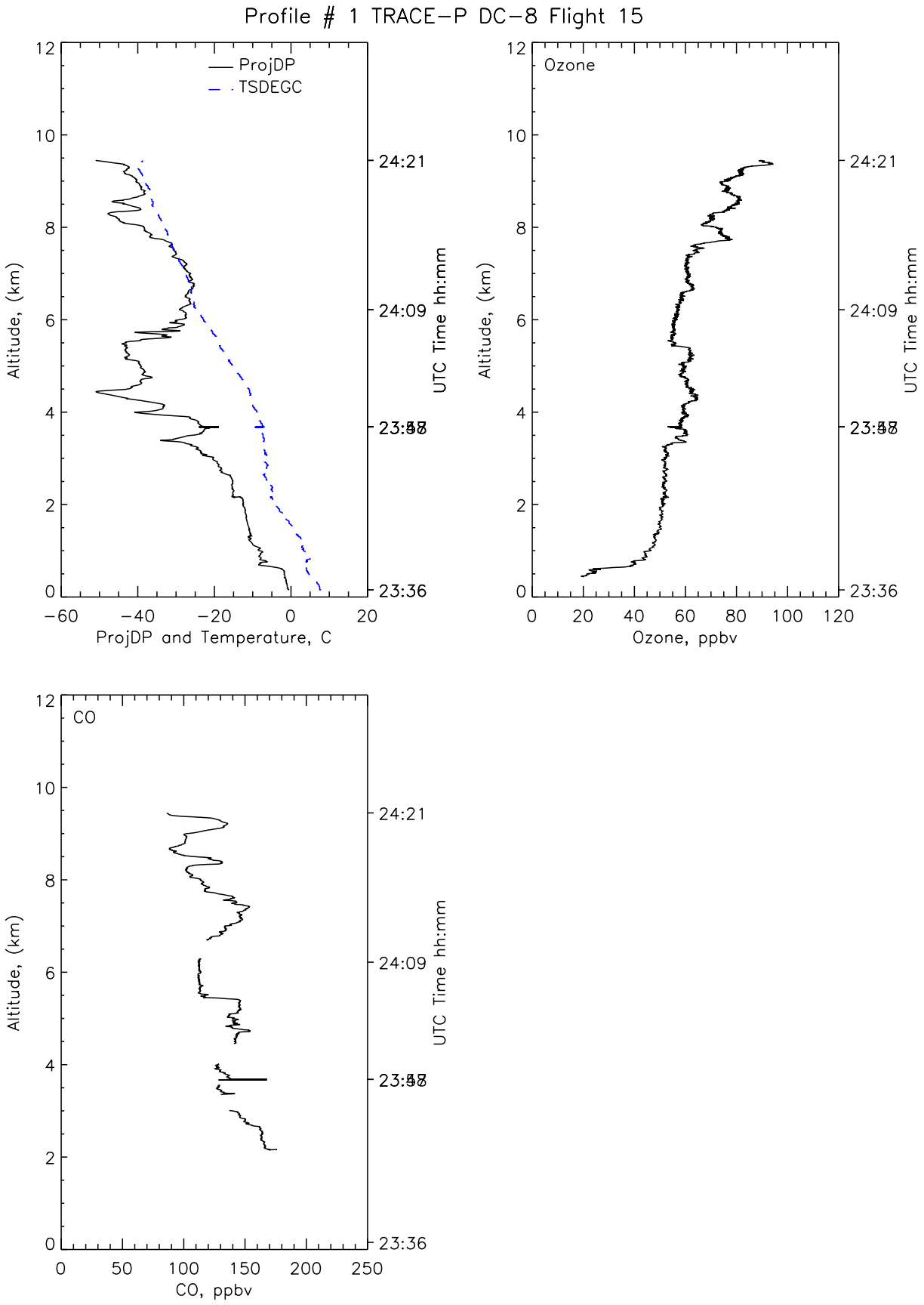

FINAL DATA: TRACE-P DC-8 Flight 15
@stp
LWC Calc, ug/m3
Aerosol absorption 565 nm, m-1
Equivalent BC mass, ug/m3
clip: max=0.00210160
Scatter 450 nm, m-1
Angstrom exponent 450-700
UTC Time

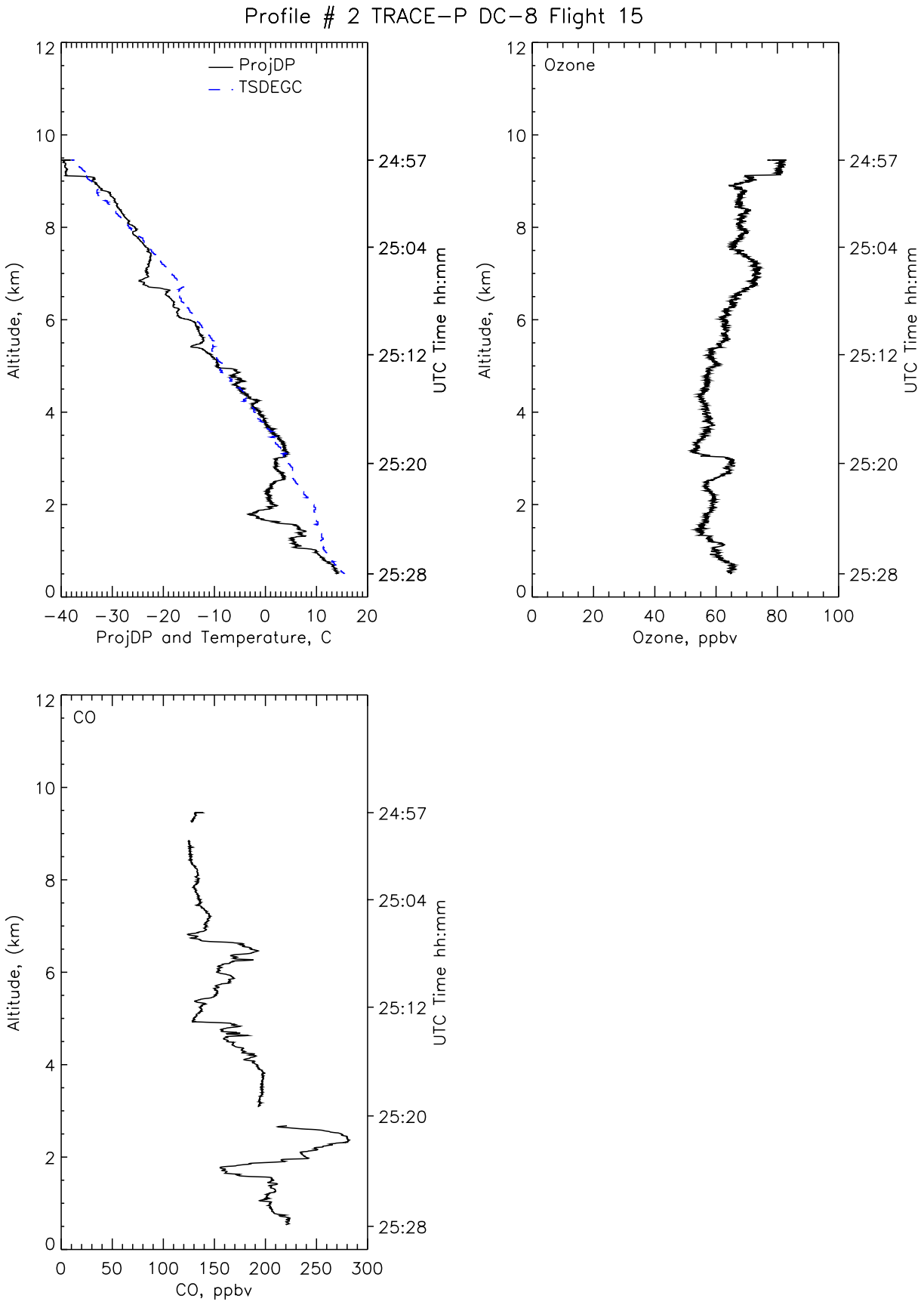

FINAL DATA: TRACE-P DC-8 Flight 15
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

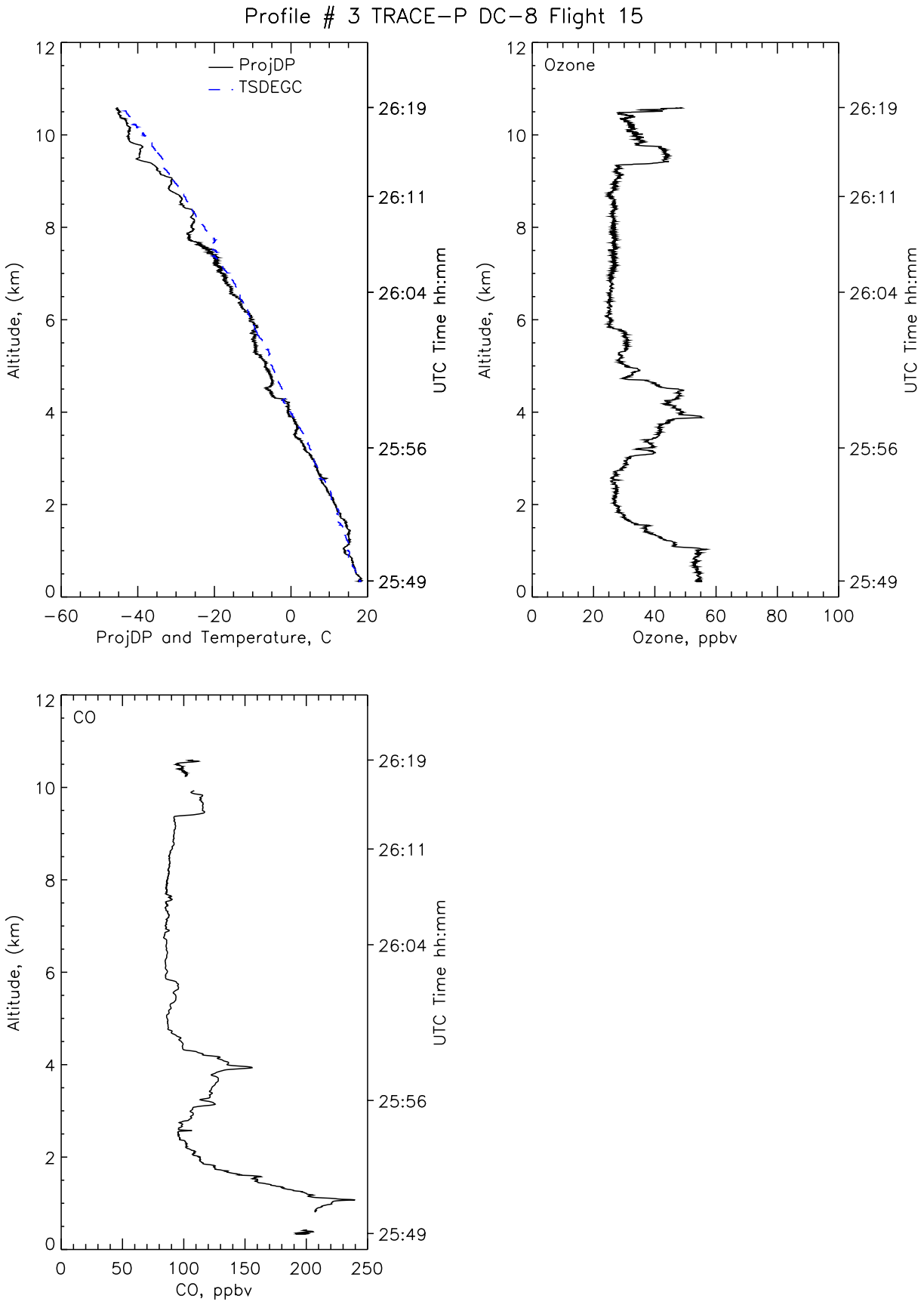

FINAL DATA: TRACE-P DC-8 Flight 15
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

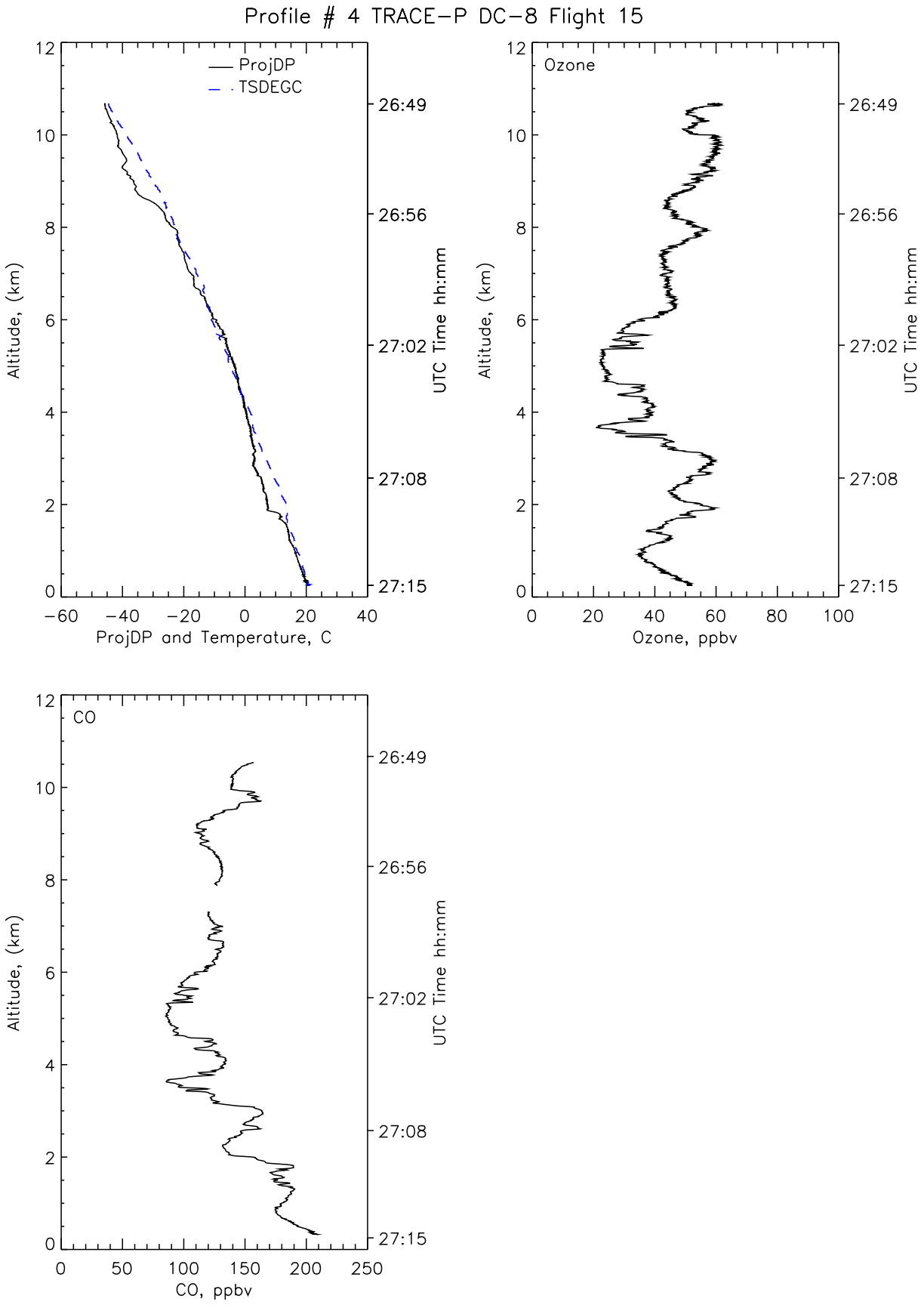

FINAL DATA: TRACE-P DC-8 Flight 15
O3 Col, DU
UTC Time
SZA, deg
UTC Time
J(O3), 1/s
UTC Time
J(H2O2), 1/s
UTC Time
J(NO2), 1/s
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 15
J(NO2)N+J(NO2)Z, 1/s
0.03
0.02
0.01
0.00
23 24 25 26 27 28 29 30 31 32 33 34
UTC Time
J(NO2)Nadir/J(NO2)Zenith
2.5
2.0
1.5
1.0
0.5
0.0
23 24 25 26 27 28 29 30 31 32 33 34
UTC Time
Roll, deg
40
20
0
−20
−40
23 24 25 26 27 28 29 30 31 32 33 34
UTC Time
AltCab, feet
6000
4000
2000
0
−2000
23 24 25 26 27 28 29 30 31 32 33 34
UTC Time

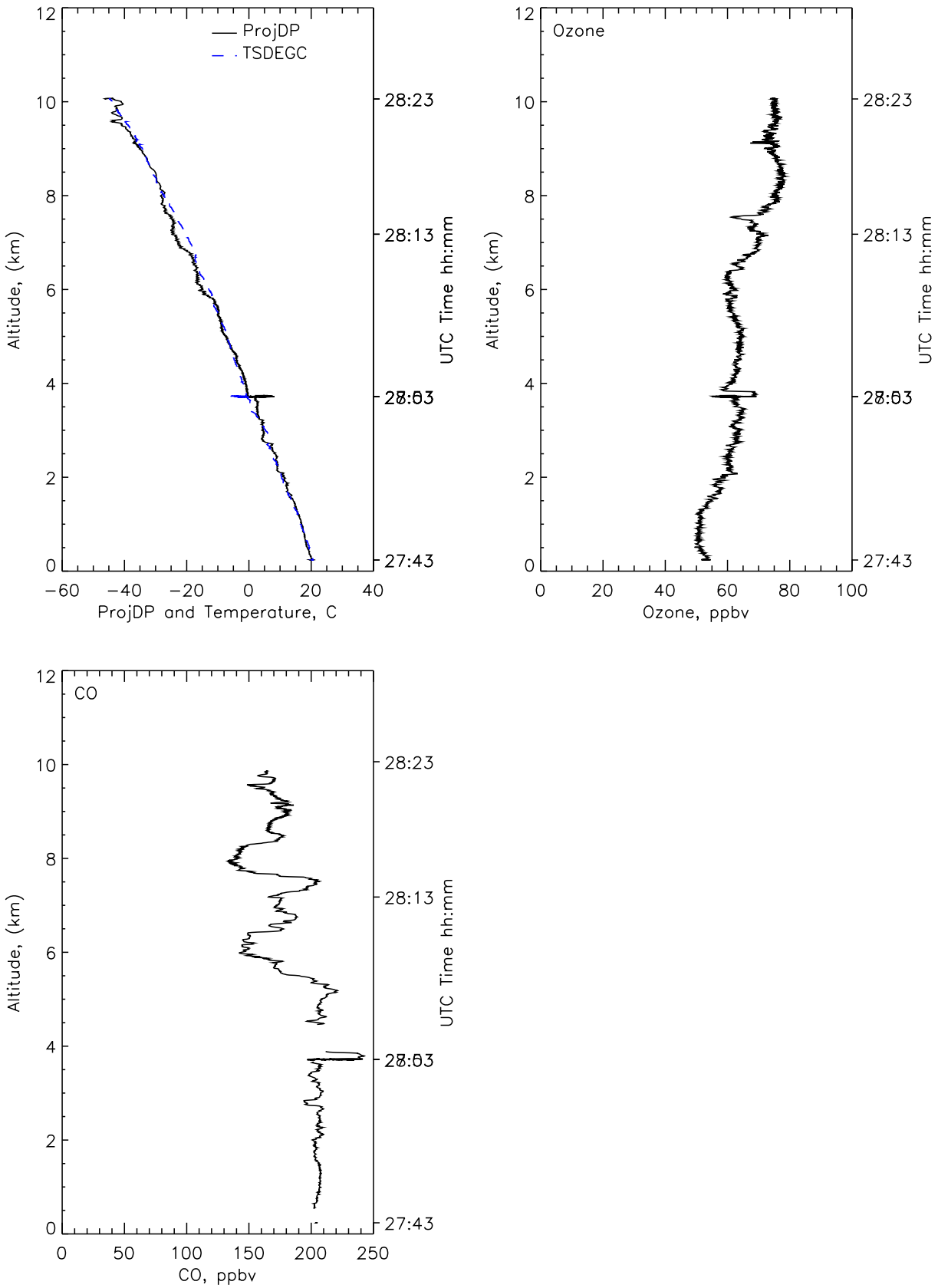

Profile # 1 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
24:21
24:09
23:57
23:36
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

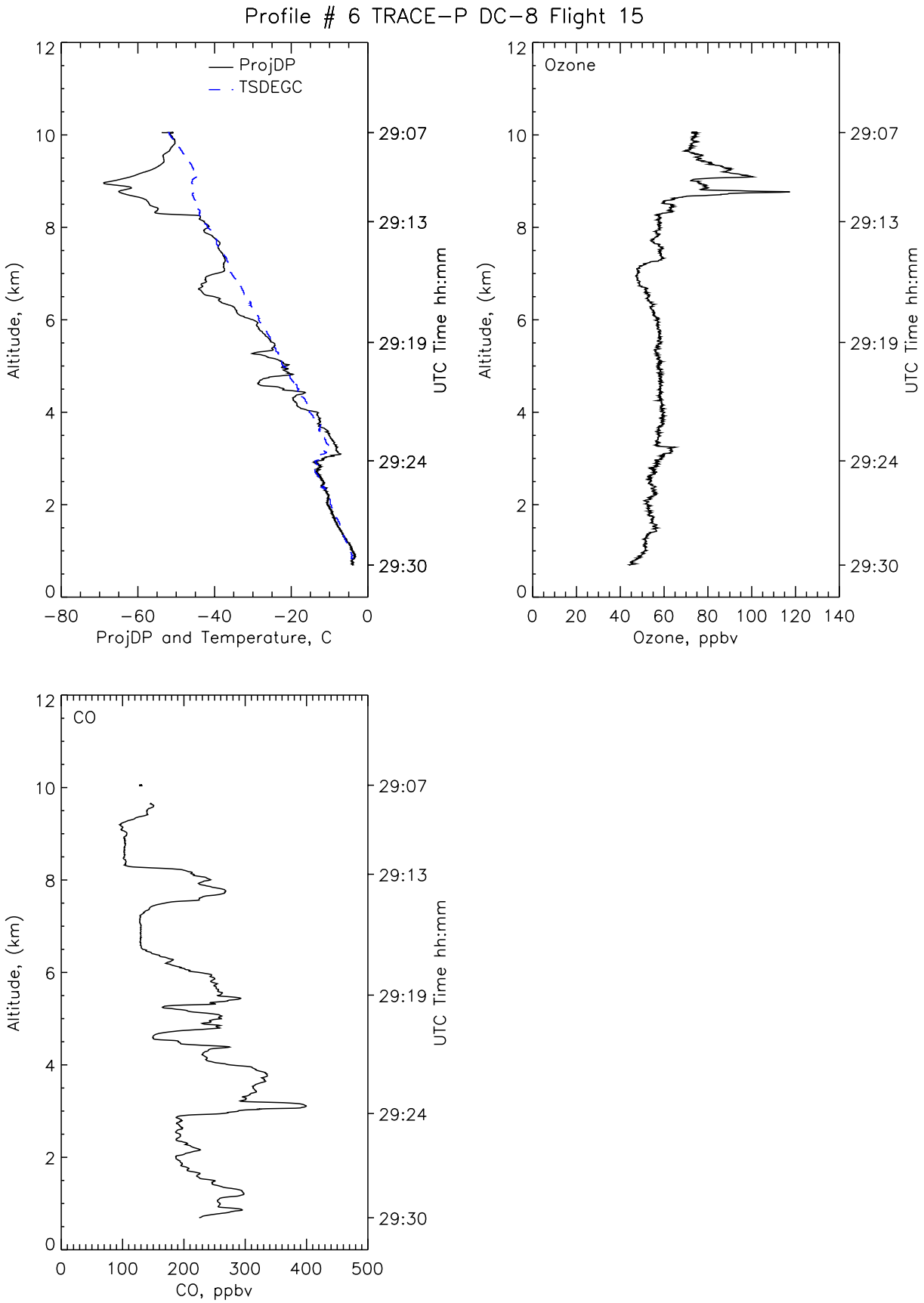

Profile # 2 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
24:57
25:04
25:12
25:20
25:28
Ozone
Ozone, ppbv
CO
CO, ppbv

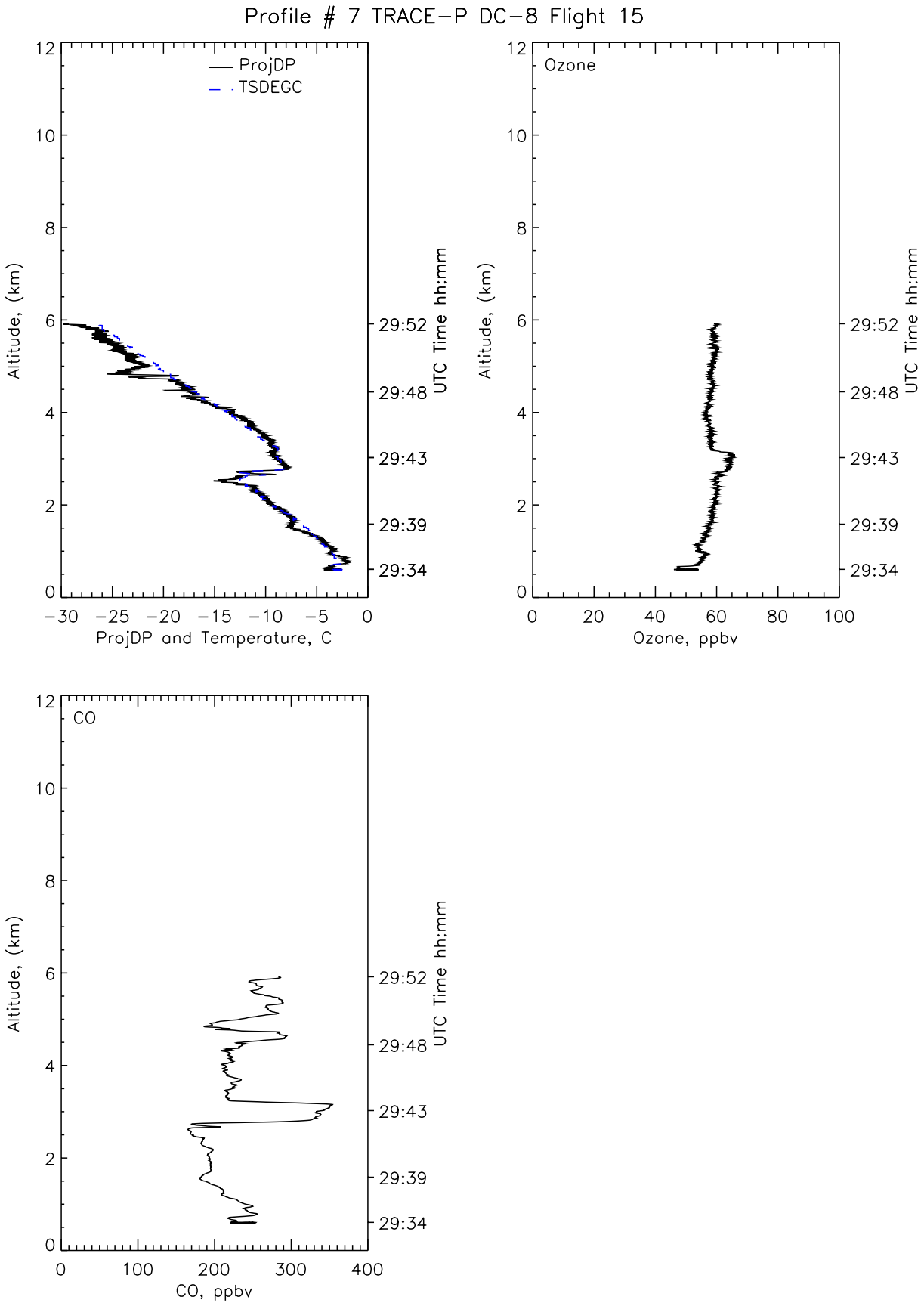

Profile # 3 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
26:19
26:11
26:04
25:56
25:49
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

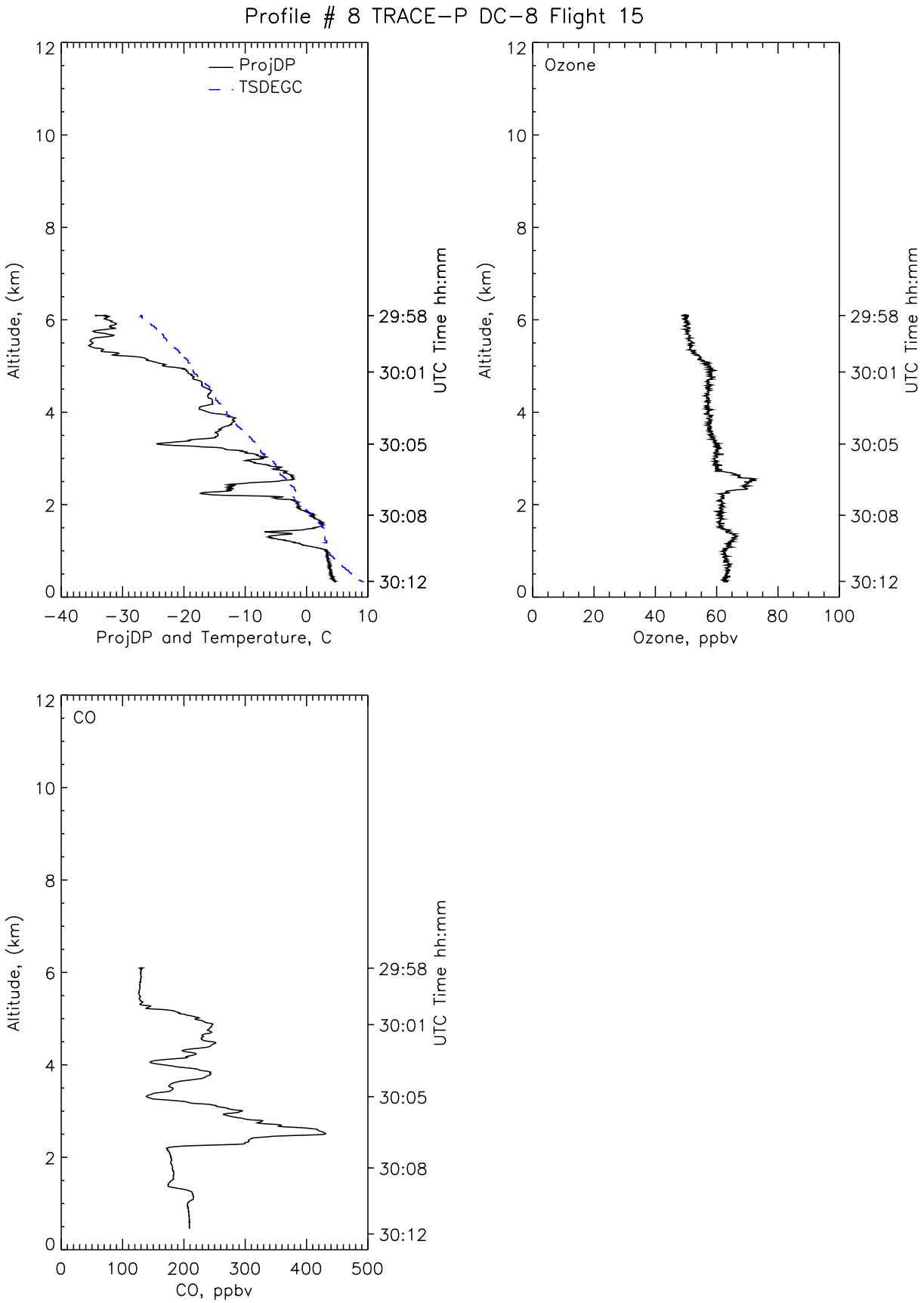

Profile # 4 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
26:49
26:56
27:02
27:08
27:15
Ozone
Ozone, ppbv
CO
CO, ppbv

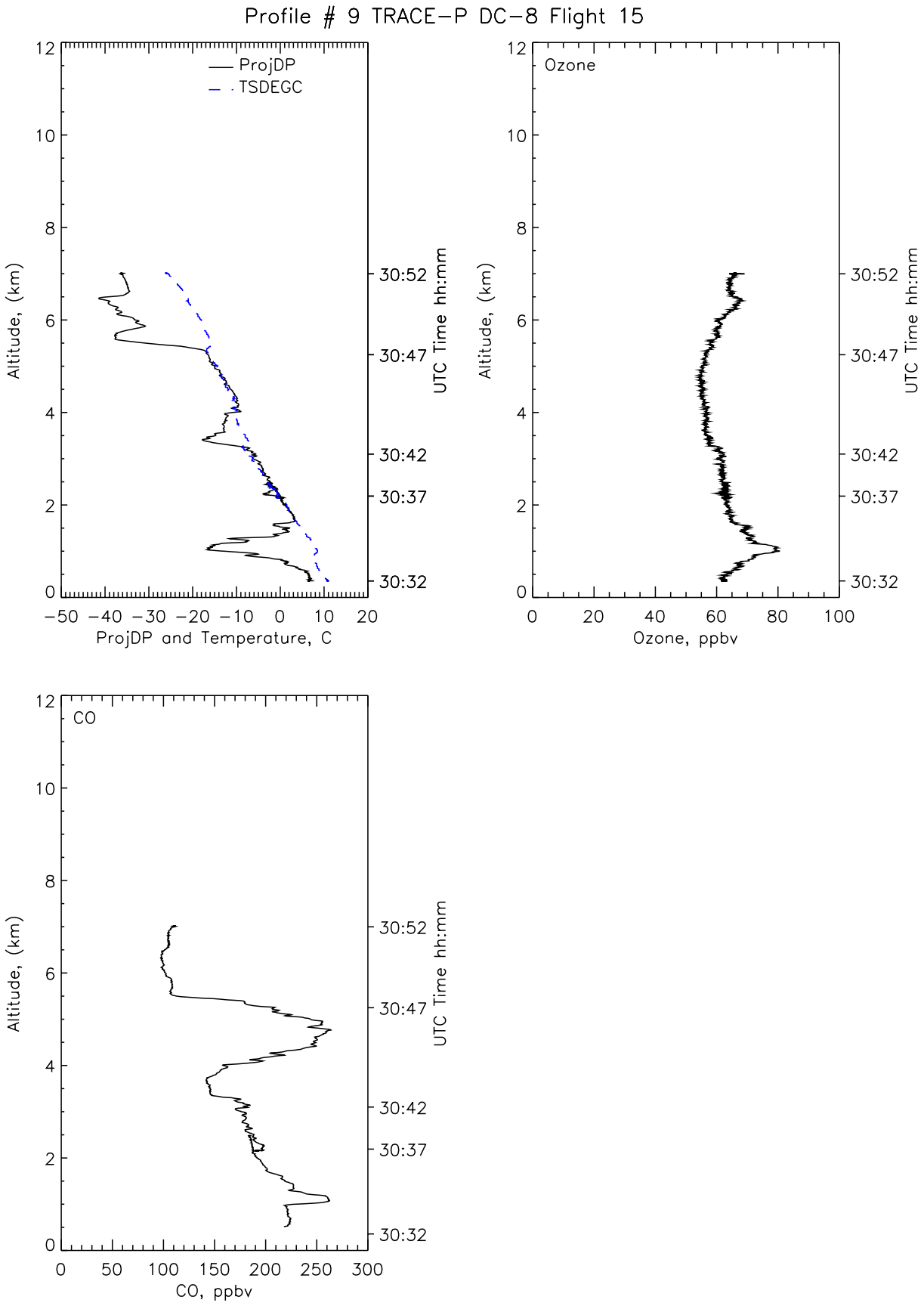
Profile # 5 TRACE-P DC-8 Flight 15

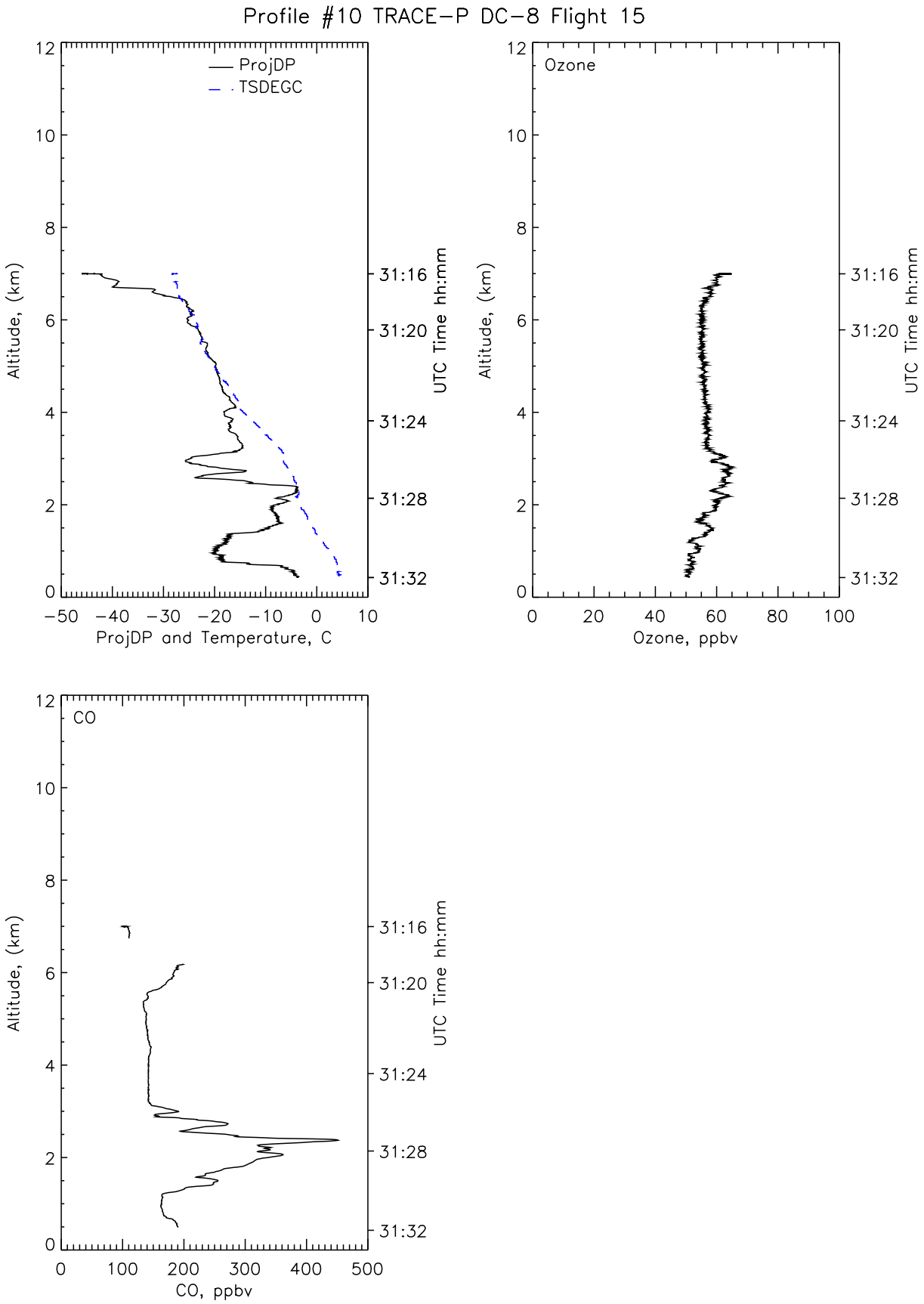


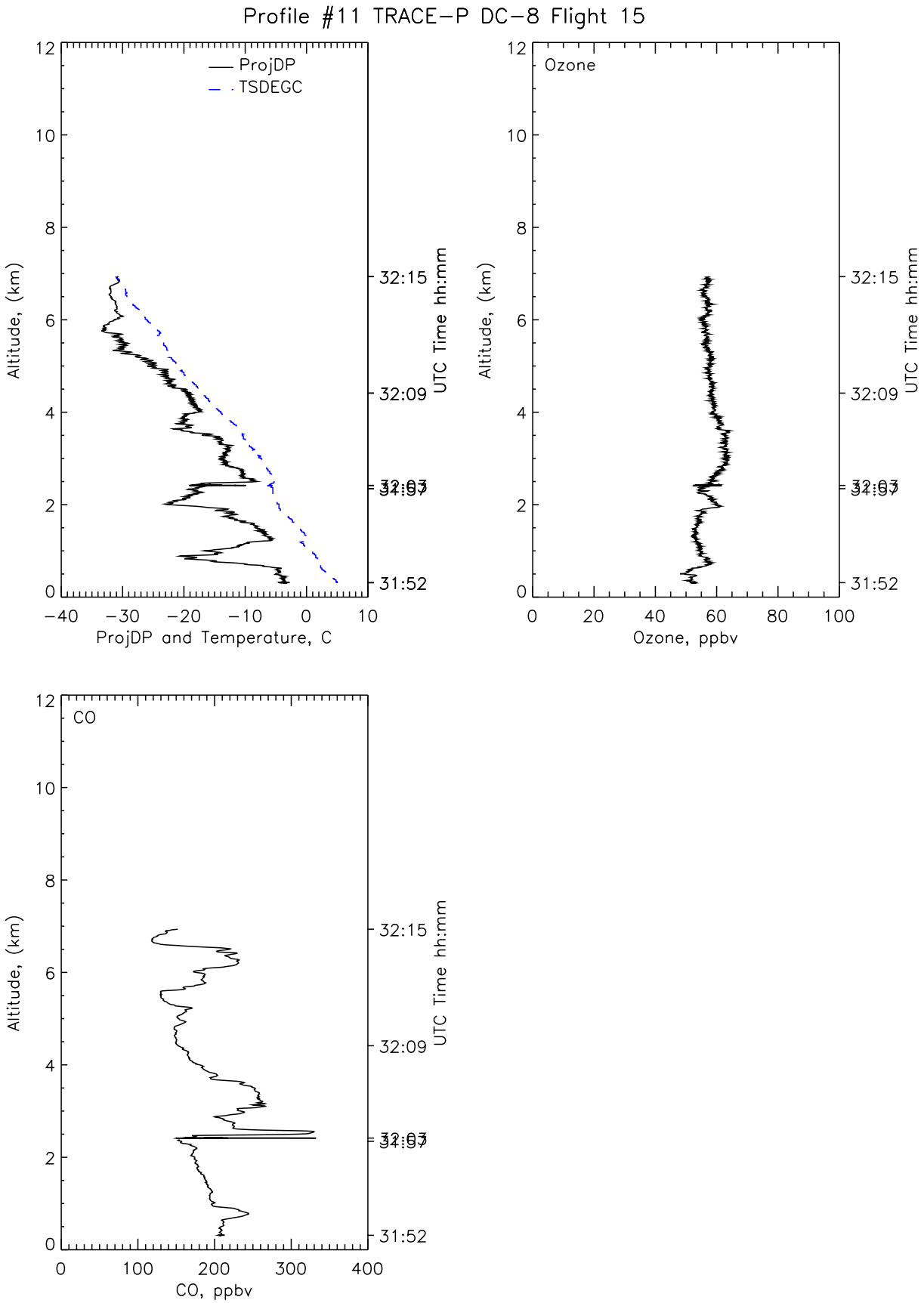

Profile # 6 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
29:07
29:13
29:19
29:24
29:30
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

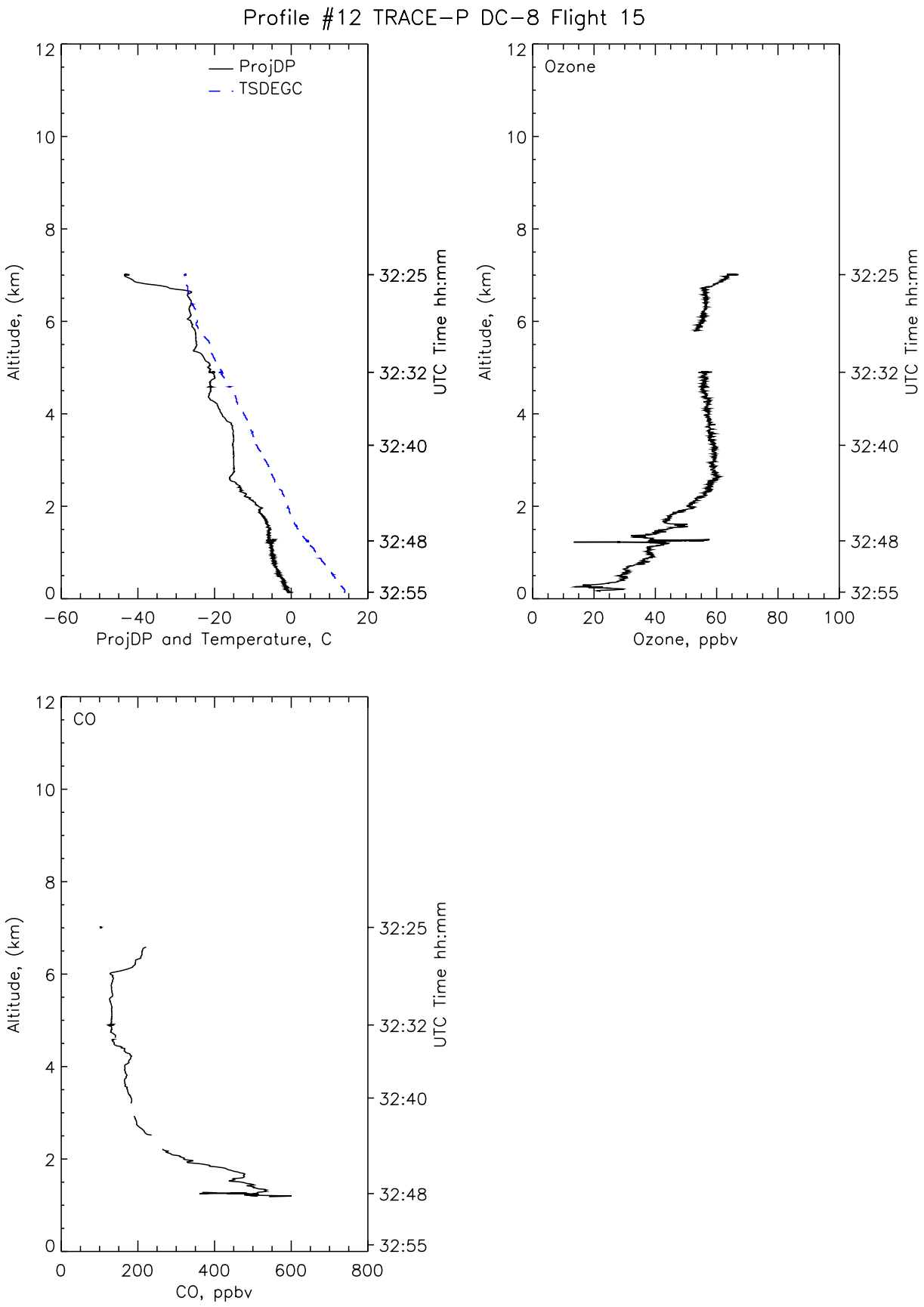

Profile # 7 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
29:52
29:48
29:43
29:39
29:34
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 8 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
29:58
30:01
30:05
30:08
30:12
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 9 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #10 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #11 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
32:15
32:09
32:03
31:57
31:52
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile #12 TRACE-P DC-8 Flight 15
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

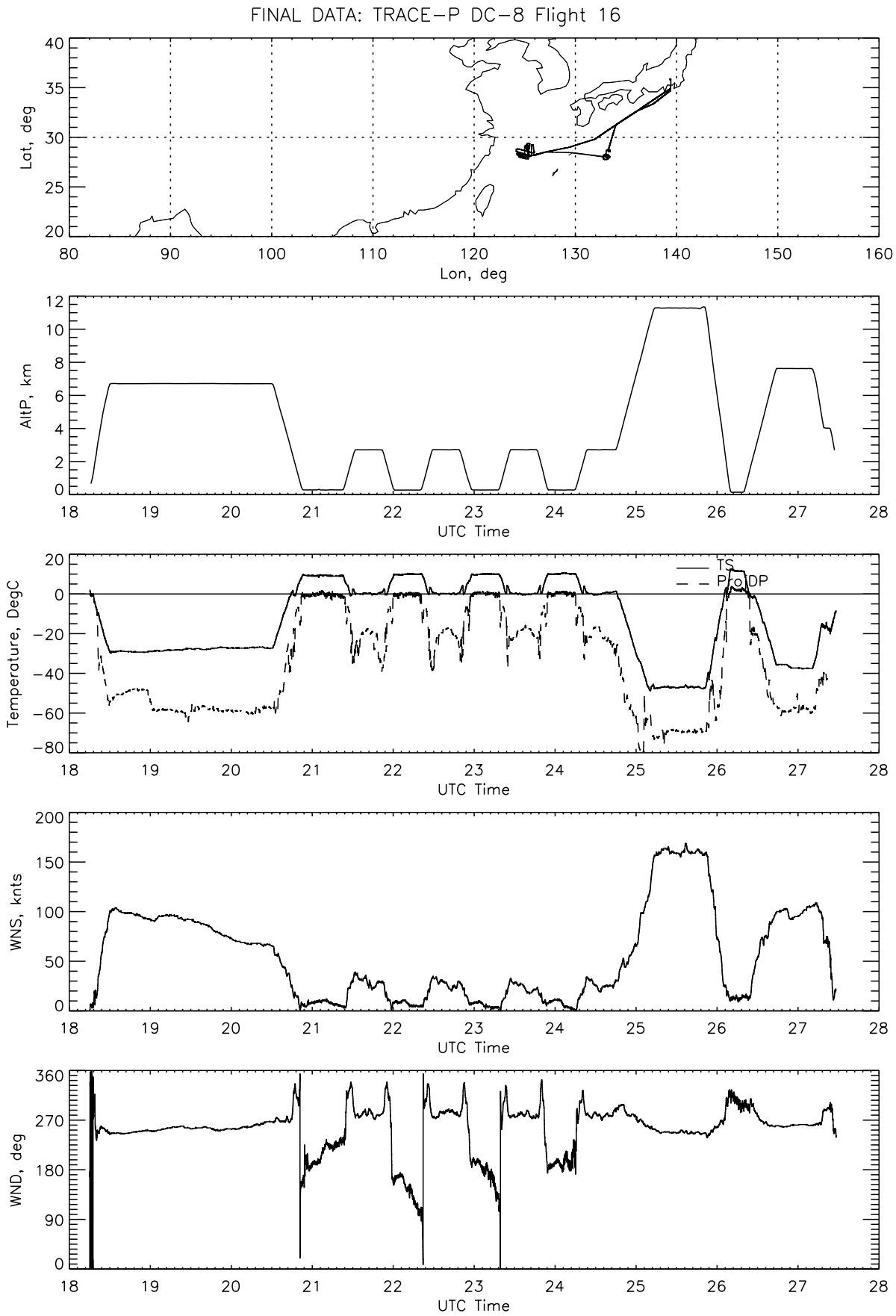
TRACE-P

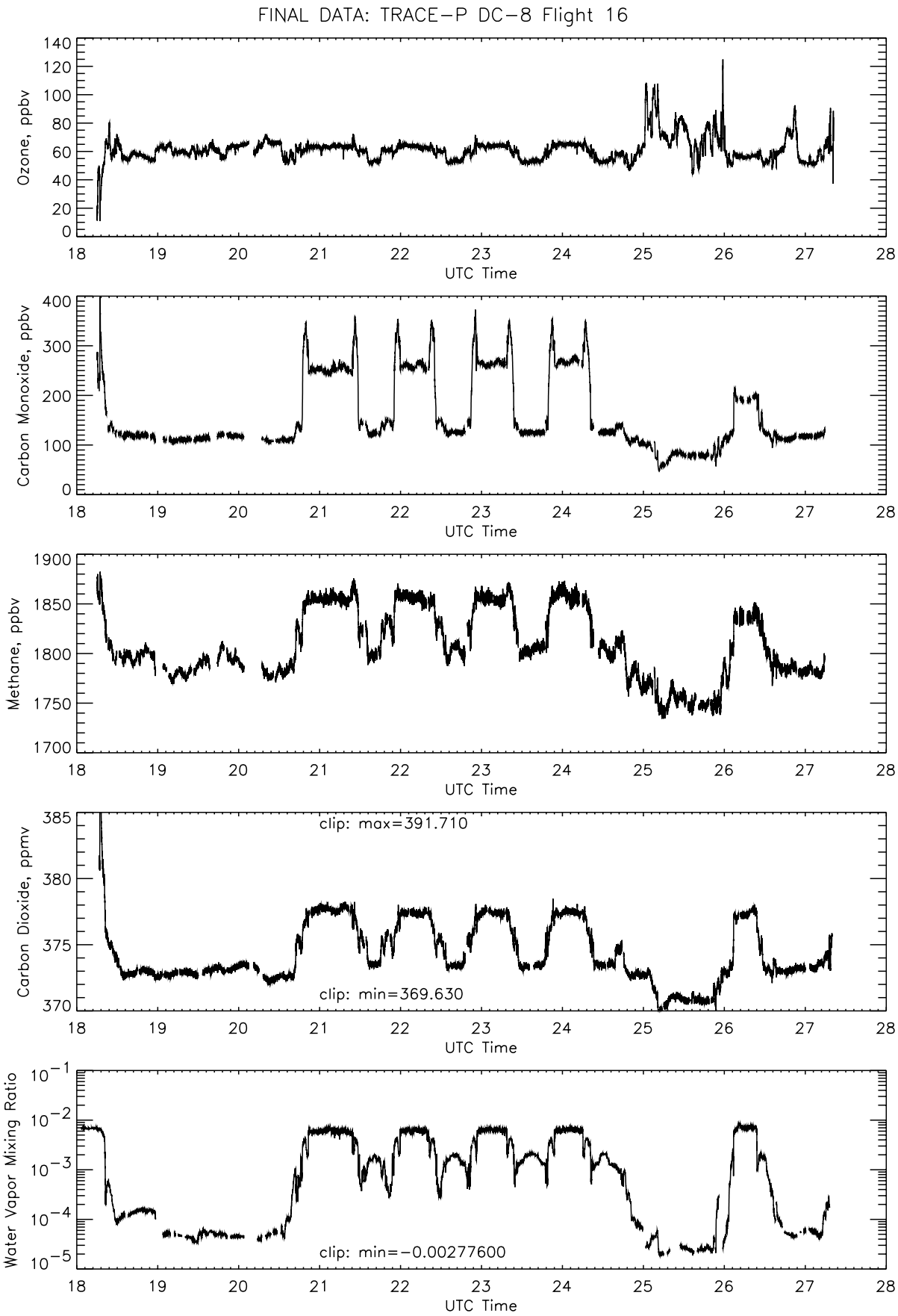
Flight 16D

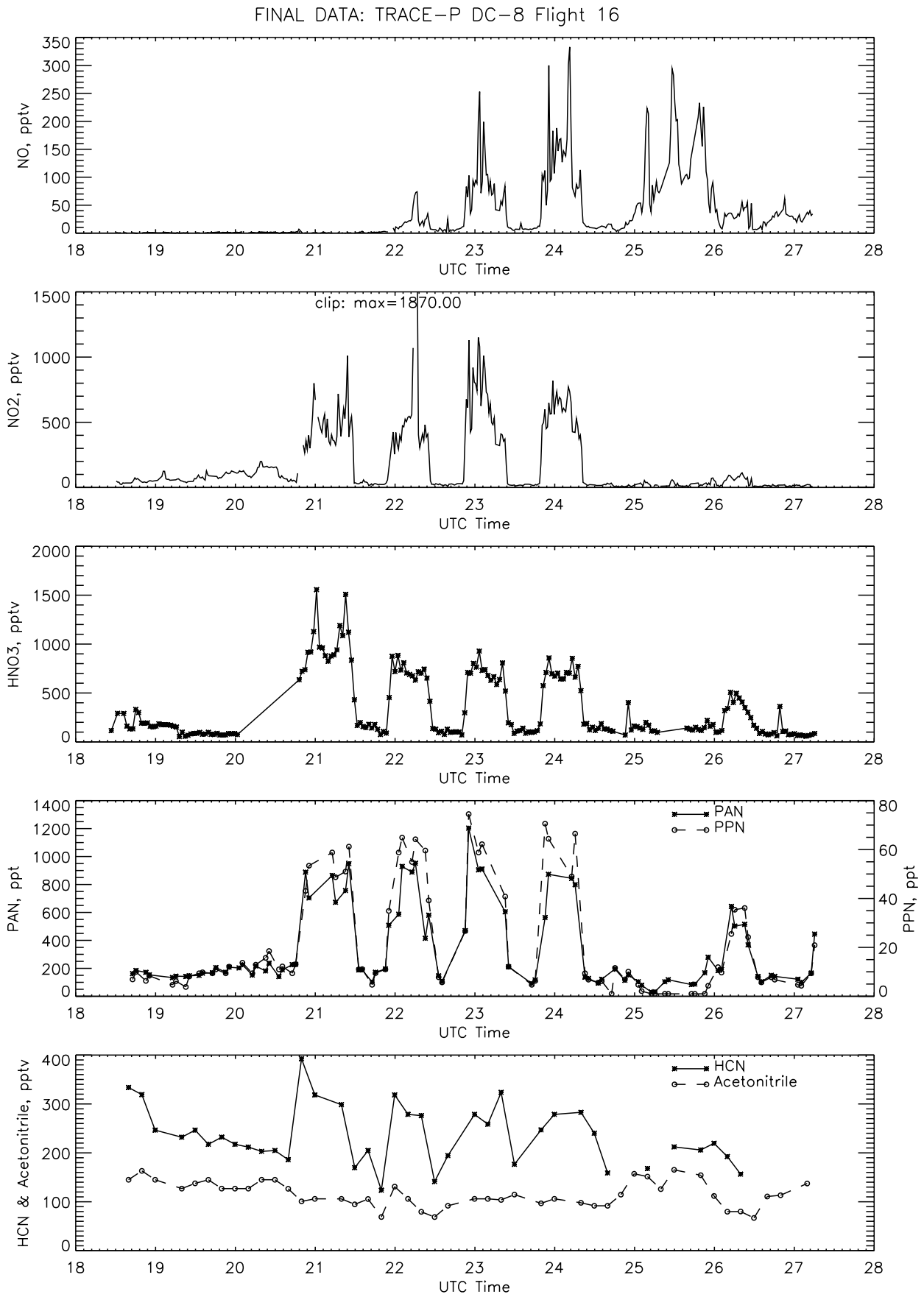
Local: Yokota No. 4

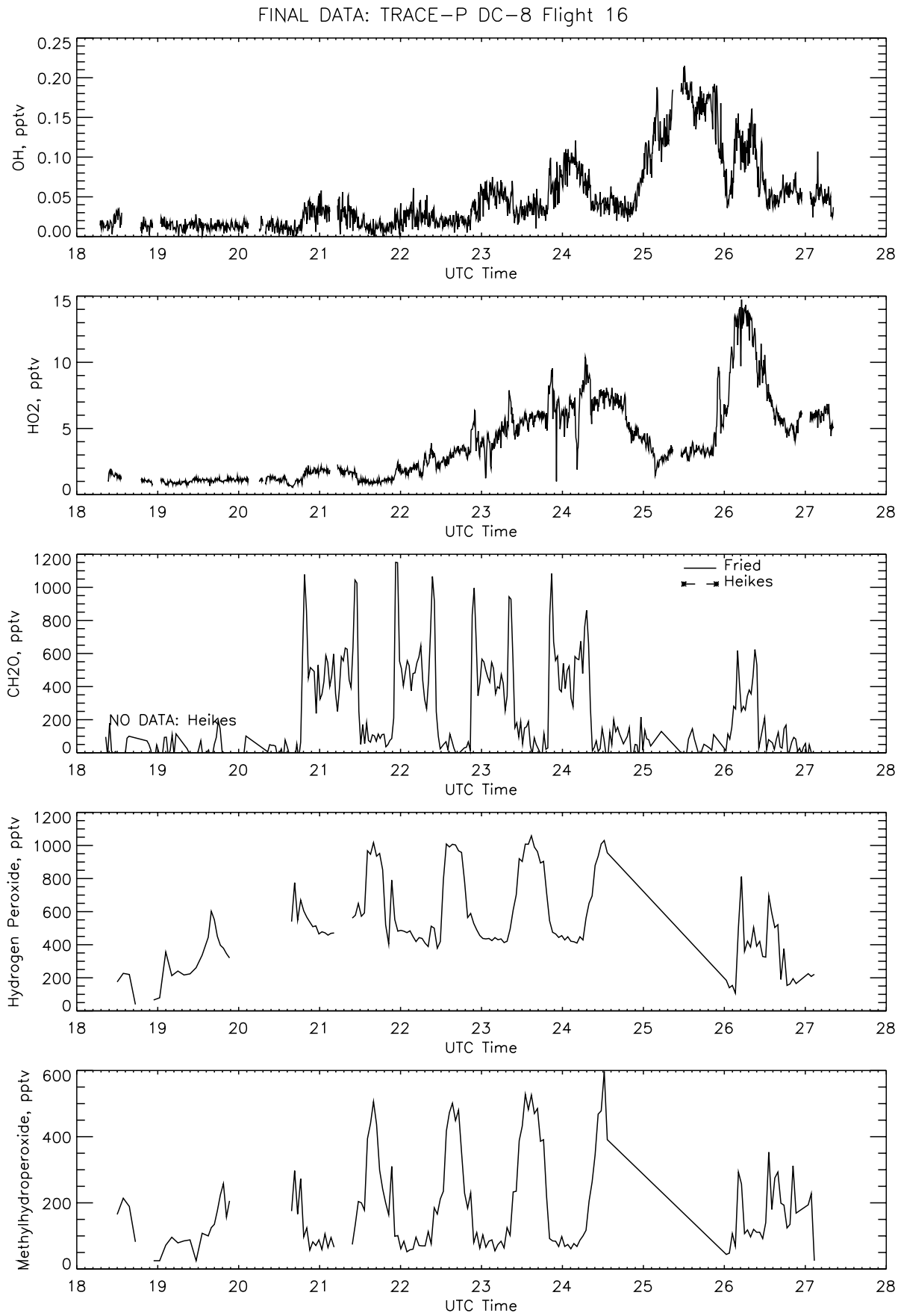
Sunrise Photochemistry of Asian Outflow

March 29, 2001

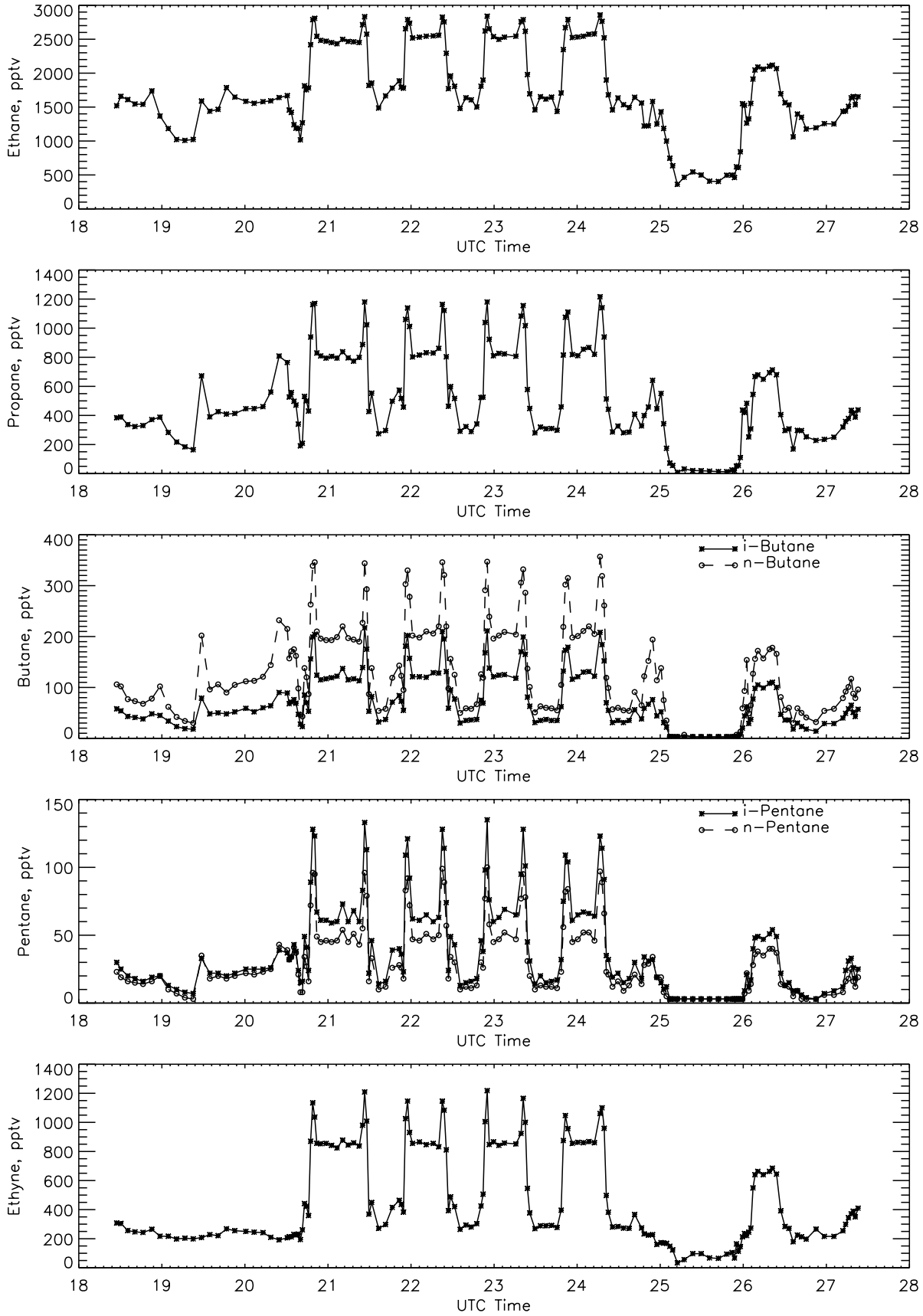

FINAL DATA: TRACE-P DC-8 Flight 16
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProbDP
WNS, knts
WND, deg


FINAL DATA: TRACE-P DC-8 Flight 16
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
Carbon Dioxide, ppmv
clip: max=391.710
clip: min=369.630
Water Vapor Mixing Ratio
clip: min=-0.00277600
UTC Time

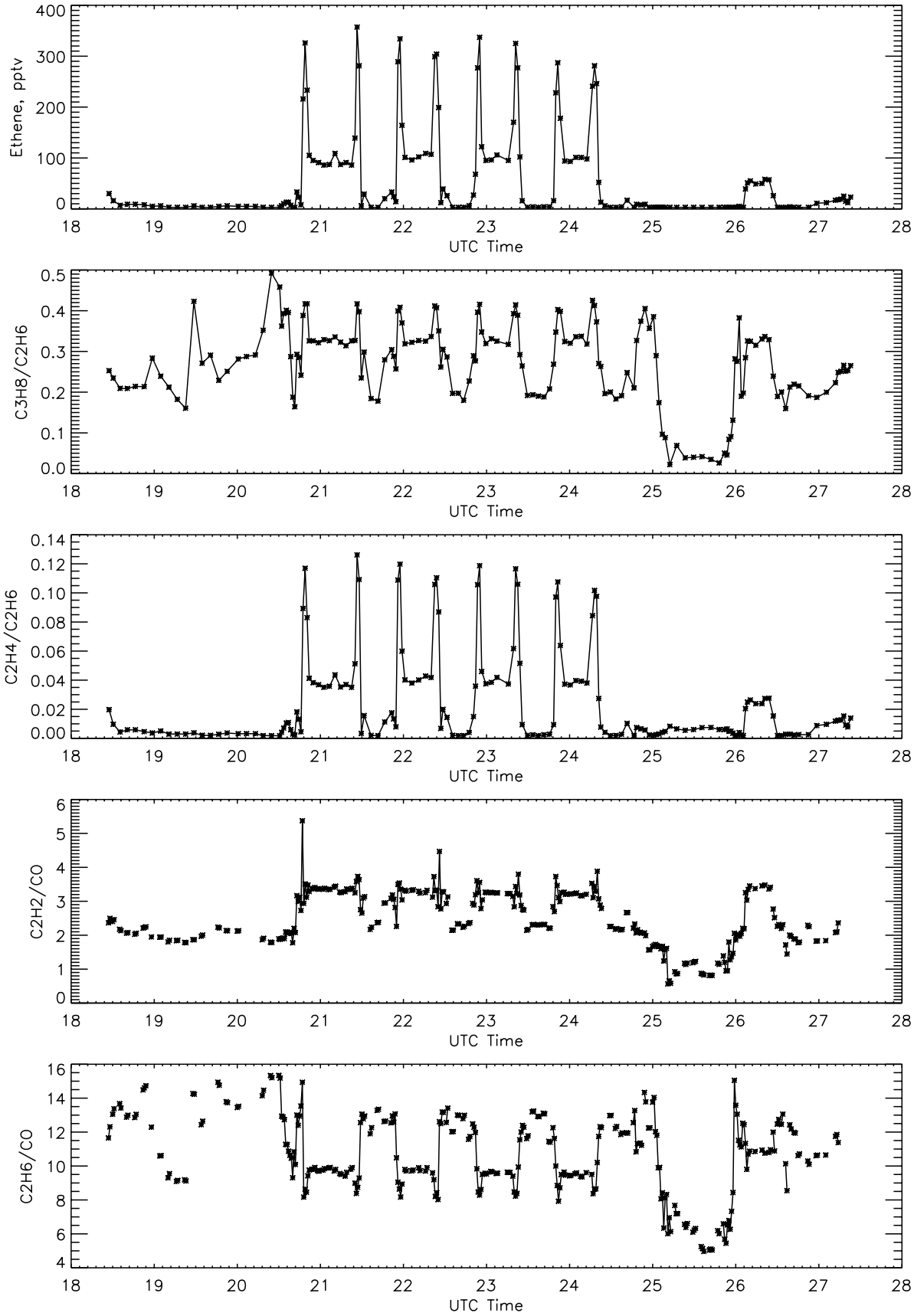

FINAL DATA: TRACE-P DC-8 Flight 16
NO, pptv
UTC Time
NO2, pptv
clip: max=1870.00
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile

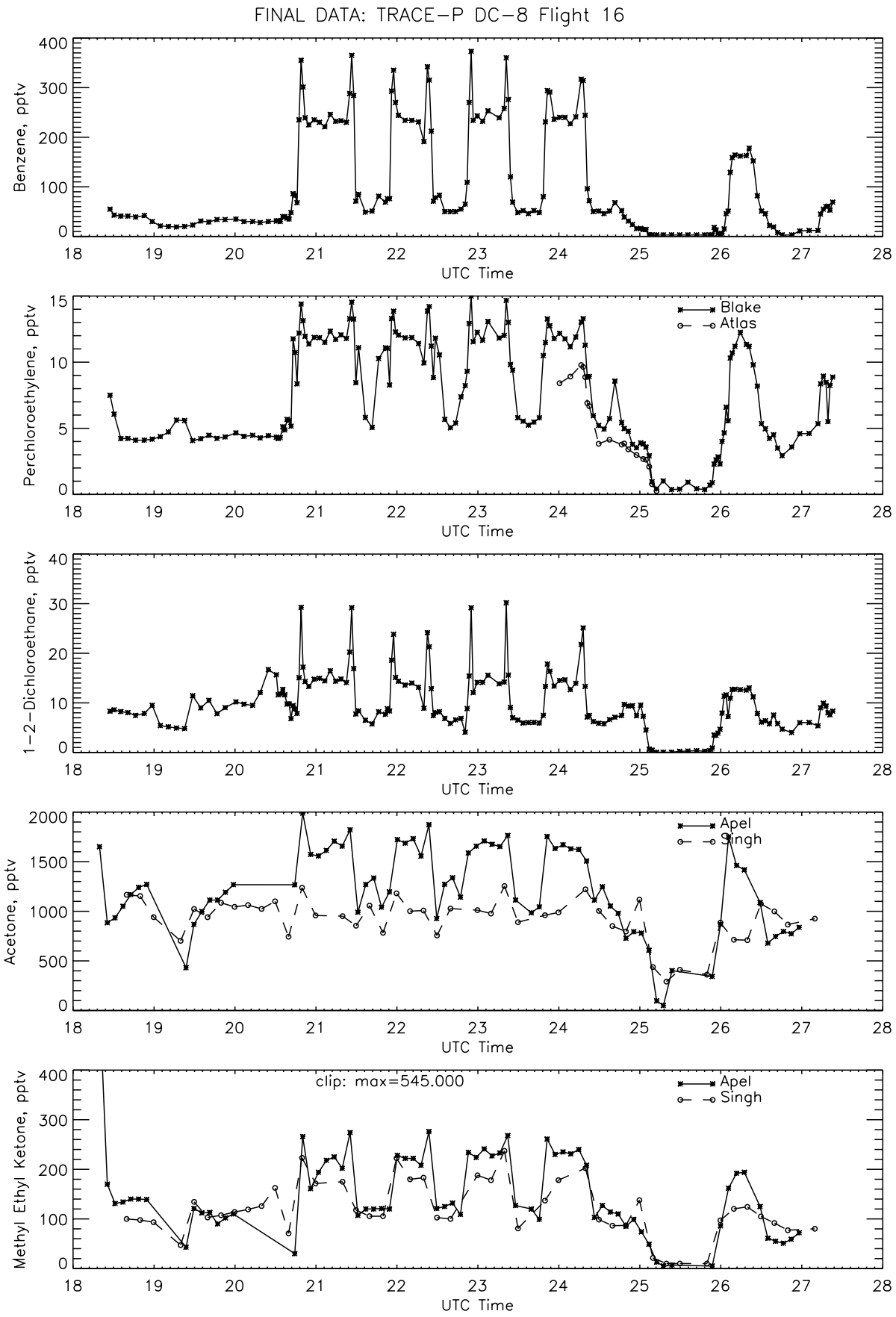

FINAL DATA: TRACE-P DC-8 Flight 16
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
NO DATA: Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

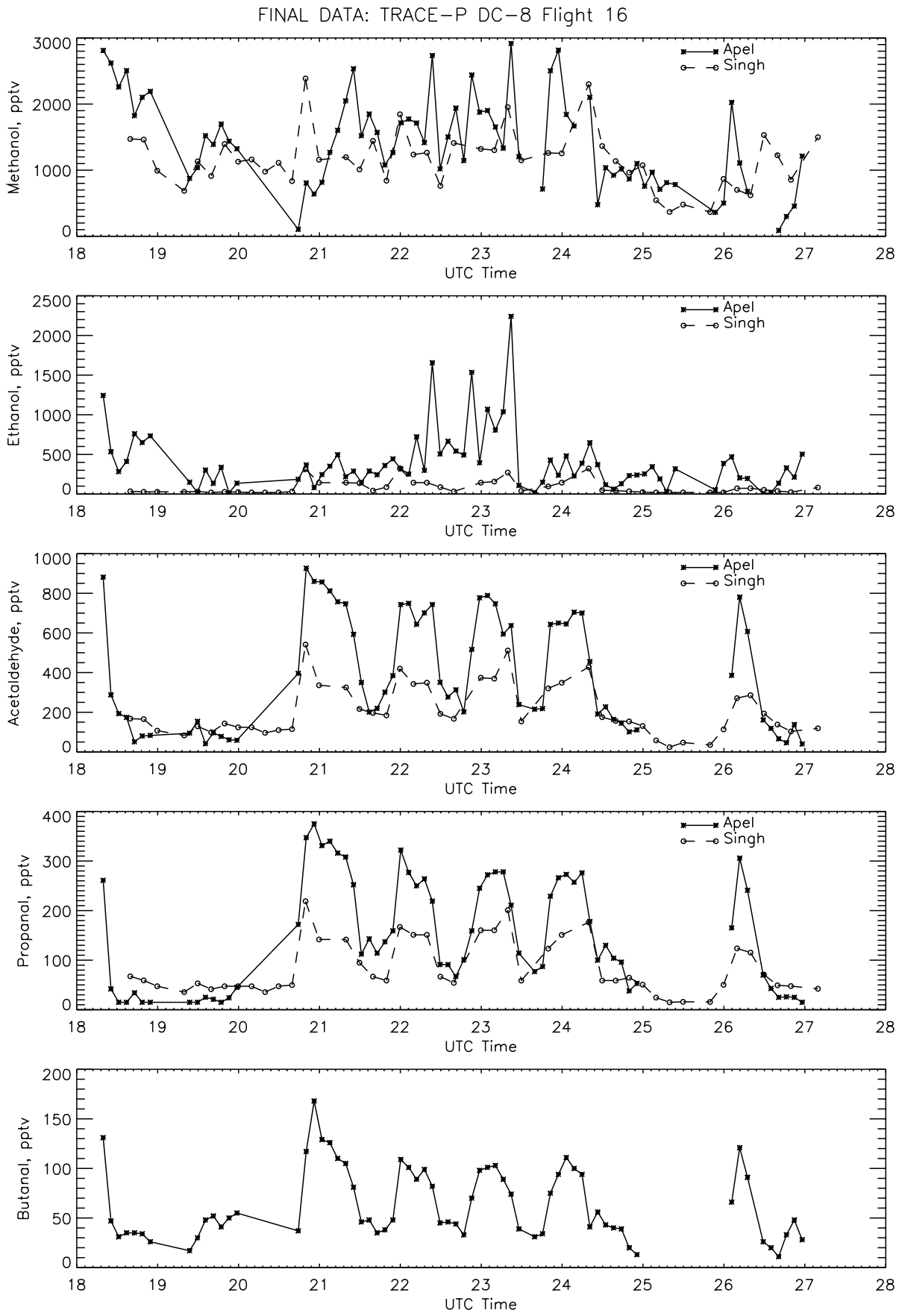
FINAL DATA: TRACE-P DC-8 Flight 16



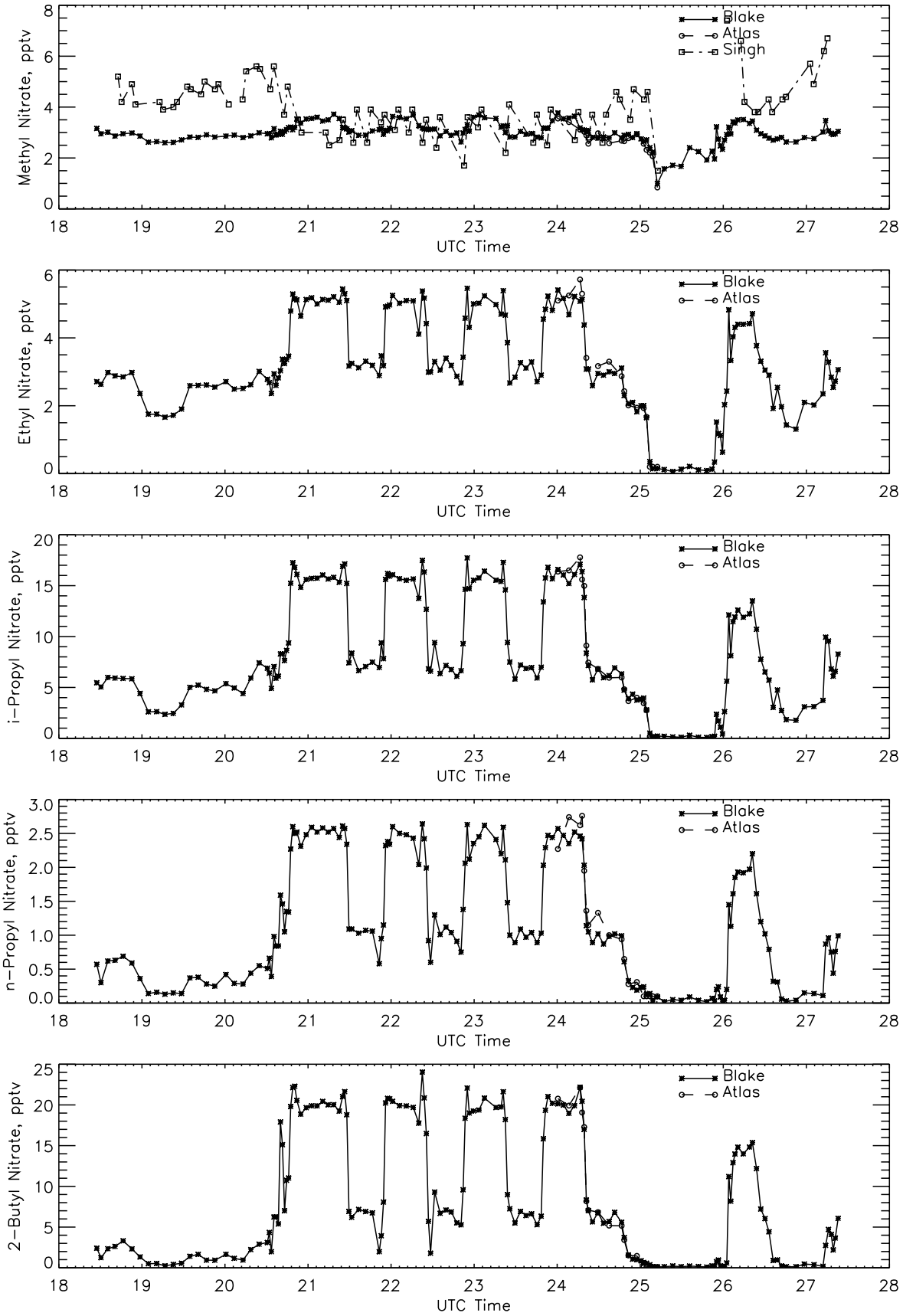
FINAL DATA: TRACE-P DC-8 Flight 16

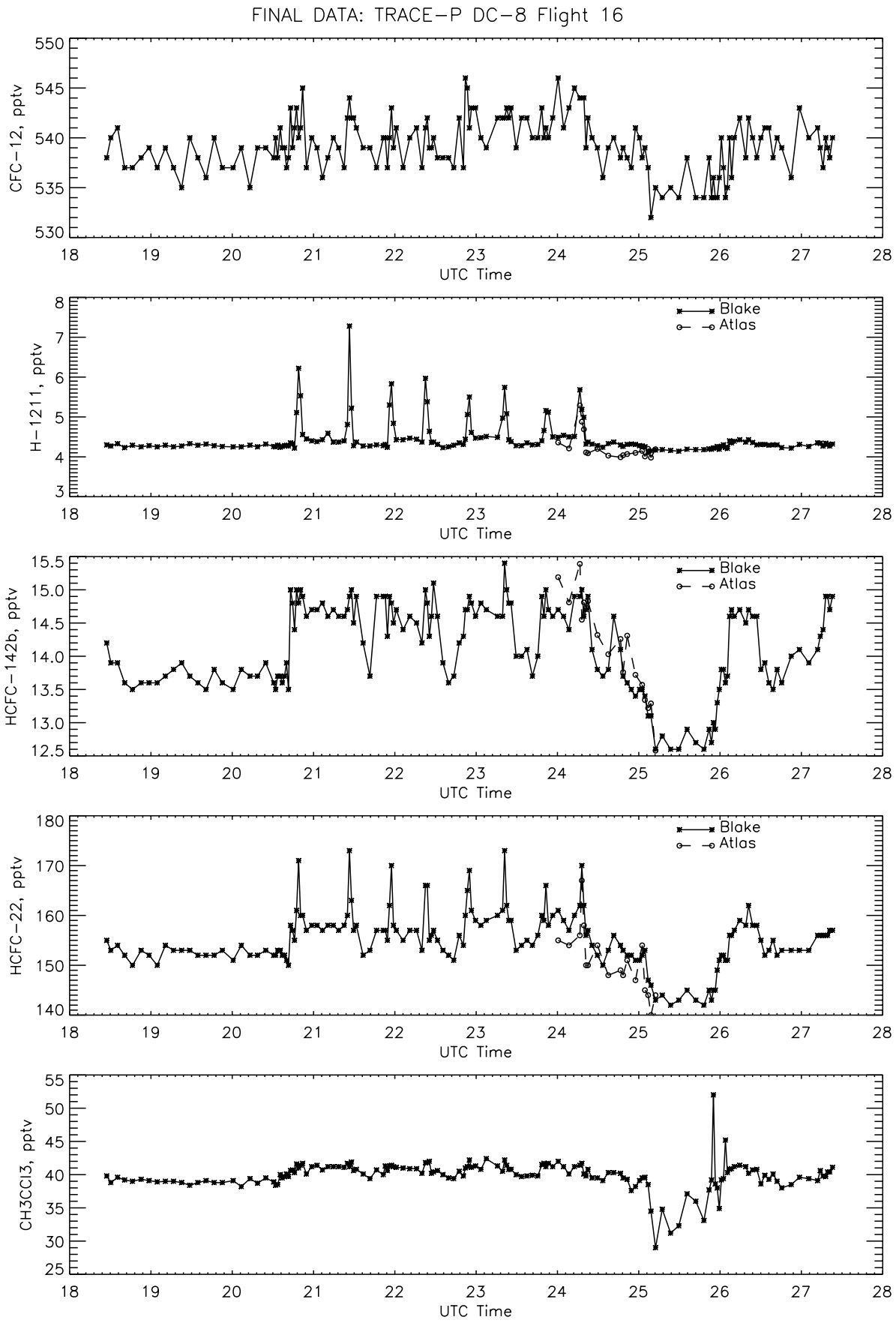



FINAL DATA: TRACE-P DC-8 Flight 16
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
clip: max=545.000
Apel
Singh
UTC Time

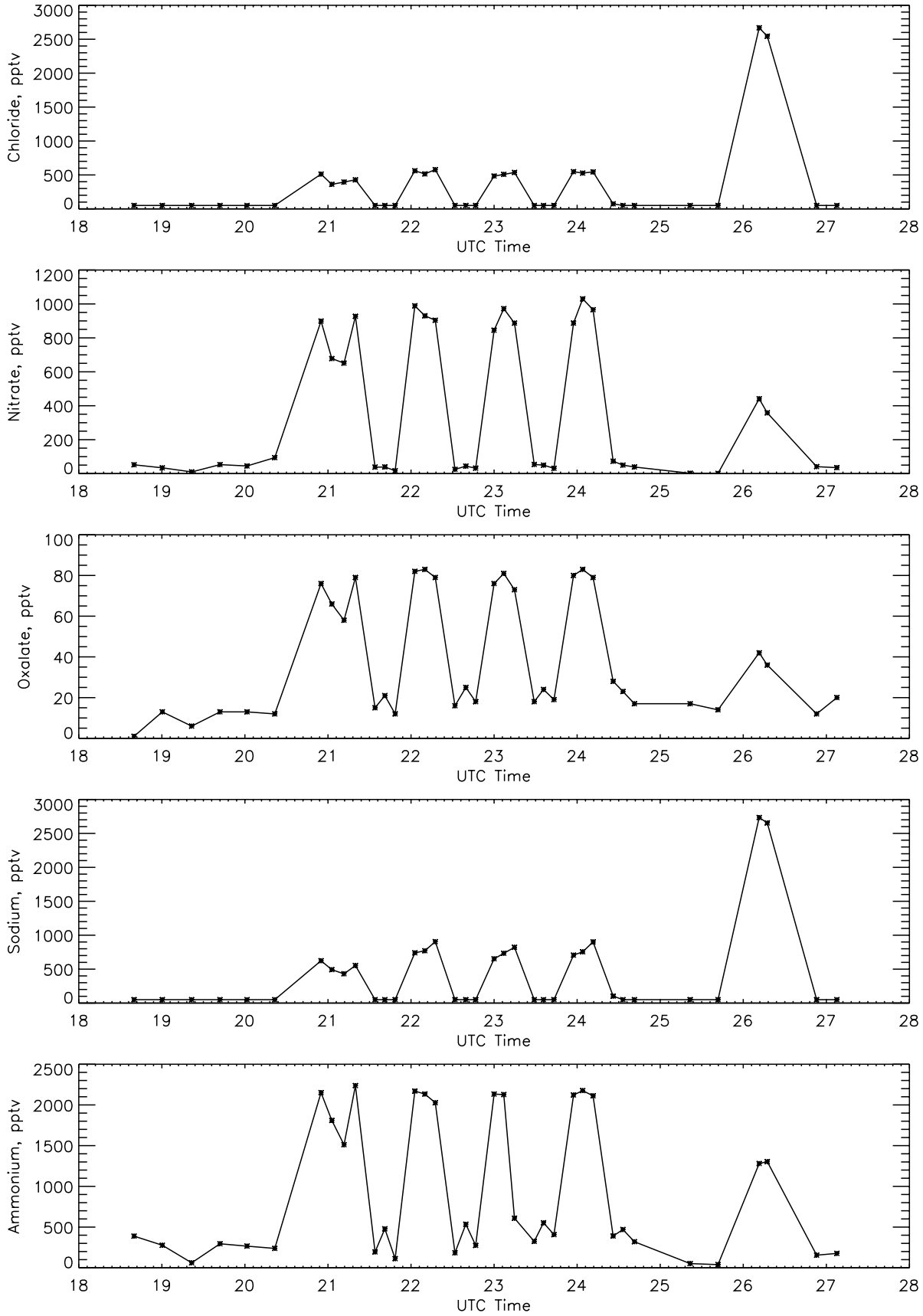

FINAL DATA: TRACE-P DC-8 Flight 16
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh

FINAL DATA: TRACE-P DC-8 Flight 16

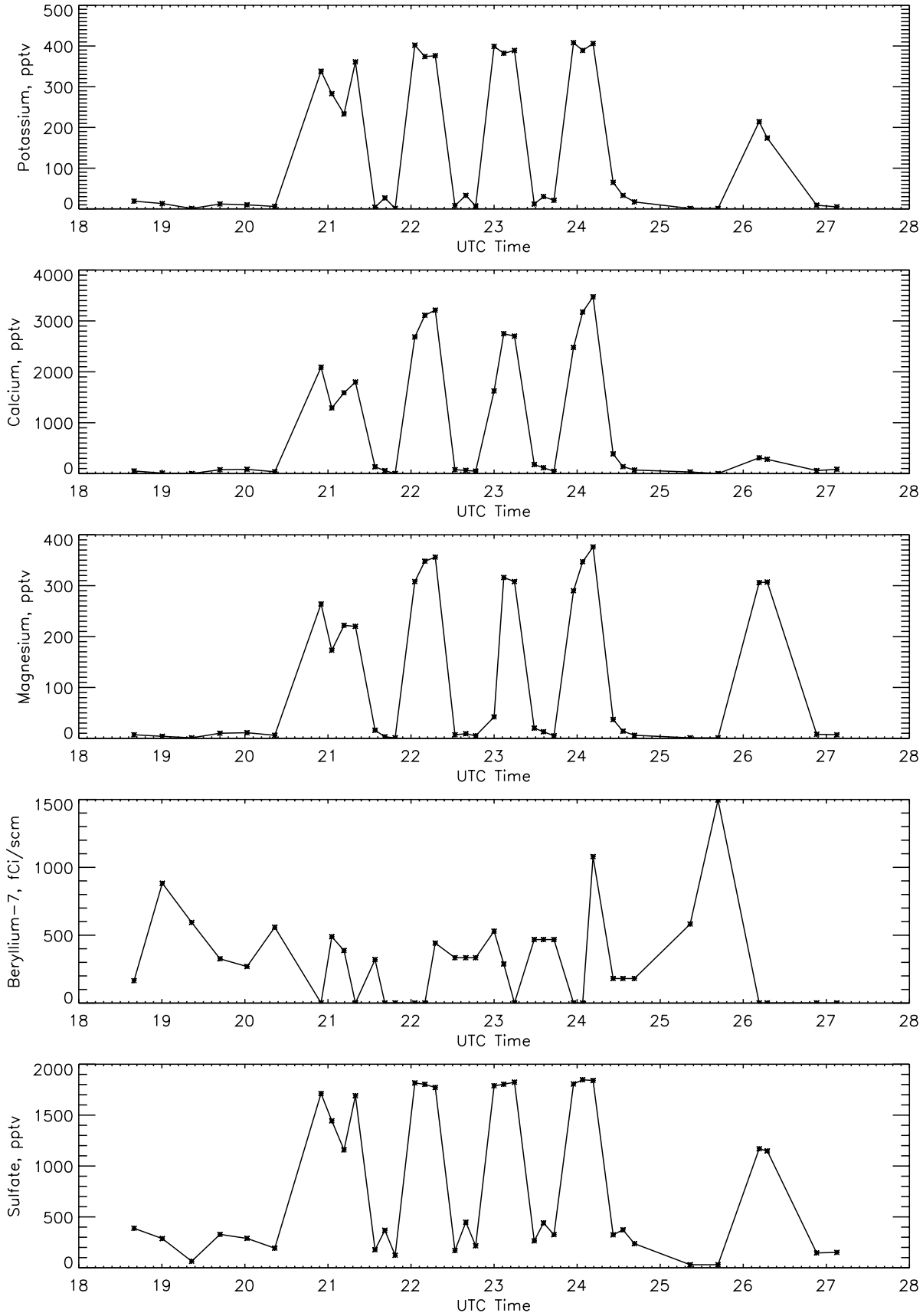


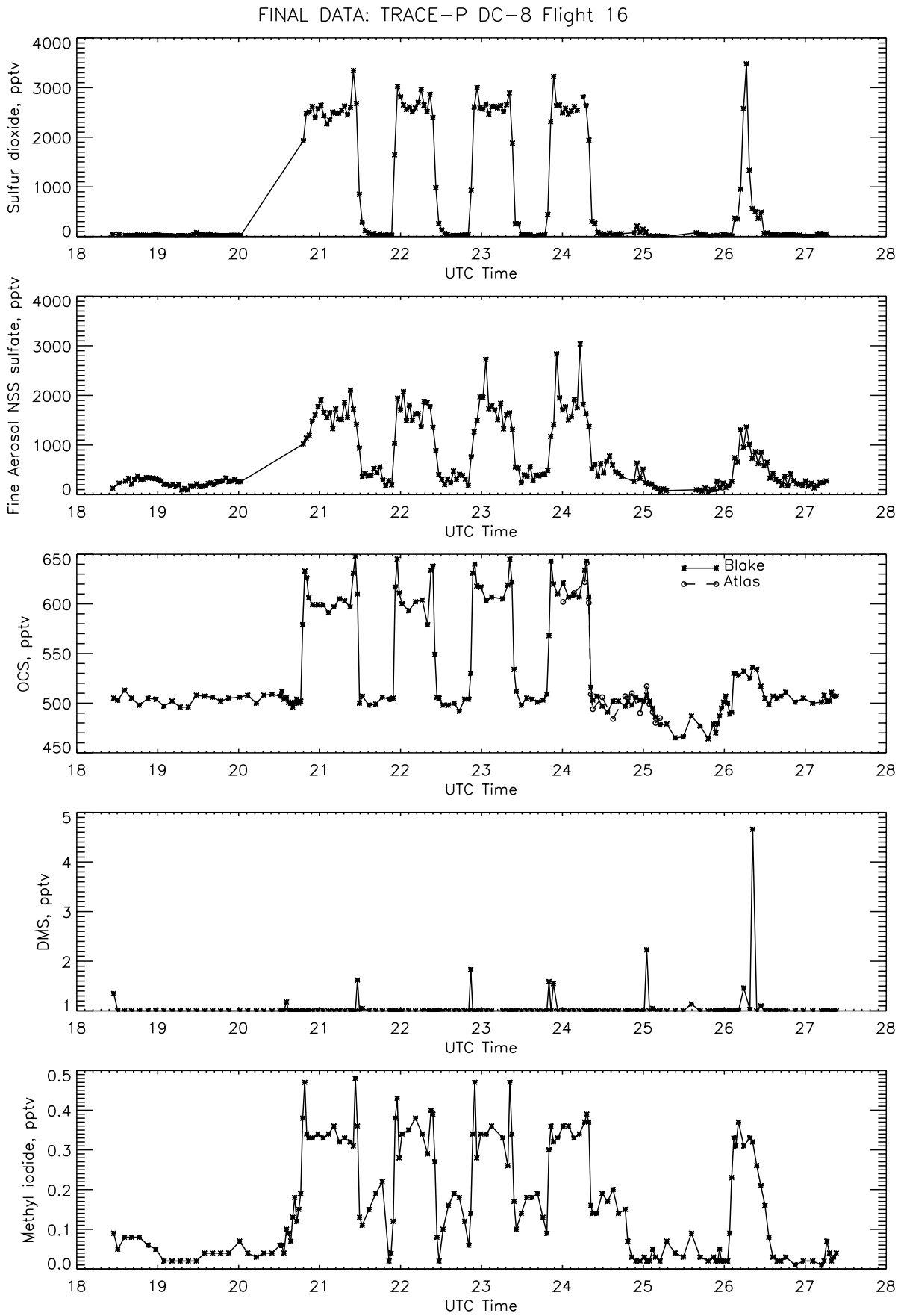

FINAL DATA: TRACE-P DC-8 Flight 16
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas

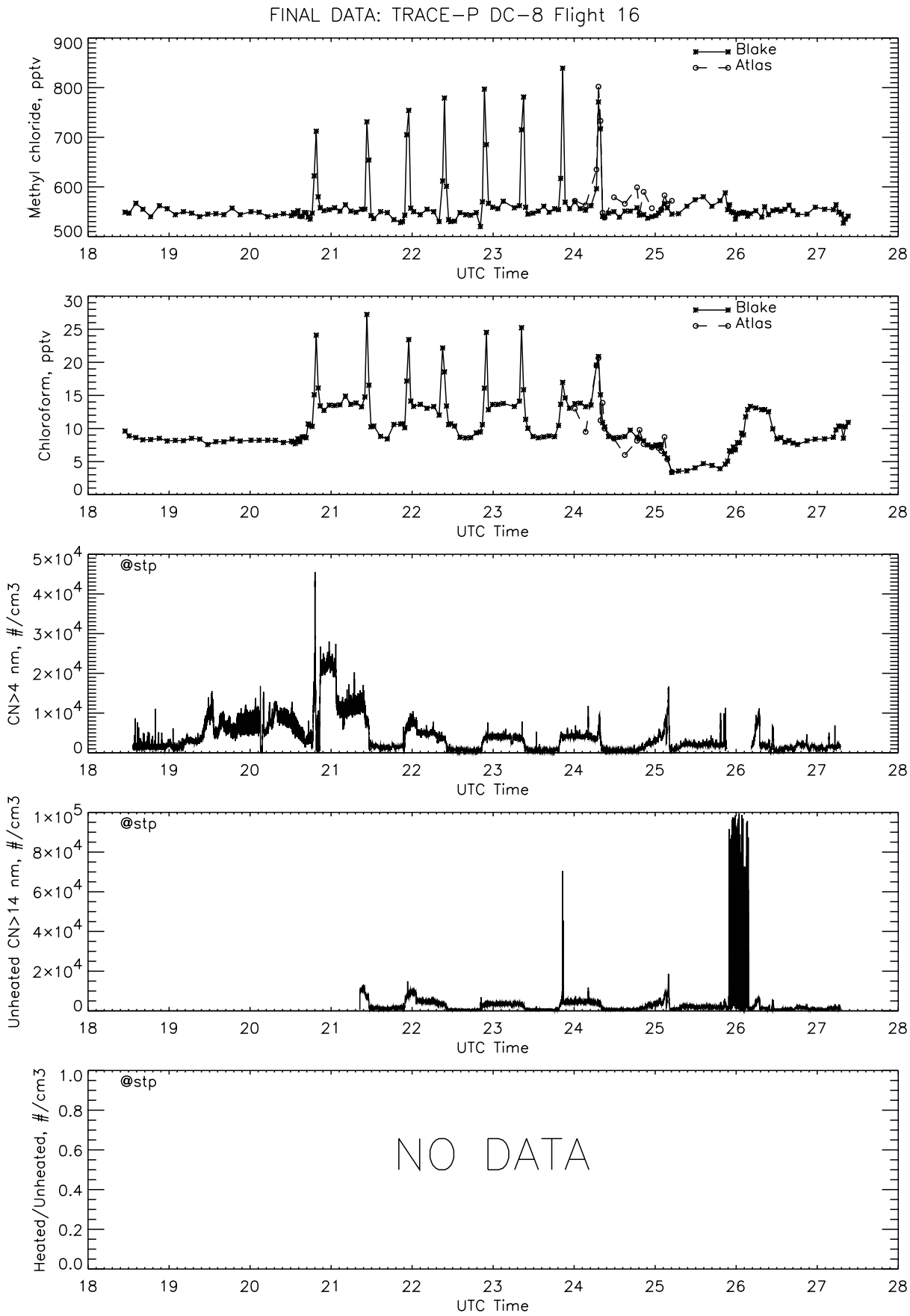
FINAL DATA: TRACE-P DC-8 Flight 16

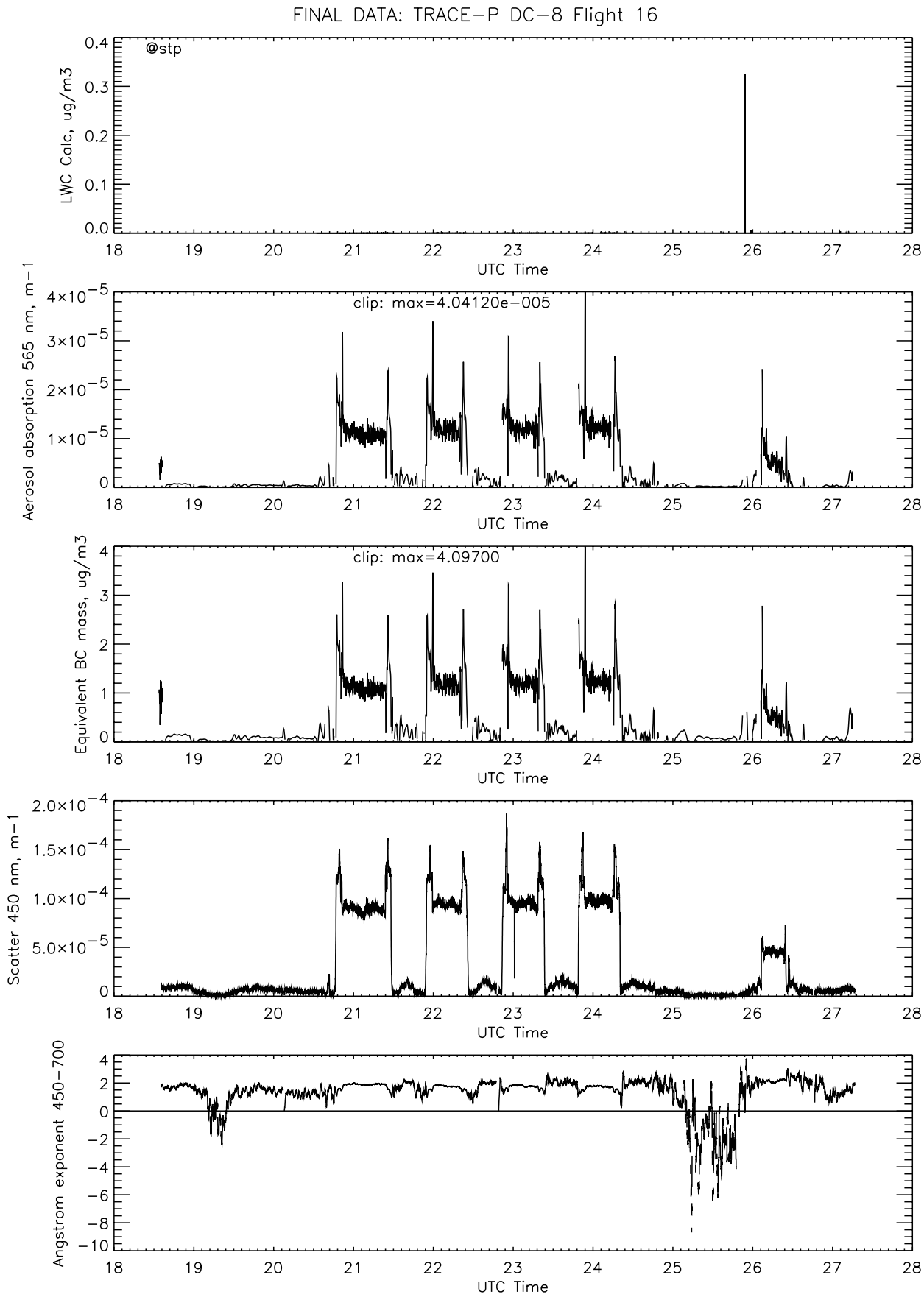


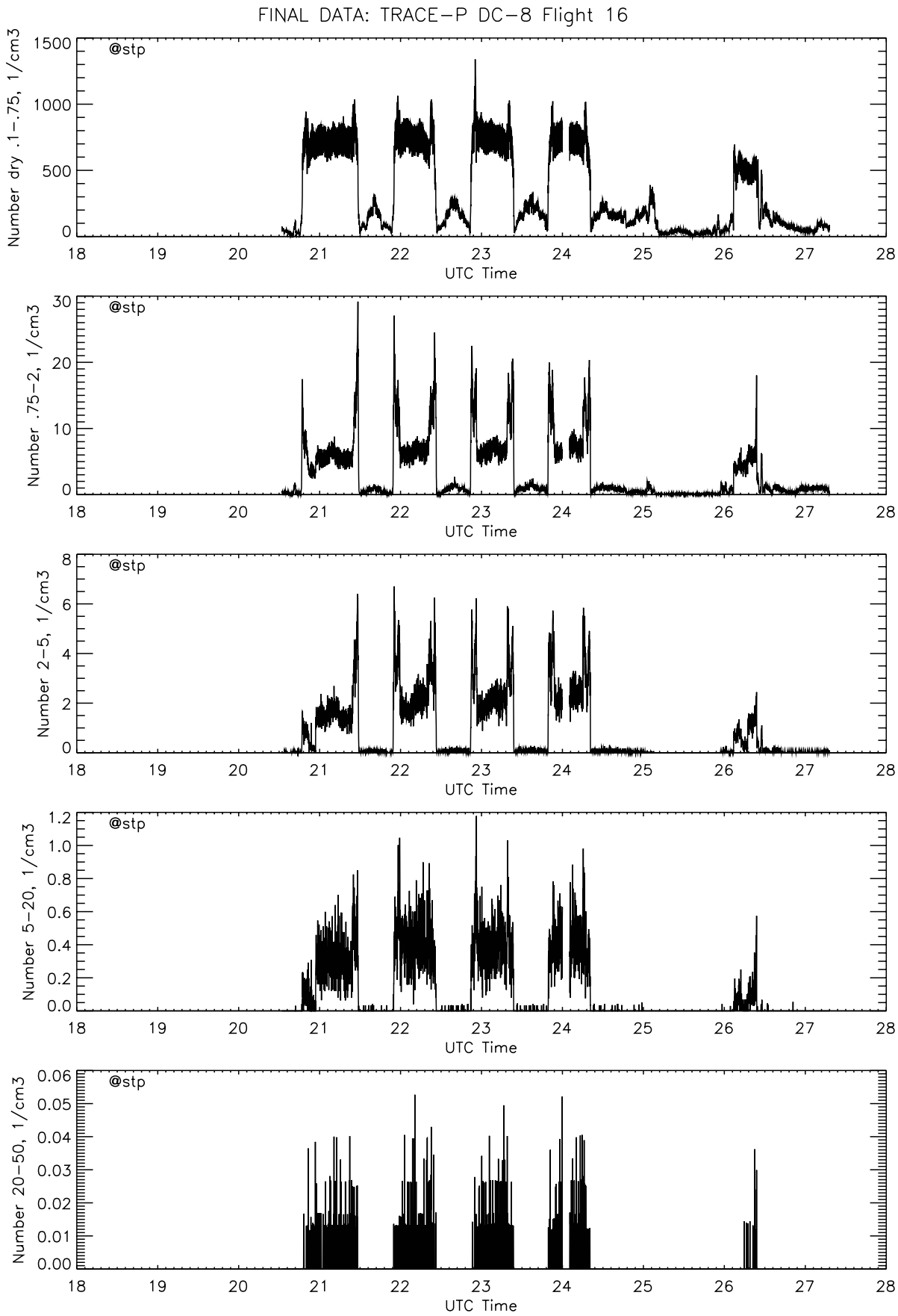
FINAL DATA: TRACE-P DC-8 Flight 16

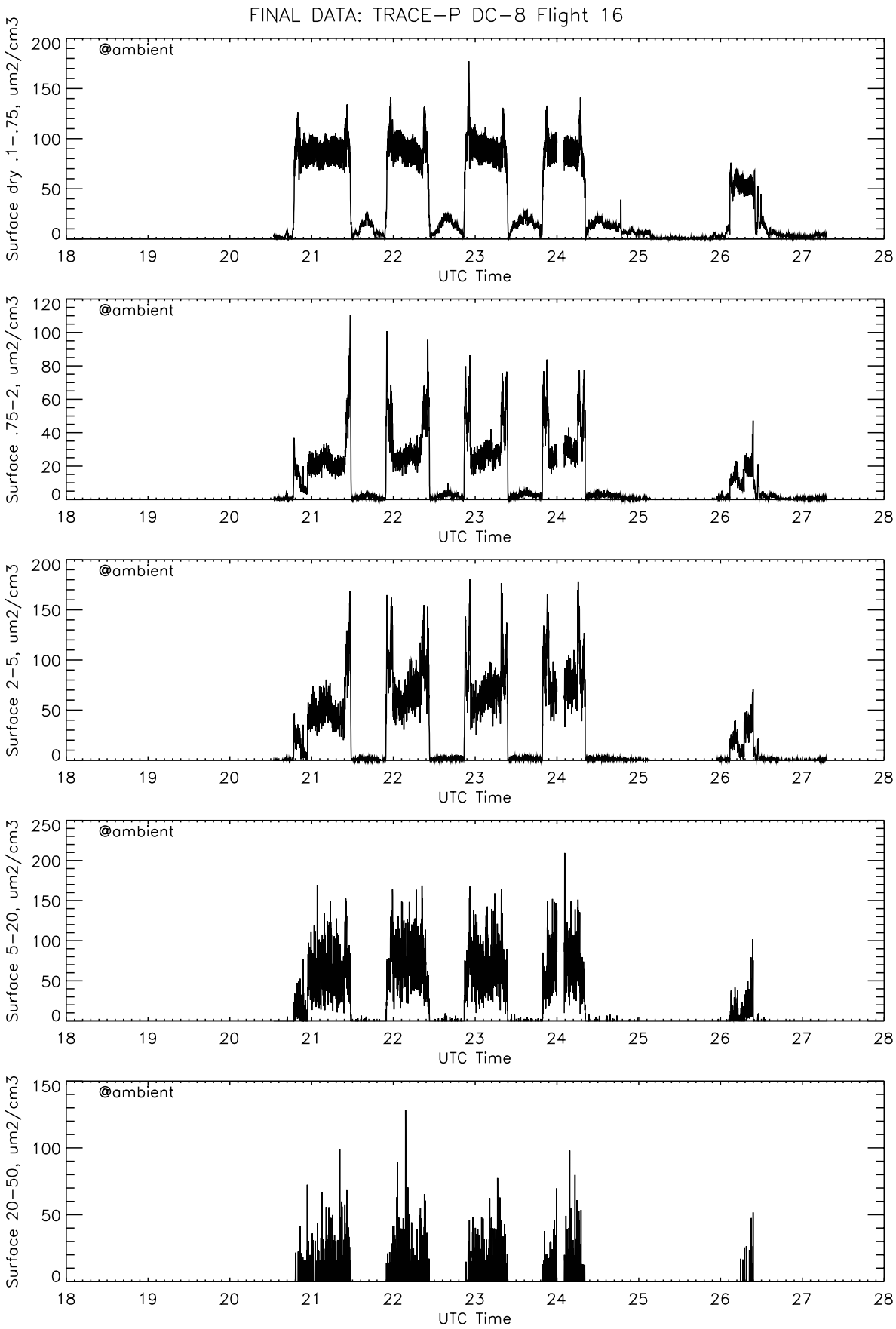


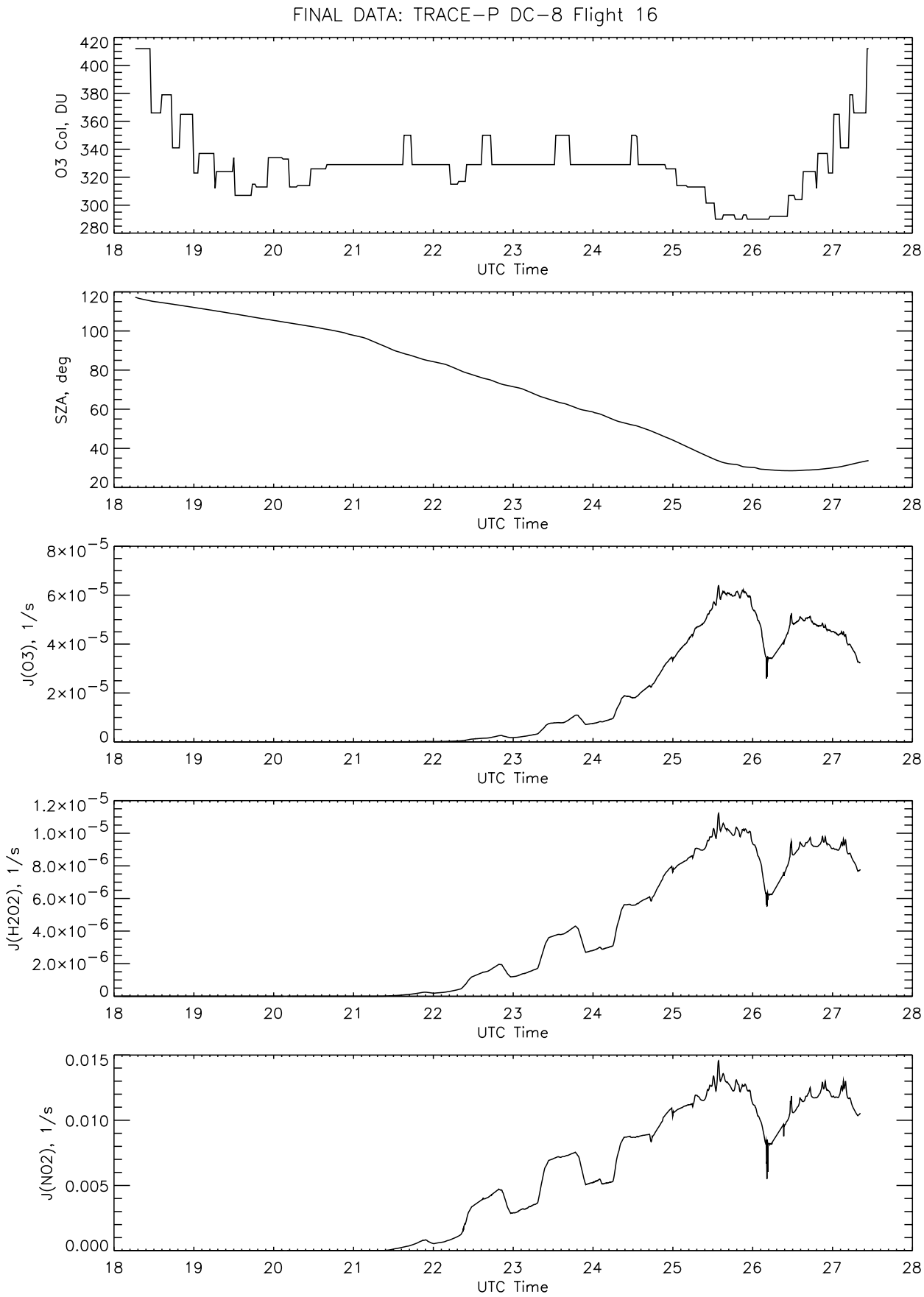

FINAL DATA: TRACE-P DC-8 Flight 16
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

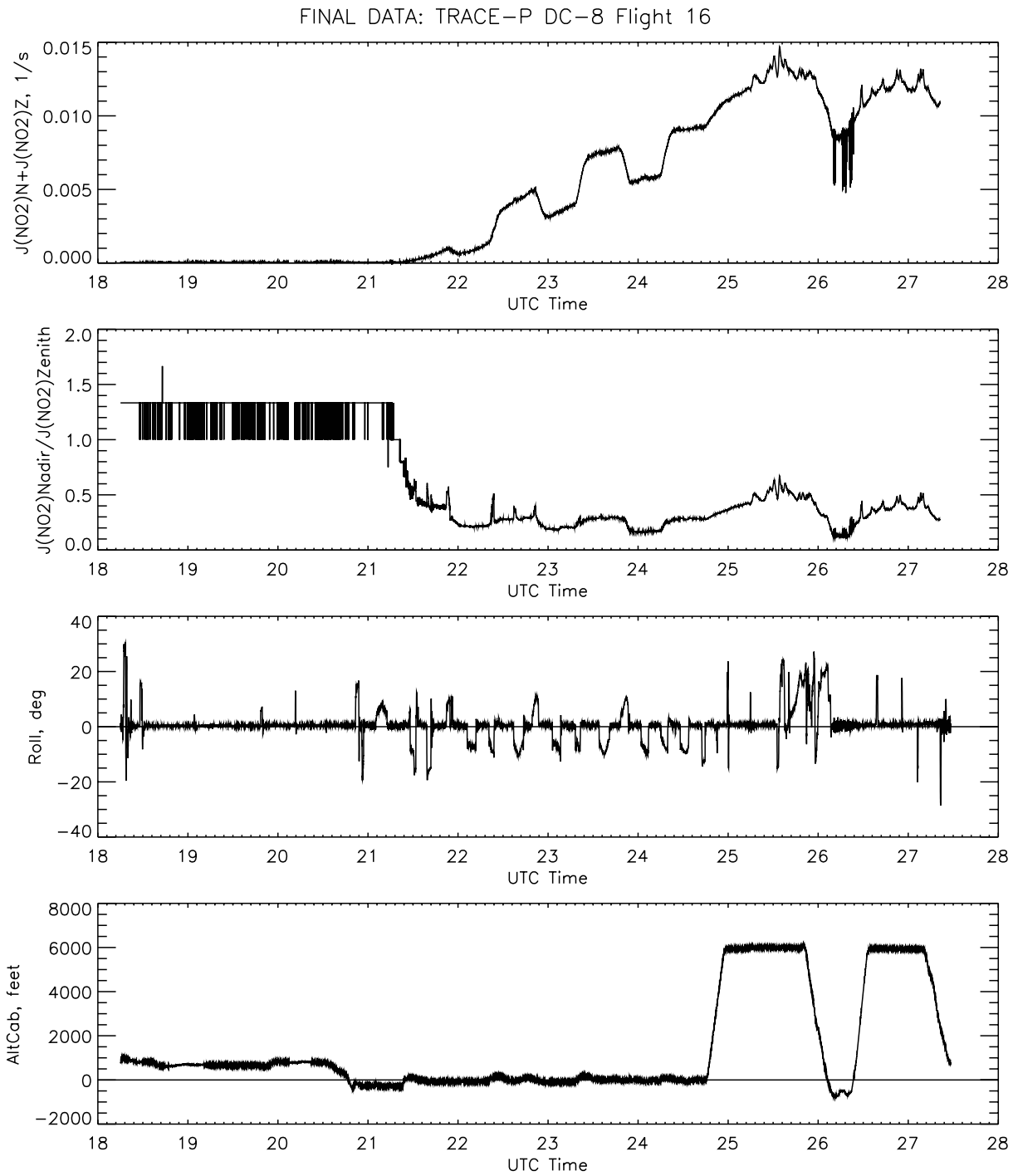

FINAL DATA: TRACE-P DC-8 Flight 16
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
NO DATA
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 16
@stp
LWC Calc, ug/m3
UTC Time
clip: max=4.04120e-005
Aerosol absorption 565 nm, m-1
UTC Time
clip: max=4.09700
Equivalent BC mass, ug/m3
UTC Time
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

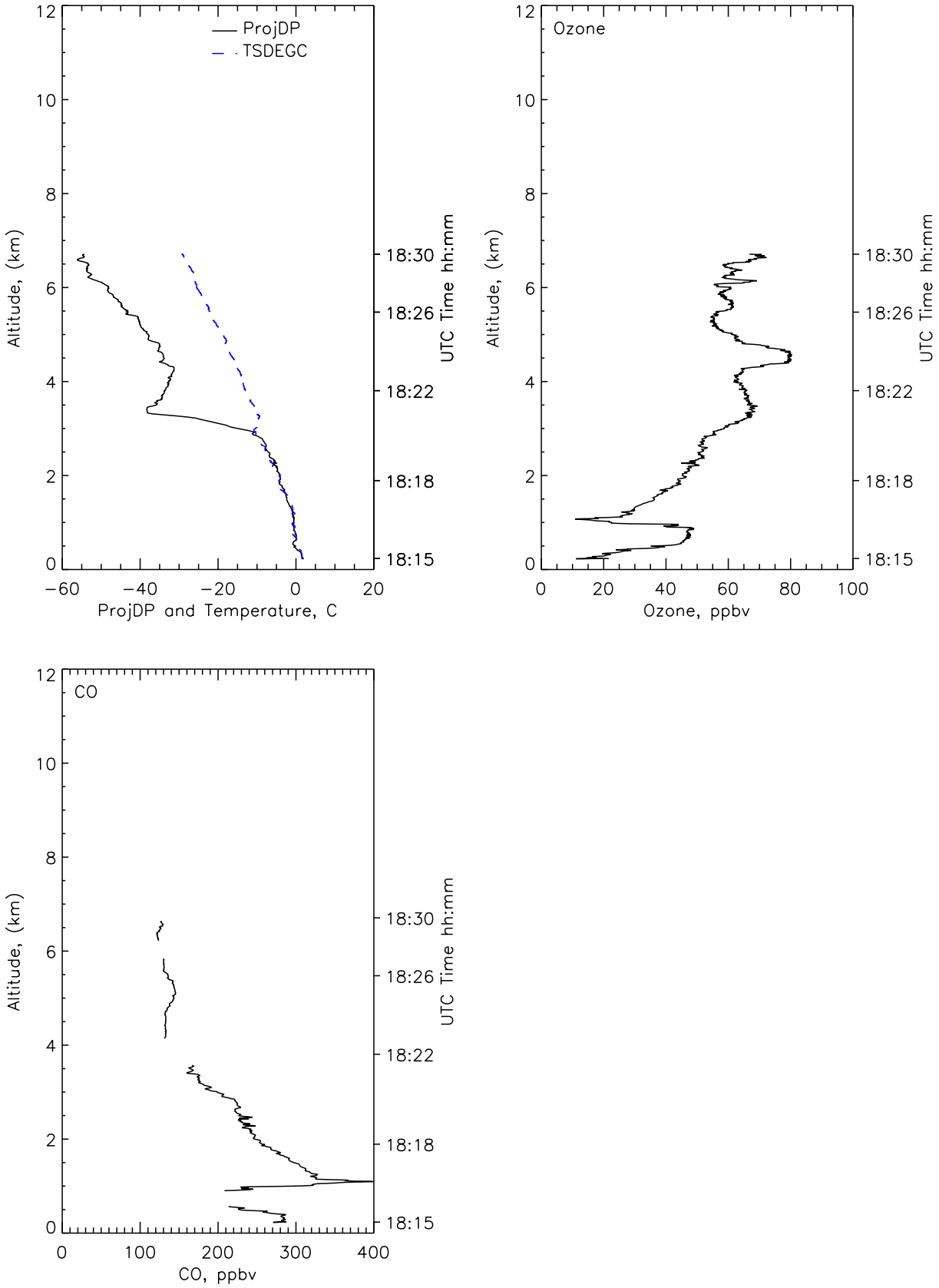

FINAL DATA: TRACE-P DC-8 Flight 16
@stp
Number dry .1-.75, 1/cm3
Number .75-2, 1/cm3
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3
UTC Time

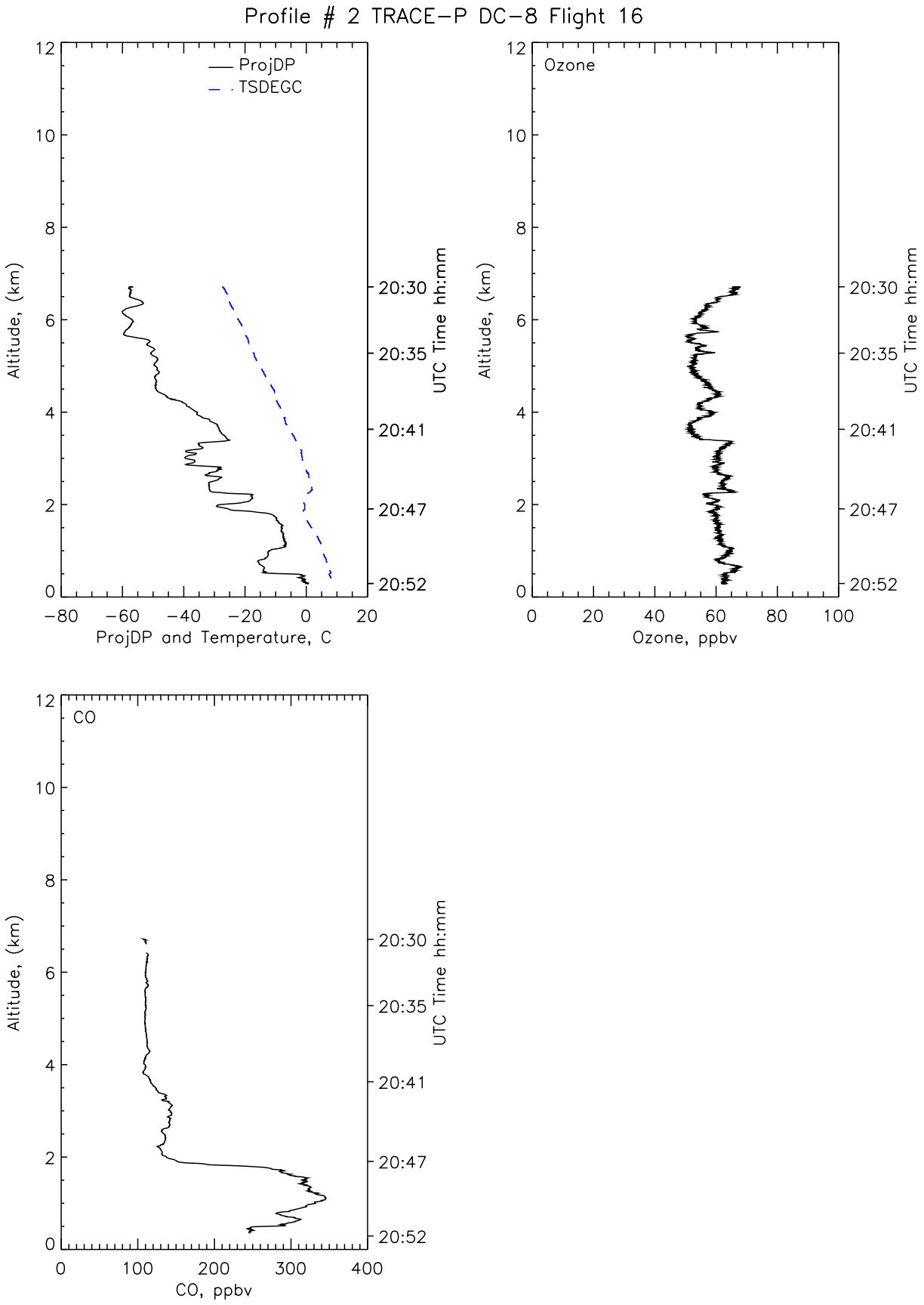

FINAL DATA: TRACE-P DC-8 Flight 16
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

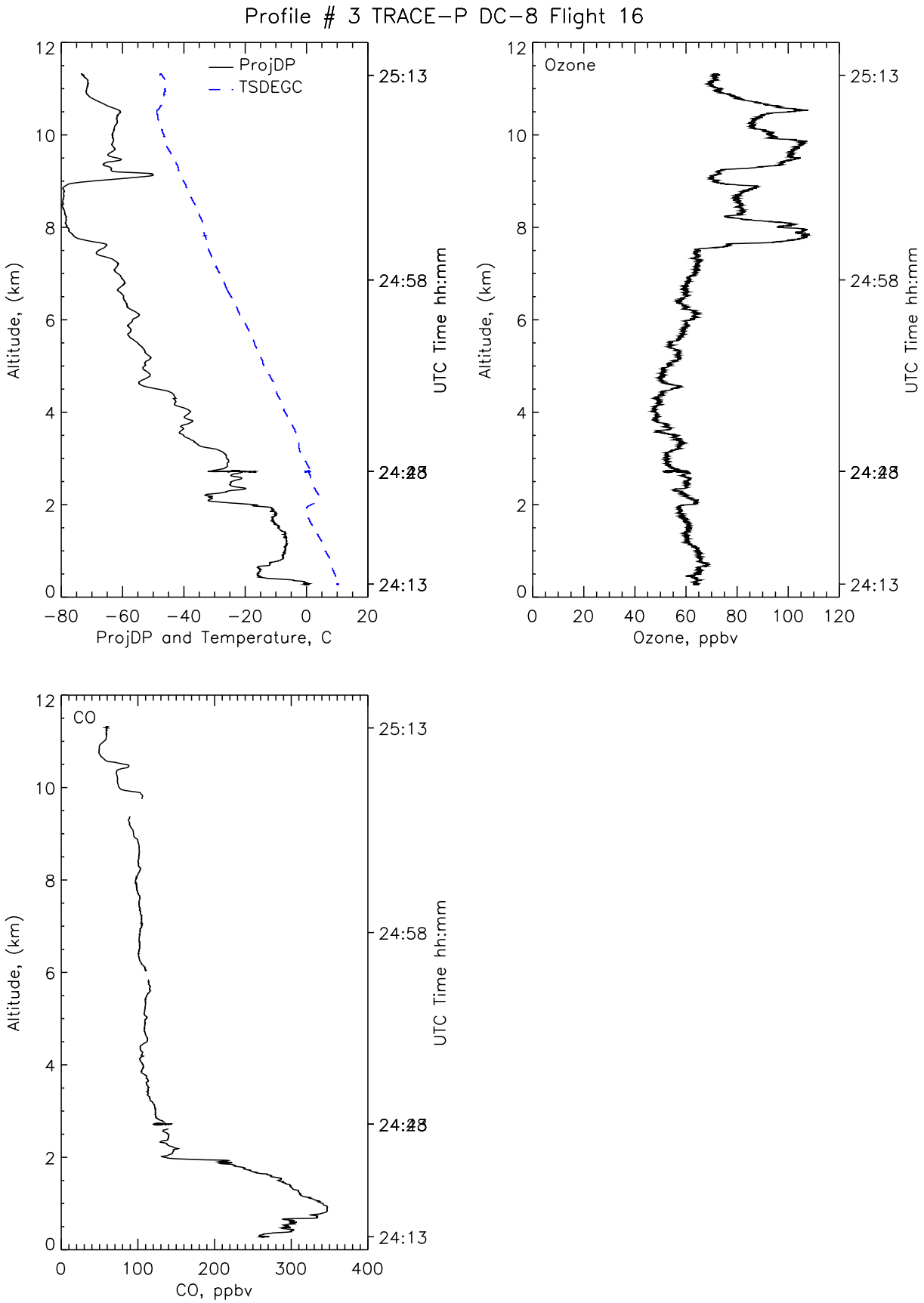

FINAL DATA: TRACE-P DC-8 Flight 16
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

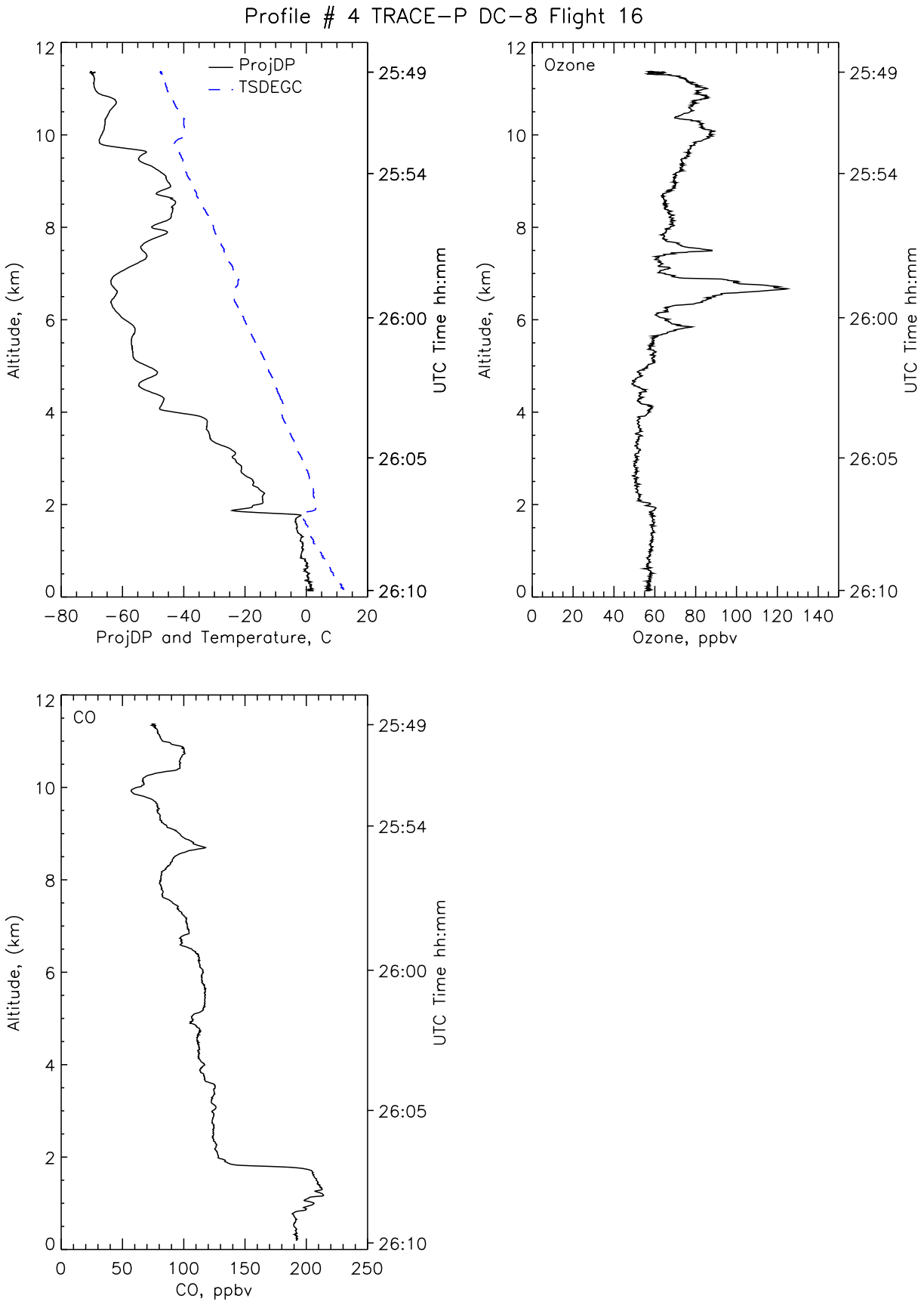

FINAL DATA: TRACE-P DC-8 Flight 16
J(NO2)N+J(NO2)Z, 1/s
0.015
0.010
0.005
0.000
18
19
20
21
22
23
24
25
26
27
28
UTC Time
J(NO2)Nadir/J(NO2)Zenith
2.0
1.5
1.0
0.5
0.0
UTC Time
Roll, deg
40
20
0
−20
−40
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
UTC Time

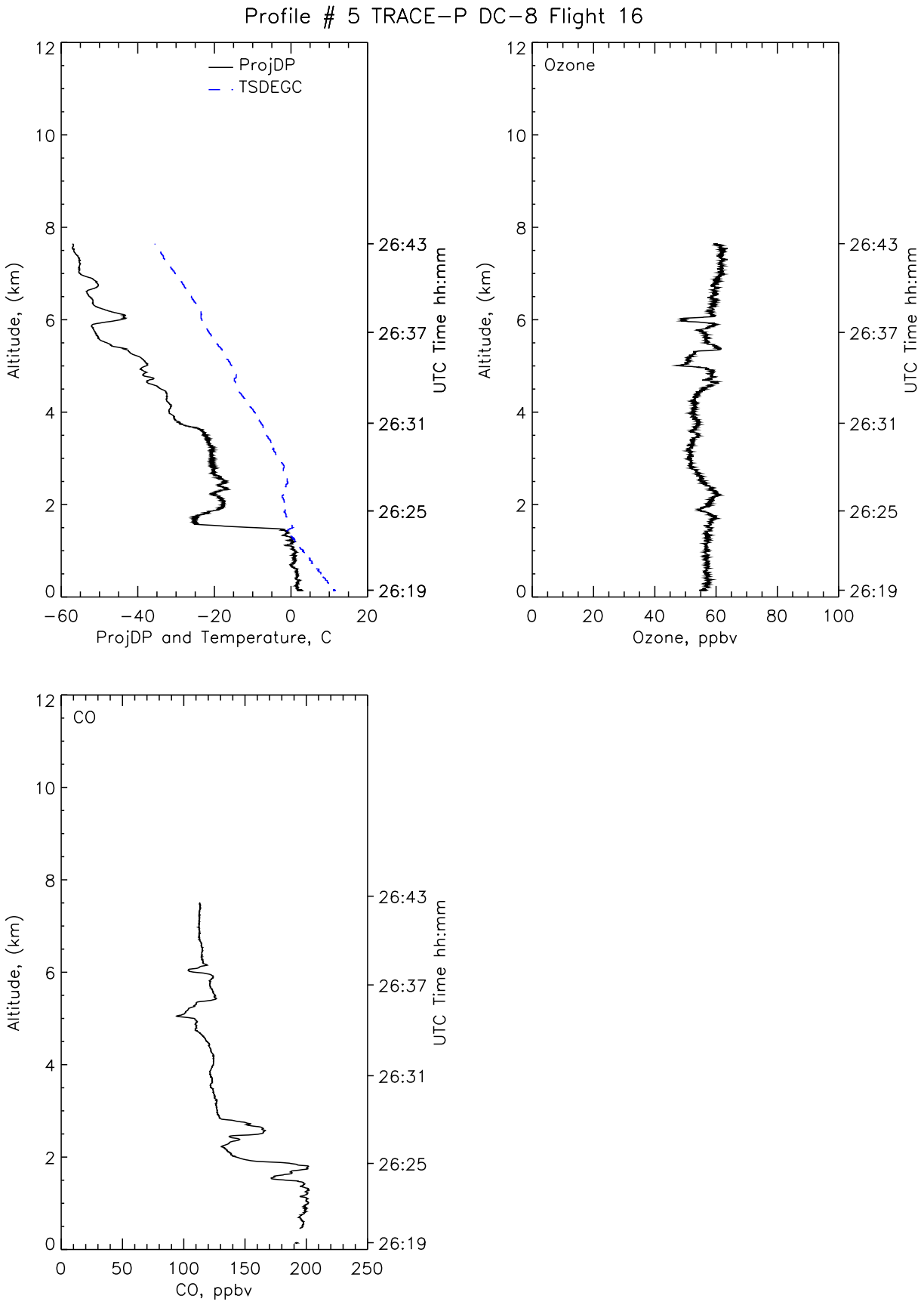
Profile # 1 TRACE-P DC-8 Flight 16

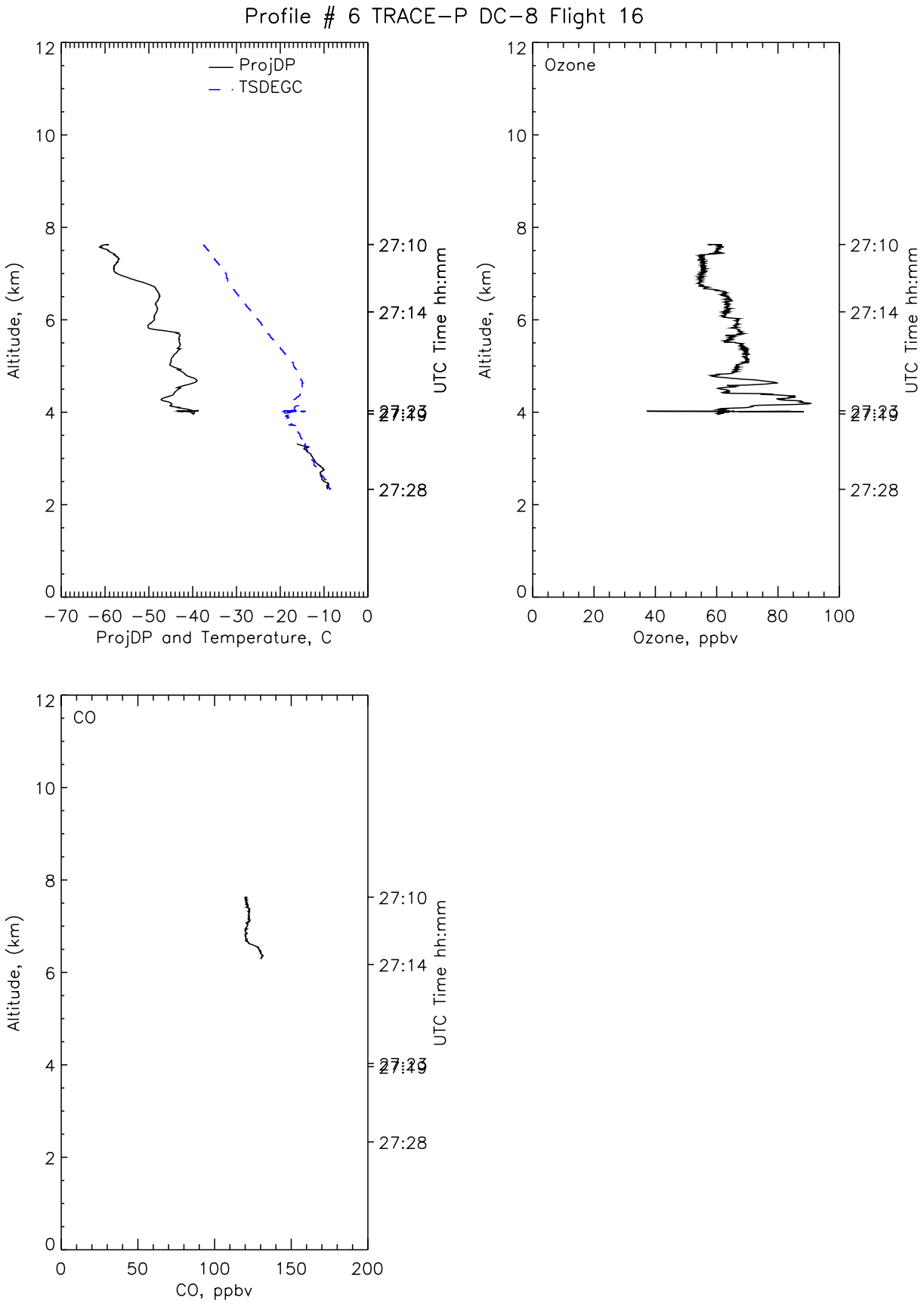



Profile # 2 TRACE-P DC-8 Flight 16
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
20:30
20:35
20:41
20:47
20:52
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 3 TRACE-P DC-8 Flight 16
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
25:13
24:58
24:43
24:13
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 16
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 5 TRACE-P DC-8 Flight 16
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 6 TRACE-P DC-8 Flight 16
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
27:10
27:14
27:23
27:28
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

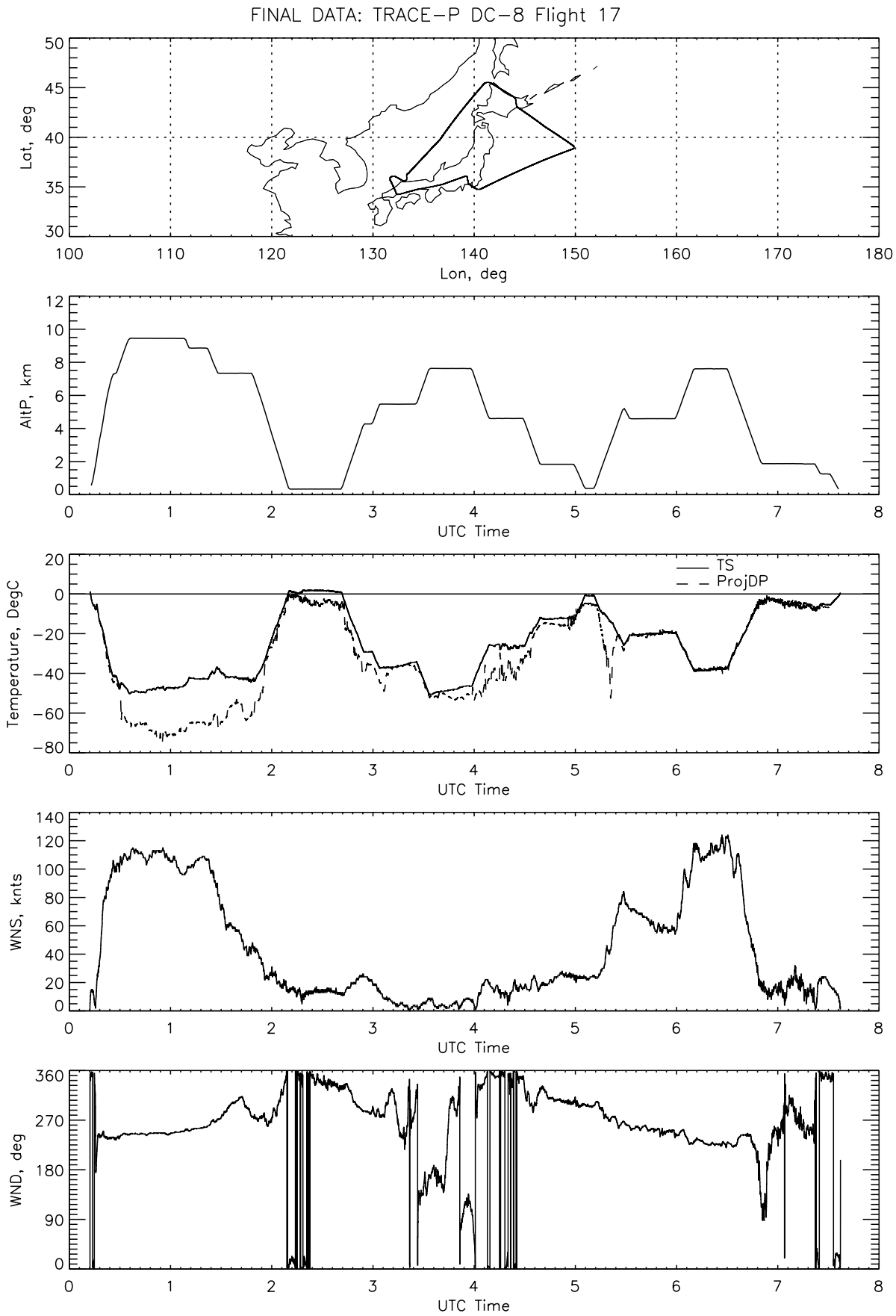
TRACE-P

Flight 17D

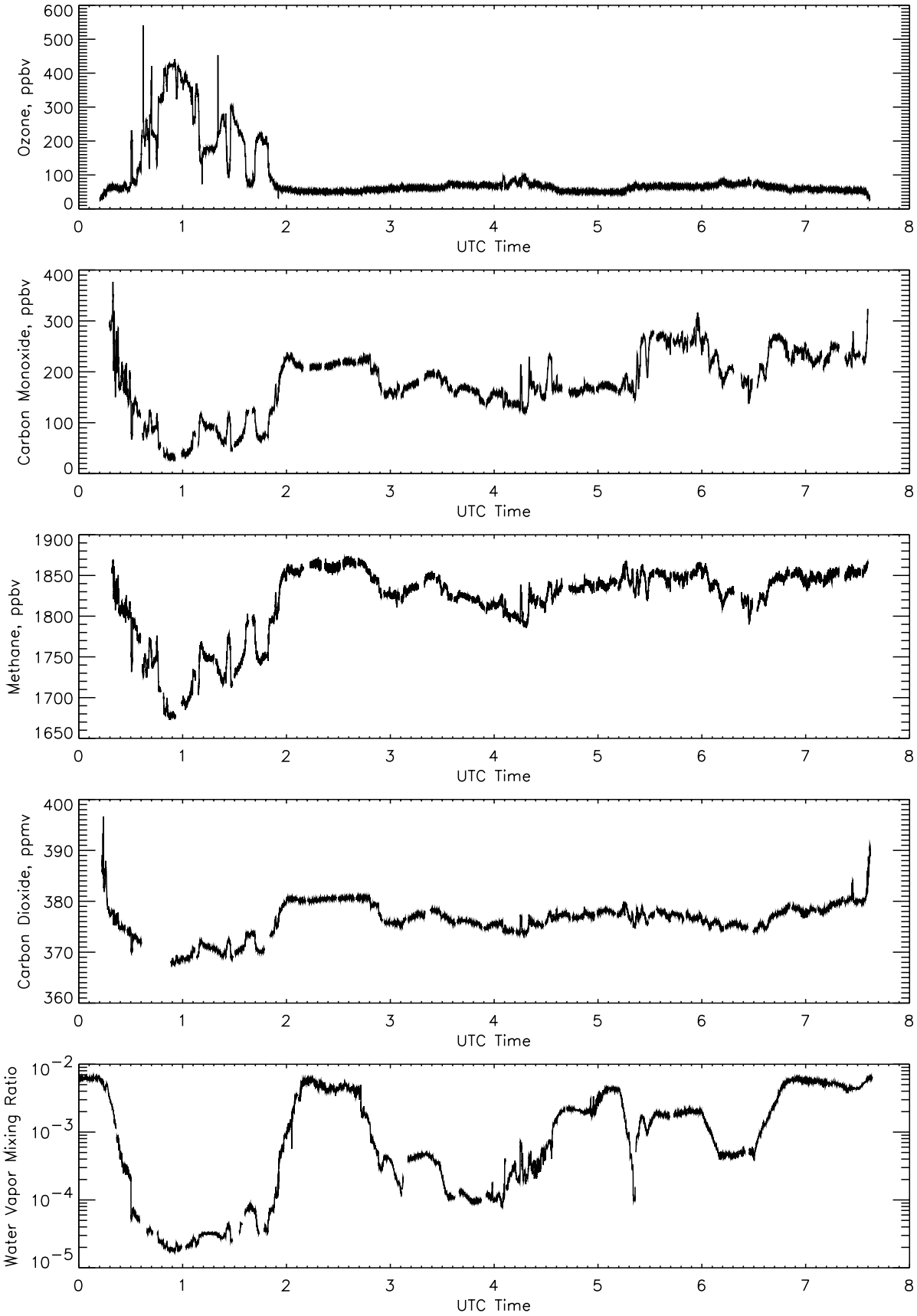
Local: Yokota No. 5

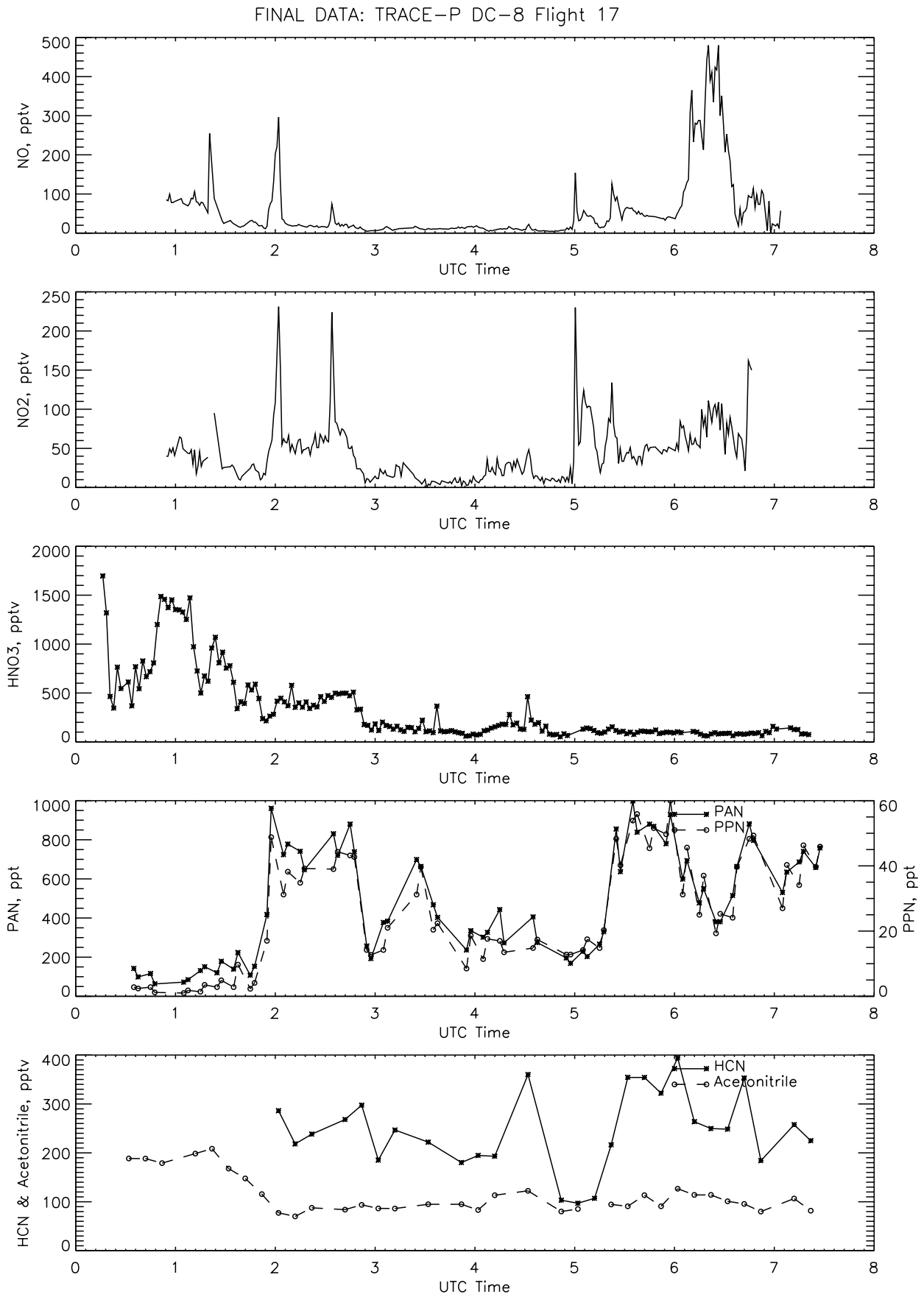
Warm Conveyor Belt and Cyclonic Recirculation

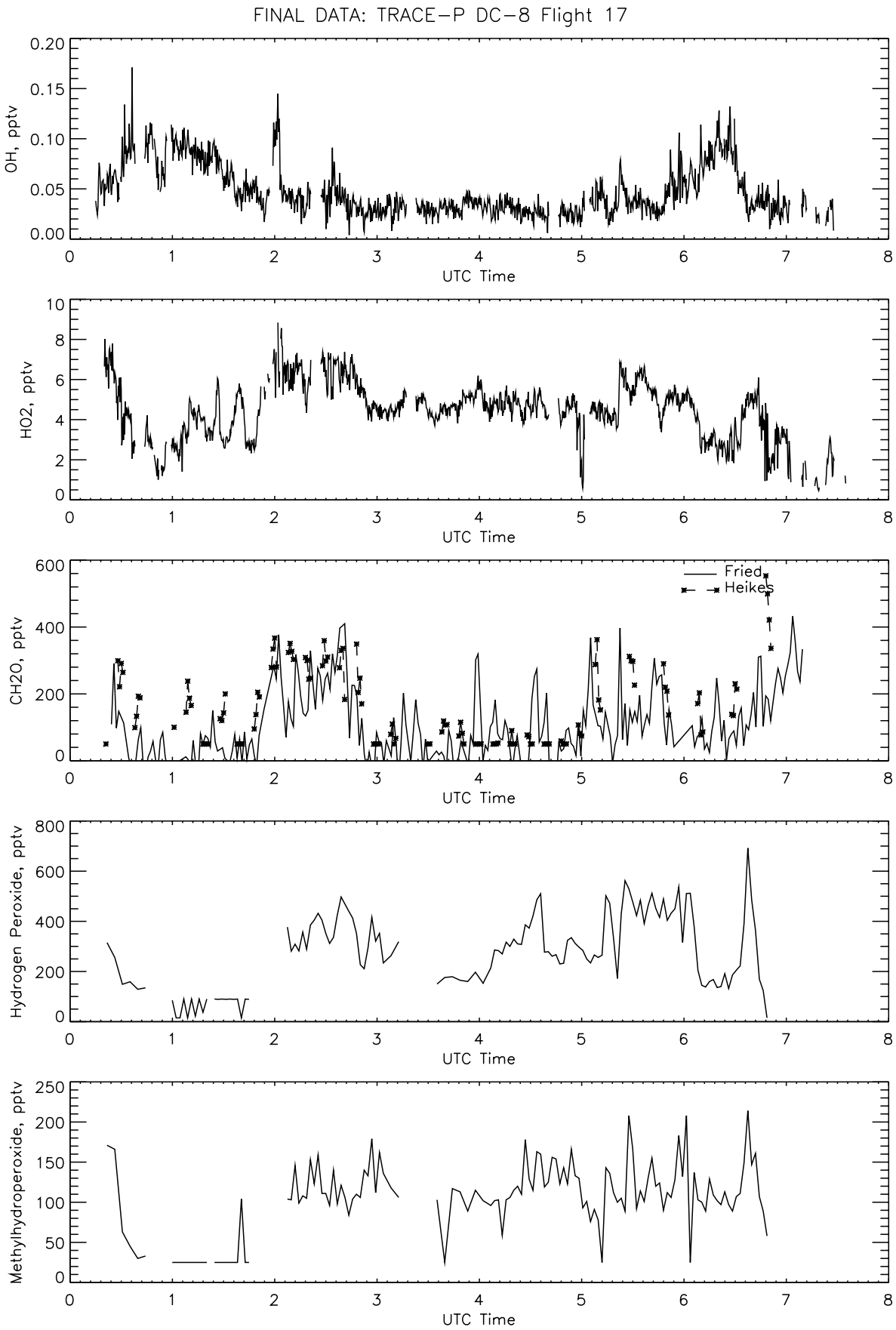
March 31, 2001

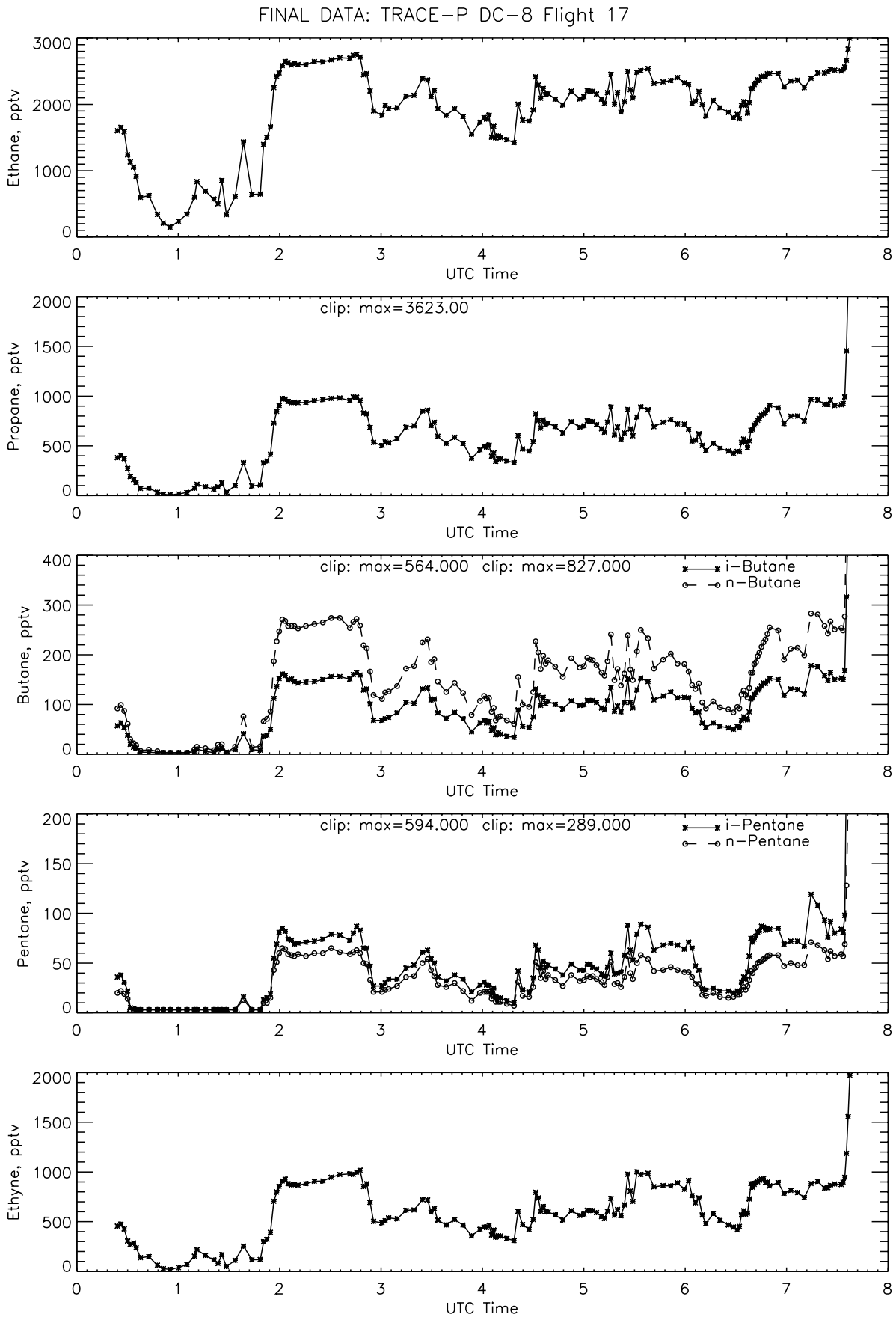

FINAL DATA: TRACE-P DC-8 Flight 17
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

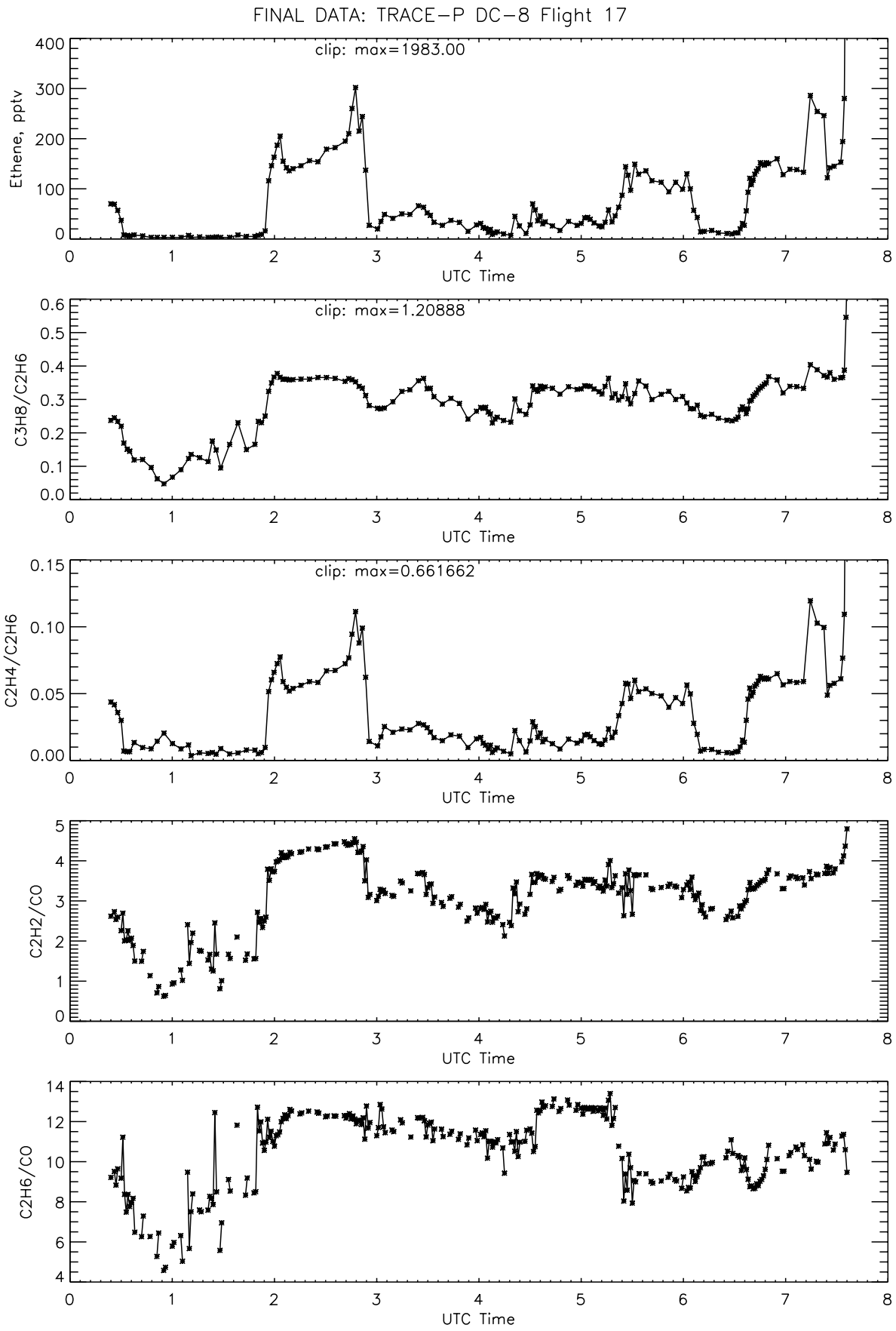
FINAL DATA: TRACE-P DC-8 Flight 17



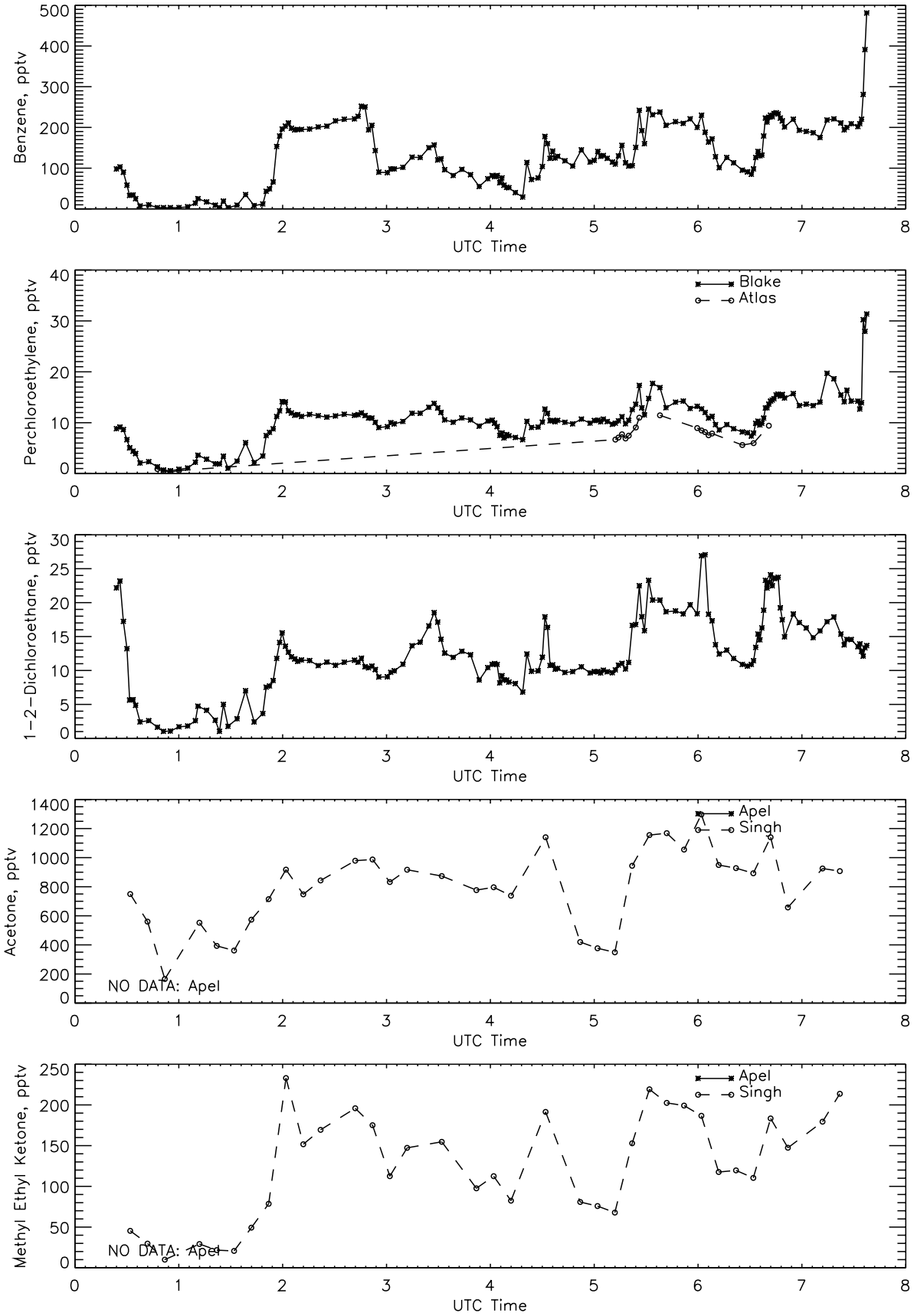

FINAL DATA: TRACE-P DC-8 Flight 17
NO, pptv
NO2, pptv
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

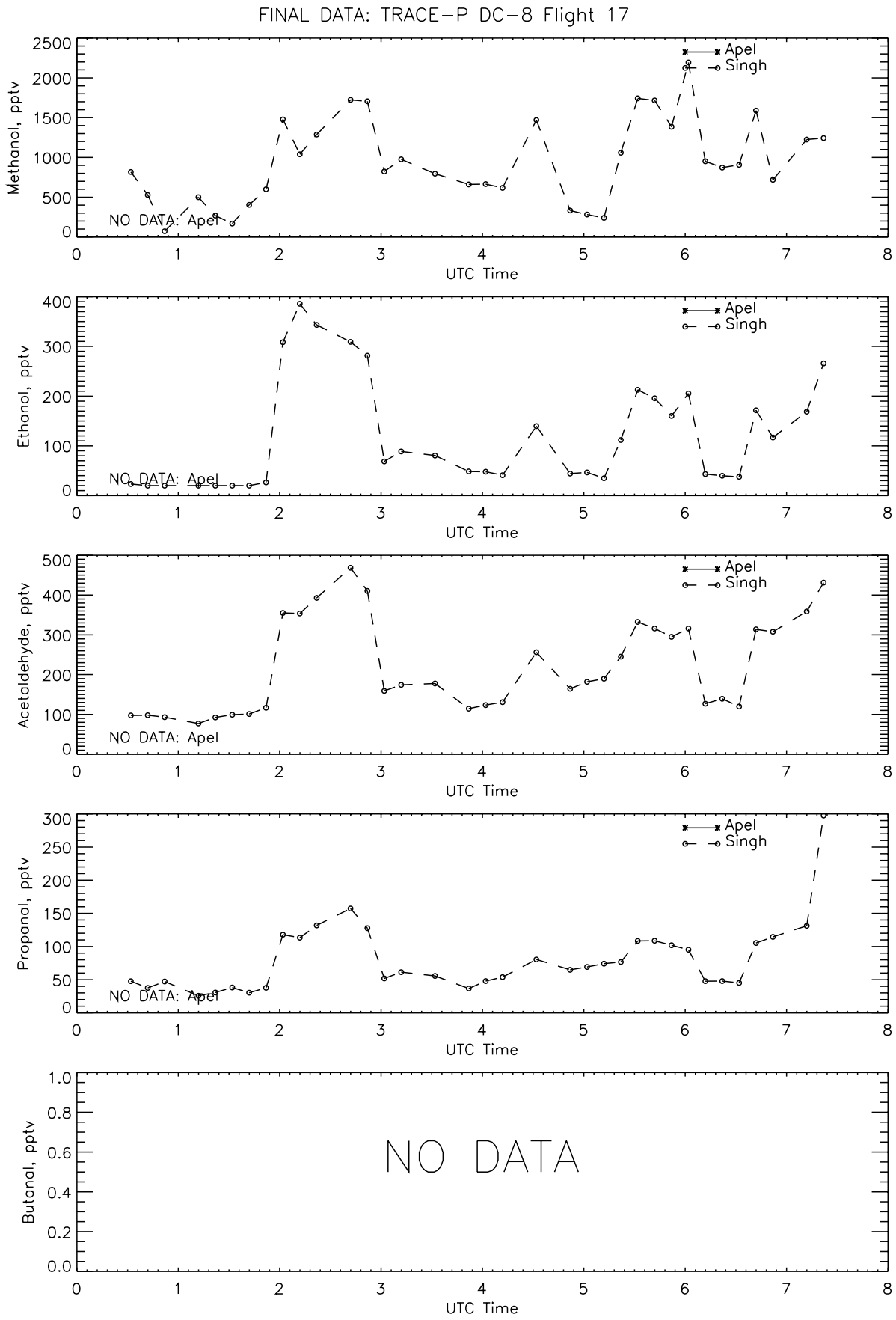

FINAL DATA: TRACE-P DC-8 Flight 17
OH, pptv
UTC Time
HO2, pptv
UTC Time
CH2O, pptv
Fried
Heikes
UTC Time
Hydrogen Peroxide, pptv
UTC Time
Methylhydroperoxide, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 17
Ethane, pptv
UTC Time
Propane, pptv
clip: max=3623.00
Butane, pptv
clip: max=564.000 clip: max=827.000
i-Butane
n-Butane
Pentane, pptv
clip: max=594.000 clip: max=289.000
i-Pentane
n-Pentane
Ethyne, pptv

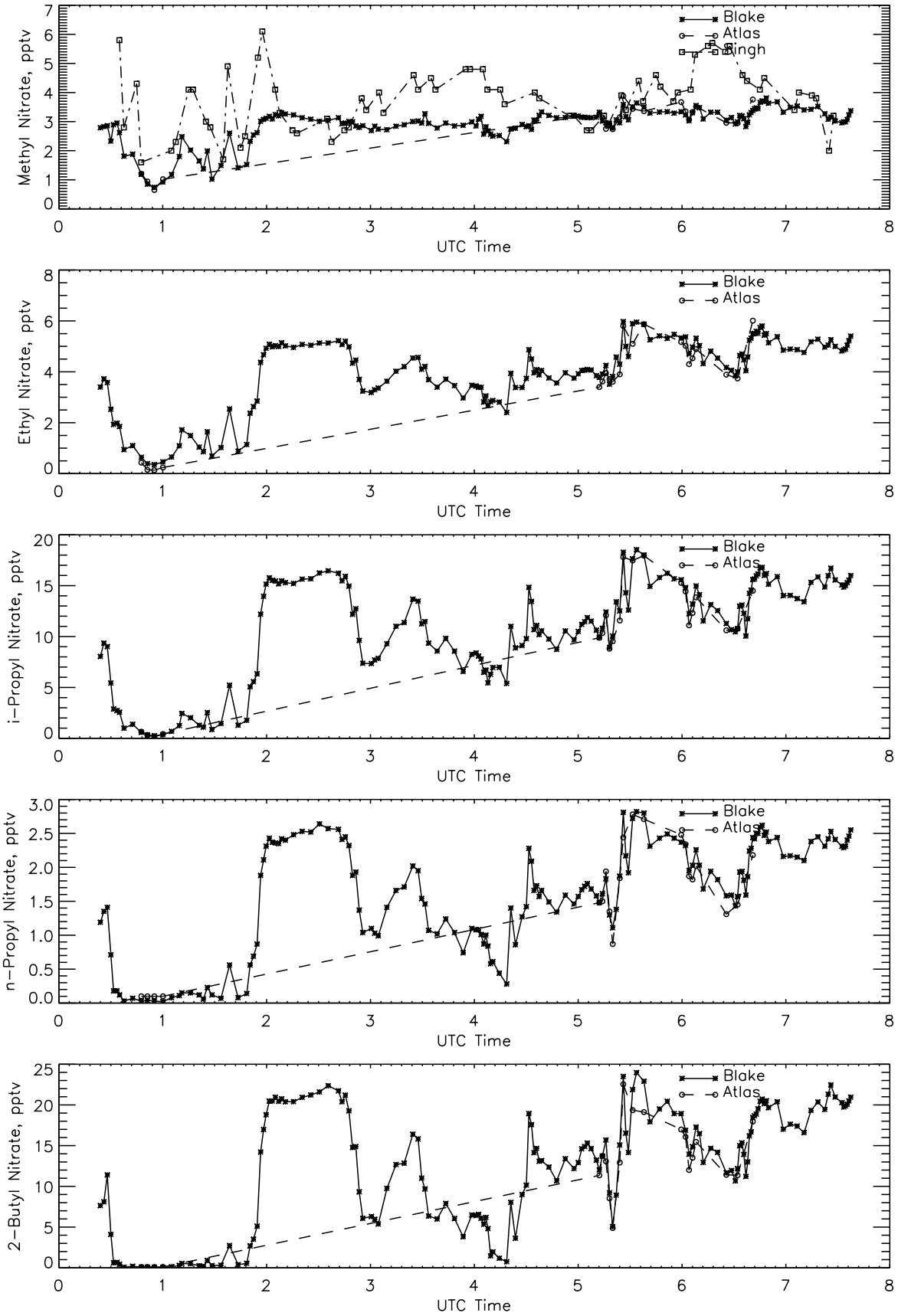

FINAL DATA: TRACE-P DC-8 Flight 17
clip: max=1983.00
Ethene, pptv
UTC Time
clip: max=1.20888
C3H8/C2H6
UTC Time
clip: max=0.661662
C2H4/C2H6
UTC Time
C2H2/CO
UTC Time
C2H6/CO
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 17

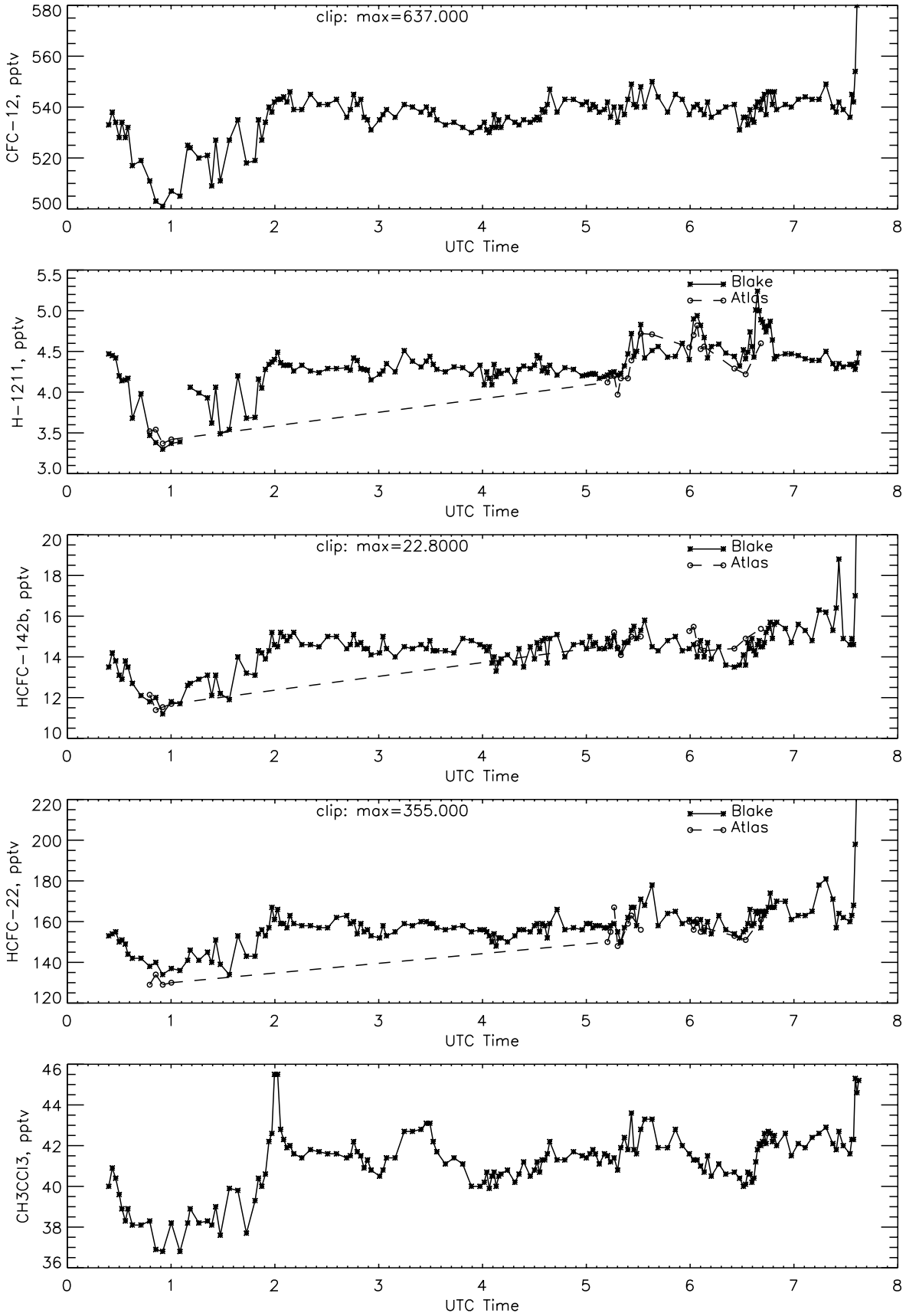



FINAL DATA: TRACE-P DC-8 Flight 17
Methanol, pptv
Apel
Singh
NO DATA: Apel
UTC Time
Ethanol, pptv
Apel
Singh
NO DATA: Apel
UTC Time
Acetaldehyde, pptv
Apel
Singh
NO DATA: Apel
UTC Time
Propanal, pptv
Apel
Singh
NO DATA: Apel
UTC Time
Butanal, pptv
NO DATA
UTC Time

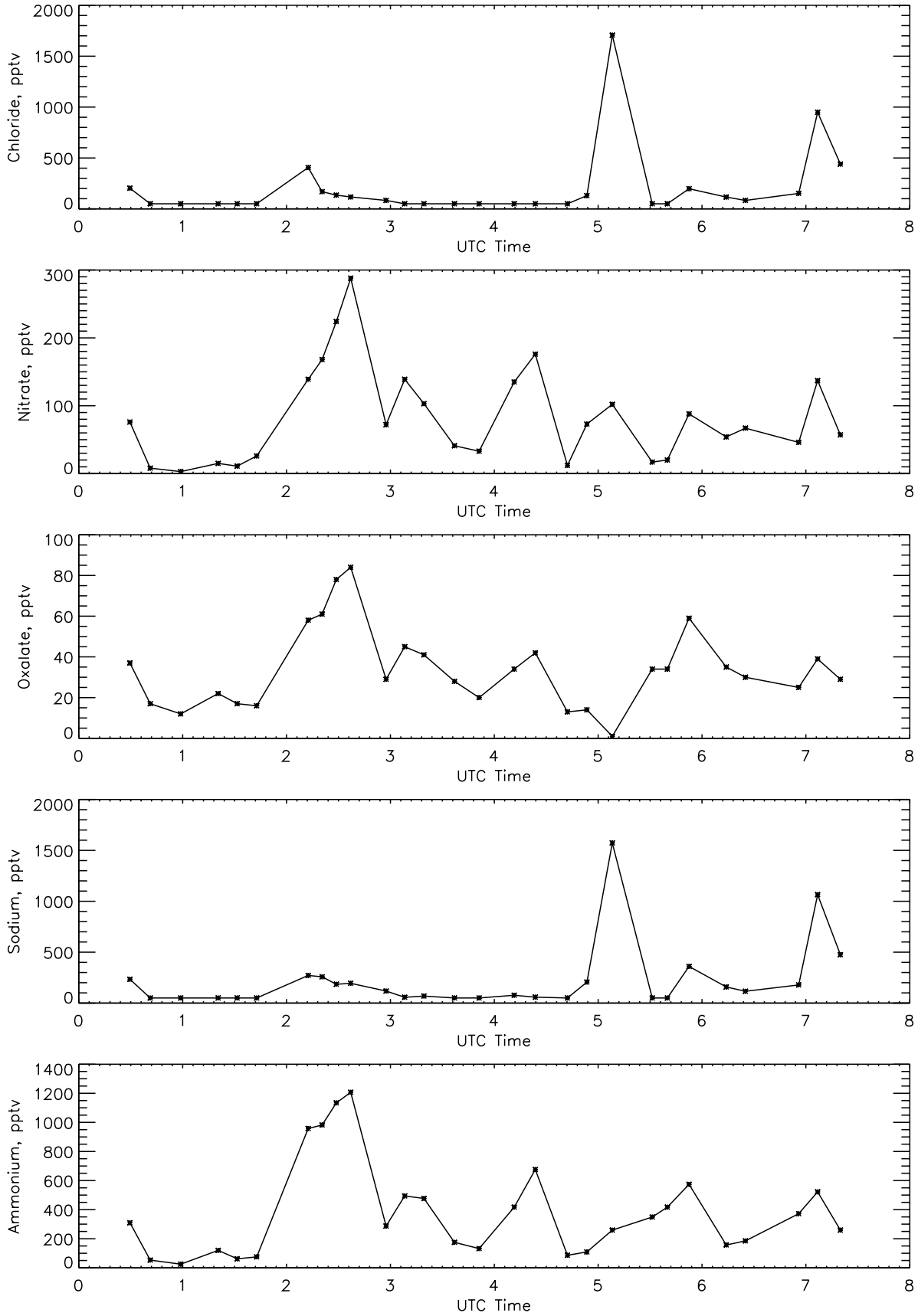
FINAL DATA: TRACE-P DC-8 Flight 17



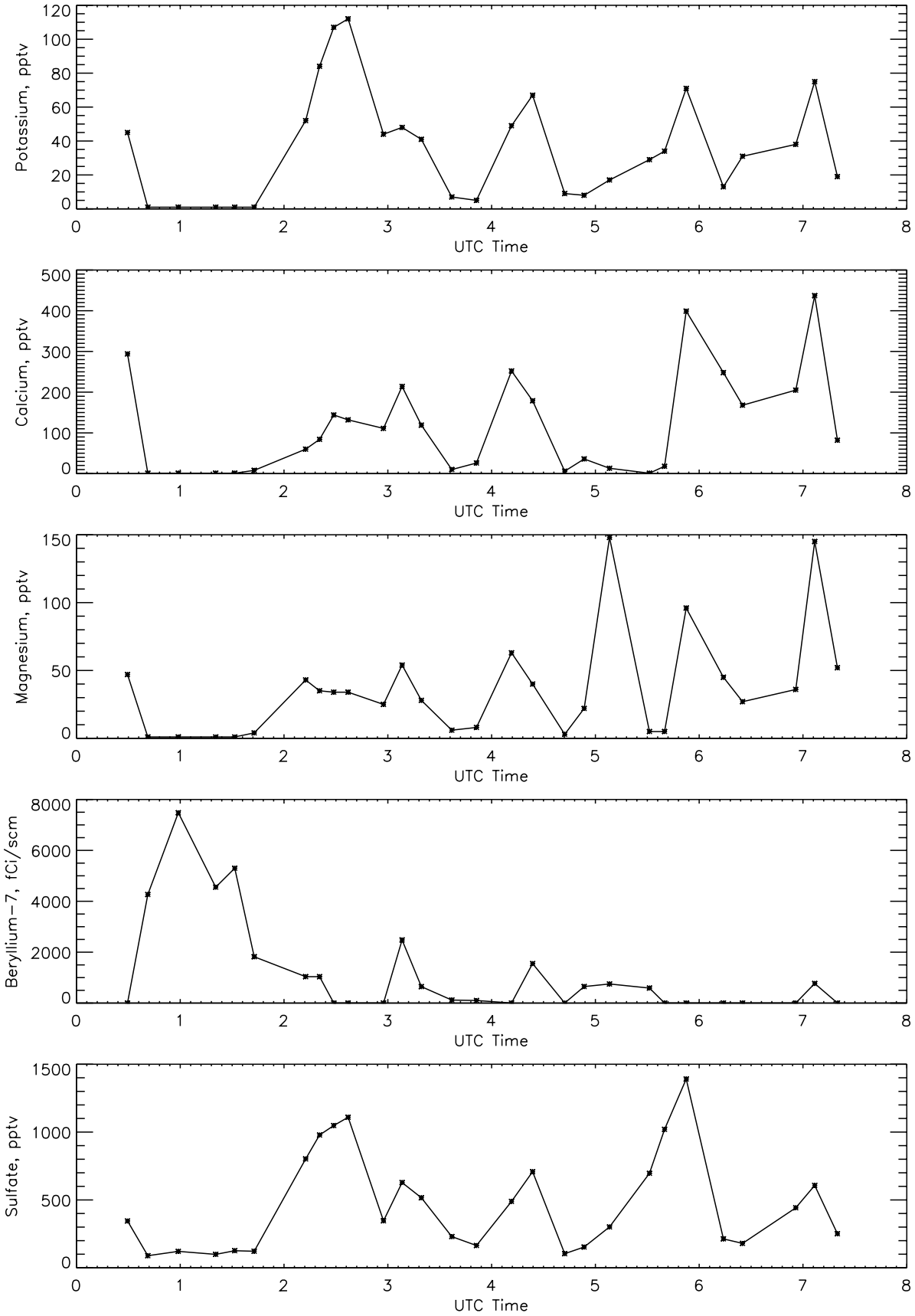
FINAL DATA: TRACE-P DC-8 Flight 17

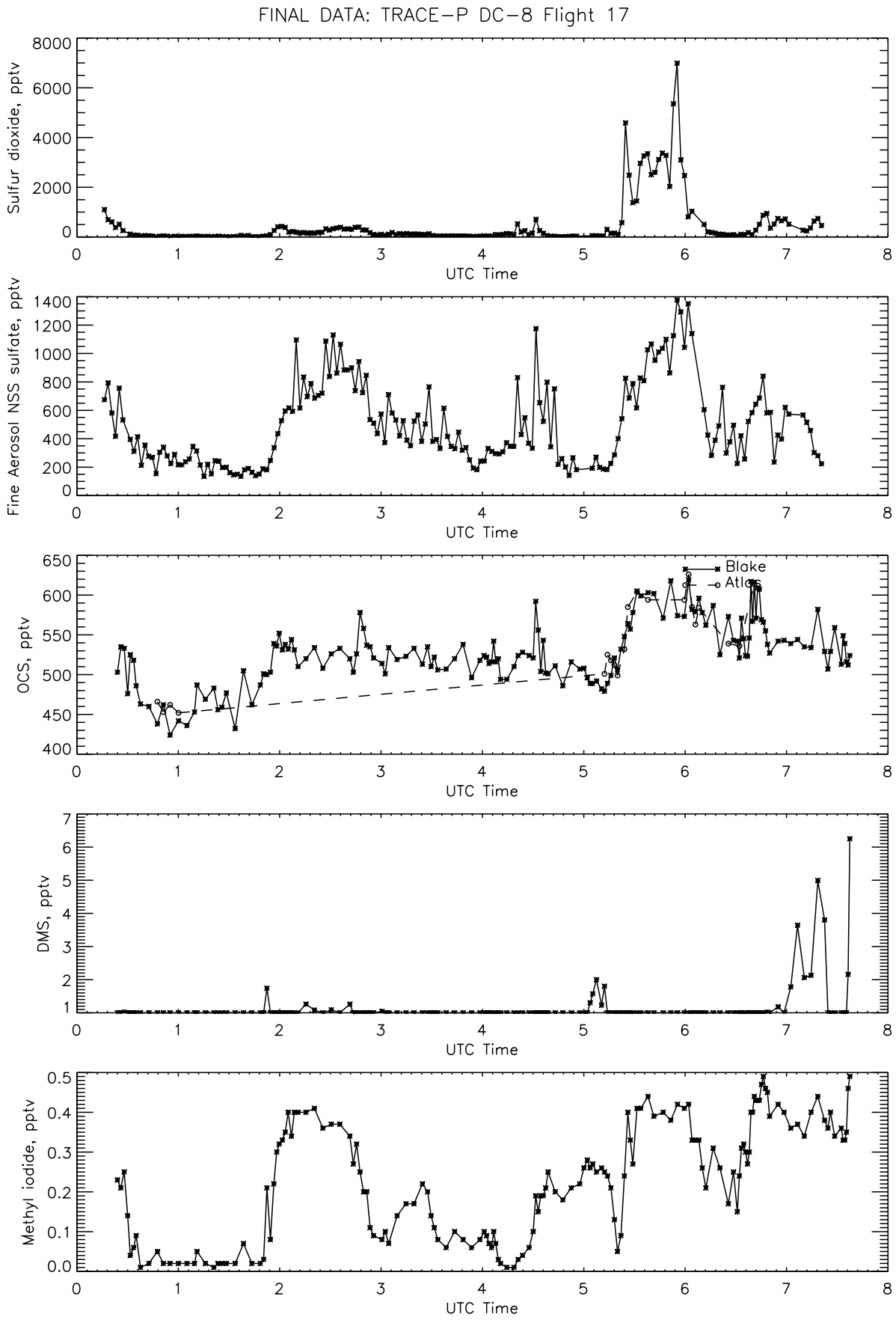


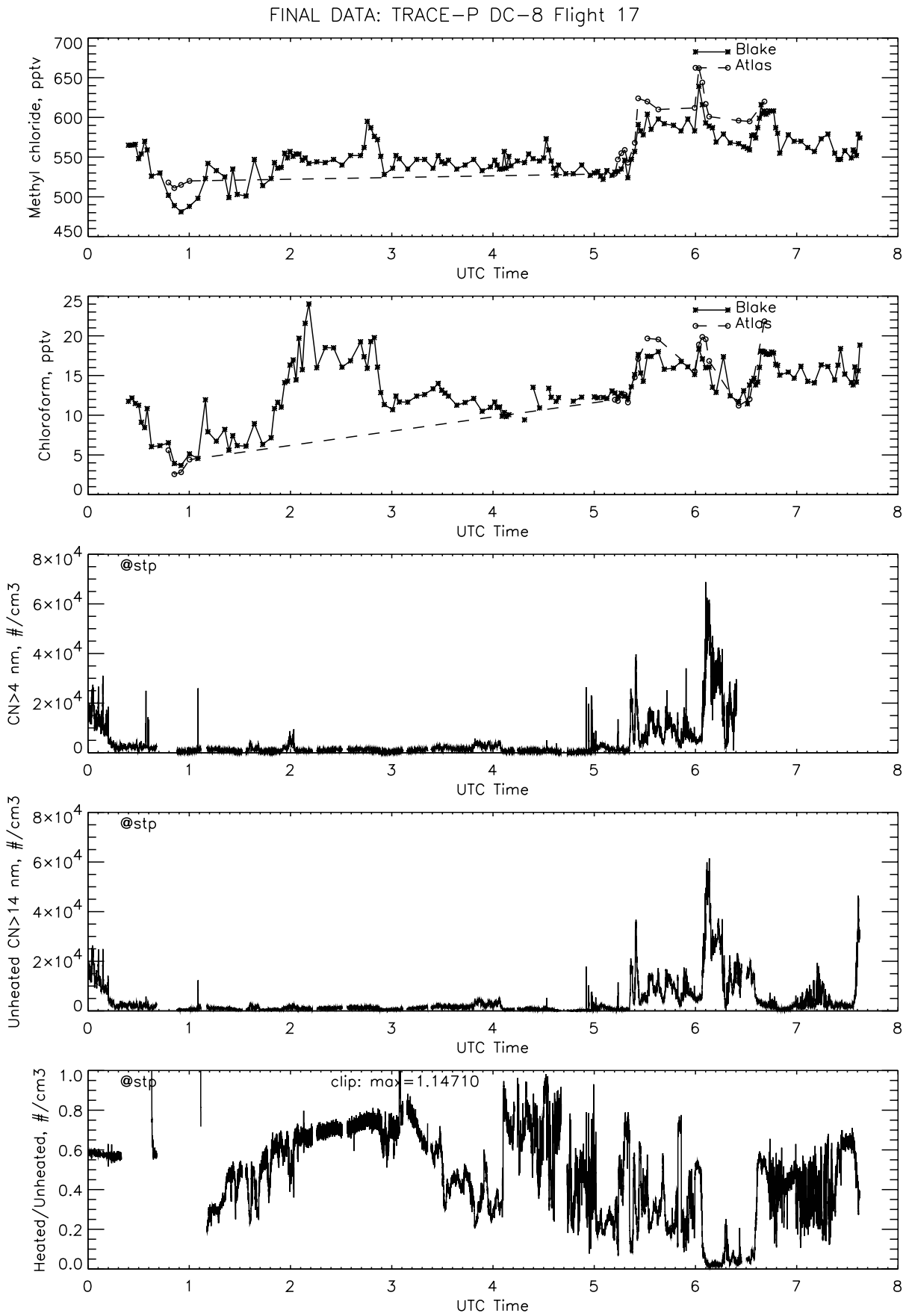
FINAL DATA: TRACE-P DC-8 Flight 17



FINAL DATA: TRACE-P DC-8 Flight 17




FINAL DATA: TRACE-P DC-8 Flight 17
Sulfur dioxide, pptv
UTC Time
Fine Aerosol NSS sulfate, pptv
UTC Time
OCS, pptv
Blake
Atlas
UTC Time
DMS, pptv
UTC Time
Methyl iodide, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 17
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
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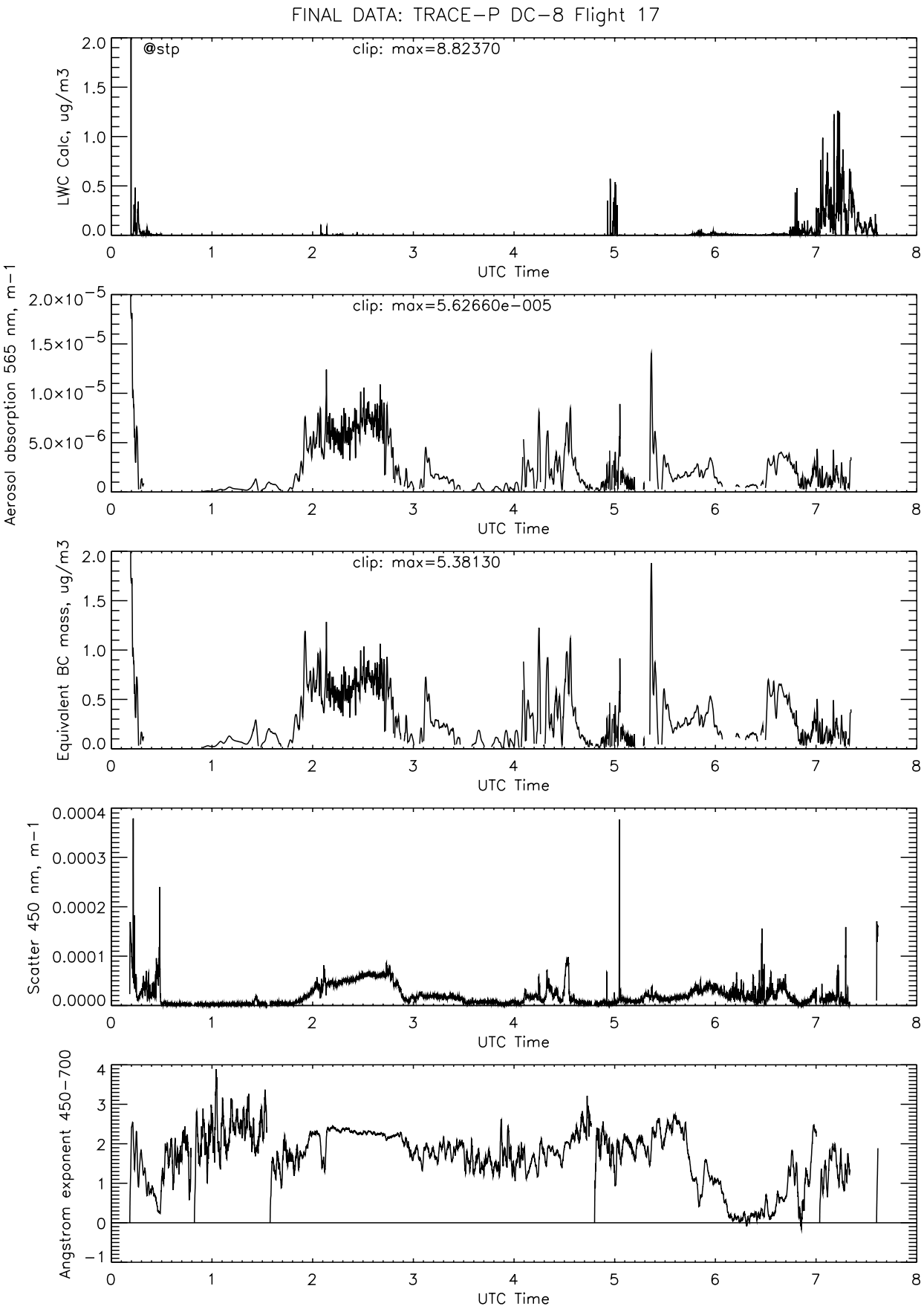
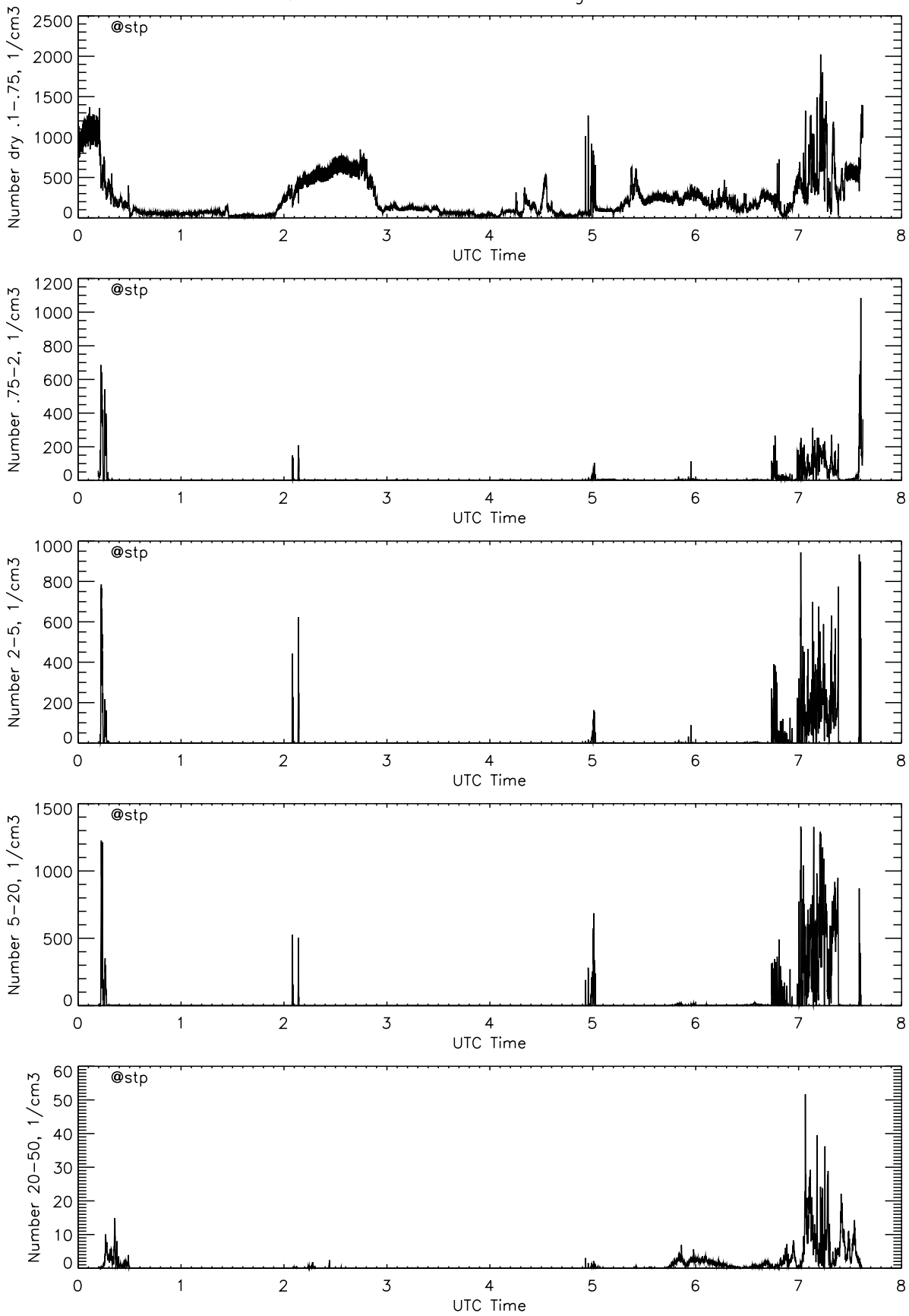
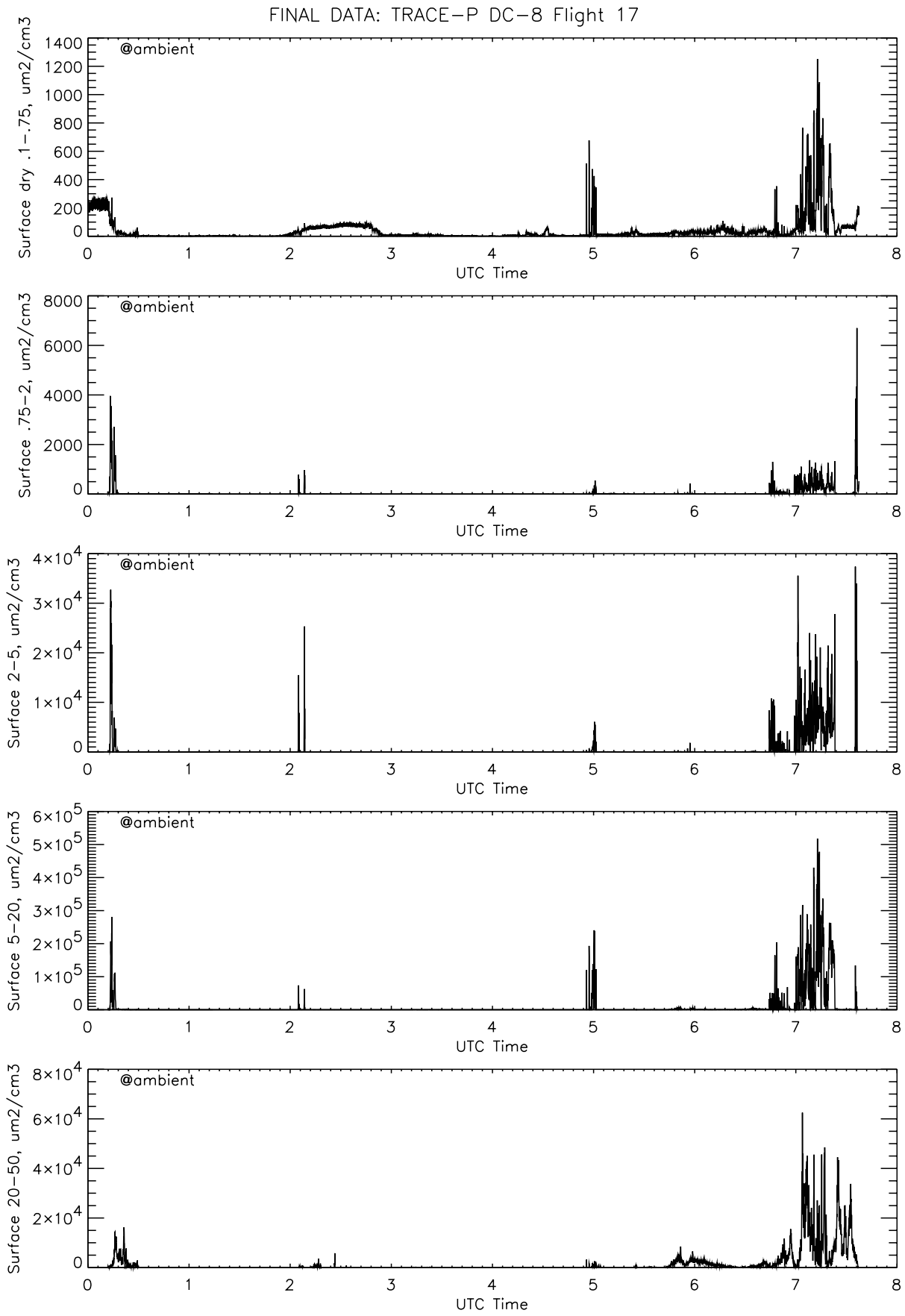
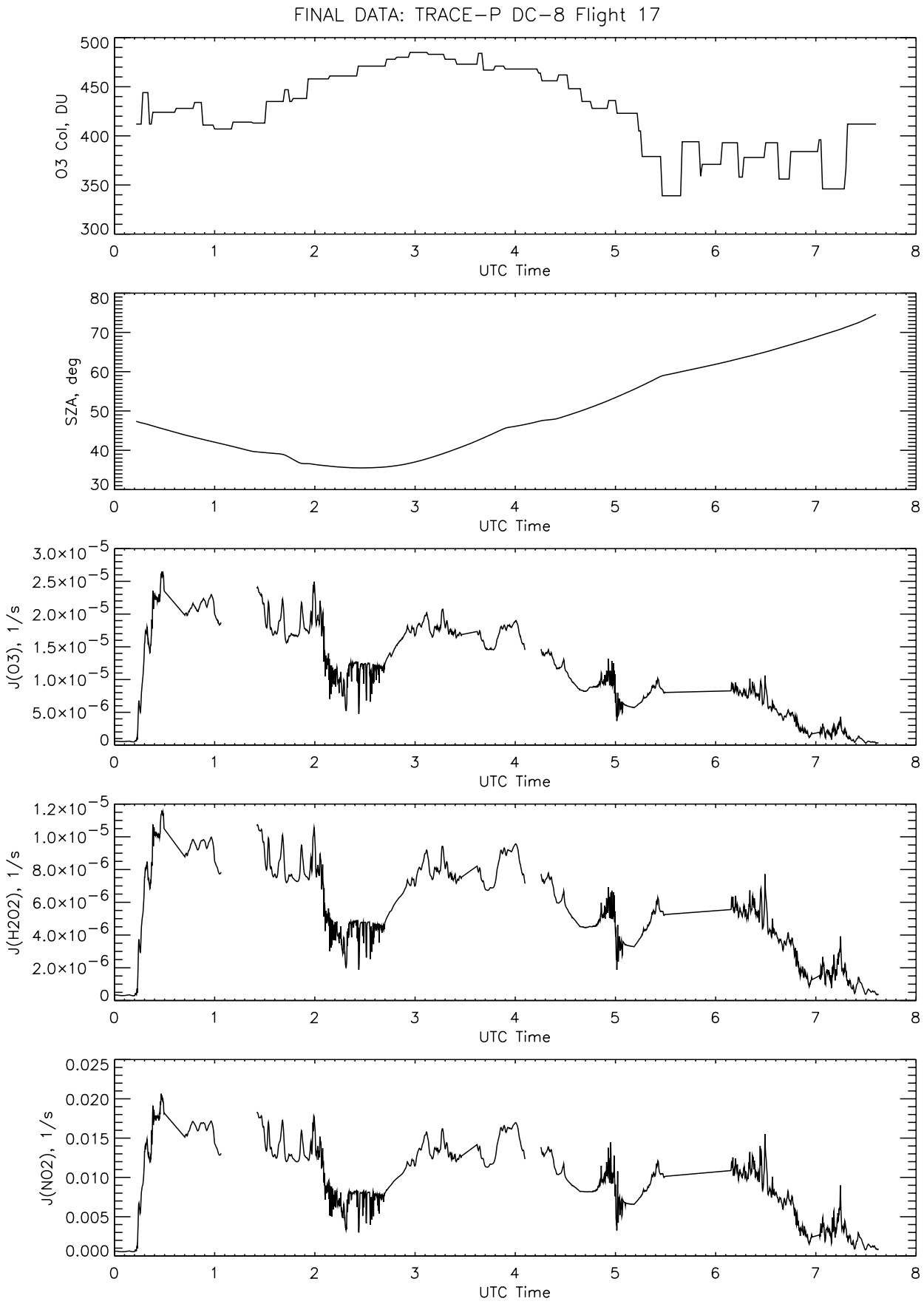
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14710
UTC Time

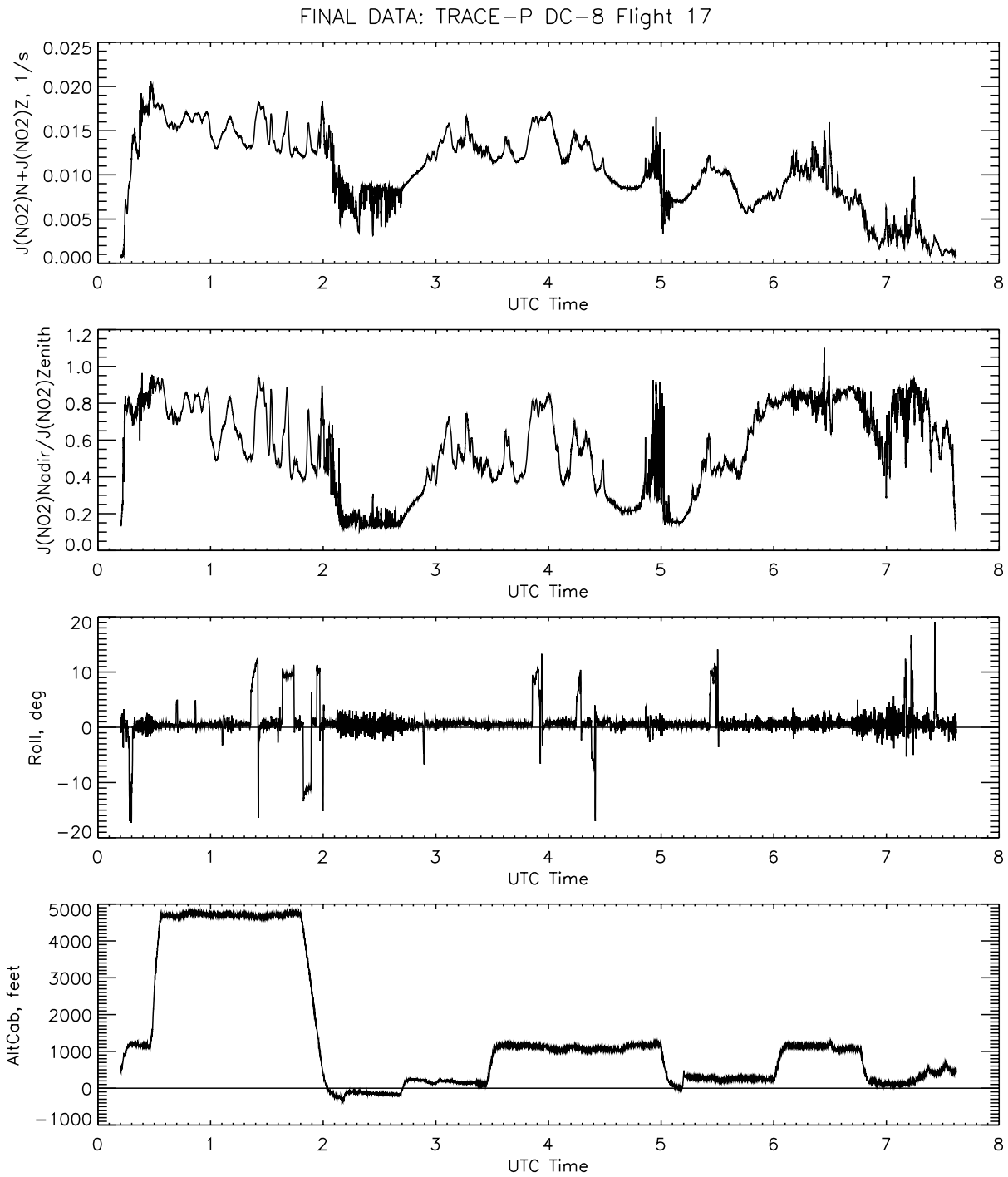

FINAL DATA: TRACE-P DC-8 Flight 17
@stp
clip: max=8.82370
LWC Calc, ug/m3
UTC Time
clip: max=5.62660e-005
Aerosol absorption 565 nm, m-1
UTC Time
clip: max=5.38130
Equivalent BC mass, ug/m3
UTC Time
Scatter 450 nm, m-1
UTC Time
Angstrom exponent 450-700
UTC Time

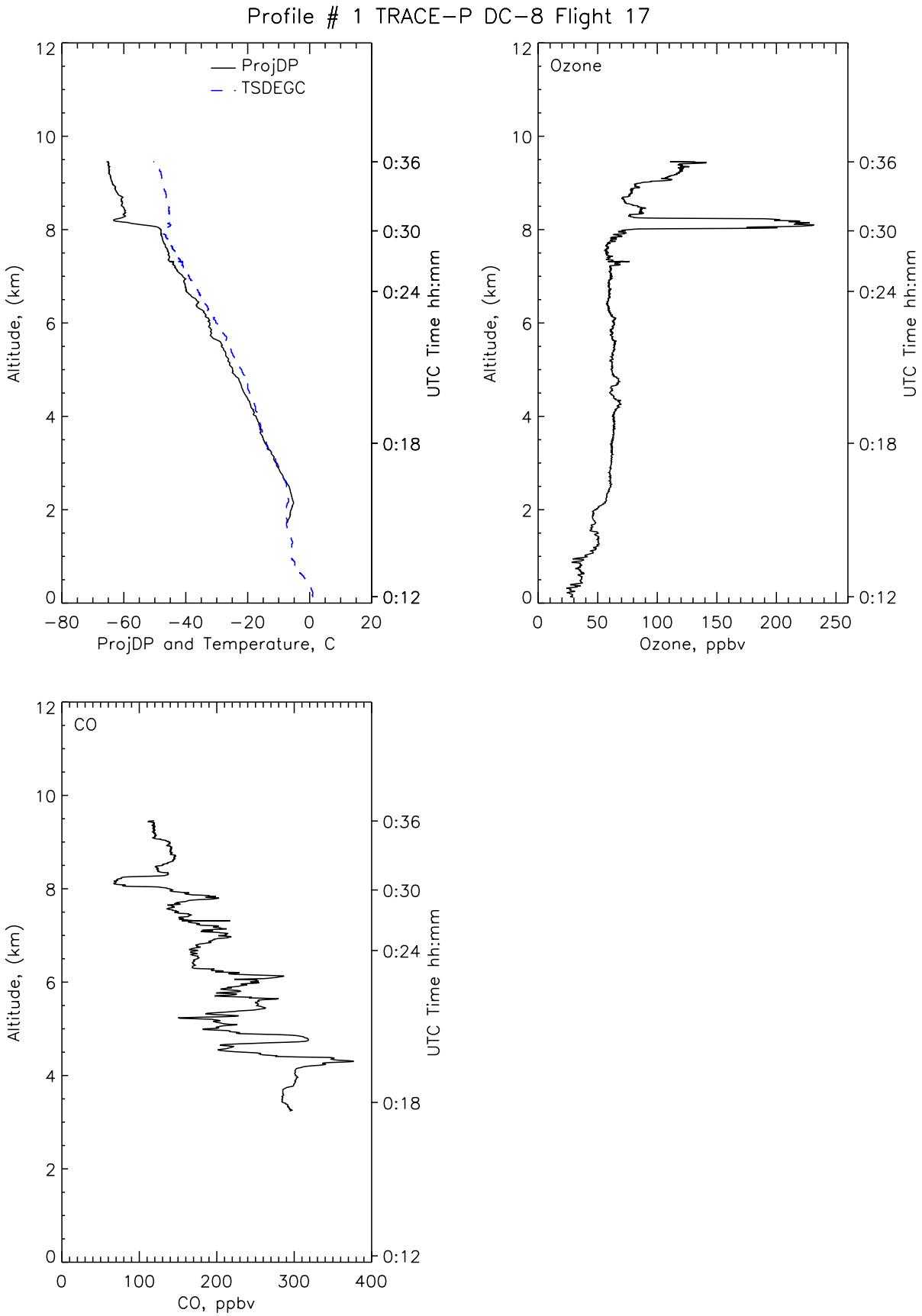
FINAL DATA: TRACE-P DC-8 Flight 17



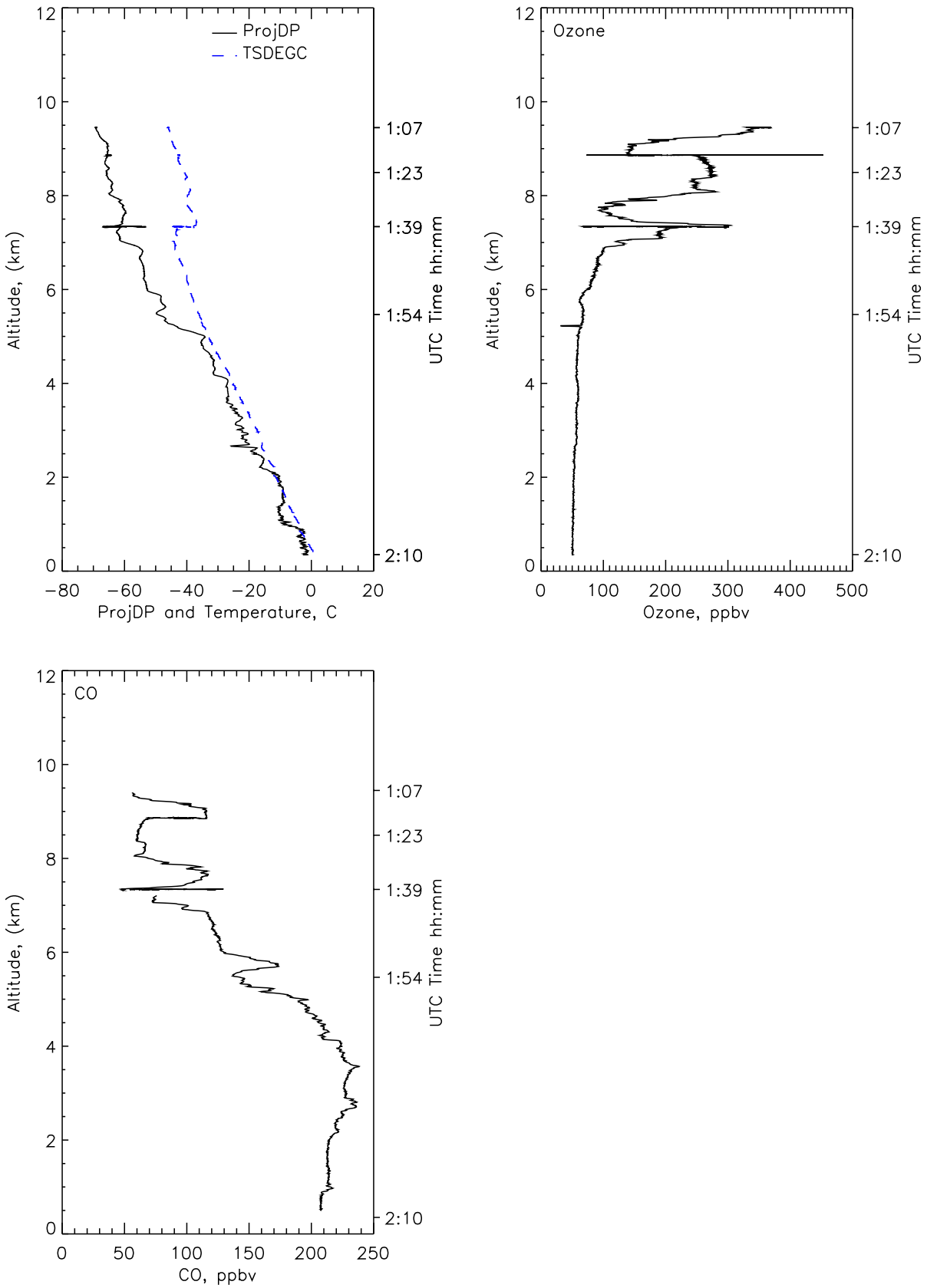

FINAL DATA: TRACE-P DC-8 Flight 17
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

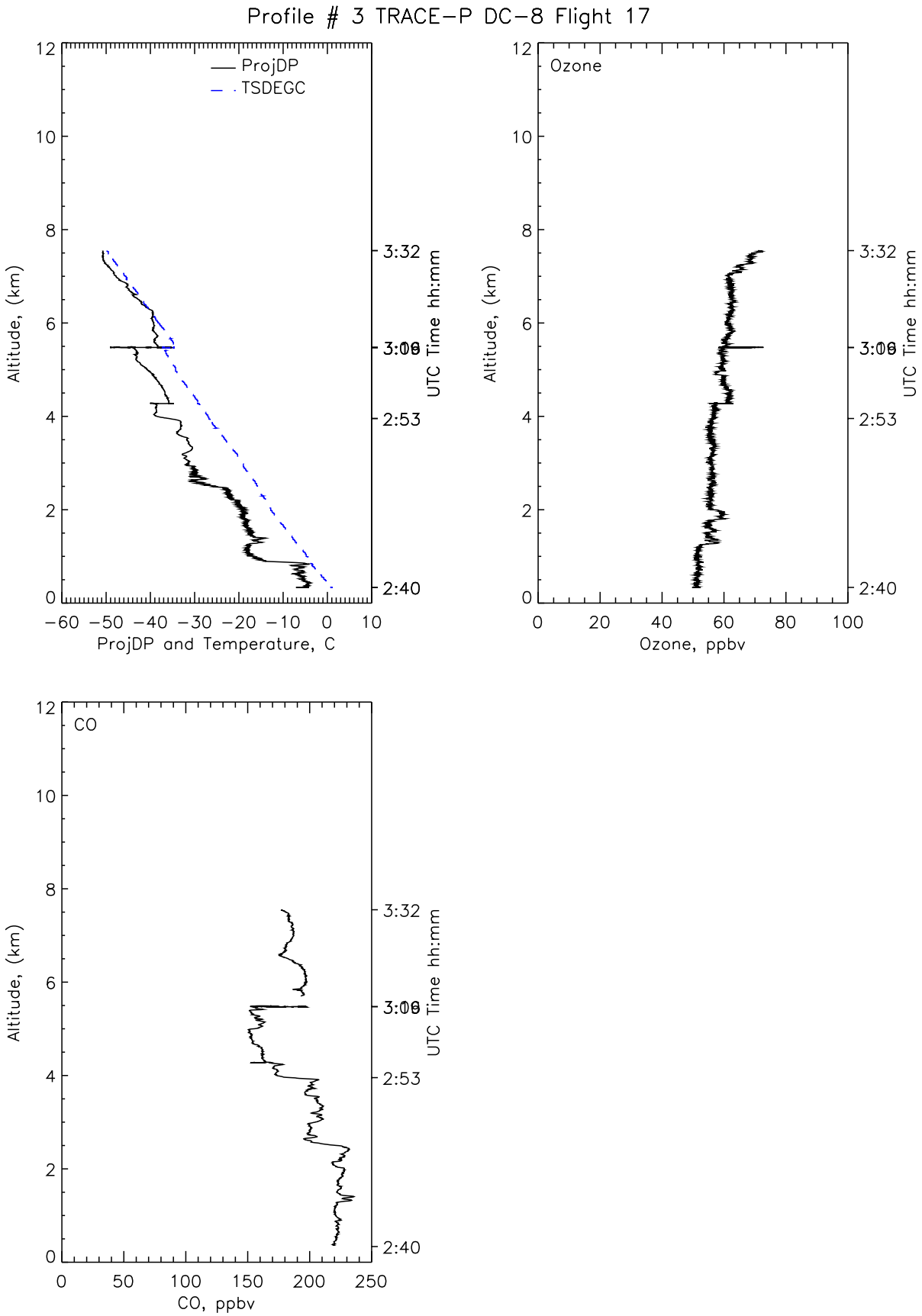

FINAL DATA: TRACE-P DC-8 Flight 17
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

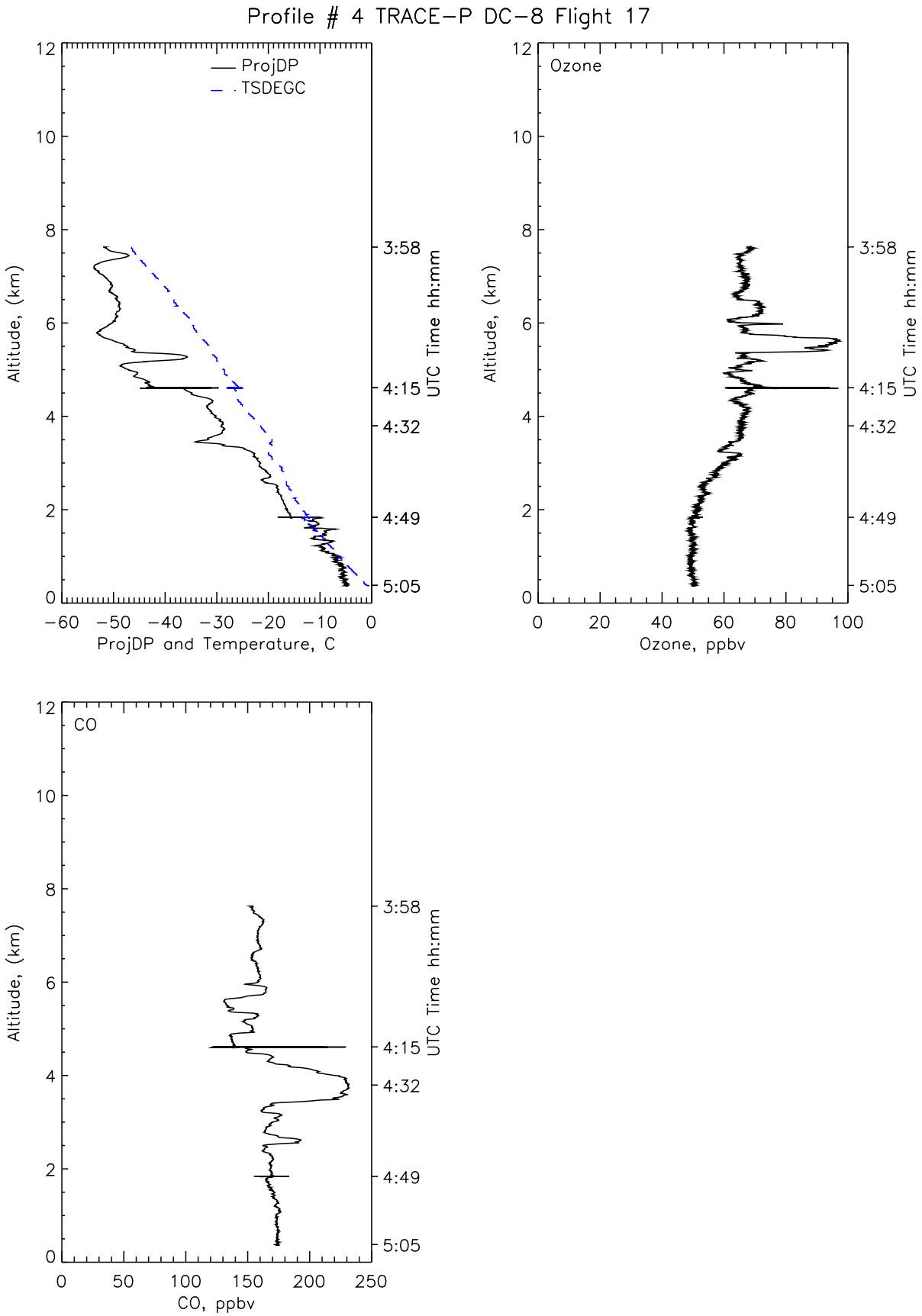

FINAL DATA: TRACE-P DC-8 Flight 17
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
0
1
2
3
4
5
6
7
8
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.2
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
20
10
0
−10
−20
UTC Time
AltCab, feet
5000
4000
3000
2000
1000
0
−1000
UTC Time


Profile # 1 TRACE-P DC-8 Flight 17
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

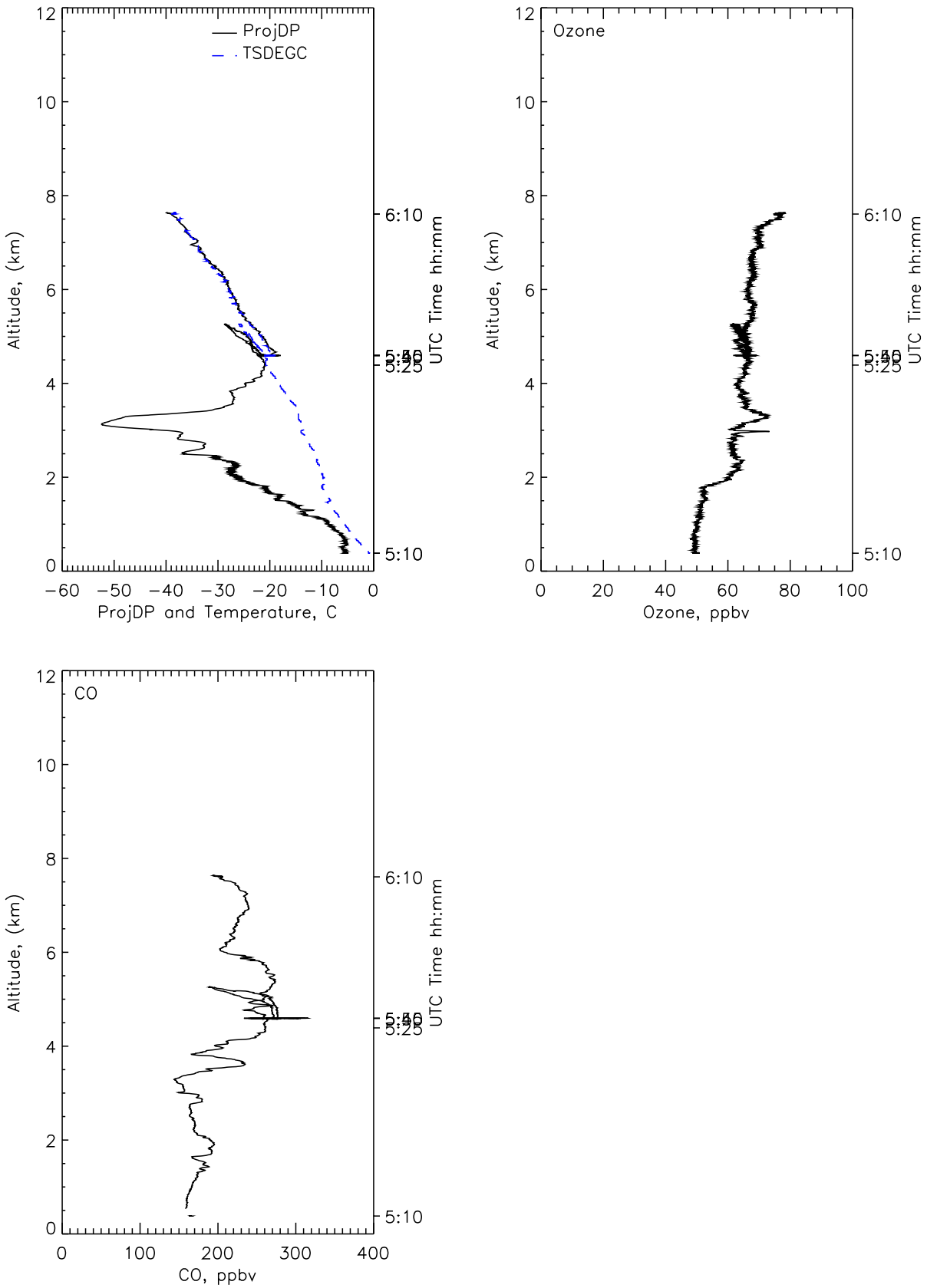
Profile # 2 TRACE-P DC-8 Flight 17

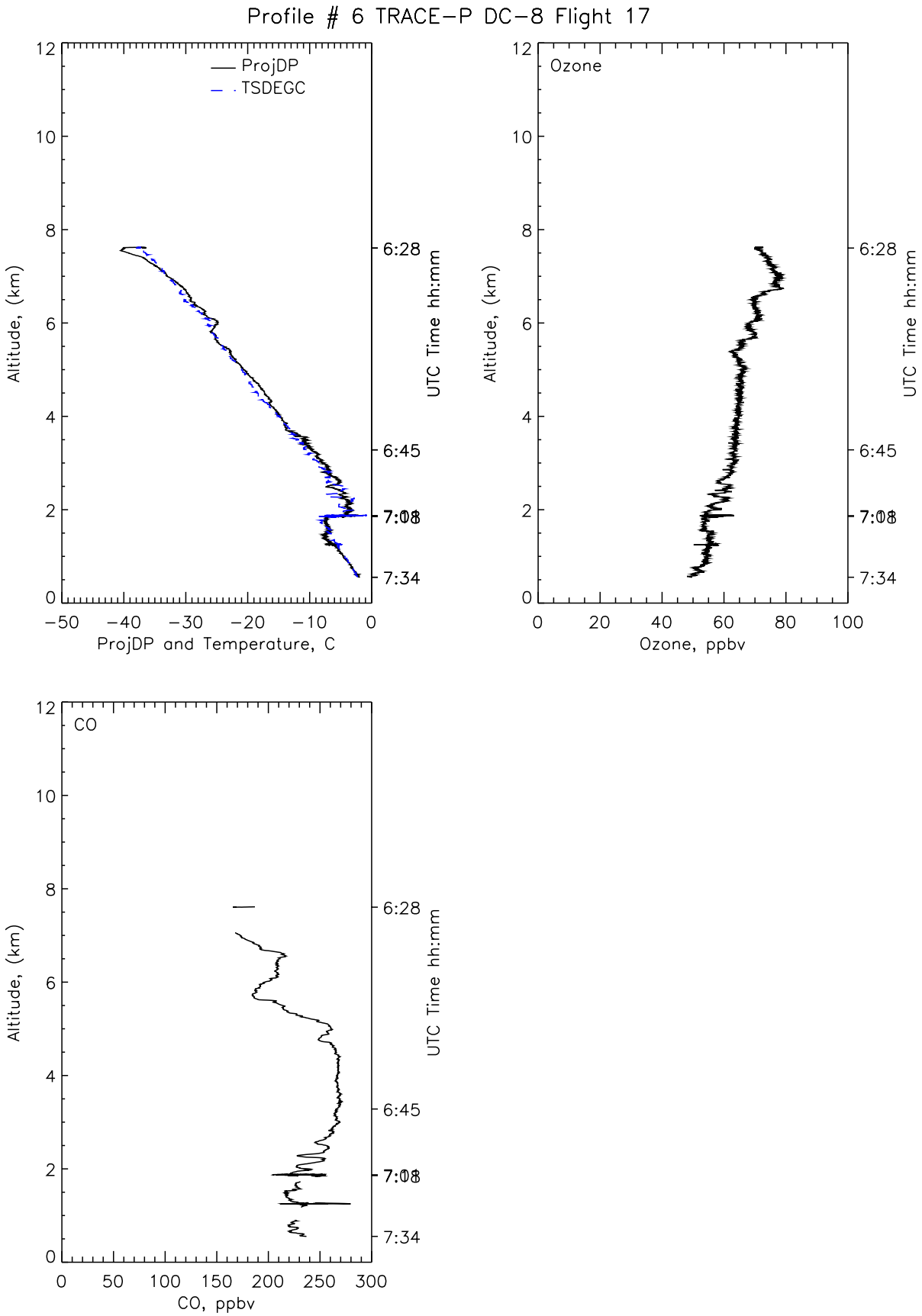



Profile # 3 TRACE-P DC-8 Flight 17
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
3:32
3:00
2:53
2:40
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 17
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
3:58
4:15
4:32
4:49
5:05
Ozone
Ozone, ppbv
CO
CO, ppbv

Profile # 5 TRACE-P DC-8 Flight 17




Profile # 6 TRACE-P DC-8 Flight 17
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
6:28
6:45
7:08
7:34
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

TRACE-P

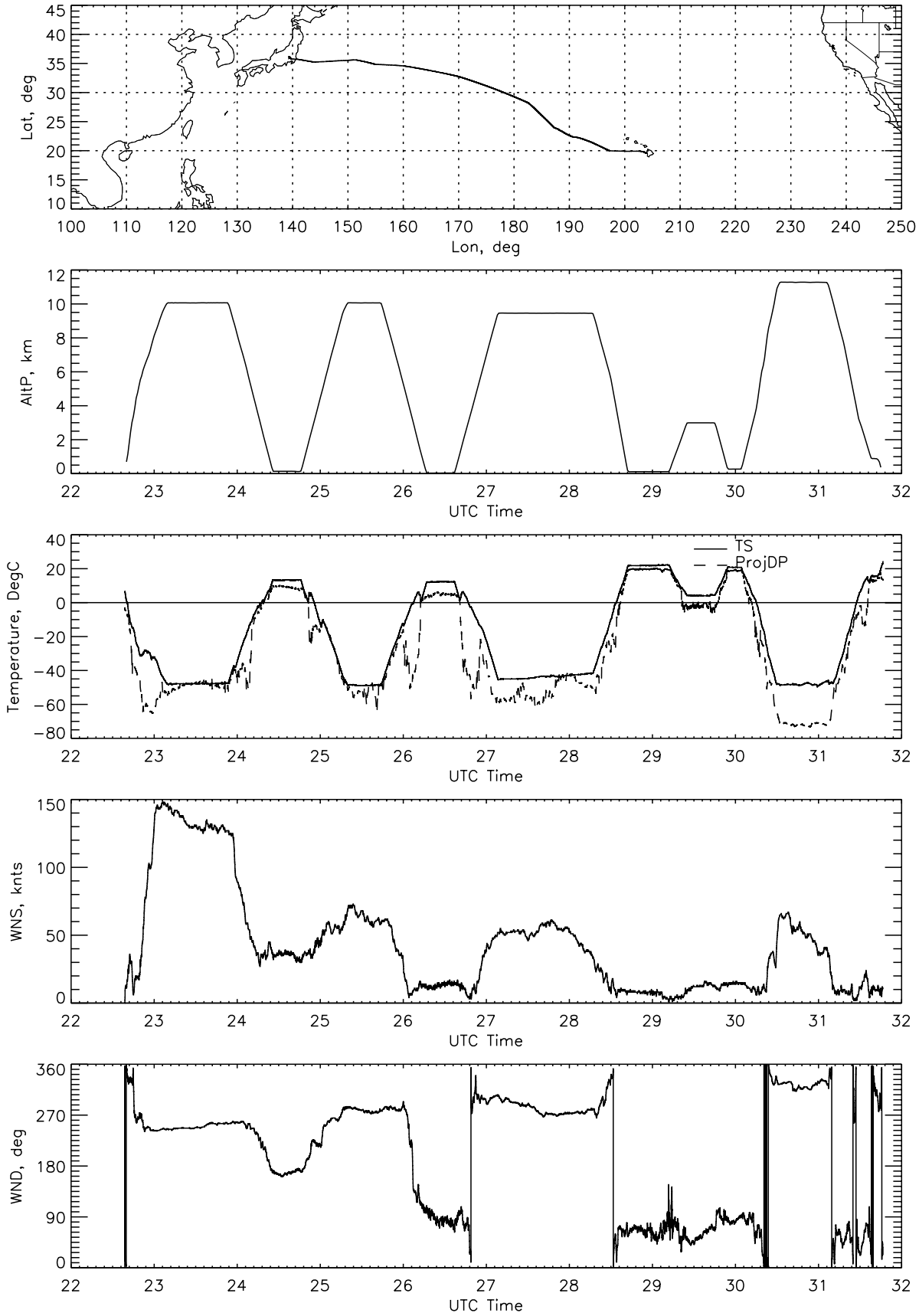
Flight 18D

Transit: Yokota AFB, Japan to Kona, HI

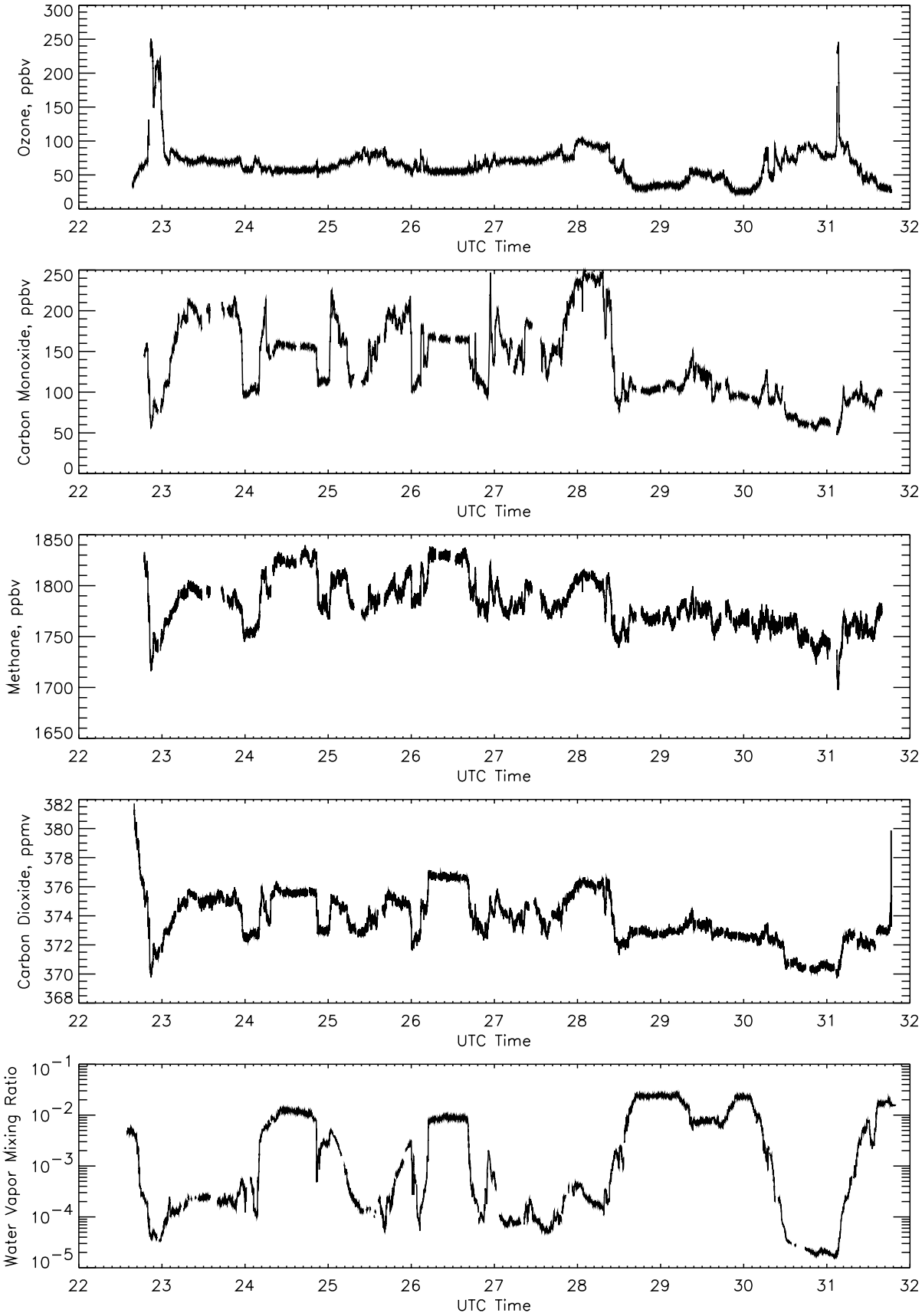
High Altitude Asian Outflow and Sunset MBL Chemistry

April 3, 2001

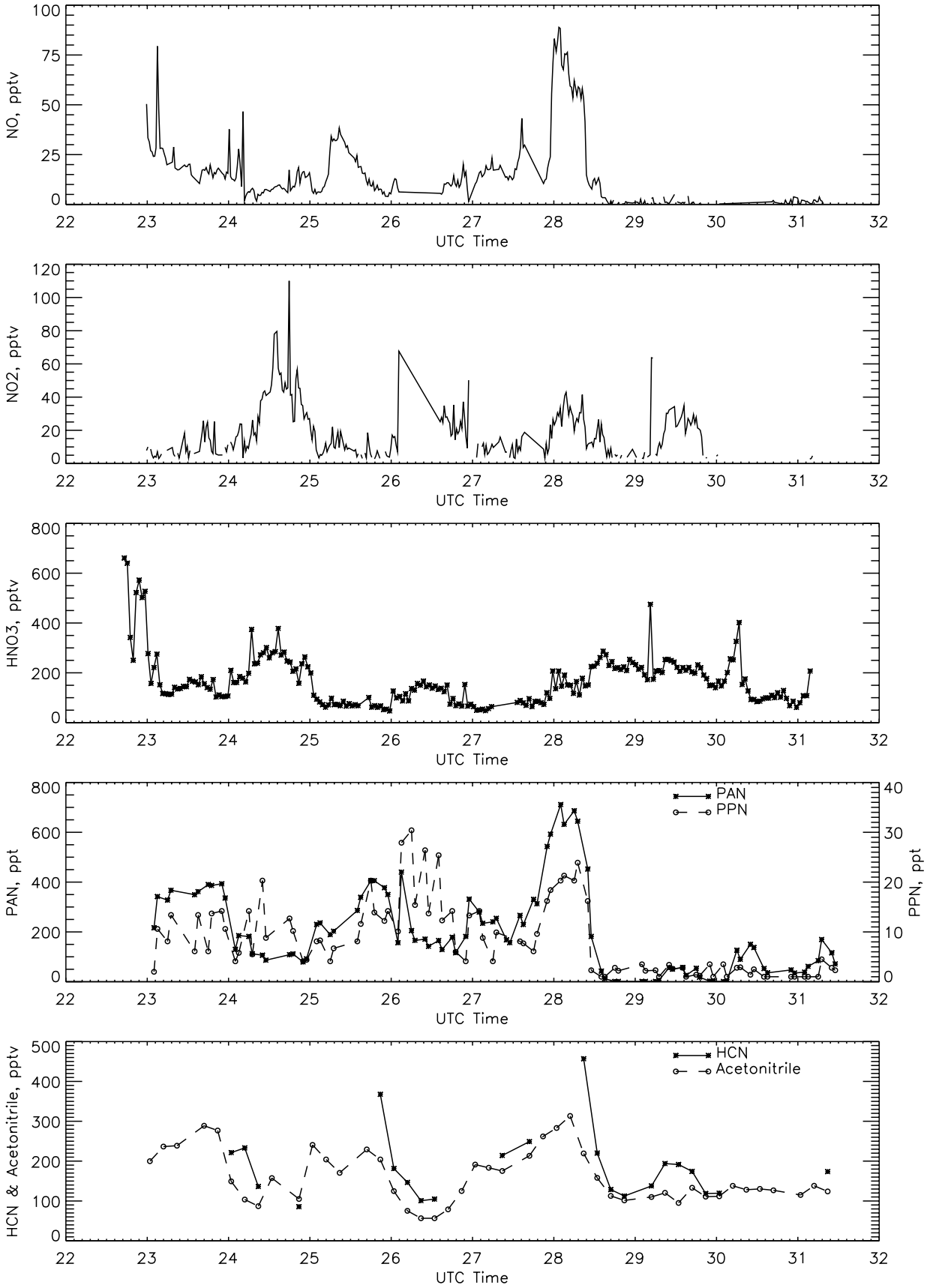
FINAL DATA: TRACE-P DC-8 Flight 18

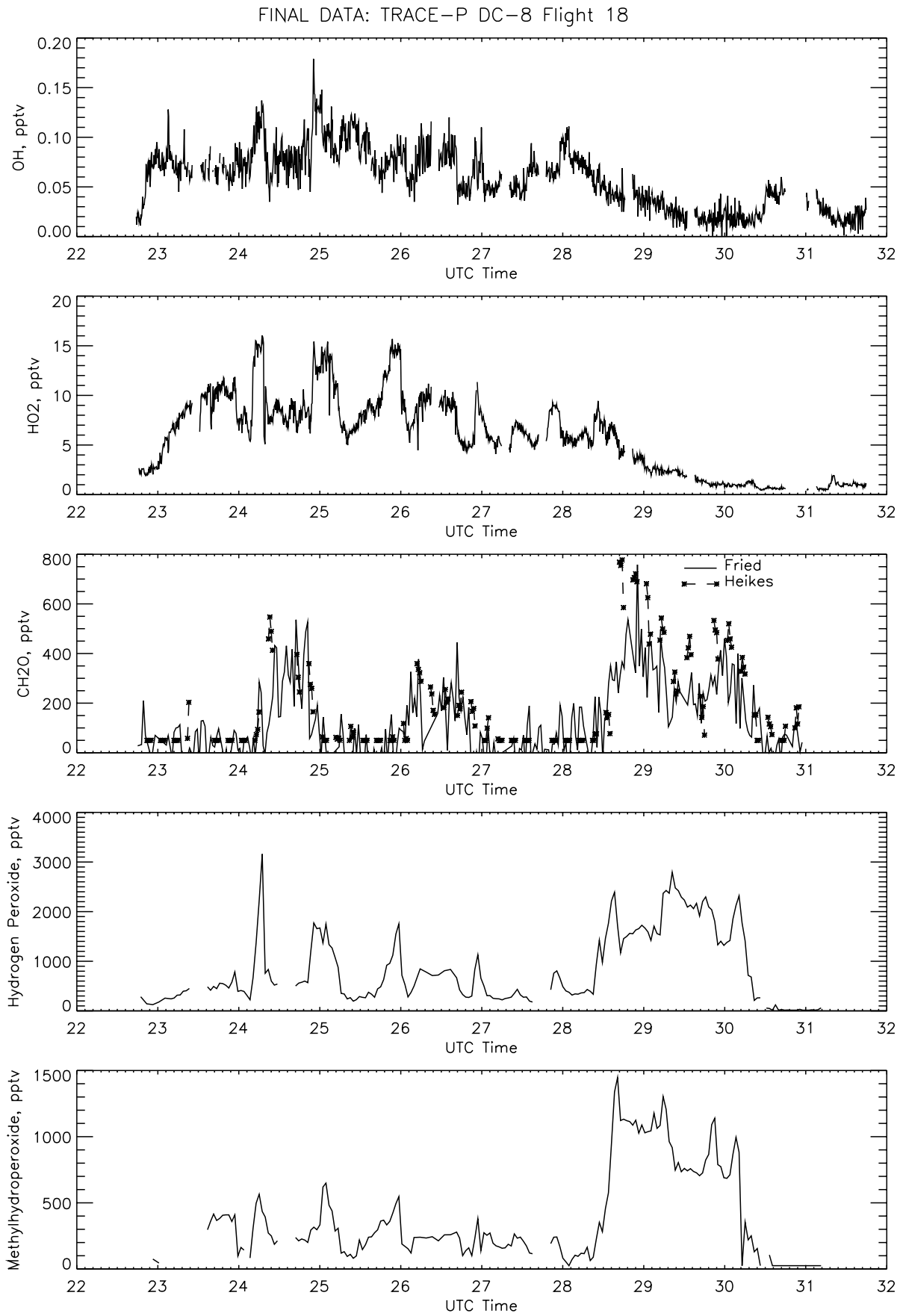


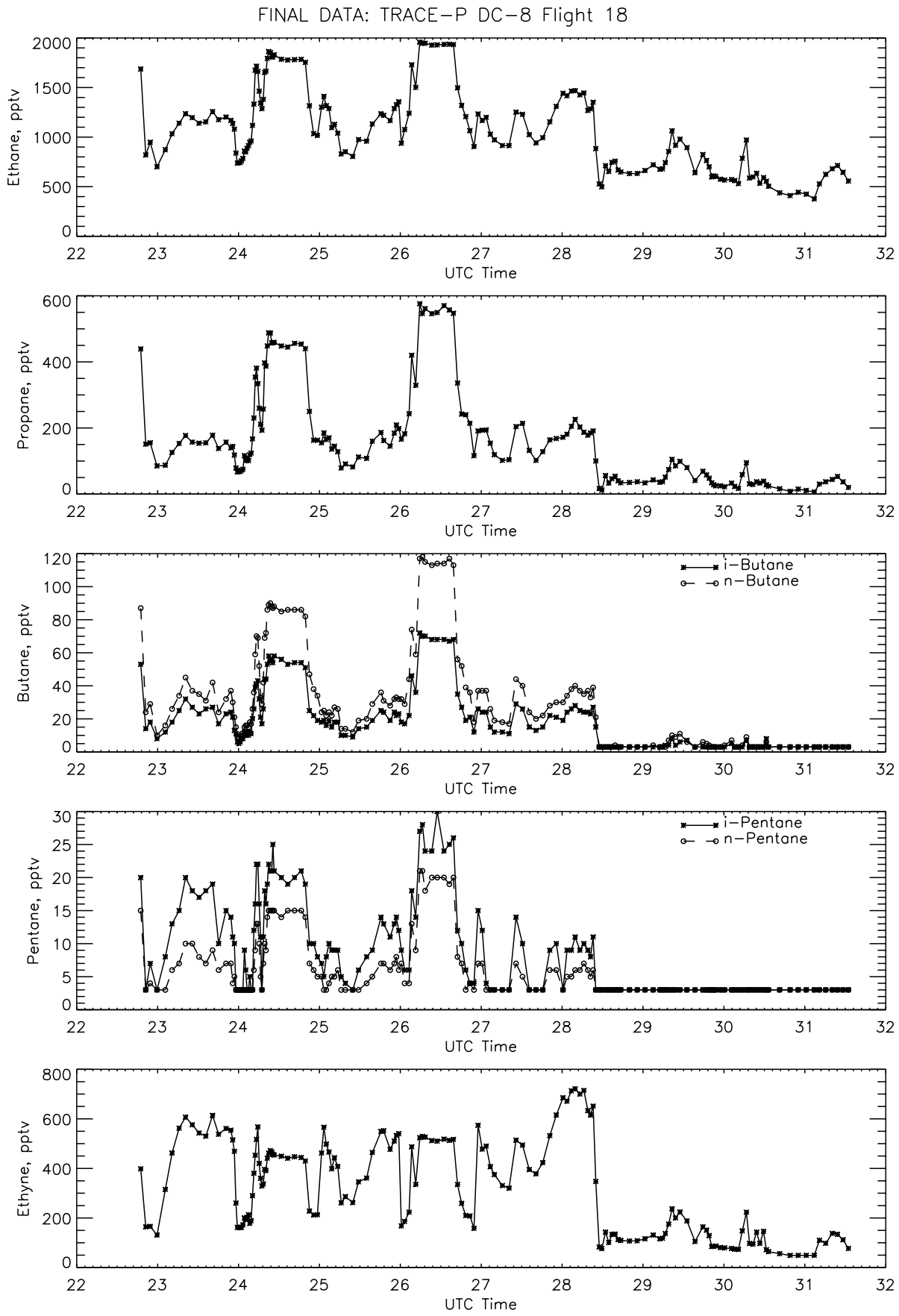
FINAL DATA: TRACE-P DC-8 Flight 18



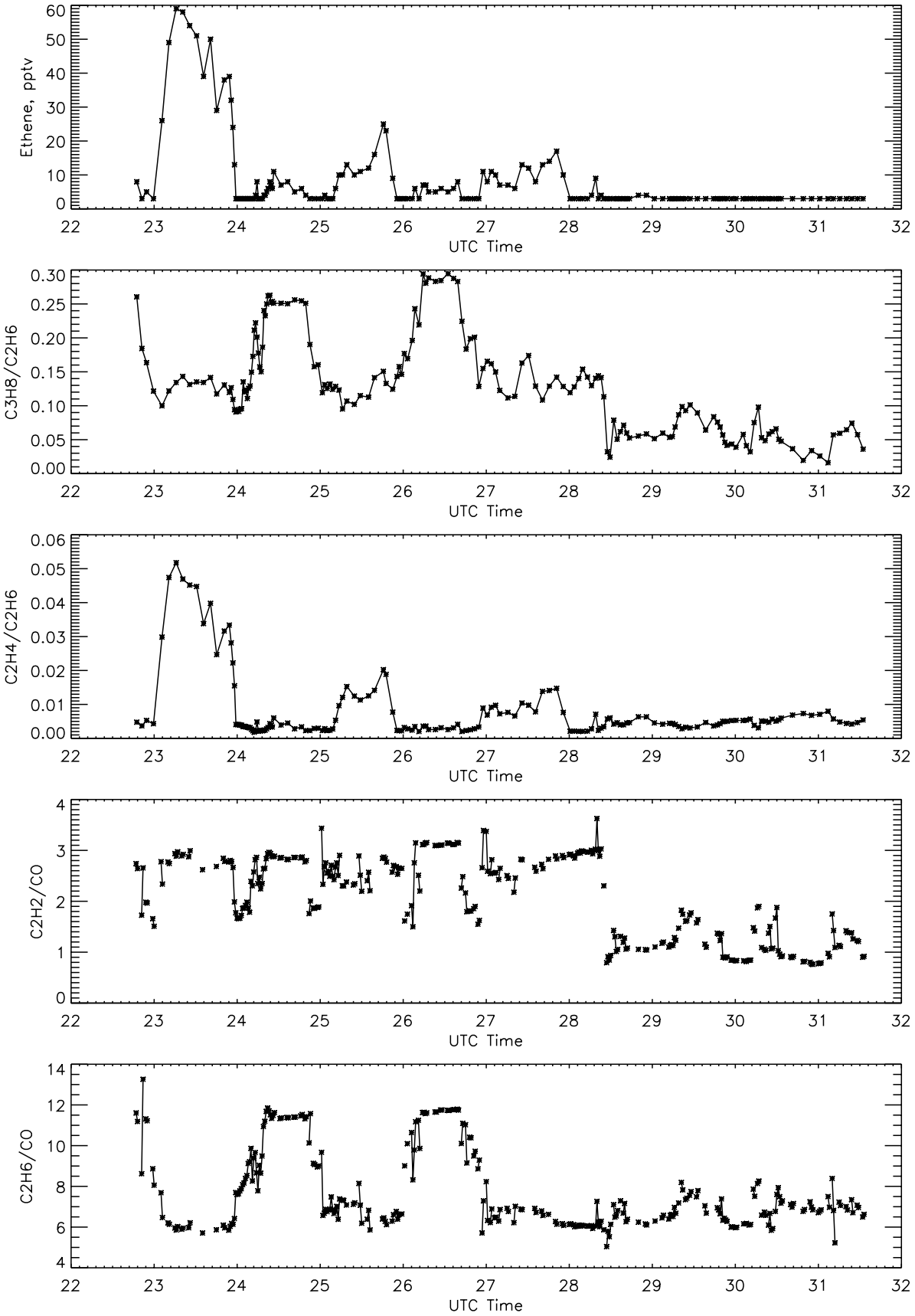
FINAL DATA: TRACE-P DC-8 Flight 18

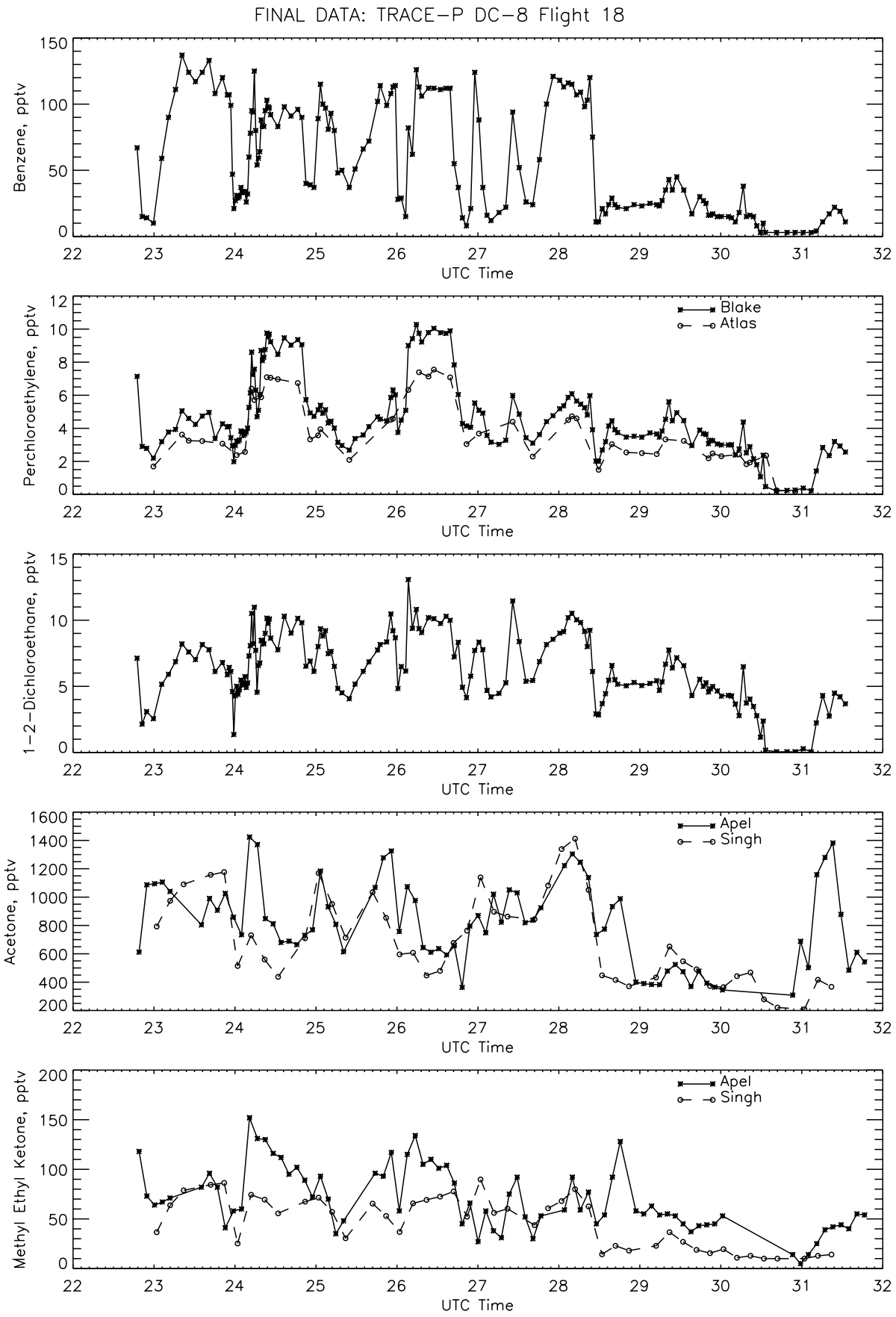


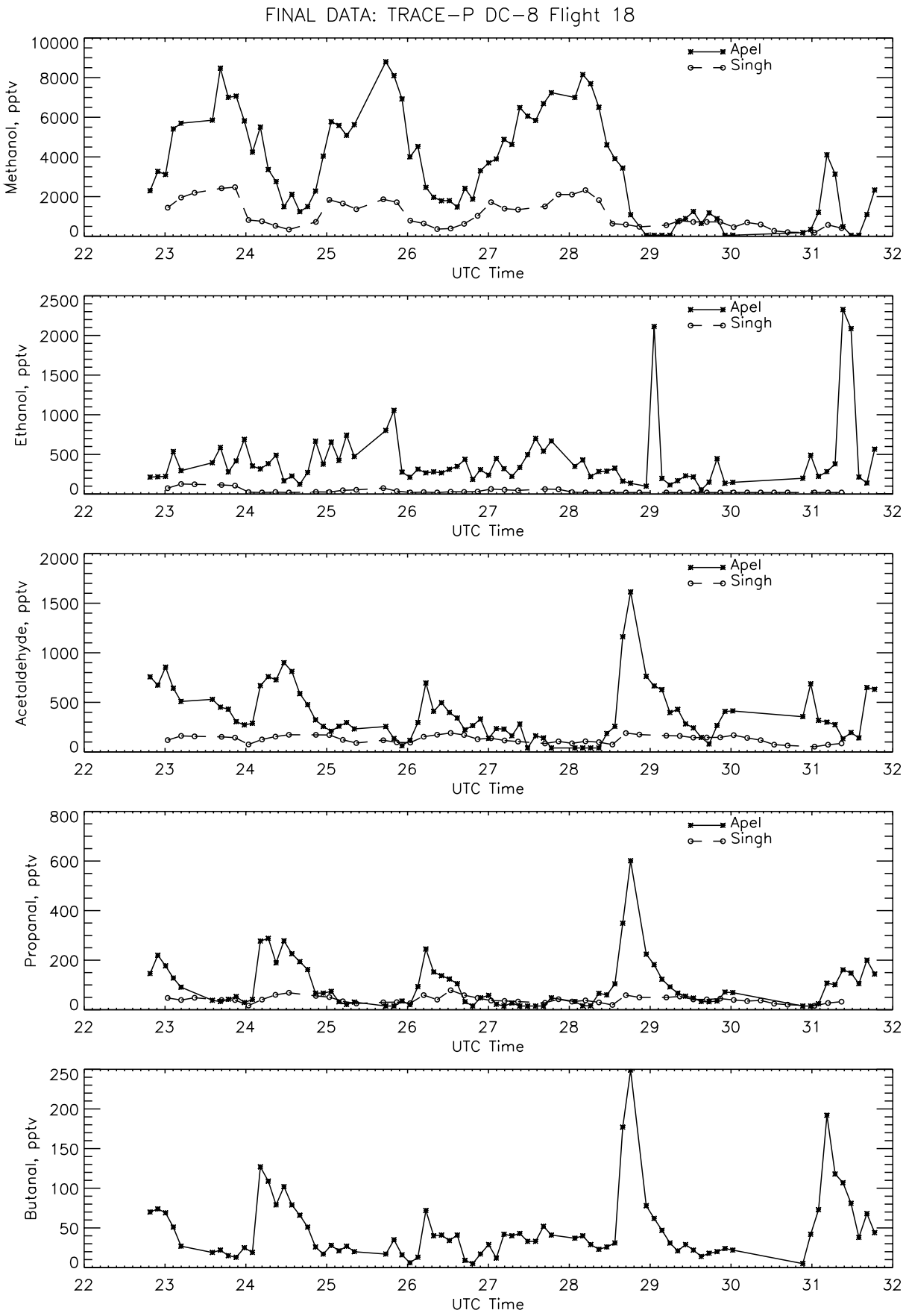

FINAL DATA: TRACE-P DC-8 Flight 18
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

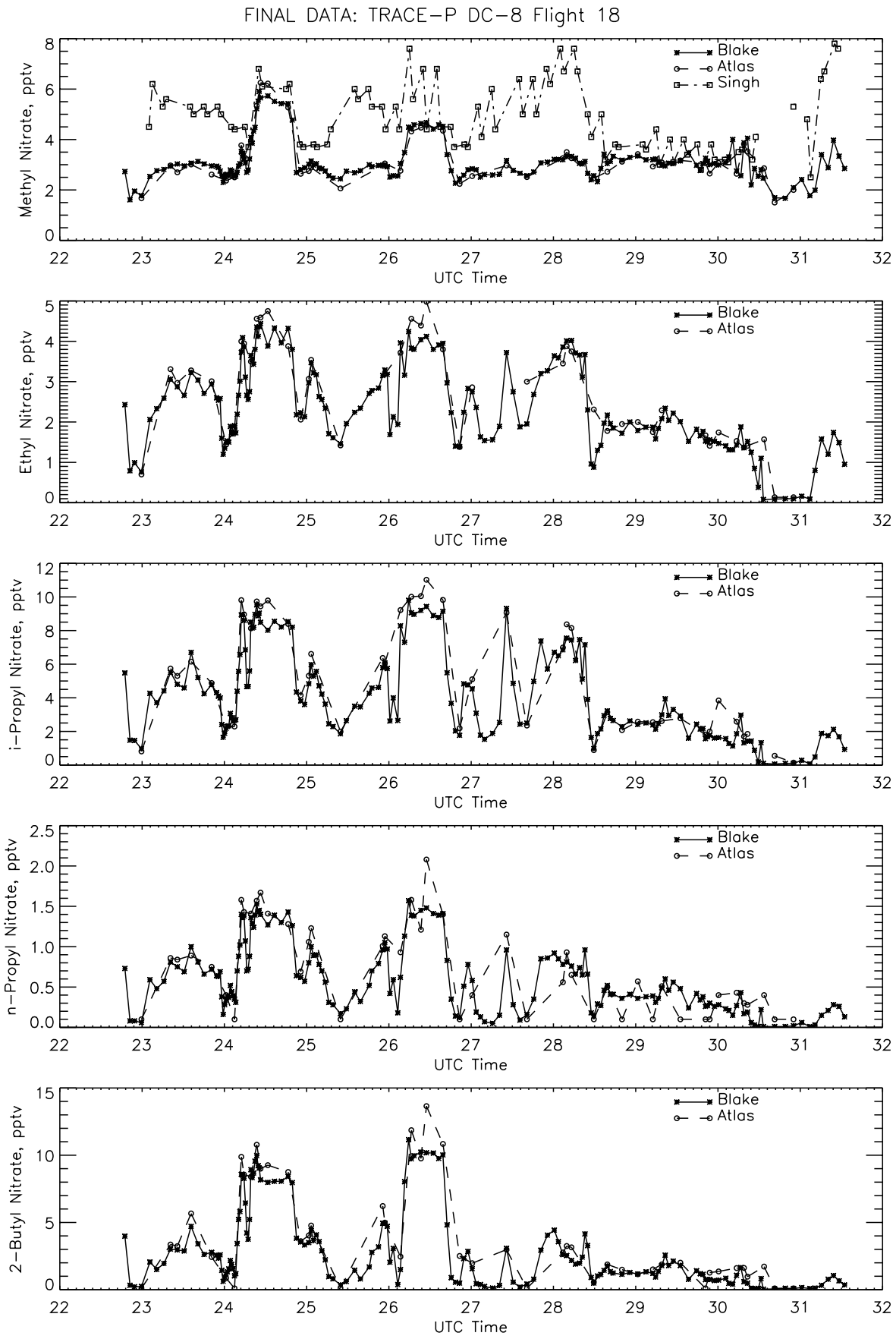

FINAL DATA: TRACE-P DC-8 Flight 18
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 18

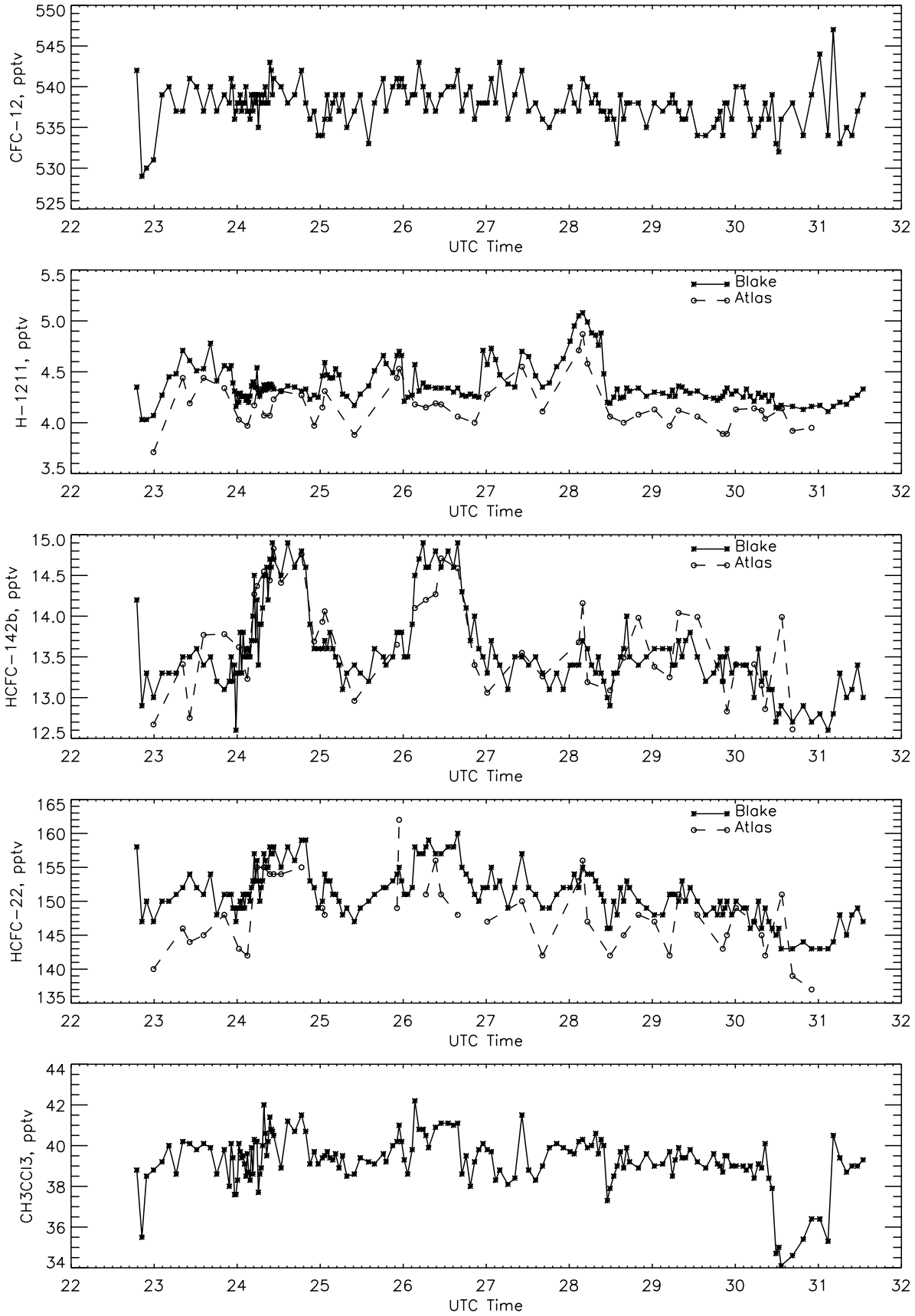



FINAL DATA: TRACE-P DC-8 Flight 18
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time

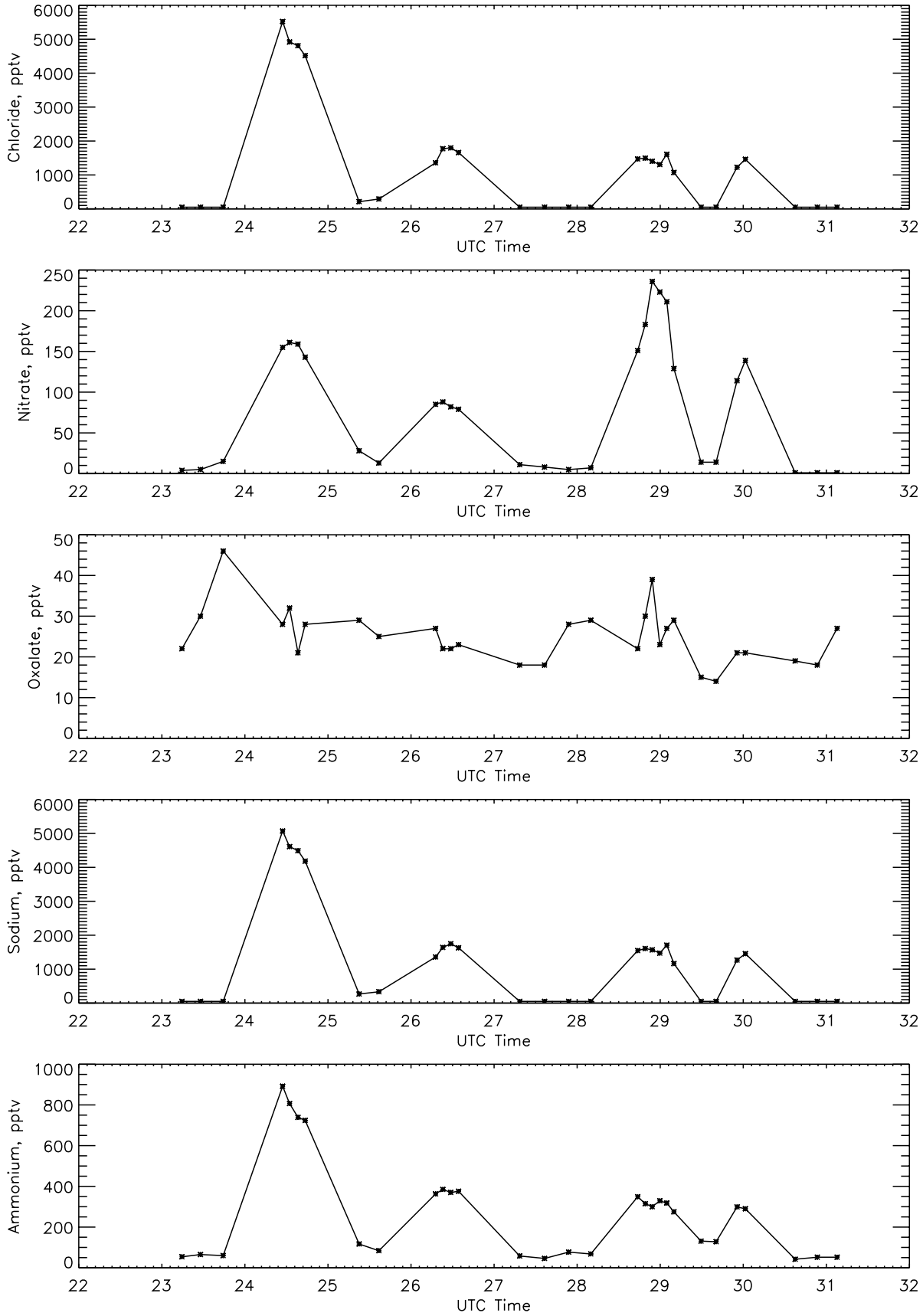

FINAL DATA: TRACE-P DC-8 Flight 18
Methanol, pptv
Ethanol, pptv
Acetaldehyde, pptv
Propanal, pptv
Butanal, pptv
UTC Time
Apel
Singh


FINAL DATA: TRACE-P DC-8 Flight 18
Methyl Nitrate, pptv
Ethyl Nitrate, pptv
i-Propyl Nitrate, pptv
n-Propyl Nitrate, pptv
2-Butyl Nitrate, pptv
UTC Time
Blake
Atlas
Singh

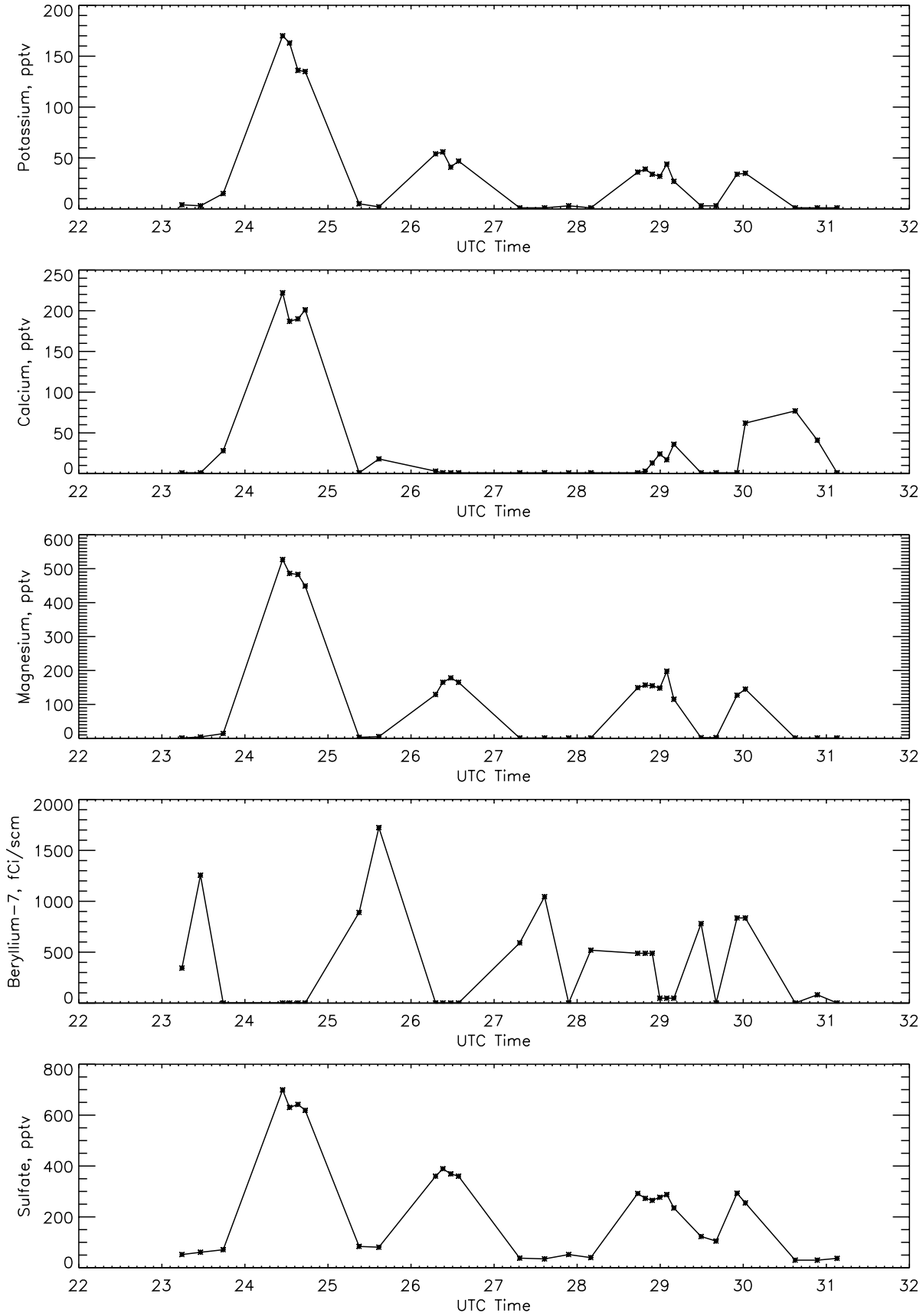
FINAL DATA: TRACE-P DC-8 Flight 18

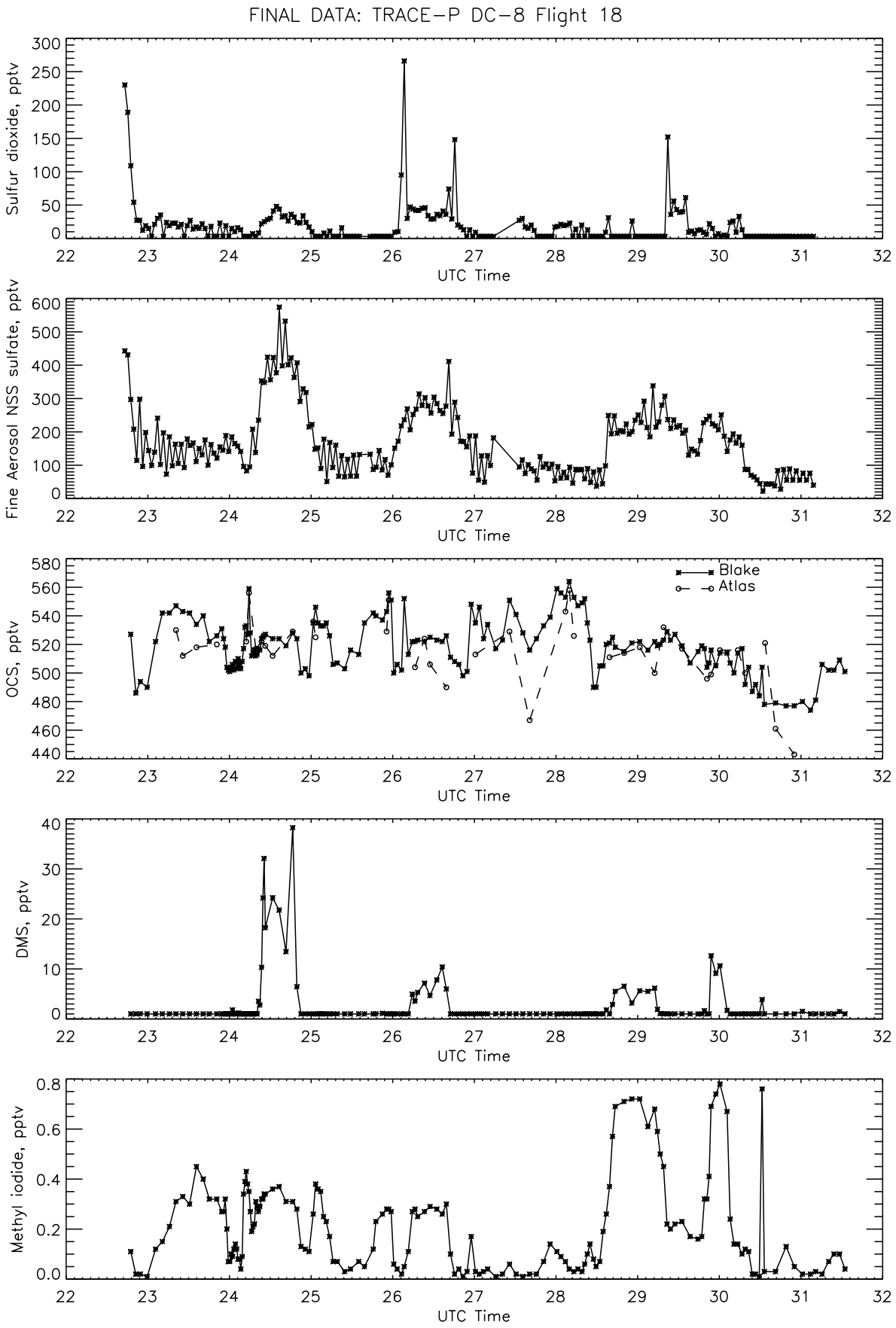


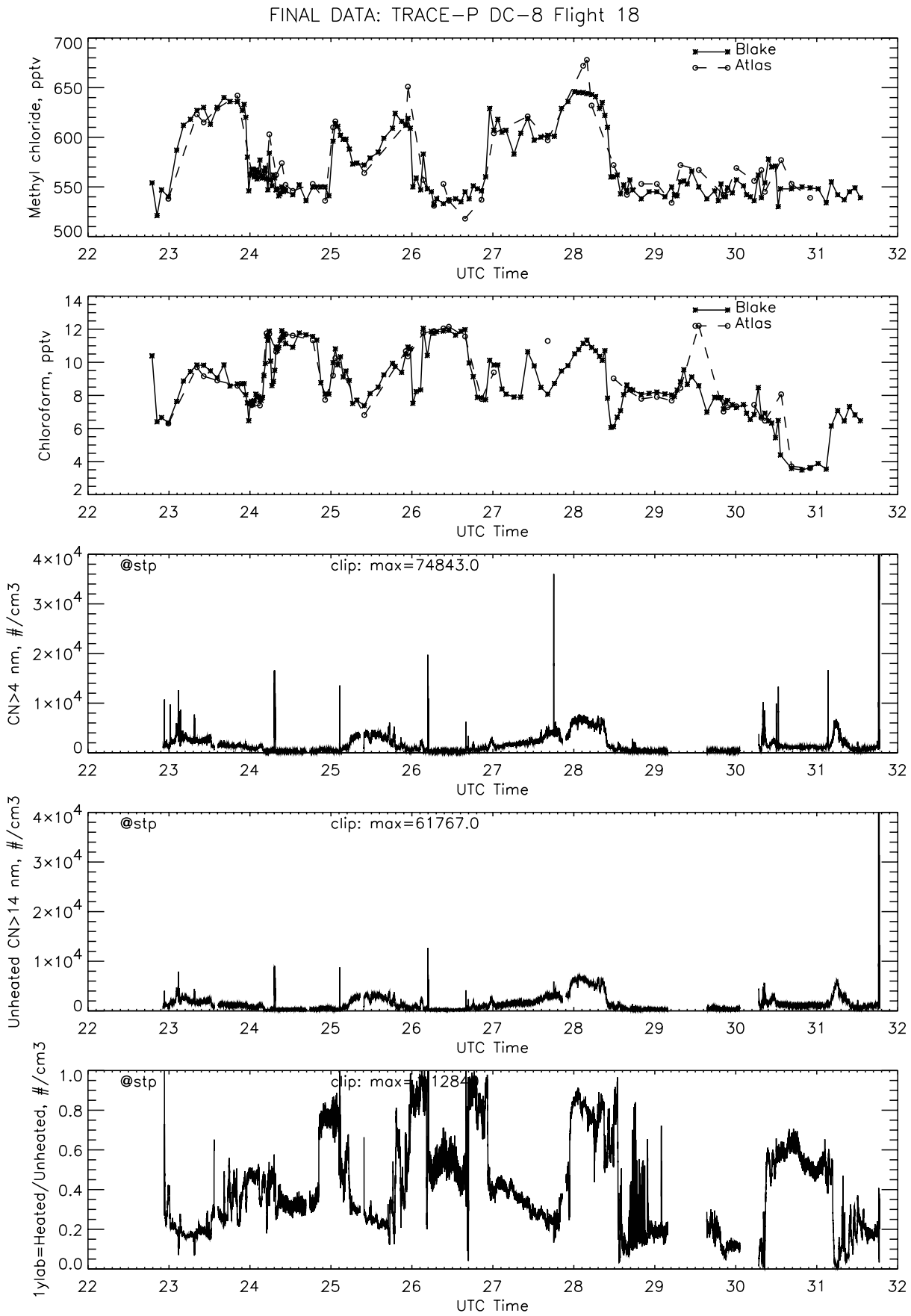
FINAL DATA: TRACE-P DC-8 Flight 18

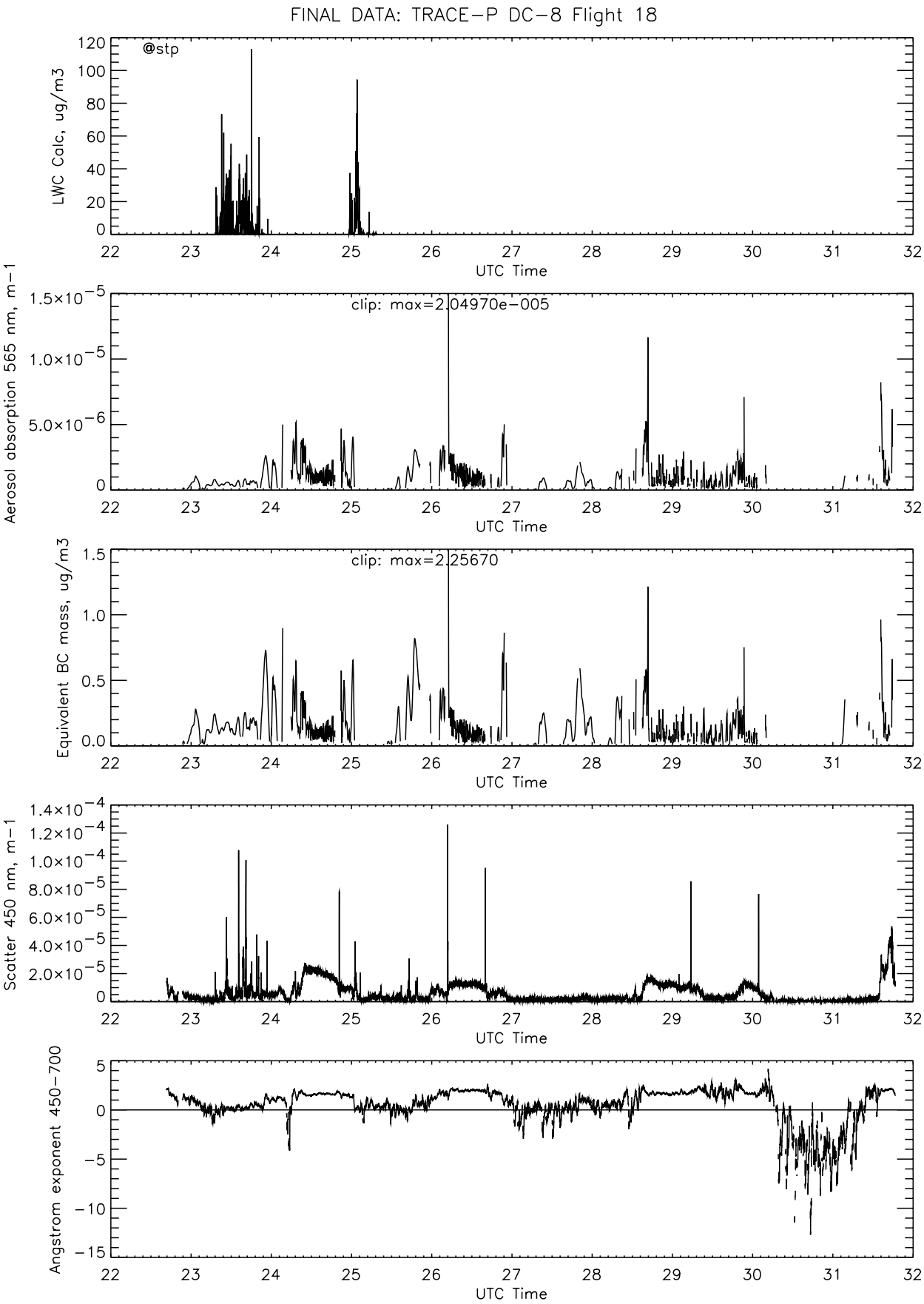


FINAL DATA: TRACE-P DC-8 Flight 18

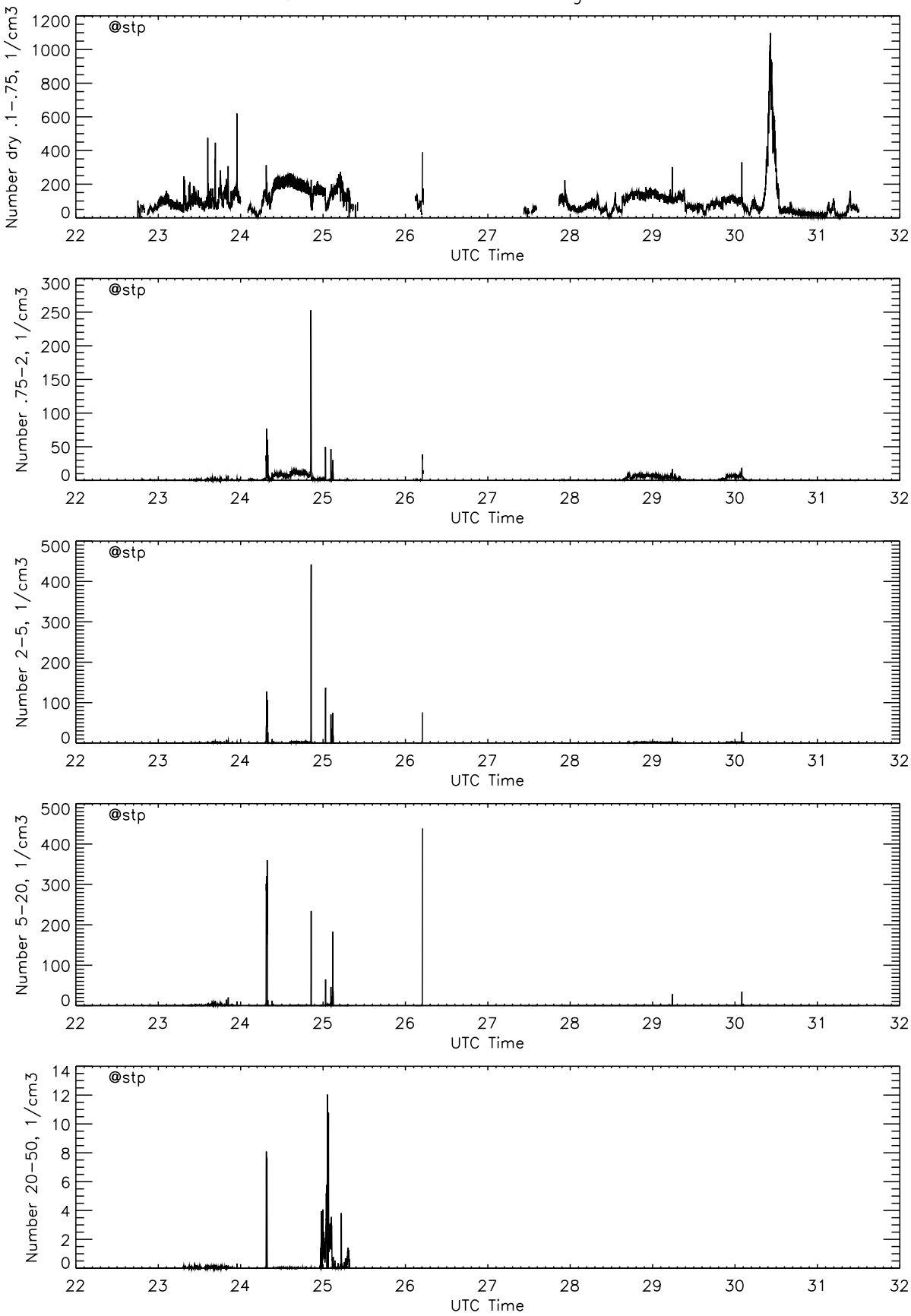


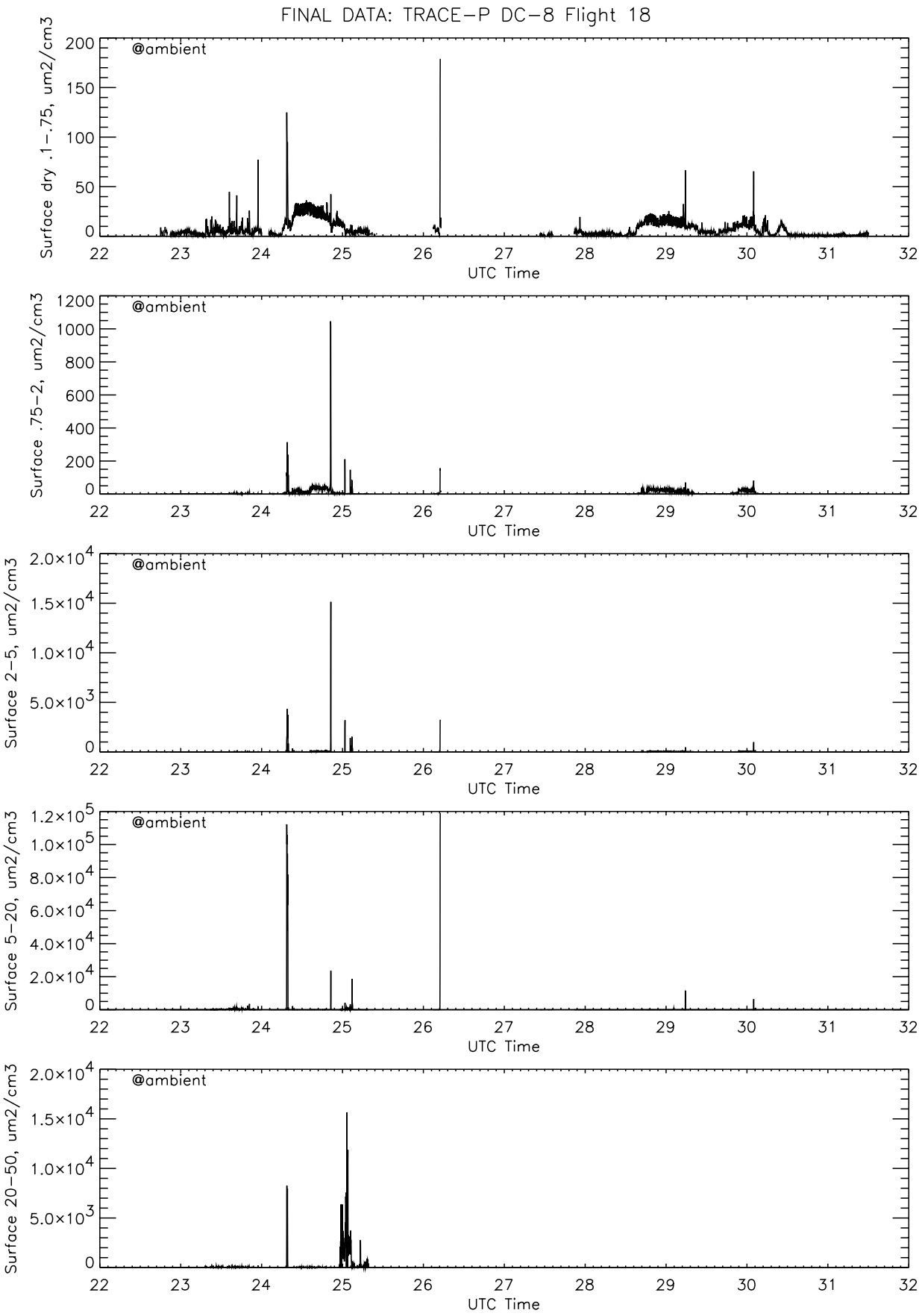

FINAL DATA: TRACE-P DC-8 Flight 18
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 18
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
clip: max=74843.0
UTC Time
Unheated CN>14 nm, #/cm3
@stp
clip: max=61767.0
UTC Time
1ylab=Heated/Unheated, #/cm3
@stp
UTC Time

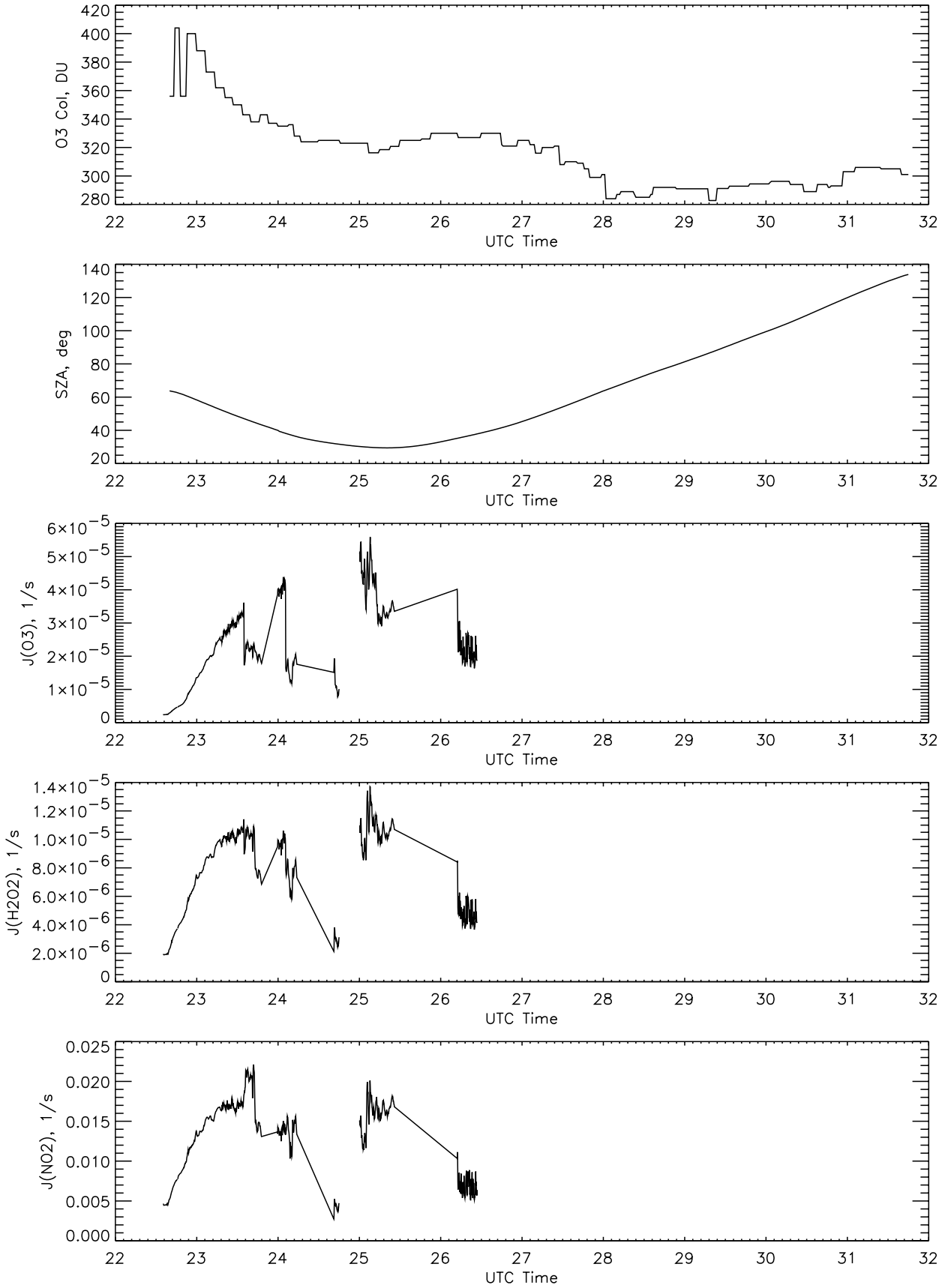

FINAL DATA: TRACE-P DC-8 Flight 18
@stp
LWC Calc, ug/m3
clip: max=2.04970e-005
Aerosol absorption 565 nm, m-1
clip: max=2.25670
Equivalent BC mass, ug/m3
Scatter 450 nm, m-1
Angstrom exponent 450-700
UTC Time

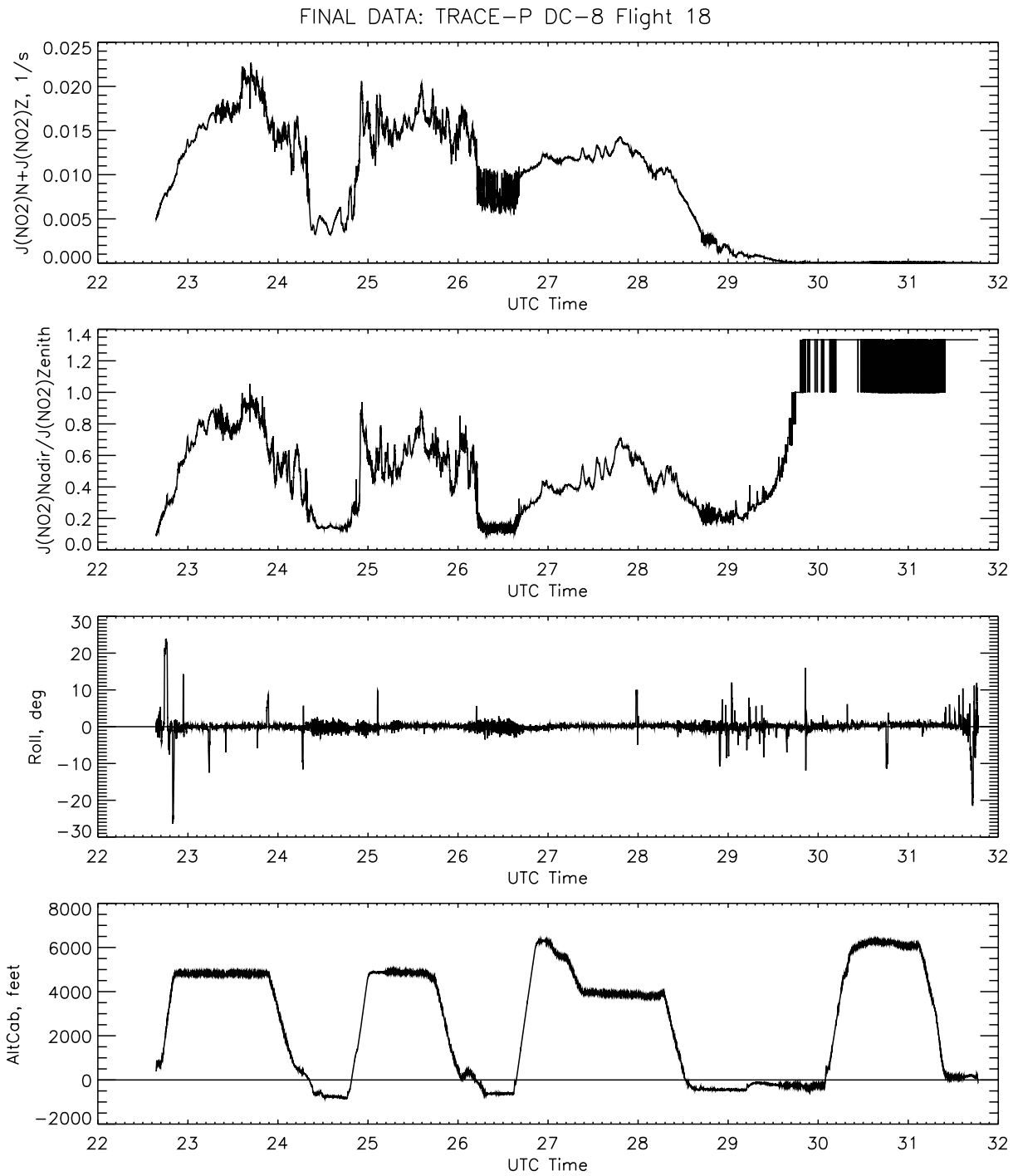
FINAL DATA: TRACE-P DC-8 Flight 18

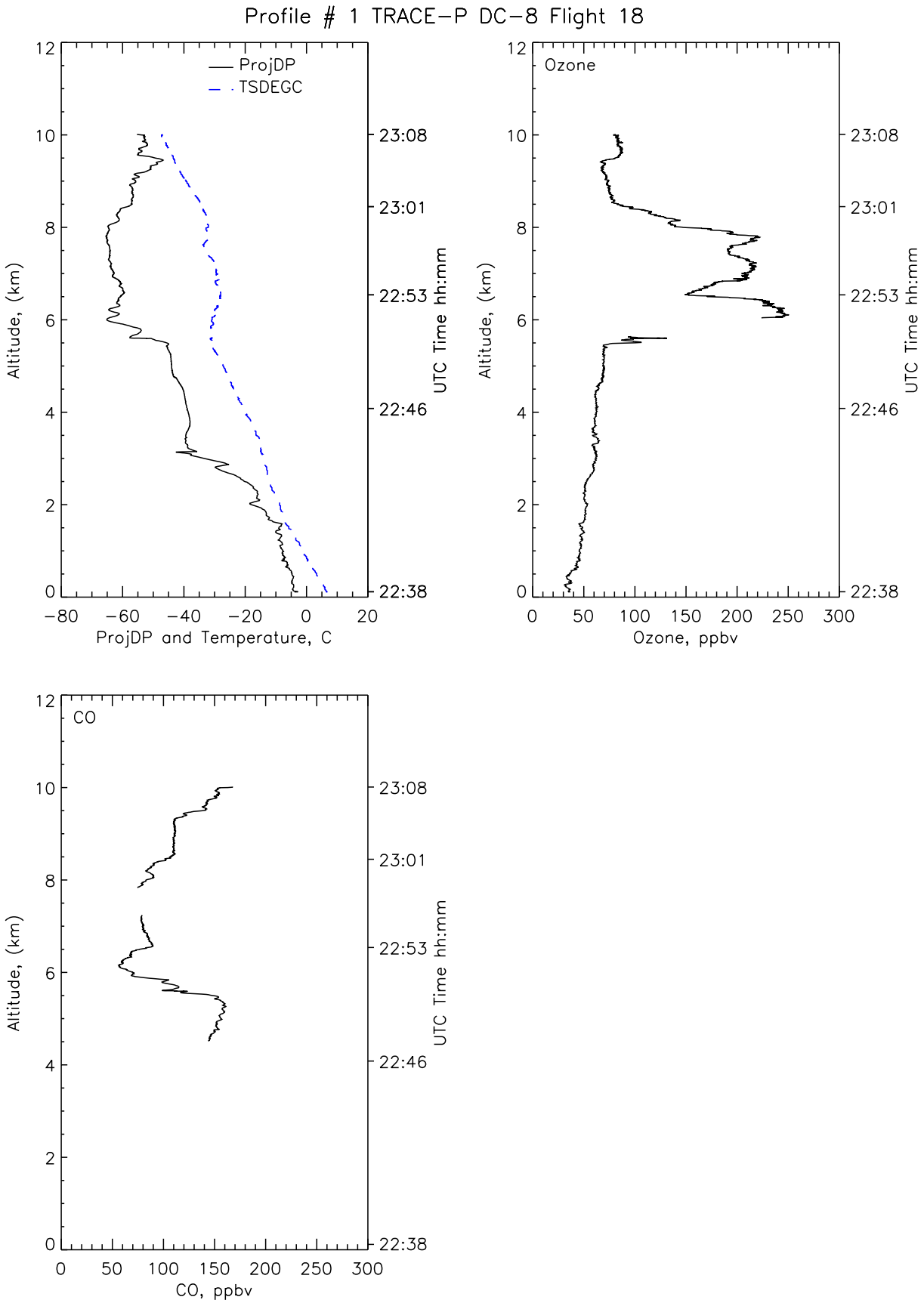


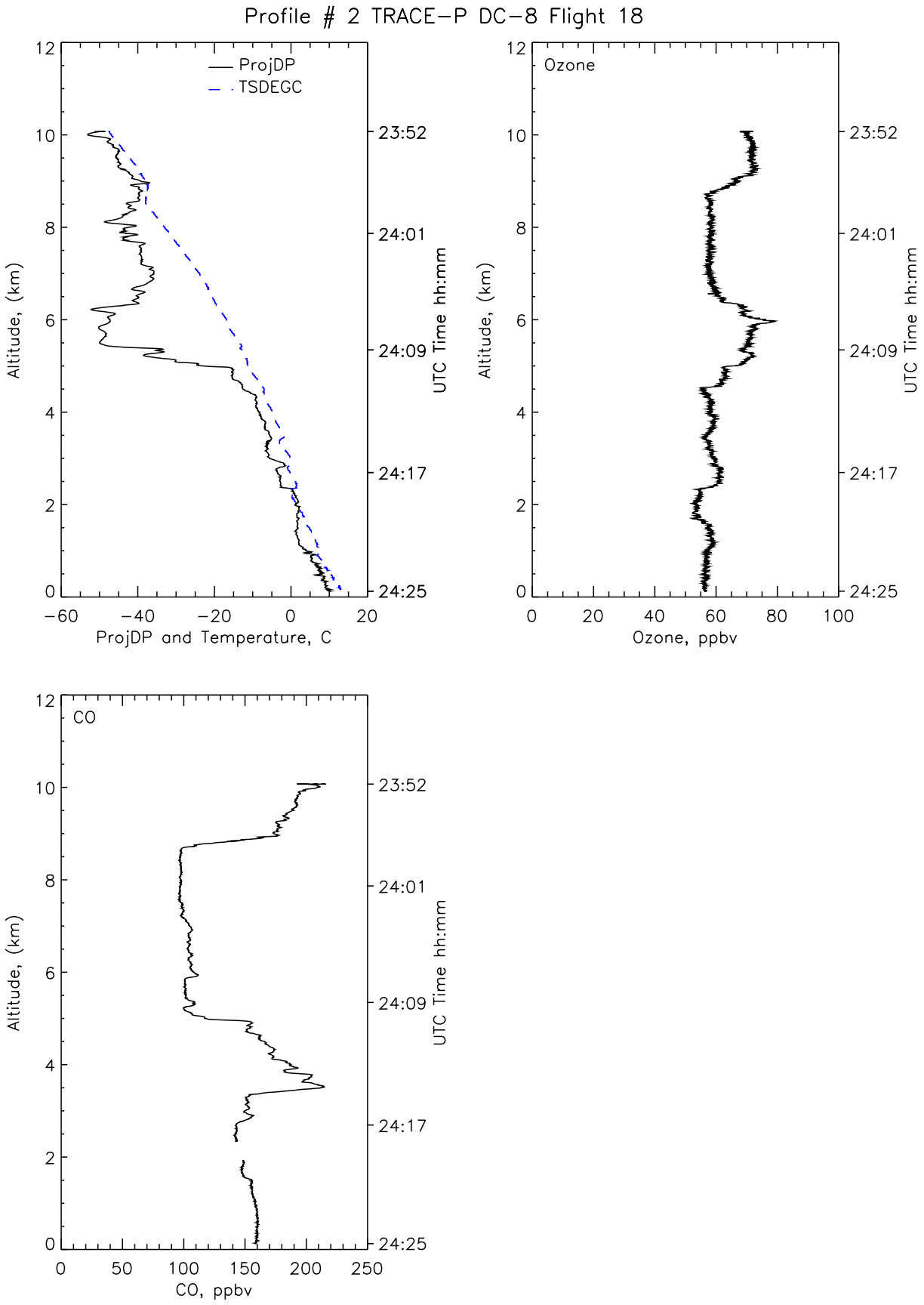

FINAL DATA: TRACE-P DC-8 Flight 18
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
UTC Time

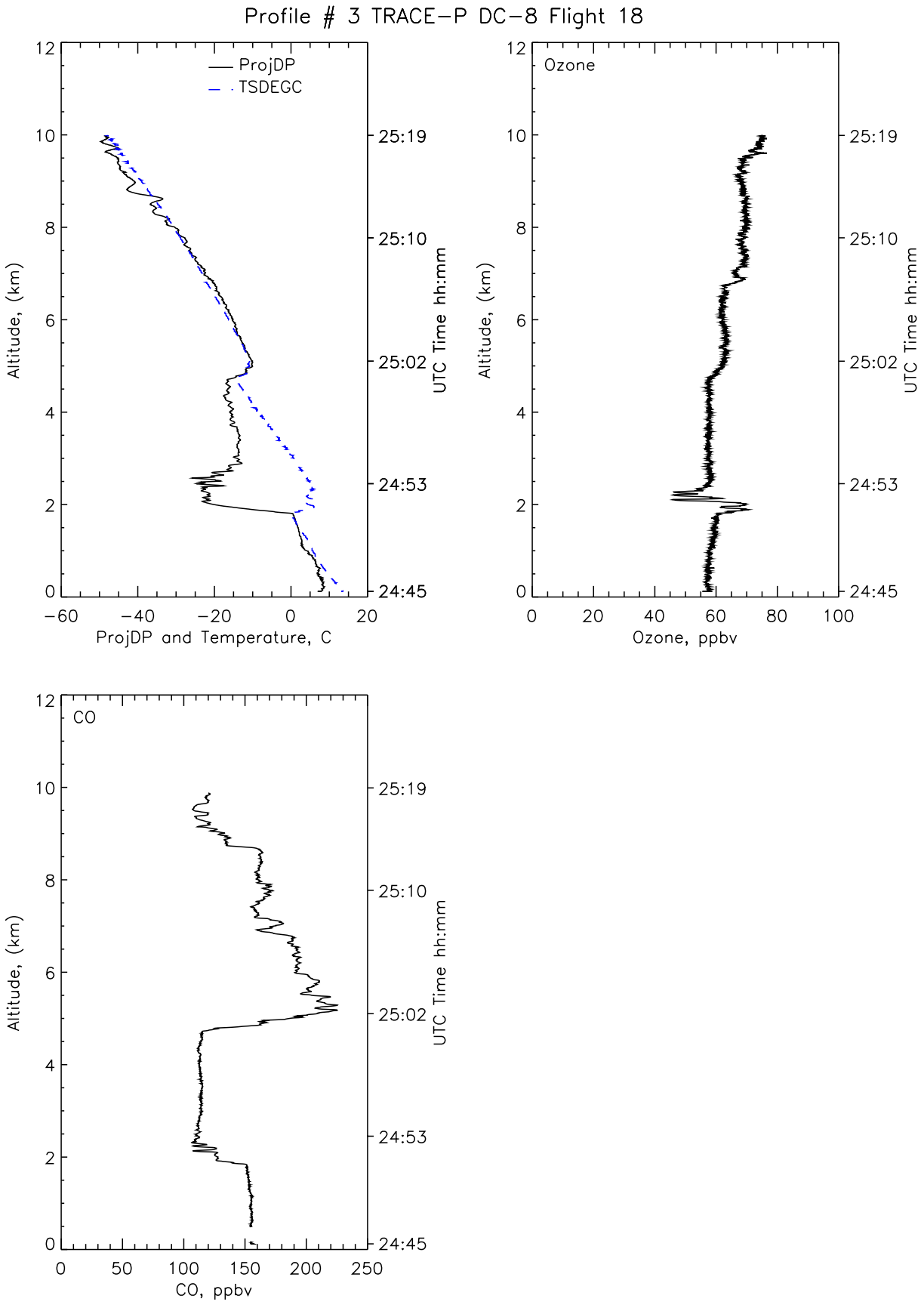
FINAL DATA: TRACE-P DC-8 Flight 18

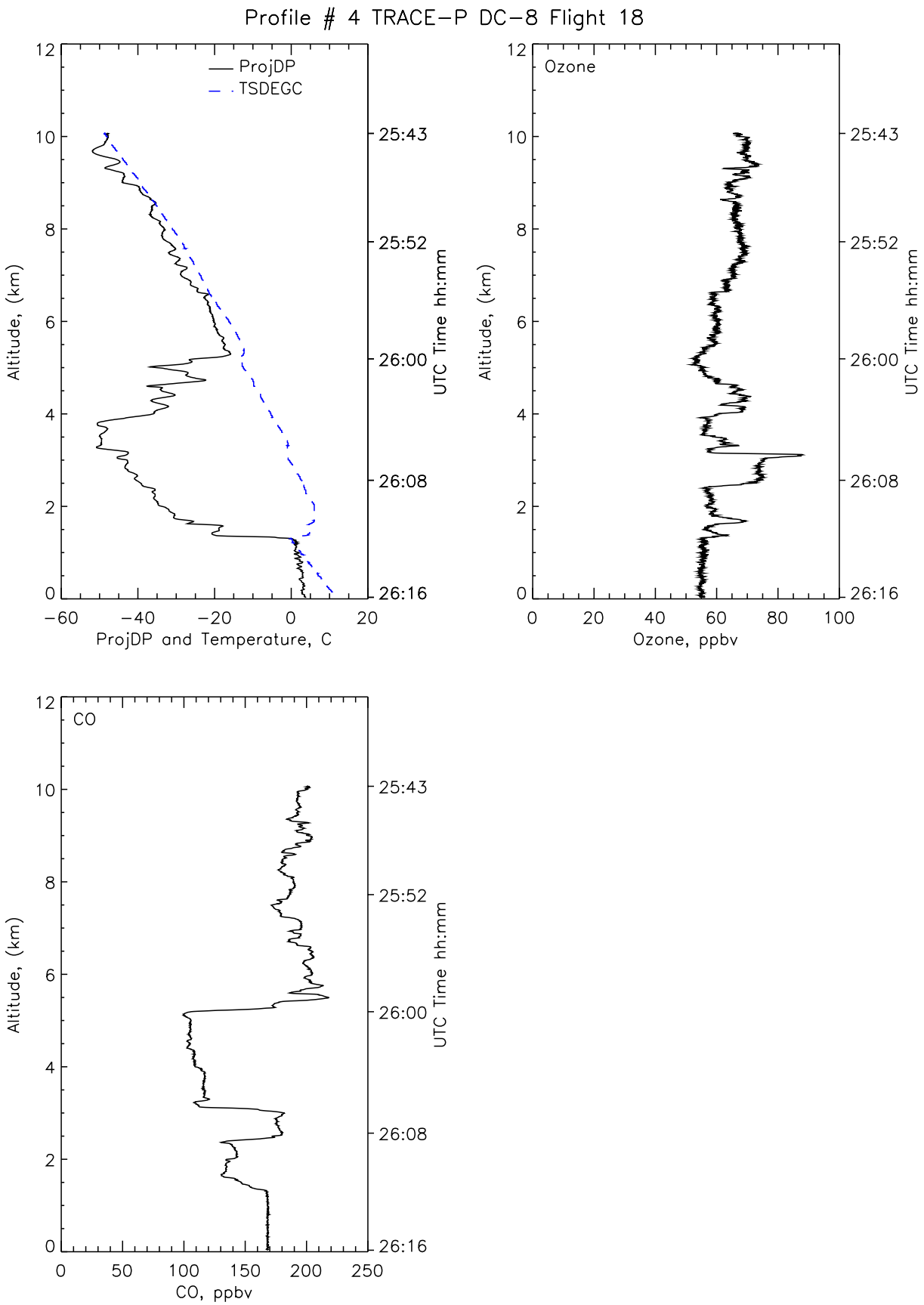


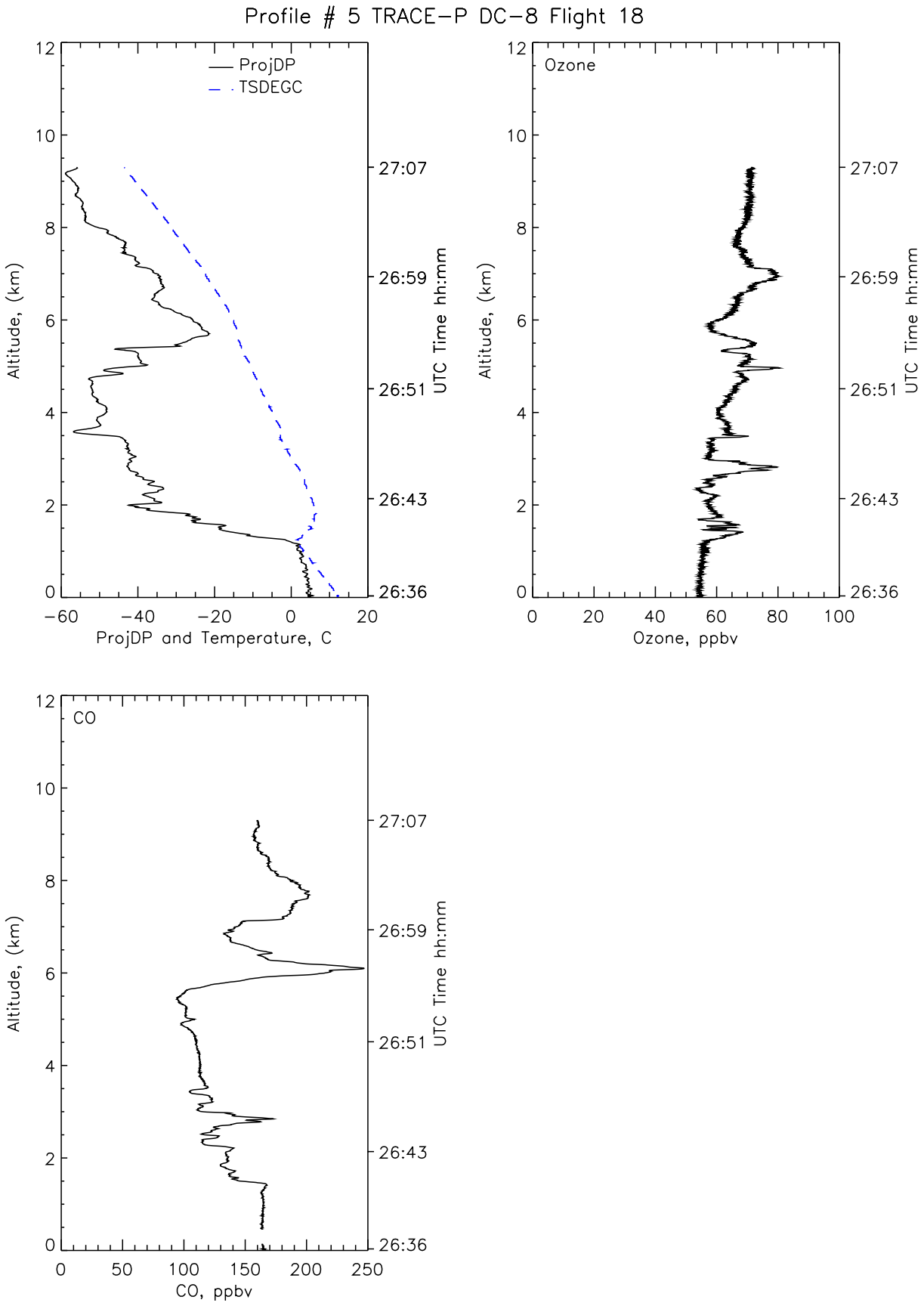

FINAL DATA: TRACE-P DC-8 Flight 18
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
22 23 24 25 26 27 28 29 30 31 32
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
22 23 24 25 26 27 28 29 30 31 32
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
22 23 24 25 26 27 28 29 30 31 32
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
22 23 24 25 26 27 28 29 30 31 32
UTC Time

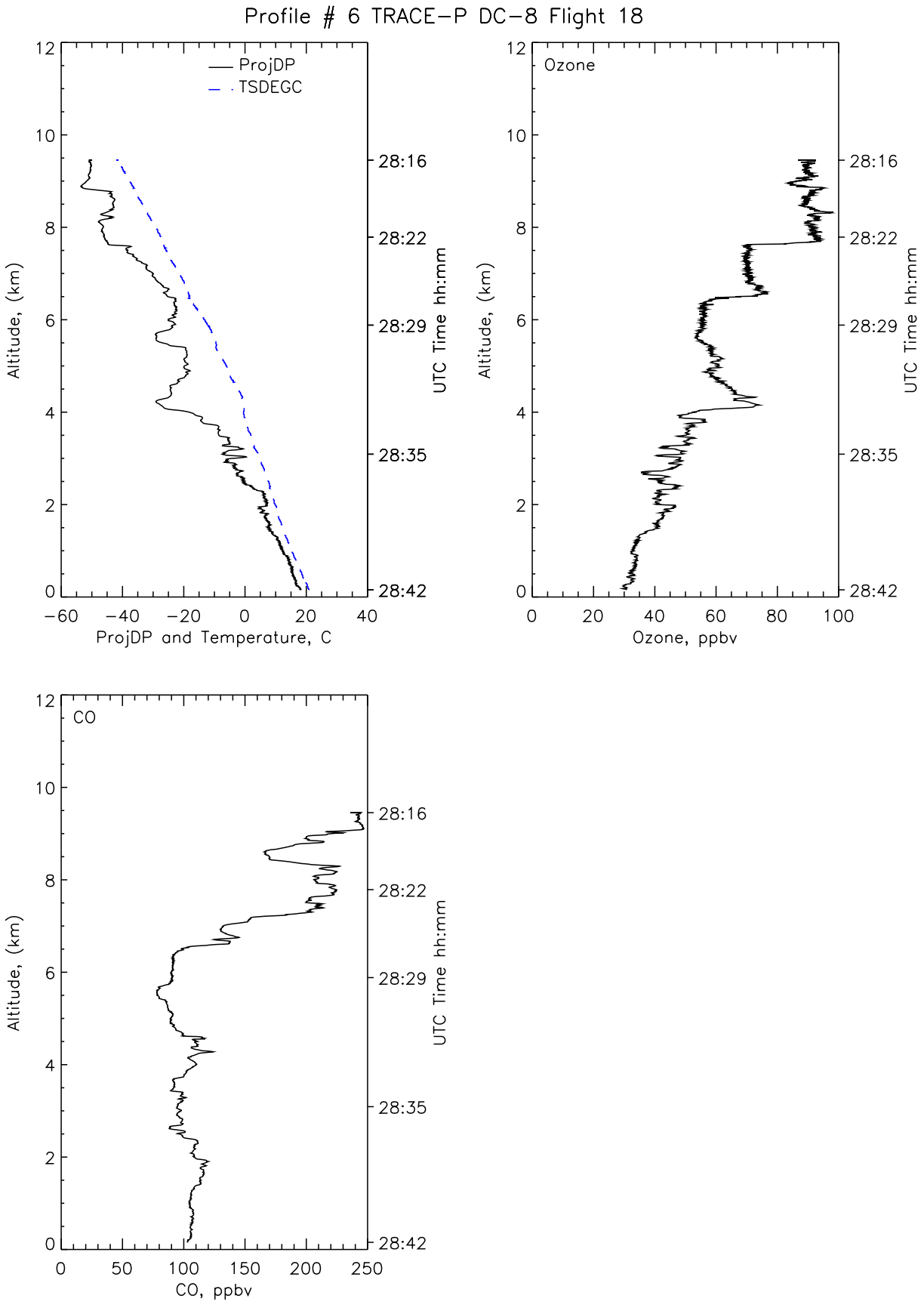

Profile # 1 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
23:08
23:01
22:53
22:46
22:38
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

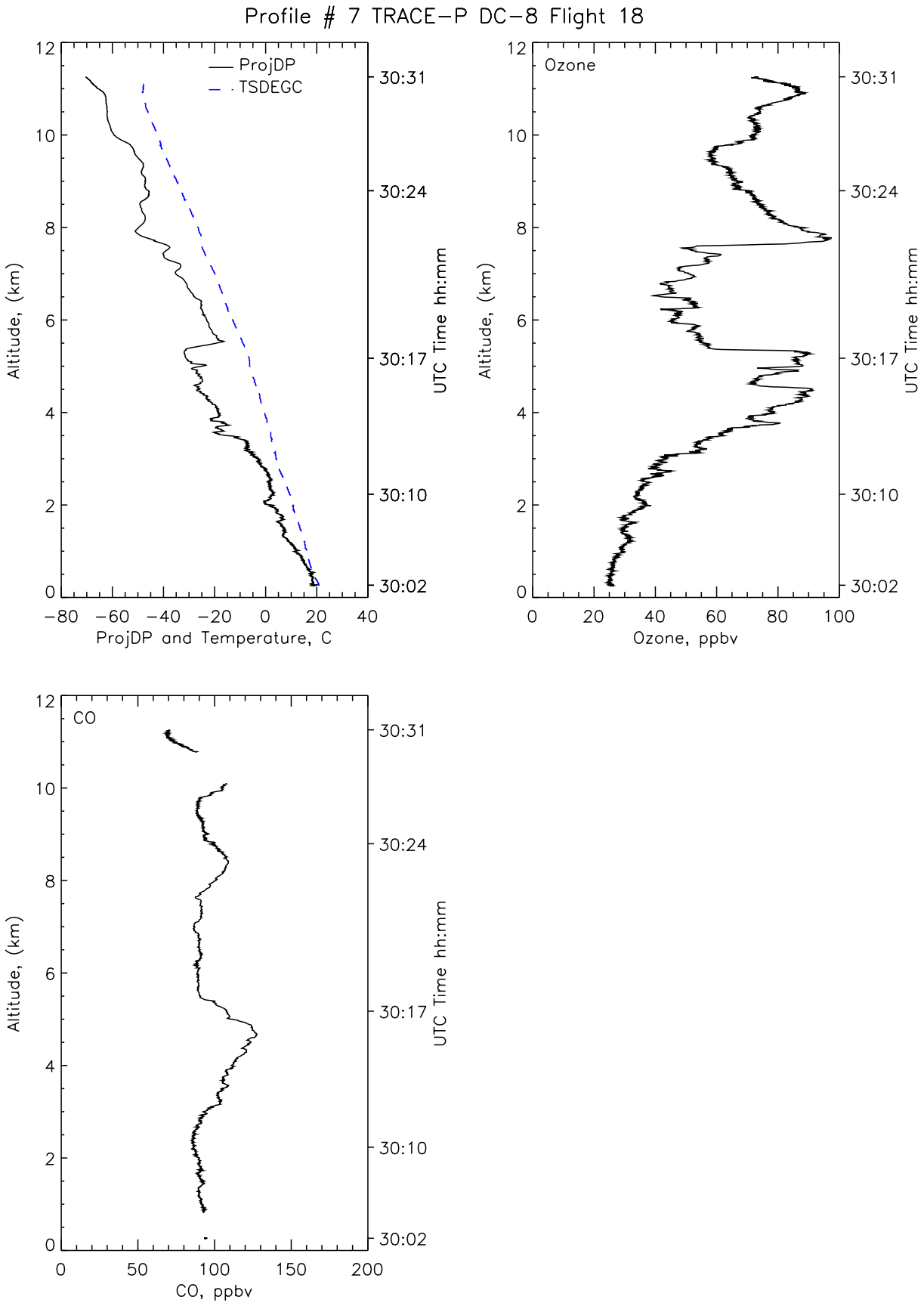

Profile # 2 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
23:52
24:01
24:09
24:17
24:25
Ozone
Ozone, ppbv
CO
CO, ppbv

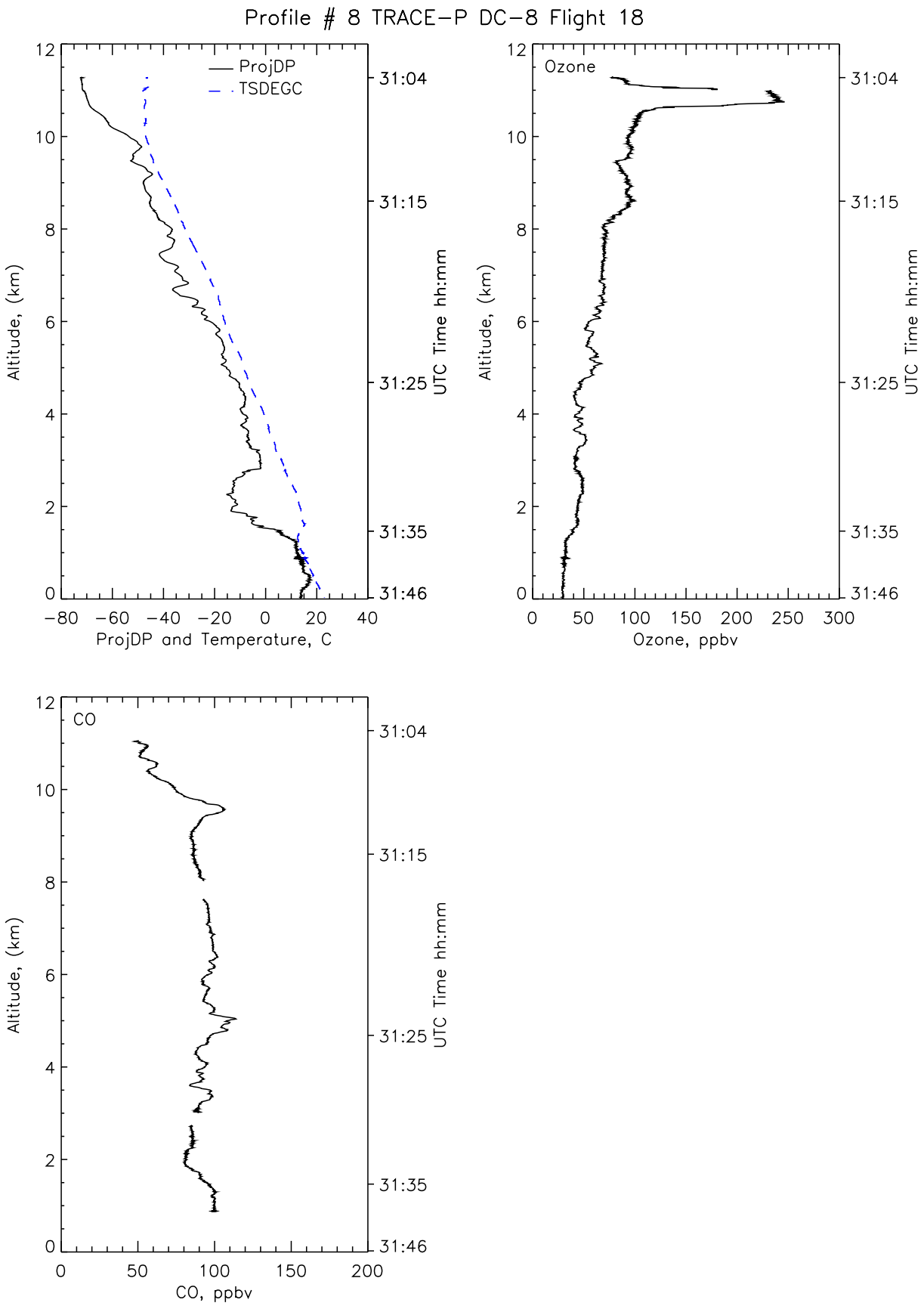

Profile # 3 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 5 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
27:07
26:59
26:51
26:43
26:36
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 6 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
28:16
28:22
28:29
28:35
28:42
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 7 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 8 TRACE-P DC-8 Flight 18
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
31:04
31:15
31:25
31:35
31:46
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

TRACE-P

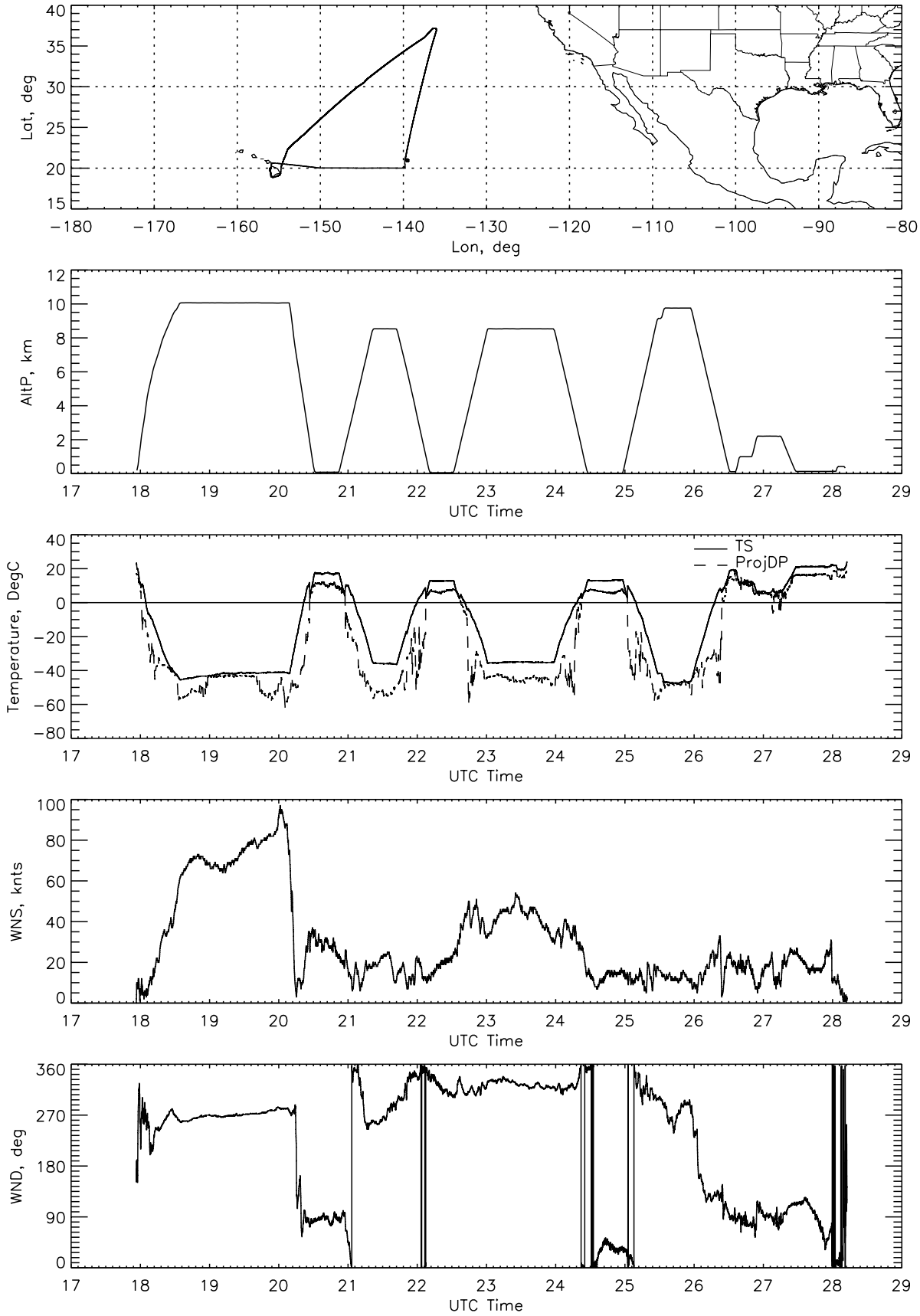
Flight 19D

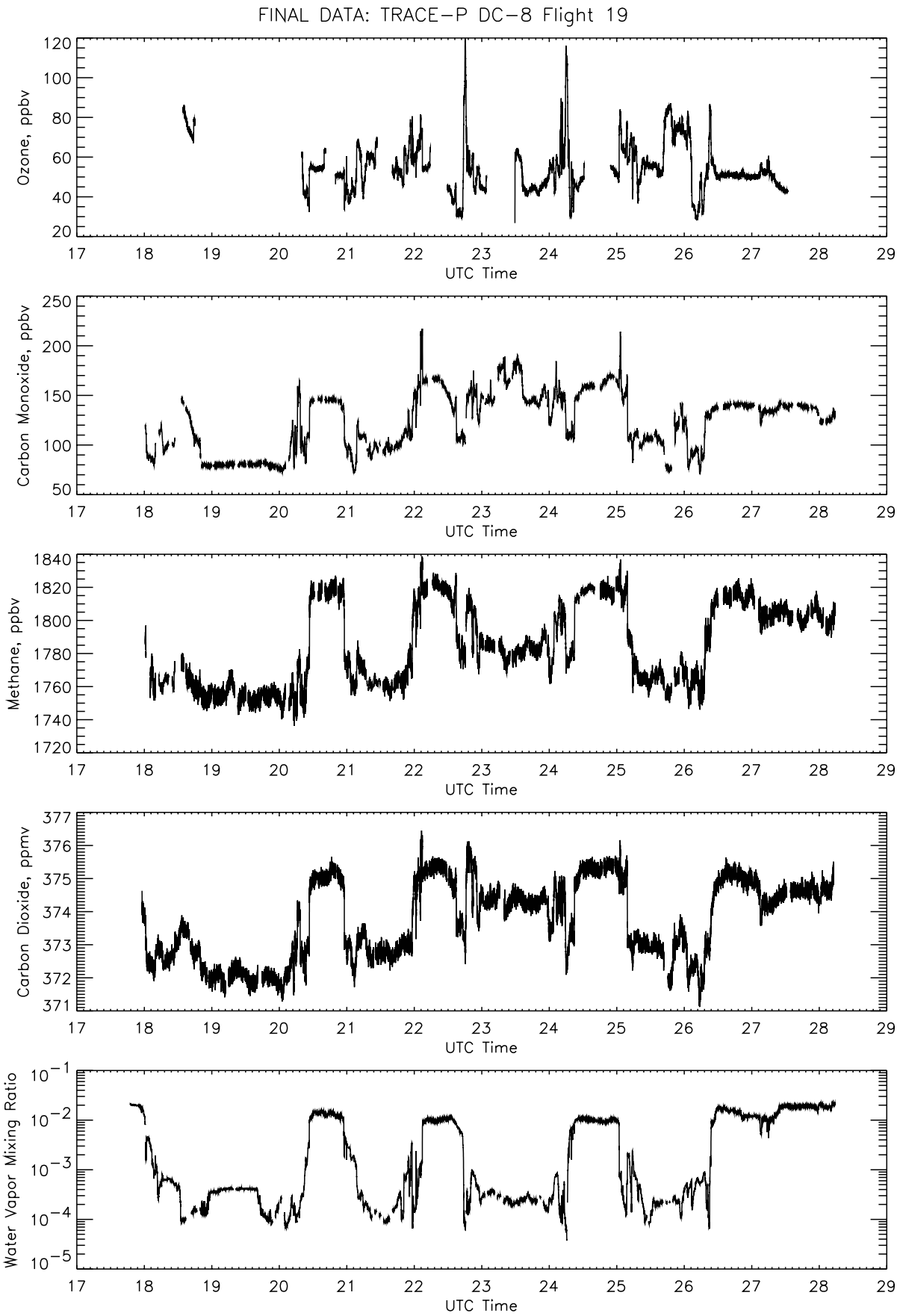
Local: Kona No. 1

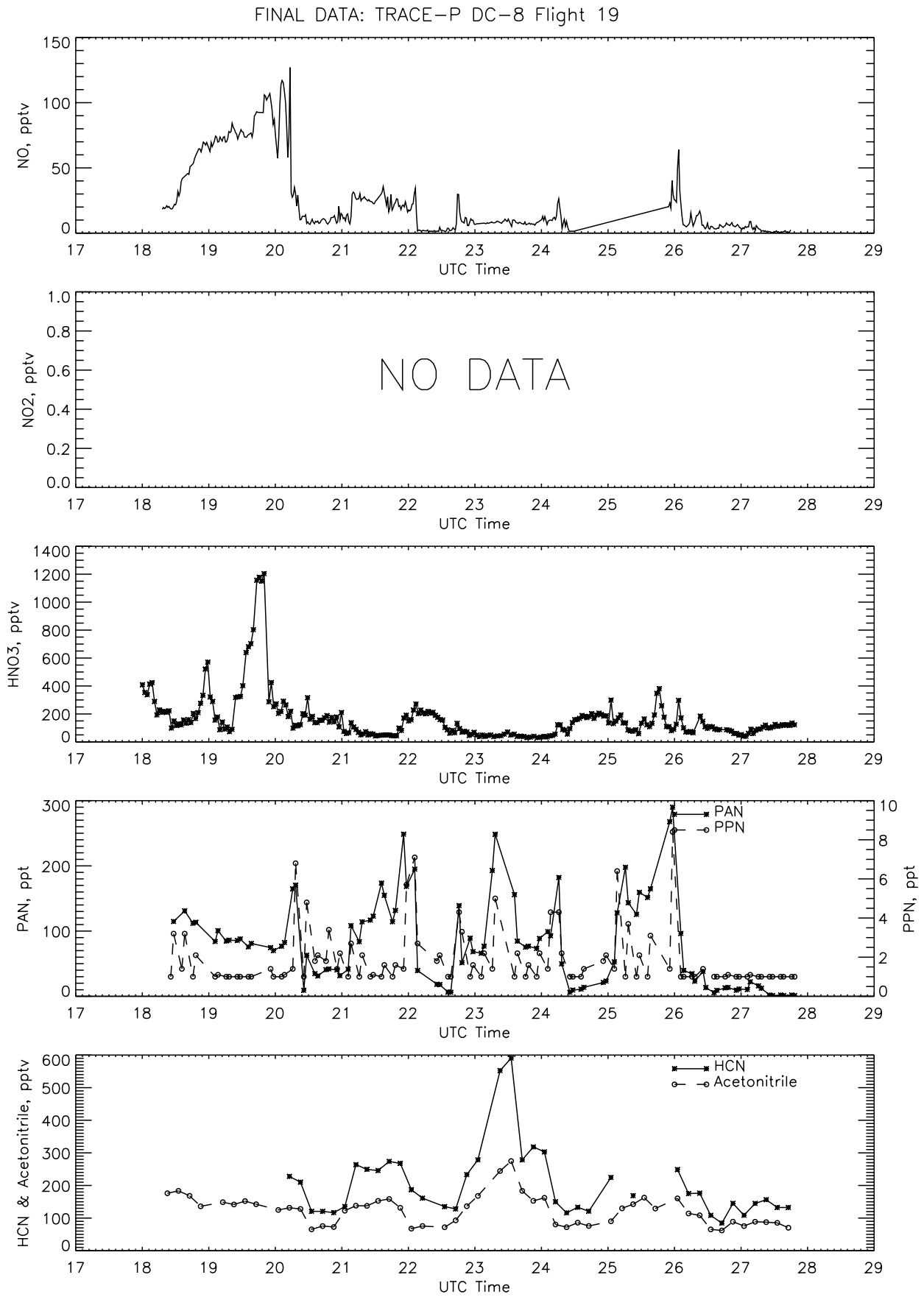
Subsidence Over East Pacific and MOPITT Transect

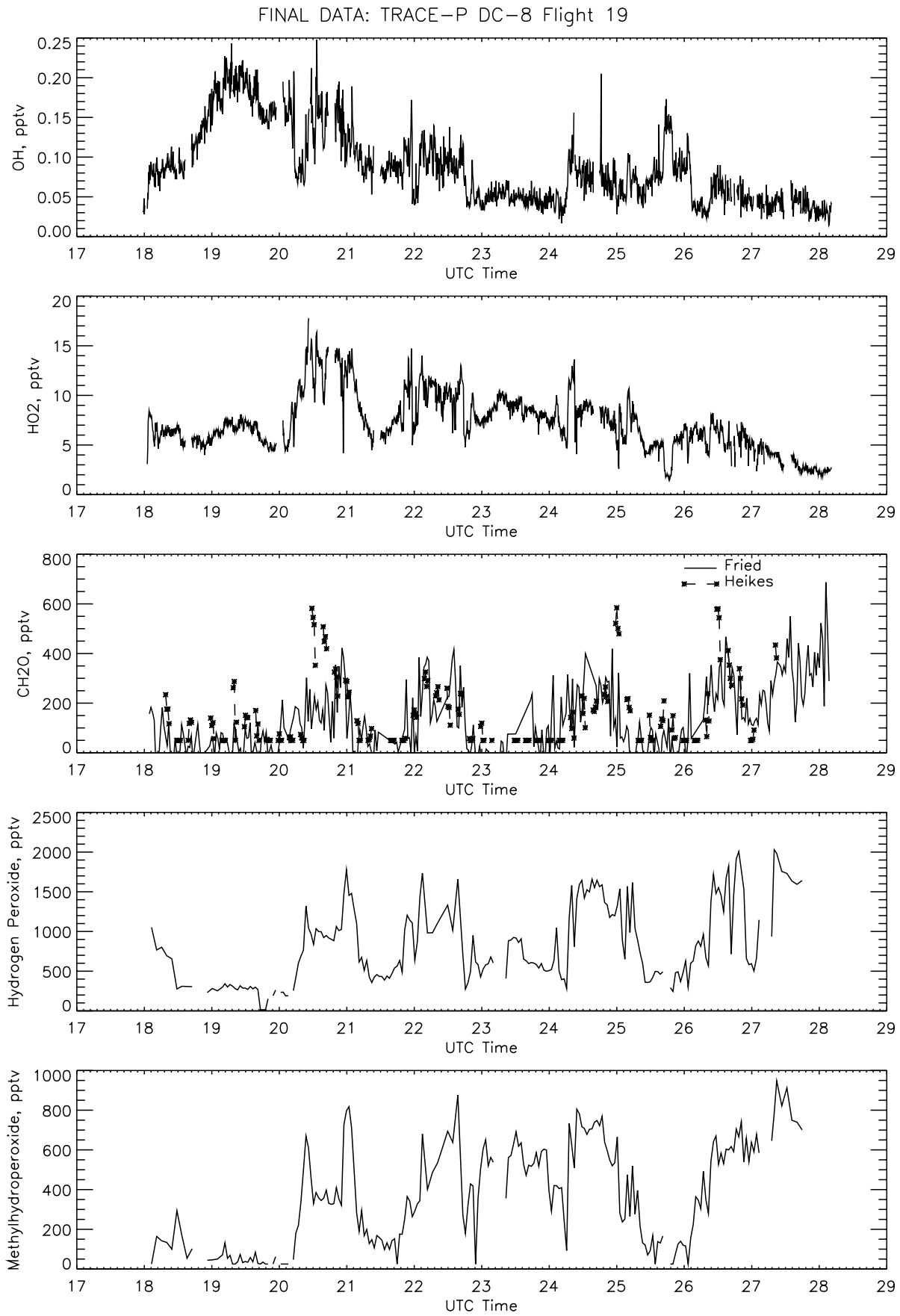
April 6, 2001

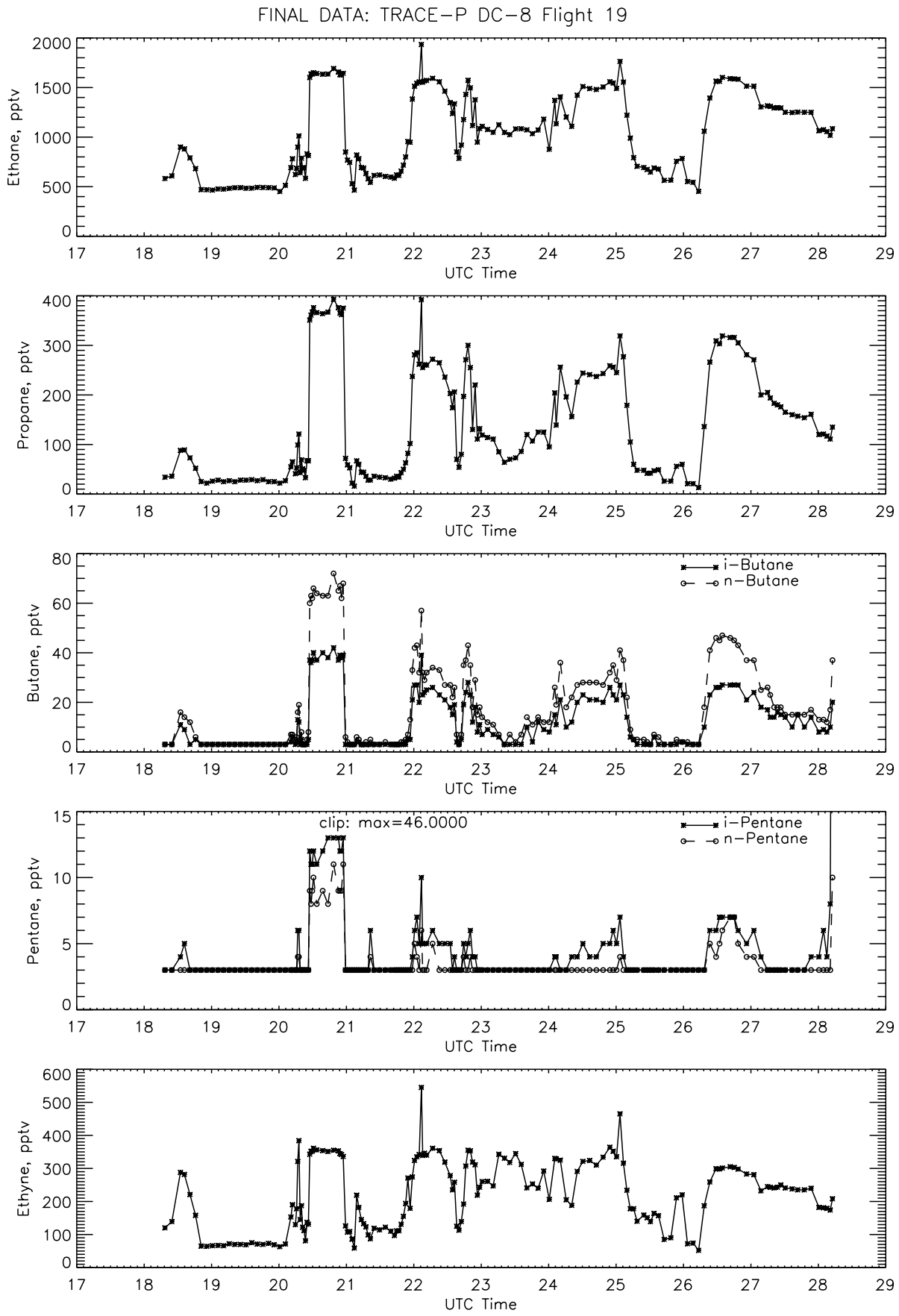
FINAL DATA: TRACE-P DC-8 Flight 19

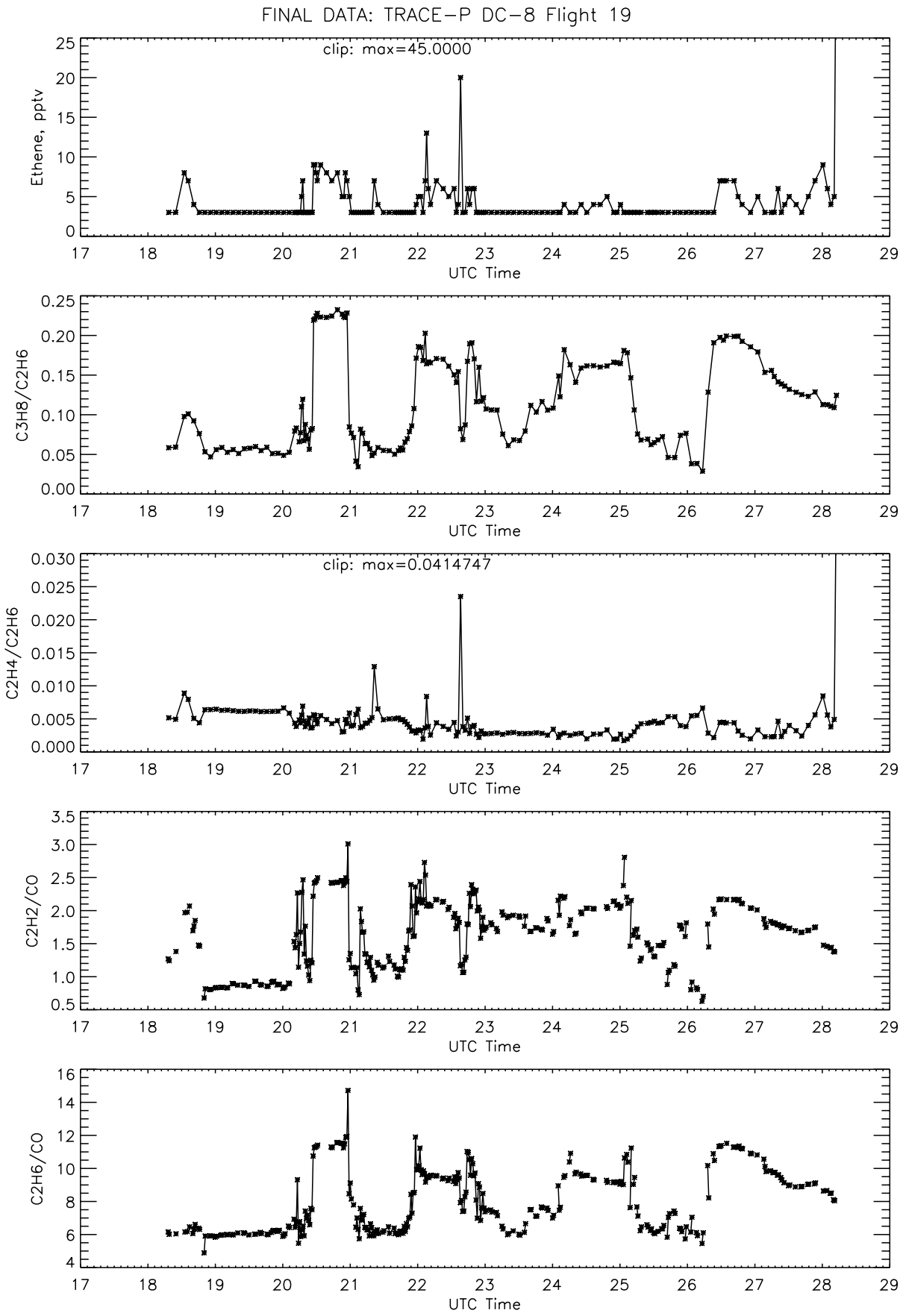


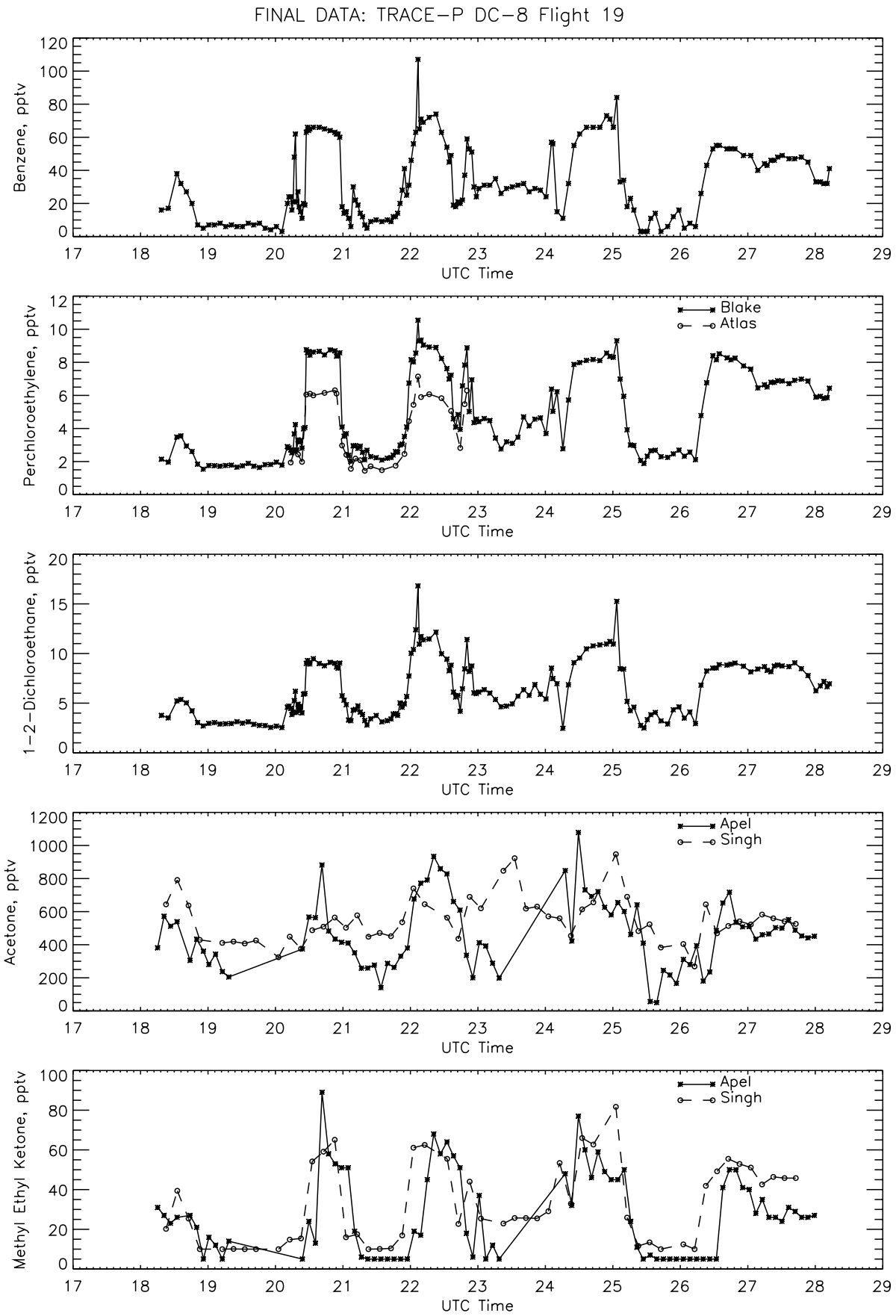

FINAL DATA: TRACE-P DC-8 Flight 19
Ozone, ppbv
Carbon Monoxide, ppbv
Methane, ppbv
Carbon Dioxide, ppmv
Water Vapor Mixing Ratio
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 19
NO, pptv
UTC Time
NO2, pptv
NO DATA
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile

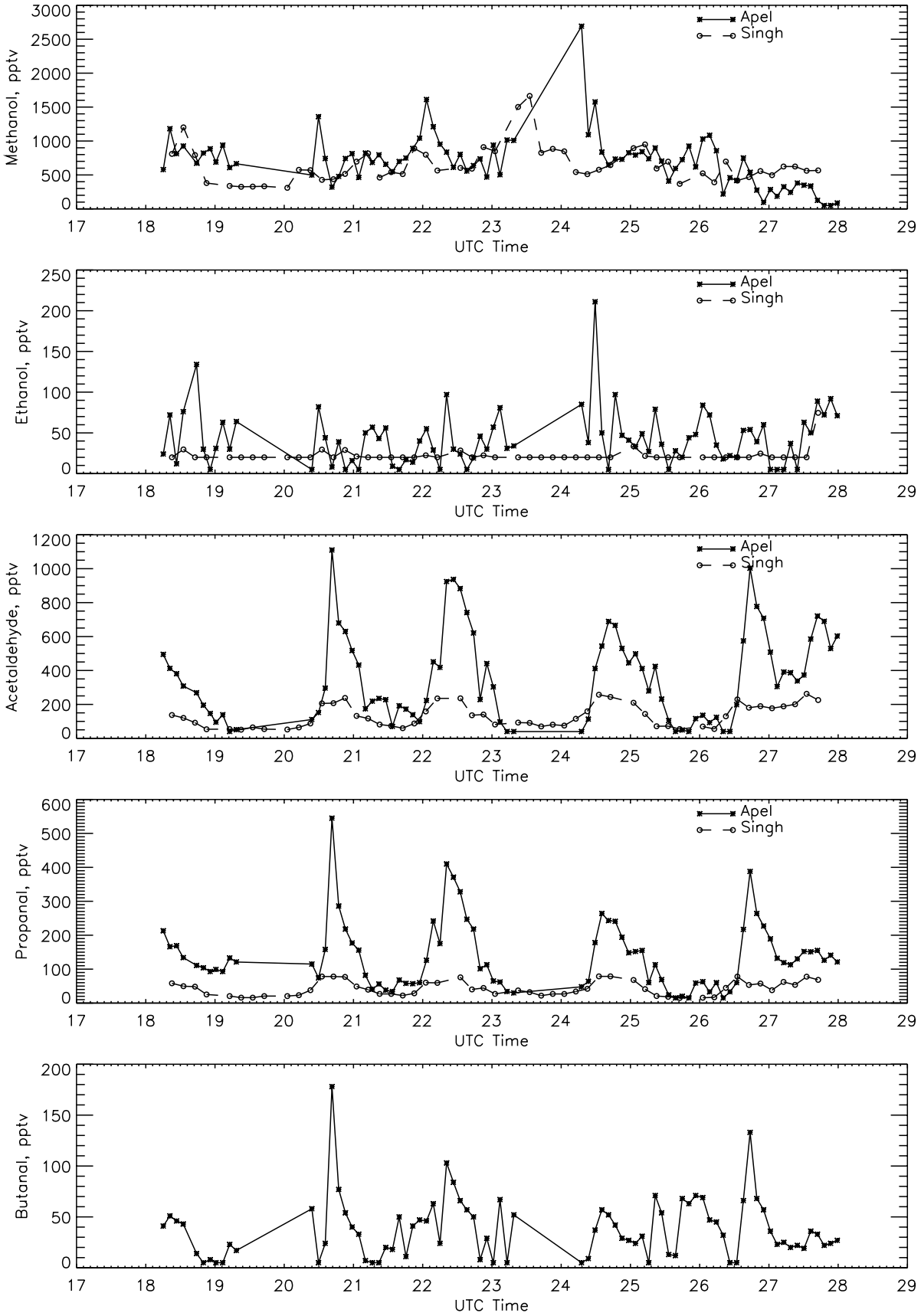

FINAL DATA: TRACE-P DC-8 Flight 19
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time

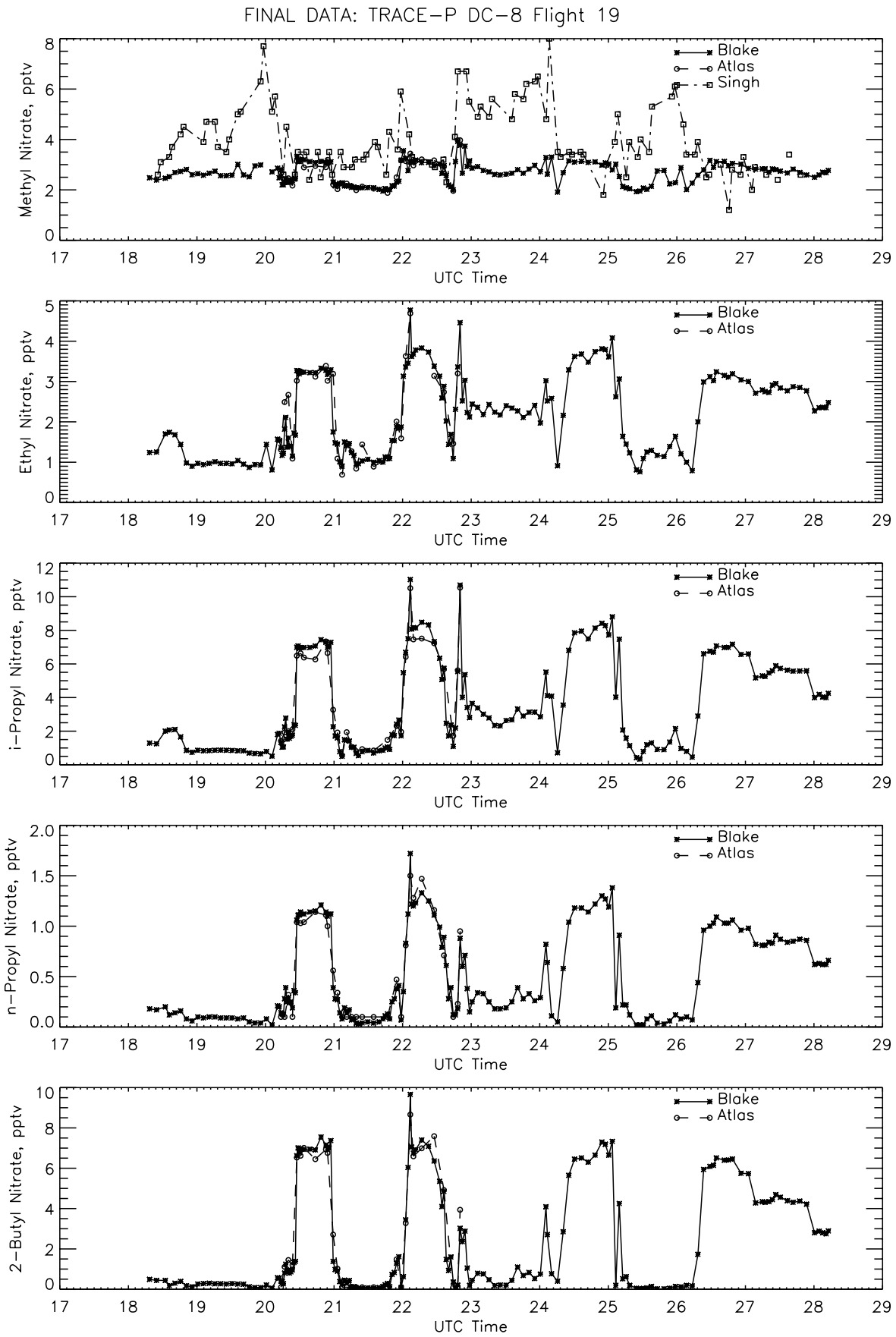

FINAL DATA: TRACE-P DC-8 Flight 19
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
clip: max=46.0000
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

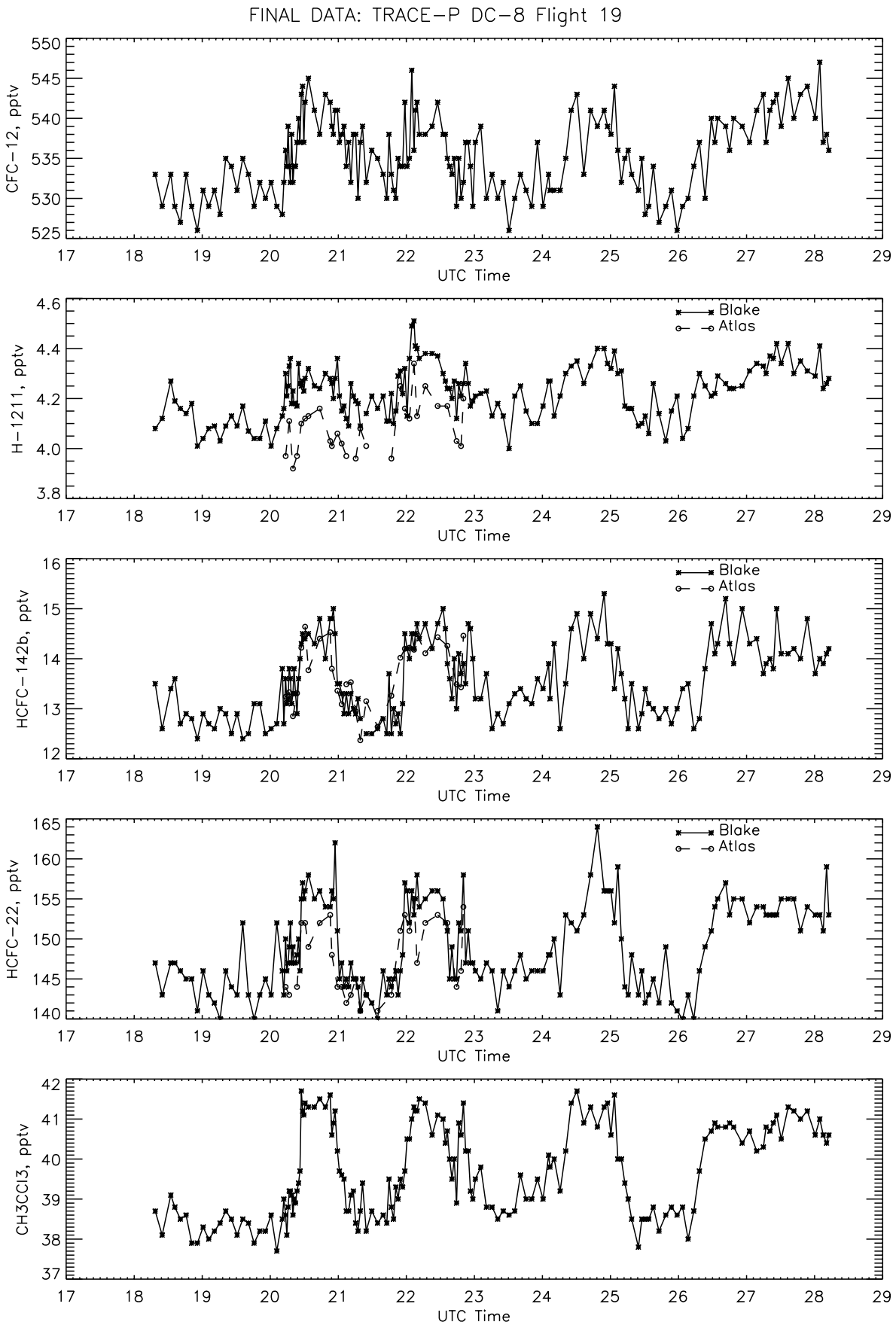

FINAL DATA: TRACE-P DC-8 Flight 19
clip: max=45.0000
Ethene, pptv
UTC Time
C3H8/C2H6
UTC Time
clip: max=0.0414747
C2H4/C2H6
UTC Time
C2H2/CO
UTC Time
C2H6/CO
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 19
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time

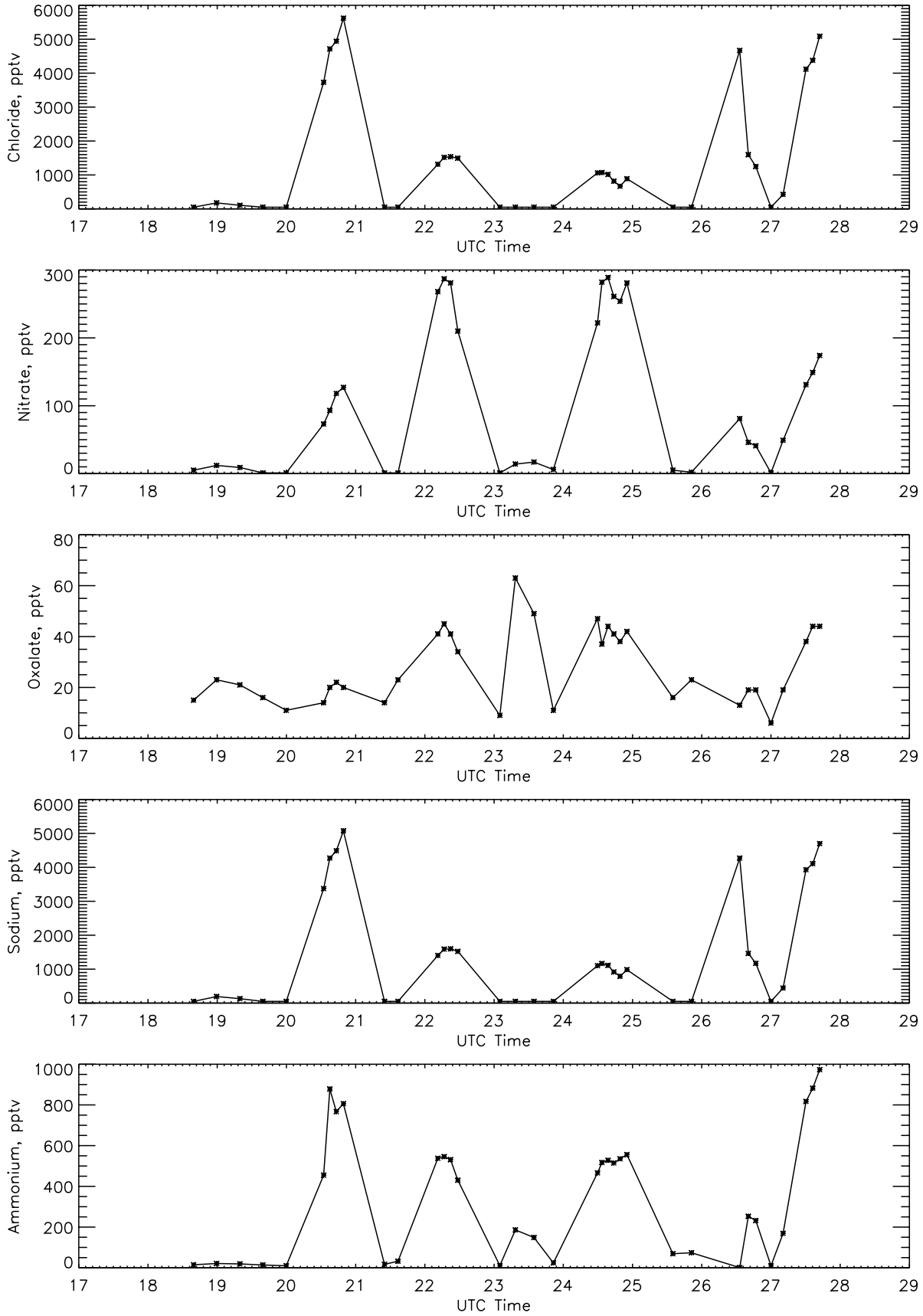
FINAL DATA: TRACE-P DC-8 Flight 19

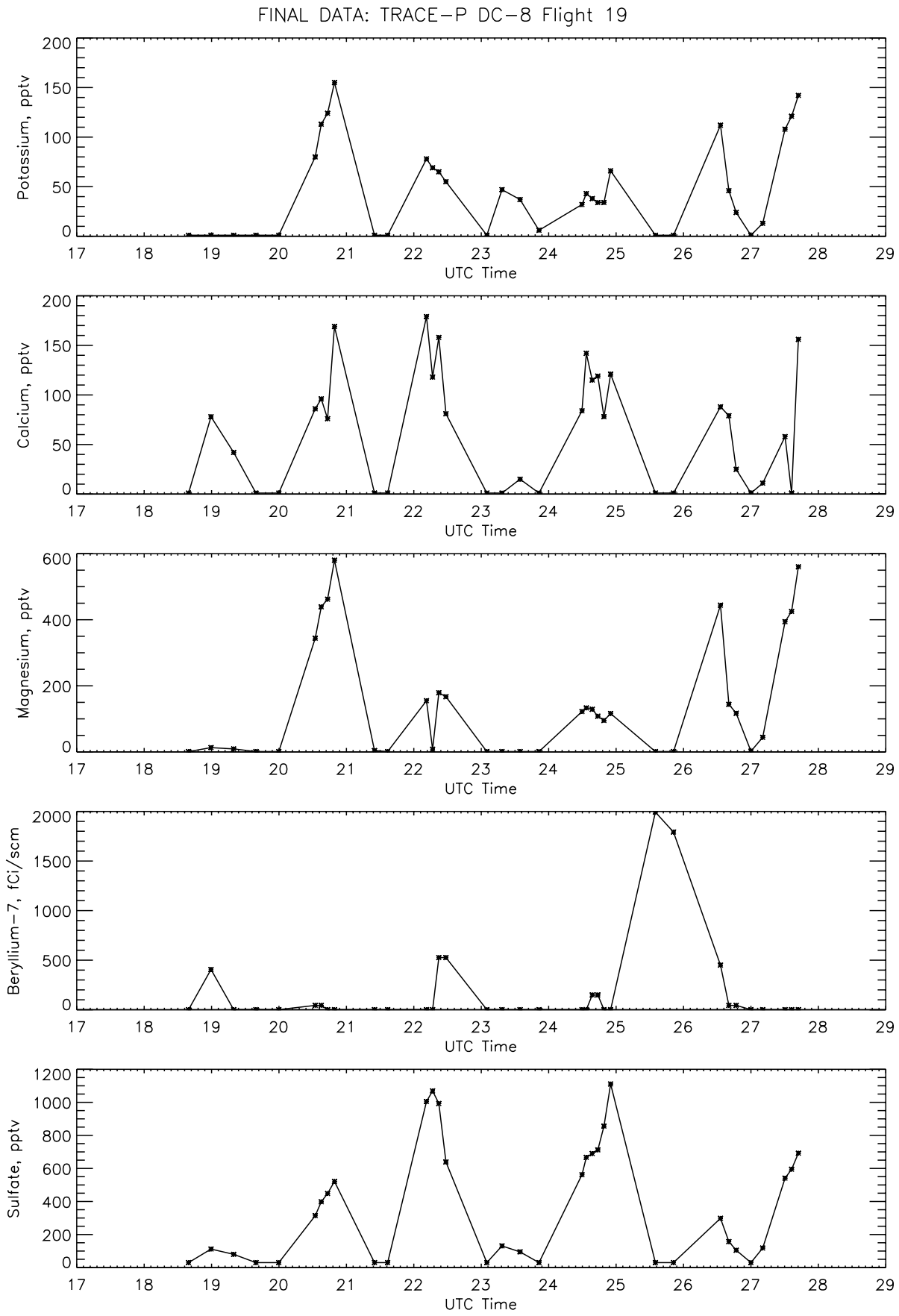


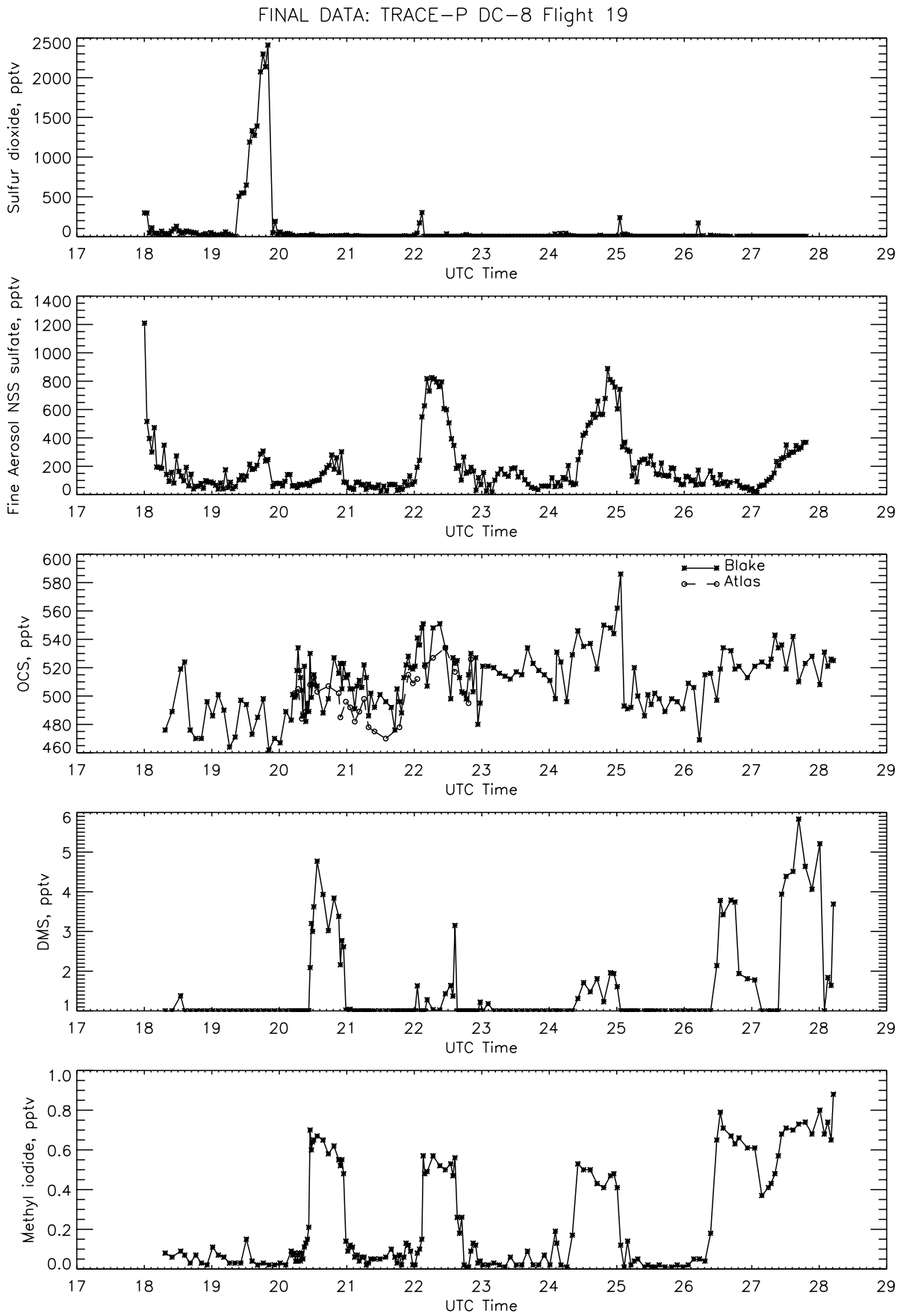

FINAL DATA: TRACE-P DC-8 Flight 19
Methyl Nitrate, pptv
Blake
Atlas
Singh
UTC Time
Ethyl Nitrate, pptv
Blake
Atlas
UTC Time
i-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
n-Propyl Nitrate, pptv
Blake
Atlas
UTC Time
2-Butyl Nitrate, pptv
Blake
Atlas
UTC Time

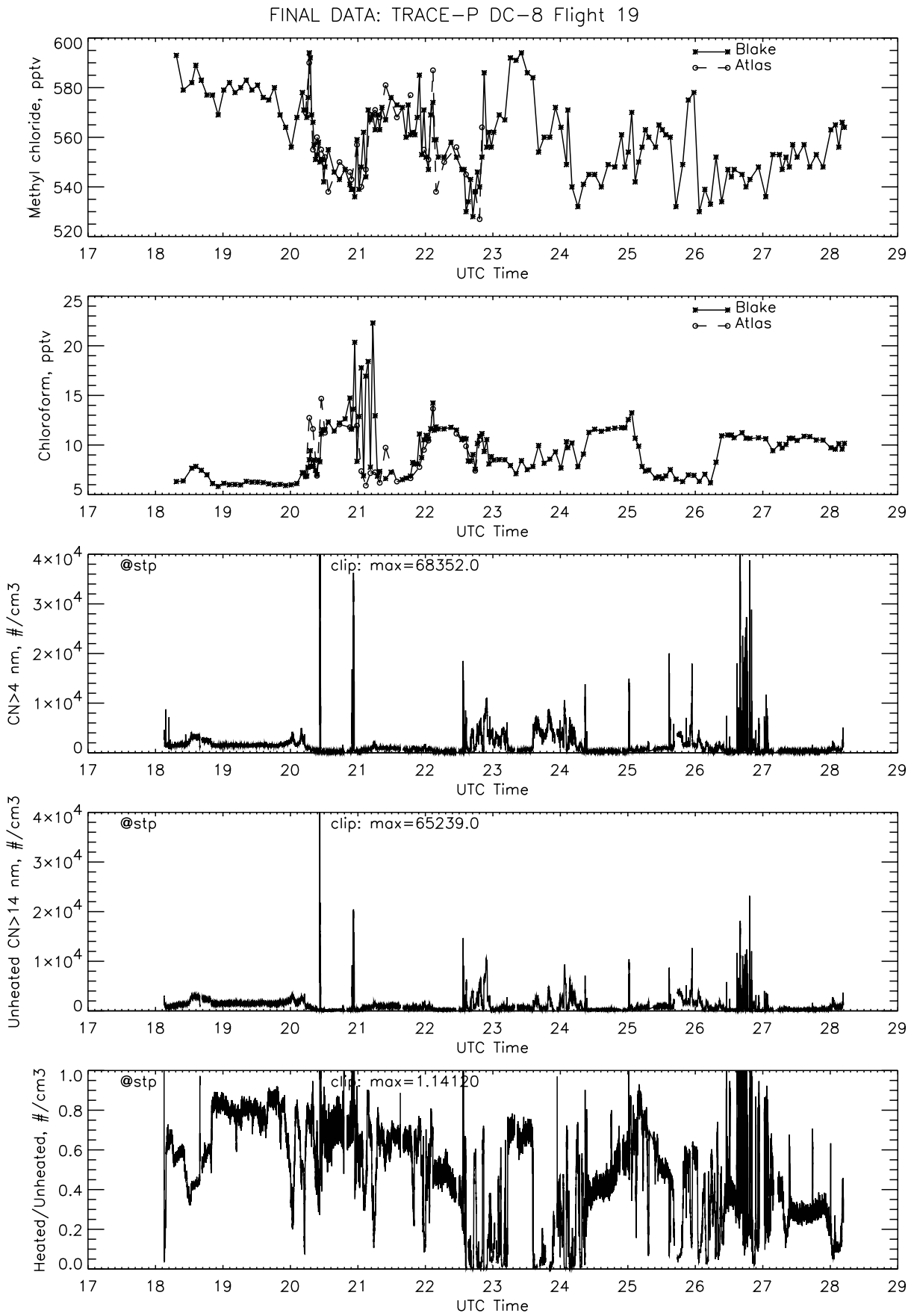

FINAL DATA: TRACE-P DC-8 Flight 19
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas

FINAL DATA: TRACE-P DC-8 Flight 19

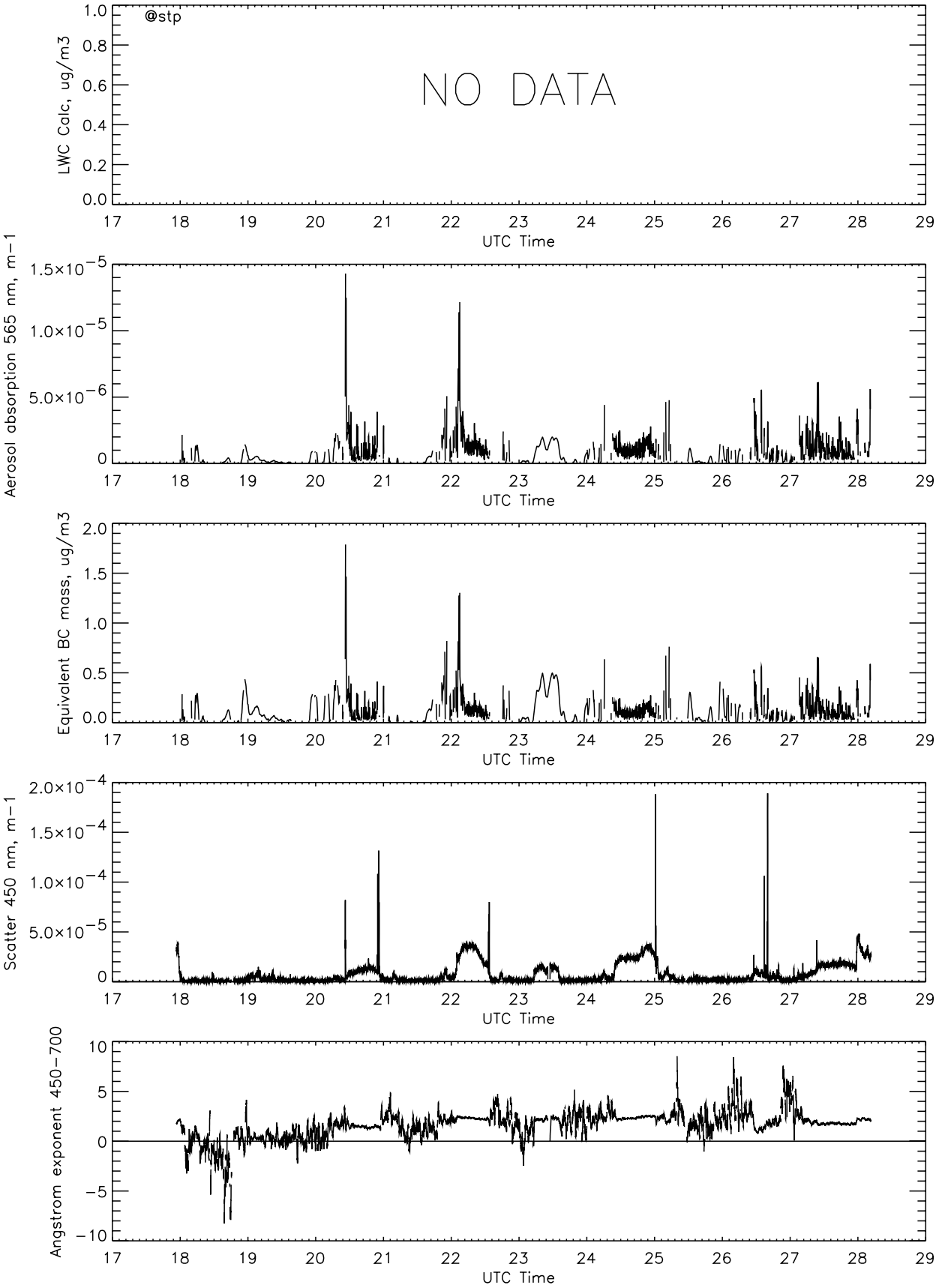


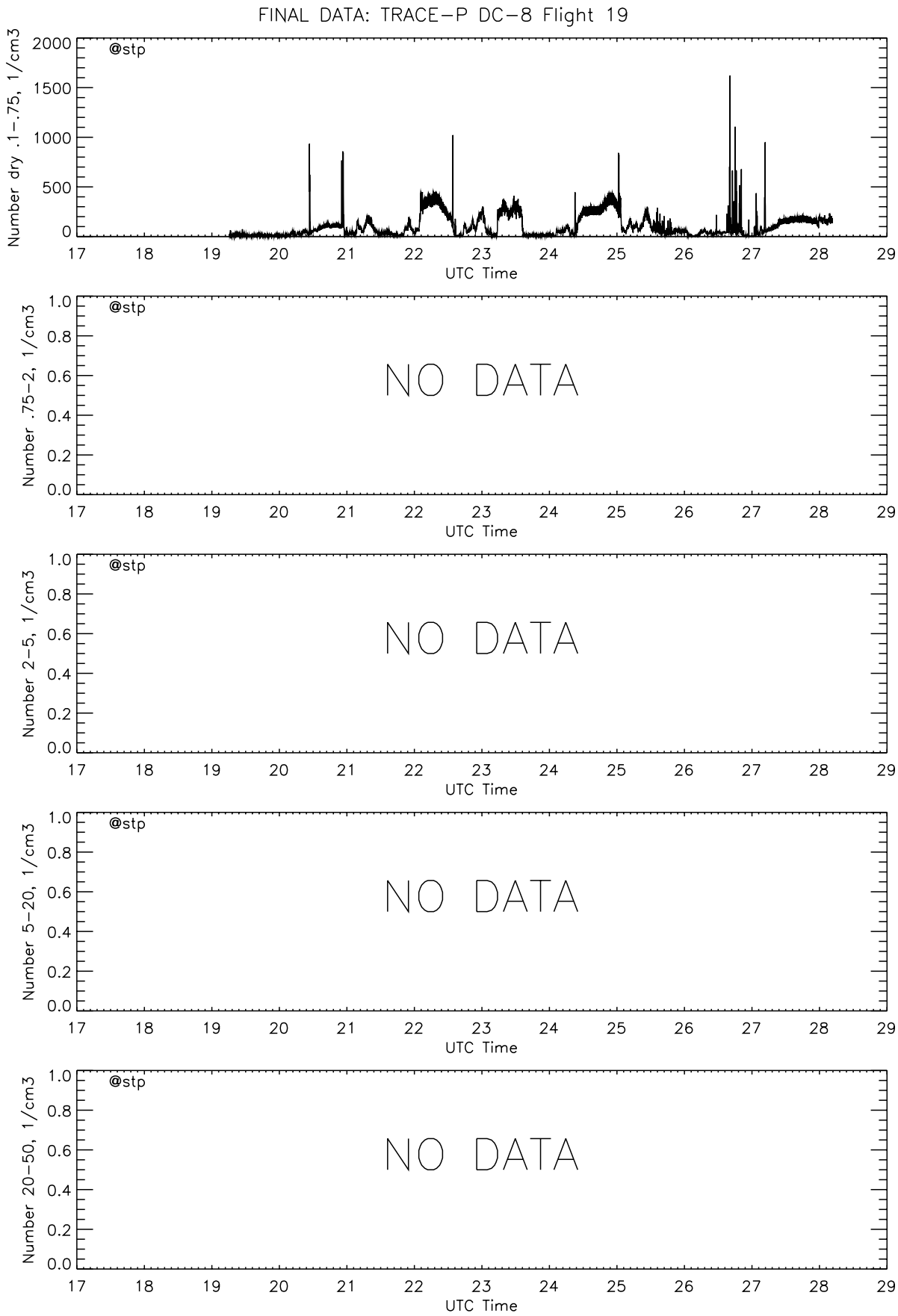

FINAL DATA: TRACE-P DC-8 Flight 19
Potassium, pptv
Calcium, pptv
Magnesium, pptv
Beryllium-7, fCi/scm
Sulfate, pptv
UTC Time

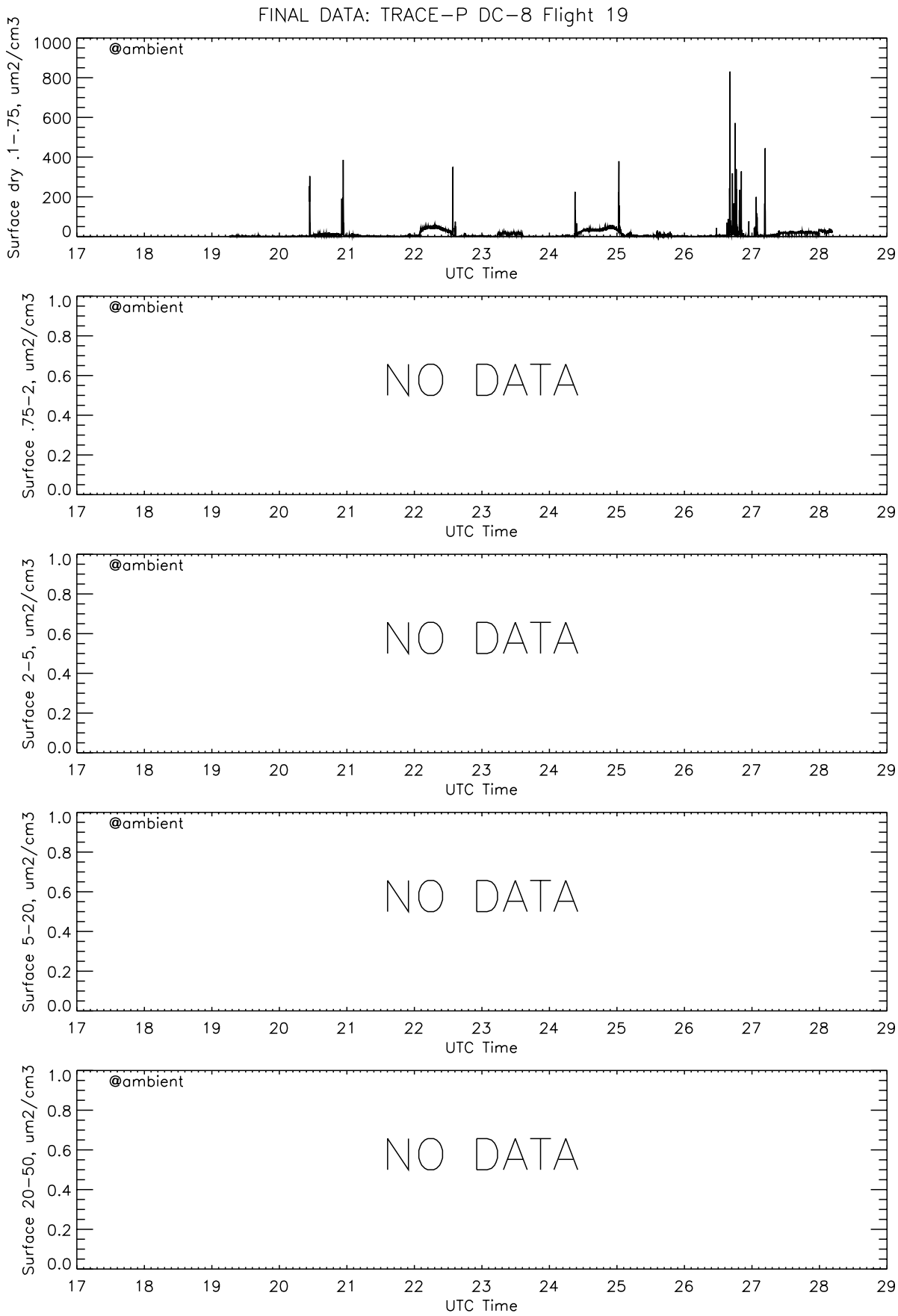

FINAL DATA: TRACE-P DC-8 Flight 19
Sulfur dioxide, pptv
Fine Aerosol NSS sulfate, pptv
OCS, pptv
Blake
Atlas
DMS, pptv
Methyl iodide, pptv
UTC Time

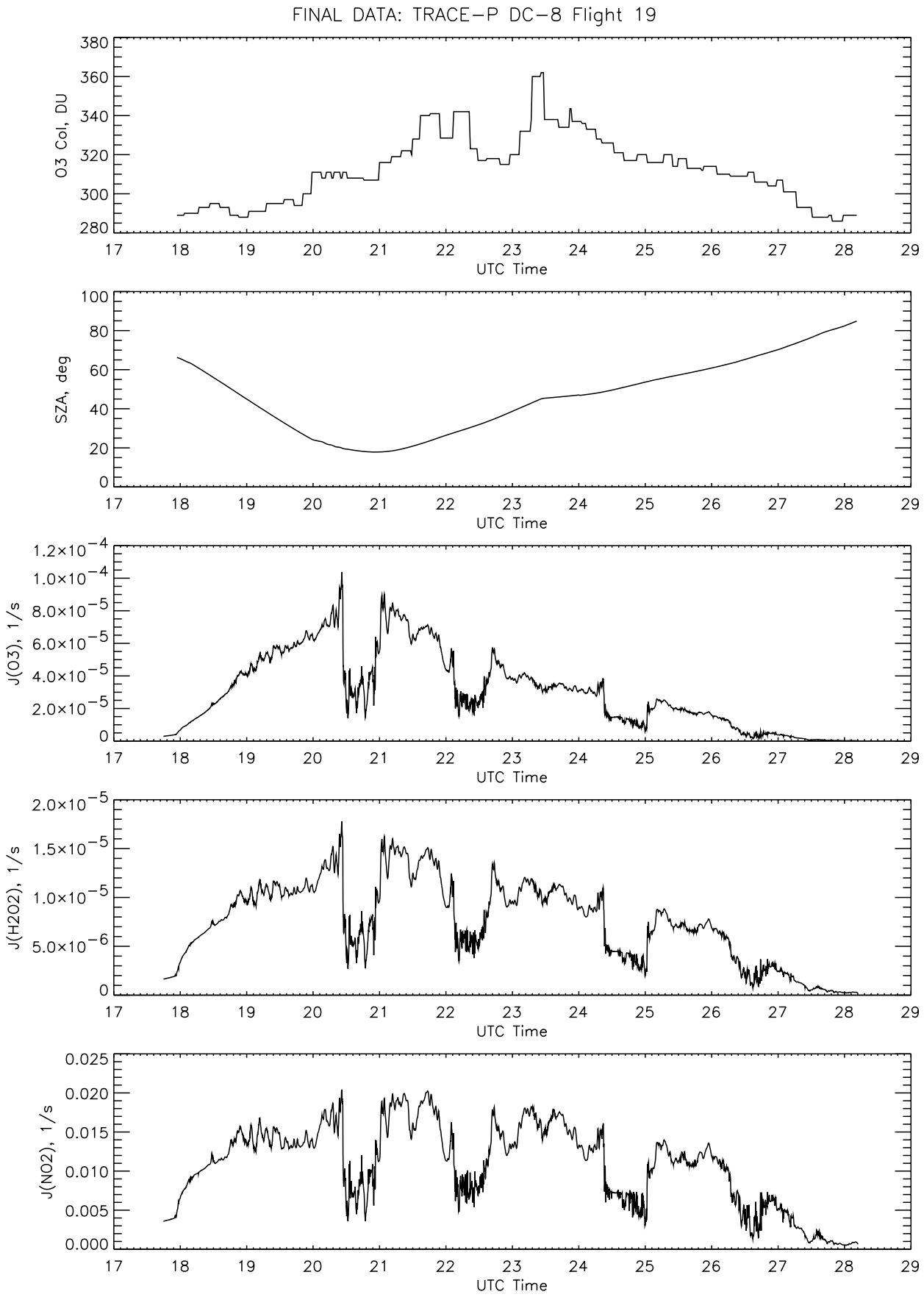

FINAL DATA: TRACE-P DC-8 Flight 19
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
clip: max=68352.0
UTC Time
Unheated CN>14 nm, #/cm3
@stp
clip: max=65239.0
UTC Time
Heated/Unheated, #/cm3
@stp
clip: max=1.14120
UTC Time

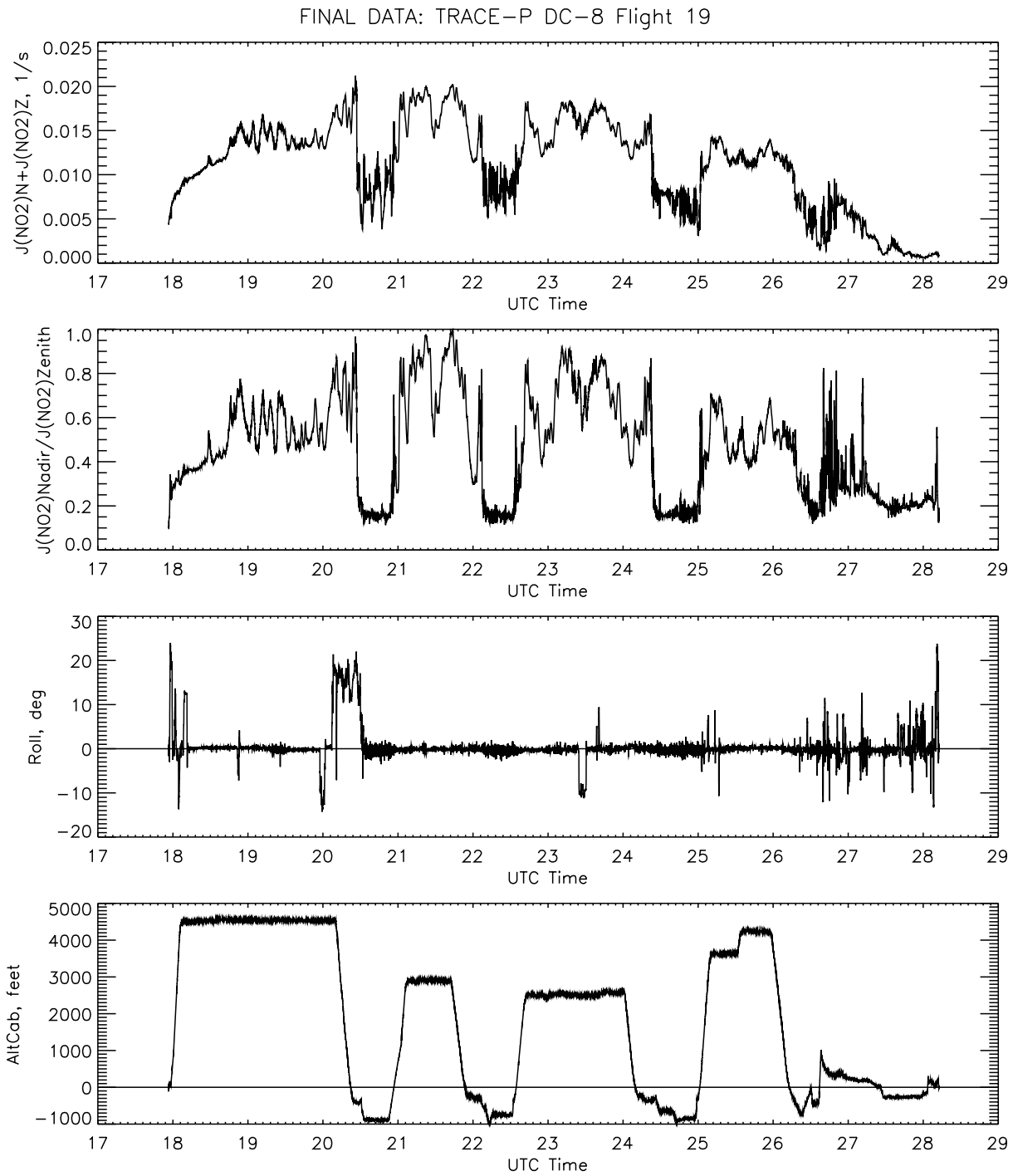
FINAL DATA: TRACE-P DC-8 Flight 19



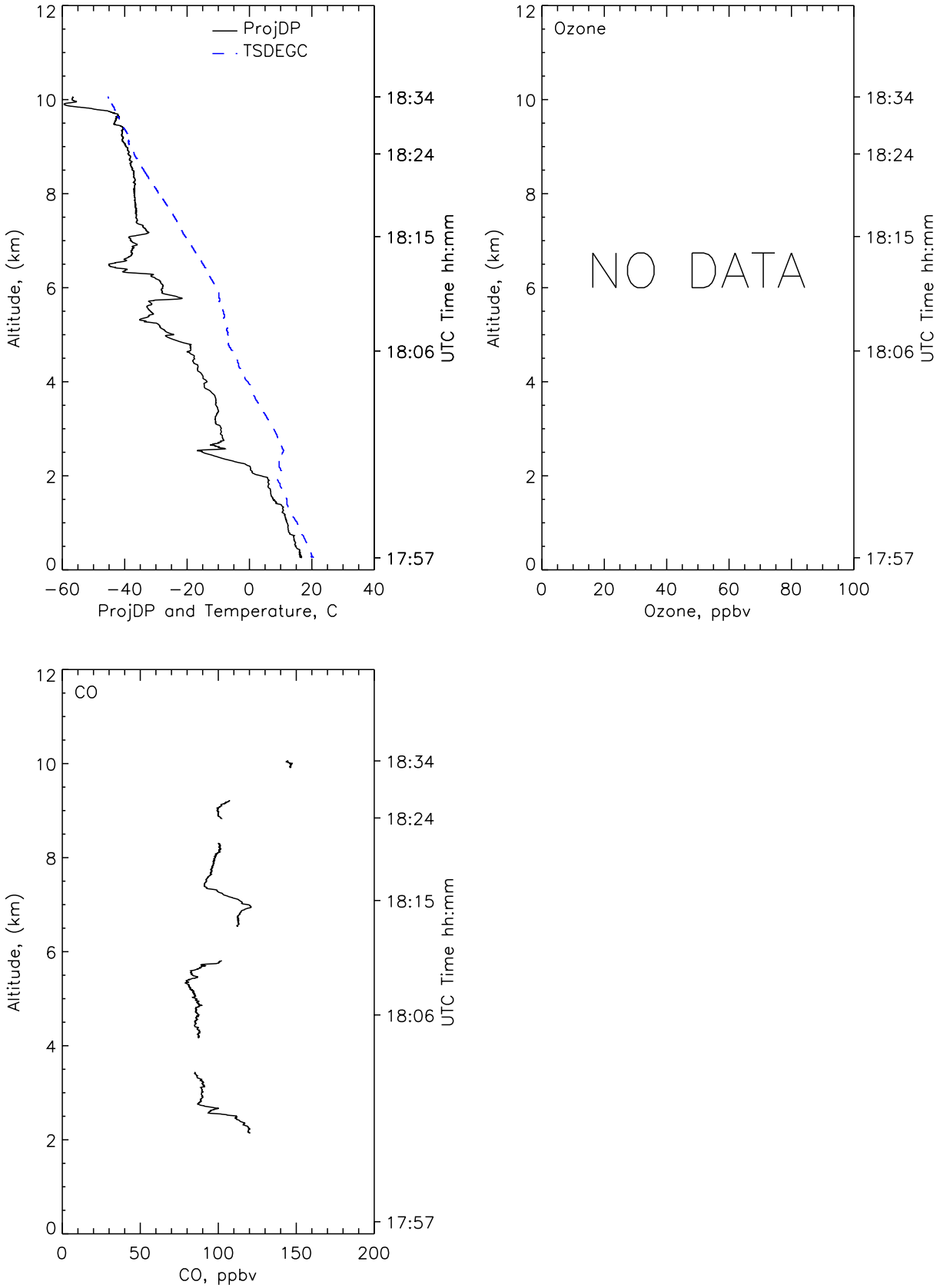

FINAL DATA: TRACE-P DC-8 Flight 19
Number dry .1-.75, 1/cm3
@stp
UTC Time
Number .75-2, 1/cm3
NO DATA
Number 2-5, 1/cm3
Number 5-20, 1/cm3
Number 20-50, 1/cm3

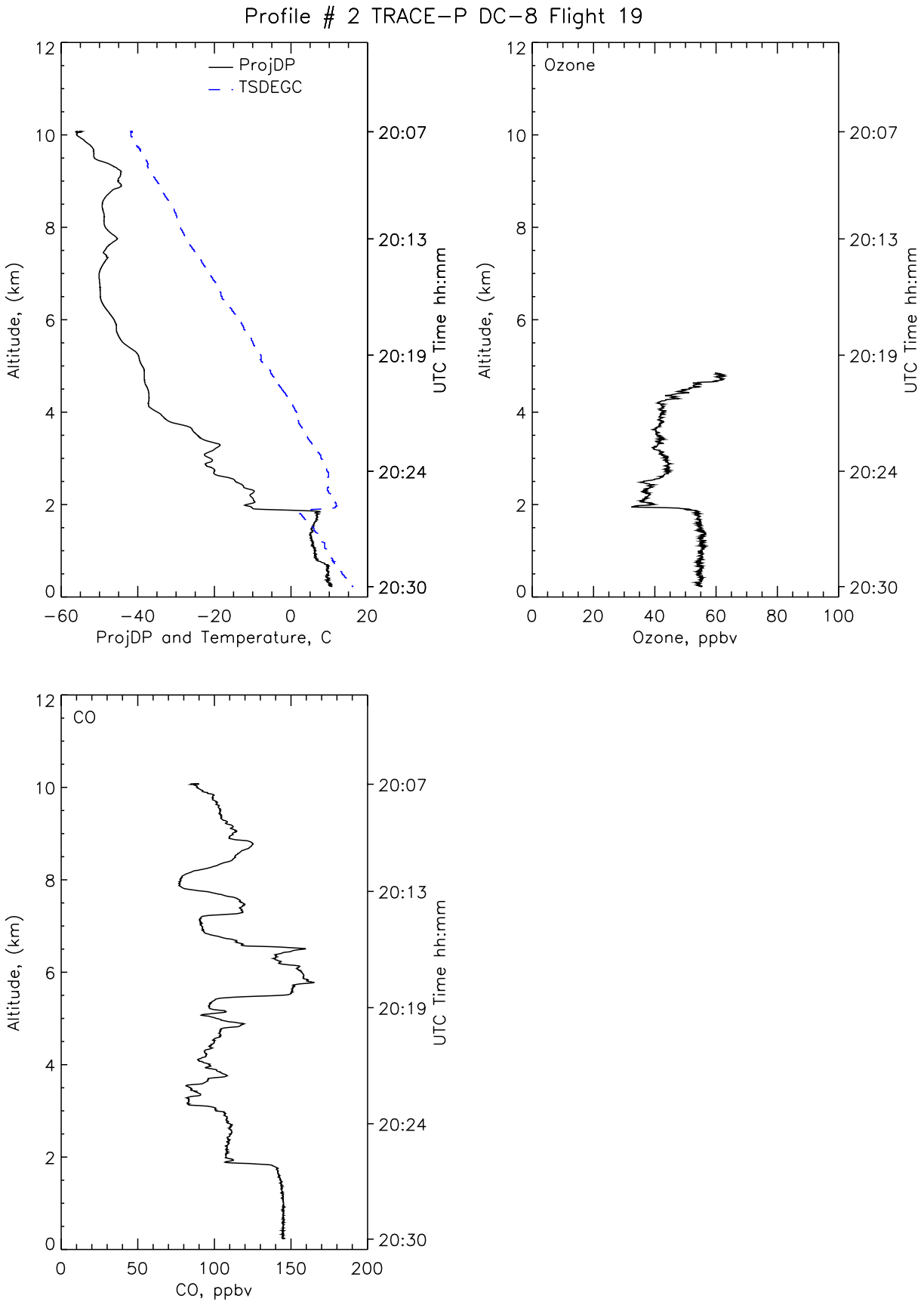

FINAL DATA: TRACE-P DC-8 Flight 19
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
NO DATA
UTC Time

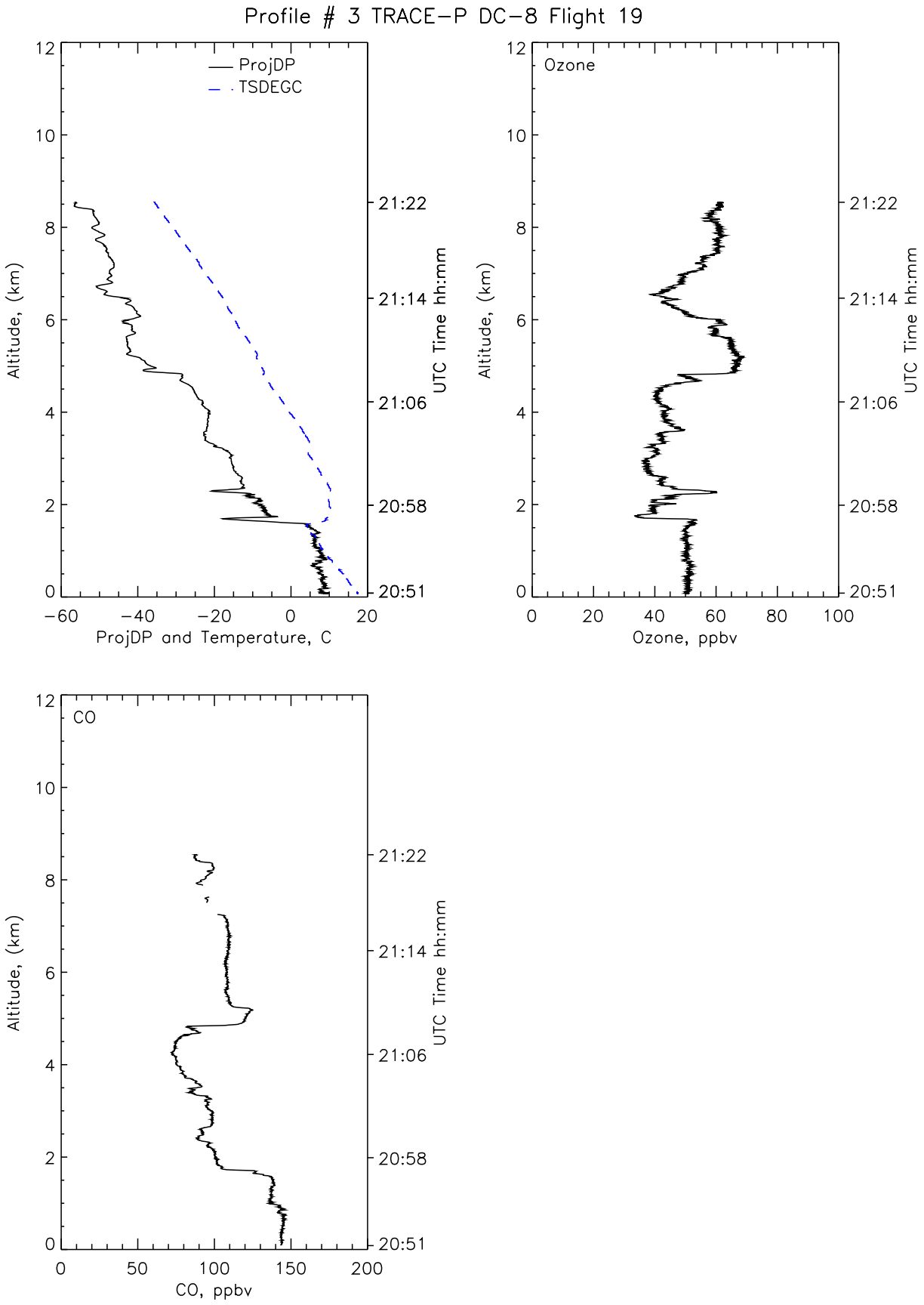

FINAL DATA: TRACE-P DC-8 Flight 19
O3 Col, DU
SZA, deg
J(O3), 1/s
J(H2O2), 1/s
J(NO2), 1/s
UTC Time

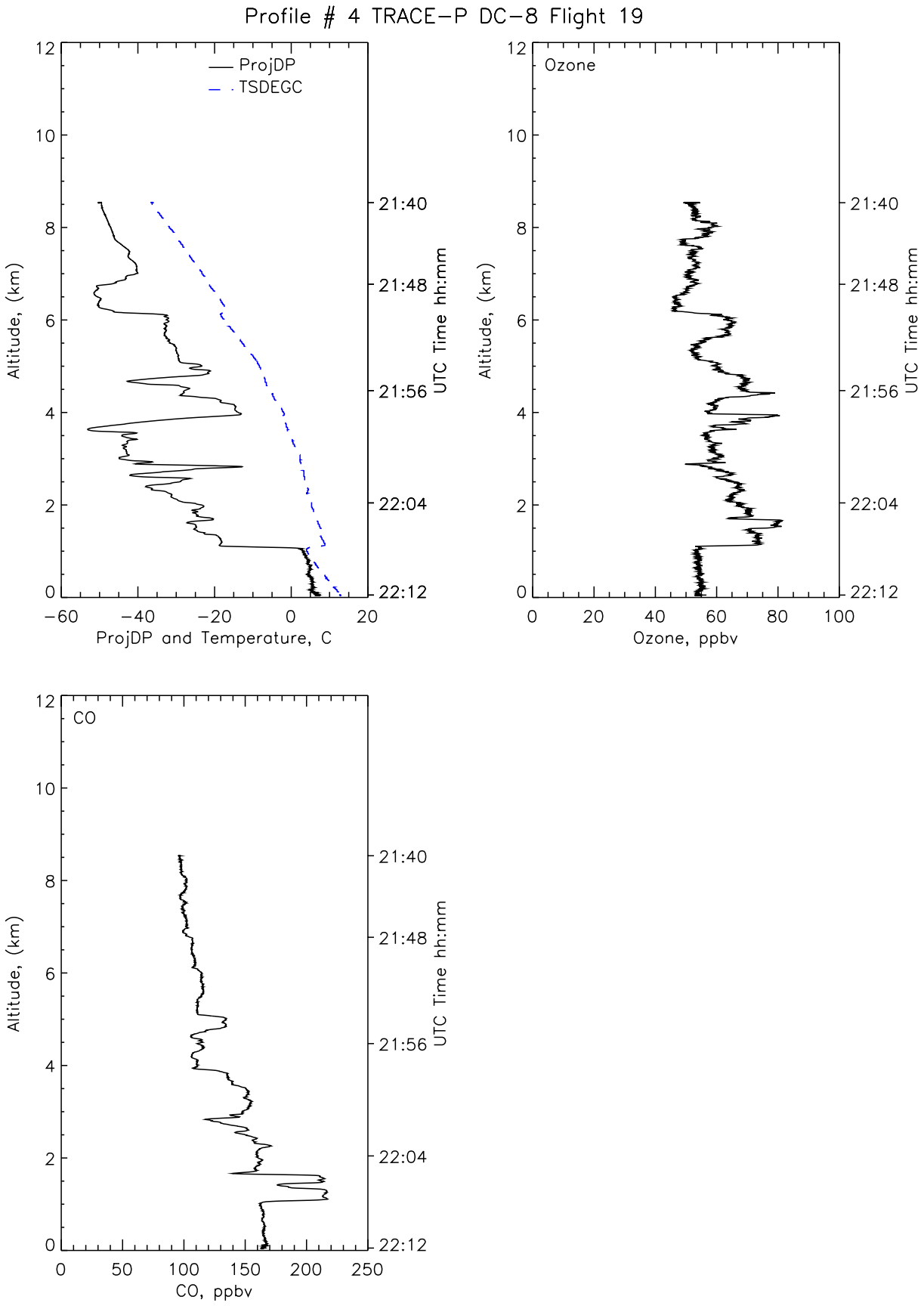

FINAL DATA: TRACE-P DC-8 Flight 19
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
17 18 19 20 21 22 23 24 25 26 27 28 29
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.0
0.8
0.6
0.4
0.2
0.0
17 18 19 20 21 22 23 24 25 26 27 28 29
UTC Time
Roll, deg
30
20
10
0
−10
−20
17 18 19 20 21 22 23 24 25 26 27 28 29
UTC Time
AltCab, feet
5000
4000
3000
2000
1000
0
−1000
17 18 19 20 21 22 23 24 25 26 27 28 29
UTC Time

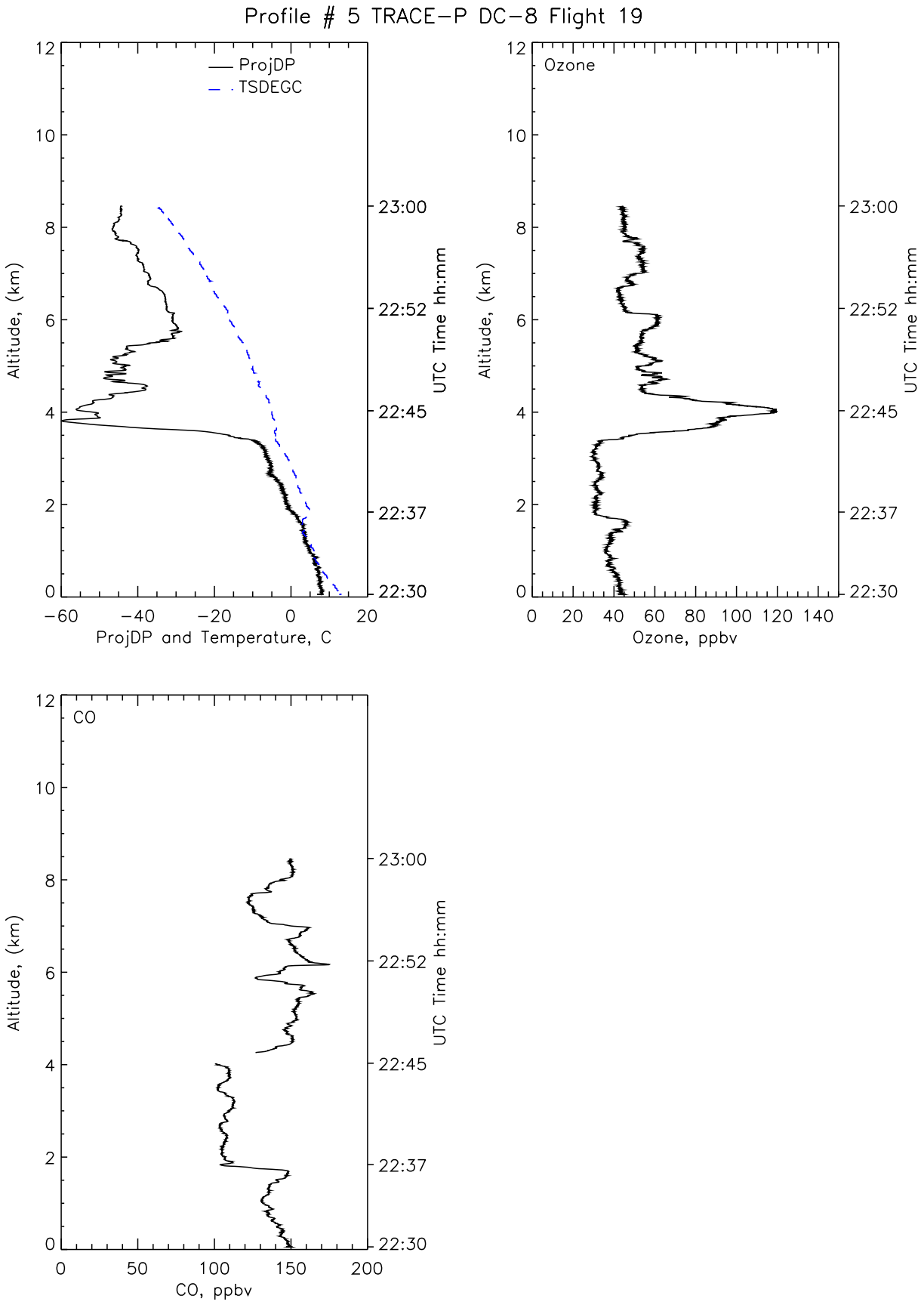
Profile # 1 TRACE-P DC-8 Flight 19

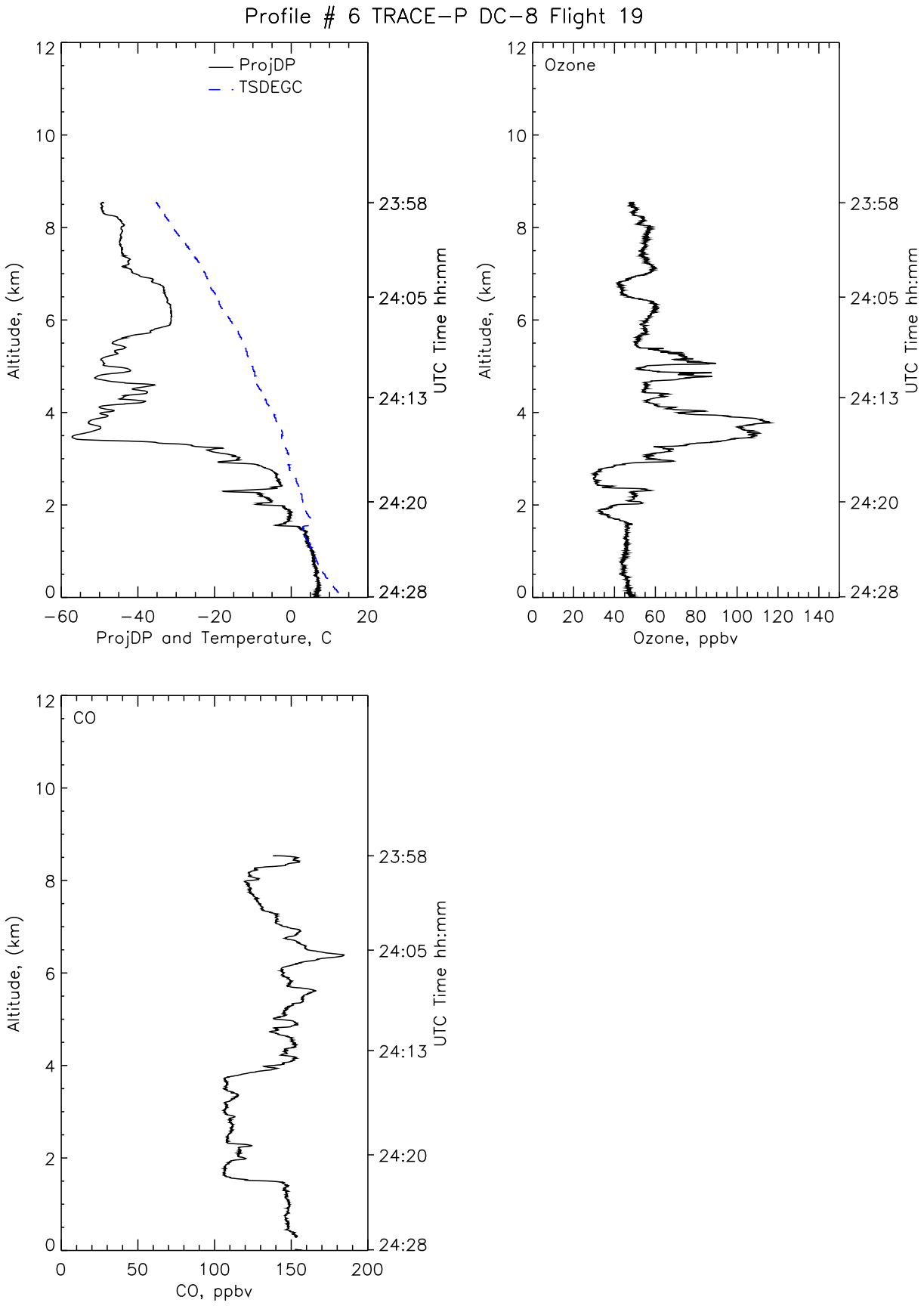


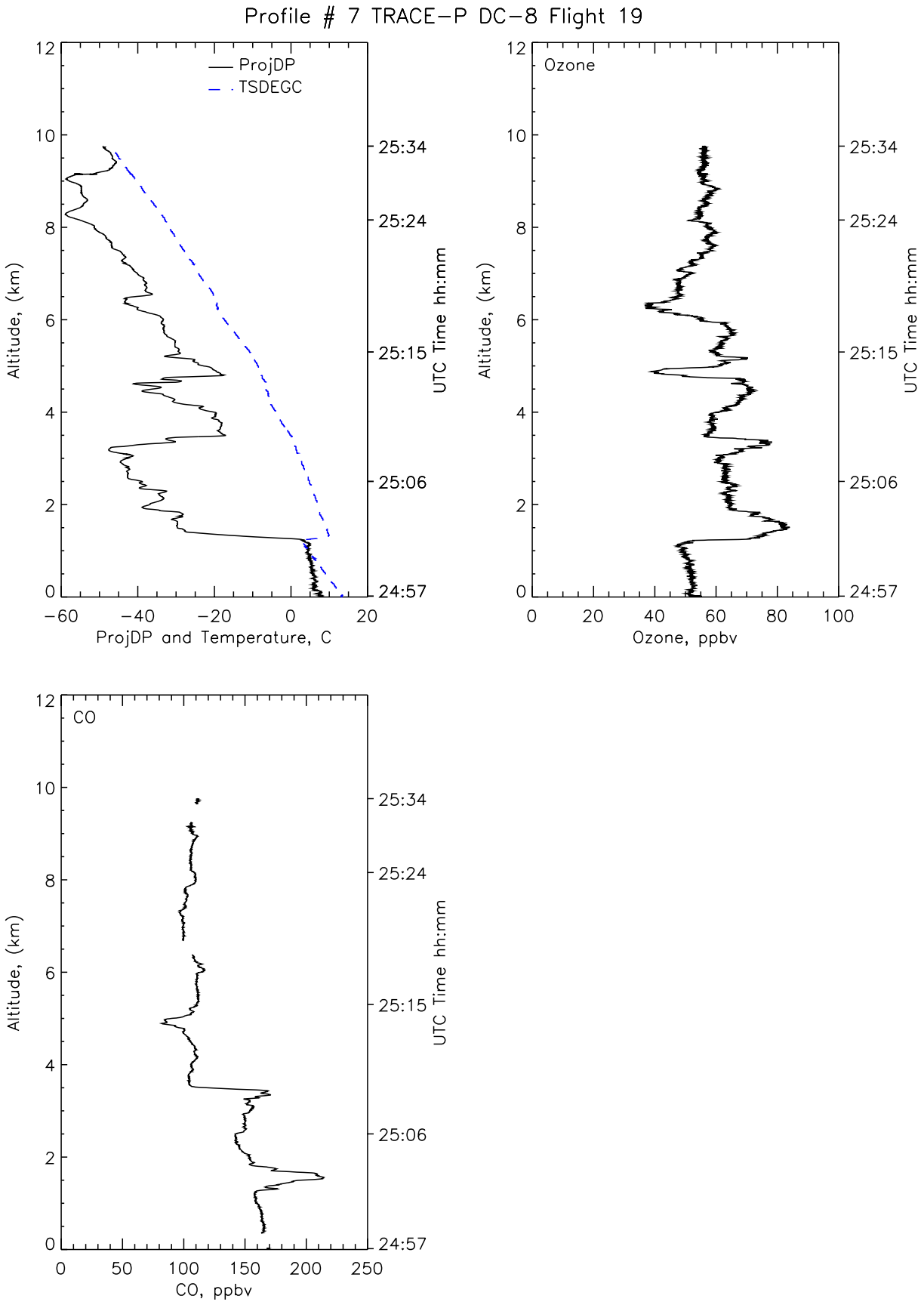

Profile # 2 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

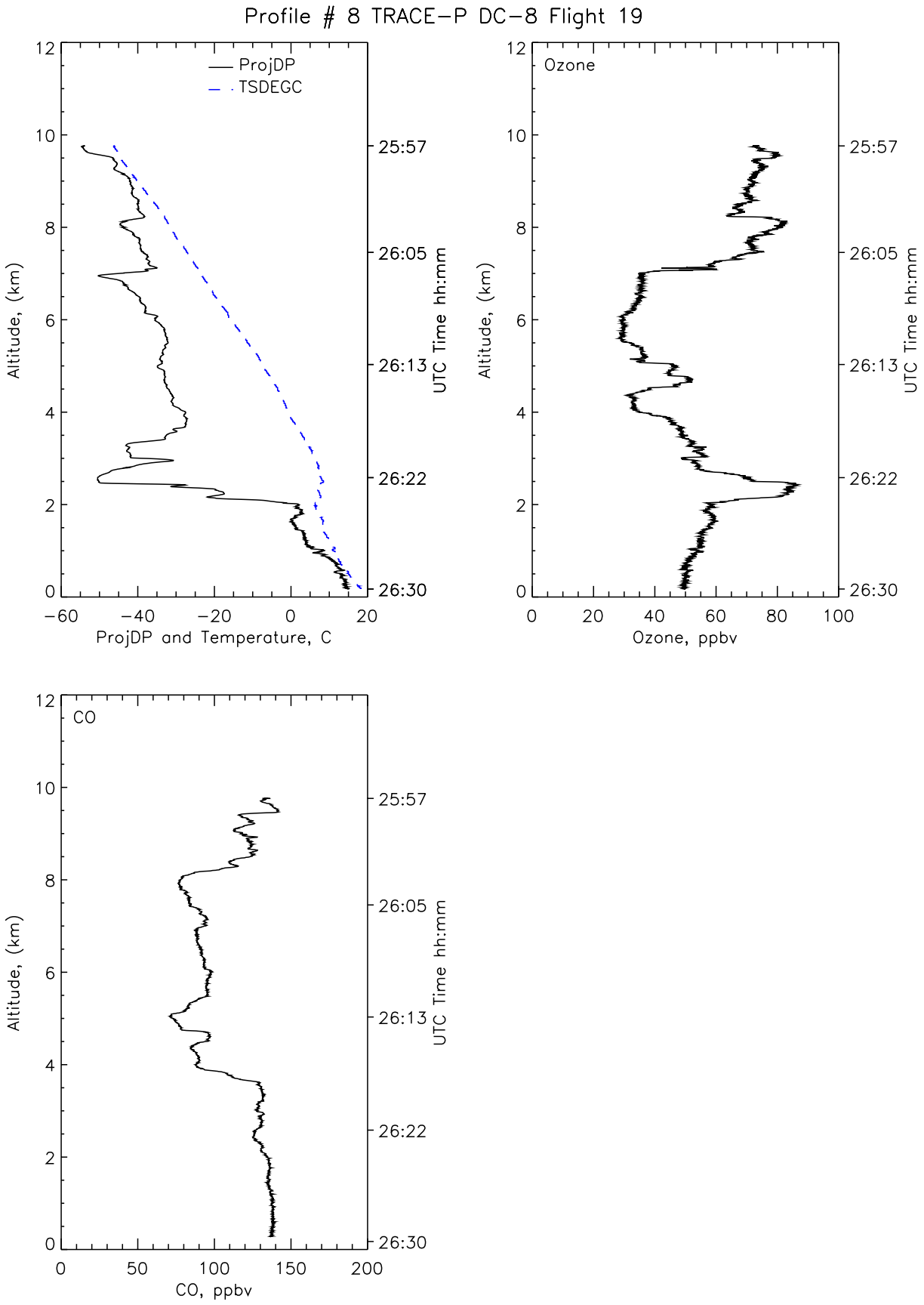

Profile # 3 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
21:22
21:14
21:06
20:58
20:51
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 5 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 6 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
23:58
24:05
24:13
24:20
24:28
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 7 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 8 TRACE-P DC-8 Flight 19
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv

CHEMICAL and METEOROLOGICAL DATA

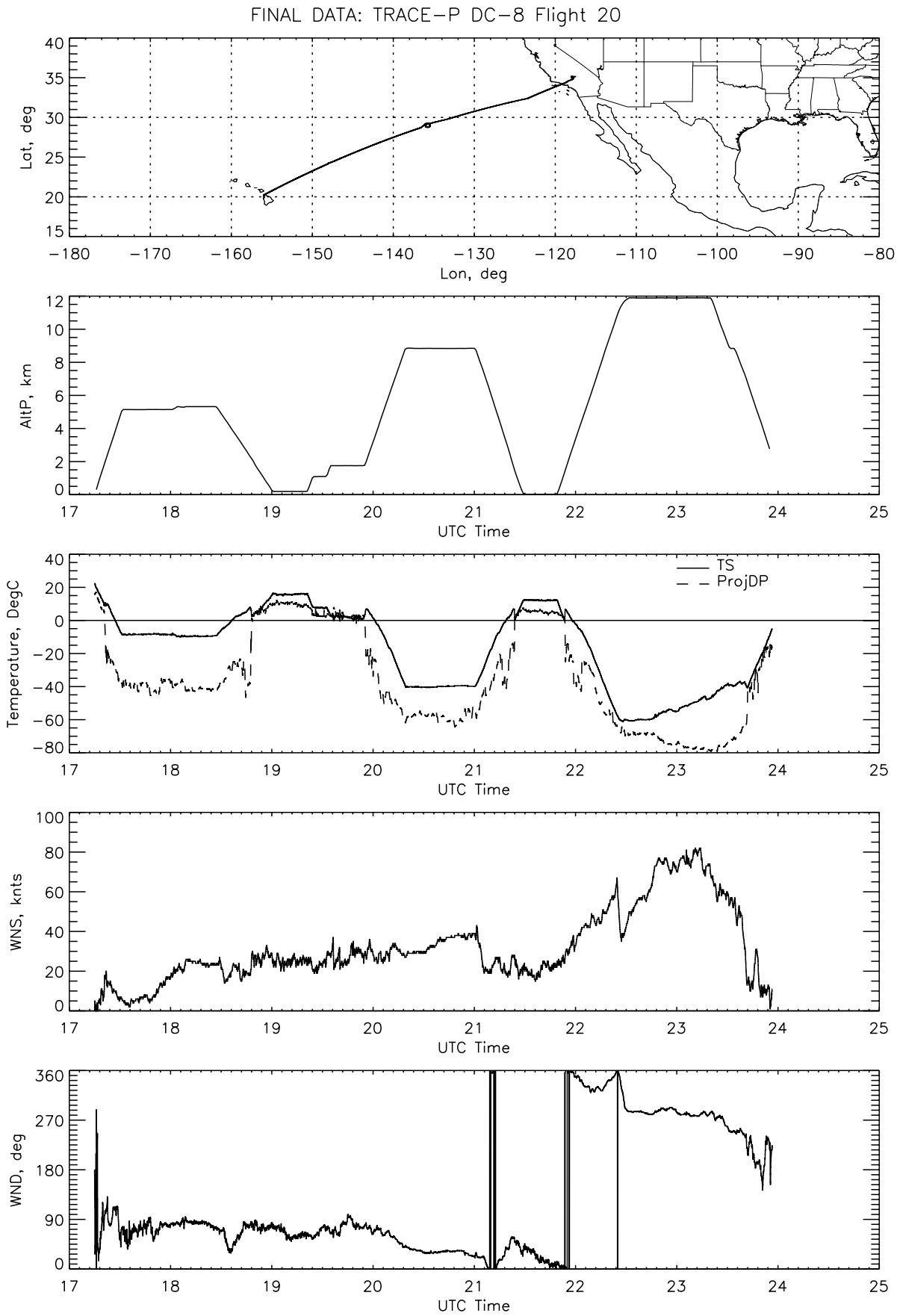
TRACE-P

Flight 20D

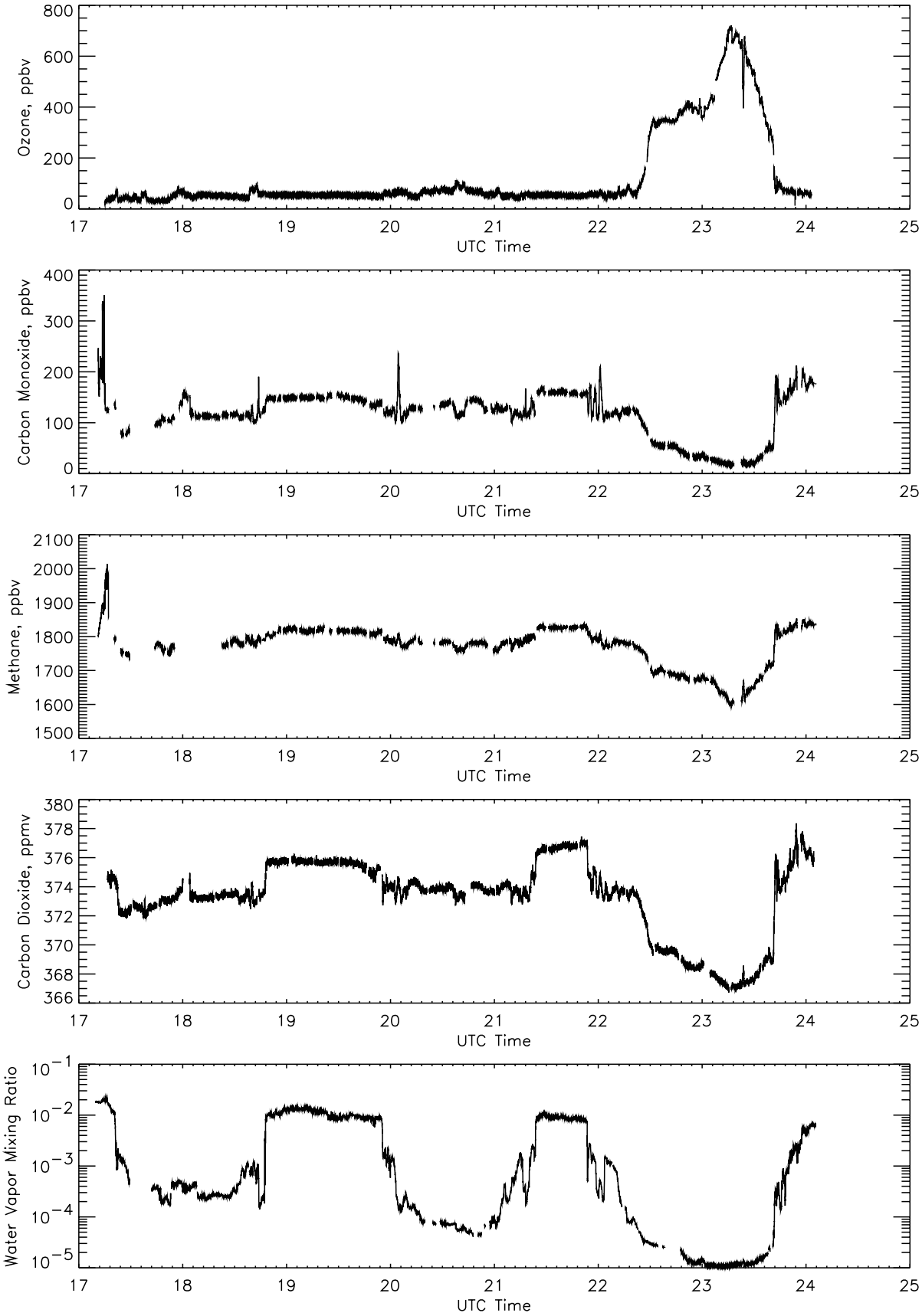
Transit: Kona, HI to NASA-DFRC

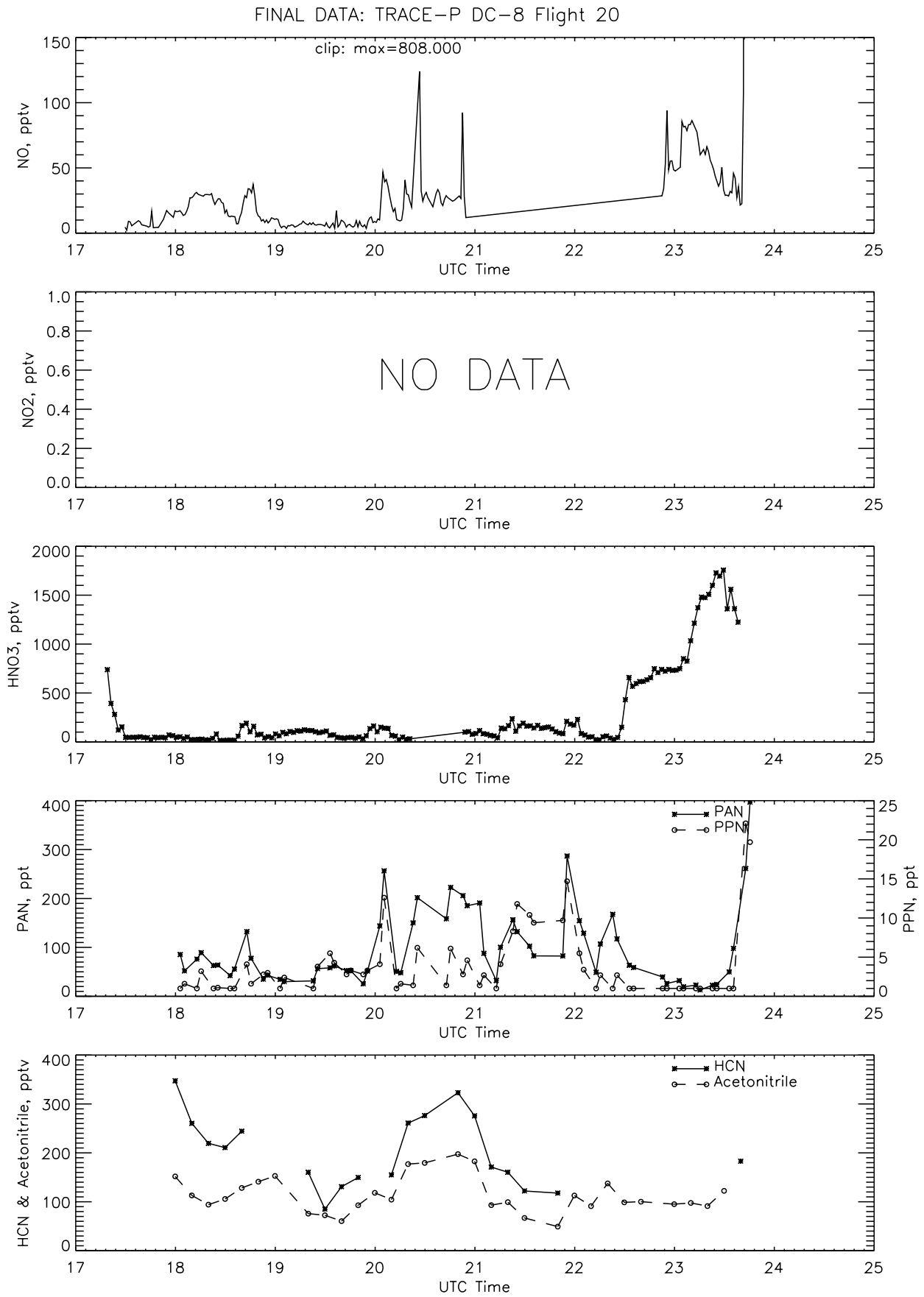
Aircraft Intercomparison, Stratus Chemistry and Jet Stream Transport

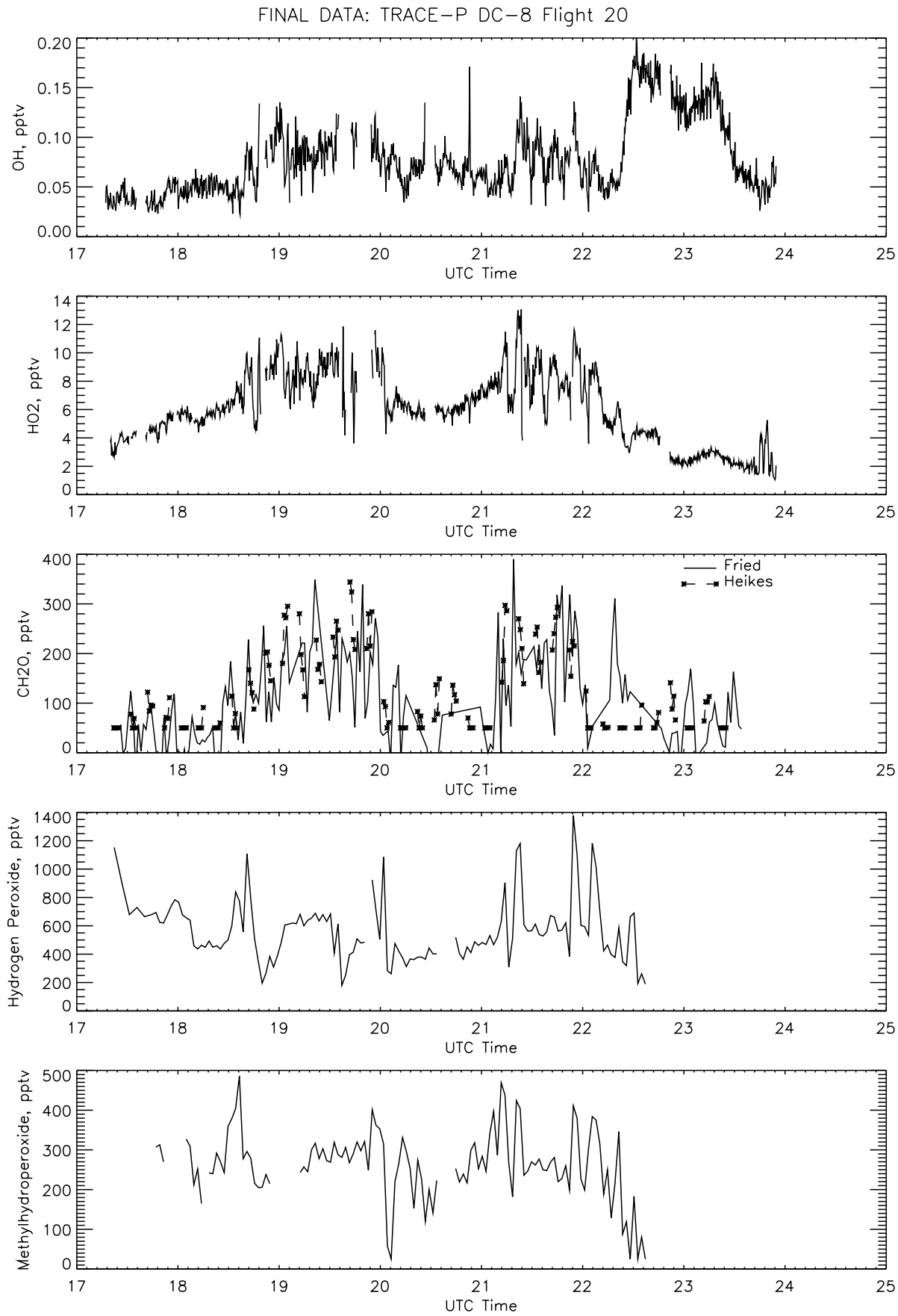
April 9, 2001

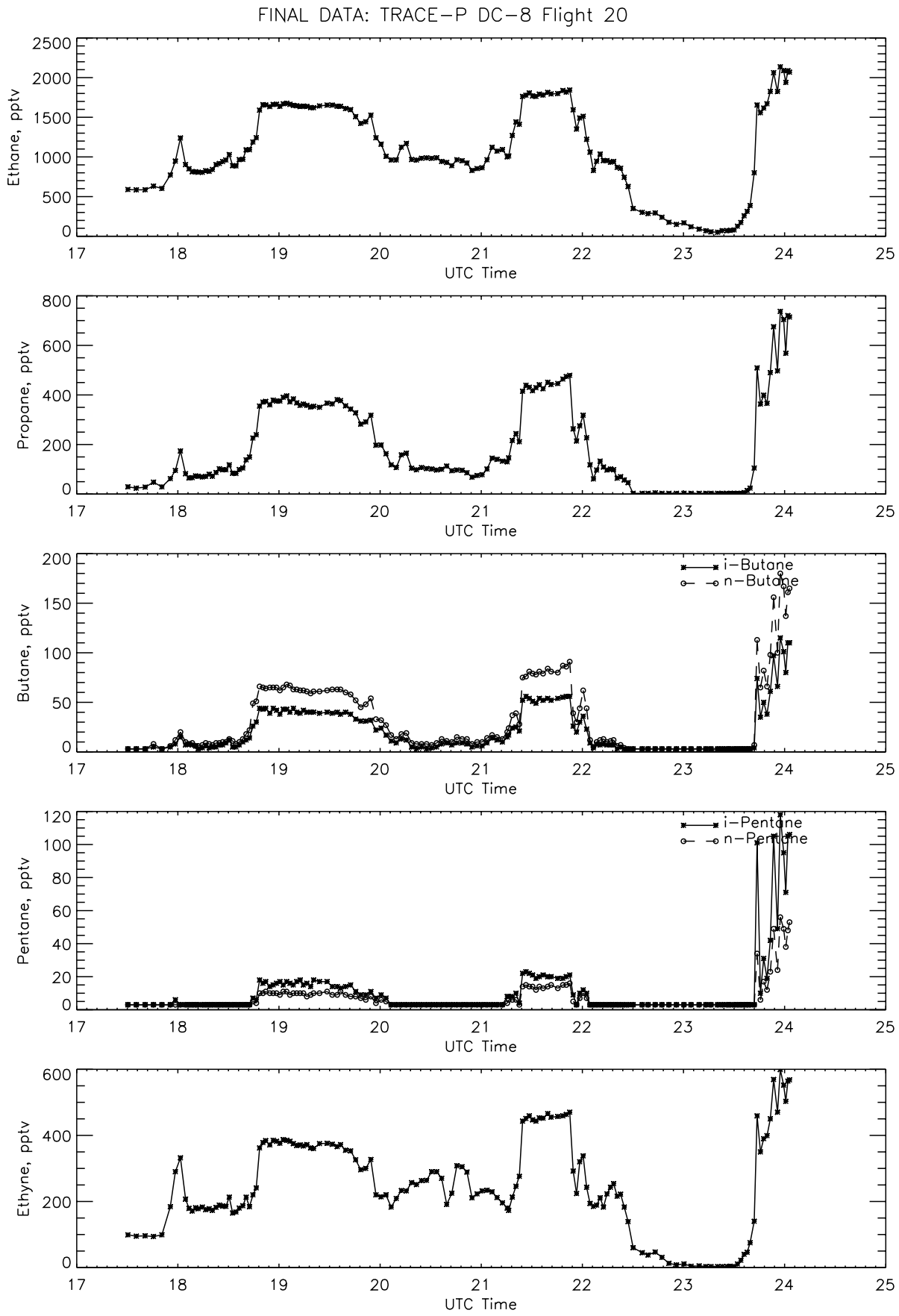

FINAL DATA: TRACE−P DC−8 Flight 20
Lat, deg
Lon, deg
AltP, km
UTC Time
Temperature, DegC
TS
ProjDP
WNS, knts
WND, deg

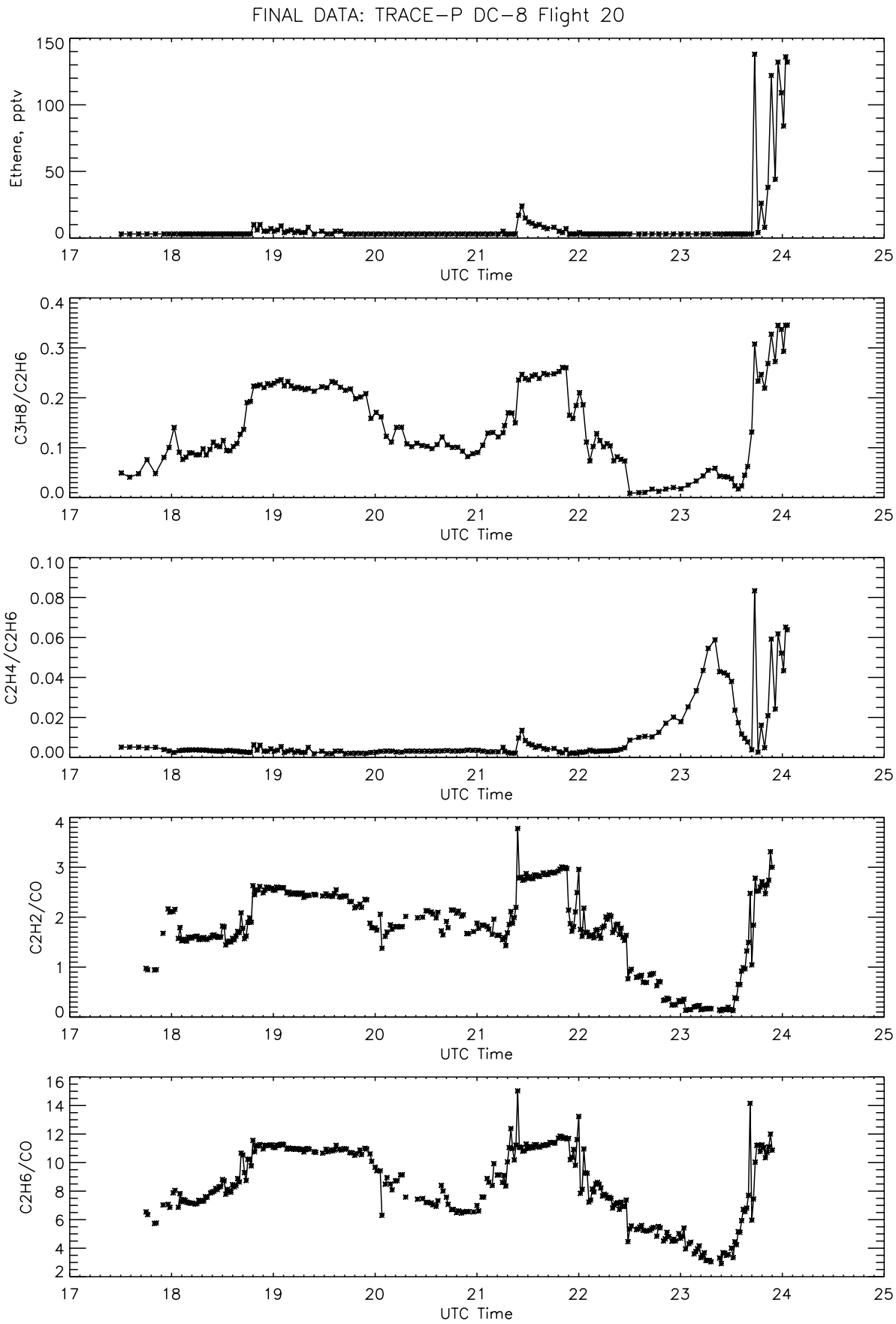
FINAL DATA: TRACE-P DC-8 Flight 20

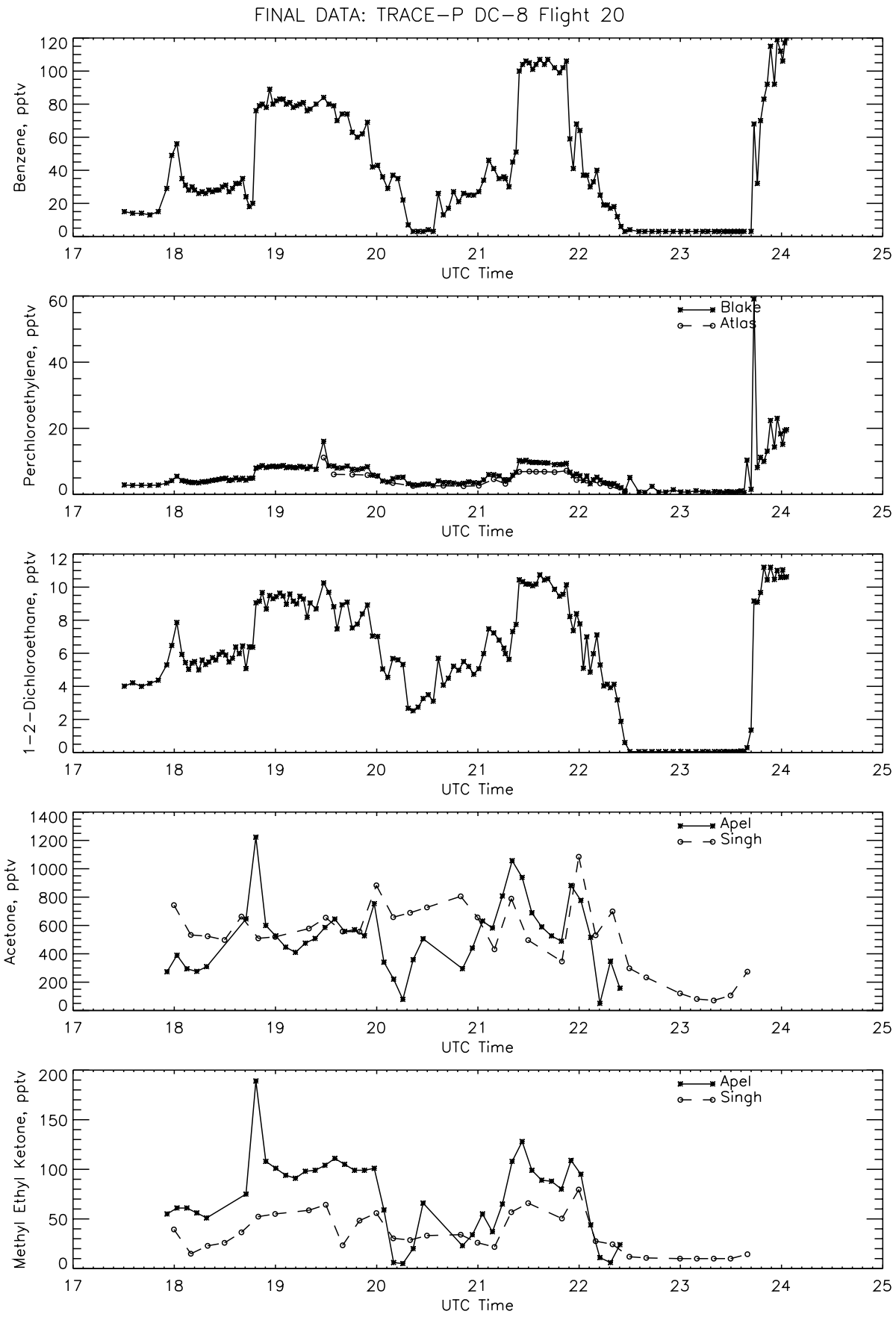



FINAL DATA: TRACE-P DC-8 Flight 20
clip: max=808.000
NO, pptv
NO2, pptv
NO DATA
HNO3, pptv
PAN, ppt
PPN, ppt
PAN
PPN
HCN & Acetonitrile, pptv
HCN
Acetonitrile
UTC Time

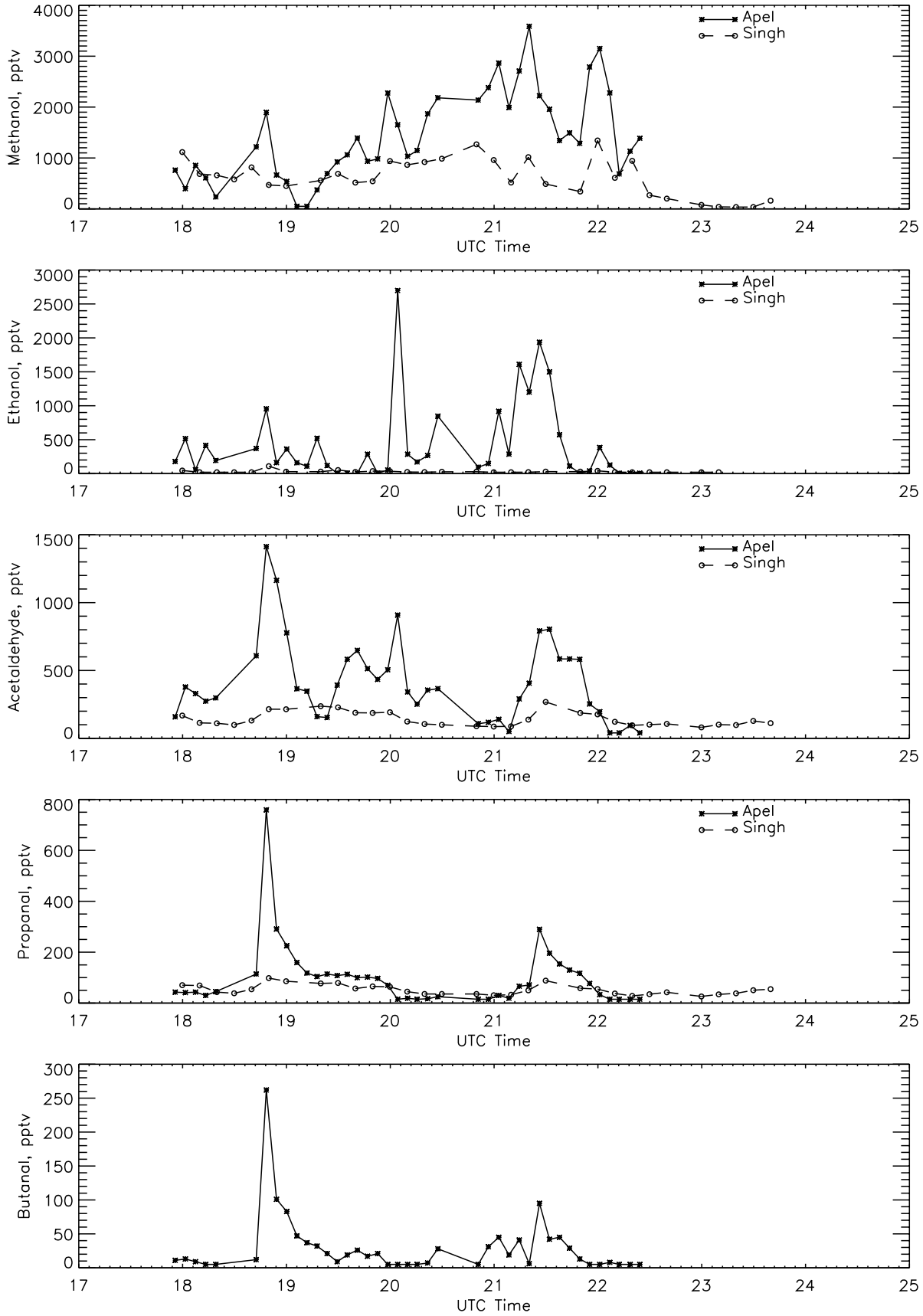

FINAL DATA: TRACE-P DC-8 Flight 20
OH, pptv
HO2, pptv
CH2O, pptv
Fried
Heikes
Hydrogen Peroxide, pptv
Methylhydroperoxide, pptv
UTC Time


FINAL DATA: TRACE-P DC-8 Flight 20
Ethane, pptv
Propane, pptv
Butane, pptv
i-Butane
n-Butane
Pentane, pptv
i-Pentane
n-Pentane
Ethyne, pptv
UTC Time

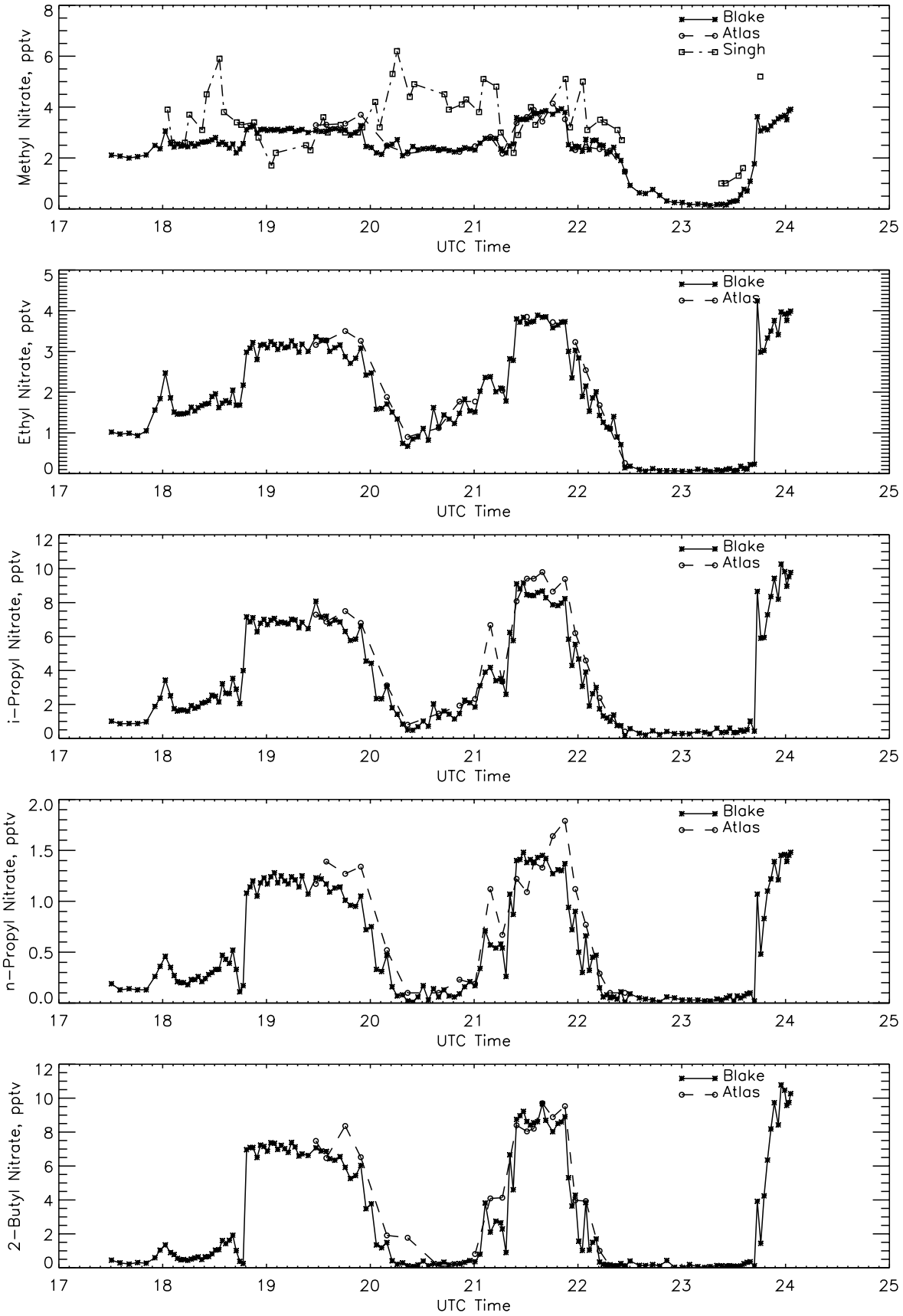

FINAL DATA: TRACE-P DC-8 Flight 20
Ethene, pptv
C3H8/C2H6
C2H4/C2H6
C2H2/CO
C2H6/CO
UTC Time

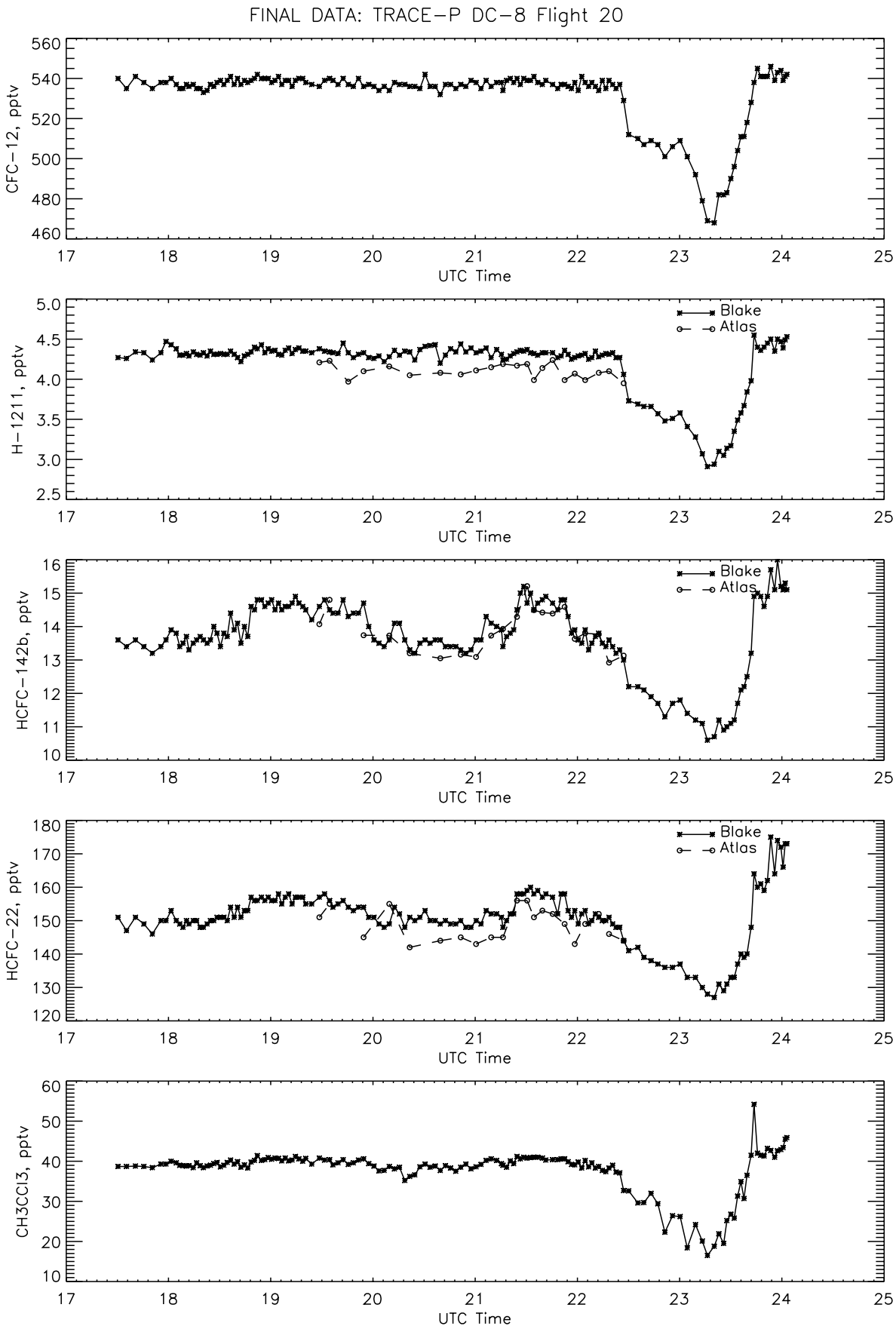

FINAL DATA: TRACE-P DC-8 Flight 20
Benzene, pptv
UTC Time
Perchloroethylene, pptv
Blake
Atlas
UTC Time
1-2-Dichloroethane, pptv
UTC Time
Acetone, pptv
Apel
Singh
UTC Time
Methyl Ethyl Ketone, pptv
Apel
Singh
UTC Time

FINAL DATA: TRACE-P DC-8 Flight 20

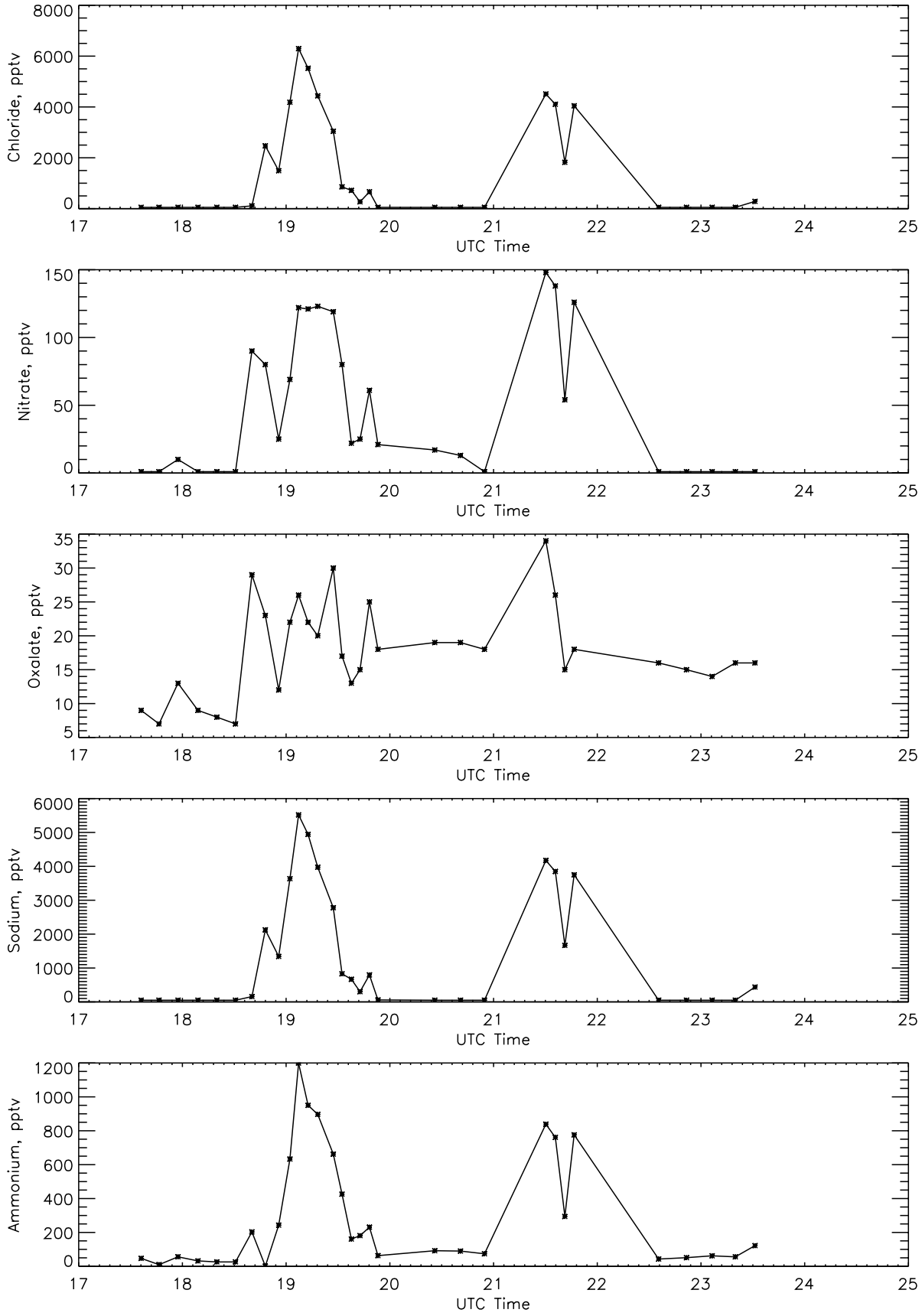


FINAL DATA: TRACE-P DC-8 Flight 20

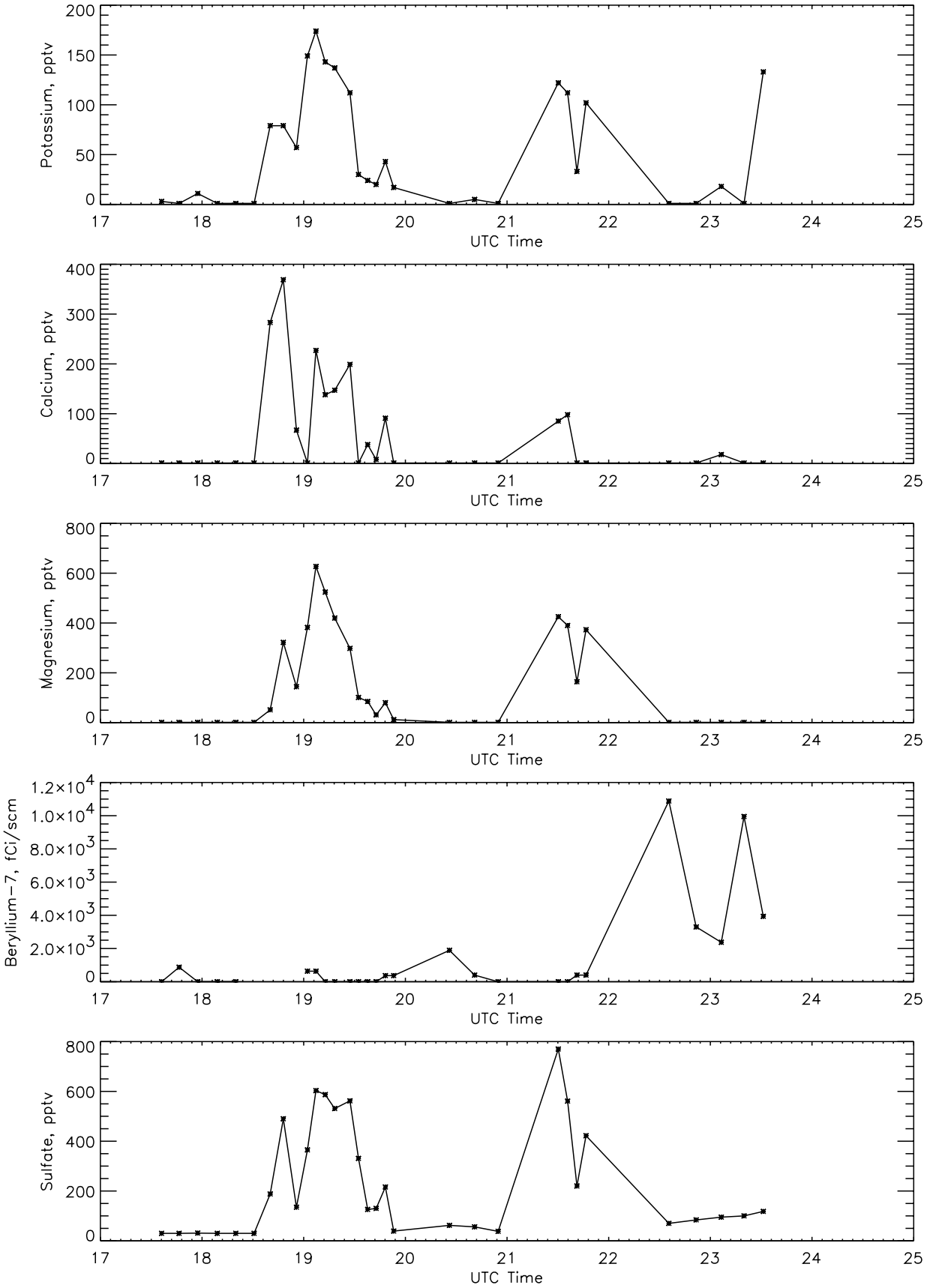



FINAL DATA: TRACE-P DC-8 Flight 20
CFC-12, pptv
H-1211, pptv
HCFC-142b, pptv
HCFC-22, pptv
CH3CCl3, pptv
UTC Time
Blake
Atlas

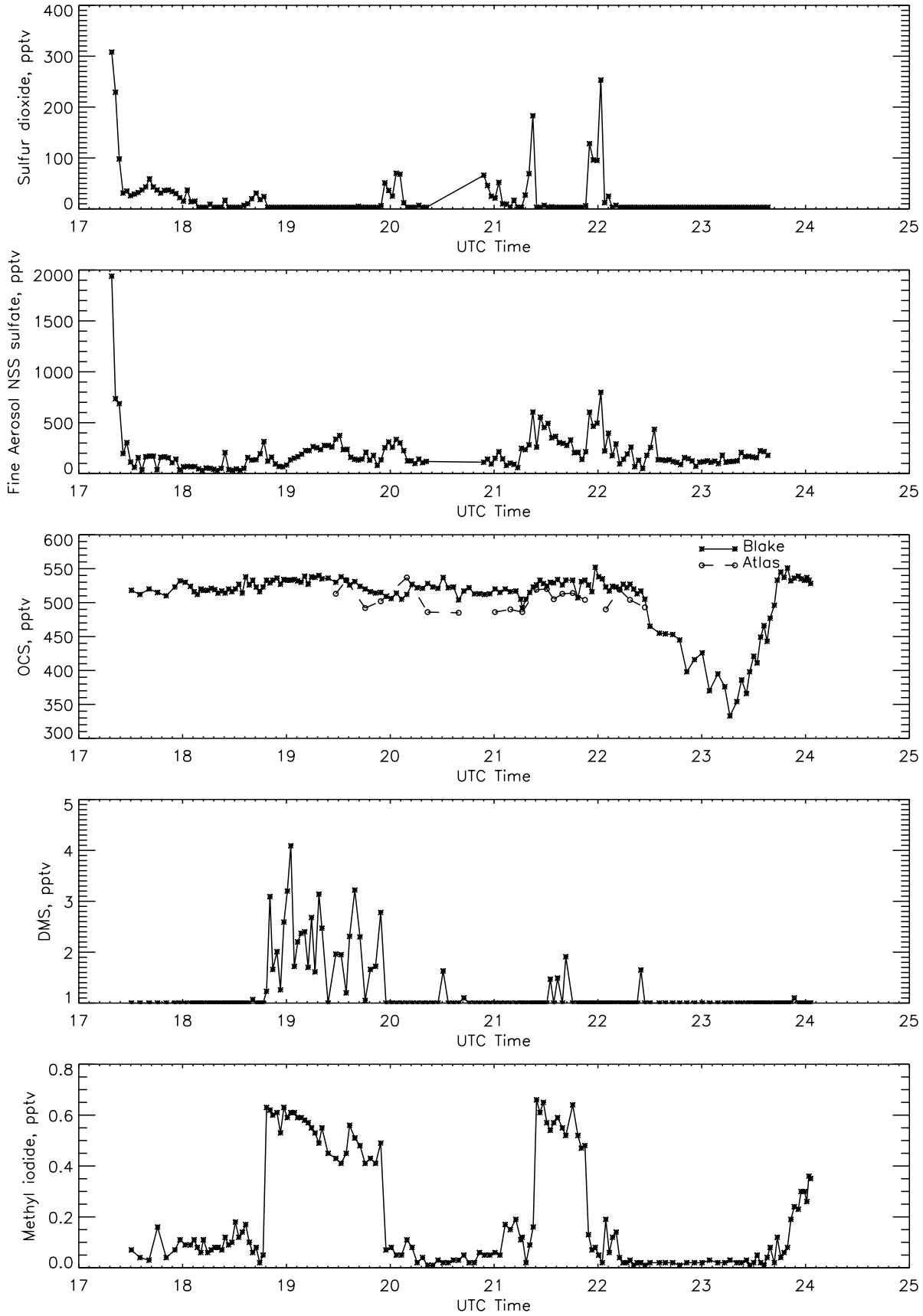
FINAL DATA: TRACE-P DC-8 Flight 20

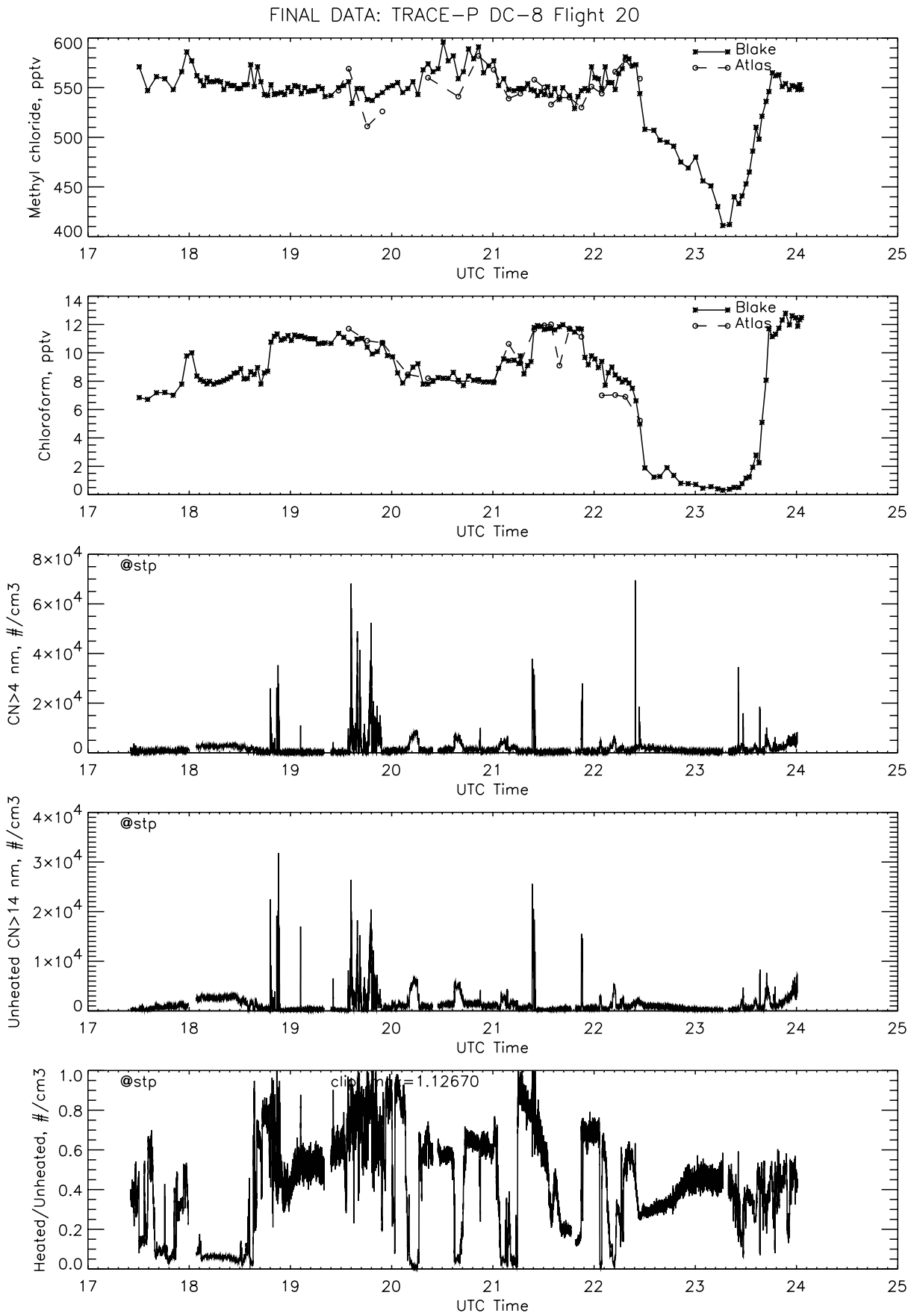


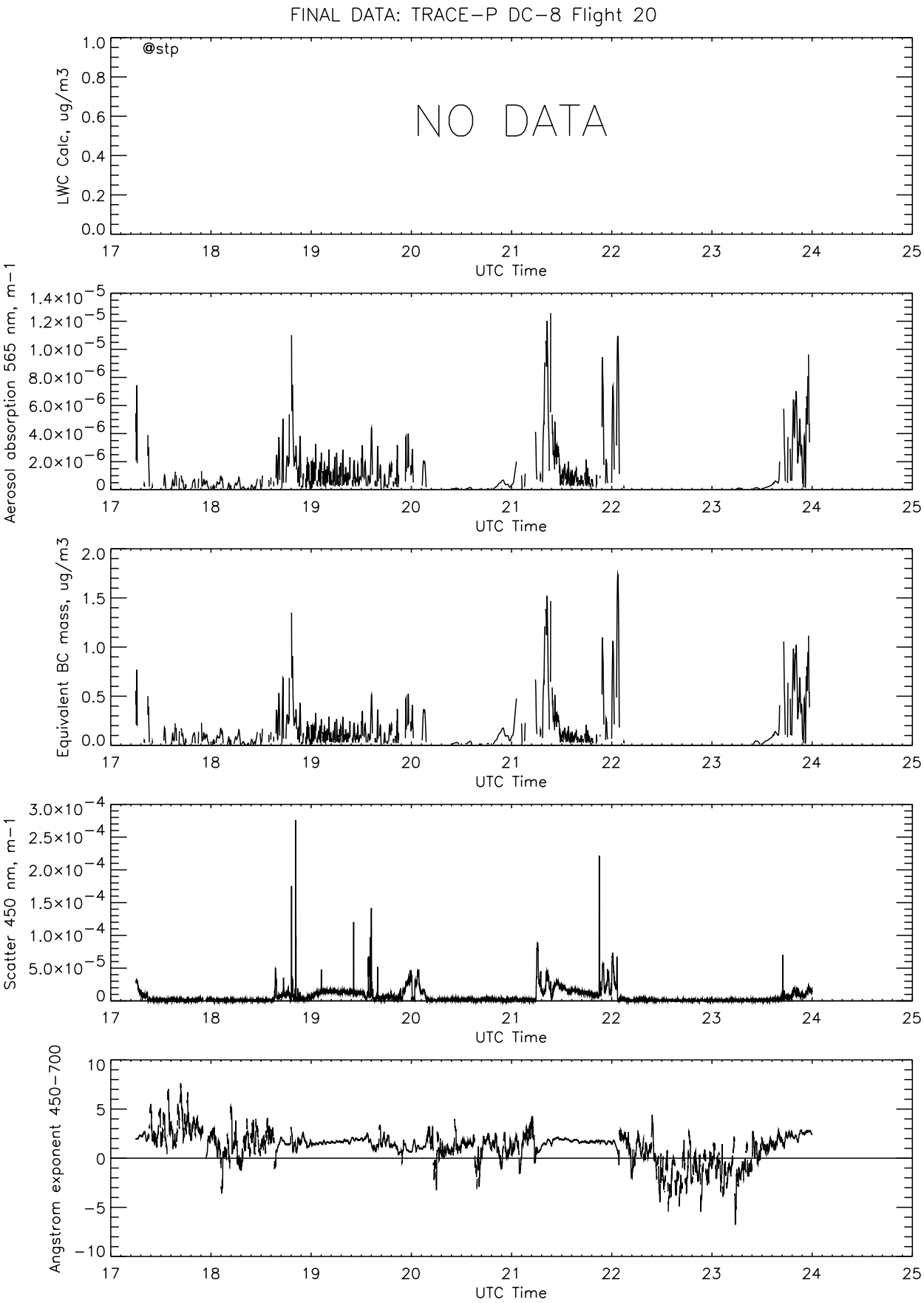
FINAL DATA: TRACE-P DC-8 Flight 20

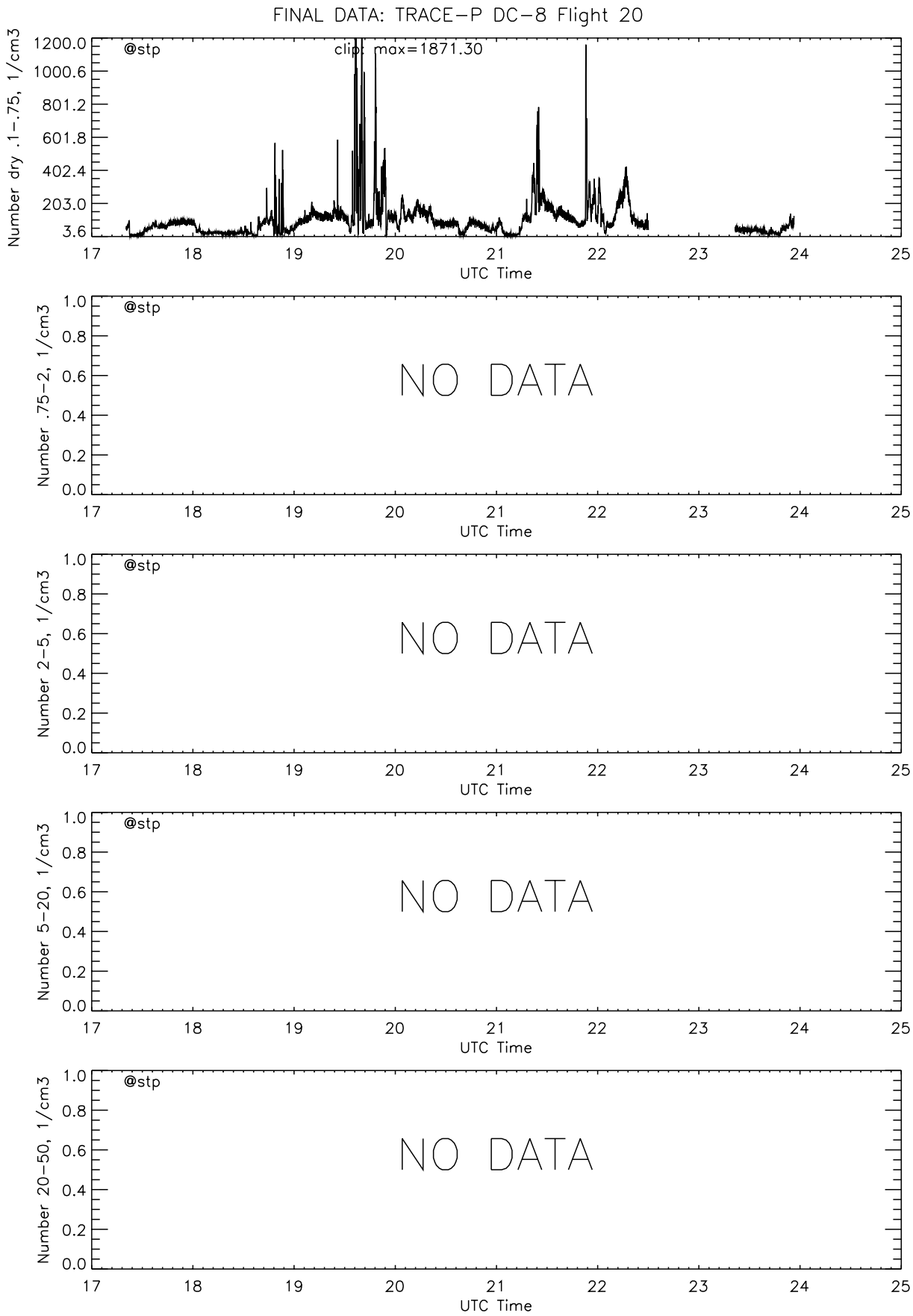


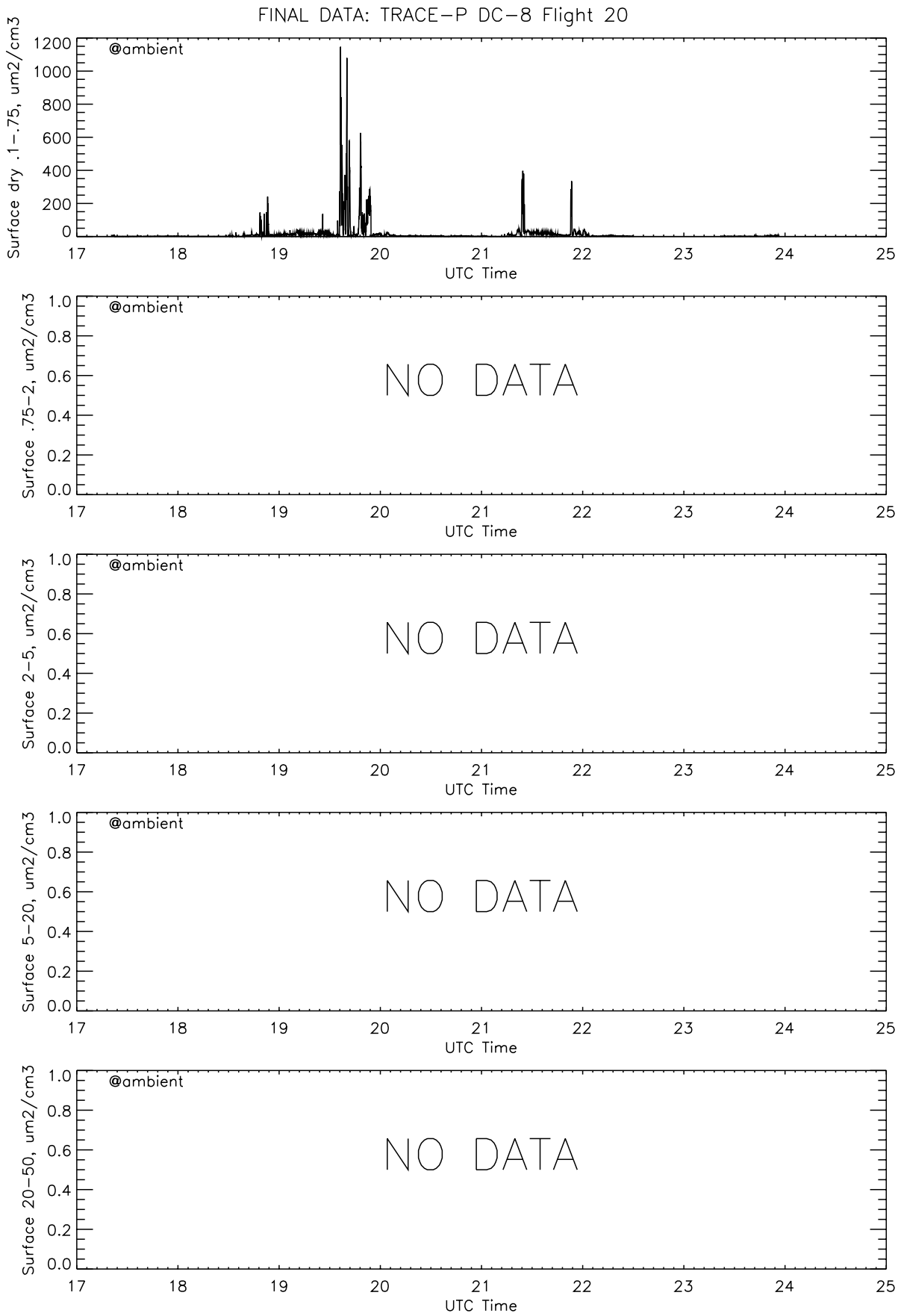
FINAL DATA: TRACE-P DC-8 Flight 20

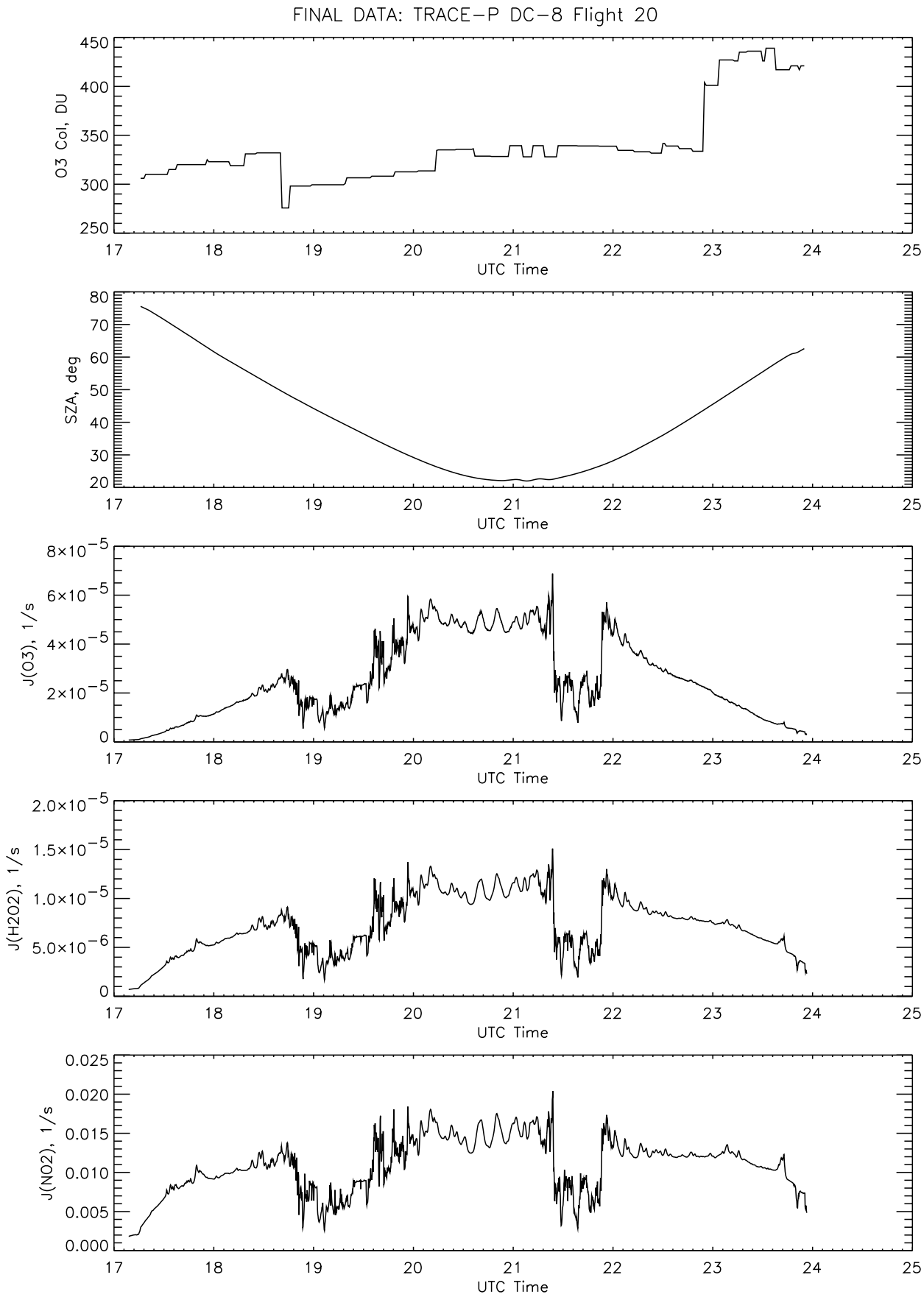


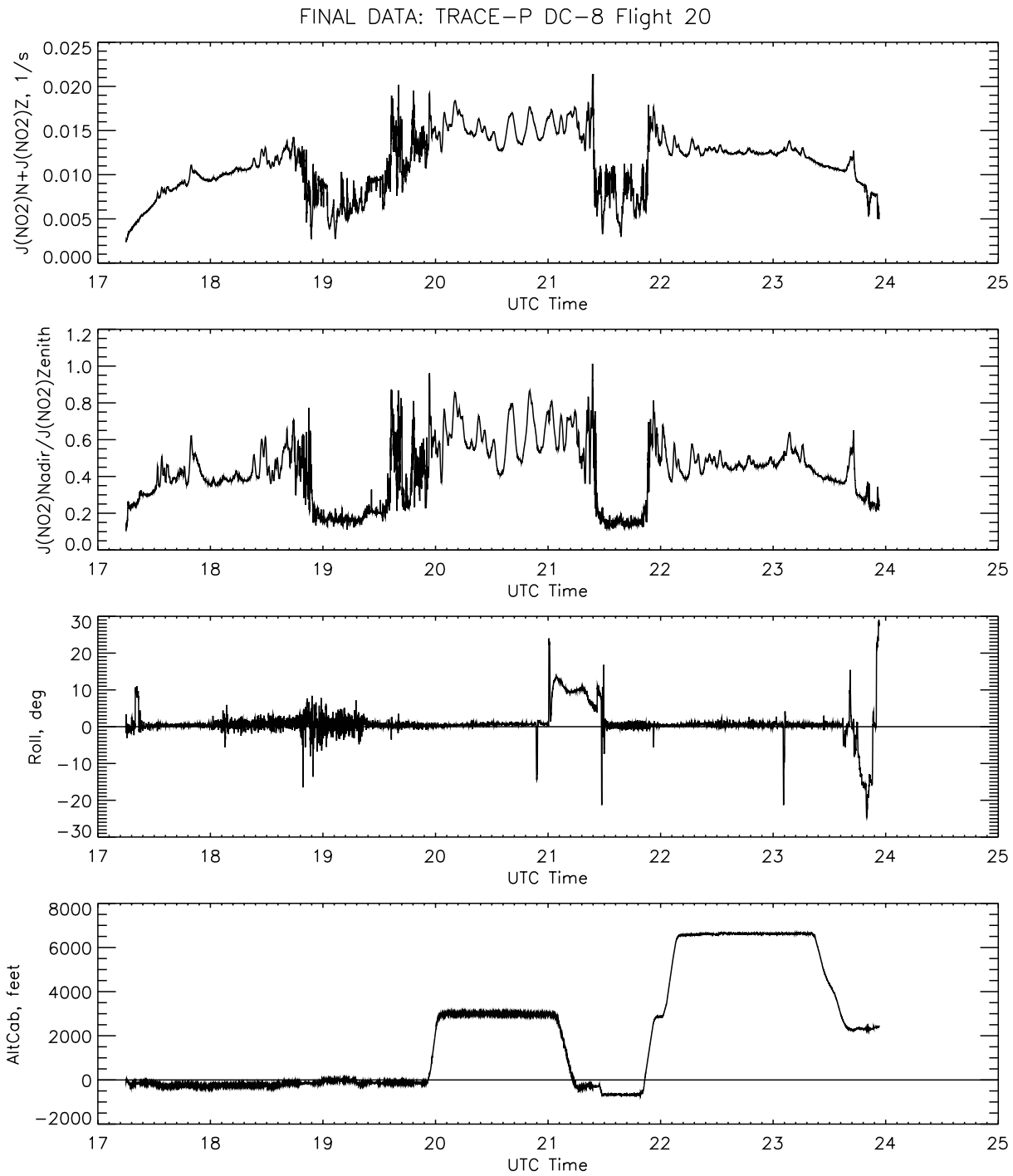

FINAL DATA: TRACE-P DC-8 Flight 20
Methyl chloride, pptv
Blake
Atlas
UTC Time
Chloroform, pptv
Blake
Atlas
UTC Time
CN>4 nm, #/cm3
@stp
UTC Time
Unheated CN>14 nm, #/cm3
@stp
UTC Time
Heated/Unheated, #/cm3
@stp
clip, mean=1.12670
UTC Time

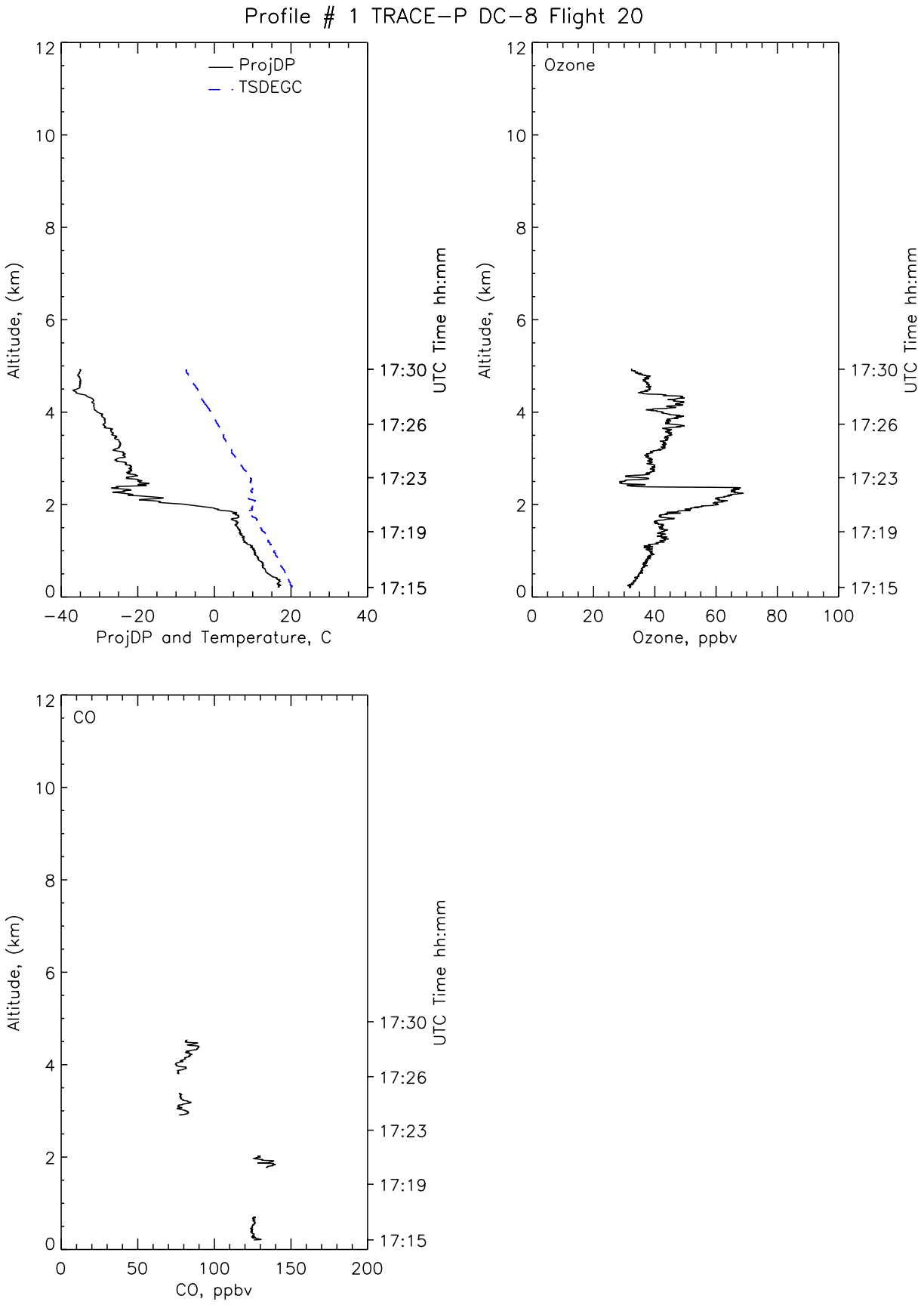

FINAL DATA: TRACE-P DC-8 Flight 20
@stp
NO DATA
LWC Calc, ug/m3
Aerosol absorption 565 nm, m-1
Equivalent BC mass, ug/m3
Scatter 450 nm, m-1
Angstrom exponent 450-700
UTC Time

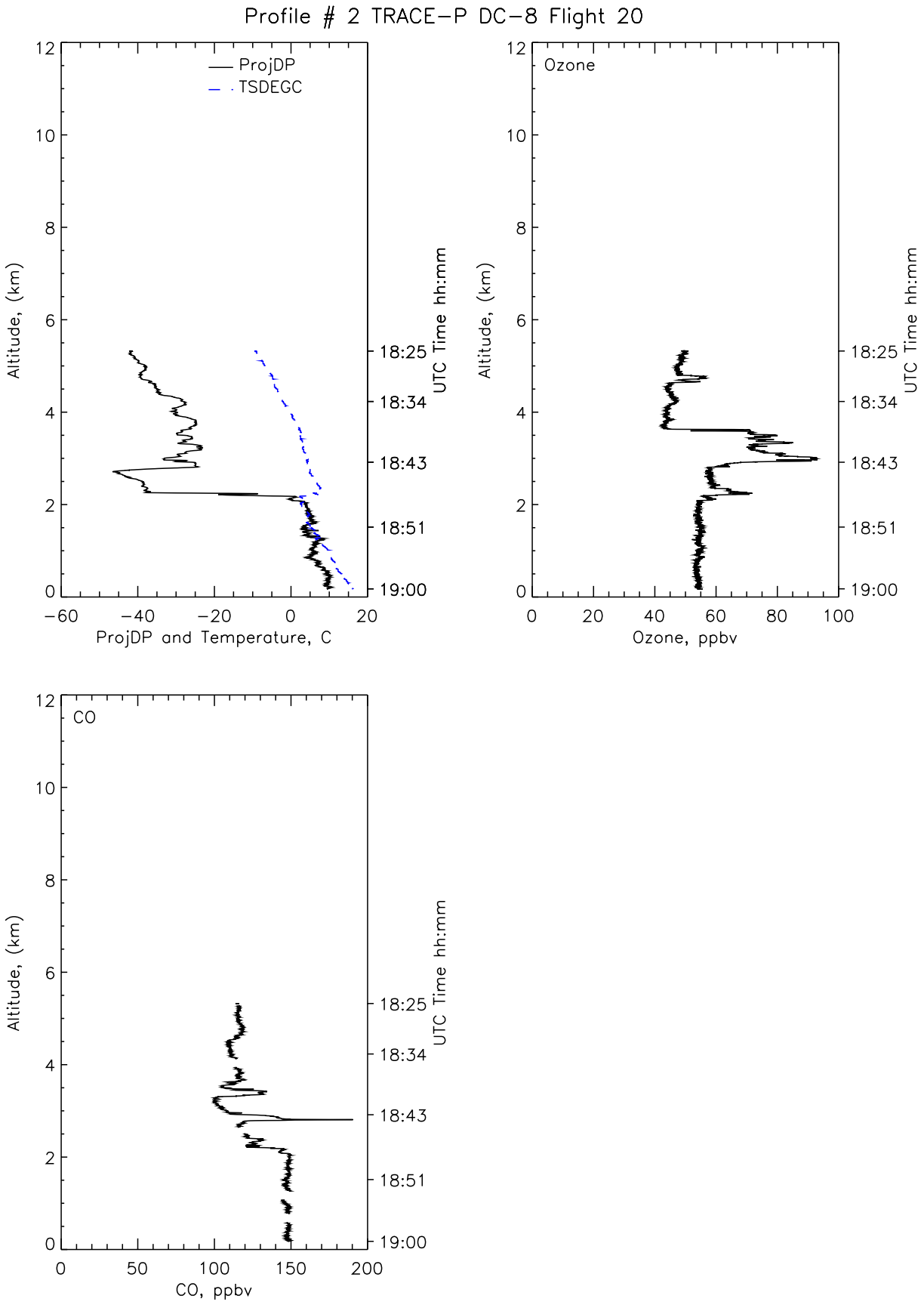

FINAL DATA: TRACE-P DC-8 Flight 20
@stp
clip: max=1871.30
Number dry .1-.75, 1/cm3
1200.0
1000.6
801.2
601.8
402.4
203.0
3.6
17
18
19
20
21
22
23
24
25
UTC Time
Number .75-2, 1/cm3
NO DATA
Number 2-5, 1/cm3
NO DATA
Number 5-20, 1/cm3
NO DATA
Number 20-50, 1/cm3
NO DATA

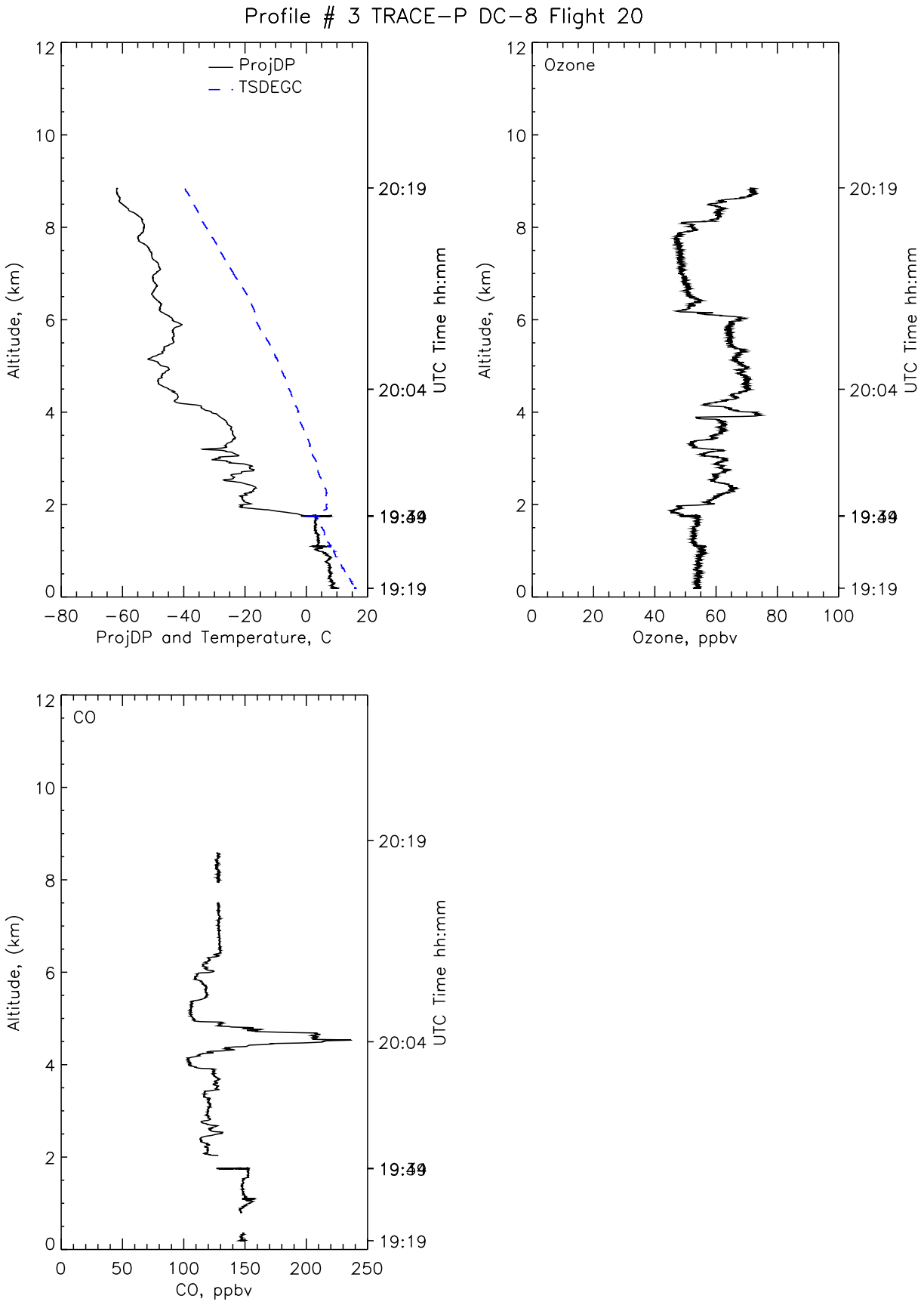

FINAL DATA: TRACE-P DC-8 Flight 20
@ambient
Surface dry .1-.75, um2/cm3
Surface .75-2, um2/cm3
Surface 2-5, um2/cm3
Surface 5-20, um2/cm3
Surface 20-50, um2/cm3
NO DATA
UTC Time

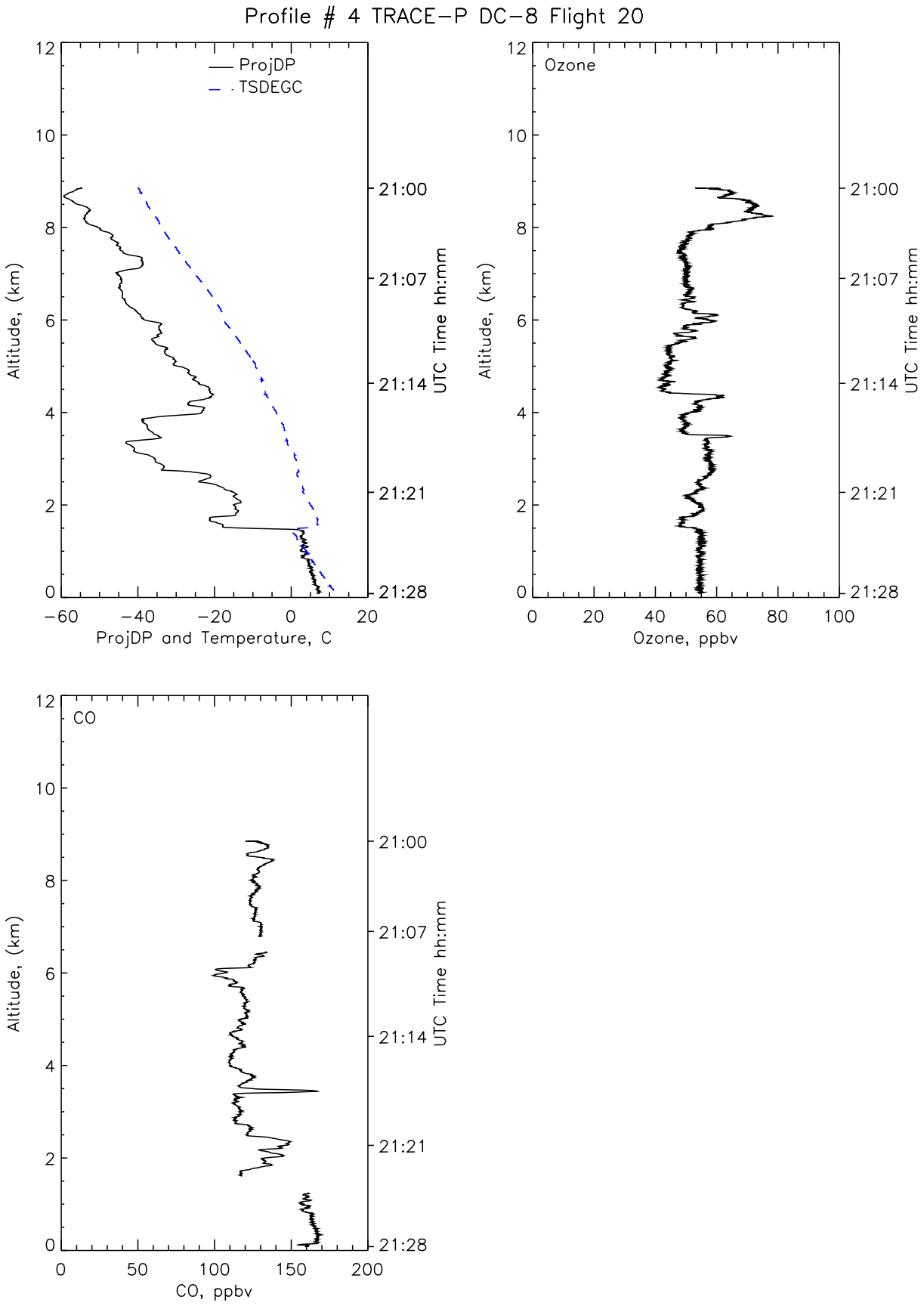

FINAL DATA: TRACE-P DC-8 Flight 20
O3 Col, DU
450
400
350
300
250
17
18
19
20
21
22
23
24
25
UTC Time
SZA, deg
80
70
60
50
40
30
20
UTC Time
J(O3), 1/s
8×10⁻⁵
6×10⁻⁵
4×10⁻⁵
2×10⁻⁵
0
UTC Time
J(H2O2), 1/s
2.0×10⁻⁵
1.5×10⁻⁵
1.0×10⁻⁵
5.0×10⁻⁶
0
UTC Time
J(NO2), 1/s
0.025
0.020
0.015
0.010
0.005
0.000
UTC Time

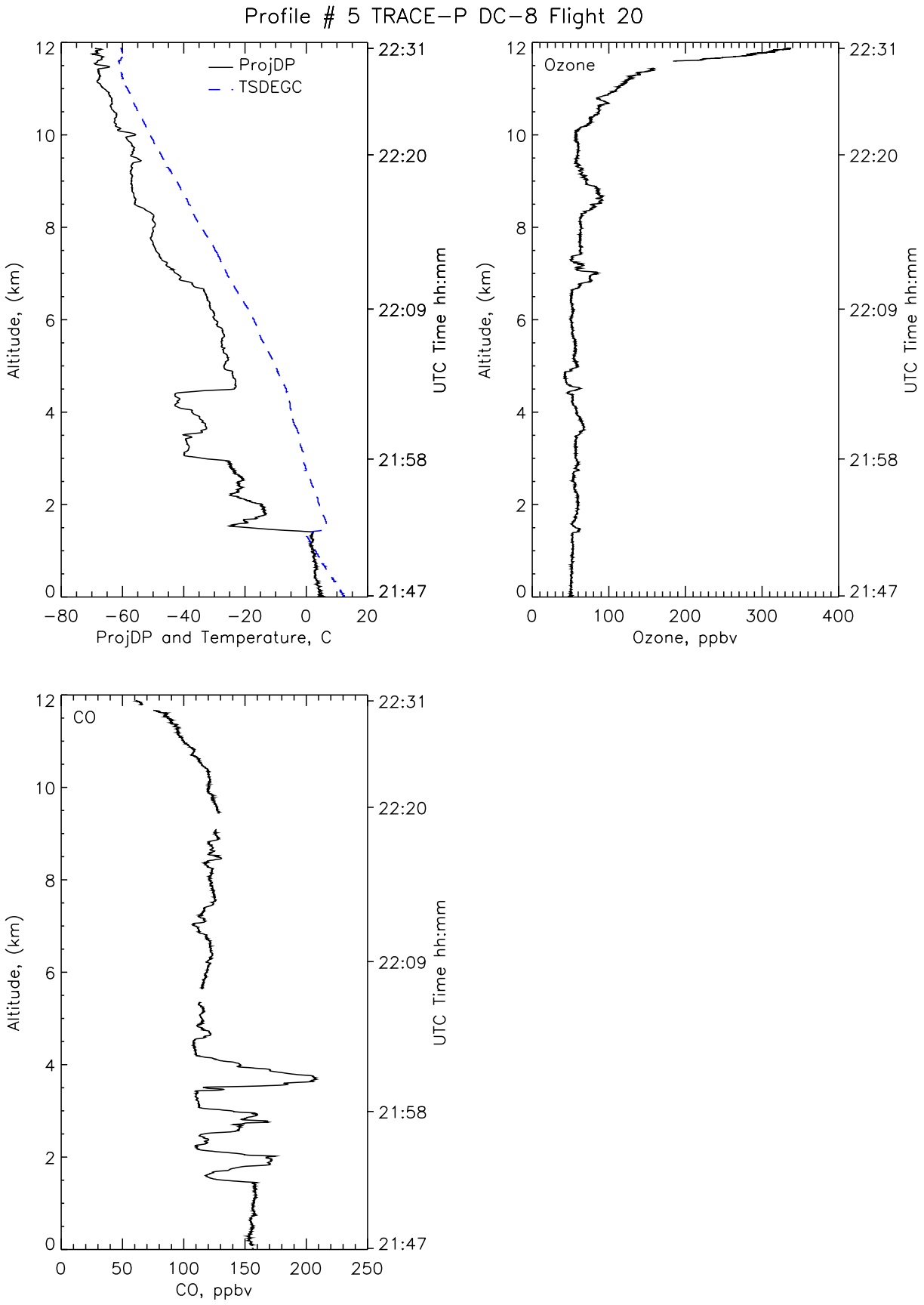

FINAL DATA: TRACE-P DC-8 Flight 20
J(NO2)N+J(NO2)Z, 1/s
0.025
0.020
0.015
0.010
0.005
0.000
17
18
19
20
21
22
23
24
25
UTC Time
J(NO2)Nadir/J(NO2)Zenith
1.2
1.0
0.8
0.6
0.4
0.2
0.0
UTC Time
Roll, deg
30
20
10
0
−10
−20
−30
UTC Time
AltCab, feet
8000
6000
4000
2000
0
−2000
UTC Time

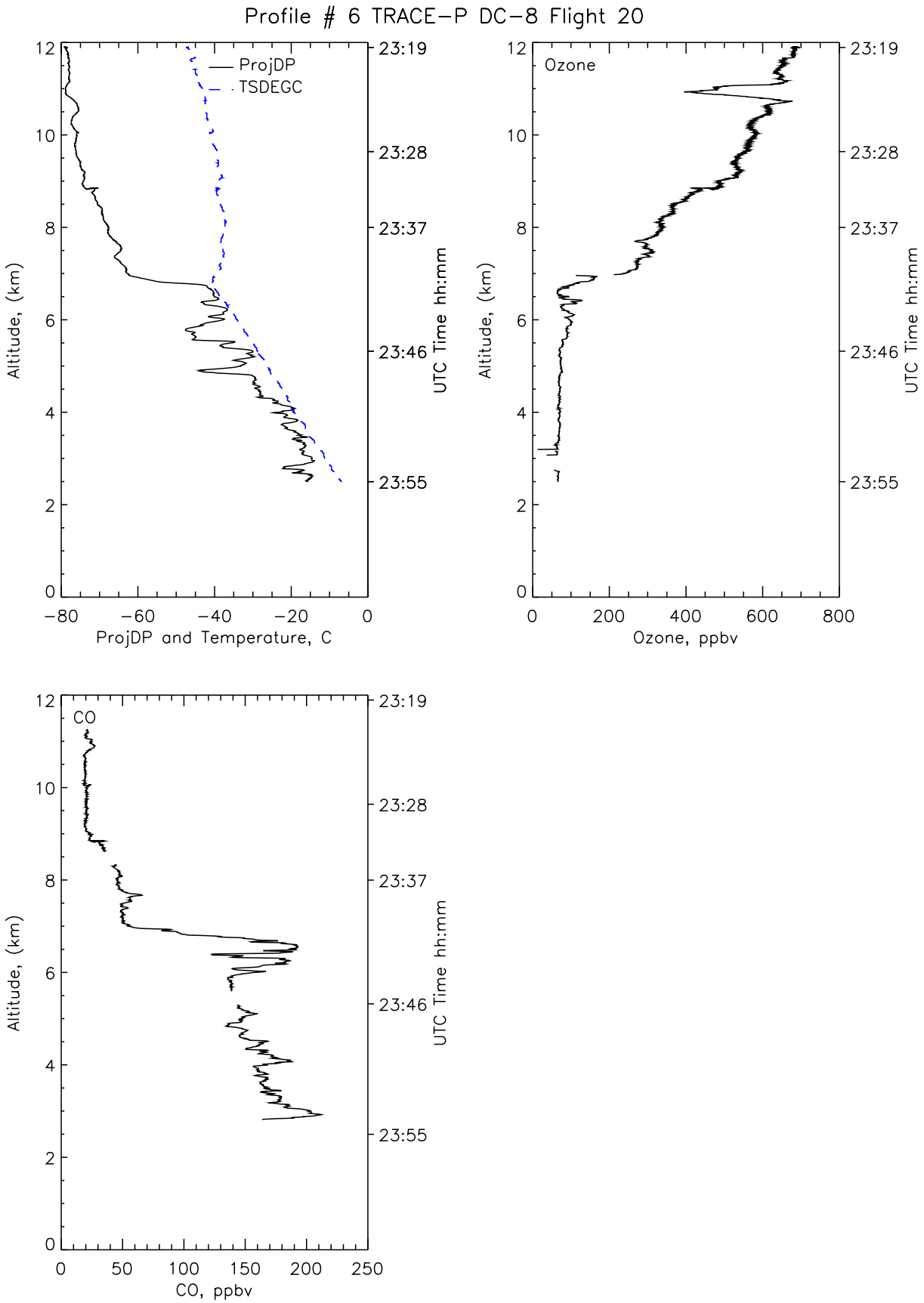

Profile # 1 TRACE-P DC-8 Flight 20
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 2 TRACE-P DC-8 Flight 20
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
18:25
18:34
18:43
18:51
19:00
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 3 TRACE-P DC-8 Flight 20
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
20:19
20:04
19:49
19:34
19:19
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 4 TRACE-P DC-8 Flight 20
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
21:00
21:07
21:14
21:21
21:28
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 5 TRACE-P DC-8 Flight 20
ProjDP
TSDEGC
Altitude, (km)
UTC Time hh:mm
ProjDP and Temperature, C
Ozone
Ozone, ppbv
CO
CO, ppbv


Profile # 6 TRACE-P DC-8 Flight 20
ProjDP
TSDEGC
Altitude, (km)
ProjDP and Temperature, C
UTC Time hh:mm
23:19
23:28
23:37
23:46
23:55
Ozone
Ozone, ppbv
CO
CO, ppbv

APPENDIX B: LANGLEY ASDC DATA ARCHIVE

System Description

The Langley Atmospheric Sciences Data Center (ASDC), located at the NASA Langley Research Center in Hampton, Virginia, is responsible for archiving and distributing NASA science data in the areas of radiation budget, clouds, aerosols, and tropospheric chemistry. This ASDC will also archive some on the data sets, which result from the EOS program and other elements of the Earth Science Enterprise. The ASDC data can be accessed and ordered on line through the website: (http://eosweb.larc.nasa.gov/index.html). Users who cannot access the web or who have any questions concerning the Langley ASDC may contact:

Langley ASDC User and Data Services
Mail Stop 157D
NASA Langley Research Center
Hampton, VA 23681-0001
Phone: (757) 864-8656 (M-F 8amñ4:30pm, Eastern Time)
FAX: (757) 864-8807
Email: larc@eos.nasa.gov

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14. ABSTRACT

This report provides a compendium of NASA aircraft data that are available from NASA's Global Tropospheric Experiment's (GTE) Transport and Chemical Evolution over the Pacific (TRACE-P) Mission. The broad goal of TRACE-P was to characterize the transit and evolution of the Asian outflow over the western Pacific. Conducted from February 24 through April 10, 2001, TRACE-P integrated airborne, satellite- and ground-based observations, as well as forecasts from aerosol and chemistry models. The format of this compendium utilizes data plots (time series) of selected data acquired aboard the NASA/Dryden DC-8 (vol. 1) and NASA/Wallops P-3B (vol. 2) aircraft during TRACE-P. The purpose of this document is to provide a representation of aircraft data that are available in archived format via NASA Langley's Distributed Active Archive Center (DAAC) and through the GTE Project Office archive. The data format is not intended to support original research/analyses, but to assist the reader in identifying data that are of interest.

15. SUBJECT TERMS
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