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Tracking Aerosol Convection Interactions Experiment (TRACER) Field Campaign Report

M Jensen

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Acronyms and Abbreviations

ACPC	Aerosol, Cloud, Precipitation and Climate Initiative
ACSM	aerosol chemical speciation monitor
AMF	ARM Mobile Facility
ANC	ancillary site
ANL	Argonne National Laboratory
AOS	Aerosol Observing System
APS	aerodynamic particle sizer
AQ	Air Quality
ARM	Atmospheric Radiation Measurement
ARSCL	Active Remote Sensing of Clouds VAP
ASR	Atmospheric System Research
BNL	Brookhaven National Laboratory
BU	Baylor University
CAT	Carbonaceous Aerosol Thrust
CCN	cloud condensation nuclei
CHIVO	C-band Hydrological Instrument for Volumetric Observation
CMACI	Chemical Markers of Aerosol Cloud Interactions
CPC	condensation particle counter
CPM	convection-permitting model
CSAPR	C-band Scanning ARM Precipitation Radar
CSU	Colorado State University
CUBE	Convective-Cloud Urban Boundary Layer Experiment
CUBIC	Coastal Urban Boundary Layer Interactions with Convection
DOE	U.S. Department of Energy
ESCAPE	Experiment of Sea Breeze Convection, Aerosols, Precipitation, and Environment
FAA	Federal Aviation Administration
GSFC	Goddard Space Flight Center
IGBP	International Geosphere-Biosphere Programme
IOP	intensive operational period
IR	infrared
KaSACR	Ka-band Scanning ARM Cloud Radar
KAZR	Ka-band ARM Zenith-pointing Radar
LANL	Los Alamos National Laboratory
LES	large-eddy simulation
LMA	Lightning Mapping Array

LT	local time
MAAS	Multisensor Agile Adaptive Sampling
MAP	Mapping Aerosol Across Houston
MIP	model intercomparison project
MPL	micropulse lidar
NASA	National Aeronautics and Space Administration
NEXRAD	Next-Generation Weather Radar
NSF	National Science Foundation
NSSL	National Severe Storms Laboratory
NWP	numerical weather prediction
PBAP	Primary Biological Aerosol Particle
POPS	portable optical particle spectrometer
PPI	plan position indicator
RAVEN	Repositionable Aerial Vane Environmental Network
RHI	range height indicator
SACR	Scanning ARM Cloud Radar
SBU	Stony Brook University
SMPS	scanning mobility particle sizer
SOM	self-organizing map
SP2	single-particle soot photometer
TAMU	Texas A&M University
TAQ	Texas Air Quality
TBS	tethered balloon system
TCEQ	Texas Commission on Environmental Quality
TOLNET	Tropospheric Ozone Lidar Network
TRACER	Tracking Aerosol Convection Interactions Experiment
UAS	Uncrewed Aerial System
UC	University of California
UFI	Ultrafine Aerosol Formation and Impacts
UHI	urban heat island
UO	University of Oklahoma
UTC	Coordinated Universal Time
UV	ultraviolet
VAP	value-added product
VOC	volatile organic compound
WCRP	World Climate Research Program
XSACR	X-band Scanning ARM Cloud Radar

Contents

Figures

Tables

1.0 Summary

Convective clouds serve a critical role in the Earth's energy and water cycles through their transport of heat, moisture, momentum, and chemical species through the troposphere driving the global circulation (e.g., Hartmann et al. 1984, Del Genio et al. 2012, Su et al. 2014). On more local scales, convective clouds impact the atmospheric heating profile through diabatic heating effects, removal of water from the atmospheric column through precipitation, and conditioning of the local environment impacting further development of clouds (e.g., Sullivan and Voigt 2021). These critical roles underscore the importance of realistic representation of convective processes across scales of models from large-eddy simulation (LES), to convection-permitting models (CPM; e.g., Kendon et al. 2020, Marinescu et al. 2021), to numerical weather prediction (NWP) models used for operational weather forecasting, to Earth system models used to predict climate sensitivity (Sanderson et al. 2011, Sherwood et al. 2014, Tomassini et al. 2014, Zhao et al. 2016, Cronin et al. 2017). A key component of improving model representation of convective clouds is better quantification and parameterization of updraft microphysics and dynamics, including their interactions with the surrounding environment and storm organization (Bony et al. 2015, Hagos and Houze 2016, Donner et al. 2016, Morrison et al. 2020).

Aerosol is an important environmental factor that could affect convective clouds and precipitation since cloud droplet and ice formation processes are initiated by it. Andrae et al. (2004) hypothesized that aerosols associated with increased biomass burning particles acting as cloud condensation nuclei (CCN) result in smaller and more monodisperse cloud droplets leading to suppression of warm rain formation, ultimately leading to more cloud water being lofted above the freezing level based on observations in the Amazon region. The subsequent increase in latent heat release increases the buoyancy of rising convective parcels invigorating the deep convection. This work was followed by a description of the theoretical basis for this "cold-phase invigoration" by Rosenfeld et al. (2008), who argued that it could have a significant effect for deep convective clouds with warm cloud-bases. Several modeling studies (e.g., Khain et al. 2005, 2009, van den Heever et al. 2006, Fan et al. 2007, 2009, 2012, Lee et al. 2008, Storer et al. 2010, Lebo et al. 2012, Storer and van den Heever 2013, Chen et al. 2020, Dagan et al. 2022) have investigated these aerosol-convection interactions and the environmental factors that influence their relative importance and magnitude. More recently, several studies have indicated that "warm-phase invigoration", the enhancement of convection through condensational heating, also appears to play a role in enhancing both shallow cumuli (Seiki and Nakajima 2014, Saleeby et al 2015) and deeper tropical convection (Lebo and Seinfeld 2011, Khain et al. 2012, Sheffield et al 2015, Fan et al. 2018, Igel and van den Heever 2021), as well as Houston thunderstorms (Fan et al. 2007, 2020). However, still other studies have provided additional evidence of systematic biases in simulated convective outflow ice size distribution properties, which are consistent with a lack of poorly understood secondary ice production within convective updrafts (e.g., Fridlind et al. 2017).

The significance of these proposed mechanisms is under debate as some modeling studies showed limited aerosol effects on convection (e.g., Grabowski and Morrison 2016, 2020, Lebo 2018, Igel and van den Heever 2021). It is known that aerosol effects on convective clouds depend on meteorological conditions. Also, model uncertainties are large (Marinescu et al. 2021) and different microphysics and aerosol treatments could contribute to the differences as summarized in Fan and Li (2022). Current understanding of the significance of fundamental interactive processes between aerosols, cloud dynamics, and microphysics remains limited. All of these require comprehensive observations to

confidently isolate and quantify aerosol effects over a range of thermodynamic and kinematic environments. A few observation-based studies have suggested an influence of aerosols on convective cloud and precipitation properties (e.g., May et al. 2011, Braga et al. 2017, Seela et al. 2017). However, robust observational quantification of an aerosol effect on convective clouds isolated from other factors often remains uncertain (e.g., Varble 2018). In part, the uncertainty in aerosol-convection interactions is due to an incomplete understanding of the underlying convective dynamical and microphysical processes as well as feedbacks among these components. Furthermore, predictions of increasing deep convective extreme precipitation and severe weather in a warming climate suggest significant vulnerabilities of life and property, highlighting the critical importance of improving deep convection representation in numerical weather prediction models for resiliency planning (e.g., Trapp et al. 2009, Diffenbaugh et al. 2013, Sillman et al. 2013, Seely and Romps 2015).

The sea-breeze circulation over the Houston region plays a key role not only in convection and precipitation, but also in local air quality (Fan et al. 2007, Banta et al. 2005, Caicedo et al. 2019). The strength and inland propagation of sea-breeze circulation can be influenced by land-sea surface temperature contrast, land use/land cover, and the synoptic flow (e.g., Angevine et al. 2006, Bao et al. 2005, Chen et al. 2011). The Houston urban heat island effect (UHI) may enhance the sea-breeze circulation and lead to faster evolution of shallow warm clouds into the mixed-phase regime as shown in Fan et al. (2020). However, aerosol direct effects from anthropogenic pollution may reduce the temperature contrast between land and ocean thus weaken the sea breeze circulation (Shen et al. 2019).

To help address these critical gaps in our understanding of cloud processes, aerosol processes and aerosol-cloud interactions, the Tracking Aerosol Convection Interactions Experiment was designed building upon efforts by the Aerosol, Cloud, Precipitation and Climate (ACPC) Initiative (http://acpcintiative.org/), a joint effort of the International Geosphere-Biosphere Programme (IGBP) and the World Climate Research Program (WCRP) that focused on resolving uncertainties in the interactions between aerosol and clouds towards better understanding the role that these interactions play in the climate system. The TRACER campaign was motivated by recommendations from a number of pilot studies undertaken by ACPC (van den Heever et al. 2017, Fridlind et al. 2019, Hu et al. 2019, Fan et al. 2020, Marinescu et al. 2021, Hernandez-Deckers et al. 2022) that pointed towards the southeastern Texas region as a locale where aerosol-convection interactions could be studied owing to the copious occurrence of isolated convection during the summer months accompanied by diverse and significant sources of aerosols from both anthropogenic and natural sources. The TRACER campaign began on 01 October 2021 and extended through 30 September 2022 with an intensive operational period (IOP) during June-September 2022. Three main sites (Table 1) were managed by the U.S. Department of Energy (DOE) Atmospheric Radiation Measurement (ARM) user facility.

Table 1. Main ARM sites during the TRACER campaign.

Designation	Site name	Latitude/longitude	Dates	Assets
M1	La Porte, Texas	29º 40’ 12’’ N 95º 3’ 32.4’’ W	01 October 2021- 30 September 2022	First ARM Mobile Facility (AMF1), guest instrumentation

Designation	Site name	Latitude/longitude	Dates	Assets
S2	Pearland, Texas	29° 31’ 55.2’’ N 95° 17’ 2.4’’ W	01 October 2021-30 September 2022	C-band Scanning ARM Precipitation Radar (CSAPR), guest instrumentation
S3	Guy, Texas	29° 19’ 40.8’’ N 95° 44’ 27.6’’ W	01 June 2021-30 September 2022	Ancillary instrumentation, guest instrumentation, tethered balloon system (TBS)

The M1 site at La Porte, Texas was selected to represent a highly polluted location that was significantly impacted by anthropogenic aerosol sources from industry, transportation, shipping, and other urban sources. The S3 ancillary (ANC) site at Guy, Texas was selected to represent a rural background state with less influence from urban aerosol sources. The S2 site at Pearland, Texas, the site for the CSAPR, was selected to enable sampling over both the M1 and S3 sites with good sampling near the climatological summertime environmental 0°C level. In addition, the three sites are similar distances from the Gulf Coast (Figure 1) such that they experience similar impacts from the sea breeze circulation.

In addition to the baseline TRACER campaign assets, several smaller related campaigns were added through the deployment of guest instrumentation. These related campaigns (Table 2) helped to fill observational gaps, particularly in the regional and vertical variability of important aerosol and meteorological quantities and expanded the scientific scope of the campaign with increased emphasis on topics including aerosol life cycle, air quality, urban meteorology, and sea breeze interactions, and increased the number and diversity of scientists and students involved in the larger campaign.

Table 2. Related DOE campaigns during TRACER.

TRACER sub-campaign	Principal investigator or campaign report
TRACER Ultrafine Aerosol Formation and Impacts (UFI)	Smith, J. et al. (2023)
Hygroscopicity and CCN Activity during TRACER (TRACER-CCN)	Wang, J. et al. (2023)
Speciated VOCs at TRACER	C. Kuang
TRACER-SONDE: O3 as a TRACER for Convective Mixing	Walter et al. (2023)
TRACER Carbonaceous Aerosol Thrust (CAT) – UC Davis	C. Cappa
TRACER Carbonaceous Aerosol Thrust (CAT)-LANL	Aiken et al. (2023)
TRACER MAP: Mapping Aerosol Across Houston	Sheesley et al. (2023)
ESCAPE C-band Radar Deployment	P. Kollias

TRACER sub-campaign	Principal investigator or campaign report
TRACER Aerosol Characterization Experiment	C Kuang
TRACER Filter Correction	Chakrabarty, RK, et al. (2023)
TRACER Vertically-resolved New particle formation And Transport Study	C Kuang
Geocarb EM27/Sun TRACER Campaign	S Crowell
Characterizing Primary Biological Aerosol Particle (PBAP)	A Steiner
Enhancements to Houston Lightning Mapping Array (LMA) for TRACER	van Lier-Walqui, M et al. (2023)
Vertical Profile of Aerosol in Convective System	S China
Chemical Markers of Aerosol Cloud Interactions (CMACI)	A Goldstein
TAMU Mobile Facility Measurements during TRACER	Rapp, A et al. (2023)
TRACER-ISO	J Galewsky
Particle Flux Measurements during TRACER	Petters, M et al. (2023)
Ice Nucleation Measurements during TRACER	Brooks, S et al. (2023)
TRACER-Coastal Urban Boundary Layer Interactions with Convection (CUBIC)	Klein, P et al. (2023)
TRACER Black and Brown Carbon – SP2	R Sheesley
Stereo Camera Deployment in Support of TRACER	Giangrande, SE et al. (2023)
TRACER – Uncrewed Aircraft System (TRACER-UAS)	de Boer, G et al. (2023)
TRACER – NASA GSFC TOLNET	J Sullivan
TRACER – Tethersonde Ozone	Walter, P et al. (2023)
TRACER-Soil Moisture (Guy, Texas)	M Young
TRACER-Repositionable Aerial Vane Environmental Network RAVEN	J Jacob
Real-Time, Simultaneous Soil Water Content and Meteorological Data Measurement to Support TRACER over Harris County, Texas (TRACER-SOIL MOISTURE)	Young, M et al. (2023)

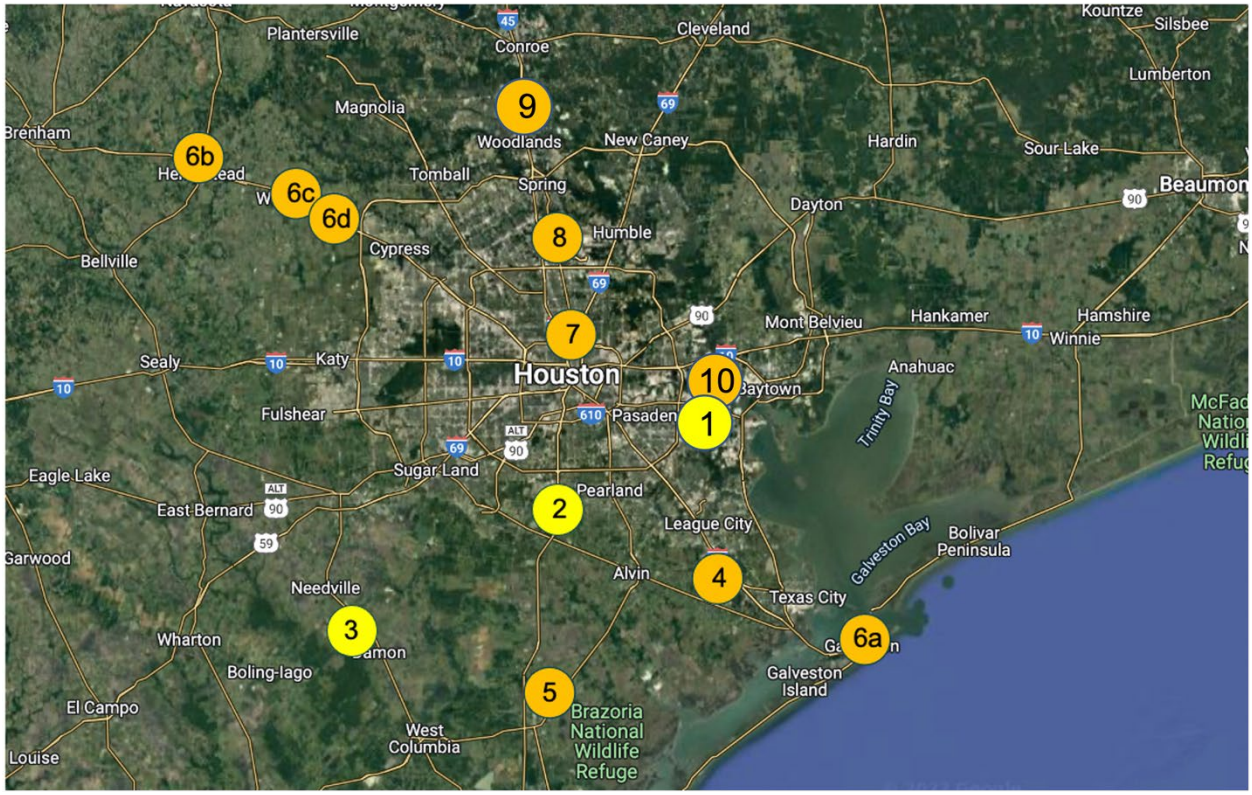

Figure 1. TRACER siting: (1) AMF1 – La Porte, (2) CSAPR site – Pearland, (3) Ancillary Site – Guy (4) University of Houston (UH) Coastal Center (UAV, CUBIC), (5) Lemon Reservoir (UAV), (6a) Seawolf Park (TAMU), (6b) Hempstead (TAMU), (6c) Waller (TAMU), (6d) Hockley (TAMU), (7) UH Moody Tower and Launch Trailer (MAP), (8) Aldine (CUBIC, MAP), (9) Jones Forest (MAP), (10) Battleground (MAP).

1.1 Related Multi-Agency Campaigns

In addition to the TRACER campaign, several complementary interagency field campaign efforts helped to fill measurement gaps, provide redundancy in observations, and expand the scientific goals of the coordinated efforts. The result was a large, multi-agency series of campaigns (Jensen et al. 2022) aimed at solving important questions related to cloud and aerosol processes and air quality in the coastal urban environment represented by southeastern Texas. The schedule of these campaigns, showing the overlaps in their timelines, are summarized in Figure 2. Collectively referred to as TRACER+, these interagency campaigns included:

1.1.1 TRACER–Air Quality (TAQ)

TAQ (Judd et al. 2021), sponsored by NASA's Tropospheric Composition Research and Health and Applied Sciences Programs and the Texas Commission on Environmental Quality (TCEQ), took place during September 2021. The focus of the TAQ campaign was the investigation of Houston air quality using a combination of ground-based supersites, mobile laboratories, and shipborne measurements with coincident overflights from the NASA Johnson Space Center Gulfstream V aircraft. The three main objectives of the TAQ campaign were: (1) study of the details on the interactions among ozone

photochemistry and local meteorology, (2) evaluation and development of chemical transport models and satellite retrievals, and (3) study at the intersection of air quality and socioeconomic factors.

1.1.2 Experiment of Sea Breeze Convection, Aerosols, Precipitation and Environment (ESCAPE)

This campaign was sponsored by the National Science Foundation's (NSF) Physical and Dynamic Meteorology Program. Airborne campaign: 30 May-17 June, Surface observatories 30 May-27 June, C-band radar 1 August-30 September. The scientific foci of the ESCAPE campaign included: (1) investigation of the control of meteorology, dynamics, and mixing on aerosol indirect effects on the early growth stage of convective clouds, (2) determination of how mature convective updraft microphysical and kinematic properties relate to those earlier in the cloud life cycle, its initiation mechanism and environmental heterogeneities, (3) characterization of how lightning flash characteristics depend on the modification of the supercooled liquid water content, scale, and volume of the mixed-phase updraft, as well as hydrometeor properties, (4) quantification of the environmental thermodynamic and kinematic controls on convective life cycle properties under different aerosol conditions, (5) characterization of coastal convection initiation and (6) quantification of how cold-pool properties and lifetimes vary as a function of precipitation amounts and precipitation size distributions, and how are these relationships modulated by the relative humidity, aerosol number concentration, and land-surface types.

1.1.3 Convective-Cloud Urban Boundary Layer Experiment (CUBE)

CUBE was sponsored by the NSF Physical and Dynamic Meteorology Program and took place during June-September 2022, aligned with the TRACER IOP. The deployment included flux towers at four sites along the coastal-urban-rural gradient combined with radiosonde profiles at opportune times. Focused on investigations of: (1) urban influences on convective storm initiation and intensification, (2) urban heat island impacts on storm movement and dynamics, and (3) convective cloud influences on urban energy balances.

1.1.4 TAQ2

TAQ2,sponsored by TCEQ, followed on the TAQ campaign and collected additional air-quality observations from similar ground-based observational platforms (fixed supersites, mobile laboratories, and shipborne) during August-September 2022.

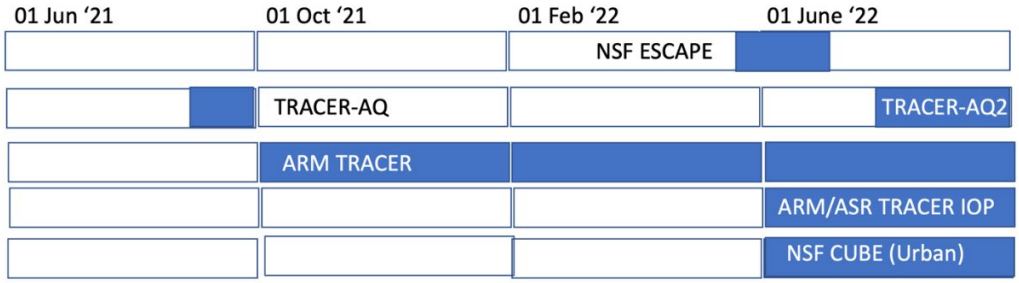

Figure 2. Schedule of TRACER+ interagency field campaigns.

1.2 TRACER Main Campaign

The campaign planning stages were challenged by the COVID pandemic. The original planned dates of the campaign were 15 April 2021 through 15 April 2022 with an intensive operational period from June through September 2021. After initial siting visits in January 2020, the COVID pandemic began shutting down businesses, workplaces, and travel in March of 2020. Further siting decisions had to be made without visiting the locations, particularly the C-SAPR site and the ancillary site, using Google Earth, and local contacts (mainly James Flynn). Making these decisions without the scientific leads being able to visit the sites resulted in some challenges when operations eventually began. Sometime during November 2020, the ARM facility needed to make the difficult decision to delay the start of the campaign to June 2021, with possible IOPs during summer 2021 and 2022. When the COVID pandemic safety concerns persisted during February 2021, the dates were moved one more time to October 2021 through September 2022 with the IOP during summer months of 2022. Unfortunately, this last change resulted in a lost overlap with the TRACER-AQ campaign, which took place during September 2021. The leads of the eventual TRACER IOP forecasting team also supported TRACER-AQ with daily weather forecast support. Due to the COVID pandemic, extra health and safety protocols were implemented for operators and guests at the ARM site. This included travel and housing guidance, masking and testing requirements, and social distancing practices.

Most of the TRACER measurements were collected 24 hours a day and seven days a week, but during the IOP enhanced operations were conducted based on daily forecast discussions. A volunteer team of forecasters prepared and presented a daily weather forecast every day (beginning 27 May 2022 through 30 September 2022) at 1:00 PM Central Time. After the formal presentation, the TRACER science and operations team would discuss the operational plan for the day with the designated mission scientist responsible for making the final call. In the case where convective conditions were forecast, enhanced operations would include launching radiosondes at (1730, 1900, 2030, 2330) at the ANC site with the regular radiosonde launch schedule at the main site augmented to synchronize with the measurements at the ANC site. In addition, the CSAPR radar would switch to automated cell-tracking mode. On days when enhanced operations were not declared, normal operations were continued and the CSAPR cell-tracking team would use discretion to switch to cell-tracking mode if unanticipated convective conditions arose. Following the operation decision by the mission scientists, Atmospheric System Research (ASR) principal investigator teams and interagency partners would decide on their related operational protocols, sharing their decisions with the larger TRACER science and operations team. Prior to the campaign, a total of 40 enhanced operational days were allocated during the TRACER IOP. This entire allotment of 40 days was deployed. Table 3 shows a calendar view of the days where enhanced operations took place.

Table 3. TRACER IOP Summary: Days highlighted with grey were enhanced operational days with additional radiosondes during the local afternoon hours and automated cell-tracking enabled. The IOP included 40 enhanced operational days.

TRACER Operations Summary June 2022						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

TRACER Operations Summary July 2022						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	21	23
24	25	26	27	28	29	30
31						

TRACER Operations Summary August 2022						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

TRACER Operations Summary September 2022						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

ARM tethered balloon system (TBS): The TBS was deployed at the ANC site during the first two weeks of each month of the TRACER IOP. A total of 150 flights were conducted on 49 days including 46 flights on 11 days between 03 and 14 June, 32 flights on 13 days between 02 and 14 July, 44 flights on 13 days between 02 and 14 August and 28 flights on 12 days between 02 and 14 September. Detailed daily reports from the TBS operations team are included in Appendix A. The TBS was not launched or retrieved when surface wind speeds exceeded 10 m/s and flights did not occur in winds aloft greater than 12 ms^{-1}. Flights were suspended or not conducted when lightning occurred within a 15-mile radius of ANC. Federal Aviation Administration (FAA) operating permissions allowed flights up to 1,500 m above ground level (agl) (1501 m msl). Flights were required to occur at least 152 m (500') below any cloud base. Turbulence was often encountered when large thunderstorms were present over M1, and in this scenario the TBS often operated at a lower altitude where stable flight was possible. Generally, three flights occurred daily, and particulate and gas-phase samples were collected within 250-m intervals (0-250 m agl, 250 m-500 m agl, 500 m-750 m agl, 750 m-1,000 m agl, 1,000 m-1,250 m agl, 1,250-1,500 m agl) for 20-minute intervals. Flights typically ascended to the highest possible altitude that could be safely achieved. A log of all simultaneously collected samples can be requested from ARM TBS mentor Dari Dexheimer, ddexhei@sandia.gov. Distributed temperature sensing, a portable optical particle spectrometer (POPS), a TSI condensation particle counter (CPC), an iMet radiosonde, and wind data were collected on all flights and considered baseline measurements, and different particulate, gas-phase, ozone, and guest sensors were integrated with the baseline payload for at least one flight daily.

1.3 Weather Regimes

Wang et al. (2022) used a self-organizing map (SOM) applied to 10 years of summertime (Jul.-Sep.) 700-hPa geopotential height anomalies from the European Centre for Medium-Range Weather Forecasting 5th generation Re-Analysis (ERA5; Hersbach et al. 2020) to quantify the synoptic-scale regimes over the southeastern Texas region. The four dominant regimes are best described as: (1) a pre-trough regime that is driven by a westward expansion of the Bermuda high, (2) a post-trough regime with an upper-level low pressure centered further inland compared to the pre-trough regime, (3) an anticyclonic regime with surface high pressure associated with a westward shift of the Bermuda high and (4) a transitional regime that represents SOM nodes in between the dominant regimes. This SOM analysis has been extended to cover the TRACER IOP period with the frequency of occurrence of the dominant synoptic regimes illustrated in Figure 3. This analysis shows that the anticyclonic regime, conducive to the formation of a sea breeze circulation and isolated convection, was the most common synoptic regime encountered during the TRACER IOP.

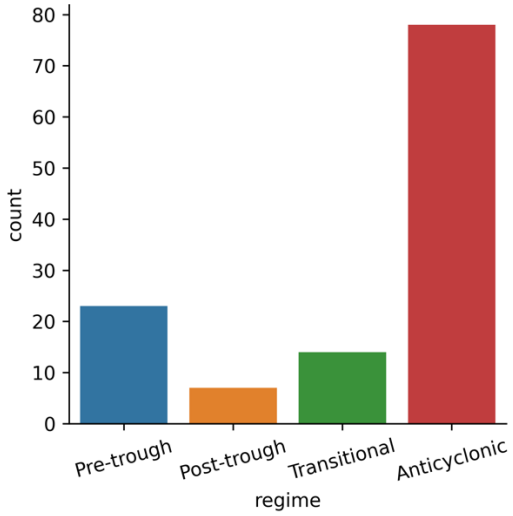

Figure 3. Frequency of occurrence of dominant synoptic-scale weather regimes during the TRACER IOP following the approach of Wang et al. (2022).

1.4 Identified Instrument Issues

1.4.1 C-band Scanning ARM Precipitation Radar

The Pearland site suffered a lightning strike on 16 July that took CSAPR down through 27 July. The repair schedule was delayed by some troubleshooting challenges and need for delivery of parts. During this time, enhanced operations were avoided.

1.4.2 Ka- and X-band Scanning Radars

The scanning cloud radars, deployed at the M1 site in LaPorte, Texas, faced some mechanical issues due to the high humidity and temperature conditions in Houston. This resulted in some periods of

inoperability, or periods where the radars were unable to scan. Figure 4 summarizes the data availability for the cloud radar systems during TRACER.

Configuration adjustments were made during the campaign to improve the radar capability and better meet the campaign objectives. First, on March 22, the radar maximum range was increased from 20 km to 40 km, which made the SACR reach the coastline and observe the sea breeze propagation. Second, on March 31, the SACR scanning rate was increased and the scanning resolution was upgraded from about 2.5 degrees to 1 degree, which provided measurement in a better spatial resolution.

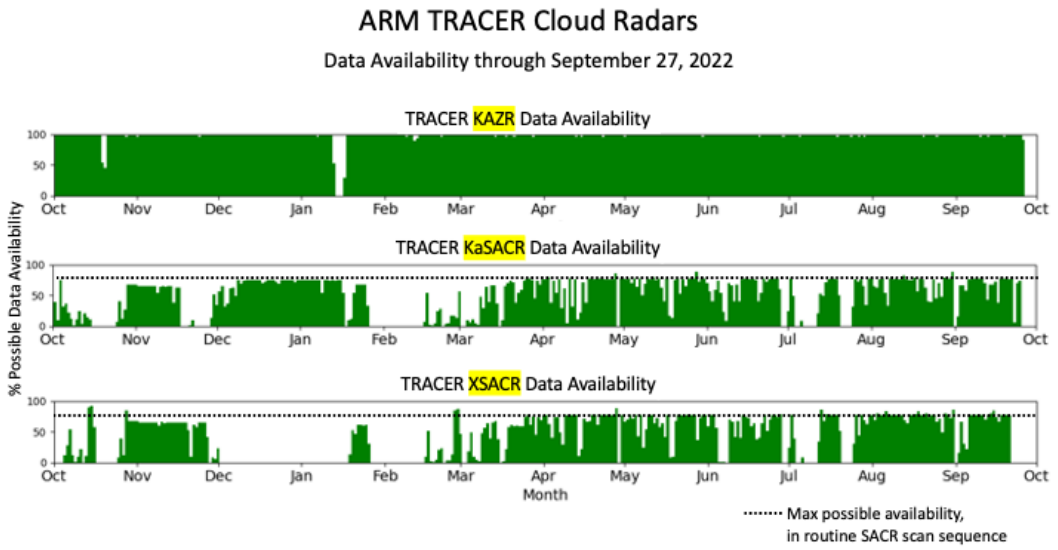

Figure 4. Summary of data availability for the ARM cloud radar systems deployed at the M1 site (La Porte, Texas) during the TRACER campaign: (top) Ka-band ARM Zenith-pointing Radar (KAZR), (middle) Ka-band Scanning ARM Cloud Radar (KaSACR) and (bottom) X-band Scanning ARM Cloud Radar (XSACR).

1.4.3 Cloud Condensation Nuclei (CCN) Counter

Comparisons of the CCN counter measurements with calculations based on independent measurements of aerosol sizes, composition, and hygroscopicity have raised some questions about the CCN measurements. Researchers wishing to use the CCN counter measurements should be sure to engage with the Aerosol Observing System (AOS) mentor team regarding these uncertainties.

1.5 Notable Events

1.5.1 Saharan Dust Event

On occasion, the southeastern Texas region experiences significant dust events associated with transatlantic transport of Saharan dust that directly impacts air quality and visibility, with additional potential impacts on cloud properties and radiative heating. Global-scale circulations during mid-July resulted in one of these dust events on 17-18 July with notable signatures in several ARM and guest

instrument measurements. Following forecasts of the dust event from the NASA Global Modeling and Assimilation Office models, the dust was observed as increased backscatter with a relatively high depolarization ratio from micropulse lidar (MPL) and elevated number concentration reported by the aerodynamic particle sizer (APS), with little change in the number concentration reported by the scanning mobility particle sizer (SMPS). Local peaks in the PM10 mass concentration (Aiken et al. 2023) also represent the influence of the dust plume. Studies aim at combining the TRACER observations with other upstream measurements to better understand the evolution of dust optical properties as a function of aging over long-range transport.

1.5.2 Golden Cases for Model Simulations

One of the major motivations for the TRACER campaign was to build upon pilot projects done within the scope of the Aerosol, Cloud, Precipitation and Climate Initiative (http://acpcinitiative.org/), providing new state-of-the-art, high-resolution, research-grade observations with a particular goal of a second model intercomparison project (MIP; Marinescu et al. 2021) to investigate aerosol impacts on convective cloud properties, including hypotheses on the invigoration or enervation of convection with increasing concentrations of CCN. Identification of potential cases for this TRACER MIP has already begun, with a few of the candidates identified in Table 4. The criteria for the selection of these cases included: Occurrence on an "enhanced" operational day, extended tracking of convective cells by the CSAPR radar, and availability of AOS measurements. Additional preferences included the presence of an observed sea-breeze circulation with associated isolated convection.

Table 4. Candidate cases for the TRACER MIP.

Date (2022)	Description
02 June	Widespread rainfall from numerous isolated cells, synoptic influence, no sea breeze. Mostly clean marine aerosols.
17 June	Good sea-breeze convection and large-scale convection scattered across domain. Overlaps with ESCAPE (aircraft and ground operations). Mostly clean marine aerosols.
21 June	Good sea-breeze convection and large-scale convection. Early morning convection along Bay that is challenging to simulate. Low-level moisture, drier aloft. Overlaps with ESCAPE (ground operations). Mixed aerosols, but more polluted.
04 August	Clouds blowing in from Louisiana late afternoon. No sea breeze. Mostly clean marine aerosols.
07 August	Early sea breeze, consistent onshore flow. Isolated convection day. Moist throughout the column. Polluted aerosols early, very marine clean after sea breeze.
17 September	No clearly discernible sea breeze. Good isolated convection, mostly shallow. Moist boundary layer, dry above 5km. Mixed aerosols but more clean than polluted.
18 September	Very clear sea breeze. Isolated convection, shallower than Sep 17. Moist boundary layer, dry above 5km, and drier than previous day, Sep 17. Mixed aerosols but more polluted than clean.

2.0 Results

There is a distinct seasonal cycle in the cloud characteristics in southeastern Texas, where large-scale synoptic systems are the main driver of cloudiness during the winter months while the summer months are strongly influenced by mesoscale coastal circulations and locally forced convective clouds. The spring and fall months include a combination of these cloud regimes. The ARM cloud remote-sensing measurements provided an opportunity to quantify and confirm this seasonal cycle. Figure 5 (6) shows the profiles of (total) cloud frequency of occurrence derived from the Active Remote Sensing of Clouds (ARSCL) value-added product (Clothiaux et al. 2000, 2001, Kollias et al. 2005, 2016). ARSCL combines observations from the Ka-band ARM Zenith-pointing Radar (KAZR), MPL, and the ceilometer to determine best estimates of cloud boundaries and radar moments in the column directly over the measurement site. The observed seasonal cycle is generally consistent with expectations, showing generally less low-level clouds during January-March with cloudiness mostly associated with frontal passages showing large values of cloud frequency of occurrence through the depths of the troposphere with clearer regions in between. Figure 6 also shows that the total cloud fraction is nearly binary, with most values being near 1 or 0. During June-September, low-level clouds occur much more frequently, following a clear diurnal cycle punctuated by deep convective events, especially prevalent during the month of August. October-December and April-May exhibit a mixture of these two extremes. Also notable is a significant decrease in the detection of cirrus clouds towards the end of September. This may be associated with a degradation in the sensitivity of the KAZR during the final weeks of TRACER.

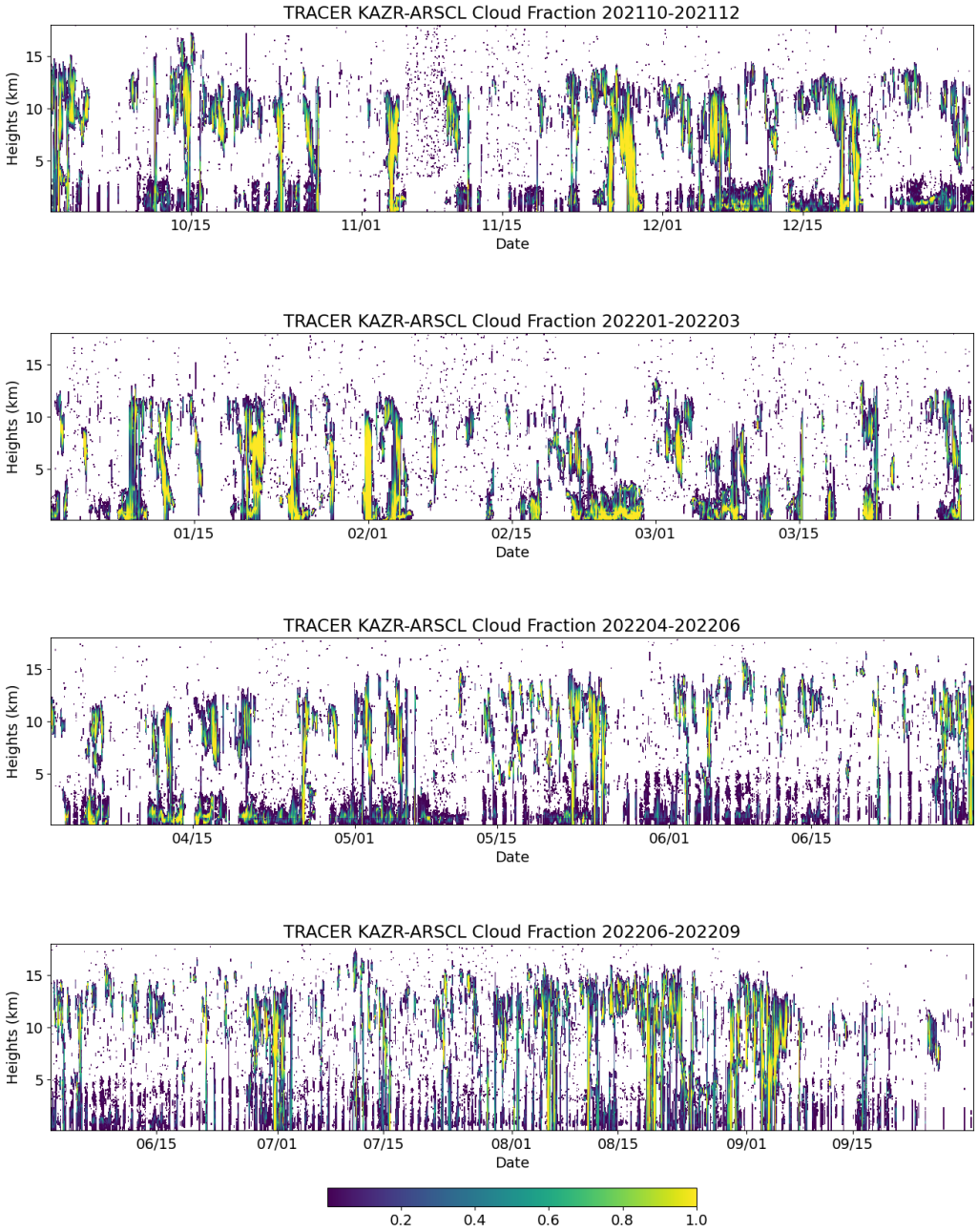

Figure 5. Profiles of cloud frequency of occurrence over a one-hour window calculated from the ARSCL value-added product at the M1 site for (top) October-December 2022, (2nd from top) January-March 2022, (3rd from top) April-June 2022, (bottom) July-September 2022.

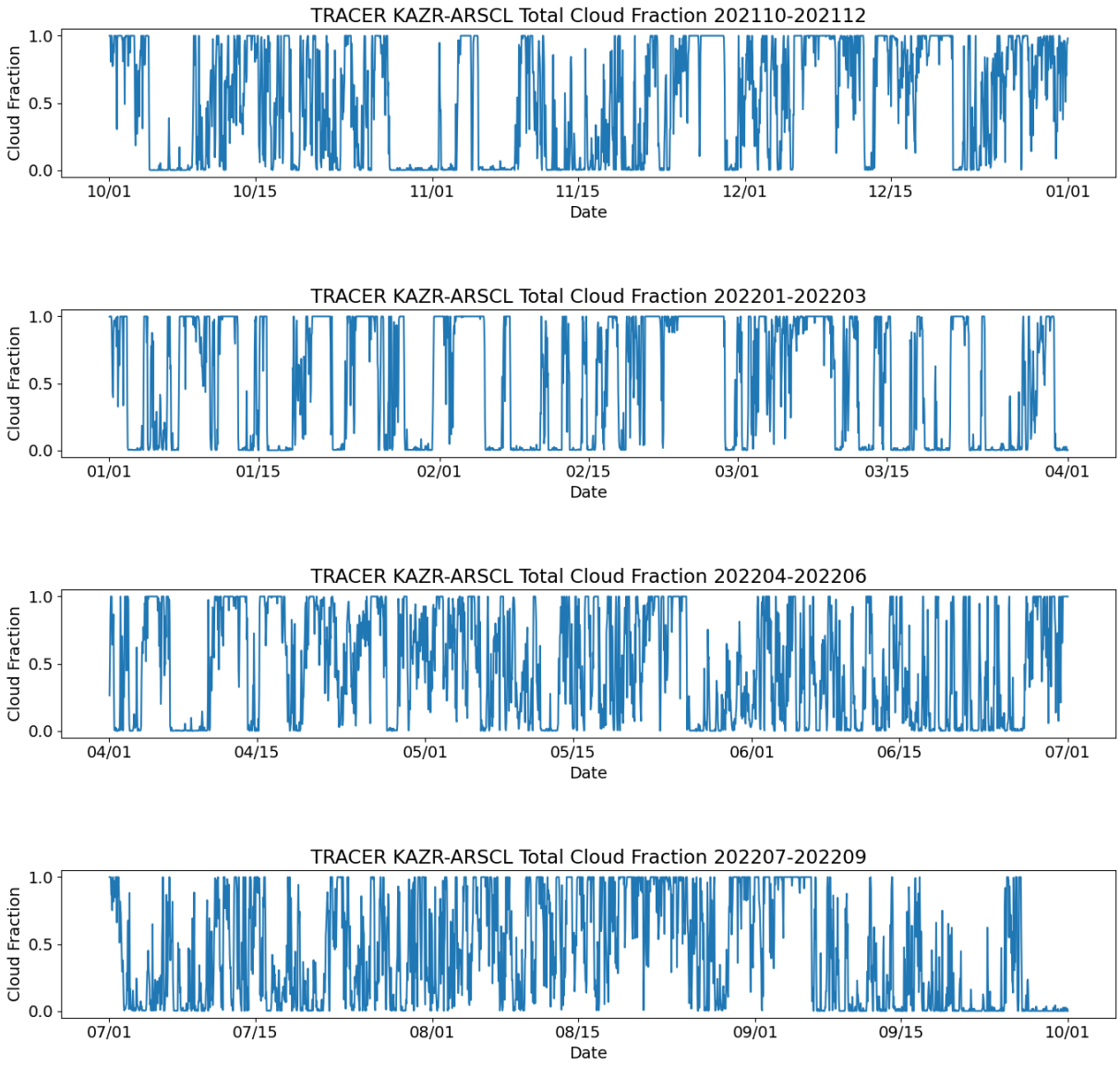

Figure 6. Total cloud frequency of occurrence over a one-hour window calculated from the ARSCL value-added product at the M1 site for (top) October-December 2022, (2nd from top) January-March 2022, (3rd from top) April-June 2022, (bottom) July-September 2022.

The sampling from operational Next-Generation Weather Radar (NEXRAD; surveillance) scanning is not sufficient to capture the evolution of convective cells (Fridlind et al. 2019). To alleviate this shortcoming, a unique component of the TRACER campaign was the use of automated, software-driven tracking of isolated convective cells towards high spatiotemporal sampling of the cell life cycle. The Multisensor Agile Adaptive Sampling (MAAS) framework (Lamer et al. 2023) was used to direct the scanning of the CSAPR on forecast convective days, and at the discretion of the MAAS team on days when convection was not forecast. When automated cell-tracking was enabled, observations from the NEXRAD were first used to estimate the motion field and identify individual cells. An isolated cell was selected and deselected based on its forecast location and cell properties. A CSAPR scan bundle included a set of three plan position indicator (PPI) scans at an elevation near the cell top, an elevation near the cell center, and a

3º elevation angle, followed by four-six range height indicator (RHI) scans directed towards the cell centroid, maximum vertically integrated liquid, region of maximum radar reflectivity (Z), and region of maximum differential reflectivity (Z_{DR}). Each full CSAPR scan bundle took approximately two minutes to complete. Figure 7 shows an example of a subset of these radar scans for an isolated convective cell observed on 07 August 2022. In addition to the CSAPR, the Colorado State University C-band Hydrological Instrument for Volumetric Observation (CHIVO) radar was also steered using the MAAS framework, generally scanning the same cell as the CSAPR, but each scan bundle included four RHIs (1 km right of maximum Z, maximum Z, 1 km left of maximum Z, maximum Z). A total of 1,330 convective cells comprising 17,708 scan bundles were sampled by the CSAPR between June and September 2022 whereas a total of 75,730 scan bundles were collected between August and September 2022. Figure 8 provides a summary of the duration of cells sampled by the NEXRAD and CSAPR along with an accounting of the diurnal cycle of numbers of collected scan bundles for the CSAPR and CHIVO radars. The implementation of the MAAS framework during the TRACER and ESCAPE field campaigns demonstrated that near-real-time data transfer and communications can substantially improve the quality of atmospheric observations even when traditional sensors are used. The CSAPR2 and CHIVO data set constitutes the largest-to-date database of high spatiotemporal radar observations of isolated convective cells quantifying sub-minute and sub-km variability. To address important questions regarding the processes responsible for this observed variability, ongoing and future research will focus on quantitative analysis of the spatiotemporal variability of convective cores and the estimate of microphysical and dynamical processes.

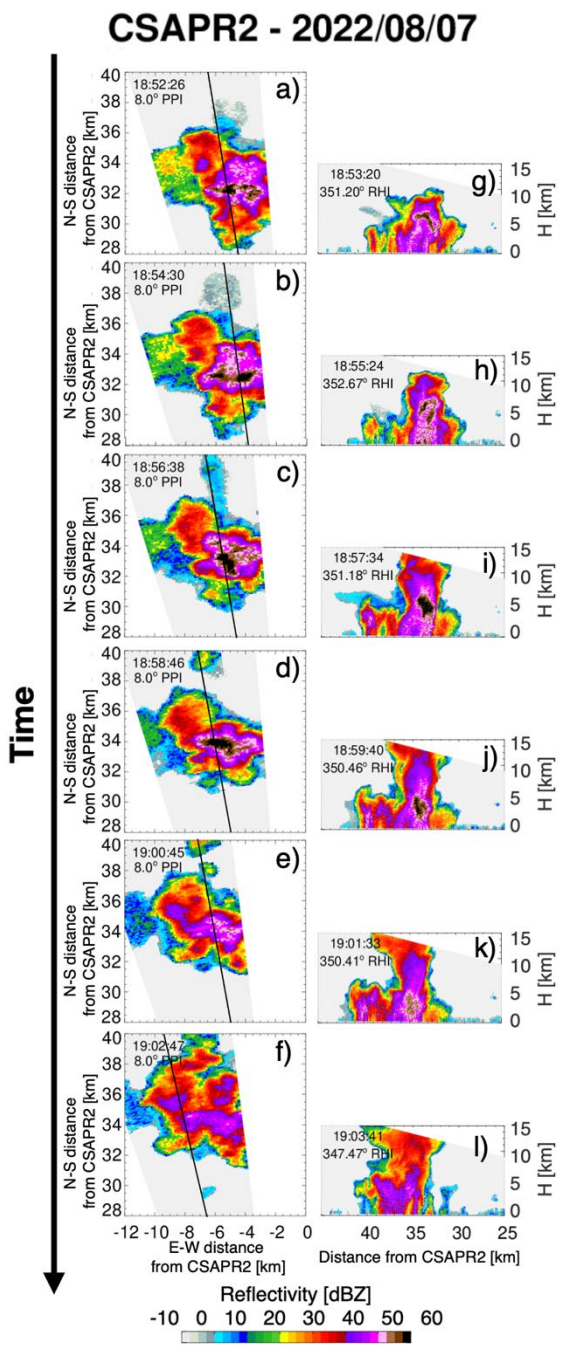

Figure 7. Temporal evolution of the 07 August 2022 convective cell between 18:52:26 and 19:03:41 UTC as viewed by (a-f) a CSAPR2 PPI and (g-l) a corresponding CSAPR2 RHI. The black line on each PPI subpanel shows the location of the corresponding RHI. (Lamer et al. 2023).

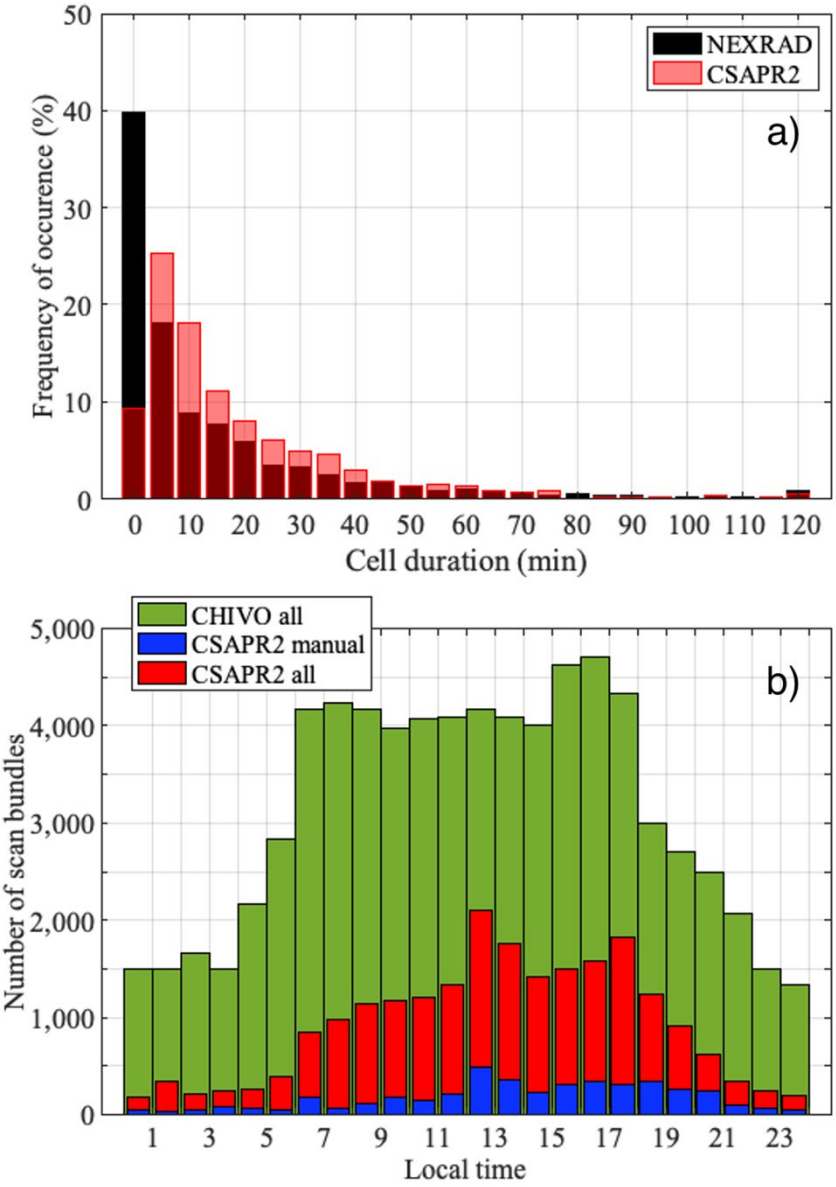

Figure 8. a) Distribution of cell duration observed by the KHGX (black bars) and by the CSAPR2 (red bars) during the campaigns and b) number of scan bundles collected by the CHIVO (green bars) and the CSAPR2 (red bars) during the entire campaign and the subset of CSAPR2 scan bundled acquired using online user input to the MAAS framework. (Lamer et al. 2023).

Measurements from the ARM AOS (Uin et al. 2019) provide continuous surface-based in situ characterization of aerosol size distribution, hygroscopicity, radiative properties, composition, gaseous precursors, and associated meteorology. Figure 9 shows the annual cycle of several of these measurements from the M1site. A strong seasonal control on aerosol properties is observed. The summer months, when marine-influenced air masses were most frequent, are generally cleaner than the winter, spring, and autumn months. The marine air masses during the summer are also associated with more hygroscopic particles.

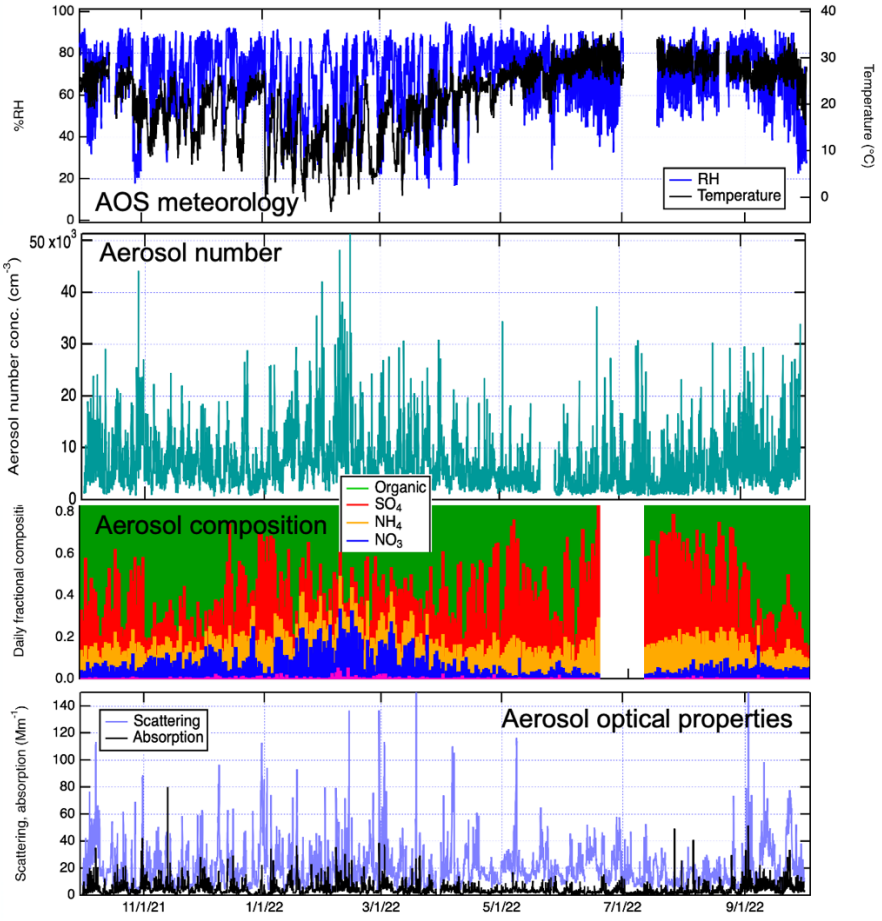

Figure 9. Summary of observations from the ARM AOS deployed at the M1 site including the surface-based temperature and relative humidity from the AOS meteorological sensors, aerosol number concentration measured by the SMPS, aerosol composition derived from the ACSM, and aerosol optical properties from the nephelometer (scattering) and aethelomter (absorption).

The sea- and bay-breeze circulations play an important role in weather, cloud and aerosol properties, and air quality in southeast Texas. Often a source of dynamical lift that drives convection initiation and development of isolated convection, it is important to identify and characterize the sea-breeze/bay-breeze frontal boundary to consider its role in convective development and atmospheric transport. Using a combination of satellite imagery, NEXRAD surveillance radar imagery, and surface meteorology measurements from the ARM sites, Wang et al. (2023) have identified more than 50 instances when a clear sea-breeze signature is observed at the ARM sites. Figure 10 shows the time series of wind direction and water vapor mixing ratio for one of these cases from 08 June 2022 when a clear wind shift from 200-250° to 100-120° is observed near 1430 LT with a coincident change to much moister conditions.

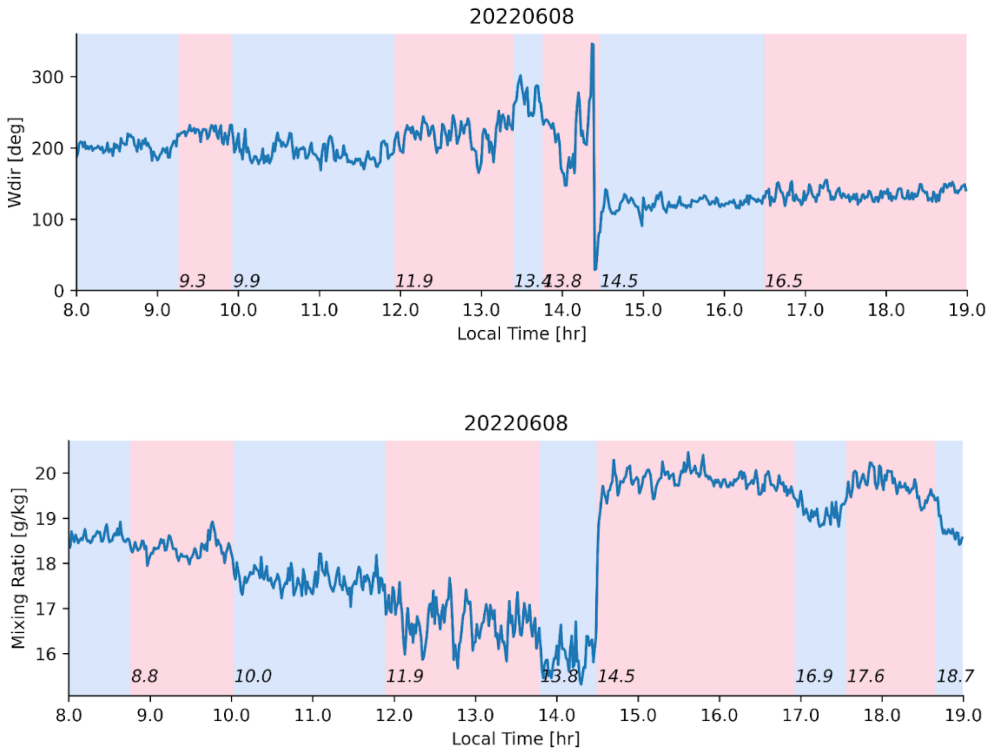

Figure 10. Time series of the (top) surface wind direction and the (bottom) water vapor mixing ratio at the M1 ARM site on 08 June 2022 showing the passage of the sea-breeze frontal boundary at about 1430 LT. The blue and pink regions represent time segments identified using the change point detection method.

3.0 Publications and References

3.1 Publications

Iguchi, T, T Matsui, M van Lier-Walqui, and EC Bruning. 2023. "Analysis of the observed and simulated diurnal cycle of convection over Houston during the TRACER field campaign IOP." *Monthly Weather Review* submitted.

Jensen, MP, JH Flynn, LM Judd, P Kollias, C Kuang, G McFarquhar, R Nadkarni, H Powers, and J Sullivan. 2022. "A succession of cloud, precipitation, aerosol and air quality field experiments in the coastal urban environment." *Bulletin of the American Meteorological Soc*iety 103(2): 103–105, https://doi.org/10.1175/BAMS-D-21-0104.1

Lamer, K, P Kollias, EP Luke, BP Treserras, M Oue ,and B Dolan. 2023. "Multisensor Agile Adaptive Sampling (MAAS): A methodology to collect radar observations of convective cell life cycle." *Journal of Atmospheric and Oceanic Technology*, https://doi.org/10.1175/JTECH-D-23-0043.1

Oue, M, SM Saleeby, PJ Marinescu, P Kollias, and SC van den Heever. 2022. "Optimizing radar scan strategies for tracking isolated deep convection using observing system simulation experiments." *Atmospheric Measurement Techniques* 15(16): 4931–4950, https://doi.org/10.5194/egusphere-2022-346

Saleeby, SM, SC van den Heever, PJ Marinescu, M Oue, A Barrett, C Barthlott, R Cherian, J Fan, AM Fridlind, M Heikenfeld, C Hoose, T Matsui, AK Miltenberger, J Quaas, J Shpund, P Stier, B Vie, BA White, and Y Zhang. 2024. "Model intercomparison of the impacts of varying cloud condensation nuclei on the lifecycle and microphysics of deep convection." *Journal of the Atmospheric Sci*ences, in internal revision.

van den Heever, SC, PJ Marinescu, M Heikenfeld, B White, A Fridlind, P Stier, M Andreae, A Barrett, C Barthlott, R Cherian, J Fan, C Hoose, T Matsui, A Miltenberger, J Quaas, D Rosenfeld, J Shpund, B Vie, and Y Zhang. 2023. "A Model Intercomparison Project Exploring Aerosol Impacts on Deep Convective Clouds." To be submitted to the *Bulletin of the American Meteorological Soc*iety.

Wang, D, MP Jensen, D Taylor, G Kowalski, M Hogan, BM Wittemann, A Rakotoarivony, SE Giangrande, and J Minnie Park. 2022. "Linking synoptic patterns to cloud properties and local circulations over southeastern Texas." *Journal of Geophysical Res*earch – *Atmospheres* 127(5), e2021JD035920, https://doi.org/10.1029/2021JD035920

Wang, D, EC Melvin, N Smith, A Abdullah-Smoot, N Pszeniczny, S Gupta, and MP Jensen. 2023. "Variability of sea-breeze characteristics during the TRACER field campaign." *Monthly Weather Rev*iew, in revision.

3.2 Presentations

Preliminary results from the TRACER campaign have been shared at several meetings and workshops, including:

2022 Annual Meeting of the American Meteorological Society. Virtual. 23-27 January 2022.

2022 Joint ARM User Facility and ASR Principal Investigator Meeting, Rockville, Maryland and online. 24-27 October 2022.

2022 Fall Meeting of the American Geophysical Union, Chicago, Illinois and online. 12-16 December 2022.

2023 Annual Meeting of the American Meteorological Society. Denver Colorado. 8-12 January 2023.

The Joint Ninth Aerosol, Clouds, Precipitation and Climate (ACPC) initiative and TRacking Aerosol Convection interactions ExpeRiment (TRACER) Workshop. Houston, Texas and online. 16-19 May 2023.

2023 Joint ARM User Facility and ASR Principal Investigator Meeting. Rockville, Maryland and online. 7-10 August 2023.

Oral and poster presentations include:

Bruning, EC, K Brunner, M van Lier-Walqui, T Logan, M Miller, JCS Souza, D Singewald, and S Weiss. 2022. "Radar polarimetry and flash rate variability in varying thermodynamic and aerosol environments in Houston, TX." *Eos Transactions American Geophysical Union, Fall Meeting Supplement*, AE13A-04.

Chen, B, S Thompson, B Matthews, Z Lei, E Asher, T Thornberry, R Calmer, G de Boer, AD Rapp, and SD Brooks. 2023. "Cross-comparison between mini-micropulse lidar and drone-based in situ aerosol measurements during the TRACER campaign." Poster presented at ACPC/TRACER Workshop, Houston, Texas.

Chen, J, D Wang, Y Liu, S-I Tai, H Dashtain, MH Young, Y Qian, J Fast, L Berg, C Kaul, Z Yang, and MP Jensen. 2023. "Understanding the Role of Urban-Rural Contrasts in the Isolated Convective Clouds during the TRACER IOP." Presented at the ACP-TRACER Workshop, Houston, Texas.

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Deng, M, MP Jensen, SE Giangrande, and D Wang. 2023. "Sea Breeze Circulation and Sea Breeze Lifecycle: An Example from TRACER." Presented at the 2023 Joint ARM User Facility and ASR Principal Investigator Meeting. Rockville, Maryland.

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Hood, C, B Tomerlin, CJ Nowotarski, M Sharma, and AD Rapp. 2023. "Cataloging parent airmass of convective cells during enhanced operations of TRACER." Poster presented at the American Meteorological Society 22nd Annual Student Conference, Denver, Colorado.

Jackson, RC, D Wang, SM Collis, and MP Jensen. 2023. "Open Classification of Regimes in the Southeast USA: An Open-Source Machine Learning Classifier for Aerosol and Meteorological Regimes for ARM Mobile Facility Deployments." Presented at the 2023 Annual Meeting of the American Meteorological Society, Denver Colorado.

Jackson, RC, D Wang, SM Collis, and MP Jensen. 2022. "Open classification of regimes in the Southeast U. S.: An open-source machine learning classifier for aerosol and meteorological regimes for the ARM mobile facility deployments." Presented at the 2022 Fall Meeting of the American Geophysical Union, Chicago, Illinois.

Jensen, MP, W Behrens, M Cadeddu, V Ghate, S Giangrande, K Johnson, P Kollias, C Kuang, E Luke, T Surleta, D Wang, M Wang, MA Zawadowicz, and A Zhou. 2022. "Summary of First Light Observations from the Tracking Aerosol Convection Interactions Experiment (TRACER)." Presented at the 2022 Annual Meeting of the American Meteorological Society. Virtual.

Jensen, MP, and 117 co-authors. 2022. "An Overview of the TRacking Aerosol Convection interactions ExpeRiment." Presented at the 2022 Joint ARM User Facility and ASR Principal Investigator Meeting, Rockville, Maryland.

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Jensen, MP, AJ Drager, VP Ghate, SE Giangrande, S Gupta, KL Johnson, P Kollias, C Kuang, EP Luke, O Mayol-Bracero, M Oue, SM Saleeby, AJ Sedlacek, A Singh, T Subba, R Trojanowski, J Uin, SC van den Heever, D Wang, and MA Zawadowicz. 2023. "Summary of Convection and Aerosol Observations during the TRacking Aerosol Convection interactions ExpeRiment (TRACER)." Presented at the 2023 Annual Meeting of the American Meteorological Society, Denver Colorado.

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Khorshidian, N, Y Choi, S Mousavinezad, A Pouyaei, J Fan, and MP Jensen. 2023. "Cloud Formation and Precipitation over Texas during TRACER Campaign Period: Improving WRF-Chem-SBM Simulations using Observation Nudging Technique." Presented at the 2023 Joint ARM User Facility and ASR Principal Investigator Meeting, Rockville, Maryland.

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Luke, E, B Puigdomenech Treserras, P Kollias, M Oue, JR Barr, and Z Mages. 2022. "Convective Cell Tracking during the TRACER IOP using Multi-sensor Agile Adaptive Sampling." Presented at the 2022 Joint ARM User Facility and ASR Principal Investigator Meeting, Rockville, Maryland.

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Park, JM, D Wang, MA Zawadowicz, MP Jensen, and A McComiskey. 2023. "Joint Variability of Aerosols, Clouds, and Synoptic Meteorology over Southeastern Texas." Presented at the 2023 Annual Meeting of the American Meteorological Society, Denver Colorado.

Rapp, AD, SD Brooks, C Nowotarski, M Sharma, S Thompson, and B Chen. 2023. "An overview of TAMU TRACER and preliminary results." Oral presentation at the ACPC/TRACER Workshop, Houston, Texas.

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Sharma, M, AD Rapp, CJ Nowotarski, SD Brooks, S Thompson, and B Chen. 2023. “Spatiotemporal variability in convective cells and their thermodynamic and aerosol environments during TAMU TRACER.” Poster presentation at the 2023 Joint ARM User Facility and ASR Principal Investigator Meeting, Bethesda, Maryland.

Sharma, M, AD Rapp, and CJ Nowotarski. 2023. “Does Meteorological Variability across Sea and Bay-Breeze Fronts Influence Thunderstorm Characteristics? Insights from the TAMU TRACER Field Campaign.” Oral presentation at the 40th American Meteorological Society Conference on Radar Meteorology, Minneapolis, Minnesota.

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4.0 Lessons Learned

Lessons Learned #1: Participation in pre-campaign siting visits – While pre-campaign siting visits are a regular practice for AMF deployments, the participation of the PI, other science team members, and

some instrument mentors (especially from the AOS team and radar team) was critical for informing siting decisions and science interpretation.

Lesson Learned #2: Importance of local contacts – Local contacts, in this case mainly through James Flynn and the University of Houston, were critical for the success of the TRACER field campaign. This was important for several different reasons: (1) Siting – extensive knowledge of local sites that were used in previous field campaigns, university- and public-owned lands that might serve as plausible sites, and local municipalities and landowners who might be open to hosting ARM facilities helped to target site location activities, (2) Relationships – existing relationships with vendors (notably local helium distributors), municipalities, and other organizations helped to bridge and overcome challenges as they arose. Even when there were not existing relationships, having a local advocate helped to build trust with the community and other local organizations and people, (3) Proximity – especially during times of COVID restrictions, having a local contact who could visit sites and individuals was invaluable.

Lesson Learned #3: Communication – The importance of communication among and between ARM staff and field campaign leadership and participants cannot be overemphasized. Concerted efforts were made for the extended TRACER+ science and operations team to meet once per month via Zoom to promote transparency and awareness of ongoing activities. In addition, smaller monthly meetings between TRACER+ leadership and the ARM operations team were very useful for identifying needs and resolving issues in a timely manner. Regular meetings of the ARM operations team and instrument mentors were critical. Even with these many communication channels, more communication between the site operations team, ARM radar mentor team, other ARM instrument mentors and the ARM TBS team would have helped to raise concerns and identify issues before they happened. One example where mode communication would have been useful was regarding the TBS shelter and how it would impact the measurements at the ancillary site, particularly the AOS measurements.

Lessons Learned #4: Humidity and Temperature Controls – The environmental conditions in Houston were even more challenging than expected and presented special challenges for some of the instrumentation. The heat presented significant challenges for some of the electronics and computers, particularly for the scanning cloud radar systems and the AOS. In addition, the heat and humidity presented special challenges for the sampling through the AOS stack with special mitigation needed to avoid condensation in the sampling lines.

Appendix A

ARM Tethered Balloon System Flight Summaries

A.1 Instrument Acronyms

ADS-B	Automatic Dependent Surveillance–Broadcast
AE-51	microAeth® *AE51* black carbon aerosol monitor
CPC	TSI 3007 condensation particle counter
DTS	Distributed Temperature Sensing
iMet	interMet (iMet)-4 RSB research radiosonde
MA200	microAeth® *MA200* 5-wavelength UV-IR black carbon monitor
MAGIC CPC	MAGIC® water condensation particle counter
MegaVOC	Baylor University VOC sampler operated on the TBS
OPUS	NOAA prototype ozone sensor
POPS	portable optical particle spectrometer
R1046	Serial number of ARM TBS wind sensor (houtbswind datastream)
RAVEN	OSU wind sensor
STAC	Size- and Time-Resolved Aerosol Collector
TBAC	total bulk aerosol collector
TBI	tethered balloon impactor
TUBE	Refers to individual tube sampled in VOC sampler
VOC	volatile organic compound
XDATA	*UART XDATA* Protocol
XQ2	interMet iMet-XQ2 UAV sensor

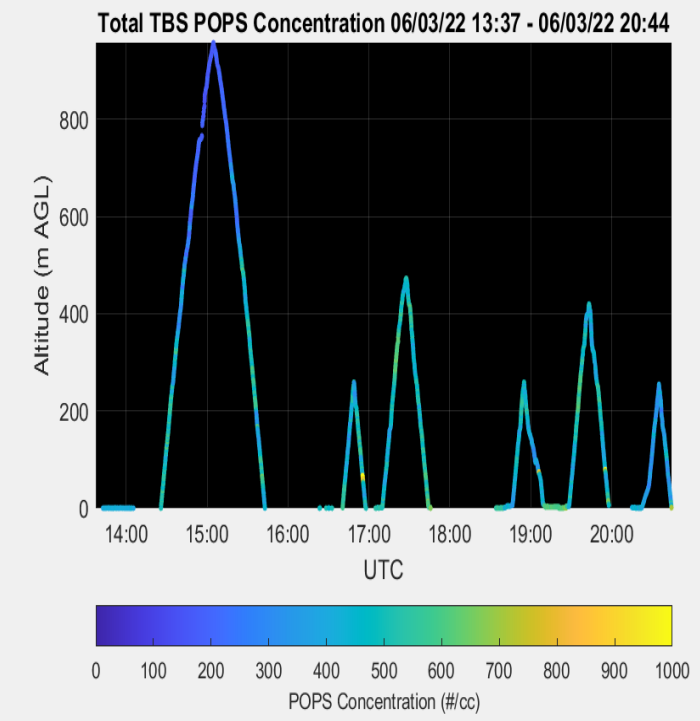
A.2 TBS Flight Summaries

Daily HOU S3 TBS Flight Summary

Date: 06/03/22
Authors: Dexheimer, Longbottom, Peterson, Zimmer
Platform: TBS: 122 m^3 aerostat, Great White

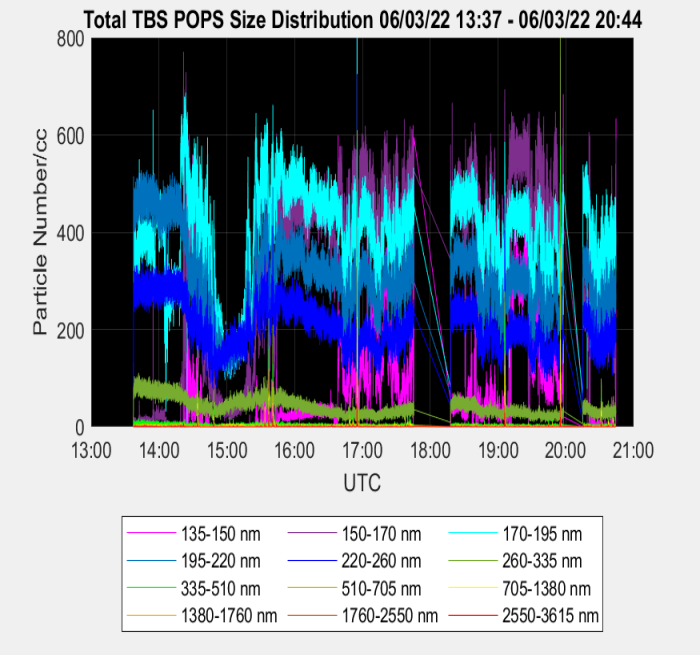
Instruments flown:
Flight 1:
STAC 20 minute delay at 14:05, 20 minute samples, IM 1-4.
R1046 & XQ2 55512
STAC
TBI4 (14:19 - 15:44)
POPS229 w/ dryer & iMet 402 MHz

Launched 14:10.
STAC1, 14:25 - 14:44, 0m - 500m, 0m ascending - 500m ascending.
Increase in small particles (bin 0) with height).
STAC2, 14:45 - 15:04, 500m - 950m, 500m ascending - 950m ascending
STAC3, 15:05 - 15:24, 950m - 450m, 950m descending - 450m descending
STAC4, 15:25 - 15:44, 450m - 0m, 450m descending - 0m descending
Surfaced 15:44.



Flight 2:
30 C, winds N at 3-7 m/s, mostly clear
STAC 5 minute delay at 16:33, 20 minute sample, IM 5.
R1046 & XQ2 55512
STAC
TBI4 (?)
POPS229 w/ dryer & iMet 402 MHz
MA200 w/ dryer
AE51 on surface
*TBI4 not running upon surface. CPC not started flights 1 or 2.

Launched 16:37.
STAC5, 16:38 - 16:57, 0m - 250m, 0m ascending - 250m ascending
Surfaced 17:00



Flight 3:
31 C, winds N at 3-7 m/s, Cu bases ~ 600m.
R1046 & XQ2 55512
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC4

Launched 17:09.
Ascended to 475m near CB at site. Began descent at 17:26.
Surfaced at 17:45.

Flight 4:
32 C, winds N at 3-8 m/s, Cu bases ~ 550m.
STAC 5 minute delay at 18:37, 20 minute sample, IM 6.
R1046 & XQ2 61152
STAC
TBI4 (18:40 - ?)
POPS229 w/ dryer & iMet 402 MHz
CPC4
MA200 w/ dryer
AE51 on surface
*TBI4 was not running upon surface.

Launched 18:37.
STAC6, 18:47 - 19:06, 0m - 250m, 0m ascending - 250m ascending
Surfaced 19:09.

Flight 5:
33 C, winds N at 3-8 m/s, Cu bases ~ 500m.
R1046 & XQ2 61152
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC4

Launched 19:24
Ascended to 425m near CB and began descent.
Surfaced 19:57.

Flight 6:
33 C, winds N at 3-9 m/s, Cu bases ~ 550m.
STAC 10 minute delay at 18:17, 20 minute sample, IM 8.
R1046 & XQ2 61152
STAC
TBI4 (20:19 - 20:44)
POPS229 w/ dryer & iMet 402 MHz
CPC4

Launched 20:18.
STAC8, 20:26 - 20:45, 0m - 250m, 0m ascending - 250m ascending
Removed retaining rings from TBI and increased flow enough to run.
Convective cloud overhead.
Surfaced 20:45.

TBS under convective cloud during Flight 6.

Daily HOU S3 TBS Flight Summary

Date: 06/04/22
Authors: Dexheimer, Longbottom, Peterson, Zimmer
Platform: TBS: 122 m^3 aerostat, Great White

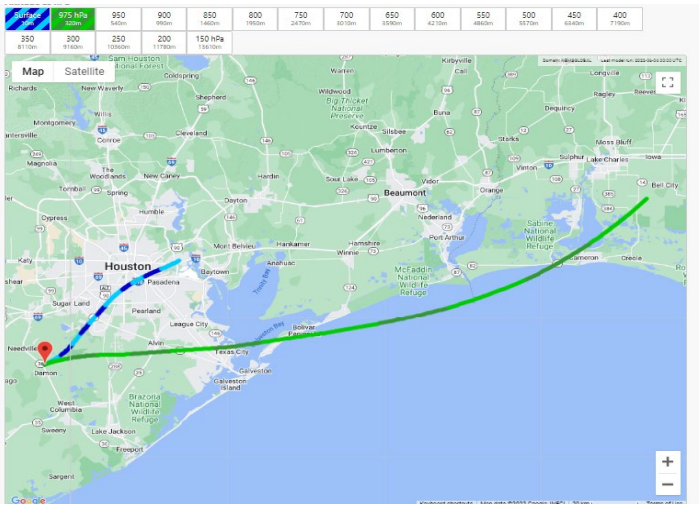
Instruments flown:
Flight 1:
26 C, winds N at 3-5 m/s, 80% clouds, CB above 3600m
POPS bins 1-5 > 150 #/cc, bin 2 max.

Flight1:
DTS
STAC 10 minute delay at 14:10, 20 minute samples, IM 9-14.
R1046 & XQ2 55512
STAC
TBI4 (14:10 - 14:39)
POPS229 w/ dryer & iMet 402 MHz
CPC3

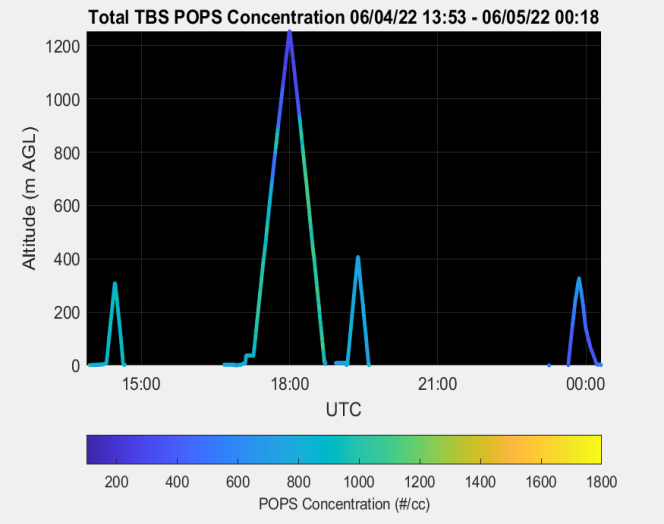
Launched 14:10.
STAC9, 14:20-14:39, 100m-310m, 0m descending - 310m descending.
Storm approaching from NW.
Surfaced at 14:39.
Precip at 14:44.

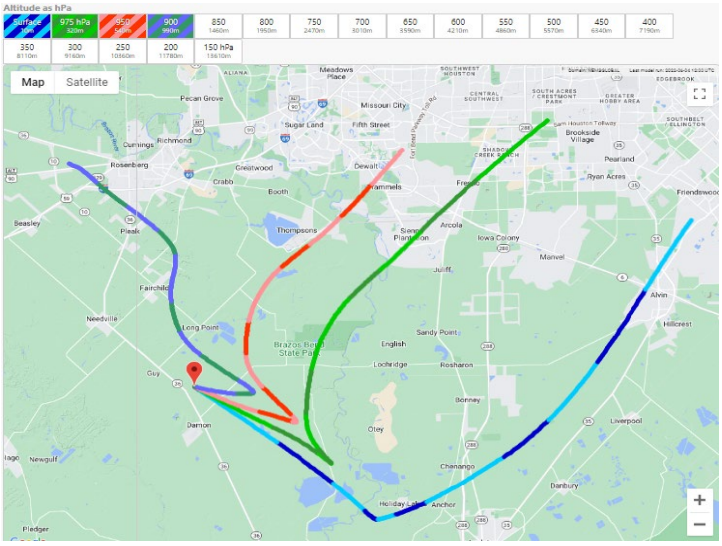
30 C, winds N 3-5 m/s, 80% clouds, base ~ 1.5 km
Flight2:
DTS
MAGIC CPC
R1046 & XQ2 55512
POPS229 w/ dryer & iMet 402 MHz
CPC3
AE-51 at surface

Launched 17:00
Ascended to 1.25 km at 18:00 and began descent.
Surfaced at 18:45.



12-hour backward trajectory for surface and 975 hPa.





12-hr backward trajectory for surface, 975 hPa, 950 hPa, 900 hPa.

Flight3:
DTS
STAC 10 minute delay at 19:04, 20 minute samples, IM 10-15.
R1046 & XQ2 61152
STAC
TBI4 (19:05 - 19:37)
POPS229 w/ dryer & iMet 402 MHz
CPC3
MA200

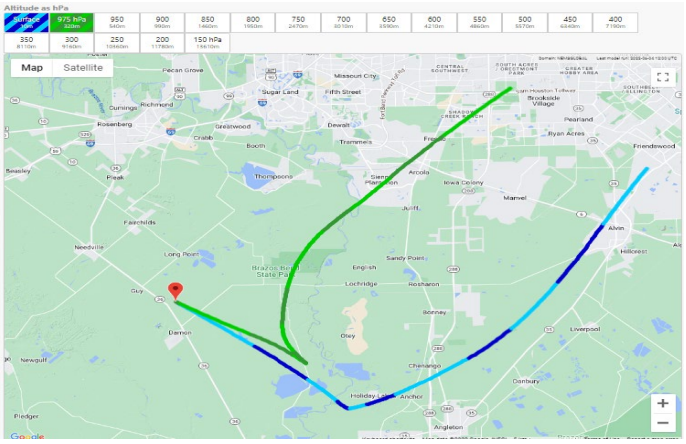
Launched 19:04.
STAC10, 19:14 - 19:33, 80m - 400m, 400m ascending - 80m descending
Thunderstorms approaching from west.
Surfaced at 19:38.

Light precip and thunder in area frequently. Waited until storms passed.

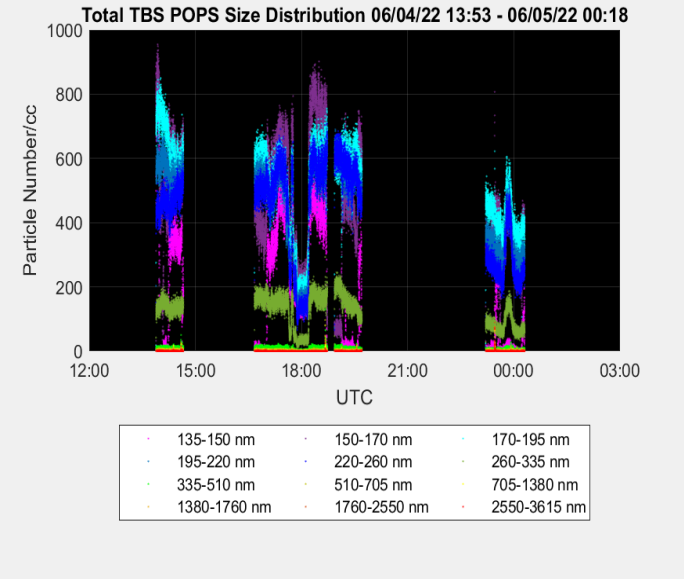
32 C, winds S 2-6 m/s, 60% clouds, base ~ 1 km00000

Flight4:
MAGIC CPC
STAC 8 minute delay 23:27, 20 minute samples, IM 1-4
TBI4 (
R1046 & XQ2 55512
POPS229 w/ dryer & iMet 402 MHz
CPC3

Launched 23:35
STAC1, 23:35 - 23:54, 0m - 325m, 0m ascending - 325m ascending
POPS concentrations somewhat reduced from previous flights.
Ascended to 325m at 23:51 and began descent. TA35 in 8 m/s.
STAC2, 23:55 - 00:14, 250m - 0m, 250m descending - 0m descending
Surfaced 00:15.



12-hr backward trajectory for surface, 975 hPa at 0Z.




Sky conditions at 14:41 before precipitation.

Sky conditions at 19:34 during Flight 3 as storms developed to west.

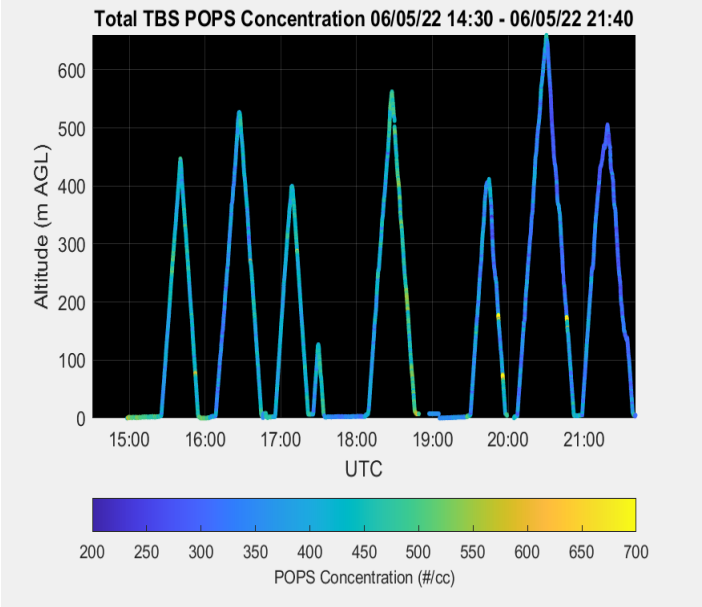
Daily HOU S3 TBS Flight Summary

Date: 06/05/22
Authors: Dexheimer, Longbottom, Peterson, Zimmer
Platform: TBS: 122 m^3 aerostat, Great White

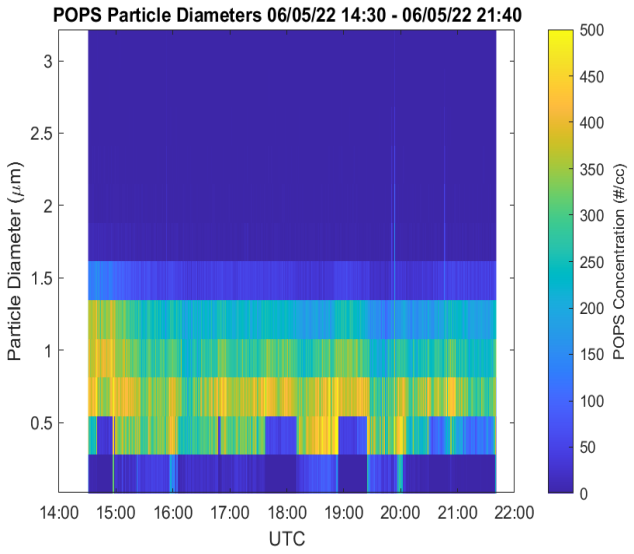
Instruments flown:
Flight 1:
29 C, winds S at 3-5 m/s, 80% clouds, CB ~600m
POPS bins 1-4 > 150 #/cc, bin 2 max.

Flight1:
DTS
R1046 & XQ2 55512
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC3
MA200 w/ dryer

Launched 15:20.



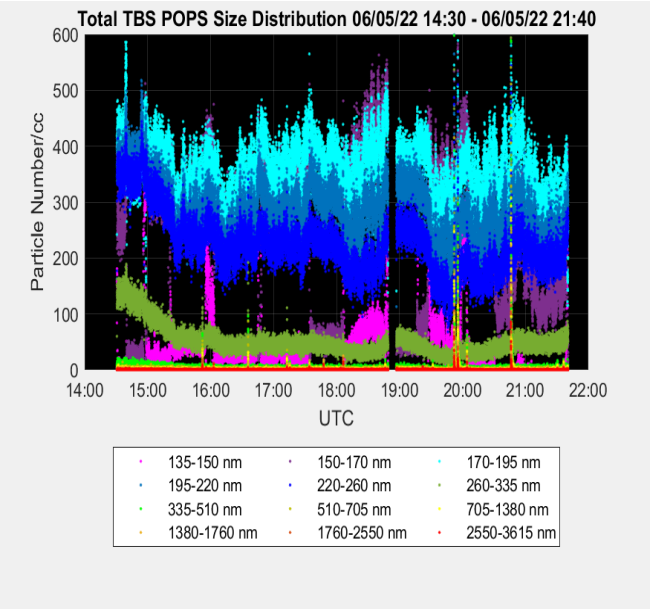
Ascended to 450m and began descent at 15:40. Approaching cloud base.
Surfaced at 15:53.



31 C, winds S at 3-6 m/s, 80% clouds, CB ~600m
POPS bins 1-4 > 150 #/cc, bin 1 max.

Flight2:
DTS
R1046 & XQ2 55512
STAC (6 min delay at 15:58, 20 minute samples, IM 3-6)
TBI4 (16:02 - 16:46)
POPS229 w/ dryer & iMet 402 MHz
CPC3
MA200 w/ dryer

Launched 16:01
STAC3, 16:04 - 16:23 , 0m - 450m, 0m ascending - 450m ascending
STAC4, 16:24 - 16:43 , 450m - 0m, 525m ascending - 0m descending
Ascended to 525m, began descent at 16:27. Approaching cloud base.
Surfaced at 16:44.



Flight3:
DTS
R1046 & XQ2 55512
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC3
MA200 w/ dryer

Profile 1:
33 C, winds S at 1-4 m/s, 40% clouds, CB ~600m
POPS bins 1-4 > 200 #/cc, bin 2 max.

Launched 16:55.
Ascended to 400m and began descent at 17:08. Turbulent thermals.
Surfaced at 17:21.

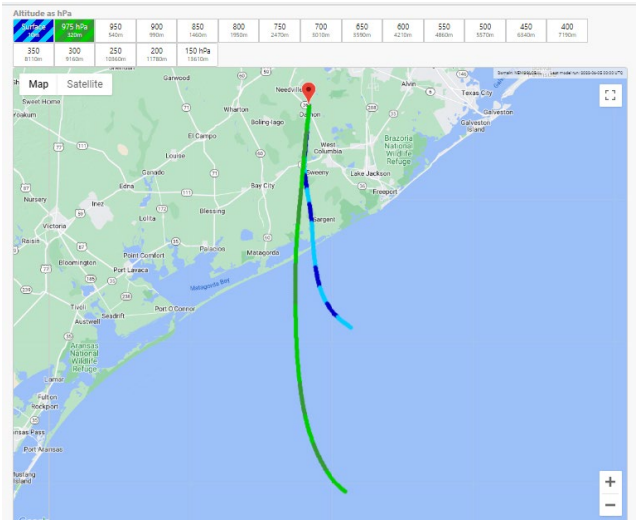
Profile 2:

33 C, winds S at 1-4 m/s, 40% clouds, CB ~600m
POPS bins 1-4 > 200 #/cc, bin 2 max.

Launched 17:25.
Ascended to 125m and began descent at 17:29.
Descending to troubleshoot vertical anemometer.
Surfaced at 17:34.

Profile 3:
34 C, winds S at 2-4 m/s, 30% clouds, CB ~600m
POPS bins 2-4 > 200 #/cc, bin 2 max.

Launched 18:09.
Ascended to 560m and began descent at 18:27.
Surfaced at 18:46.



Surface and 975 hPa 12 hr backward trajectories at 16Z.

Flight4:
DTS
R1046 & XQ2 61152
STAC (7 minute delay at 19:21, 20 minute samples, IM 5-8)
TB14 (19:25:19:58)
POPS229 w/ dryer & iMet 402 MHz
CPC3
MA200 w/ dryer

Launched 19:23.
STAC5, 19:28 - 19:47, 0m - 300m, 0m ascending - 400m descending
Started DTS late
STAC6, 19:48 - 20:07, 300m - 0m, 300m descending –
0m descending (half was run on ground)
Ascended to 400m, began descent at 19:43. Approaching cloud base, 8-9m/s winds.
Surfaced at 19:57.

TBS in flight during Flight 3.

Flight5:
DTS
R1046 & XQ2 61152
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC3
MA200 w/ dryer

Profile 1:
36 C, winds S at 3-7 m/s, 20% clouds, CB ~600m
POPS bins 1-4 > 200 #/cc, bin 2 max.
Launched 20:07.
Ascended to 660m and began descent at 20:30. Approaching cloud base, 10 m/s winds.

Profile 2:
37 C, winds S at 2-4 m/s, 20% clouds, CB ~600m
POPS bins 1-4 > 200 #/cc, bin 2 max.
Launched 20:58.
DTS damaged during flight. Unusable data.
Ascended to 500m and began descent at 21:18.
Surfaced at 21:38.

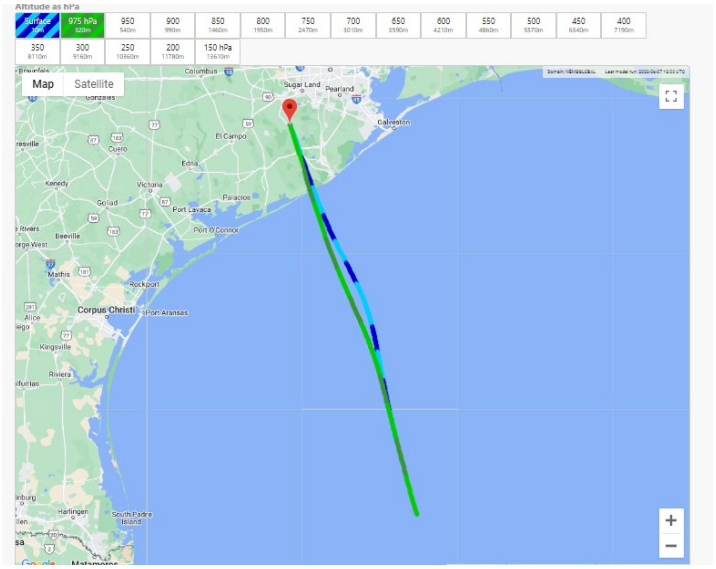
Daily HOU S3 TBS Flight Summary

Date: 06/07/22
Authors: Dexheimer, Longbottom, Peterson, Zimmer
Platform: TBS: 122 m^3 aerostat, Great White

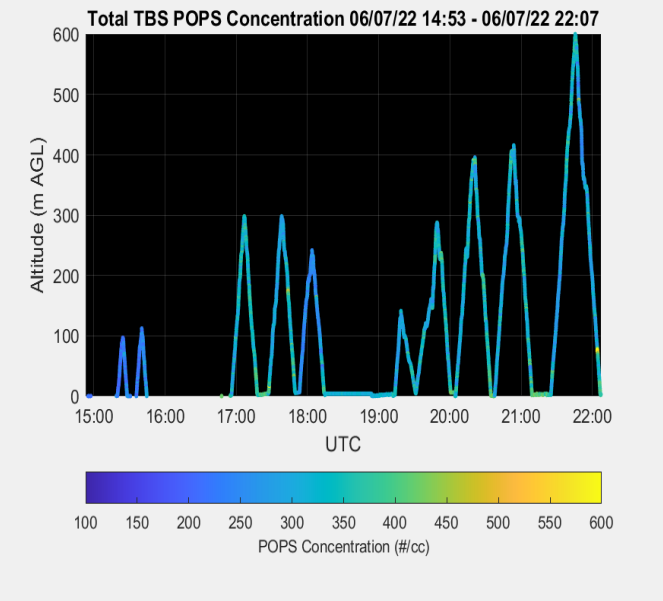
Instruments flown:
Flight 1:
31 C, winds SSE at 4-9 m/s, 80% clouds, CB ~700m
POPS bins 1-4 > 100 #/cc, bin 2 max.

R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz
**CPC2 and 3 running on ground to test suspected weak pump on 3.

Profile1:
Test of winds aloft.
Launched 15:10.
Ascended to 100m. TA of 37 in gusty conditions, 9 m/s.
Surfaced at 15:28.



19Z 12 hr backward trajectory.

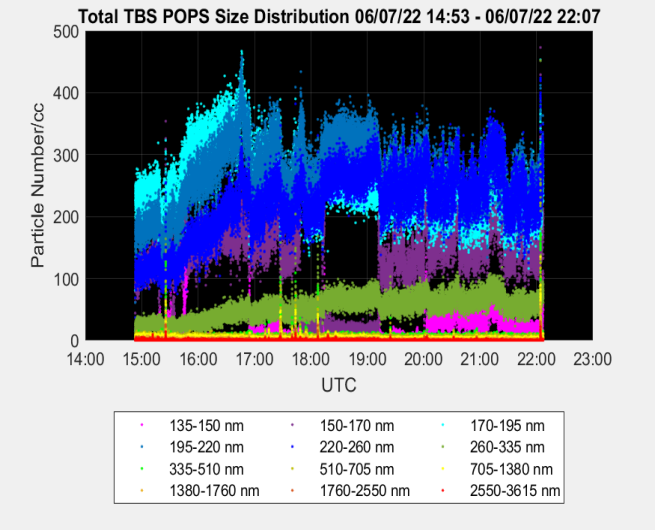


Profile2:
Added MAGIC CPC.
Launched 15:30.
Ascended to 115m and TA of 39 in 10 m/s.
Gusts of 12 m/s on descent.
Surfaced at 15:46.

Flight2:
R1046 & XQ2 61152
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz

Profile 1:
Launched 16:52.
Ascended to 300m at 17:06.
Surfaced at 17:18.

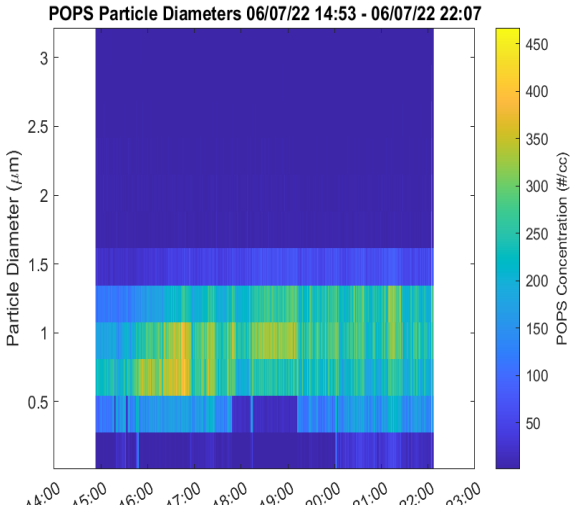
Profile 2:
Added CPC2
Launched 17:26.
Ascended to 300m at 17:38.
Surfaced at 17:50.
CPC did not record.



Profile 3:
Launched 17:52.
Ascended to 250m at 18:03.
Surfaced at 18:13.

Flight3:
R1046 & XQ2 61152
STAC (15 minute delay at 19:01, 20 minute samples, IM 8-11)
TBI4 (19:10 - 19:59)
POPS229 w/ dryer & iMet 402 MHz

Launched 19:04
STAC8, 19:16 - 19:35, 80m - 80m, 0m ascending - 150m ascending
STAC9, 19:36 - 19:55, 80m - 145m, 80m ascending - 290m ascending
Surfaced 20:00.



Flight4:
R1046 & XQ2 61152
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz

Profile1:
Launched 20:02
Ascended to 400m at 20:20.
Surfaced at 20:35.

Profile2:
Launched 20:39
Ascended to 410m at 20:54. 13.5 m/s surface gust.
Surfaced at 21:09.

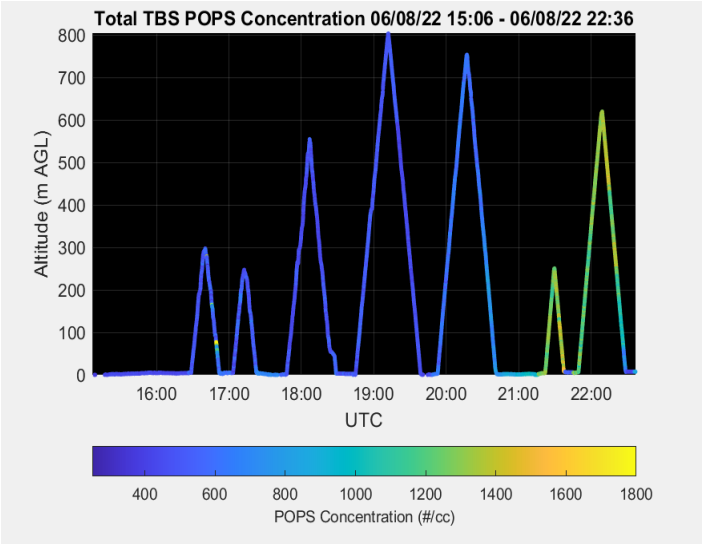
Profile3:
Launched 21:13.
Ascended to 600m at 21:45 and began descent due to approaching cloud base.
Surfaced 22:08.


06/07/2022
12:41


06/07/2022
13:33

Daily HOU S3 TBS Flight Summary

Date: 06/08/22
Authors: Dexheimer, Longbottom, Peterson, Zimmer
Platform: TBS: 122 m^3 aerostat, Great White

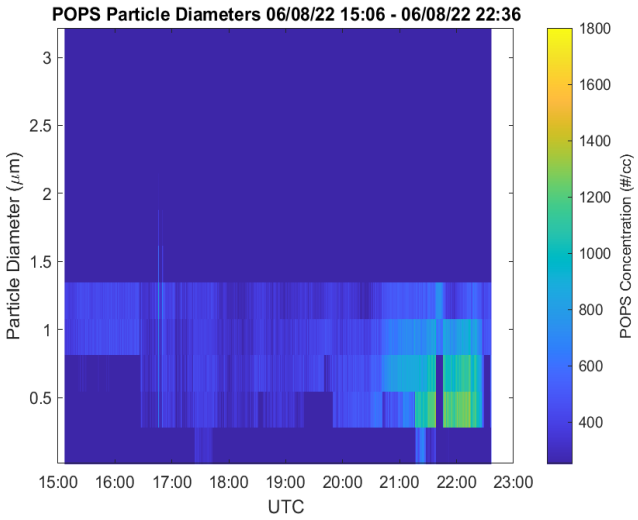


Instruments flown:
Flight 1:
31 C, winds SSE at 4-9 m/s, 80% clouds, CB ~700m
POPS bins 2-5 > 150 #/cc, bin 4 max.
Ground fog at 14-15Z.
First day of TBAC operation.

R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz

Profile 1:
Launched at 16:28
Ascended to 300m at 16:40 and began descent, gusts to 10m/s.
Surface gust to 10.5 m/s.
Surfaced 16:54.

Profile 2:
Added MAGIC CPC.
Launched 17:03.
Ascended to 250m at 17:12.
Surfaced at 17:22.



Flight2:
R1046 & XQ2 61152
STAC (10 minute delay at 17:38, 20 minute samples, IM 1-4)
TBI4 (17:41 - 18:31)
POPS229 w/ dryer & iMet 402 MHz

Launched 17:45.
STAC1, 17:48 - 18:07, 0m - 550m, 0m ascending - 550m descending
STAC2, 18:08 - 18:27, 550m - 0m, 550m descending - 0m descending
Surfaced 18:30.

Flight3:
R1046 & XQ2 61152

MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC2

Launched 18:41.
Ascended to 800m at 19:11.
Surfaced at 19:39.

STAC samples processed.

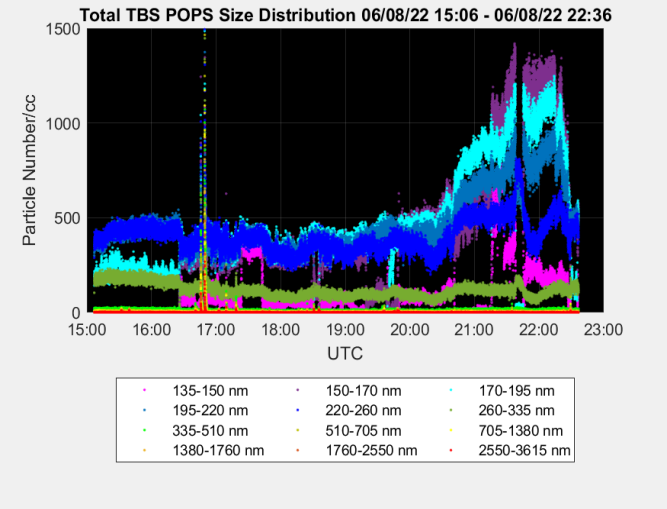
Flight4:
R1046 & XQ2 61152
DTS
STAC (10 minute delay at 19:45, 20 minute samples, IM 1-4)
TBI4 (19:48 - 20:42)
POPS229 w/ dryer & iMet 402 MHz
CPC2

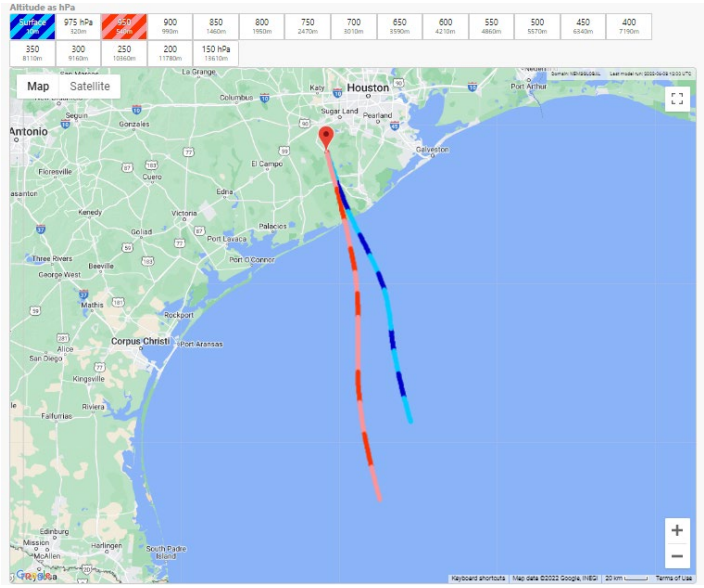
Launched 19:51.
STAC1, 19:58 - 20:17, 175m - 700m, 175m ascending - 750m descending
STAC2, 20:18 - 20:37, 700m - 100m, 700m descending - 100m descending
Surfaced 20:40.

Flight5:
DTS
R1046 & XQ2 61152
MAGIC CPC
POPS229 w/ dryer & iMet 402 MHz
CPC2

Profile1:
Very elevated POPS concentrations. Bin 1 > 1000 #/cc.
Launched 21:23.
Ascended to 250m and began descent because MAGIC CPC reached thermal limit.
Surfaced at 21:37.

Profile2:
Replaced with second MAGIC CPC.
Added AE-51 at surface and MA200 aloft.
Launched 21:49.
POPS concentrations increasing with height.
Ascended to 625m and began descent. Low cloud overhead.
Surfaced at 22:30.
Concentrations much reduced at surface.



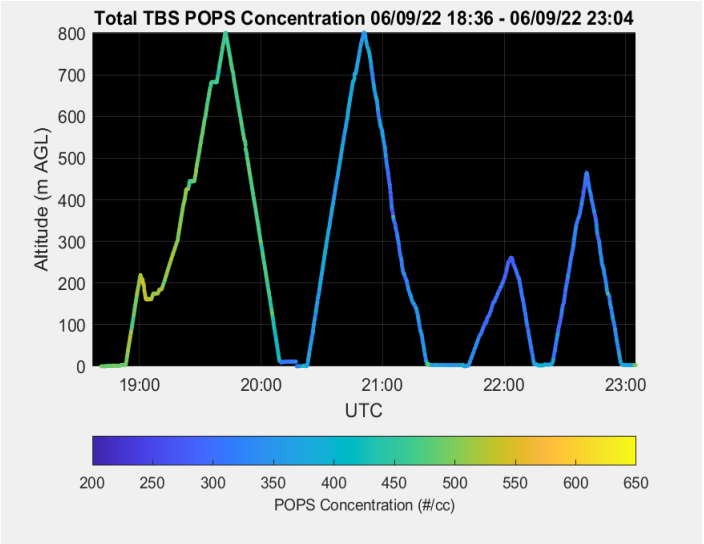


21Z 12-hr backward trajectory.


06/08/2022
14:32

Daily HOU S3 TBS Flight Summary

Date: 06/09/22
Authors: Dexheimer, Longbottom, Ruiz, Tezak
Platform: TBS: 122 m^3 aerostat, Great White

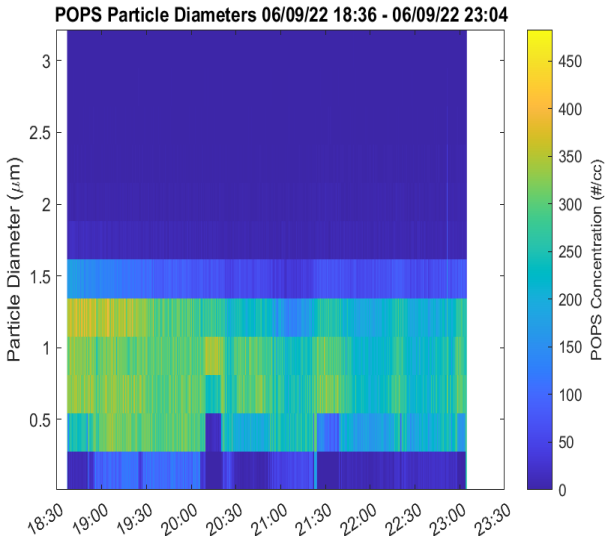


Instruments flown:

Flight1:
R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz
MAGIC CPC
CPC2

Launched 18:50.
Ascended to 250m under convective cloud and began to spin so began descent.
Strong downdraft under cloud.
Slow ascent around clouds.
Ascended to 800m at 19:42 and began descent.
Surfaced 20:09.

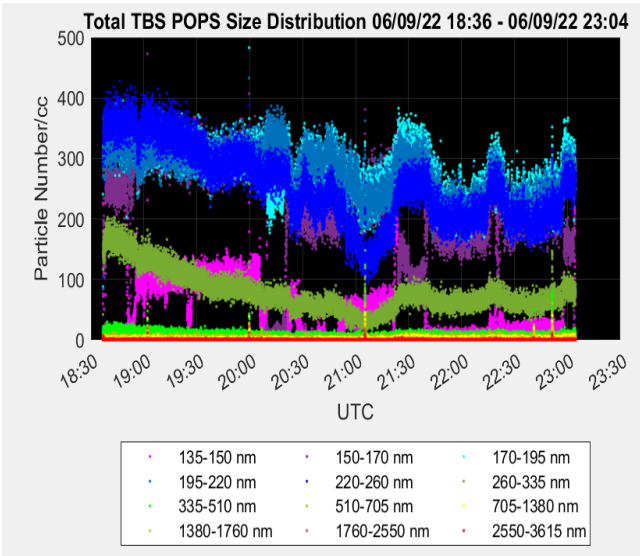
Flight2:
R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz
STAC (5 min delay at 20:15, 20 minute samples, IM3-6)
TBI4 (20:19 - 21:22)
CPC2

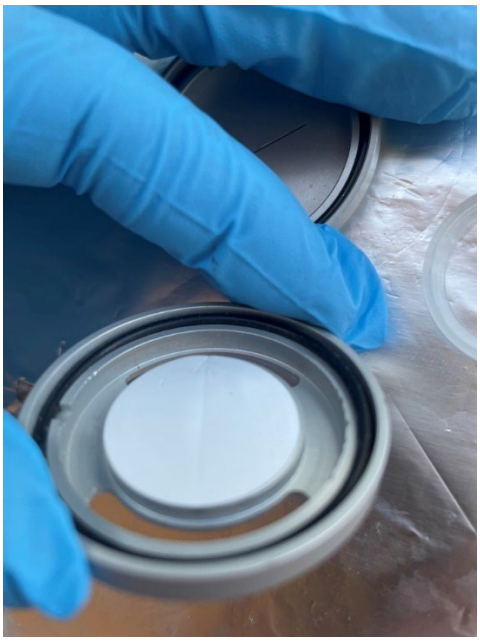


Launched 20:17
STAC3, 20:20 - 20:39, 0m - 500m, 0m ascending - 500m ascending
STAC4, 20:40 - 20:59, 500m - 550m, 500m ascending - 800m descending
STAC5, 21:00 - 21:19, 550m - 50m, 550m descending - 50m descending
Surfaced at 21:21

Flight3:
R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz
STAC (5 min delay at 21:35, 1 hr sample, IM7 - bulk sample)
TBI4 (21:38 - 22:16)
MA200
AE51 on surface

Launched 21:37.
STAC7, 21:40 - 22:39, 0m - 450m, 0m ascending - 450m ascending
Surfaced at 22:14.
Removed TBI4
Added Magic CPC
Launched 22:21.
Ascended to 450m at 22:40, and began descent
Surfaced at 22:58.





Visible line on airborne TBL.

TBS aloft at 14:42.

Daily HOU S3 TBS Flight Summary

Date: 06/10/22
Authors: Dexheimer, Longbottom, Ruiz, Tezak
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
29 C, winds SSW at 3-7 m/s, 70% clouds, CB 400m
POPS bins 1-4 > 100 #/cc, bin 3 max.
Lower aerosol concentration than previous days.

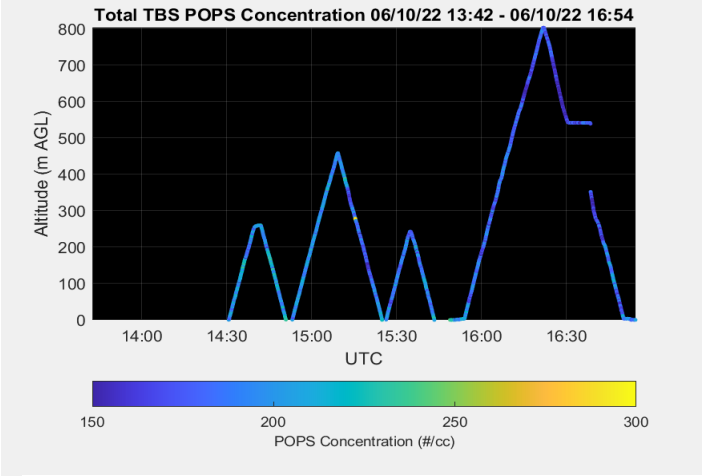
R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz
MAGIC CPC
CPC2
Launched 14:23.
Decreasing aerosol concentration with height.
Ascended to 260m below clouds and began descent.
Conducted second profile to 460m at 15:08 and began descent.
CB increased to approximately 600m.
Conducted third profile to 250m at 15:34 and began descent to change Magic CPC settings due to overheating.
Surfaced 15:43.

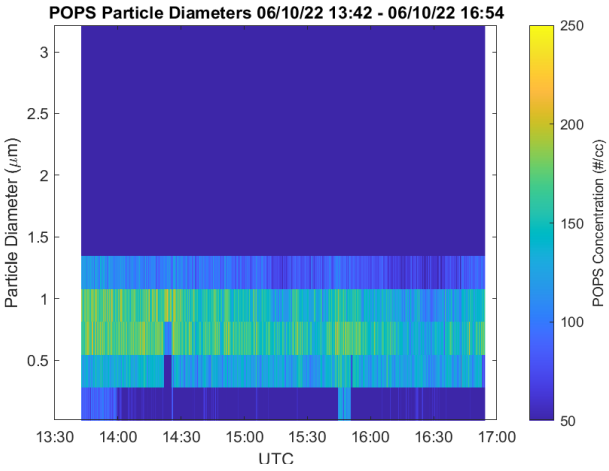
Flight2:
R1046 & XQ2 61152
POPS229 w/ dryer & iMet 402 MHz
STAC (8 min delay at 15:42, 20 min sample, IM7-10)
TBI4 (15:49 - 16:53)
MA200
AE51 on surface

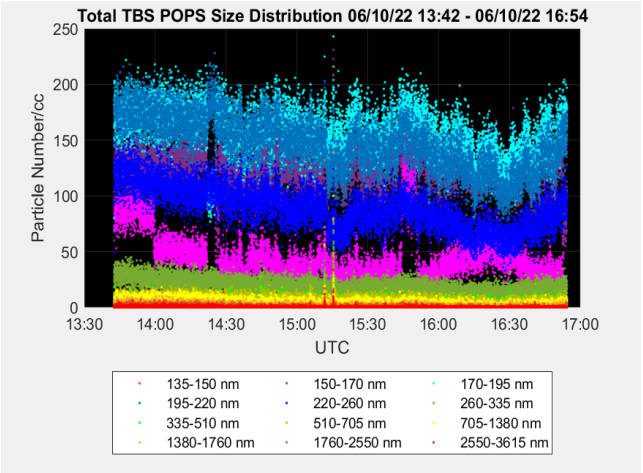
Launched 15:50.
STAC7, 15:50 - 16:09, 0m - 480m, 0m ascending - 480m ascending
STAC8, 16:10 - 16:29, 480m - 800m, 480m ascending - 800m ascending
STAC9, 16:30 - 16:49, 550m - 0m, 550m descending - 0m descending
iMet powered off during flight.
Surfaced at 16:50.

34C, winds SSW at 4-6 m/s, 70% cloud cover, CB 1 km
Flight3:
R1046 & XQ2 55512
POPS221 & iMet 402 MHz & Ozonesonde 2Z39428
*No dryer setup on POPS for this flight.
MAGIC CPC
CPC2

Launched 17:50.
Profile 1:
Ascended to 635m and began descent.
Surfaced at 18:38.
Profile 2:
Added DTS at 18:40.
Launched 18:50.



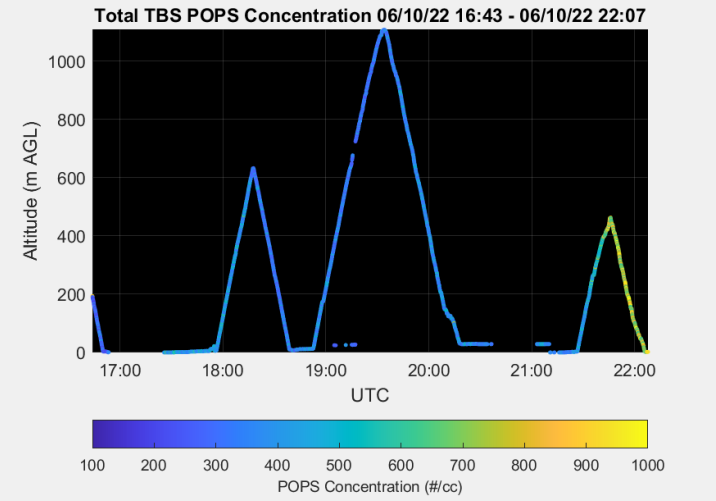


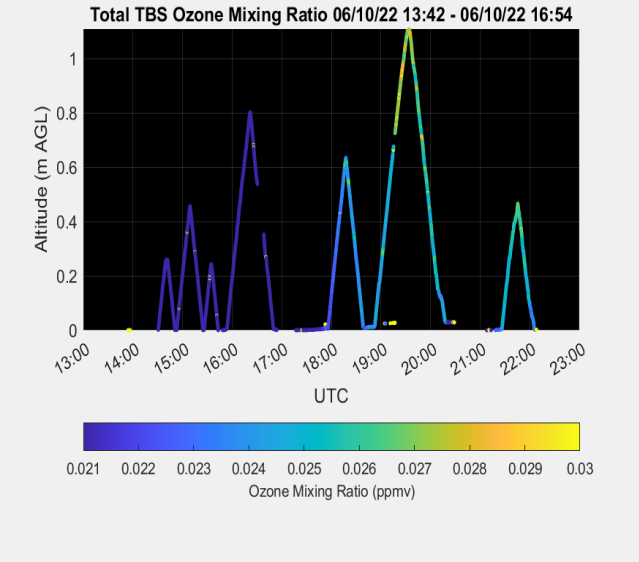


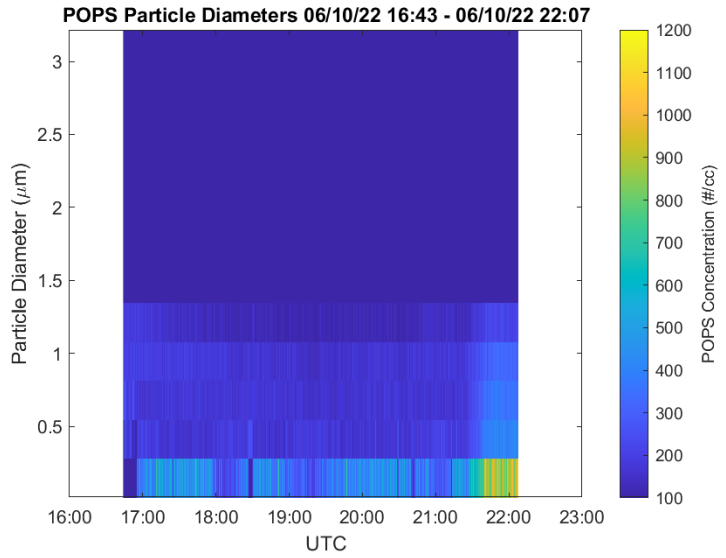
Elevated concentration in bin0.
Ascended to 1.11km at 19:32 and began descent.
Surfaced at 20:17

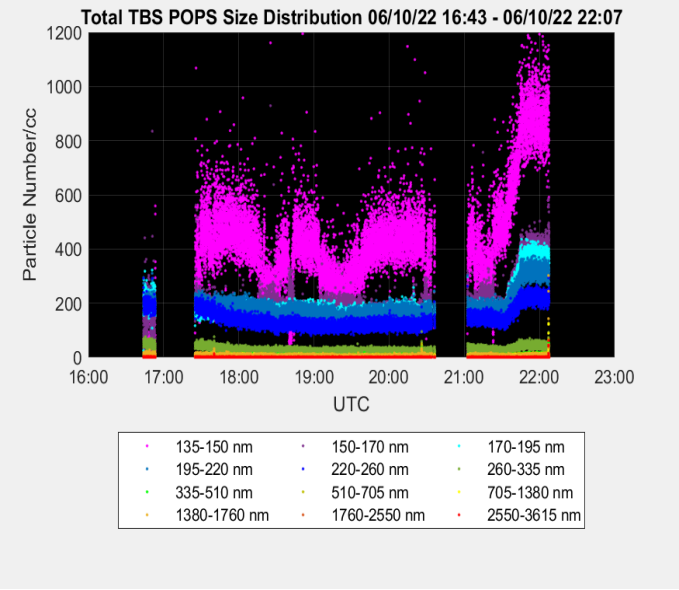
Flight 4:
38C, winds SSW at 4-8 m/s, 20% cloud cover, base ~1.5 km
POPS bin 0 max, > 450 #/cc.
R1046 & XQ2 55512
POPS221 & iMet 402 MHz & Ozonesonde 2Z39549
MAGIC CPC
MegaVOC (20 minute samples, started 21:20)

Launched 21:20.
Bin 0 increasing with height.
MegaVOC1, 21:25 - 21:44, 0m -465m
MegaVOC2, 21:45 - 22:04, 465m -0m
POPS counts almost 1000 #/cc in bin 0 at ~350m.
Surfaced at 22:05.



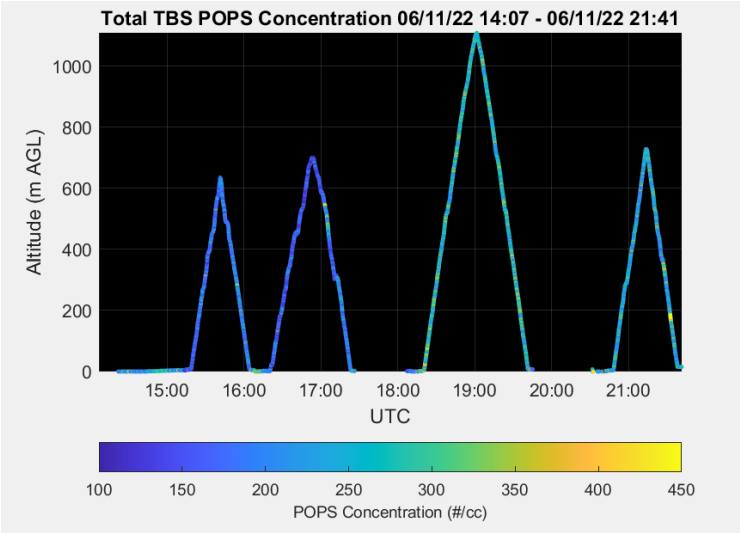



POPS Particle Diameters 06/10/22 16:43 - 06/10/22 22:07
Particle Diameter (μm)
3
2.5
2
1.5
1
0.5
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
UTC
1200
1100
1000
900
800
700
600
500
400
300
200
100
POPS Concentration (#/cc)


Total TBS POPS Size Distribution 06/10/22 16:43 - 06/10/22 22:07
Particle Number/cc
1200
1000
800
600
400
200
0
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
UTC
135-150 nm
150-170 nm
170-195 nm
195-220 nm
220-260 nm
260-335 nm
335-510 nm
510-705 nm
705-1380 nm
1380-1760 nm
1760-2550 nm
2550-3615 nm

Daily HOU S3 TBS Flight Summary

Date: 06/11/22
Authors: Dexheimer, Longbottom, Ruiz, Tezak
Platform: TBS: 122 m^3 aerostat, Great White



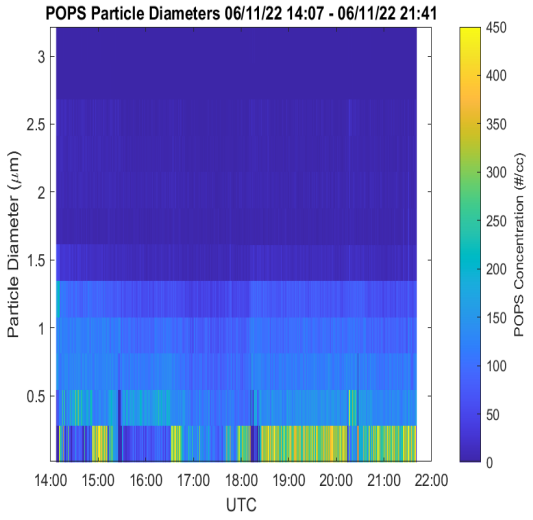
Instruments flown:
Flight1:
30 C, winds SSW at 3-6 m/s, 40% clouds, CB ~600m
POPS bins 2-4 > 75 #/cc, bin 3 max.

R1046 & XQ2 61152
POPS221 & iMet 402 MHz & Ozonesonde 2Z39428
MAGIC CPC
CPC2

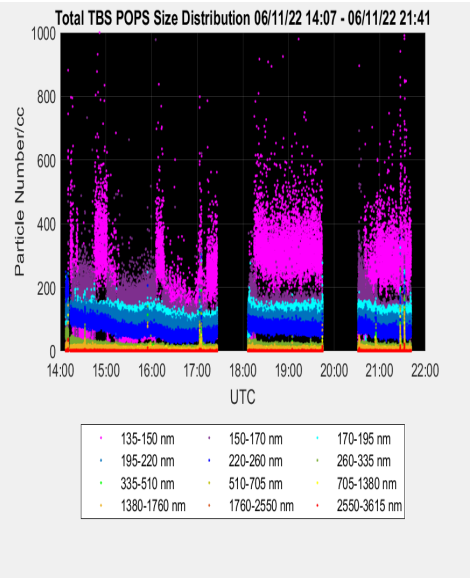
Launched 15:10.
CB has increased to ~800m.
Ascended to 635m at 15:41 and began descent.
Surfaced at 16:04.

Flight 2:
33C, winds SSW 4-8 m/s, 40% clouds, CB ~ 1 km
DTS
R1046 & XQ2 61152
POPS221 & iMet 402 MHz & Ozonesonde 2Z39428
STAC (10 minute delay at 16:00, 20 minute samples, IM10 - 13)
TBI4 (16:13 - 17:26)
MA200
AE51 at surface

Launched at 16:08.
STAC10, 16:10 - 16:29, 0m - 200m, 0m ascending - 200m ascending
STAC11, 16:30 - 16:49, 200m - 640m, 200m ascending - 700m ascending
STAC12, 16:50 - 17:09, 640m - 320m, 700m descending - 320m descending
STAC13, 17:10 - 17:29, 320m - 0m, 320m descending - 0m descending
POPS cable ripped out of connector at 50m AGL on descent.
Surfaced at 17:26.



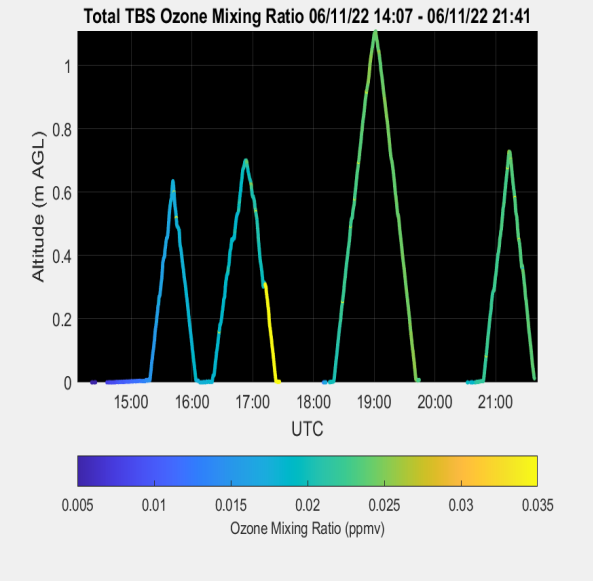
Flight 3:
34C, SSW winds 3 - 8 m/s, 50% clouds, CB ~1 km
Bin0 max.
DTS
R1046 & XQ2 55512
POPS221 & iMet 402 MHz & Ozonesonde 2Z39428
MAGIC CPC
MegaVOC (5 minute delay at 18:10, 3 20 minute samples)
CPC2



Launched at 18:15.
MEGAVOC1, 18:15 - 18:34, 0m ascending - 435m ascending
MEGAVOC2, 18:35 - 18:54, 435m ascending - 975m ascending
MEGAVOC3, 18:55 - 19:14, 975m ascending - 1.11 km maximum - 760m descending
Ascended to 1.11 km at 19:00.
Smoke plume to SSW at 19:00.
Surfaced at 19:45.
XQ2 was not turned on.

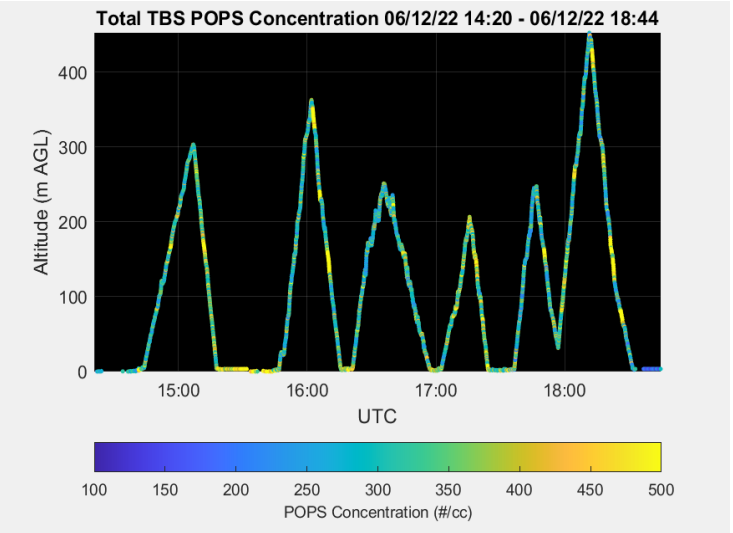
Flight 4:
38C SSW winds 3 - 8 m/s, 50% clouds, Cirrus deck approaching from west, lower deck ~1 km
Bin0 max.
DTS
R1046 & XQ2 55512
POPS221 & iMet 402 MHz & Ozonesonde 2Z39428
MAGIC CPC
CPC2

Launched 20:45.
Ascended to 730m at 21:13 and began descent.
Surfaced at 21:39.



Daily HOU S3 TBS Flight Summary

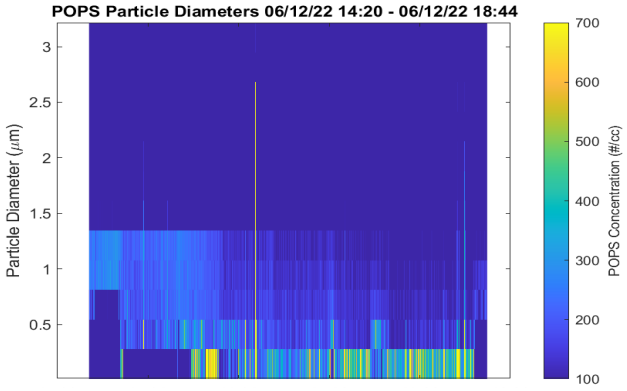
Date: 06/12/22
Authors: Dexheimer, Longbottom, Ruiz, Tezak
Platform: TBS: 122 m^3 aerostat, Great White



Instruments flown:
Flight1:
R1046 & XQ2 61152
POPS221 & iMet 402 MHz
Light payload to test wind speeds.

Launched 14:43.
Ascended to 300m at 15:07 and began descent.
Surfaced at 15:22.

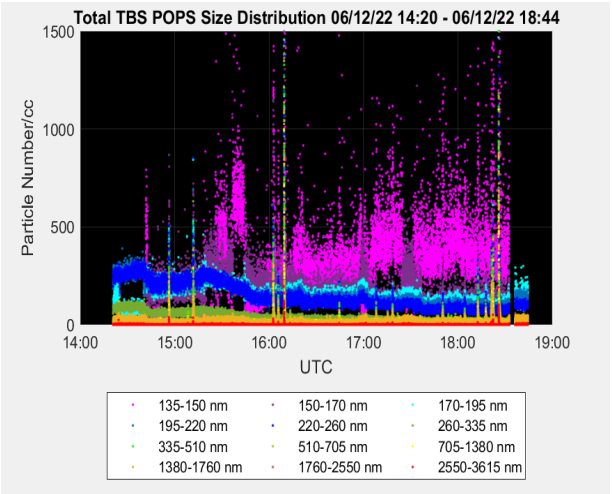
Flight 2:
32C, SSW winds 5 - 9 m/s, 40% clouds, CB ~600m
POPS bins 2-4 > 150 #/cc, bin 1 max.
R1046 & XQ2 61152
MAGIC CPC
POPS221 & iMet 402 MHz & Ozonesonde 2Z39478
CPC2



Profile 1:
Launched 15:48.
Bin0 increasing with height.
Ascended to 350m at 16:01 and began descent.
POPS counts increased to ~300-500 in bin 0-2 during descent .
Surfaced at 16:15.

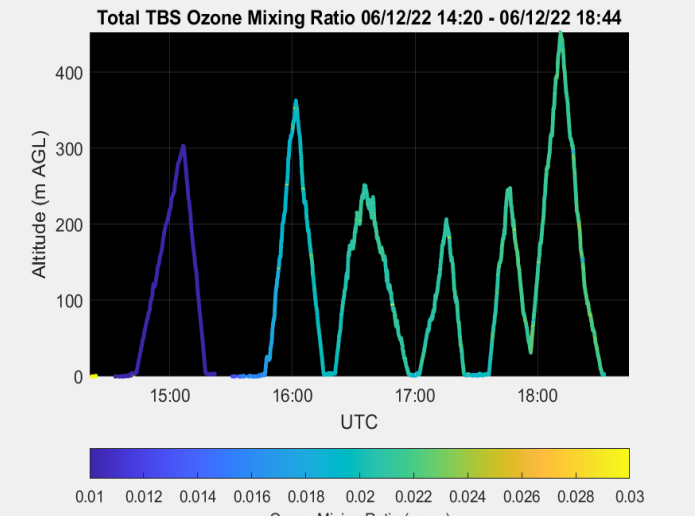
Profile 2:
Added MegaVOC (5 minute delay at 16:18, 3 20 minute samples)
Launched at 16:20.
Bin0 maximum now.
MEGAVOC1, 16:23 - 16:42, 70m ascending - 250m maximum - 170m descending
MEGAVOC2, 16:43 - 17:02, 170 m descending - 0m descending
Removed MAGIC CPC at 16:59 due to loss of temperature setpoint control. CPC2 also removed.
MEGAVOC3, 17:03 - 17:23, 0m ascending - 200m maximum - 0m descending.
Low altitude flights in high winds.
Surfaced at 17:23.

Flight 3:
35C, SSW winds 5 - 10 m/s, 40% clouds, CB ~1 km
POPS bins 0 > 300.
Consistent winds of 10-11 m/s aloft.
R1046 & XQ2 61152
POPS221 & iMet 402 MHz & Ozonesonde 2Z39478
STAC (10 minute delay at 17:21, 20 minute samples, IM1-3)



Launched 17:26.
STAC1, 17:31 - 17:50, 0m - 250m, 0m ascending - 250m ascending
STAC2, 17:51 - 18:10, 150m - 450m, 150m descending - 450m descending
STAC3, 18:11 - 18:30, 450m - 0m, 450m descending - 0m descending
Surfaced at 18:32.

Flight 4:
35C, SSW winds 5 - 9 m/s, 40% clouds, CB ~1 km
R1046 & XQ2 55512
RAVEN
MAGIC CPC
POPS229 & iMet 402 MHz & Ozonesonde 2Z39549
MA200



Profile1:
Launched 19:14.
Ascended to 185m at 19:26 and began descent.
Several gusts over 10 m/s at surface.
Surfaced at 19:34.

Profile2:
Launched 21:14.
Added MegaVOC (5 minute delay at 21:14)
Removed MAGIC CPC

MEGAVOC1, 21:19 - 21:38, 0m - 415m max - 310m
MEGAVOC2, 21:39 - 21:58, 310m - 0m minimum.
Unit removed from tether at 21:51 so Meghan could check on overheating.
Surfaced at 21:51.


Flight 4 launch.

Daily HOU S3 TBS Flight Summary

Date: 06/13/22
Authors: Dexheimer, Longbottom, Ruiz, Tezak
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
30 C, winds S at 2-4 m/s, clear, ground fog and haze
POPS bins 1-3 > 200, bin1 max.

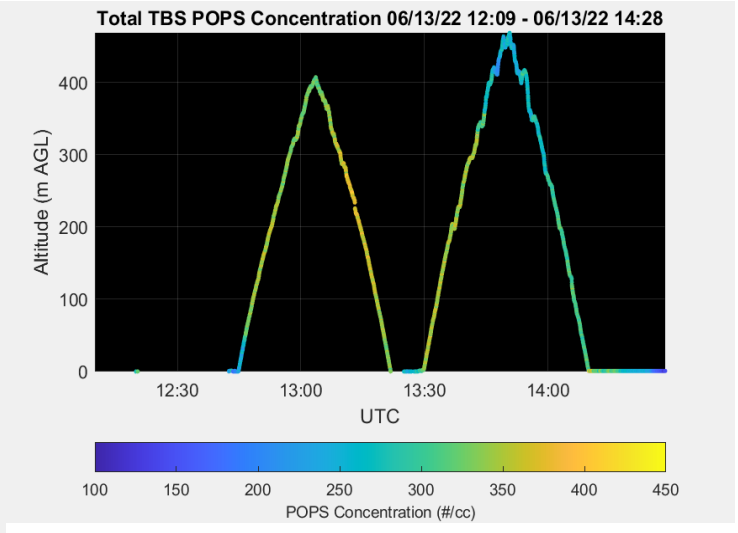
Flight 1:
R1046 & XQ2 61152
RAVEN
POPS221 & iMet 402 MHz
STAC (7 min delay at 12:34, 20 min samples, IM 4-7)
CPC2
*Ozonesonde had negative flow rate correction at launch and did not make the flight.

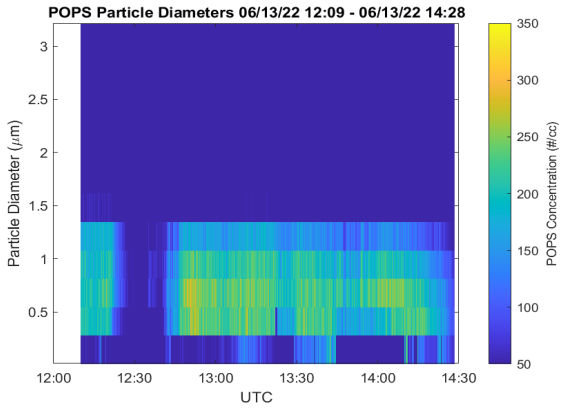
Launched 12:35.
STAC4, 12:41 - 13:00, 0m - 375m, 0m ascending - 375m ascending
STAC5, 13:01 - 13:20, 375m - 0m, 405m ascending - 0m descending
Winds aloft > 10 m/s, TA 42.
Surfaced at 13:21.

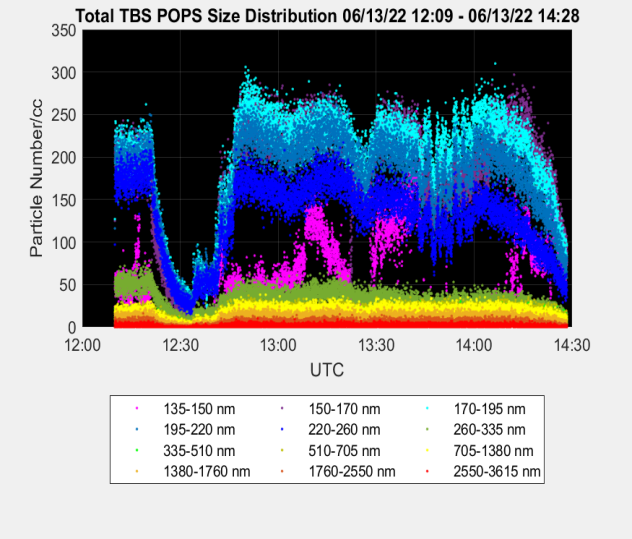
Flight 2:
R1046 & XQ2 61152
RAVEN (sonde1)
MAGIC CPC
POPS221 & iMet 402 MHz & Ozonesonde 2Z39549
CPC2
-200m RAVEN (sonde2)

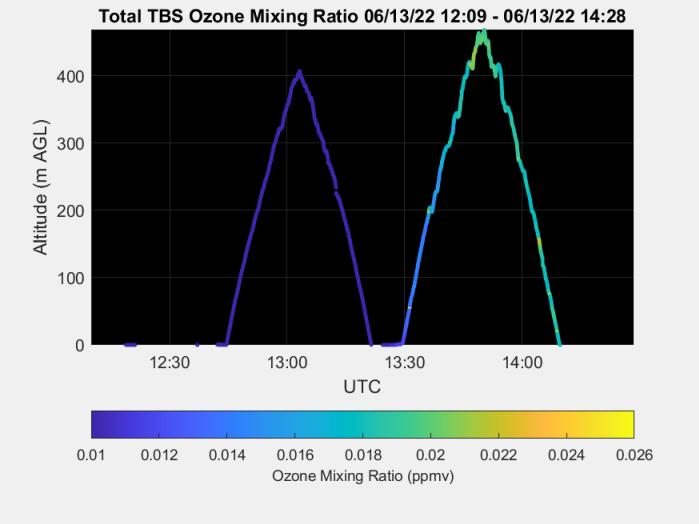
Launched 13:26.
Ascended to 465m at 13:49 and began descent.
iMetRH saturated.
Surfaced at 14:12.

Skirt partially ripped from balloon upon descent.
Ended flights for the day due to expected high winds.
Skirt patched but requires 18 hours for cure.








Total TBS Ozone Mixing Ratio 06/13/22 12:09 - 06/13/22 14:28
Altitude (m AGL)
0
100
200
300
400
12:30
13:00
13:30
14:00
UTC
0.01
0.012
0.014
0.016
0.018
0.02
0.022
0.024
0.026
Ozone Mixing Ratio (ppmv)

Daily HOU S3 TBS Flight Summary

Date: 06/14/22
Authors: Dexheimer, Longbottom
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
30C, S wind 2 - 5 m/s, intermittent clouds at ~550m from S
POPS bins 3-6 > #/cc, bin 2 max

POPS229 displaying very low counts at boot. Had to use 138 due to 221 digitizer problem.

Flight1:
First flight with repaired skirt.
R1046 & 61152 XQ2
PAVEN 1
POPS 138 & iMet 405 & Ozonesonde 2Z39428
-150m (150m AGL) RAVEN 2
-100m (250m AGL) RAVEN 3

Launched 12:58.
Ascended to 375m. Descended once reached consistent 9 m/s winds and 40 degree tether angle to check on skirt integrity.
Surfaced at 13:34.

Flight2:
R1046 & 61152 XQ2
RAVEN 1
POPS 138 & iMet 405 & Ozonesonde 2Z39428
MAGIC CPC
-150m (150m AGL) RAVEN 2
-120m (270m AGL) RAVEN 3
Launched 13:37.
Frequent clouds now from south at ~600m.
Some thunderstorms on eastern edge of Galveston Bay.
Ascended to ~150m below cloud base, 450m at 13:55.
Surfaced at 14:12.

Flight3:
R1046 & 61152 XQ2
RAVEN 1
POPS 138 & iMet 405 & Ozonesonde 2Z39428
STAC (7 minute delay at 14:09, 20 min samples, IM6-9)
-150m (150m AGL) RAVEN 2
-120m (270m AGL) RAVEN 3

Launched 14:14.
STAC6, 14:16 - 14:35, 0m - 500m, 0m ascending - 500m ascending
STAC7, 14:36 - 14:55, 500m - 0m, 500m descending - 0m descending
Surfaced at 14:55.

Flight 4:
R1046 & 61152 XQ2
RAVEN 1

Balloon ascending below clouds on Flight 3.

POPS 138 & iMet 405 & Ozonesonde 2Z39428
MAGIC CPC
CPC2
-150m (150m AGL) RAVEN 2
-130m (280m AGL) RAVEN 3

Launched 14:59.
Surfaced winds gusting over 9 m/s.
CB has increased to ~700m.
Ascended to 500m at 15:24 and began descent.
Surfaced at 15:45.

Flight 5:
R1046 & 55512 XQ2
RAVEN 1
POPS 138 & iMet 405 & Ozonesonde 2Z39549
TBI4 (17:25 - rrd
CPC2
-150m (150m AGL) RAVEN 2
-130m (280m AGL) RAVEN 3

Launched 17:24.
Aborted at 17:35 due to high winds at launch.

Showers at 16:30 that aborted first flight attempt.

Daily HOU S3 TBS Flight Summary

Date: 07/02/22
Authors: Dexheimer, Longbottom
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
31 C, winds S at 4-7 m/s, Scattered Cu CB 800m
POPS bins 0-1 = 0, bin 3 max - was bin 4 before aborted flight

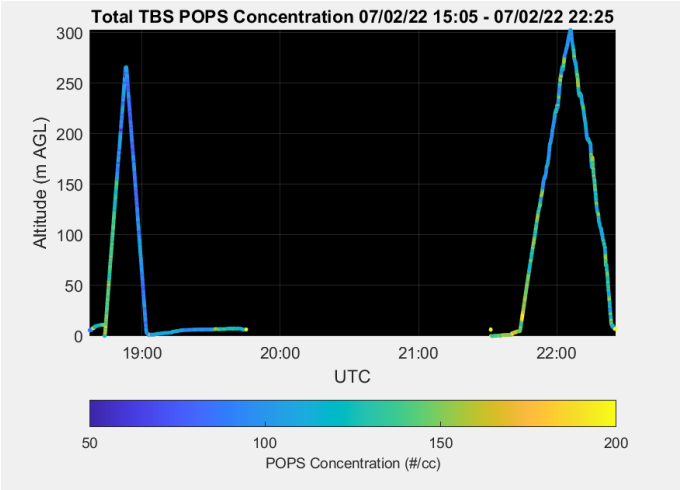
R1046 & XQ2 55345
POPS308 & iMet 402 MHz
STAC (7 min delay at 18:36, 20 min samples, IM 1-6)
MA200
CPC2
AE-51 at surface

Attempted launch at 15:56. Aborted due to rapid cell development and approach from SW.
Precip at 16:36 - 18:00. Popup awning over samplers destroyed in 11 m/s gust.

Launched 18:36.
STAC1, 18:43 - 19:02, 0m - 0m, 0m ascending - 265m descending
Ascended to 265m and began descent due to cells forming to south.
Surfaced at 19:03.

Intermittent precip from 19:10 - 21:30.

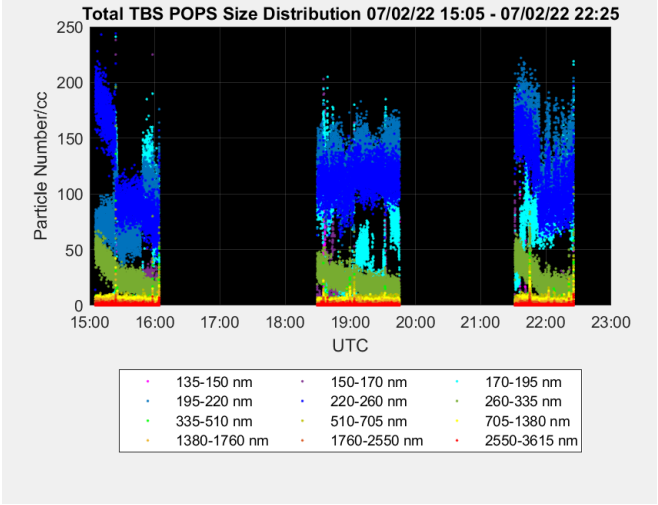
Flight 2:
33 C, winds S at 2-4 m/s, Scattered Cu CB 800m

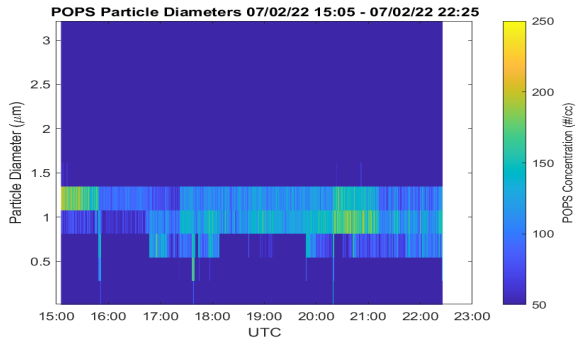


POPS bins 0-1 = 0, bin 3 max

R1046 & XQ2 55345
POPS308 & iMet 402 MHz
STAC (8 min delay at 21:37, 20 min samples, IM 2-6)
MA200
CPC2
TBI 4 (21:39 - 22:25)
AE-51 at surface

Launched 21:38.
CPC concentration much higher than Flight 1.
STAC2, 21:45 - 22:04, 0m - 300m, 0m ascending - 300m descending
Towering cumulus developing overhead and rain to north on radar.
STAC3, 22:05 - 22:24, 300m - 0m, 300m descending - 0m descending
Surfaced 22:25.



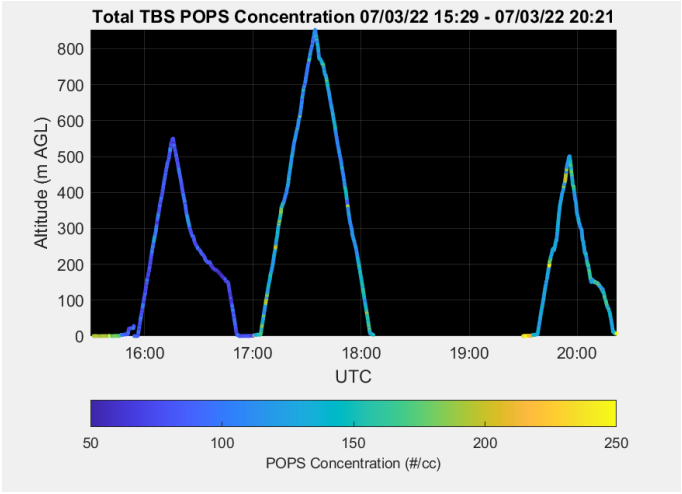


Daily HOU S3 TBS Flight Summary

Date: 07/03/22
Authors: Dexheimer, Longbottom
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
30 C, winds S at 4-7 m/s, Scattered Cu CB 900m, light precip to east
POPS bins 0 = 0, bin 3 max, conc higher than on 7/2

Profile 1:
R1046 & XQ2 44488
POPS308 & iMet 402 MHz
STAC (7 min delay at 15:42, 20 min samples, IM 4-9)
TBI4 (15:48 - 18:06)
MA200
CPC2
AE-51 at surface



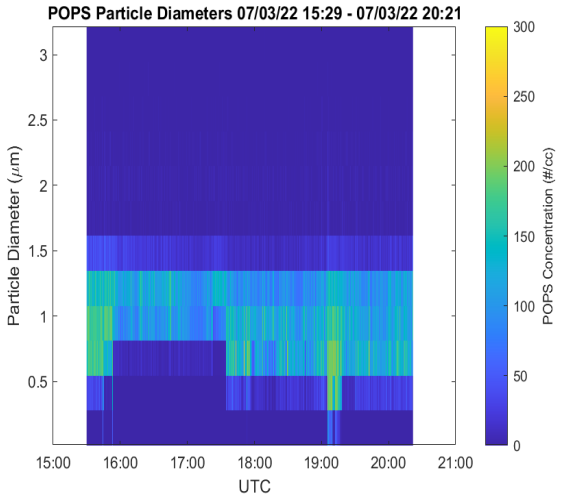
Launched 15:45.
STAC4, 15:49 - 16:08, 0m - 375m, 0m ascending - 375m ascending
Aborted ascent when computer restarted unexpectedly.
Relaunched 15:56.
STAC5, 16:09 - 16:28, 375m - 250m, 550m descending - 250m descending
Cloud directly above balloon ended ascent.
STAC6, 16:29 - 16:48, 250m - 0m, 250m descending - 0m descending
Surfaced 16:51.

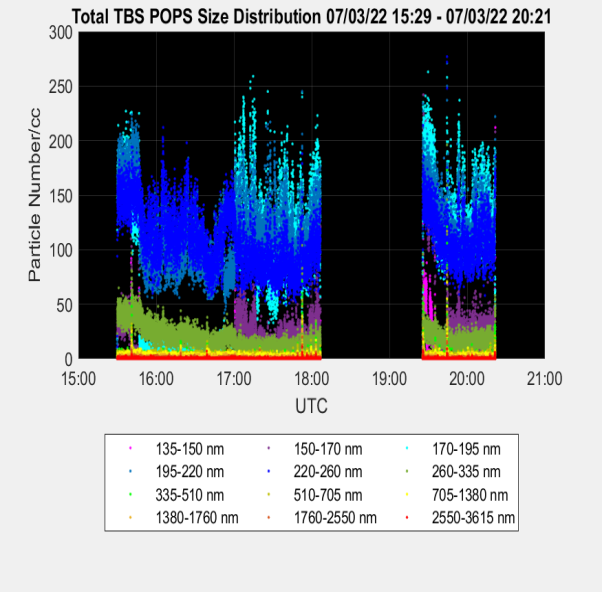
Profile 2:
STAC7 bulk impactor, 17:05 - 18:04, 0m - 0m, 0m ascending - 850m ascending
Launched 17:02.
Ascended to 850m at 17:35.
Surfaced at 18:06.

Flight 2:
34 C, winds S at 4-8 m/s, Scattered Cu CB 1.2 km
POPS bins 0 = 0, bin 3 max

R1046 & XQ2 44483
POPS308 & iMet 402 MHz
STAC (7 min delay at 19:31, 20 min samples, IM 8-11)
TBI4 (19:34 - 20:21) **NEW FILTER FROM MORNING
MA200
CPC2
AE-51 at surface

Launched 19:36.
STAC8, 19:38 - 19:57, 0m - 500m, 0m ascending - 500m ascending
STAC9, 19:58 - 20:17, 400m - 0m, 400m descending - 0m descending
Airborne winds over 10 m/s and forecasted to increase.
Surfaced at 20:21.





Daily HOU S3 TBS Flight Summary

Date: 07/04/22
Authors: Dexheimer, Longbottom, Tezak
Platform: TBS: 122 m^3 aerostat, Great White

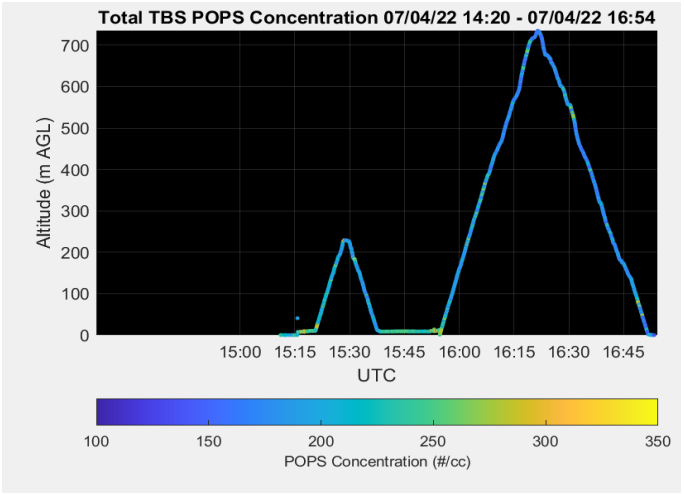
Instruments flown:

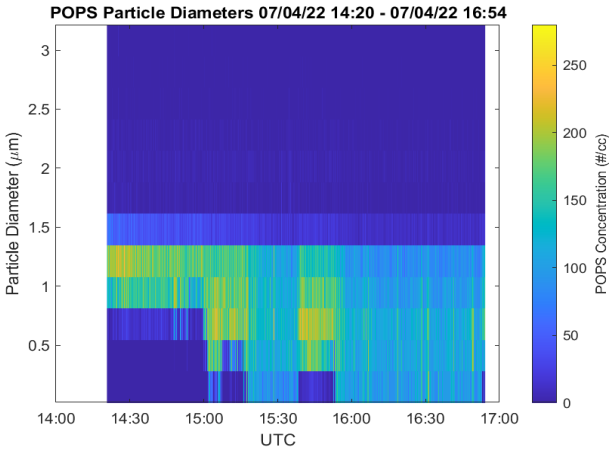
Flight1:

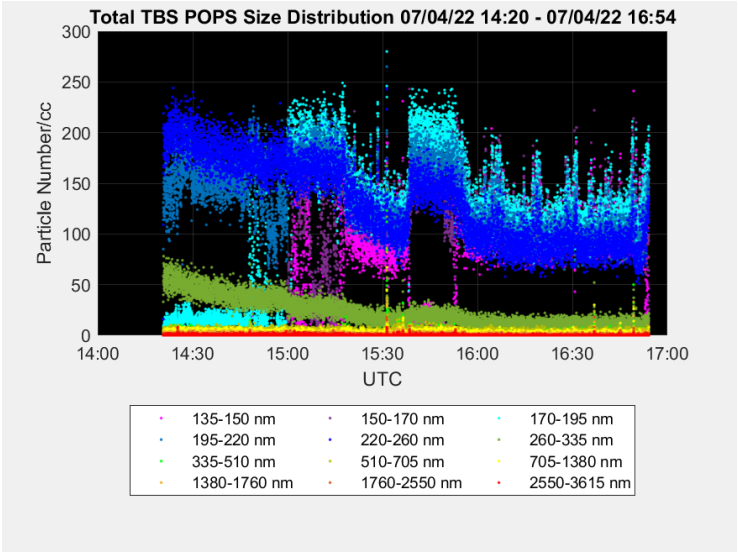
30 C, winds S at 4-7 m/s, Scattered Cu CB 800m
POPS bins 0-4 ~ 150, higher conc than 7/3

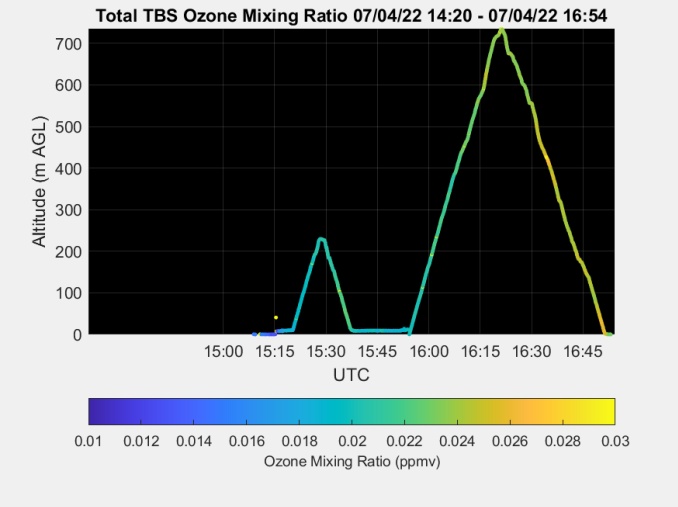
R1046 & XQ2 44488
POPS308 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (7 min delay at 15:14, 20 min samples, IM 1-4)
TBI4 (15:16-16:52)
MA200
CPC2
AE-51 at surface

Launched 15:15.
STAC1, 15:21 - 15:40, 0m - 0m, 0m ascending - 225m ascending
ADSB transponder not reporting, required immediate descent.
Battery voltage reporting 25 V, but transponder would not report.
Worked fine after battery replacement.
STAC restarted at 15:50 with 20 minute delay, IM2-5.
STAC2, 16:10 - 16:29, 450m - 550m, 450m ascending - 730m ascending
Cloud overhead.
STAC3, 16:30 - 16:49, 550m - 0m, 550m descending - 0m descending
Surfaced at 16:52.



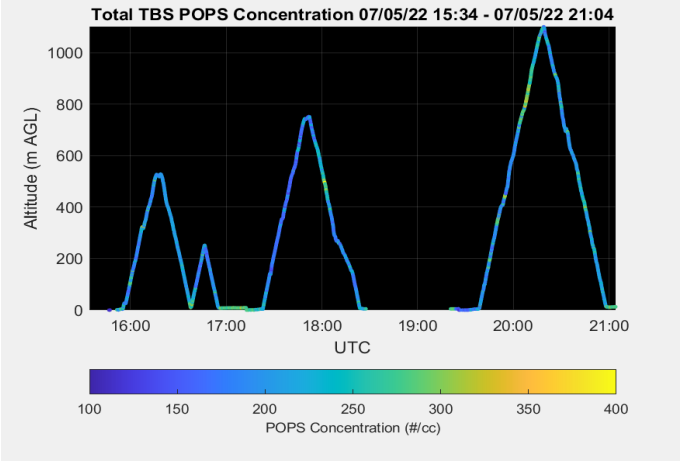






Daily HOU S3 TBS Flight Summary

Date: 07/05/22
Authors: Dexheimer, Longbottom, Tezak
Platform: TBS: 122 m^3 aerostat, Great White



Instruments flown:

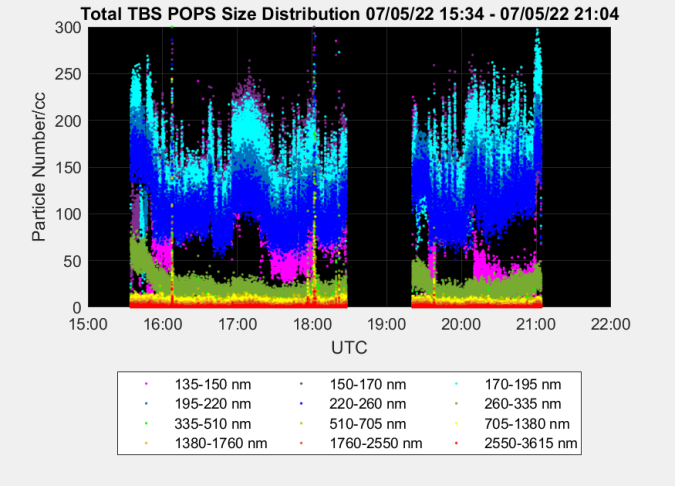
Flight1:

31 C, winds S at 4-7 m/s, Scattered Cu CB 700m, very light showers to east
POPS bins 0-4 ~ 150, higher conc than 7/4

Flight 1:

R1046 & XQ2 44488
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (7 min delay at 15:47, 20 min samples, IM 4-6)
TBI4 (15:50-18:24)
MA200
CPC2
AE-51 at surface
*Attempted DTS but hot bath heater had to be replaced.

Launched 15:50.
STAC4, 15:54 - 16:13, 0m - 450m, 0m ascending - 450m ascending
Ascended to 530m at 16:17. Descended as approached cloud overhead.
STAC5, 16:14 - 16:33, 450m - 120m, 530m descending - 120m descending
STAC6, 16:34 - 16:53, 120m - 0m, 0m ascending - 250m ascending
Ascended to 250m at 16:46.
Surfaced at 16:55.

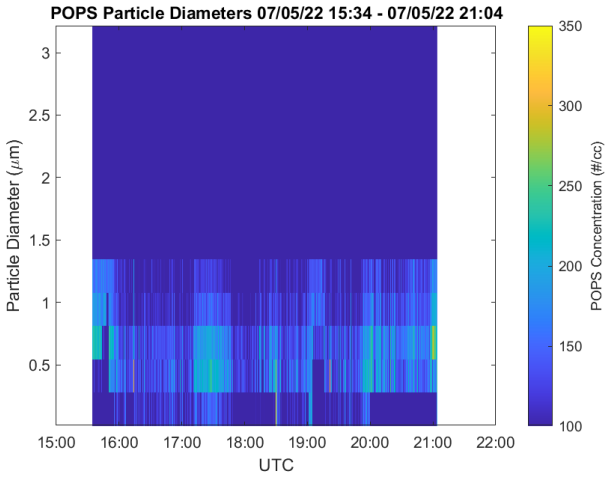


Flight 2:

33 C, winds S at 4-7 m/s, Scattered Cu CB 1 km
POPS bins 0-4 ~ 150

DTS
R1046 & XQ2 44488
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (7 min delay at 17:14, 1 hr bulk sample, IM 7)
TBI4 (15:50-18:24)
MA200
CPC2
AE-51 at surface

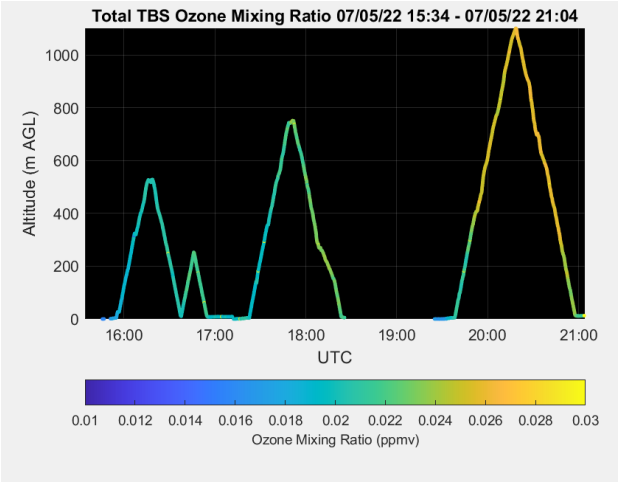
Launched 17:18.
STAC7, 17:21 - 18:20, 0m - 0m, 0m ascending - 750m ascending
Ascended to 750m and had to descend due to anemometer ground station antenna failure.
Surfaced 18:24.



Flight 3:
35 C, winds S at 4-7 m/s, Scattered Cu CB 1.5 km
POPS bins 0-4 ~ 100, conc lower than previous flight

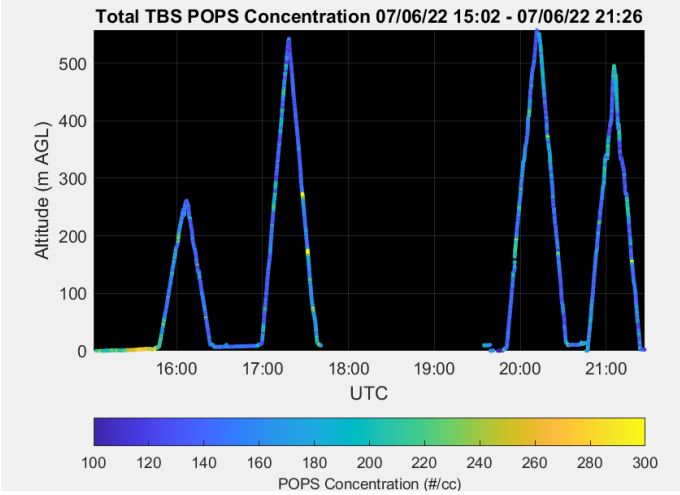
DTS
R1046 & XQ2 44488
POPS308 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (7 min delay at 19:31, 20 minute samples, IM 8-13)
MA200
CPC2
AE-51 at surface

Launched 19:31.
STAC8, 19:38 - 19:57, 0m - 550m, 0m ascending - 550m ascending
STAC9, 19:58 - 20:17, 550m - 1.1 km, 550m ascending - 1.1 km ascending
STAC10, 20:18 - 20:37, 1.1 km - 590m, 1.1 km descending - 590m descending
STAC11, 20:38 - 20:57, 590m - 0m, 590m descending - 0m descending
Surfaced 21:00.



Daily HOU S3 TBS Flight Summary

Date: 07/06/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White



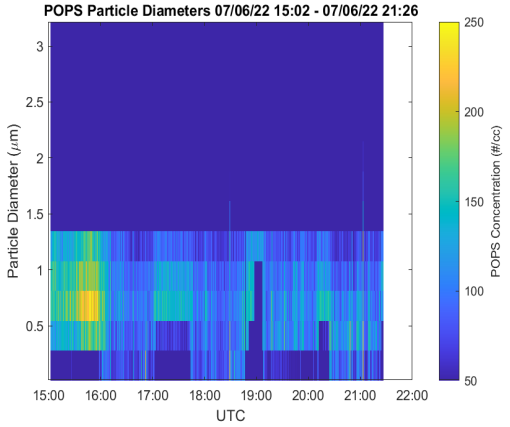
Instruments flown:

Flight1:

30 C, winds S at 2-6 m/s, Scattered Cu CB 1 km, light showers to east
POPS bins 1-4 ~ 150 #/cc

Flight 1:
R1046 & XQ2 44488 (found RH probe faulty when data was pulled)
POPS308 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (7 min delay at 15:39, 20 min samples, IM 1-4)
TBI4 (15:42-17:40)
MA200 (changed to dual spots)
CPC2
AE-51 at surface

Profile 1:
Launched 15:47.
STAC1, 15:46 - 16:05, 0m -260m, 0m ascending - 260m descending
STAC2, 16:06 - 16:25, 260m - 0m, 260m descending - 0m descending
Ascended to 260m at 16:06. Descended as convection started forming to the east.
Surfaced at 16:23.

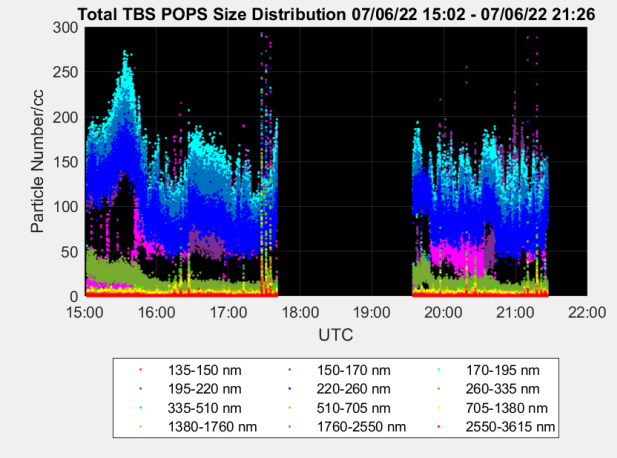


Profile 2:
STAC (7 min delay at 16:50, 20 min samples, IM 3-6)
Launched 16:59
STAC3, 16:58 - 17:17, 0m - 540m, 0m ascending - 540m descending
STAC4, 17:18 - 17:37, 540m - 0m, 540m descending - 0m descending
Surfaced at 17:37.

Flight 2:

35 C, winds S at 4-6 m/s, Scattered clouds CB 1.5 km,
POPS bin 1-4 ~ 50 #/cc

R1046 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z29477
STAC (7 min delay at 19:43, 20 min samples, IM 1-4)
TBI4 (19:46-21:25)
CPC2
AE-51 at surface



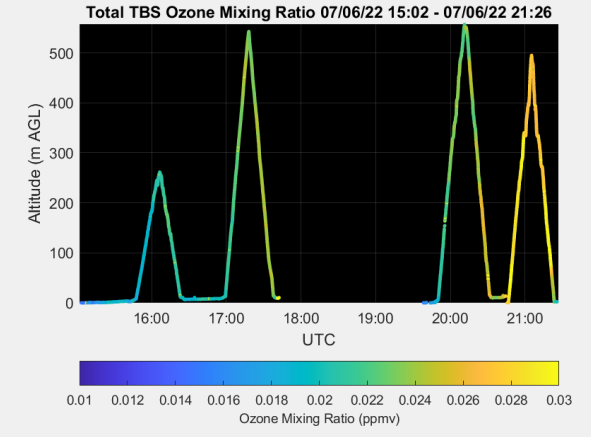
Profile 1:
Launched 19:51.
STAC1, 19:51 - 20:10, 0m -550m, 0m ascending - 550m descending
STAC2, 20:11 - 20:30, 550m - 0m, 550m descending - 0m descending
Surfaced at 20:32.

Flight 3:

35 C, winds S at 4-6 m/s, scattered clouds CB 1.6 km
R1046 & XQ2 44483

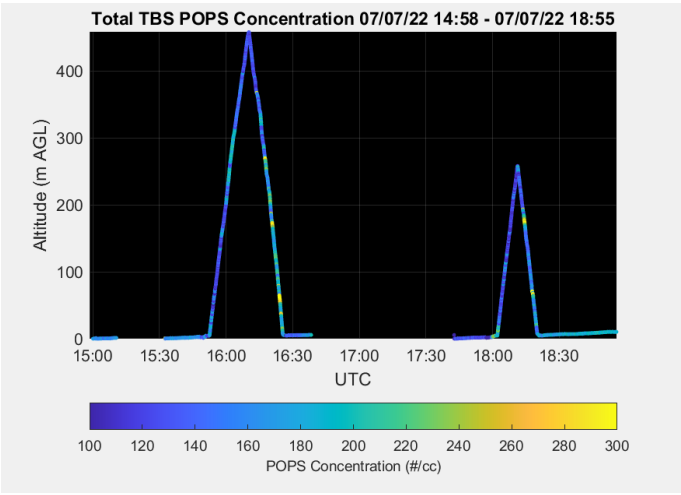
POPS308 & iMet 402 MHz & Ozonesonde 2Z29477
STAC (7 min delay at 20:39, 1 hr bulk impactor sample, IM 7)
TBI4
MA200
CPC2
AE-51 at surface

Launched 20:47.
STAC7, 20:45 - 21:25, 0m - 500m, 0m ascending - 500m descending
Ascended to 550m at 20:11 and began descent due to 14.5 m/s surface gust.
Surfaced at 21:22.



Daily HOU S3 TBS Flight Summary

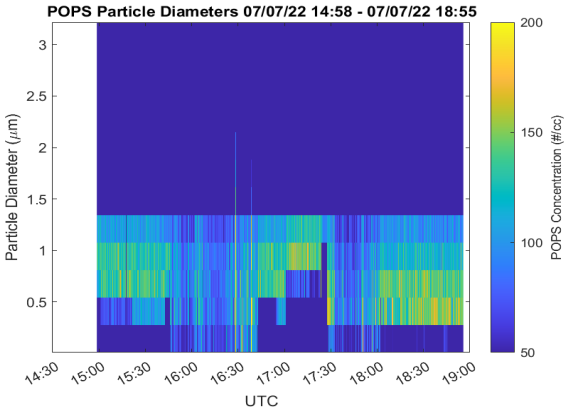
Date: 07/07/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White



Instruments flown:
Flight1:
32 C, winds S at 2-5 m/s, Scattered Cu CB 900m, light showers to south
POPS bins 2-4 ~ 150 #/cc

R1046 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (7 min delay at 15:46, 20 min samples, IM 3-6)
TBI4 (15:48-16:33)
MA200
CPC2
AE-51 at surface

Launched 15:52.
STAC3, 15:52 - 16:11, 0m -400m, 0m ascending - 460m descending
Ascended to 460m at 16:10. Descended as convection started forming to the s
STAC4, 16:12 - 16:31, 400m - 0m, 400m descending - 0m descending
Surfaced at 16:26.

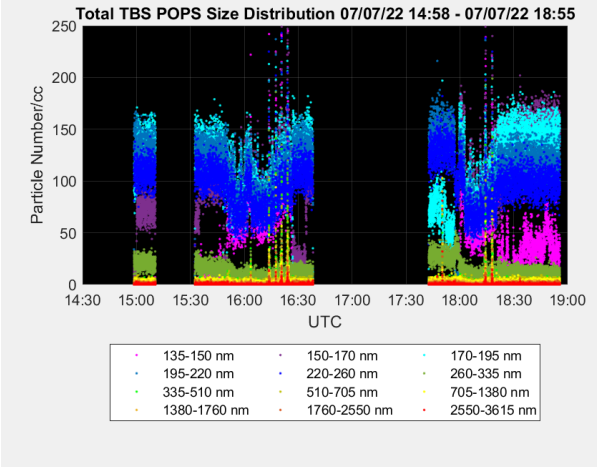


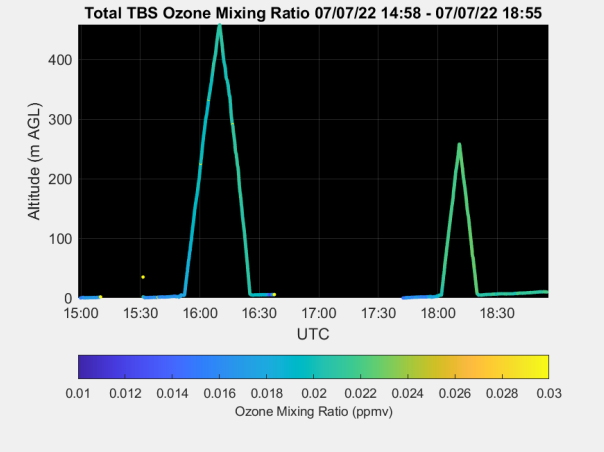
Flight 2:
33 C, winds S at 2-5 m/s, Scattered Cu CB 1300m, post convection
POPS bins 3-4 ~ 150 #/cc

R1046 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (7 min delay at 17:54, 20 min samples, IM 5)
TBI4 (17:57-18:55)
MA200 (changed to dual spots)
CPC2

AE-51 at surface

Launched 18:01.
STAC5, 18:01 - 18:20, 0m - 0m, 0m ascending - 250m descending
Ascended to 250m at 18:10. Descended due to TBS ground station heat failure.
Surfaced at 18:19.



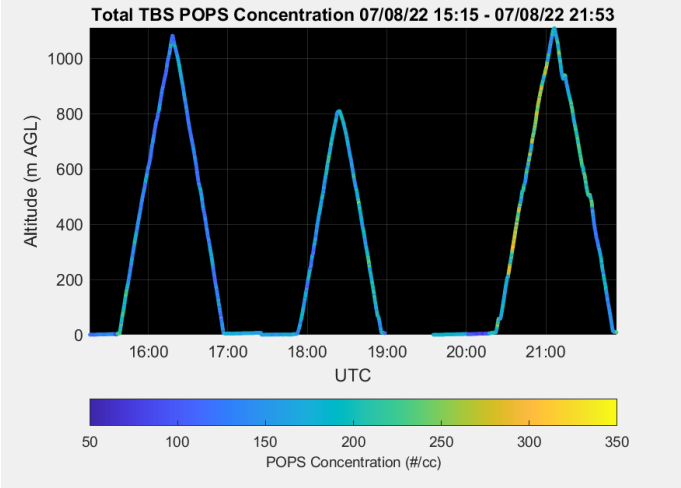


Daily HOU S3 TBS Flight Summary

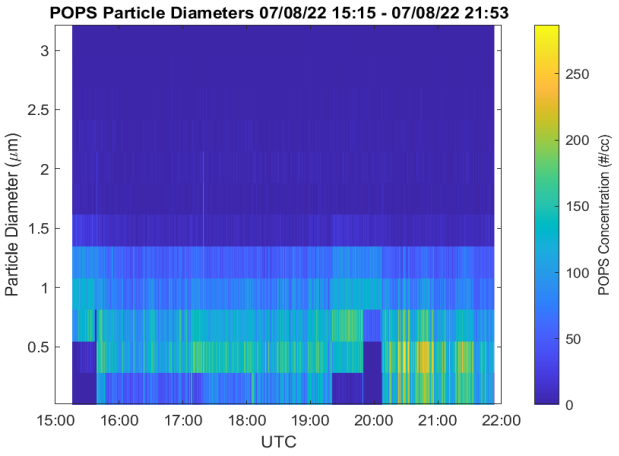
Date: 07/08/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
31 C, winds SSW at 2-5 m/s, Scattered Cu CB 800m,
POPS bins 2-3 ~ 150 #/cc

R1046 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (7 min delay at 15:31, 20 min samples, IM 1-4)
TBI4 (15:33-16:57)
MA200
CPC2
AE-51 at surface

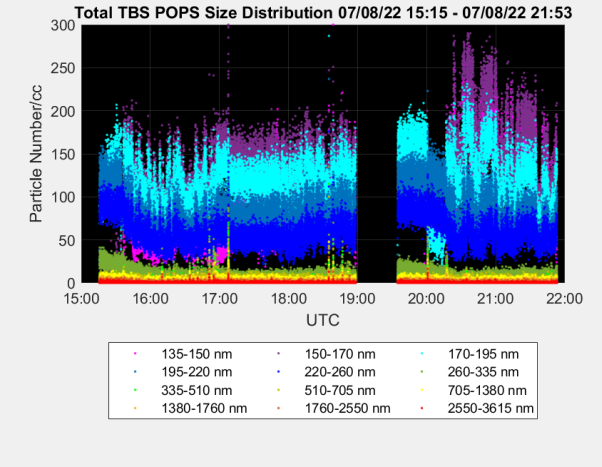


Launched 15:38.
STAC1, 15:38 - 15:57, 0m - 560m, 0m ascending - 560m ascending
CB increase to 1080m
STAC2, 15:58 - 16:17, 560m - 1080m, 560m ascending - 1080m descending
STAC3, 16:18 - 16:37, 1080m - 560m, 1080m descending - 560m descending
STAC4, 16:38 - 16:57, 560m - 0m, 560m descending - 0m descending
Surfaced at 16:57.



Flight 2:
34 C, winds S at 2-7 m/s, Scattered Cu CB 1300m,
POPS bin 1 ~ 150 #/cc

DTS
R1046
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (10 min delay at 17:42, 1 hr bulk impactor sample, IM 7)
TBI4 (17:45-18:58) – new filter
CPC2
AE-51 at surface



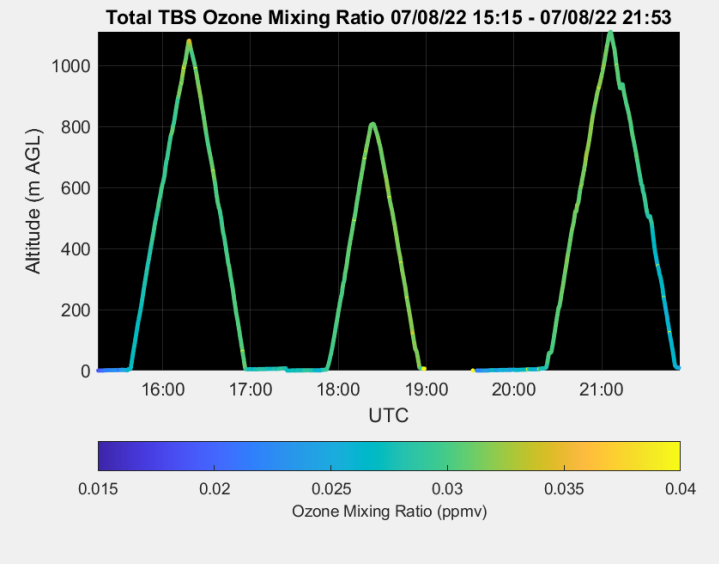
Launched 17:52.
STAC7, 17:52 - 18:51, 0m - 90m, 0m ascending - 800m descending
Surfaced at 18:55.

Flight 3:
37 C, winds S at 2-5 m/s, Scattered Cu CB 1800m,
POPS bins 0-3 ~ 150 #/cc

DTS
R1046 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39549
STAC (30 min delay at 20:10, 1 hr sample, IM 5)
TBAC (30 min delay at 20:10, 1 hr sample, V1)
MA200
CPC2
AE-51 at surface

Launched 20:22.
STAC5, 20:40 - 21:39, 475m - 300m, 475m ascending - 1100m descending

TBAC1, 20:40 - 21:39, 475m - 300m, 475m ascending - 1100m descending
Noticed broken DTS fiber at 20:53 (650-700m AGL)
Surfaced at 21:50.
CPC lost power during flight.
AE51 lost power during day.

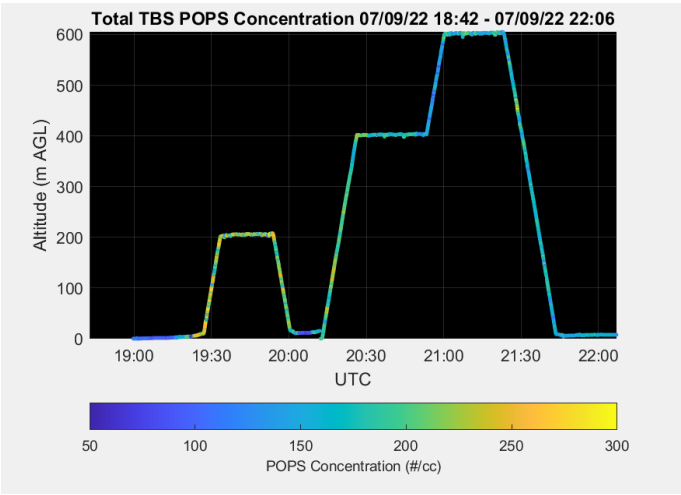


Daily HOU S3 TBS Flight Summary

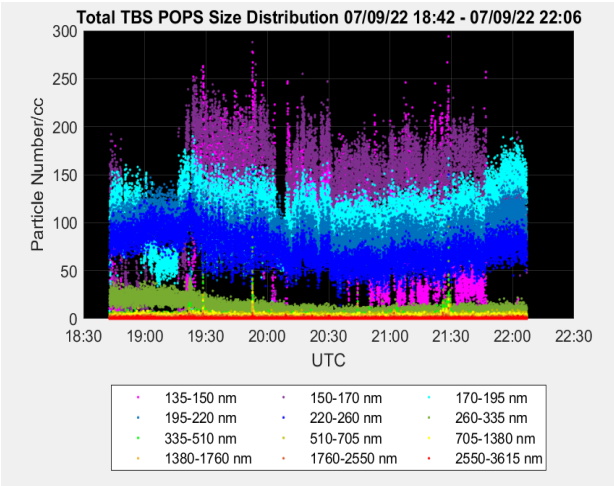
Date: 07/09/22
Authors: Cook, Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
36 C, winds SSW at 2-7 m/s, Scattered Cu CB 1500m,
POPS bins 0-2 > 150 #/cc.

Profile 1:
R1046 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (10 min delay at 19:15, 40 min samples, IM 1-4)
MegaVOC (18 min delay at 19:15, 20 min samples, 10 min delays, 4 tubes)
CPC2

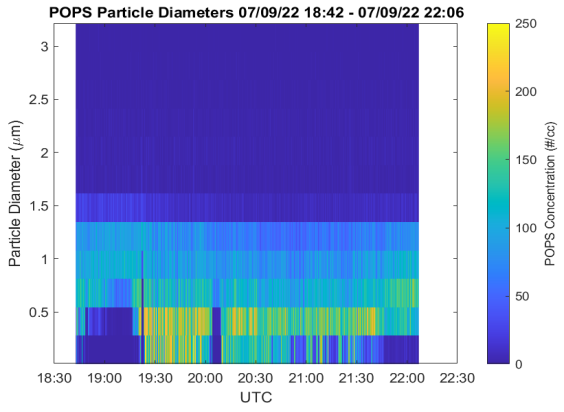


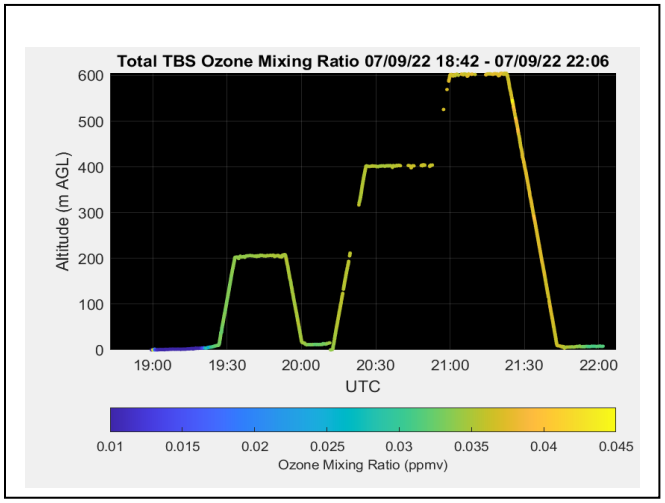
Launched 19:15.
STAC1, 19:25 - 20:04, 0m - 0m, 0m ascending - 200m ascending
MegaVOC1, 19:33 - 19:52, 200m constant
Anemometer horizontal speed not reporting. Forced descent.
Surfaced 20:00.
Cracked housing allowed enclosure to slip sideways and block cups.
Replaced ano 1046 with 1042.



Profile 2:
Relaunched 20:06.
STAC2, 20:05 - 20:44, 0m - 400m, 0m ascending - 400m ascending
MegaVOC2, 20:03 - 20:22, 0m - 300m, 0m ascending - 300m ascending
MegaVOC3, 20:33 - 20:52, 400m constant
STAC3, 20:45 - 21:24, 400m - 0m, 400m ascending - 00m ascending
Ozonesonde and POPS not reporting over iMet at 20:57.
MegaVOC4, 21:03 - 21:22, 600m constant
STAC4, 21:25 - 21:44, 550m - 0m, 550m descending - 0m ascending
Surfaced 21:44.

MegaVOC shutoff during MegaVOC1. Unsure if due to heat or jarring.
Prototype TBAC enclosure lost lid and computer.



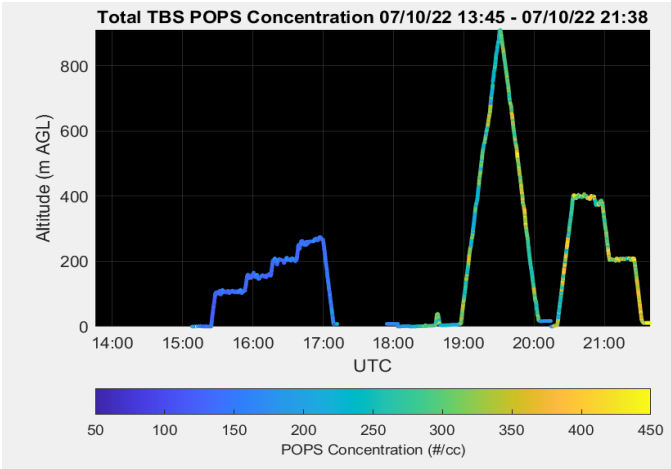


Daily HOU S3 TBS Flight Summary

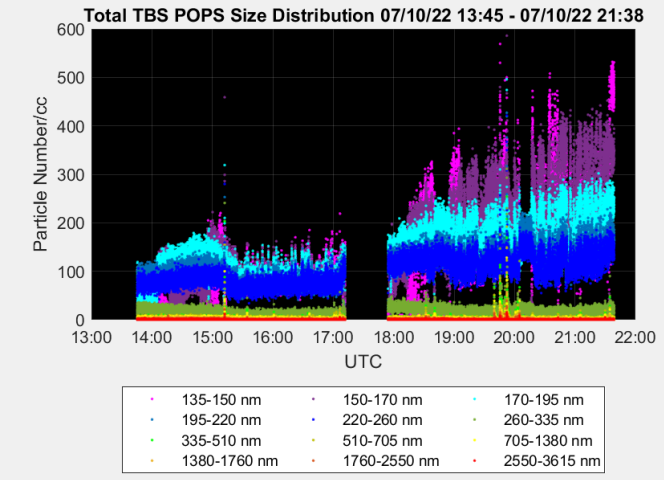
Date: 07/10/22
Authors: Cook, Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
28 C, winds SSW at 4-8 m/s, Scattered Cu CB 400m,
POPS bins 0-2 > 150 #/cc

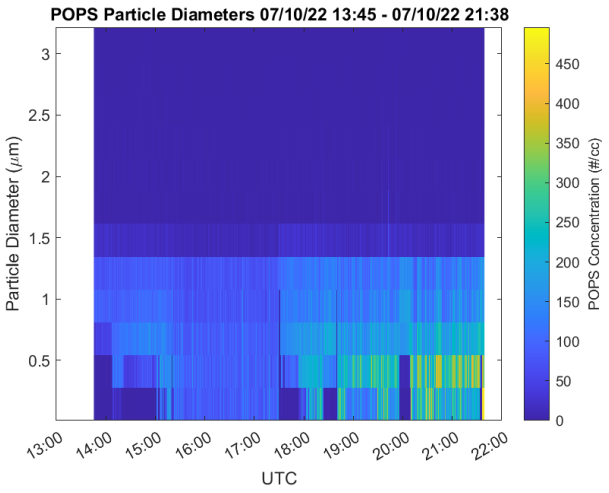
R1042 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (56 min delay at 15:08, 50 min samples, IM5)
TBAC (56 min delay at 15:08, 50 min samples, V3)
MegaVOC (12 min delay at 15:21, 20 min samples, 10 min delays, 4 tubes)
CPC2



Launched 15:18.
MegaVOC1, 15:33 - 15:52, 100m constant
MegaVOC2, 15:55 - 16:14, 150m constant
STAC5, 16:01 - 16:49, 150m - 250m, 150m ascending - 250m descending
TBAC3, 16:01 - 16:49, 150m - 250m, 150m ascending - 250m descending
MegaVOC3, 16:17 - 16:36, 200m constant
MegaVOC4, 16:39 - 16:58, 250m constant
Lost iMet transmission at ~16:48, had to restart program.
Surfaced at 17:08.
Very high CPC concentrations.
CPC data suspect. Could be due to change in setpoint in heat.
Ozonesonde data bad. Perhaps a faulty calibration?

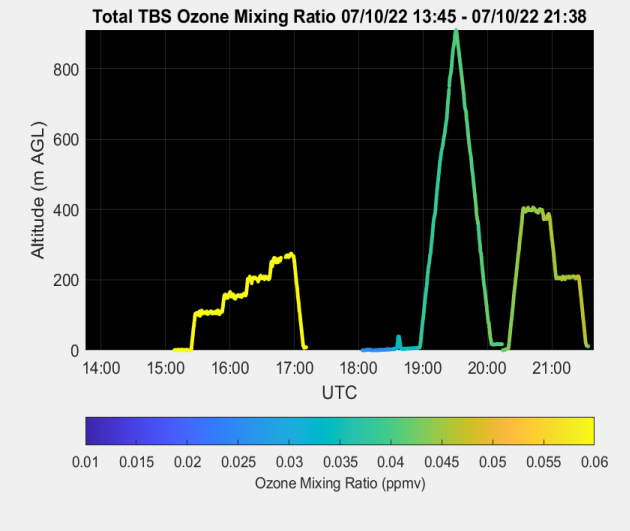


Flight 2:
36 C, winds SSW at 4-8 m/s, Mostly clear
POPS bins 0-4 > 150 #/cc, bin 0 max
DTS
R1042 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39549
STAC (10 min delay at 18:53, 60 min samples, IM6)
TBAC (10 min delay at 18:53, 60 min samples, V4)
CPC3



Launched 18:31.
Ascended 40m and descended due to transponder not reporting.
Relaunched 18:53.
POPS bin 0 concentration increasing with height.
STAC6, 19:02 - 20:01, 150m - 0m, 0m ascending - 900m descending
TBAC4, 19:02 - 20:01, 150m - 0m, 0m ascending - 900m descending
DTS fiber broke at 30m at 20:03.
Surfaced 20:03.

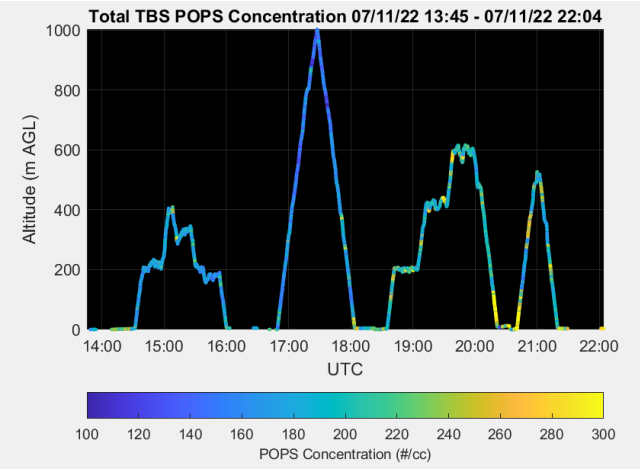
Flight 3:
DTS
R1042 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39549
STAC (24 min delay at 20:13, 60 min samples, IM6)
TBAC (24 min delay at 20:13, 60 min samples, V5)
MegaVOC (24 min delay at 20:13, 20 min samples, 8 min delay, 4 tubes)
CPC2



Launched 20:14.
MegaVOC1, 20:37 - 20:56, 400m constant
Began descent due to convective towers approaching from north.
MegaVOC2, 21:05 - 21:24, 200m constant
Elevated concentrations in POPS bin 0.
STAC7, 20:37 - 21:34, 400m - 0m, 400m ascending - 0m descending
TBAC5, 20:37 - 21:34, 400m - 0m, 400m ascending - 0m descending
Increase in POPS bin1 concentration.
Surfaced 21:34.

Daily HOU S3 TBS Flight Summary

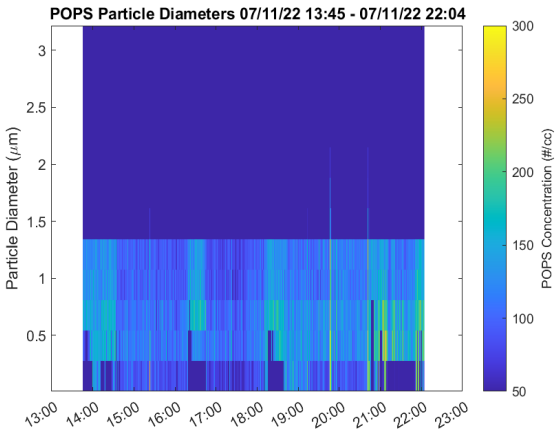
Date: 07/11/22
Authors: Cook, Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White



Instruments flown:
Flight1:
29 C, winds SSW at 4-7 m/s, Scattered Cu CB 2 km,
POPS bins 0-4 > 150 #/cc, bin 1 max

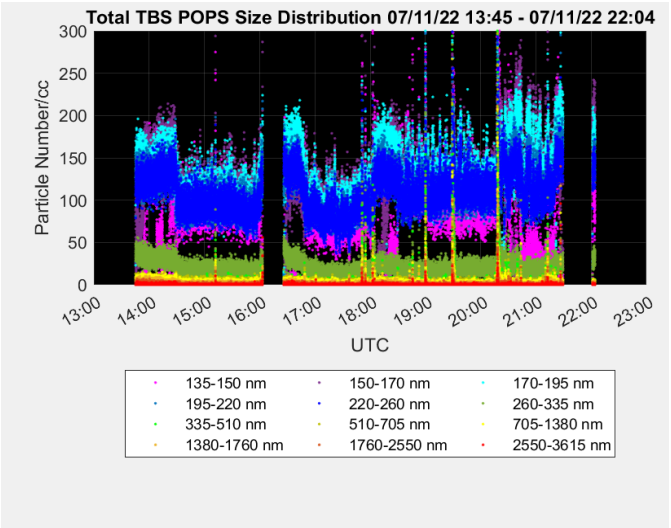
R1042 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (12 min delay at 14:25, 48 min samples, IM10-11)
TBAC (12 min delay at 14:25, 48 min samples, V3-4)
MegaVOC (12 min delay at 14:25, 20 min samples, 10 min delays, 4 tubes)
CPC3

Launched 14:24.
MegaVOC1, 14:37 - 14:56, 200m constant
MegaVOC2, 15:05 - 15:24, 400m constant until 15:10. Descended to 300m.
STAC9, 14:37 - 15:24, 200m - 300m, 200m ascending - 400m ascending
TBAC3, 14:37 - 15:24, 200m - 300m, 200m ascending - 400m ascending
STAC10, 15:25 - 16:01, 350m - 0m, 350m descending - 0m ascending
TBAC4, 15:25 - 16:01, 350m - 0m, 350m descending - 0m ascending
MegaVOC3, 15:33 - 15:52, 200m constant
Descended to 160m during strong gusts then reascended.
Very gusty aloft. Difficult to maintain altitude.
Surfaced 16:01.



Zero tested CPC2 and 3. Added vents to enclosure.

Flight 2:
R1042 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39477
MAGIC CPC
CPC3



Launched 16:49.
Ascended to 1000m at 17:27. Began descent.
Increase in humidity at 900m. Pops counts quartered.
Surfaced at 18:04.

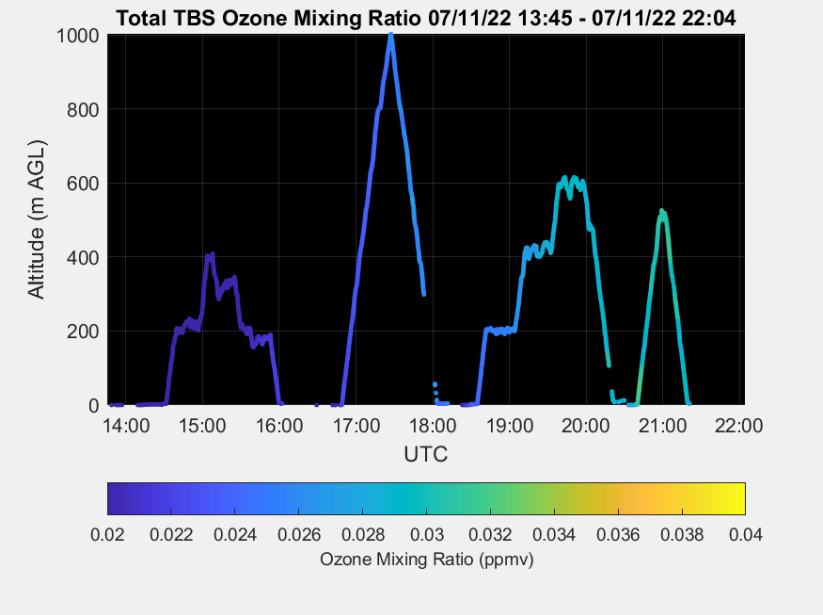
Flight 3:
R1042 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39549
STAC (40 min delay at 18:26, 48 min samples, IM11)
TBAC (40 min delay at 18:26, 48 min samples, V5)
MegaVOC (12 min delay at 18:32, 20 min samples, 10 min delays, 4 tubes)
CPC3

Launched 18:26.
MegaVOC1, 18:44 - 19:03, 200m constant
STAC11, 19:06 - 19:53, 250m - 600m, 250m ascending - 600m ascending
TBAC5, 19:06 - 19:53, 250m - 600m, 250m ascending - 600m ascending

MegaVOC2, 19:12 - 19:31, 400m constant
MegaVOC3, 19:40 - 19:59, 600m constant
Surfaced at 20:21.

Flight 4:
R1042 & XQ2 58849
POPS308 & iMet 402 MHz & Ozonesonde 2Z39549
MAGIC CPC
CPC3

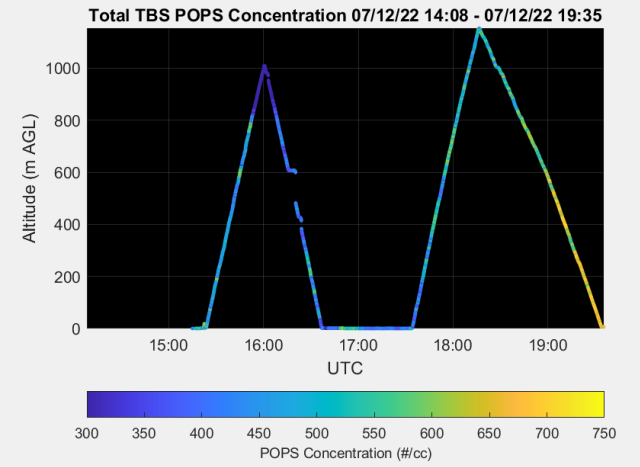
Launched 20:38.
Ascended to 530m and iMet stopped reporting forcing descent.
Surfaced 21:22.



Daily HOU S3 TBS Flight Summary

Date: 07/12/22
Authors: Cook, Dexheimer, Storch
Platform: TBS: 122 m^3 aerostat, Great White

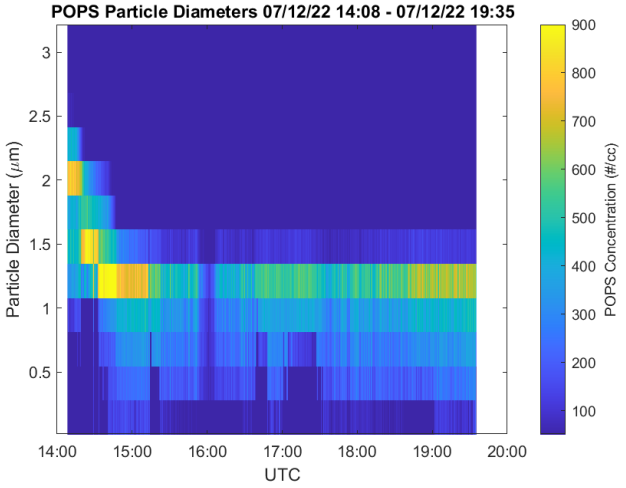
Instruments flown:
Flight1:
31 C, winds SSW at 4-7 m/s, Scattered Cu CB 700m,
POPS bins 2-5 > 150 #/cc, bin 4 max
Very high POPS concentrations compared to previous days.



R1042 & XQ2 44483
POPS306 & iMet 402 MHz
MAGIC CPC
CPC3

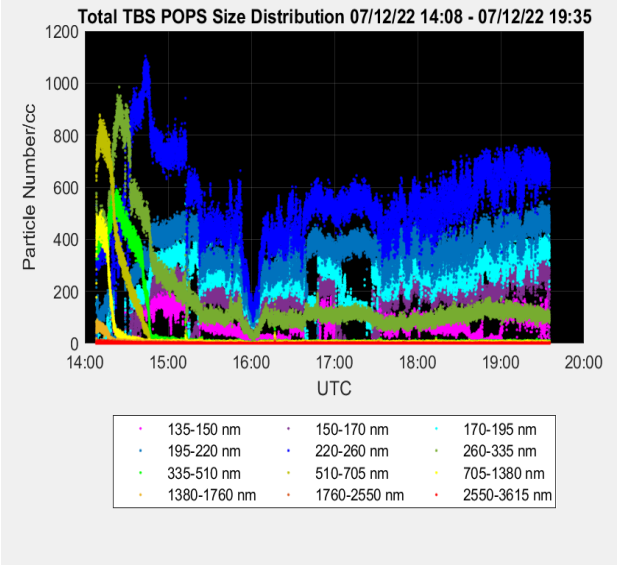
Launched 15:22.

Ascended to 1 km at 16:00 and began descent.
Surfaced at 16:38.

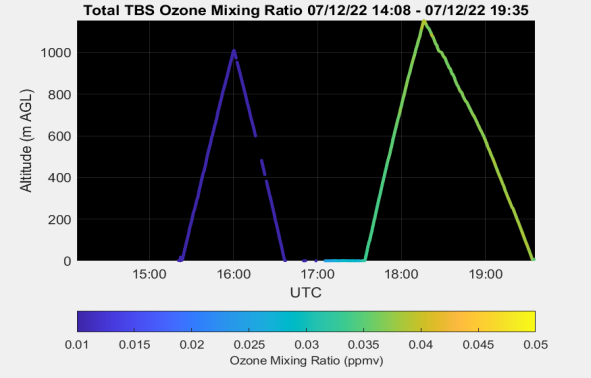


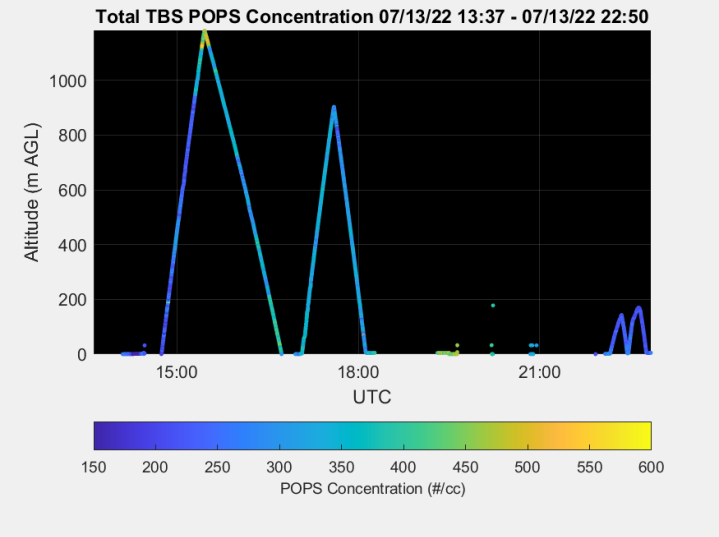
Flight 2:
DTS
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39478
STAC (10 minute delay at 17:26, erroneously set to 10 minutes samples, IM12-14)
TBAC (10 minute delay at 17:26, 45 minutes samples, V3-5)
MAGIC CPC

Launched 17:30.
Started DTS at 17:36.
STAC12, 17:36 - 17:45, 50m - 350m, 50m ascending - 350m ascending
TBAC3, 17:36 - 18:20, 50m - 1100m, 50m ascending - 1150m ascending
STAC13, 17:46 - 17:55, 350m - 650m, 350m ascending - 650m ascending
TBAC4, 18:21 - 19:05, 1100m - 475m, 1100m descending - 475m descending
Smoke to north at landfill 19:18 - 19:35.
STAC14, 17:56 - 18:05, 650m - 905m, 650m ascending - 905m ascending
TBAC5, 19:06 - 19:51, 475m - 0m, 475m descending - 0m descending
CB at 2.5 km at 18:40.
CB at 1.8 km at 19:15.
Surfaced at 19:36.
TBAC run on ground until 19:50.
Convective storm to SE immediately after descent. Rain shaft to west.



Precipitation at 20:17.





Daily HOU S3 TBS Flight Summary

Date: 07/13/22
Authors: Cook, Dexheimer, Storch
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
Flight1:
30 C, winds W at 4-7 m/s, Scattered Cu CB 600m,
POPS bins 1-4 > 150 #/cc, bin 2 max

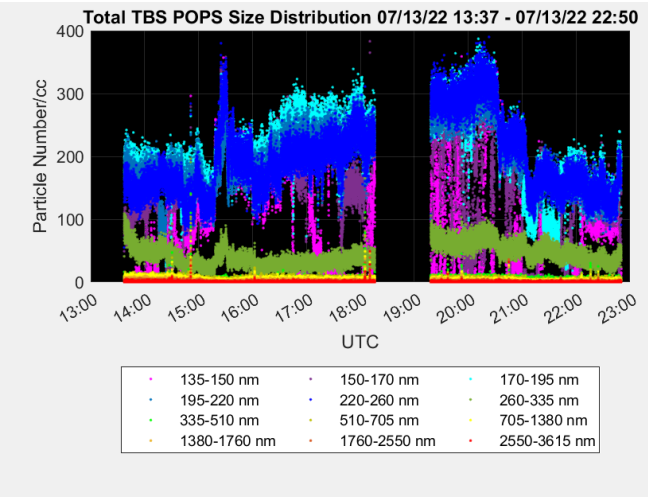
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39550
STAC (8 minute delay at 14:39, 40 minutes samples, IM15-17)
TBAC (8 minute delay at 14:39, 40 minutes samples, V3-5)

DTS broken
Launched 14:39.
STAC15, 14:47 - 15:26, 0m - 1180m, 0m ascending - 1180m ascending
TBAC3, 14:47 - 15:26, 0m - 1180m, 0m ascending - 1180m ascending
STAC16, 15:27 - 16:06, 1180m - 600m, 1180m descending - 600m ascending
TBAC4, 15:27 - 16:06, 1180m - 600m, 1180m descending - 600m descending
STAC17, 16:07 - 16:46, 600m - 0m, 600m ascending - 0m ascending
TBAC5, 16:07 - 16:46, 600m - 0m, 600m descending - 0m descending
Surfaced at 16:46.

Flight 2:
34 C, winds W at 3-6 m/s, Scattered Cu CB 1500m,
POPS bins 1-4 > 200 #/cc, bin 2 max

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39550
MAGIC CPC
CPC3

Launched 17:00.

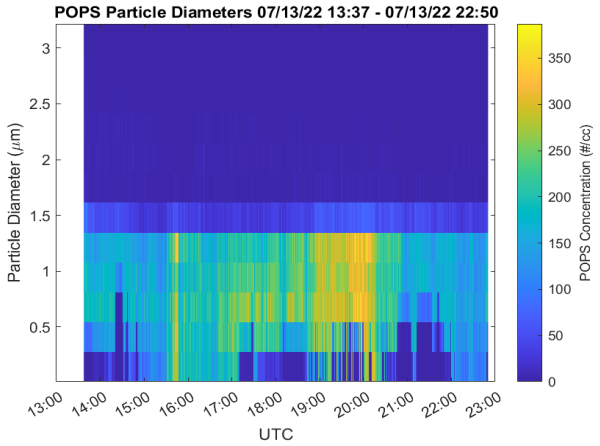


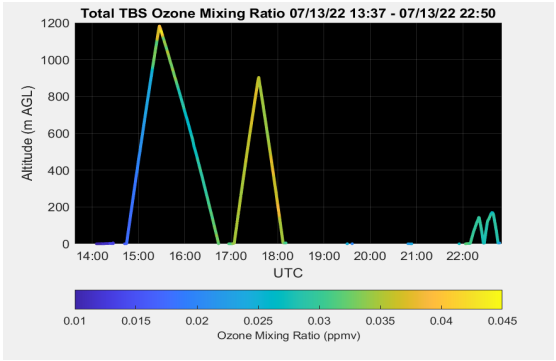
CB down to 1.1 km at 17:31.
Ascended to 900m at 17:35. Cloud immediately overhead.
Surfaced at 18:09.
Convective towers developing 18:14.

Flight 3:
After storms in immediate area, but no precip at site.
28C, 3-5 m/s from SE, CB 2 km
POPS bin 1-4 100 #/cc, bin 2 max

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39550
*Great difficulty with ozonesonde comms. Repeat run of sonde from the morning.
STAC (8 minute delay at 21:59, 40 minutes samples, IM18)
TBAC (8 minute delay at 21:59, 40 minutes samples, V3)
MAGIC CPC

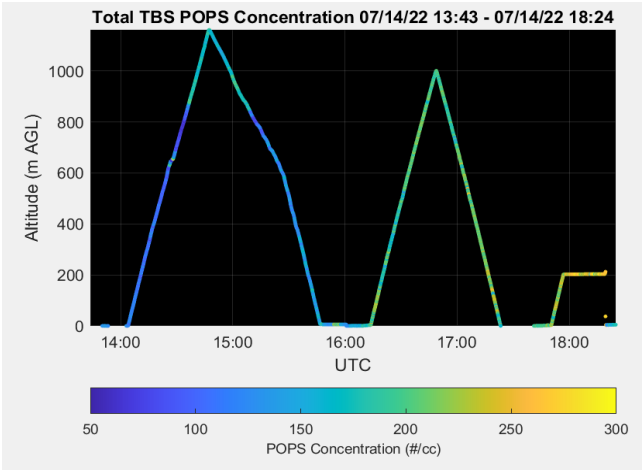
Launched 21:58.
STAC18, 22:07 - 22:46, 0m - 175m, 0m ascending - 175m ascending
TBAC3, 22:07 - 22:46, 0m - 175m, 0m ascending - 175m ascending
Winds increasing quickly with altitude to operating limit.
Surfaced at 22:47.





Daily HOU S3 TBS Flight Summary

Date: 07/14/22
Authors: Cook, Dexheimer, Storch
Platform: TBS: 122 m^3 aerostat, Great White



Instruments flown:
Flight1:
28 C, winds SW at 1-4 m/s, Clear, high clouds to SE from offshore precip
POPS bins 1-5 > 80 #/cc, bin 3 max
Lower POPS concentrations than previous days.

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
STAC (8 minute delay at 13:59, 40 minutes samples, IM19-20)
TBAC (8 minute delay at 13:59, 40 minutes samples, V4-5)
MAGIC CPC

Launched 13:58.

STAC19, 14:07 - 14:46, 0m - 1160m, 0m ascending - 1160m ascending
TBAC4, 14:07 - 14:46, 0m - 1160m, 0m ascending - 1160m ascending
Intermittent cumulus with bases at 650m. Cloud very near balloon at 14:26.
STAC20, 14:47 - 15:26, 1160m - 600m, 1160m descending - 600m descending
TBAC5, 14:47 - 15:26, 1160m - 600m, 1160m descending - 600m descending
Surfaced at 15:50.

Flight 2:
33 C, winds WNW at 1-4 m/s, Mostly cloudy, Cu CB 800m
POPS bins 2-4 > 100 #/cc, bin 2 max

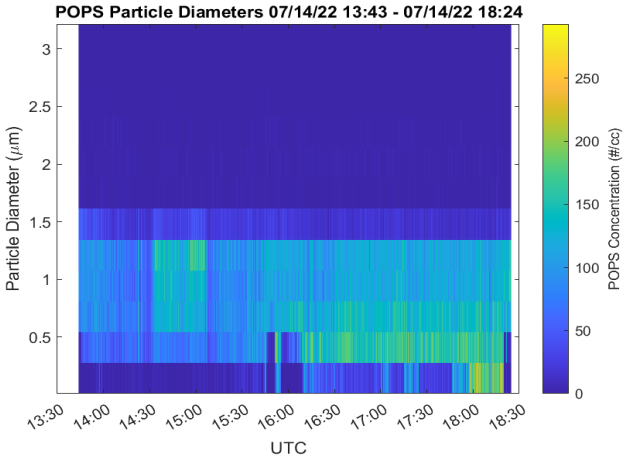
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
MAGIC CPC
MA200

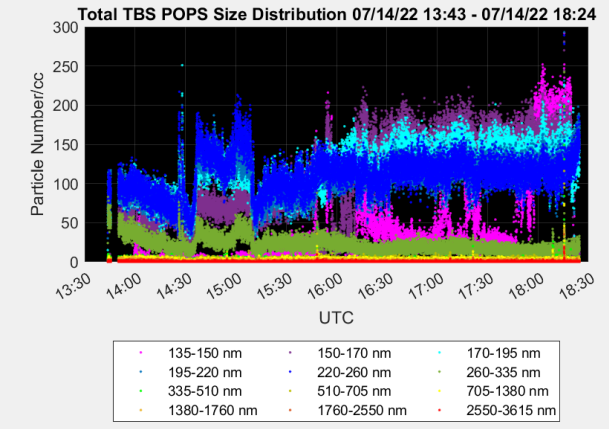
Launched 16:13.
CB has increased to 1.5 km at 16:40.
Ascended to 1 km at 16:48. Convective clouds initiate at 17:15.
Surfaced at 17:24.

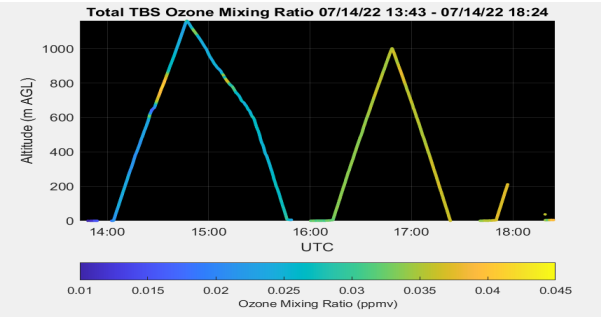
Flight 3:
37 C, winds NW at 3-6 m/s, Mostly cloudy, Cu CB 1.5 km
POPS bins 2-4 > 100 #/cc, bin 2 max

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
TBAC (5 minute delay at 17:42, 30 minutes samples, V3-4)
MAGIC CPC
MA200

Launched 17:47.
TBAC3, 17:47 - 18:16, 0m - 0m, 0m ascending - 415m descending
iMet stopped reporting above 215m. No ozonesonde data above 215m.
Began descent at 415m.
Surfaced at 18:17.







Daily HOU S3 TBS Flight Summary

Date: 08/02/22
Authors: Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
28 C, winds SW at 3-6 m/s, Clear
POPS bins 1-5 > 80 #/cc, bin 2 max

Flight1:
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (10-minute delay at 13:56, 30-minutes samples, V3)
CPC3
*STAC
*MAGIC CPC

Profile 1:
Launched 14:02.
TBAC3, 14:05 - 14:34, 0m - 250m, 0m ascending - 250m ascending
STAC did not run.
Cumulus base developing at 600m at 14:12.
Removed CPC3.
Surfaced 14:34.

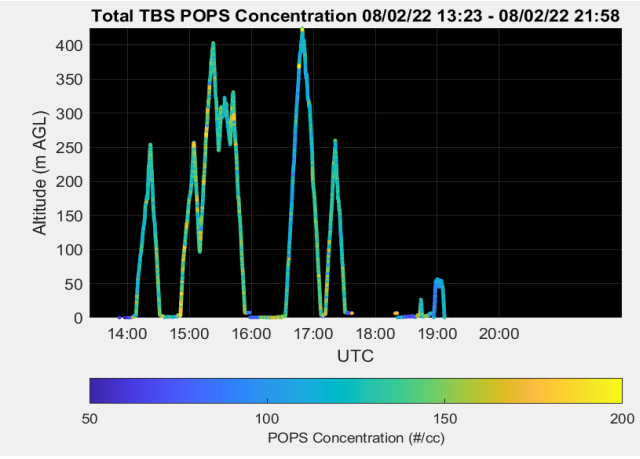
Profile 2:
Launched 14:43.
Added STAC and MAGIC CPC.
STAC (4-minute delay at 14:39, 30-minutes sample, IM15-17)
STAC15, 14:43 - 15:12, 0m - 250m, 0m ascending - 250m ascending
CB increased to 900m.
STAC16, 15:13 - 15:42, 250m - 400m, 250m ascending - 400m ascending
STAC17, 15:43 - 15:53, 0m - 250m, 250m descending - 0m descending
Loss of XDATA (POPS and ozonesonde) noticed at 15:30.
Surfaced at 15:53.
Ozonesonde cable broke in flight. High winds aloft.

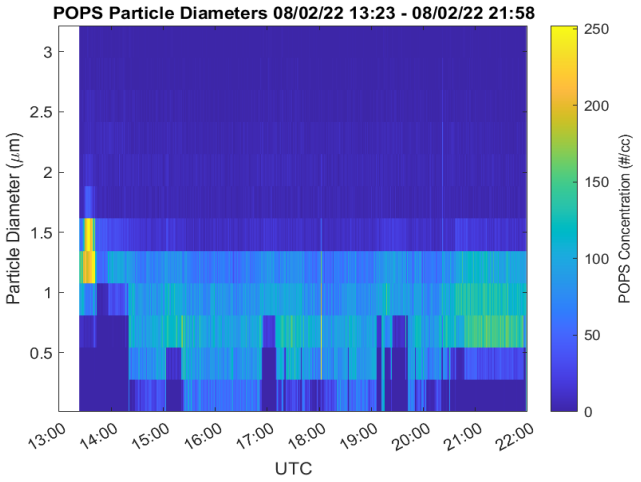
Flight 2:
33 C, winds SE at 5-8 m/s, mostly clear
POPS bins 1-5 > 80 #/cc, bin 2 max

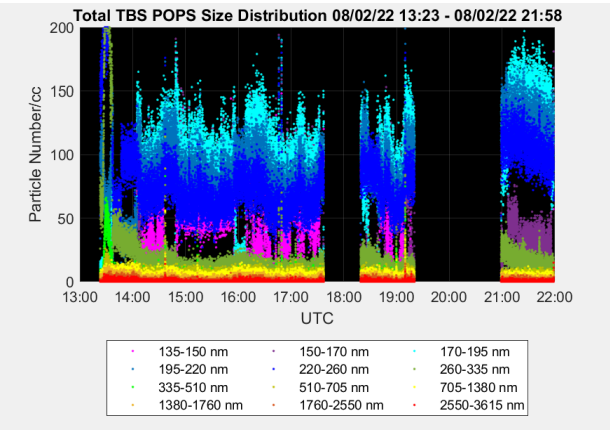
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (10-minute delay at 16:26, 30-minutes samples, V4-5)
MAGIC CPC
*MA200
*AE-51 at surface

Profile 1:
Launched 16:28.
CB at 1.4 km at 16:41.
TBAC4, 16:36 - 17:05, 60m - 425m, 60m descending - 425m descending
Thunderstorm to northeast and high winds.
Surfaced at 17:08.

Profile 2:
Removed TBAC. Added MA200. AE-51 at surface.
Launched 17:11.
Ascended to 250m.
Surfaced at 17:31.
Thunderstorm to NE intensified but moving away. Waited for winds aloft to calm.



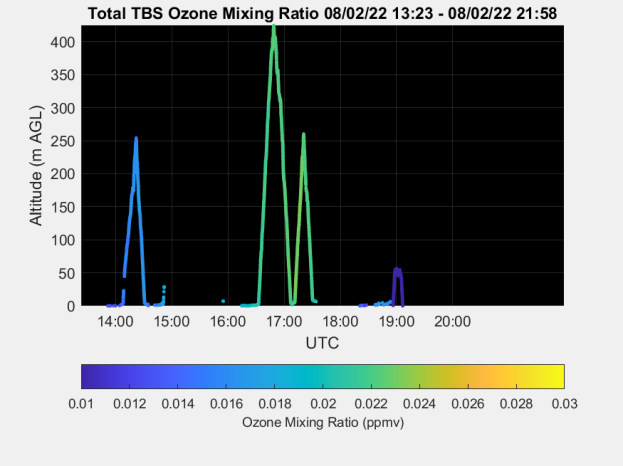




Flight 3:
35 C, winds SE at 5-9 m/s, CB 1.7 km
POPS bins 1-5 > 80 #/cc, bin 2 max

R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
MegaVOC (6-minute delay at 18:52:50, 20-minute samples, T1-3)
CPC3
*AE-51 at surface

Launched 18:42.
Aborted launch for high winds at 18:45.
Surfaced at 18:45.
Reascended with ano only at 18:47.
Ozonesonde aborted, would not communicate.
MegaVOC, TUBE1, 18:59 - 19:08, 50m - 0m
Winds too high.
Surfaced at 19:07.

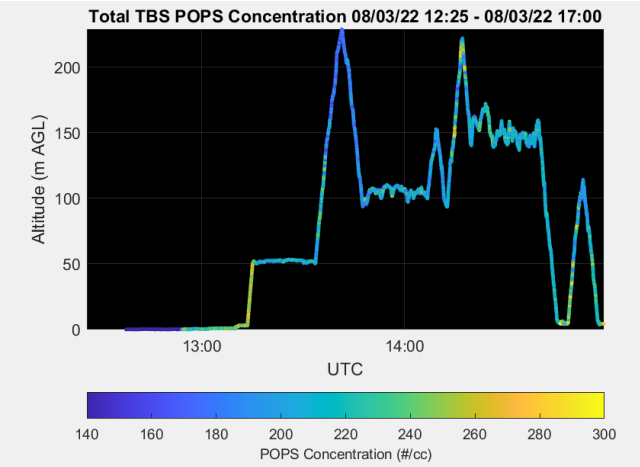


Daily HOU S3 TBS Flight Summary

Date: 08/03/22
Authors: Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
25 C, winds SE at 1-3 m/s, Clear
POPS bins 3-4 > 100 #/cc, bin 4 max

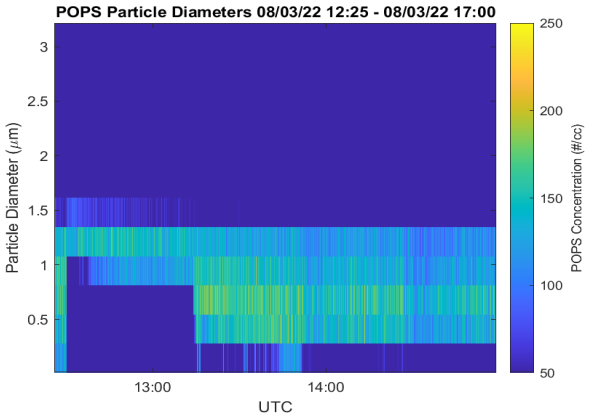
Flight1:
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
TBAC (6 minute delay at 13:08, 30 minutes sample, V5)
STAC (6 minute delay at 13:08, 30 minutes sample, IM18)
MegaVOC (6 minute delay at 13:08, 20 minute samples with 13 minute delays in between, tubes 1, 3-4
*MAGIC CPC



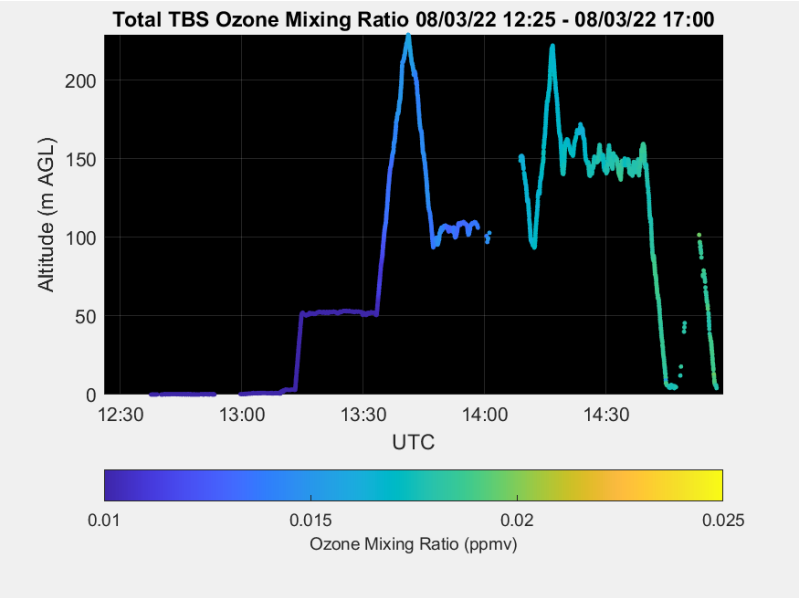
Profile 1:
Launched 13:10.
TBAC5, 13:14 - 13:43, 0m - 225m, 0m ascending - 225m ascending
STAC18, 13:14 - 13:43, 0m - 225m, 0m ascending - 225m ascending
TUBE1, 13:14 - 13:33, 50m L
TUBE2, 13:47 - 14:06, 100m L
TUBE3, 14:20 - 14:39, 150m L
MAGIC CPC added 14:07. Ascended 50m and removed due to steep TA at 14:13.
Surfaced at 14:46.

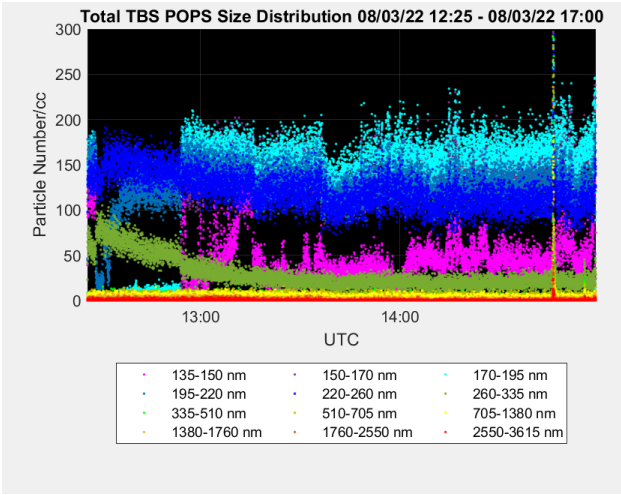
Profile 2:
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
MAGIC CPC

Launched 14:48.
Cu CB at 1 km.
Ascended to 115m.



Strong winds required descent.
Surfaced at 14:59.





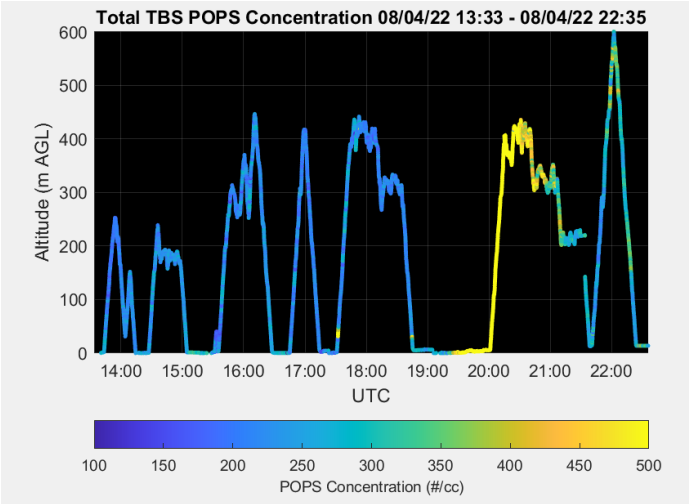
Daily HOU S3 TBS Flight Summary

Date: 08/04/22
Authors: Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White

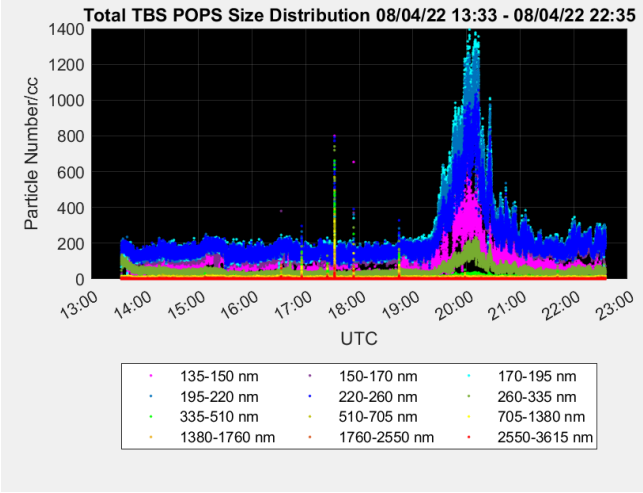
Instruments flown:
30 C, winds S at 3-6 m/s, Clear
POPS bins 2-4 > 100 #/cc, bin 4 max

Flight1:
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
TBAC (6-minute delay at 13:37, 30-minutes sample, V3)
STAC (6-minute delay at 13:37, 30-minutes sample, IM2)
MAGIC CPC

Launched 13:37.
TBAC3, 13:43 - 14:12, 0m - 0m, 0m ascending - 250m ascending



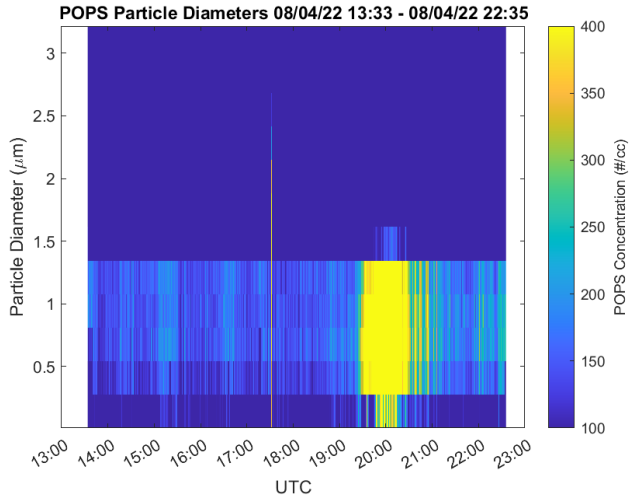
STAC2, 13:43 - 14:12, 0m - 0m, 0m ascending - 250m ascending
Surfaced at 14:13



31 C, winds S at 3-6 m/s, Clear
POPS bins 1-4 > 100 #/cc, bin 4 max

Flight 2:
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
MegaVOC (15-minute delay at 14:23, 20-minutes sample, Tube 1)
MAGIC CPC
OPUS
CPC3

Launched at 14:25.
Ascended to 240m and then descended to 200m.
Attempted to loiter at 200m but could not.
TUBE1, 14:38 - 14:57, 180L
Surfaced at 15:05.



Flight 3:
R1042 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
TBAC (15-minute delay at 15:29, 30-minutes sample, V4)
STAC (15-minute delay at 15:29, 30-minutes sample, IM3)
MAGIC CPC
OPUS

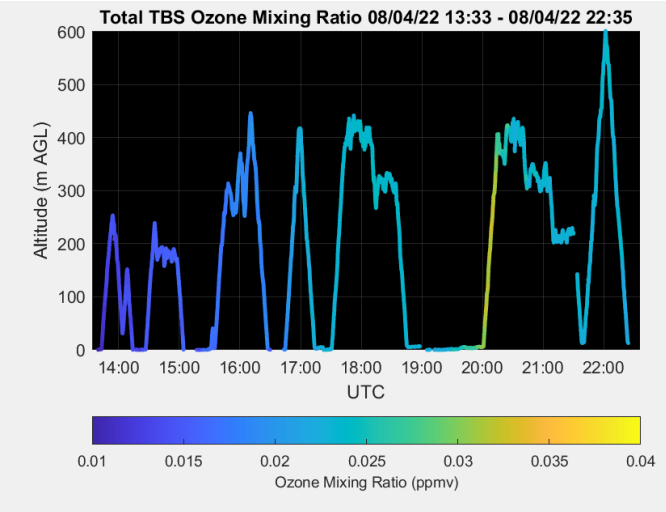
Launched 15:29. Redescended from 40m to add forgotten OPUS.
CB at 1.2 km.
TBAC4, 15:44 - 16:13, 250m - 385m, 250m ascending - 450m ascending
STAC3, 15:44 - 16:13, 250m - 385m, 250m ascending - 450m ascending
Gusty winds aloft.
Surfaced at 16:29.

Flight 4:
34C, winds S at 4 - 8 m/s, Cu CB at 1.2 km

R1042 & XQ2 44483
MAGIC CPC I
MAGIC CPC II

POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
OPUS

Launched 16:41.
Ascended to 415m at 16:59.
Surfaced at 17:14

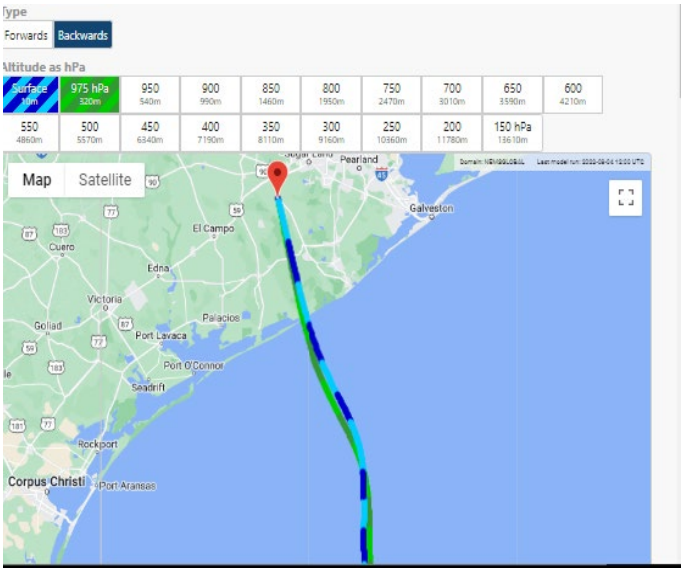


Flight 5:
34C, winds S at 4 - 8 m/s, Cu CB at 1.2 km

R1042 & XQ2 44483
MAGIC CPC II
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
OPUS
MegaVOC (22-minute delay at 17:27, 20-minutes sample, Tube 1)
MegaVOC (5-minute delay, 20-minutes sample, Tube 3)

Launched 17:30

TUBE1, 17:49 - 18:08, 400L
5 minute delay
TUBE3, 18:14 - 18:33, 300L
Surfaced at 18:45



Flight 6:
36C, winds S at 4 - 8 m/s, Cu CB at 1.2 km

R1042 & XQ2 44483
MAGIC CPC II
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
OPUS
MegaVOC (22-minute delay at 19:59, 20 minutes sample, Tube 1)
MegaVOC (5-minute delay, 20-minutes sample, Tube 3)
MegaVOC (5-minute delay, 20-minutes sample, Tube 4)

Launched 19:59.
High pops conc bin 1-4 >700, visible smoke, smell smoke 20:03, conc increasing with height.

TUBE1, 20:21 - 20:40, 400L
No longer smell smoke at ground 20:29.
5-minute delay
TUBE3, 20:46 - 21:05, 300L
5-minute delay
TUBE4, 21:11 - 21:30, 200L
Disconnection of Skysonde USB resulted in data loss.
Surfaced at 21:37.

Flight 7:
39C, winds S at 4 - 8 m/s, Cu CB at 2 km

R1042 & XQ2 44483
MAGIC CPC
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
OPUS
CPC
MA200
AE-51 at surface

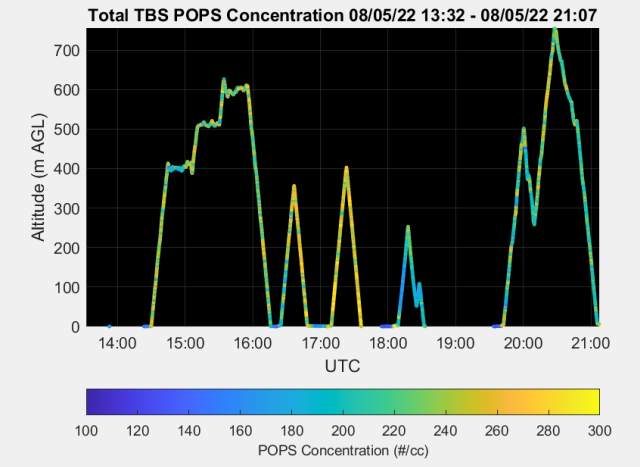
Launched at 21:40
Ascended to 600m at 22:02 and began descent
Surfaced at 22:25.
OPUS not running when surfaced.
Thunderstorms have developed over downtown.

Daily HOU S3 TBS Flight Summary

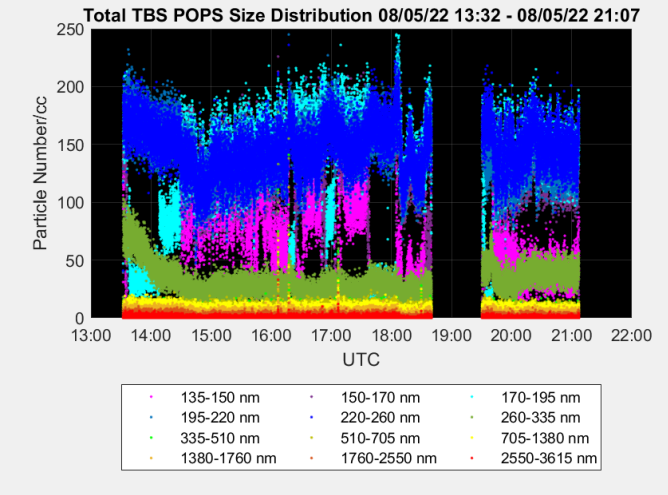
Date: 08/05/22
Authors: Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White

Instruments flown:
27 C, calm, overcast to SE with precip to SE
POPS bins 1-4 > 100 #/cc, bin 2 max

Flight 1:
DTS
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
TBAC (24 minute delay at 14:21, 30 minutes sample, V3-5)
STAC (24 minute delay at 14:21, 30 minutes sample, IM2-4)
MegaVOC (24 minute delay at 14:21, 20 minutes sample, T 1,3,4)
MAGIC CPC

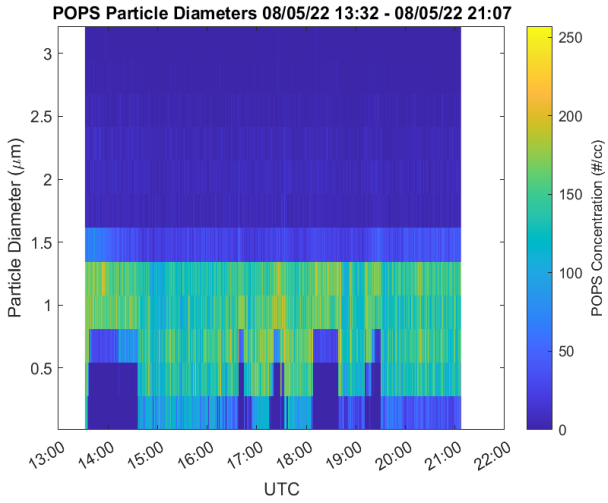


Launched 14:30.
TBAC3, 14:45 - 15:14, 400m - 500m, 400m ascending - 500m descending
STAC2, 14:45 - 15:14, 400m - 500m, 400m ascending - 500m descending
TBAC4, 15:15 - 15:44, 500m - 625m, 500m ascending - 625m descending
STAC3, 15:15 - 15:44, 500m - 625m, 500m ascending - 625m descending
TBAC5, 15:45 - 16:14, 600m - 0m, 600m descending - m ascending
STAC4, 15:45 - 16:14, 600m - 0m, 600m descending - m ascending
VOC1, 14:45 - 15:04, 400L
VOC2, 15:10 - 15:29, 500L
VOC3, 15:35 - 15:54, 600L
Surfaced at 16:16.



Flight 2:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
MAGIC CPC
CPC3

Launched 16:17.
Ascended to 350m at 16:36 and began descent.
Surfaced at 16:48.



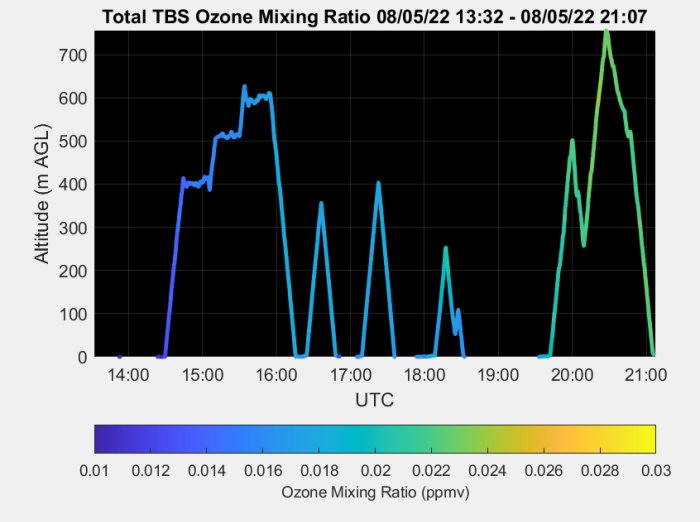
Flight 3:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
MAGIC CPC
CPC3

Launched 17:04.
Light precip begins at 17:16. CB 3.5 km.
Ascended to 400m at 17:23.
Surfaced 17:36.

Flight 4:
DTS
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
TBAC (6 minute delay at 17:58, 30 minutes sample, V3-5)
STAC (6 minute delay at 17:58, 30 minutes sample, IM5-7)
MAGIC CPC
CPC3

Launched 18:02.
Heavier precip begins at 17:56 - 18:11. CB 1.3 km.
TBAC3, 18:04 - 18:33, 0m - 250m, 0m ascending - 250m descending
STAC5, 18:04 - 18:33, 0m - 250m, 0m ascending - 250m descending

New tshower developing to east.
Surfaced 18:34.

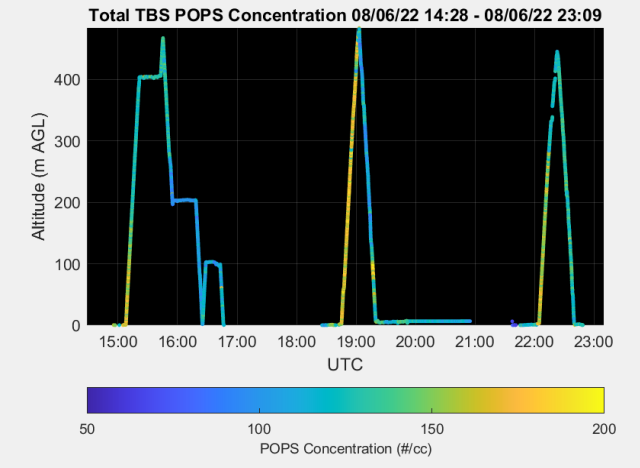


Flight 5:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (12 minute delay at 19:36, 30 minutes sample, V4-5)
STAC (12 minute delay at 19:36, 30 minutes sample, IM4-7)
MAGIC CPC
CPC3

Launched 19:37.
TBAC4, 19:48 - 20:17, 180m - 500m, 180m ascending - 500m ascending
STAC6, 19:48 - 20:17, 180m - 500m, 180m ascending - 500m ascending
Convective boundary visible to north at 19:58.
TBAC5, 20:18 - 20:47, 500m - 500m, 500m ascending - 750m descending
STAC7, 20:18 - 20:47, 500m - 500m, 500m ascending - 750m descending
Surfaced at 21:06

Daily HOU S3 TBS Flight Summary

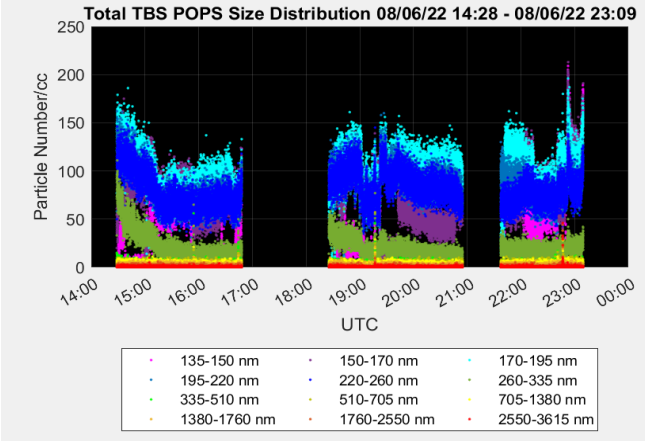
Date: 08/06/22
Authors: Dexheimer, Longbottom, Storch
Platform: TBS: 122 m^3 aerostat, Great White



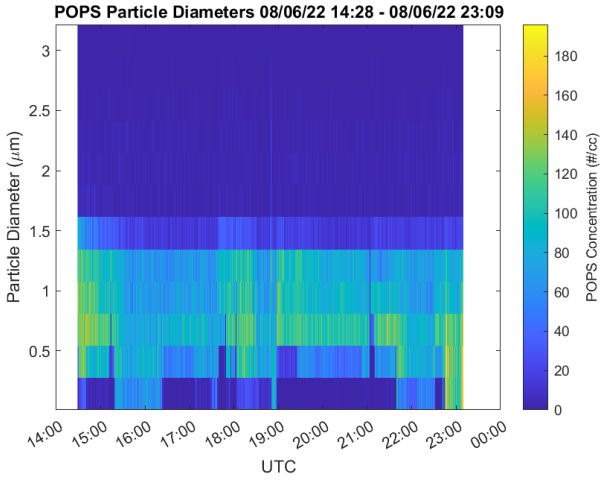
Instruments flown:
26 C, E wind 2-4 m/s, 80% cloud cover, CB 1.5 km
Low POPS conc aloft. Higher ozone conc than previous days.

Flight 1:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
TBAC (24 minute delay at 14:59, 30 minutes sample, V3-5)
STAC (24 minute delay at 14:59, 30 minutes sample, IM2-4)
MegaVOC (24 minute delay at 14:59, 20 minutes sample, 15 minute intersample delay, T 1,3,4)
MAGIC CPC
OPUS

Launched 15:00.
TBAC3, 15:23 - 15:52, 400m - 250m, 250m ascending - 465m descending
STAC2, 15:23 - 15:52, 400m - 250m, 250m ascending - 465m descending
TBAC4, 15:53 - 16:22, 250m - 0m, 0m ascending - 250m descending
STAC3, 15:53 - 16:22, 250m - 0m, 0m ascending - 250m descending
TBAC5, 16:23 - 16:52, 60m - 100m, 0m descending - 100m descending
STAC4, 16:23 - 16:52, 60m - 100m, 0m descending - 100m descending
VOC1, 15:23 - 15:42, 400L
VOC2, 15:58 - 16:17, 200L
VOC3, 16:33 - 16:52, 100L aborted loiter for lightning. Sample finished on ground.
Precip at 16:23.
Removed OPUS at 16:25 to prevent damage from precip.
Surfaced at 16:47.
Only MegaVOC shutoff aloft after VOC1.



Flight 2:
31 C, S wind 2-5 m/s, 80% cloud cover, CB 1 km
Low POPS conc aloft. Higher ozone conc than previous days.
Tstorm to SE. Light precip.



R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
MAGIC CPC I
MAGIC CPC II

Launched 18:45.
Ascended to 485m at 19:03. Intensifying tstorms in multiple directions.
Gusty winds.
Surfaced at 19:20.

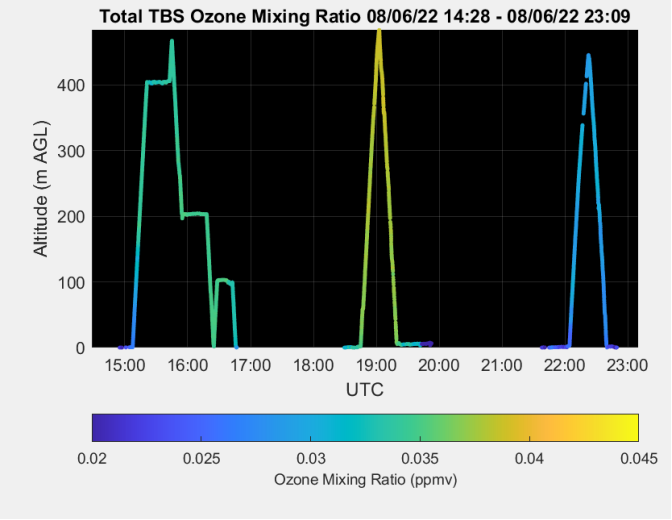
Flight 3:
Post-convection.

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
TBAC (24 minute delay at 22:00, 30 minutes sample, V3-5)
STAC (24 minute delay at 22:00, 30 minutes sample, IM5-7)
MAGIC CPC
CPC4
OPUS

Launched 22:00.
Ascended to 455m.
TBAC3, 22:24 - 22:41, 425m - 0m, 0m descending - 425m descending

STAC5, 22:24 - 22:41, 425m - 0m, 0m descending - 425m descending

Large smoke plume to ESE at 22:22. Induced PyrCu and convective cell.
Perhaps fire is lightning-induced from brief tstorm that passed ~21:30?
Lightning strike within 3 mi at 22:36.
Surfaced at 22:41.

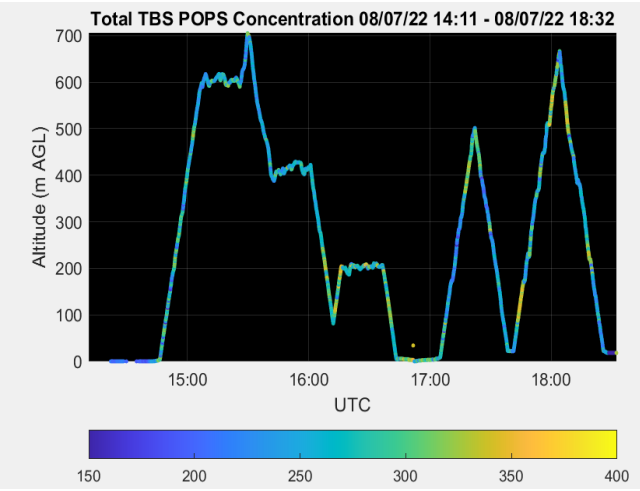


Daily HOU S3 TBS Flight Summary

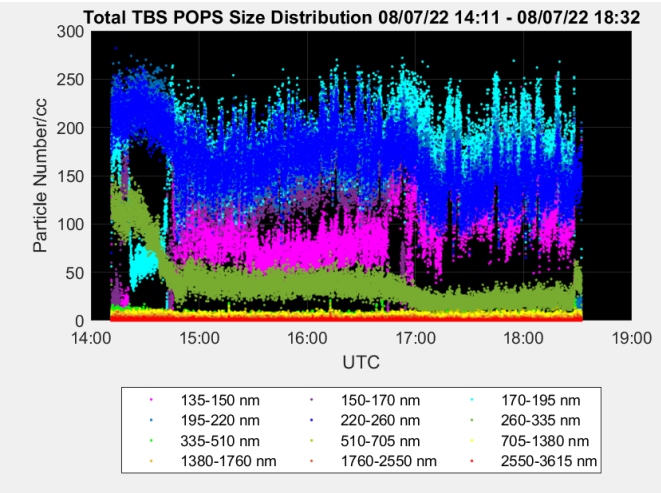
Date: 08/07/22
Authors: Dexheimer, Longbottom
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
30 C, SE wind 3-5 m/s, 80% cloud cover, Cu CB 1 km
POPS bins 3-5 >100 #/cc, bin3 max.

Flight 1:
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
TBAC (26 minute delay at 14:40, 30 minutes sample, V3-5)
STAC (26 minute delay at 14:40, 30 minutes sample, IM2-4)
MegaVOC (26 minute delay at 14:40, 20 minutes sample, 15 minute intersample delay, T 1,3,4)
MAGIC CPC
OPUS



Launched 14:45.
iMet RH is broken.
TBAC3, 15:06 - 15:35, 575m - 500m, 500m descending - 700m descending
STAC2, 15:06 - 15:35, 575m - 500m, 500m descending - 700m descending
TBAC4, 15:36 - 16:05, 500m - 250m, 250m descending - 500m descending
STAC3, 15:36 - 16:05, 500m - 250m, 250m descending - 500m descending
TBAC5, 16:06 - 16:35, 250m - 0m, 250m descending - 0m descending
STAC4, 16:06 - 16:35, 250m - 0m, 250m descending - 0m descending
VOC1, 15:06 - 15:25, 600L
VOC2, 15:41 - 16:00, 400L
VOC3, 16:16 - 16:35, 200L
Surfaced at 16:45.

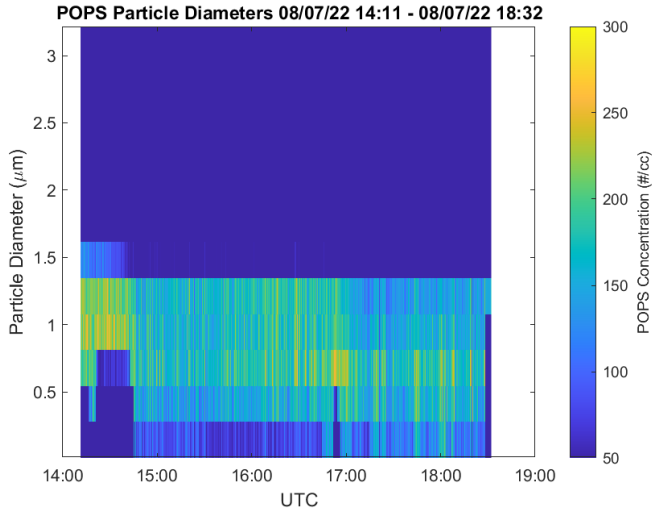


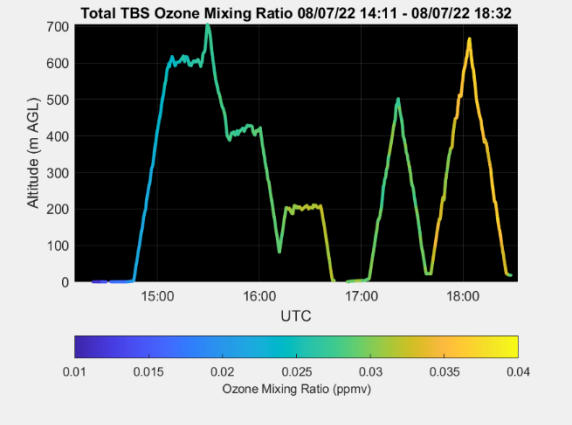
Flight 2:
33C, SE winds 5-8 m/s, Cu CB 1.5 km

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
STAC (3 minute delay at 17:01, 60 minutes sample, IM1)
MAGIC CPC
OPUS

CPC4
MA200 w/ dryer
AE-51 at surface

Launched 17:02.
Ascended to 500m at 17:22 and began descent. Cu Congestus beginning.
Wind shift to east aloft. Loitered at 20m and reoriented truck at 17:39.
Reascended at 17:41.
STAC1, 17:04 - 18:03, 0m - 650m, 0m ascending - 650m descending
Ascended to 650m at 18:03.
Gusty winds aloft.
Surfaced at 18:26.





Daily HOU S3 TBS Flight Summary

Date: 08/08/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
32 C, SE wind 0-2 m/s, Clear
POPS bins 2-4 >50 #/cc, bin3 max.

Flight 1:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (26 minute delay at 14:12, 30 minutes sample, V3-5)
STAC (26 minute delay at 14:12, 30 minutes sample, IM4-6)
MegaVOC (26 minute delay at 14:12, 20 minutes sample, 15 minute intersample delay, T 1,3,4)
MAGIC CPC
OPUS -15 m from top

Launched 14:20.
TBAC3, 14:38 - 15:07, 500m - 500m, 500m ascending - 700m descending
STAC4, 14:38 - 15:07, 500m - 500m, 500m ascending - 700m descending
TBAC4, 15:08 - 15:37, 500m - 250m, 500m descending - 250m descending
STAC5, 15:08 - 15:37, 500m - 250m, 500m descending - 250m descending
TBAC5, 15:38 - 16:07, 250m - 0m, 250m descending - 0m descending
STAC6, 15:38 - 16:07, 250m - 0m, 250m descending - 0m descending
VOC1, 14:38 - 14:57, 600L
VOC3, 15:13 - 15:32, 400L did not run
VOC4, 15:48 - 16:07, 200L did not run
Surfaced at 16:15.
MegaVOC shutoff aloft after VOC1.

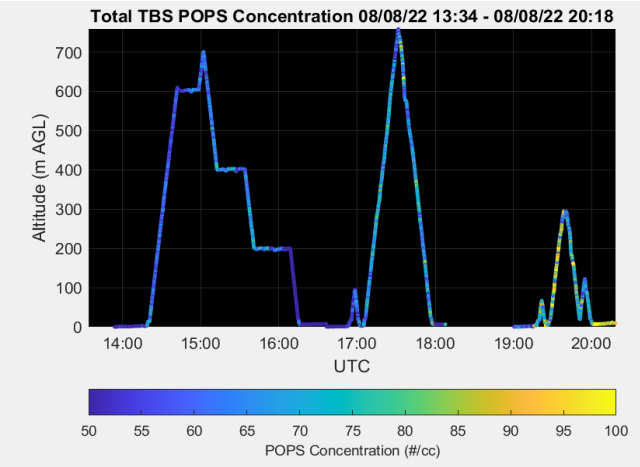
Flight 2:
34C, SE winds 2-4 m/s, clear

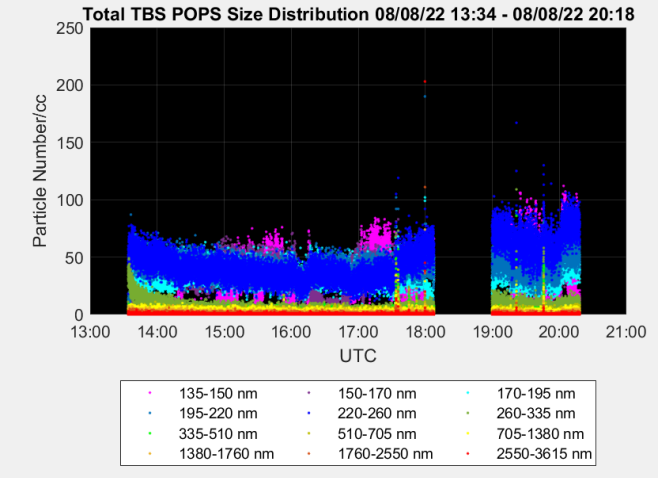
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
STAC (5 minute delay at 16:49, 60 minutes sample, IM1)
MAGIC CPC
OPUS -15m from the top
CPC4
MA200 w/ dryer
AE-51 at surface

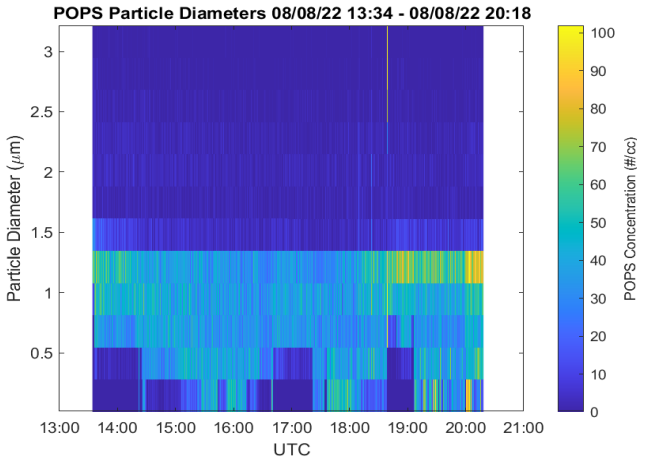
Launched 16:54.
Ascended to 100m at 16:58 and began descent due to issues with Magic CPC.
Removed Magic CPC.
Relaunched 17:06.
Winds shifted to E.
STAC1, 16:54 - 17:53, 0m - 750m, 0m ascending - 750m descending
Ascended to 750m at 17:31 and began descent.
Surfaced at 17:57.

Flight 3:
34C, SE winds 5-9 m/s, 60% cloudy, CB ~1.5Km

R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39546
MAGIC CPC
OPUS -15m from the top



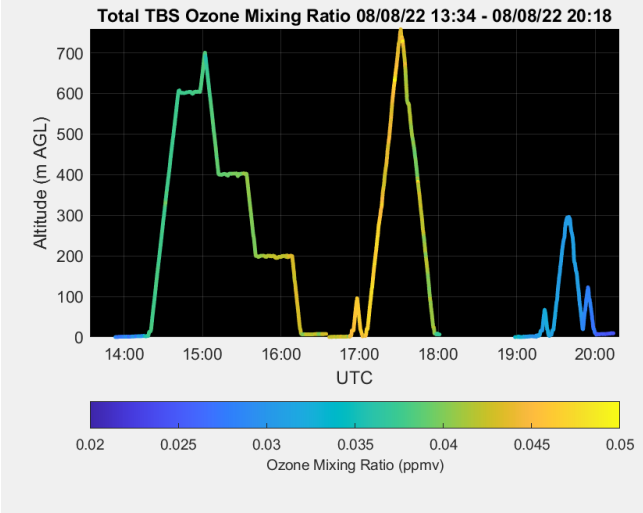




CPC4
MA200 w/ dryer
AE-51 at surface

Profile 1:
Launched 19:21.
Ascended to 60m at 19:23 and began descent due to blocking of anemometer cups.
Relaunched 19:28.
Ascended to 300m at 19:40 and began descent due to high winds (10 m/s).
Surfaced at 19:50.

Profile 2:
Launched 19:50.
Convection starting.
Ascended to 120m at 19:55 and began descent due to high winds aloft and at surface.
Surfaced at 20:00.

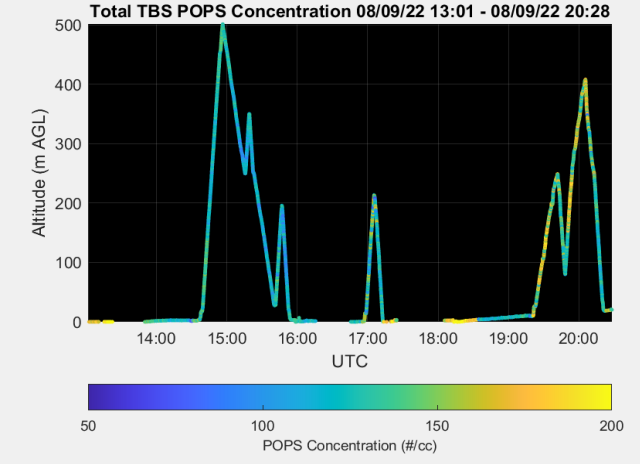


Daily HOU S3 TBS Flight Summary

Date: 08/09/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
31 C, SE wind 2-4 m/s, 30% clouds
POPS bins 2-3 >100 #/cc, bin3 max.

Flight 1:
DTS
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
TBAC (26 minute delay at 14:27, 30 minutes sample, V3-5)
STAC (26 minute delay at 14:27, 30 minutes sample, IM2-4)
MAGIC CPC
CPC4
OPUS -15 m from top



Launched 14:39.
TBAC3, 14:53 - 15:22, 420m - 500m, 250m ascending - 500m descending
STAC2, 14:53 - 15:22, 420m - 500m, 250m ascending - 500m descending
TBAC4, 15:23 - 15:52, 250m - 0m, 250m descending - 0m descending
STAC3, 15:23 - 15:52, 250m - 0m, 250m descending - 0m descending
TBAC5, 15:53 - 16:22, 250m - did not run
STAC4, 15:53 - 16:22, 250m - did not run
Surfaced at 15:53.

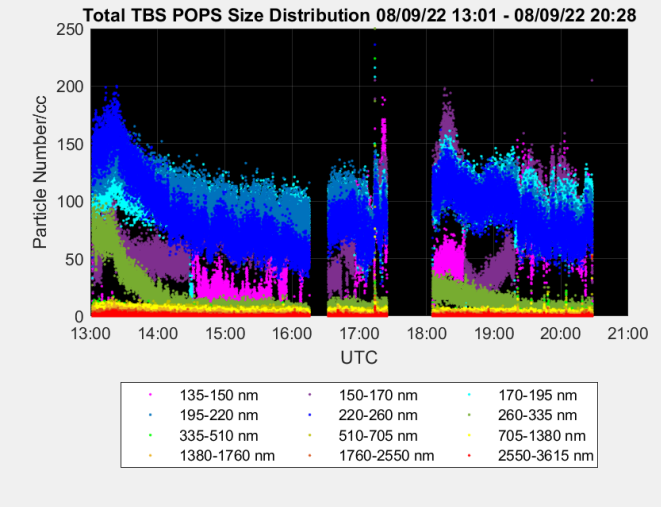
Flight 2:
DTS
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
TBAC (28 minute delay at 16:52, 30 minutes sample, V5) did not run
STAC (28 minute delay at 16:52, 30 minutes sample, IM4) did not run
MAGIC CPC
OPUS -15 m from top

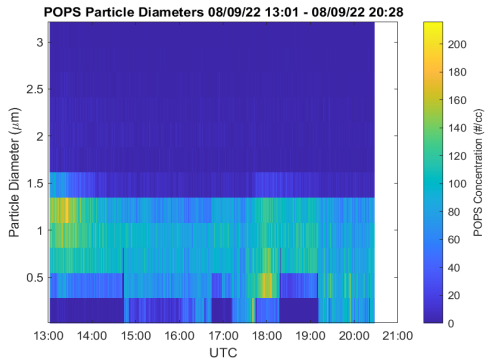
Launched 16:58.
Ascended to 200m at 17:06 and began descent due to issues with magic CPC.
Surfaced at 17:14
Onset of convective storm during retrieval, precip for ~15 minutes.

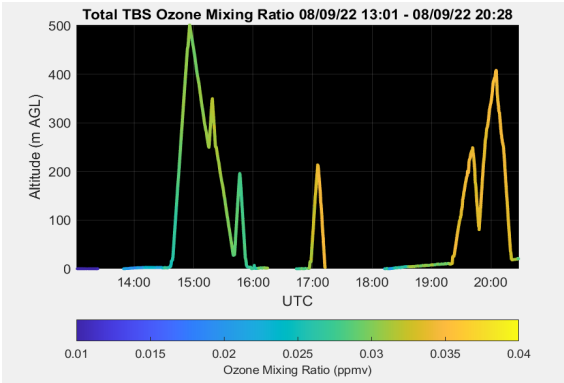
Flight 3:
35 C, E wind 4-6 m/s, 70% clouds 1.5km CB
POPS bins 0-4 >100 #/cc, bin2 max.

DTS
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
TBAC (10 minute delay at 19:13, 30 minutes sample, V3-4)
STAC (10 minute delay at , 30 minutes sample, IM4-5)
MAGIC CPC
OPUS -15 m from top

Launched 19:21.
TBAC3, 19:23 - 19:52, 0m - 250m, 0m ascending - 250m ascending
STAC4, 19:23 - 19:52, 0m - 250m, 0m ascending - 250m ascending
TBAC4, 19:53 - 20:22, 0m - 400m, 400m descending - 0m descending
STAC5, 19:53 - 20:22, 0m - 400m, 400m descending - 0m descending
Surfaced at 20:23.







Daily HOU S3 TBS Flight Summary

Date: 08/10/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
24 C, Calm, clear
POPS bins 3-5 >100 #/cc, bin4 max.

Flight 1:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z395522
TBAC (28 minute delay at 13:27, 30 minutes sample, V3-5)
STAC (28 minute delay at 13:27, 30 minutes sample, IM6-8)
MAGIC CPC
OPUS -15 m from top

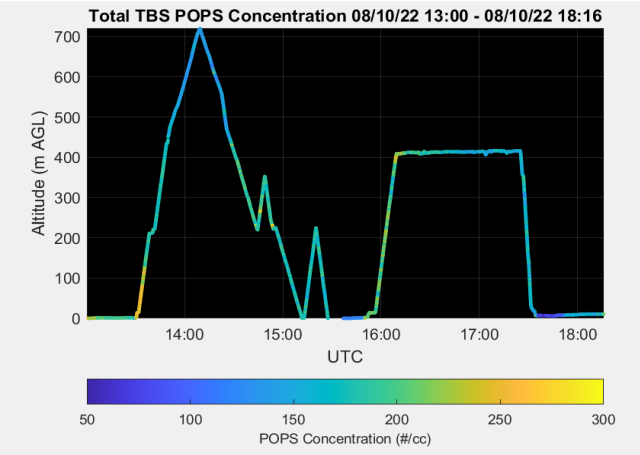
Launched 13:31.
TBAC3, 13:55 - 14:24, 500m - 500m, 500m ascending - 750m descending
STAC6, 13:55 - 14:24, 500m - 500m, 500m ascending - 750m descending
TBAC4, 14:25 - 14:54, 500m - 250m, 500m descending - 250m descending
STAC7, 14:25 - 14:54, 500m - 250m, 500m descending - 250m descending
TBAC5, 14:55 - 15:24, 250m - 0m, 250m descending - 0m descending
STAC8, 14:55 - 15:24, 250m - 0m, 250m descending - 0m descending
Surfaced at 15:30.

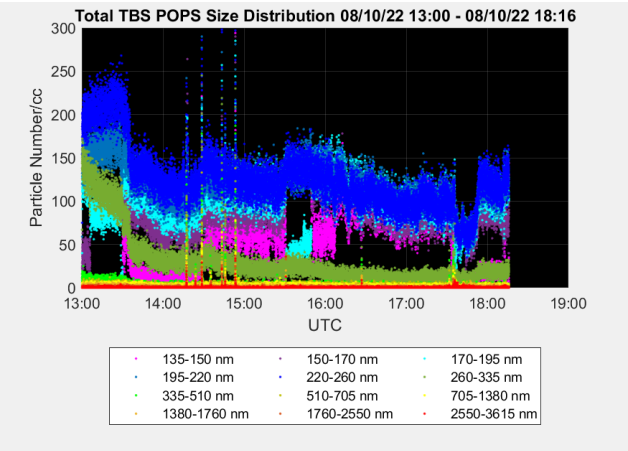
Flight 2:
32 C, E wind 2-4 m/s, 20% clouds 1 km CB
POPS bins 3-4 >100 #/cc, bin3 max.

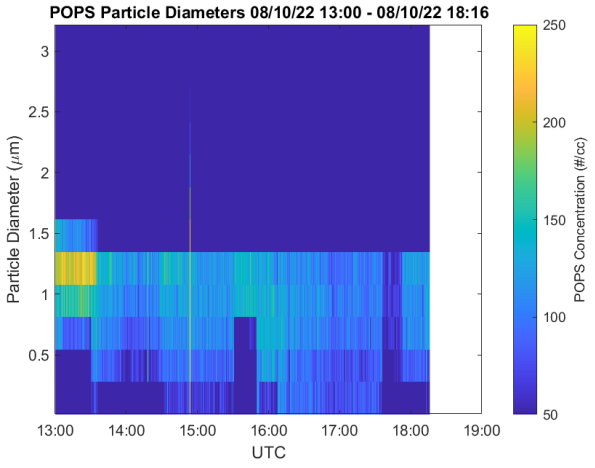
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z395522
STAC (10 minute delay at 15:46, 1hr sample, IM1 bulk)
MAGIC CPC
MA200
OPUS -15 m from top
AE51 on surface

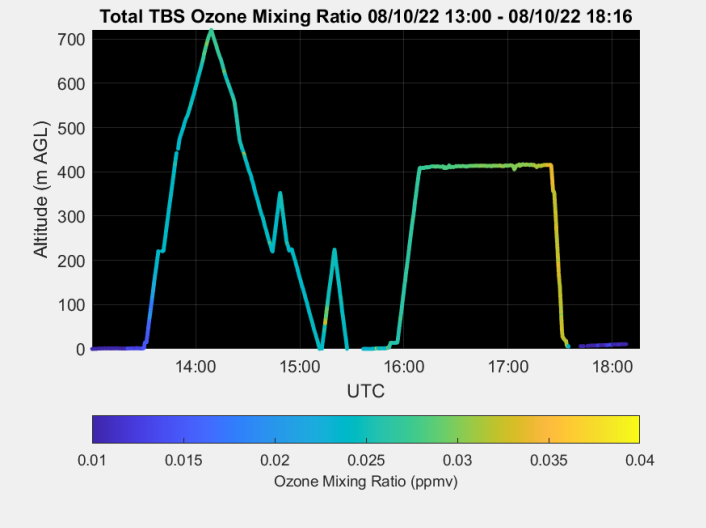
Launched 15:50.
STAC1, 15:56 -16:55, 0m - 400m, 0m ascending - 400m descending
Winch motor failed at 400m at ~16:20.

Balloon retrieved at 17:30 via emergency pull-down procedure.









Daily HOU S3 TBS Flight Summary

Date: 08/11/22
Authors: Longbottom, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
30 C, Calm, clear

Flight 1:
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549

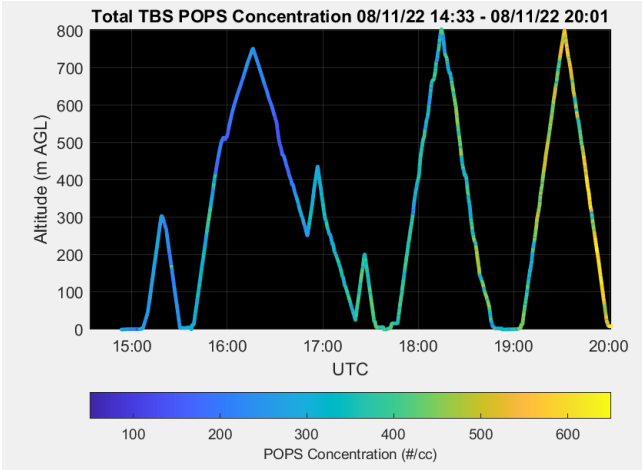
Test flight after winch repair.
Launched 15:06
Ascended to 300m at 15:18 and began descent.
Surfaced at 15:33.

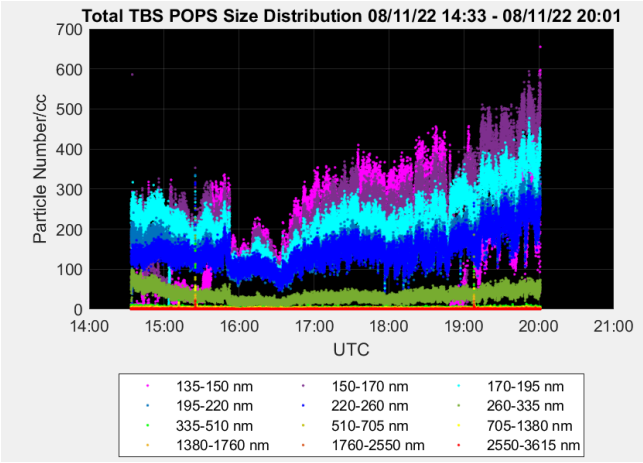
Flight 2:
32 C, W wind 3-4 m/s, mostly clear
POPS bins 2-4 >100 #/cc, bin3 max.

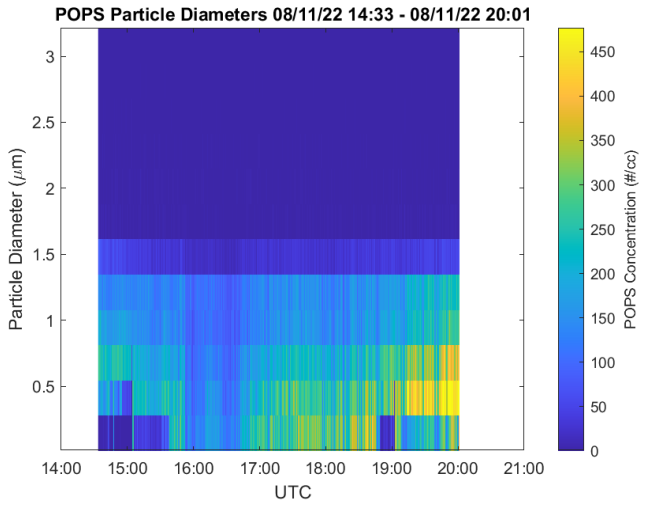
R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
TBAC (26 minute delay at 15:35, 30 minutes sample, V3-5)
STAC (26 minute delay at 15:35, 30 minutes sample, IM2-4)
MAGIC CPC
OPUS -15 m from top
CPC3 on ground

Launched 15:38.
TBAC3, 16:02 - 16:31, 565m - 500m, 500m ascending - 750m descending
STAC2, 16:02 - 16:31, 565m - 500m, 500m ascending - 750m descending

TBAC4, 16:32 - 17:01, 500m - 250m, 500m descending - 250m descending
STAC3, 16:32 - 17:01, 500m - 250m, 500m descending - 250m descending
TBAC5, 17:02 - 17:31, 250m - 0m, 250m descending - 0m descending
STAC4, 17:02 - 17:31, 250m - 0m, 250m descending - 0m descending
Surfaced at 17:32.







Flight 3:
34 C, NW wind 2-4 m/s, mostly clear
POPS bins 0-2 >200 #/cc, bin0 max.

R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
STAC (5 minute delay at 17:41, 1hr sample, IM1 bulk)
MAGIC CPC
CPC4
MA200
OPUS -15 m from top
AE51 on surface

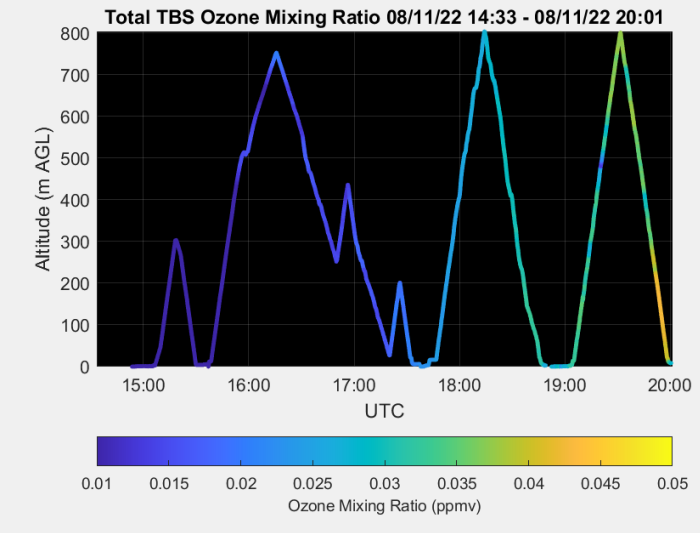
Launched 17:46.
STAC1, 17:46 - 18:45, 0m - 0m, 0m ascending - 800m descending
Surfaced at 18:46.

Flight 4:
36 C, N wind 4-7 m/s, mostly clear
POPS bins 0-2 >200 #/cc, bin0 max.

R1042 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
MAGIC CPC
CPC4
MA200

OPUS -15 m from top
AE51 on surface

Launched 19:06.
Ascended to 800m at 19:32 and began descent.
Surfaced at 19:58.

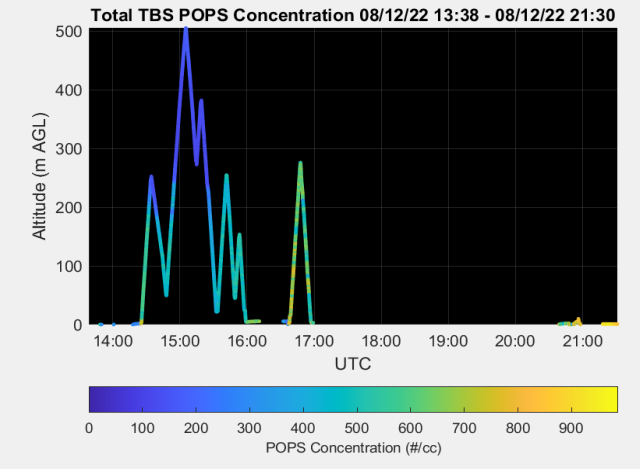


Daily HOU S3 TBS Flight Summary

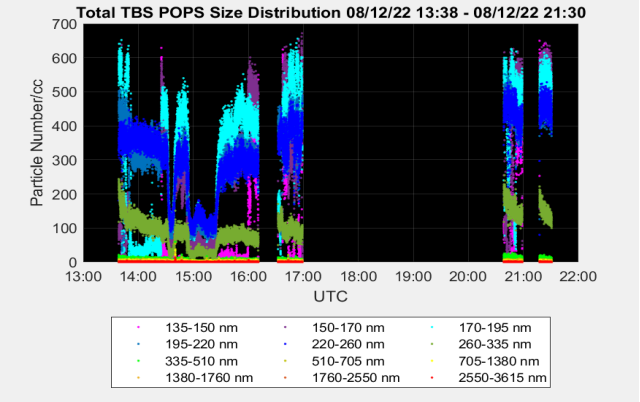
Date: 08/12/22
Authors: Dexheimer, Ruiz, Whitson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
26 C, N wind 2-4 m/s, 80% cloud cover, Cu CB 3.5 km
POPS bins 0-4 >300 #/cc, bin1 max.

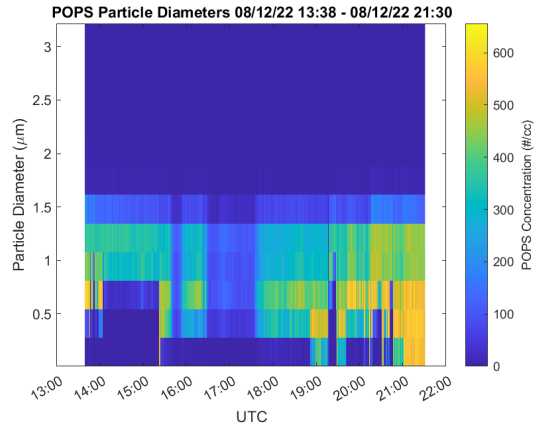
Flight 1:
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (10 minute delay at 14:15, 30 minutes sample, V3-5)
STAC (3 minute delay at 14:21, 30 minutes sample, IM2-4)
MAGIC CPC
CPC4
OPUS -15m*



Launched 14:20.
TBAC3, 14:24 - 14:53, 0m - 250m, 0m ascending - 250m ascending
STAC2, 14:25 - 14:54, 0m - 250m, 0m ascending - 250m ascending
TBAC4, 14:54 - 15:23, 250m - 250m, 250m ascending - 500m descending
STAC3, 14:55 - 15:24, 250m - 250m, 250m ascending - 500m descending
TBAC5, 15:24 - 15:53, 250m - 0m, 250m descending - 0m descending
STAC4, 15:25 - 15:54, 250m - 0m, 250m descending - 0m descending
New convective storms initiate to west at 15:00.
*OPUS added at 15:31.
Thunderstorms firing in multiple directions.
Surfaced at 16:00.
Lightning at 7.5 mi.



Flight 2:
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
MAGIC CPC
CPC4 - did not log.
MA200
OPUS -15m*
AE-51 at surface



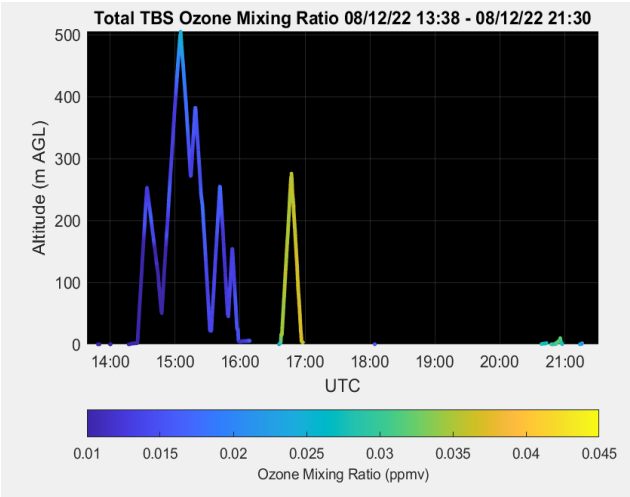
Launched 16:38.
Ascended to 275m at 16:47.
Tstorm forming to NE.
Surfaced at 16:59.

Rain and thunderstorm.

Flight 3:
27C, 2-4 m/s from SE, CB 1.5 km and 3 km
POPS bin 3-4 > 400, bin4 max

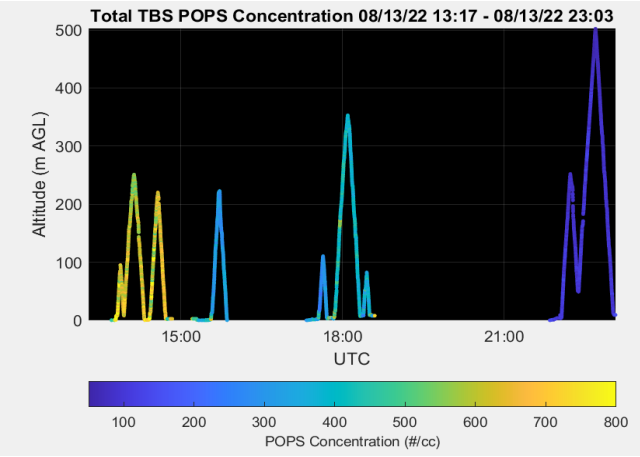
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (4 minute delay at 20:49, 30 minutes sample, V3-5)
STAC (4 minute delay at 20:49, 30 minutes sample, IM5-7)
MAGIC CPC
CPC4

A few test ascents and descents to troubleshoot winch brake.
Aborted for lightning.



Daily HOU S3 TBS Flight Summary

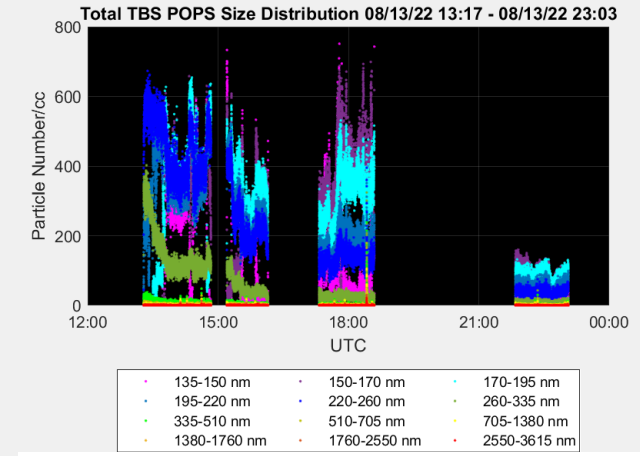
Date: 08/13/22
Authors: Dexheimer, Peterson, Ruiz
Platform: TBS: 122 m^3 aerostat, Great White



Conditions:
26 C, N wind 4-5 m/s, 80% clear, some clouds to SE
POPS bins 0-4 >300 #/cc, bin1 max.

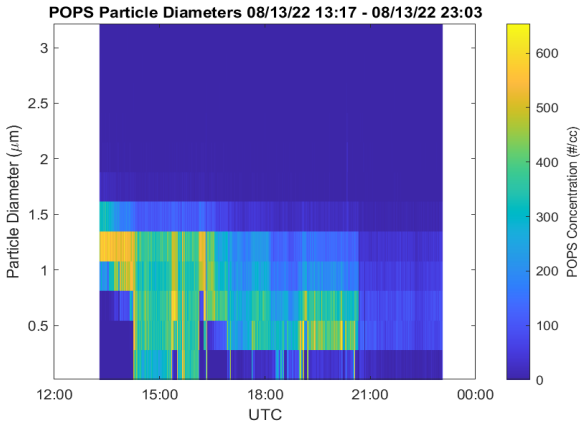
Flight 1:
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (4 minute delay at 13:43, 30 minutes sample, V3)
STAC (4 minute delay at 13:43, 30 minutes sample, IM5-7)
MAGIC CPC
OPUS -15m
CPC1, could not run due to saturating

Profile 1:
Launched 13:44.
TBAC3, 13:47 - 14:16, 0m - 250m, 0m ascending - 250m descending
STAC5, 13:47 - 14:16, 0m - 250m, 0m ascending - 250m descending
High winds aloft.
Surfaced 14:19.



Profile 2:
STAC and TBAC removed.
Launched 14:25.
Cu CB developed at 500m.
Ascended to 220m and descended because MAGIC CPC saturated.
Surfaced at 14:45.

Flight 2:
R1042 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
MAGIC CPC
OPUS -15m
CPC1



Cu CB 700m. POPS conc decreased to > 200 #/cc bin 1 - 4.
Launched 15:33.
Ascended to 225m.
Surfaced at 15:52.

Flight 3:
32 C, E winds 5-9 m/s, Cu CB 1.2 km
POPS bin 1-4 >100 #/cc, bin 1 max.

R1039 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
MAGIC CPC
OPUS -15m
CPC1

Profile 1:
CPC is saturating.
Launched 17:27.
Ascended to 115m and noticed no XDATA from POPS or ozonesonde. Descended.
Reascended at 17:50.
Ascended to 350m at 18:05 and began descent.
Surfaced at 18:20.

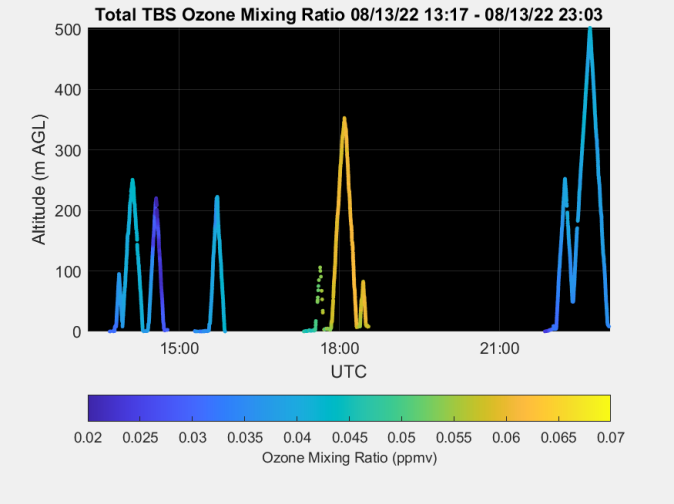
Profile 2:
Launched 18:21.
Ascended to 75m with TBAC then got several gusts of almost 10 m/s and removed TBAC.
Surfaced at 18:32.

Light precip.

Flight 4:
26 C, E winds 3-8 m/s, Overcast 2 km.
POPS bin 1 >100 #/cc, bin 1 max.

R1039 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (4 minute delay at 21:57, 30 minutes sample, V4-5)
STAC (4 minute delay at 21:57, 30 minutes sample, IM6-8)
CPC1
OPUS - 50m

Launched 21:56.
TBAC4, 22:01 - 22:30, 0m - 250m, 0m ascending - 250m ascending
STAC6, 22:01 - 22:30, 0m - 250m, 0m ascending - 250m ascending
OPUS added at 22:22.
TBAC5, 22:31 - 23:00, 250m - 0m, 250m ascending - 500m descending
STAC7, 22:31 - 23:00, 250m - 0m, 250m ascending - 500m descending
Winds increased during sample forcing descent.
Surfaced at 23:02.

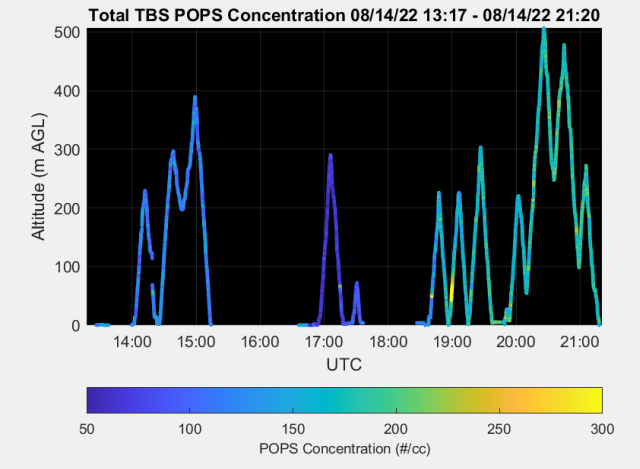


Daily HOU S3 TBS Flight Summary

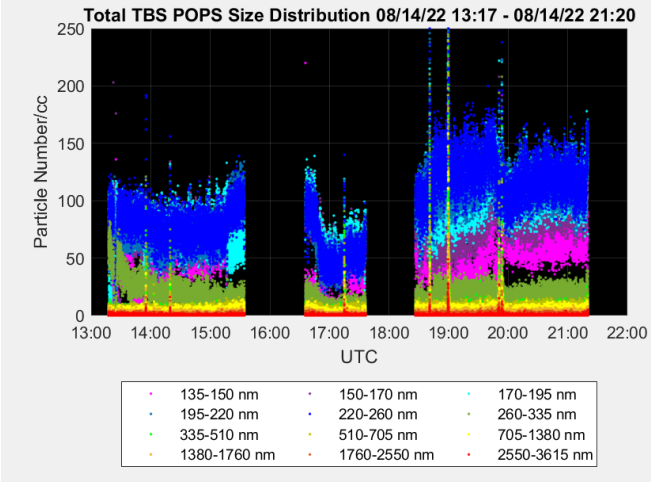
Date: 08/14/22
Authors: Dexheimer, Peterson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
25 C, E wind 3-5 m/s, 80% cloud cover, CB 2 km
POPS bins 1-4 < 100 #/cc, bin4 max.

Flight 1:
R1039 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (6 minute delay at 13:57, 30 minutes sample, V3)
STAC (6 minute delay at 13:57, 30 minutes sample, IM8-10)
MAGIC CPC (added 14:24)
CPC1
OPUS -15m

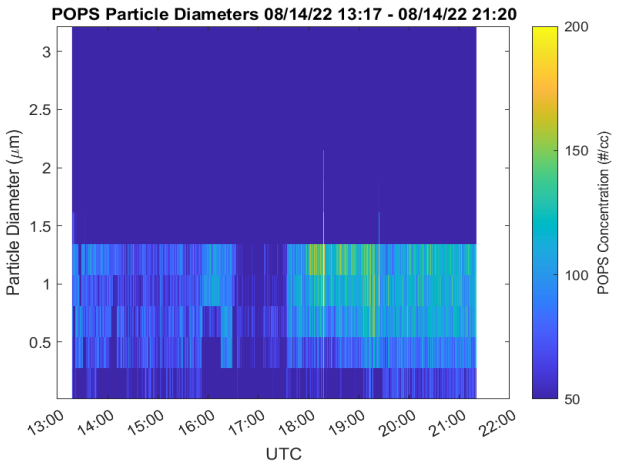


Launched 13:59.
TBAC3, 14:03 - 14:32, 0m - 200m, 0m ascending - 230m descending
STAC8, 14:03 - 14:32, 0m - 200m, 0m ascending - 230m descending
OPUS removed at 14:26 due to threat of incoming precipitation.
TBAC4, 14:33 - 15:02, 200m - 295m, 200m ascending - 390m descending
STAC9, 14:33 - 15:02, 200m - 295m, 200m ascending - 390m descending
Light precip at 14:42. Intermittent scud at 350m.
TBAC5, 15:03 - 15:14, 295m - 0m, 295m descending - 0m descending
STAC10, 15:03 - 15:14, 295m - 0m, 295m descending - 0m descending
Surfaced at 15:14.
XQ2 not turned on.



Flight 2:
28 C, S wind 4-6 m/s, 80% cloud cover, CB 500m (intermittent)
POPS bins 1-4 < 100 #/cc, bin1 max.

R1039 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
*MAGIC CPC
CPC1
OPUS -15m
*MA200
*AE-51 at surface



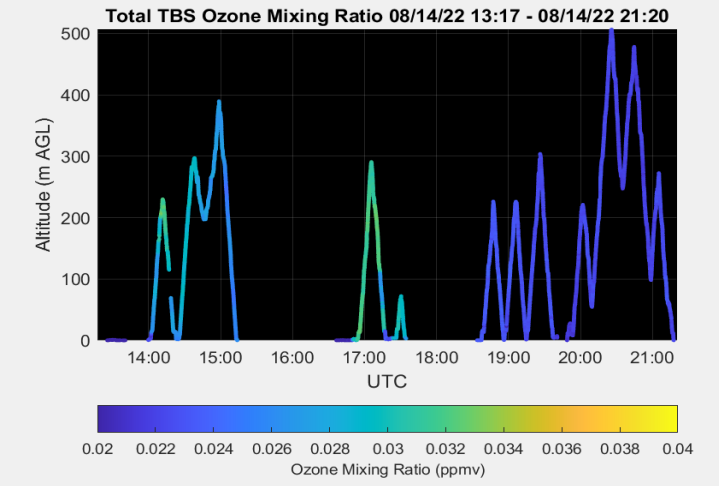
Profile 1:
Launched 16:47.
Ascended to 280m at 17:06 and began descent for winds.
Surfaced 17:17.

Profile 2:
MA200 added.
AE-51 at surface.
MAGIC CPC removed.
Cu CB 600m.
Launched 17:27.
Ascended to 75m at 17:30 and began descent. Much higher winds aloft.
Surfaced at 17:34.

Flight 3:
32 C, S wind 4-6 m/s, 80% cloud cover, CB 1 km
POPS bins 1-4 < 100 #/cc, bin4 max.

R1039 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
MAGIC CPC
*CPC1

*MA200
OPUS -15m
*AE-51 at surface



Profile 1:
Launched 18:38.
Ascended to 225m at 18:47. High winds aloft.
Surfaced at 18:56.

Profile 2:
Removed CPC1 and MA200.
Launched 18:57.
Ascended to 225m at 19:06.
Surfaced at 19:14.

Profile 3:
CPC1 and MA200 still off.
Launched 19:16.
Ascended to 300m at 19:26 and began descent.
Surfaced at 19:3

Flight 4:
32 C, S wind 4-6 m/s, 80% cloud cover, CB 1 km
POPS bins 1-4 ~ 100 #/cc, bin4 max.

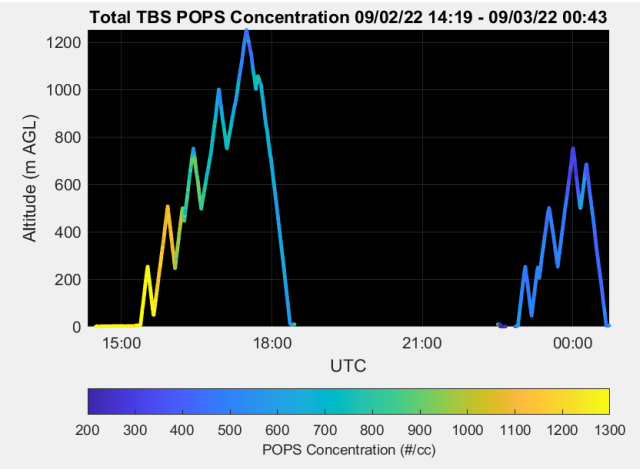
R1039 & XQ2 58849
POPS306 & iMet 402 MHz & Ozonesonde 2Z39549
MAGIC CPC
TBAC (2 minute delay at 19:46, 30 minutes sample, V3)
STAC (2 minute delay at 19:46, 30 minutes sample, IM11-13)
OPUS -15m

Launched 19:46.
TBAC3, 19:48 - 20:17, 0m - 270m, 0m ascending - 270m ascending
STAC11, 19:48 - 20:17, 0m - 270m, 0m ascending - 270m ascending
TBAC4, 20:18 - 20:47, 270m - 405m, 250m ascending - 505m descending
STAC12, 20:18 - 20:47, 270m - 405m, 250m ascending - 505m descending
Still windy aloft.
TBAC5, 20:48 - 21:17, 405m - 0m, 405m descending - 0m descending
STAC13, 20:48 - 21:17, 405m - 0m, 405m descending - 0m descending
Surfaced at 21:17.

Daily HOU S3 TBS Flight Summary

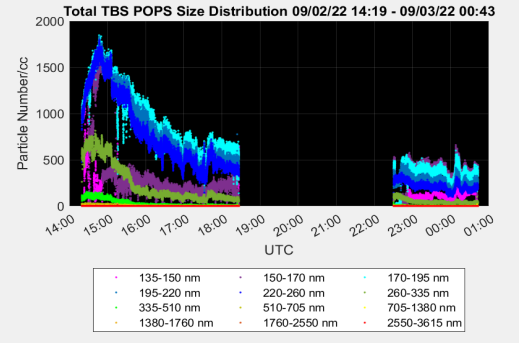
Date: 09/02/22
Authors: Dexheimer, Longbottom, Peterson
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
31 C, E wind 3-4 m/s, 80% cloud cover, CB 2 km
POPS bins 2-4 > 1000 #/cc, bin2 max.



Flight 1:
R1039 & XQ2 55345
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (5 minute delay at 15:12, 30 minutes sample, V3-5)
STAC (5 minute delay at 15:12, 30 minutes sample, IM2-6)
CPC1
MA200 - dryer end was blocked.
*AE-51 at surface

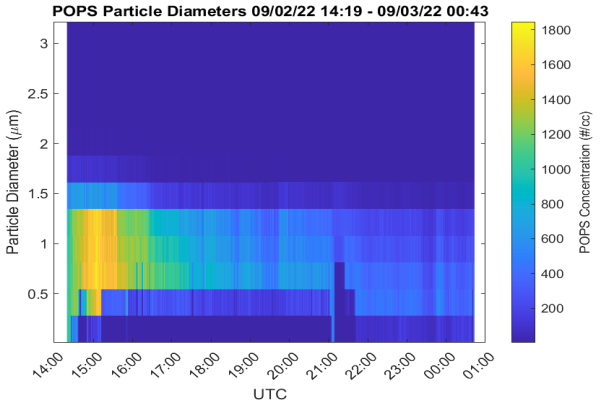
Launched 15:21.
TBAC3, 15:17 - 15:46, 0m - 250m, 0m ascending - 250m ascending
STAC2, 15:17 - 15:46, 0m - 250m, 0m ascending - 250m ascending
TBAC4, 15:47 - 16:16, 250m - 500m, 250m ascending - 500m ascending
STAC3, 15:47 - 16:16, 250m - 500m, 250m ascending - 500m ascending
POPS conc decreasing with height.
CB developed at 750m - 900m.
TBAC5, 16:17 - 16:46, 500m - 750m, 500m ascending - 750m ascending
STAC4, 16:17 - 16:46, 500m - 750m, 500m ascending - 750m ascending
STAC5, 16:47 - 17:16, 750m - 1000m, 750m ascending - 1000m ascending
STAC6, 17:17 - 17:46, 1000m - 1250m, 1000m ascending - 1250m ascending
Smoke plume visible to SW at 17:34.
Convective storms developing nearby at 18:18.
Surfaced at 18:23.



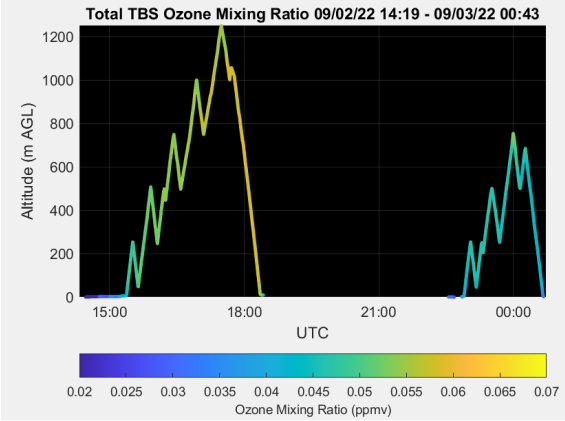
Heavy precipitation.

Flight 2:
30C, S wind 3-4 m/s, 80% cloud cover, CB 3.5 km
POPS bins 1-4 > 300 #/cc, bin1 max.

DTS
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (5 minute delay at 22:46, 30 minutes sample, V3-5)
STAC (5 minute delay at 22:46, 30 minutes sample, IM7-10)
CPC1
MA200
*AE-51 at surface



Launched 22:48.
TBAC3, 22:51 - 23:20, 0m - 250m, 0m ascending - 250m ascending
STAC7, 22:51 - 23:20, 0m - 250m, 0m ascending - 250m ascending
DTS started at 80m.
TBAC4, 23:21 - 23:50, 250m - 500m, 250m ascending - 500m ascending
STAC8, 23:21 - 23:50, 250m - 500m, 250m ascending - 500m ascending
TBAC5, 23:51 - 00:20, 500m - 500m, 500m ascending - 750m descending
STAC9, 23:51 - 00:20, 500m - 500m, 500m ascending - 750m descending
Surfaced at 00:40.



Daily HOU S3 TBS Flight Summary

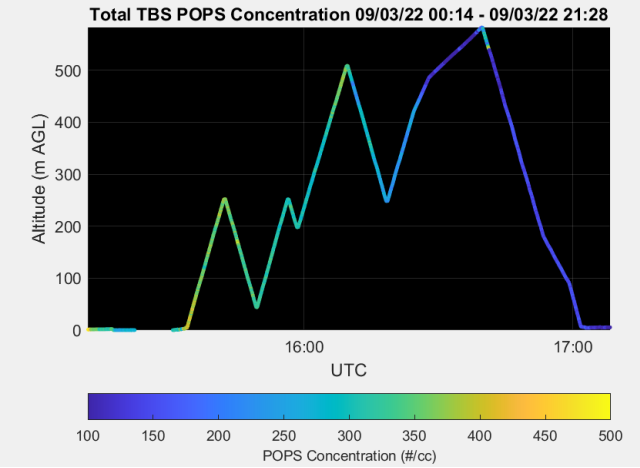
Date: 09/03/22
Authors: Dexheimer, Longbottom, Peterson
Platform: TBS: 122 m^3 aerostat, Great White

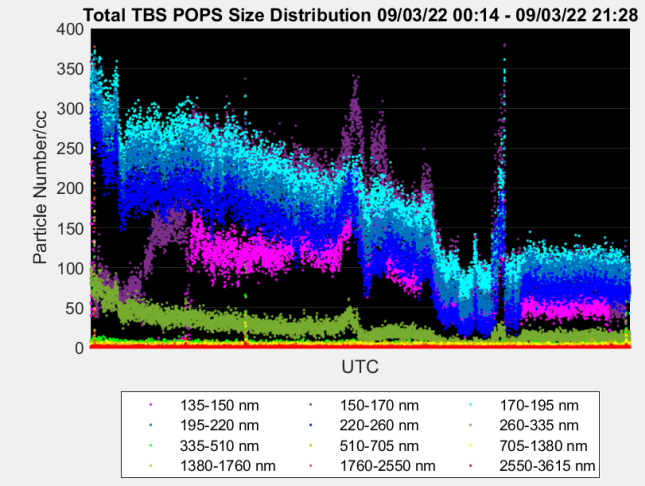
Conditions:
28 C, W wind 2-4 m/s, 80% cloud cover, intermittent CB 500m and 3.5 km
POPS bins 2-4 > 300 #/cc, bin3 max.

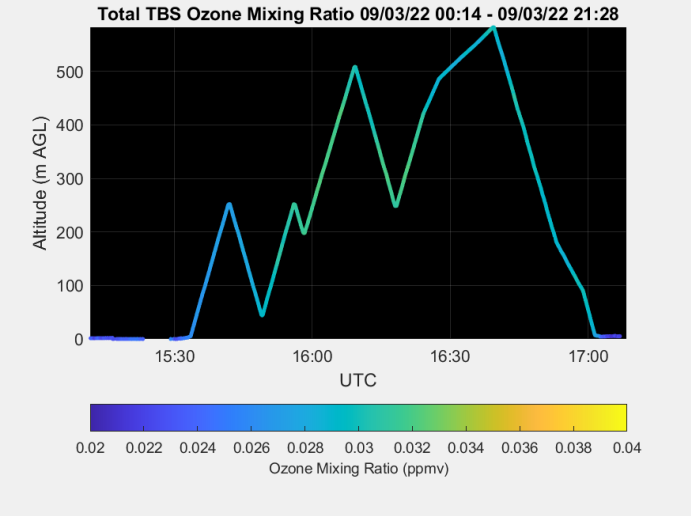
Flight 1:
DTS
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (5 minute delay at 15:29, 30 minutes sample, V3-5)
STAC (5 minute delay at 15:29, 30 minutes sample, IM10-14)
CPC1
MA200 - dryer end was blocked.
*AE-51 at surface

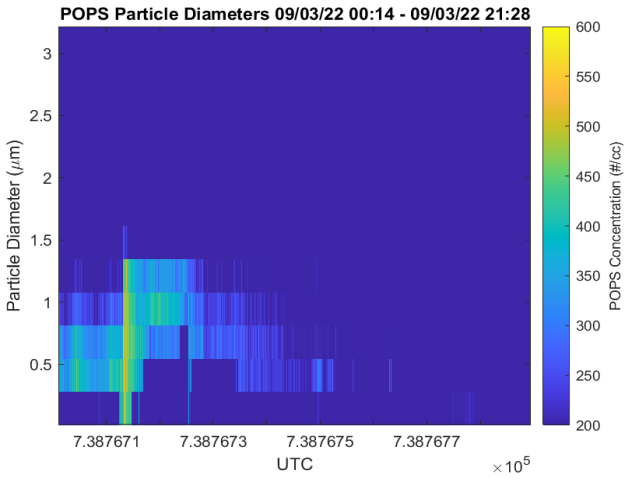
Launched 15:29.
TBAC3, 15:31 - 16:00, 0m - 250m, 0m ascending - 250m ascending
STAC10, 15:31 - 16:00, 0m - 250m, 0m ascending - 250m ascending
Convective cells popping to north.
TBAC4, 16:01 - 16:30, 250m - 500m, 250m ascending - 500m ascending
STAC11, 16:01 - 16:30, 250m - 500m, 250m ascending - 500m ascending
CB has lowered to be intermittent at 500m.
TBAC5, 16:31 - 17:00, 580m - 0m, 580m ascending - 0m descending
STAC12, 16:31 - 17:00, 580m - 0m, 580m ascending - 0m descending
Lightning on edge of safe radius forcing descent.
Surfaced at 17:03.

Attempted a second flight but truck was stuck in field after light precip.



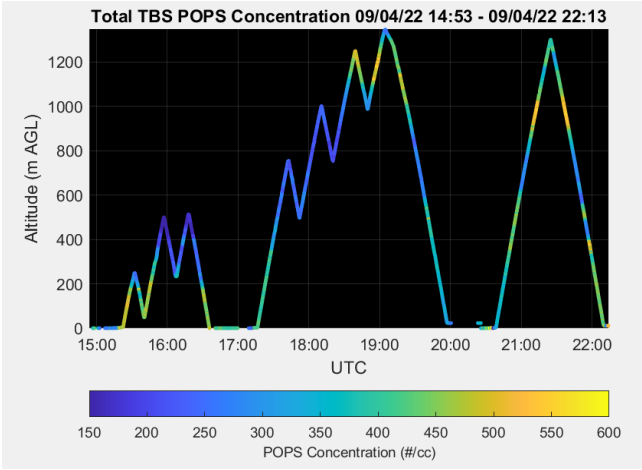






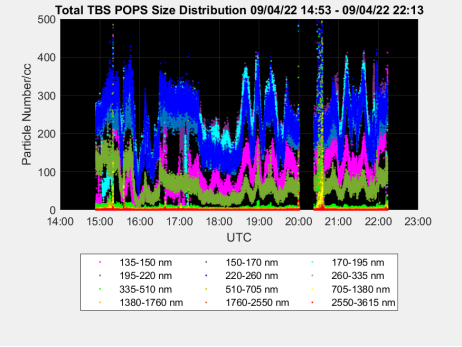
Daily HOU S3 TBS Flight Summary

Date: 09/04/22
Authors: Dexheimer, Longbottom, Peterson
Platform: TBS: 122 m^3 aerostat, Great White



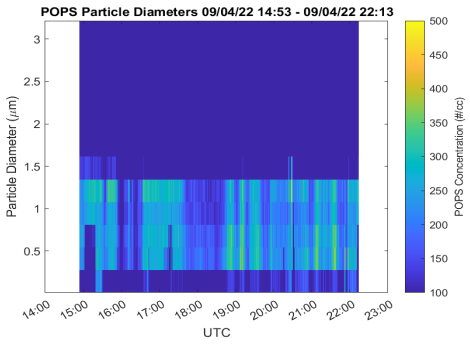
Conditions:
24 C, W wind 2-4 m/s, 70% cloud cover, intermittent CB > 4 km
POPS bins 2-4 > 100 #/cc, bin3 max.

Flight 1:
Launched 15:16.
TBAC3, 15:19 - 15:48, 0m - 250m, 0m ascending - 250m ascending
STAC2, 15:19 - 15:48, 0m - 250m, 0m ascending - 250m ascending
TBAC4, 15:49 - 16:18, 250m - 500m, 250m ascending - 500m ascending
STAC3, 15:49 - 16:18, 250m - 500m, 250m ascending - 500m ascending
No POPS or ozonesonde data over iMet. Began descent.
TBAC5, 16:19 - 16:48, 500m - 0m, 500m descending - 0m descending
STAC4, 16:19 - 16:48, 500m - 0m, 500m descending - 0m descending
Surfaced at 16:37, samplers ran time out at surface.



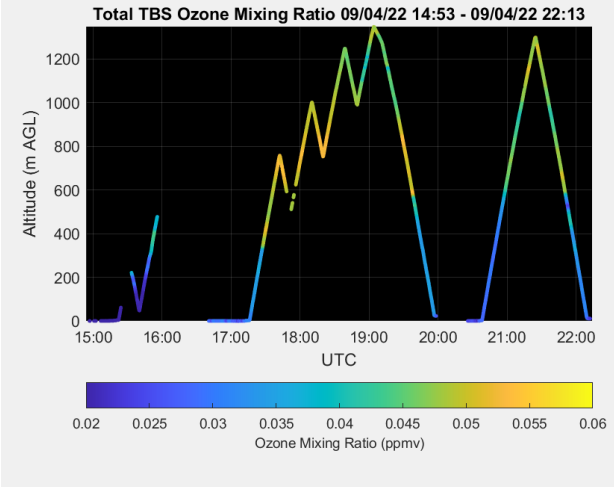
29 C, SW wind 2-4 m/s, overcast, intermittent CB 2 km
POPS bins 1-4 > 100 #/cc, bin2 max.
Flight 2:
DTS
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552
TBAC (20 minute delay at 17:09, 30 minutes sample, V3-5)
STAC (20 minute delay at 17:09, 30 minutes sample, IM5-9)
CPC1
*AE-51 at surface

Launched 17:10.
TBAC3, 17:29 - 17:58, 400m - 750m, 400m ascending - 750m ascending
STAC5, 17:29 - 17:58, 400m - 750m, 400m ascending - 750m ascending
TBAC4, 17:59 - 18:28, 750m - 1000m, 750m ascending - 1000m ascending
STAC6, 17:59 - 18:28, 750m - 1000m, 750m ascending - 1000m ascending
TBAC5, 18:29 - 18:58, 1000m - 1250m, 1000m ascending - 1250m ascending
STAC7, 18:29 - 18:58, 1000m - 1250m, 1000m ascending - 1250m ascending
STAC8, 18:59 - 19:28, 840m - 1350m, 840m descending - 1350m descending
STAC9, 19:29 - 19:58, 840m - 0m, 840m descending - 0m descending
Ascended to limit of DTS fiber.
Intermittent cloud layer developed around 1150m forcing descent at 19:12.
Surfaced at 20:00.
XQ2 not started.



29 C, S wind 2-4 m/s, overcast, intermittent CB 500m
POPS bins 1-5 > 100 #/cc, bin4 max.
Flight 3:
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z339477
STAC (3 minute delay at 20:34, 60 minutes sample, IM1)
MAGIC CPC
CPC1
*AE-51 at surface

Launched 20:35.
STAC1, 20:37 - 21:36, 0m - 1300m, 0m ascending - 1300m descending
Surfaced at 22:10.

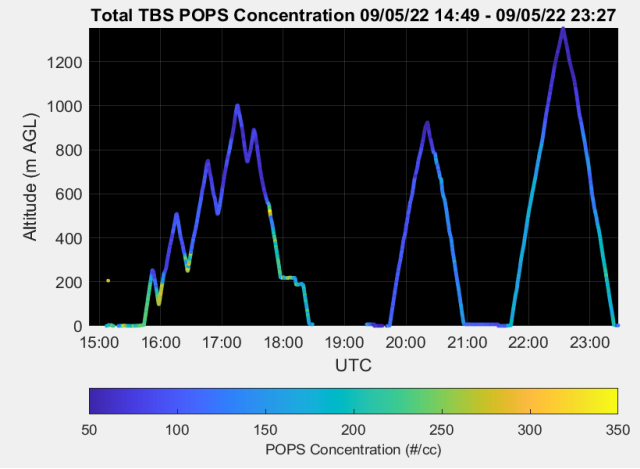


Daily HOU S3 TBS Flight Summary

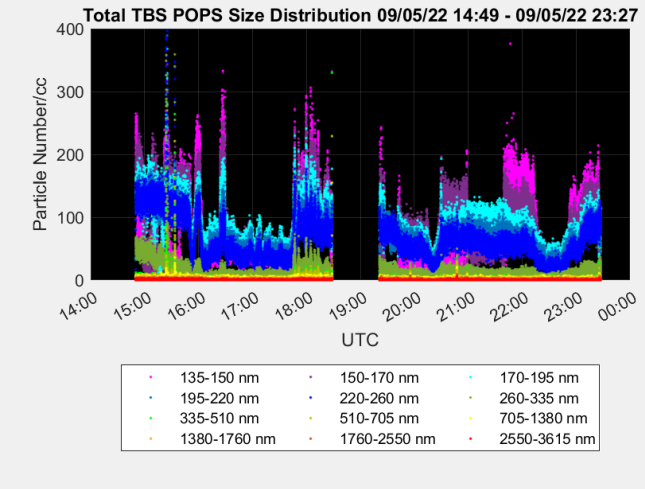
Date: 09/05/22
Authors: Dexheimer, Longbottom, Tezak
Platform: TBS: 122 m^3 aerostat, Great White

Conditions:
24 C, W wind 2-4 m/s, 70% cloud cover, intermittent CB > 4 km
POPS bins 2-4 > 100 #/cc, bin3 max.

Flight 1:
DTS - cannot use after ~16:55 - 18:20 due to fiber break.
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
TBAC (5 minute delay at 15:30, 30 minutes sample, V3-5)
STAC (5 minute delay at 15:30, 30 minutes sample, IM10-14)
MAGIC CPC
CPC1
*AE-51 at surface

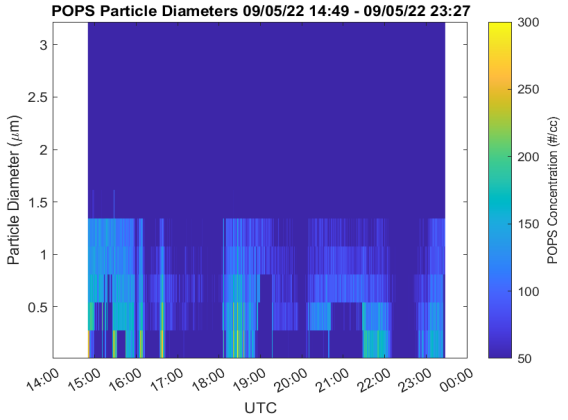


Launched 15:30.
TBAC3, 15:35 - 16:04, 0m - 250m, 0m ascending - 250m ascending
STAC10, 15:35 - 16:04, 0m - 250m, 0m ascending - 250m ascending
TBAC4, 16:05 - 16:34, 250m - 500m, 250m ascending - 500m ascending
STAC11, 16:05 - 16:34, 250m - 500m, 250m ascending - 500m ascending
Very low POPS concentrations aloft.
TBAC5, 16:35 - 17:04, 500m - 750m, 500m ascending - 750m ascending
STAC12, 16:35 - 17:04, 500m - 750m, 500m ascending - 750m ascending
STAC13, 17:05 - 17:34, 750m - 1000m, 750m ascending - 1000m ascending
Fiber break at ~16:55 coming off spool. Break approximately 220m from end.
STAC14, 17:35 - 18:04, 750m - 220m, 750m descending - 220m descending
Pauses on descent to splice fiber twice.
Surfaced at 18:25.



Flight 2:
28 C, S wind 2-5 m/s, 80% cloud cover, intermittent CB at 800m
POPS bins 3-4 > 50 #/cc, bin4 max.

DTS
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (5 minute delay at 19:36, 60 minutes sample, IM1)
CPC1
MAGIC CPC
*AE-51 at surface



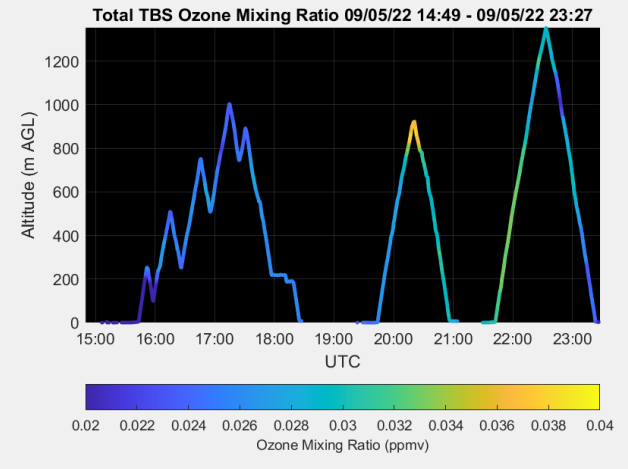
Launched 19:37
STAC1, 19:41 - 20:40, 0m - 450m, 0m ascending - 925m descending
Ascended to 925m.
Surfaced at 21:00.

28 C, S wind 2-4 m/s, 70% cloud cover, intermittent CB 500m
POPS bins 2-4 > 50 #/cc, bin2 max.

Flight 3:
DTS - Can only use until 22:53.
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
TBAC (5 minute delay at 21:33, 30 minutes sample, V3-5)
MAGIC CPC
CPC1
*AE-51 at surface

Launched 21:34.
TBAC3, 21:38 - 22:07, 0m - 720m, 0m ascending - 720m ascending

POPS concentration increasing with height. Bin 0 maximum.
TBAC4, 22:08 - 22:37, 720m - 1250m, 720m ascending - 1350m descending
TBAC5, 22:38 - 23:07, 1250m - 440m, 1250m descending - 440m descending
Fiber broke within reel at 22:53 at 850m.
Surfaced at 23:25.

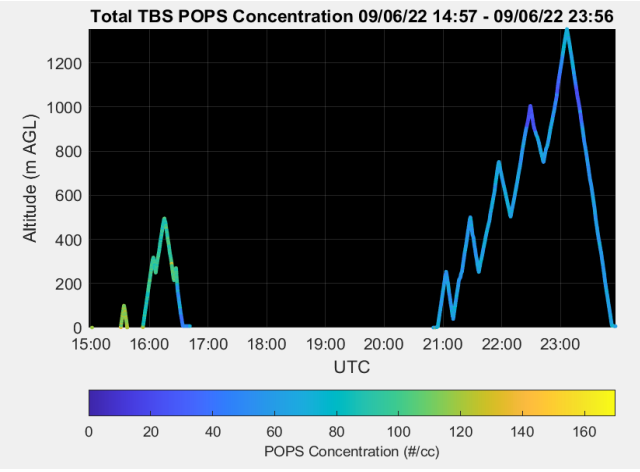


Daily HOU S3 TBS Flight Summary

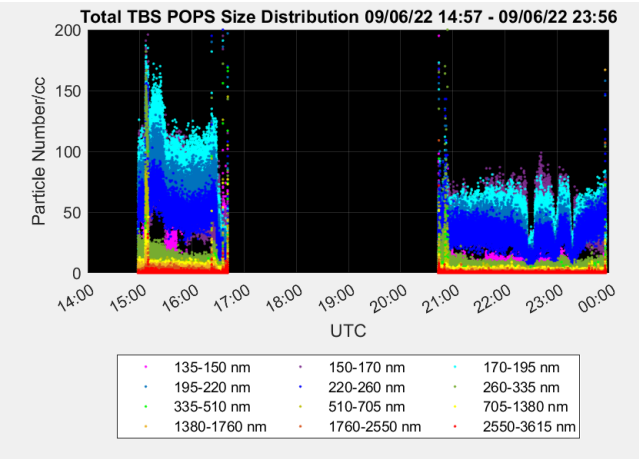
Date: 09/06/22
Authors: Dexheimer, Longbottom, Tezak
Platform: TBS: 122 m^3 aerostat, Great White F1, Second Chance F2

Conditions:
30 C, W wind 2-4 m/s, 30% cloud cover, intermittent CB ~ 1 km
POPS bins 2-3 > 100 #/cc, bin2 max.

Flight 1:
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39552*
STAC (5 minute delay at 15:25, 30 minutes sample, IM2-6)
MAGIC CPC
CPC1
*AE-51 at surface
TBAC would not boot.



Launched 15:26.
STAC2, 15:30 - 15:59, 0m - 210m, 0m ascending - 210m ascending
Descended at 15:33 due to loss of XDATA.
Ozonesonde turned off at 15:45 and would not restart.
POPS data in iMet file erroneous due to ozonesonde failure.
Reascended at 15:45.
STAC3, 16:00 - 16:29, 120m - 495m, 120m ascending - 495m ascending
STAC4, 16:30 - 16:40, 120m - 0m, 120m descending - 0m descending
CB at 700m and precip approaching from SE.
High winds aloft and at surface from outflow boundary.
Surfaced at 16:35.

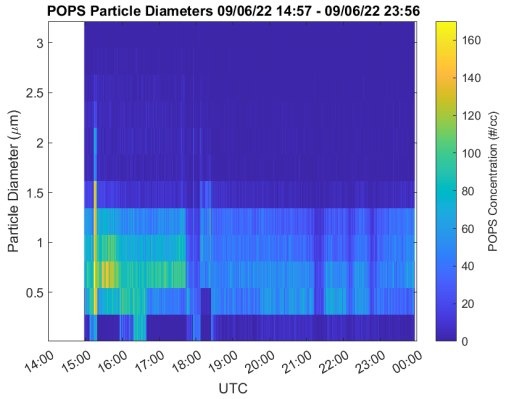


Light precip.
Pause to deflate Great White and inflate Second Chance.

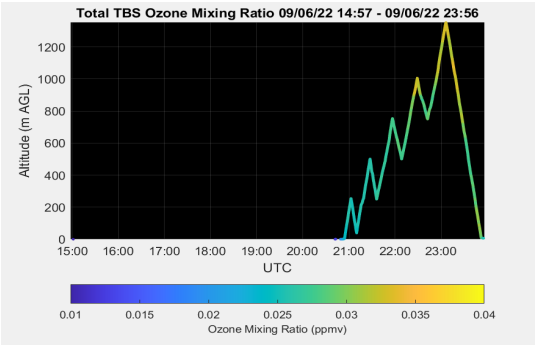
31 C, SE wind 2-4 m/s, 20% cloud cover, intermittent CB ~ 1 km
POPS bins 2-5 < 100 #/cc, bin3 max.

Flight 2:
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (5 minute delay at 20:44, 30 minutes sample, IM5-9)
TBAC (5 minute delay at 20:44, 30 minutes sample, IM3-5)
MAGIC CPC

CPC1
*AE-51 at surface

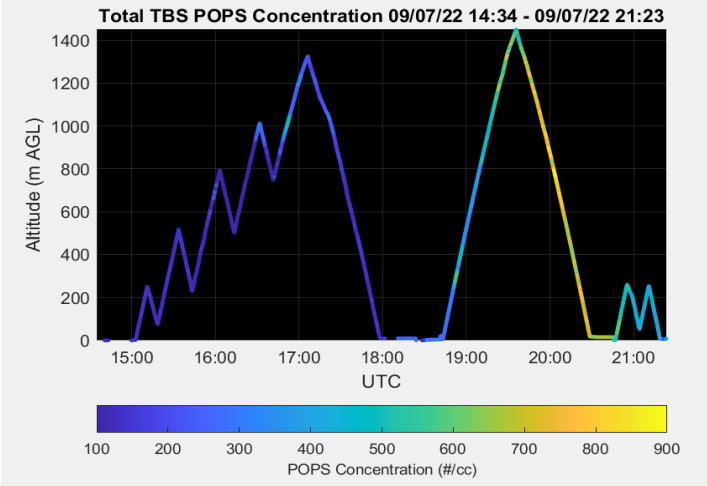


Launched 20:47.
STAC5, 20:49 - 21:18, 0m - 250m, 0m ascending - 250m ascending
TBAC3, 20:49 - 21:18, 0m - 250m, 0m ascending - 250m ascending
STAC6, 21:19 - 21:48, 250m - 500m, 250m ascending - 500m ascending
TBAC4, 21:19 - 21:48, 250m - 500m, 250m ascending - 500m ascending
STAC7, 21:49 - 22:18, 500m - 750m, 500m ascending - 750m ascending
TBAC5, 21:49 - 22:18, 500m - 750m, 500m ascending - 750m ascending
STAC8, 22:19 - 22:48, 750m - 1000m, 750m ascending - 1000m ascending
STAC9, 22:49 - 23:18, 900m - 1350m, 900m ascending - 1350m descending
Surfaced at 23:55.



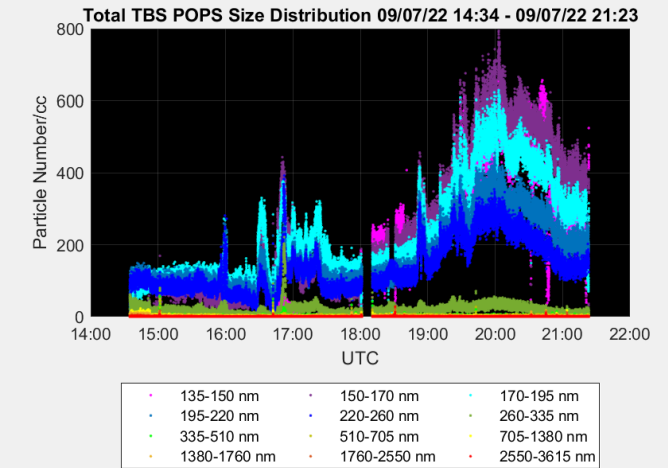
Daily HOU S3 TBS Flight Summary

Date: 09/07/22
Authors: Dexheimer, Longbottom, Tezak
Platform: TBS: 122 m^3 aerostat, Second Chance
Conditions:
30 C, NW wind 2-4 m/s, 30% cloud cover, intermittent CB ~ 600-800m
POPS bins 3-4 > 100 #/cc, bin3 max.



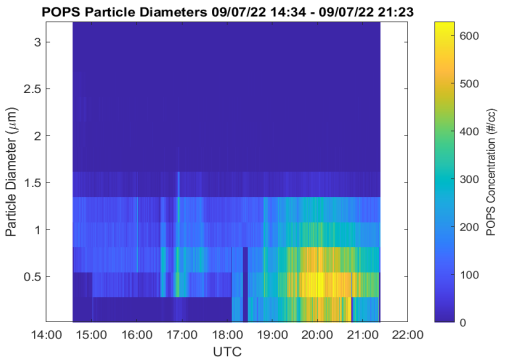
Flight 1:
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
STAC (5 minute delay at 14:57, 30 minutes sample, IM10-14)
TBAC (5 minute delay at 14:57, 30 minutes sample, IM3-5)
MAGIC CPC
CPC1
*AE-51 at surface

Launched 14:58.
STAC10, 14:52 - 15:21, 0m - 250m, 0m ascending - 250m ascending
TBAC3, 14:52 - 15:21, 0m - 250m, 0m ascending - 250m ascending
STAC11, 15:22 - 15:51, 200m - 500m, 200m ascending - 500m ascending
TBAC4, 15:22 - 15:51, 200m - 500m, 200m ascending - 500m ascending
STAC12, 15:52 - 16:21, 500m - 795m, 500m ascending - 795m ascending
TBAC5, 15:52 - 16:21, 500m - 795m, 500m ascending - 795m ascending
STAC13, 16:22 - 16:51, 750m - 1000m, 750m ascending - 1000m ascending
STAC14, 16:52 - 17:21, 1000m - 1325m, 1000m ascending - 1325m descending
Surfaced at 17:59.
CPC saturated at descent. Surface NPF event.



33 C, SE wind 2-5 m/s, 30% cloud cover, intermittent CB ~ 1 km
POPS bins 2-3 > 100 #/cc, bin2 max.

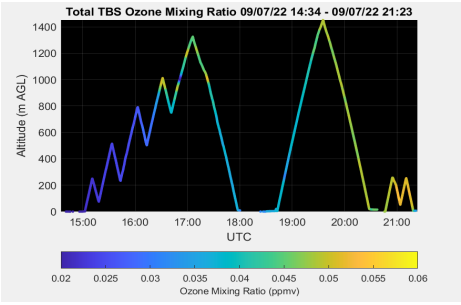
Flight 2:
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
STAC (3 minute delay at 18:28, 60 minutes sample, IM1)
MAGIC CPC
CPC1
*AE-51 at surface



Launched 18:39.
STAC1, 18:31 - 19:30, 0m - 1375m, 0m ascending - 1375m descending
Intermittent CB at 1250 at 18:59.
Increasing POPS concentrations with height. Bin 1 max.
Ascended to 1.45 km.
Surfaced at 20:30.

36 C, E wind 1-4 m/s, 30% cloud cover
POPS bins 1-4 > 200 #/cc, bin1 max.
Added all five valves to TBAC because swapped solenoid block with surface TBA

Flight 3:
R1039 & XQ2 55345
POPS306 & iMet 402 MHz & Ozonesonde 2Z39477
TBAC (3 minute delay at 20:43, 30 minutes sample, V1)
MAGIC CPC
CPC1
*AE-51 at surface



Launched 20:45.
TBAC1, 20:46 - 21:15, 0m - 250m, 0m ascending - 250m ascending
Cold front with thunderstorms along edge approaching from north.
Surfaced at 21:19.

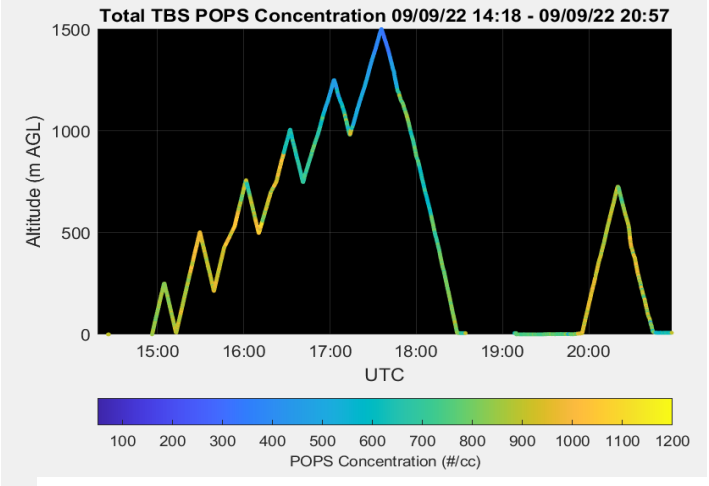
Daily HOU S3 TBS Flight Summary

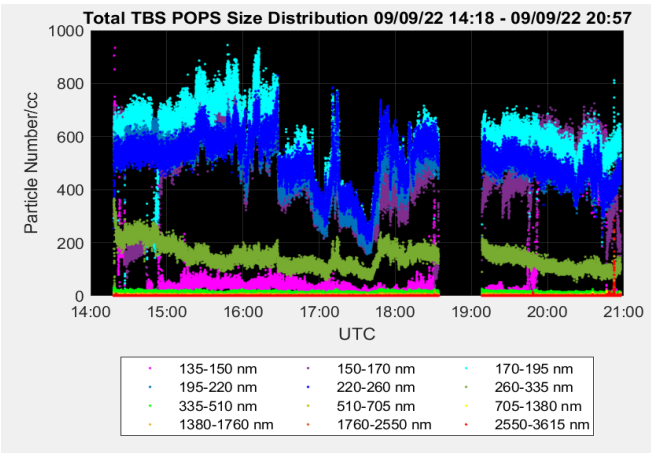
Date: 09/09/22
Authors: Dexheimer, Longbottom, Whitson
Platform: TBS: 122 m^3 aerostat, Second Chance

Conditions:
29 C, E wind 2-4 m/s, Mostly clear
POPS bins 2-5 > 200 #/cc, bin2 max.

Flight 1:
R1039 & XQ2 55345
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
STAC (3 minute delay at 14:49, 30 minutes sample, IM2-6)
TBAC (3 minute delay at 14:49, 30 minutes sample, V1-5)
MAGIC CPC
CPC1

Launched 14:52.
STAC2, 14:52 - 15:21, 0m - 250m, 0m ascending - 250m ascending
TBAC1, 14:52 - 15:21, 0m - 250m, 0m ascending - 250m ascending
STAC3, 15:22 - 15:51, 250m - 500m, 250m ascending - 500m ascending
TBAC2, 15:22 - 15:51, 250m - 500m, 250m ascending - 500m ascending
STAC4, 15:52 - 16:21, 500m - 750m, 500m ascending - 750m ascending
TBAC3, 15:52 - 16:21, 500m - 750m, 500m ascending - 750m ascending
STAC5, 16:22 - 16:51, 750m - 1000m, 750m ascending - 1000m ascending
TBAC4, 16:22 - 16:51, 750m - 1000m, 750m ascending - 1000m ascending
STAC6, 16:52 - 17:21, 1000m - 1250m, 1000m ascending - 1250m ascending
TBAC5, 16:52 - 17:21, 1000m - 1250m, 1000m ascending - 1250m ascending
Ascended to 1.5 km at 17:35.
Lost anemometer data at 17:42.
Surfaced at 18:30.

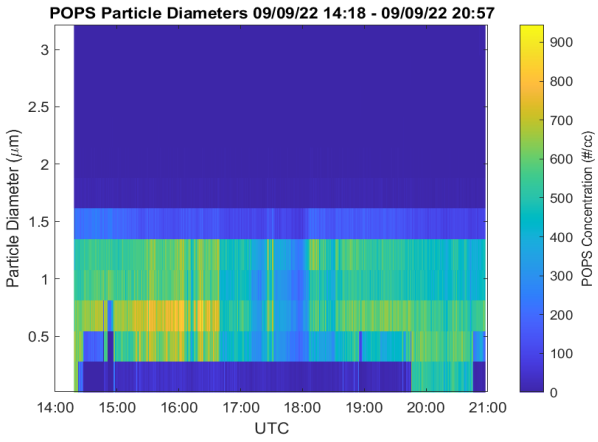


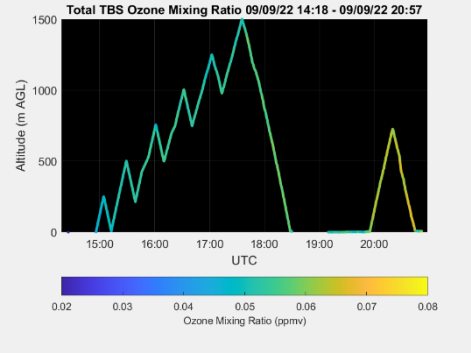


36 C, E wind 2-5 m/s, 30% cloud cover, Intermittent CB 1.5 km
POPS bins 1-4 > 400 #/cc, bin2 max.

Flight 2:
DTS
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551 (quick prepped between flights)
STAC (3 minute delay at 19:45, 60 minutes sample, IM1)
MAGIC CPC
CPC1
MA200
*AE-51 at surface

Launched 19:46.
STAC1, 19:48 - 20:47, 0m - 725m, 0m ascending - 725m ascending
Convective cell to east.
Ascended to 725m at 20:20 and began descent due to approaching outflow boundary visible on radar.
Stronger east winds aloft and at surface, gusting to 9 m/s.
Surfaced at 20:48.



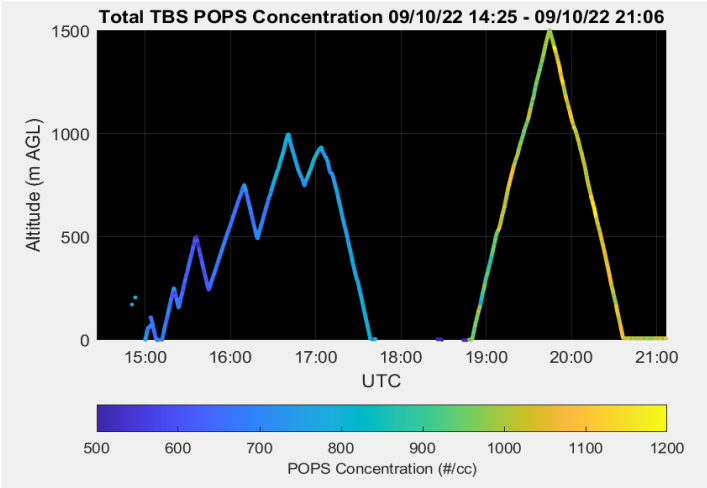


Daily HOU S3 TBS Flight Summary

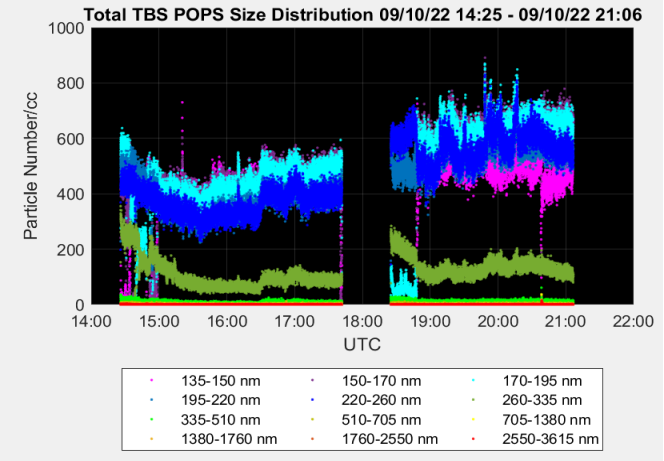
Date: 09/10/22
Authors: Dexheimer, Longbottom, Whitson
Platform: TBS: 122 m^3 aerostat, Second Chance

Conditions:
29 C, N wind 2-4 m/s, Mostly clear
POPS bins 2-5 > 150 #/cc, bin3 max.

Flight 1:
DTS
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39545
STAC (3 minute delay at 14:54, 30 minutes sample, IM7-11)
TBAC (3 minute delay at 14:54, 30 minutes sample, V1-5)
CPC1
MA200 *Removed at 15:09.
MAGIC CPC *Added at 15:09.
*AE-51 at surface *Removed at 15:09.

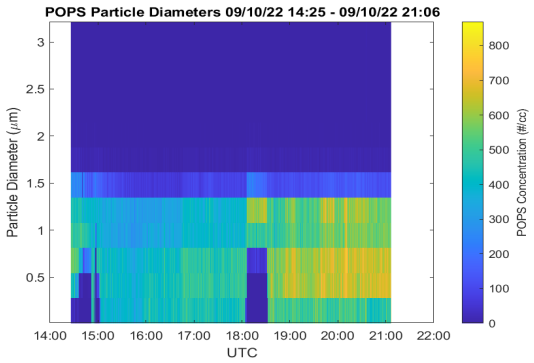


Launched 14:57.
STAC7, 14:57 - 15:26, 0m - 250m, 0m ascending - 250m ascending
TBAC1, 14:57 - 15:26, 0m - 250m, 0m ascending - 250m ascending
Ascended to 107m and descended to restart Skysonde Client.
STAC8, 15:27 - 15:56, 250m - 500m, 250m ascending - 500m ascending
TBAC2, 15:27 - 15:56, 250m - 500m, 250m ascending - 500m ascending
STAC9, 15:57 - 16:26, 500m - 750m, 500m ascending - 750m ascending
TBAC3, 15:57 - 16:26, 500m - 750m, 500m ascending - 750m ascending
STAC10, 16:27 - 16:56, 700m - 1000m, 700m ascending - 1000m ascending
TBAC4, 16:27 - 16:56, 700m - 1000m, 700m ascending - 1000m ascending
STAC11, 16:52 - 17:21, 935m - 500m, 935m descending - 500m descending
TBAC5, 16:52 - 17:21, 935m - 500m, 935m descending - 500m descending
Surfaced at 17:40.
Surface NPF event.

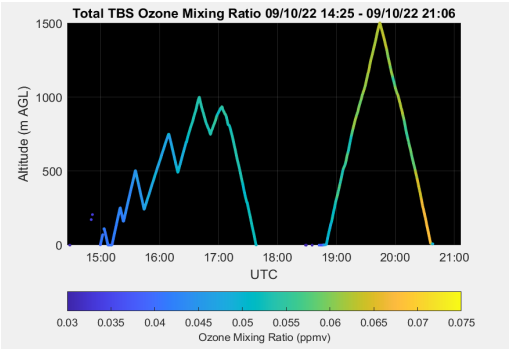


37 C, N wind 2-6 m/s, 50% cloud cover
POPS bins 3-5 > 200 #/cc, bin4 max.

Flight 2:
DTS
R1039 & XQ2 55345
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
STAC (3 minute delay at 18:44, 60 minutes sample, IM1)
CPC1
MA200
MAGIC CPC
*AE-51 at surface



Launched 18:44.
STAC1, 18:47 - 19:46, 0m - 1500m, 0m ascending - 1500m descending
Intermittent cloud base 1750m.
Ascended to 1.5 km at 19:46.
Surfaced at 20:40.
CPC saturated again upon surfacing.

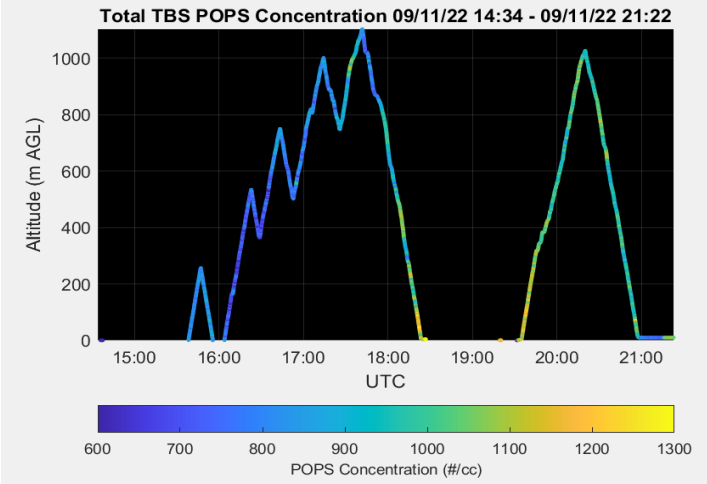


Daily HOU S3 TBS Flight Summary

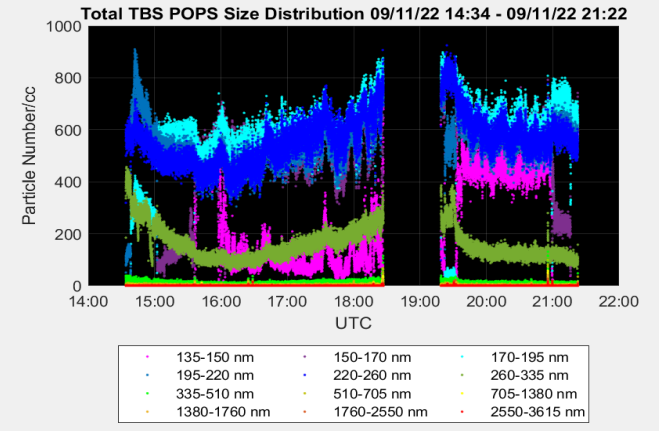
Date: 09/11/22
Authors: Dexheimer, Longbottom, Whitson
Platform: TBS: 122 m^3 aerostat, Second Chance

Conditions:
28 C, N wind 2-4 m/s, Clear
POPS bins 0-5 > 200 #/cc, bin2 max (> 500 #/cc).

Flight 1:
DTS (delayed start for splicing at 15:58)
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39545
STAC (3 minute delay at 15:31, 30 minutes sample, IM11-15)
TBAC (3 minute delay at 15:31, 30 minutes sample, V1-5)
CPC1
MAGIC CPC

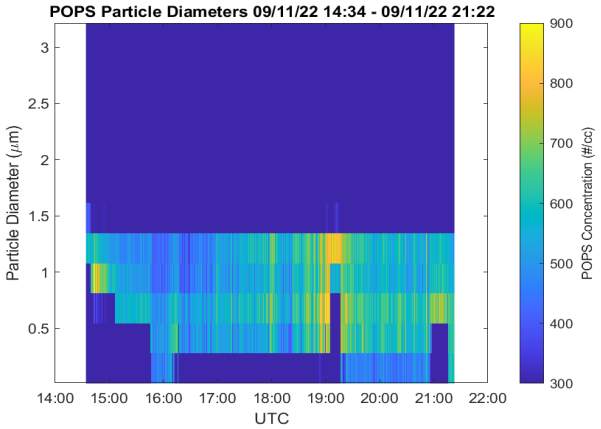


Launched 15:31.
STAC11, 15:34 - 16:03, 0m - 250m, 0m ascending - 250m ascending
TBAC1, 15:34 - 16:03, 0m - 250m, 0m ascending - 250m ascending
STAC12, 16:04 - 16:33, 0m - 530m, 0m ascending - 530m ascending
TBAC2, 16:04 - 16:33, 0m - 530m, 0m ascending - 530m ascending
STAC13, 16:34 - 17:03, 500m - 750m, 500m ascending - 750m ascending
TBAC3, 16:34 - 17:03, 500m - 750m, 500m ascending - 750m ascending
STAC14, 17:04 - 17:34, 750m - 1000m, 750m ascending - 1000m ascending
TBAC4, 17:04 - 17:34, 750m - 1000m, 750m ascending - 1000m ascending
STAC15, 17:35 - 18:04, 1100m - 500m, 1100m descending - 500m descending
TBAC5, 17:35 - 18:04, 1100m - 500m, 1100m descending - 500m descending
Surfaced at 18:25.

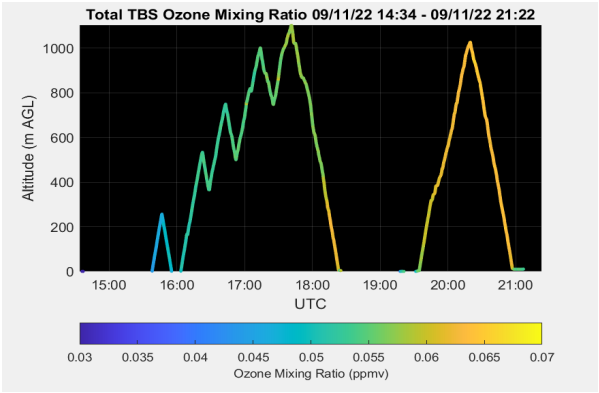


37 C, N wind 2-6 m/s, 50% cloud cover, intermittent CB 1.75 km
POPS bins 1-5 > 200 #/cc, bin2 max (> 800 #/cc).

Flight 2:
DTS
R1039 & XQ2 55512
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551
STAC (3 minute delay at 19:29, 60 minutes sample, BIM1)
CPC1
MAGIC CPC
MA200
*AE-51 at surface

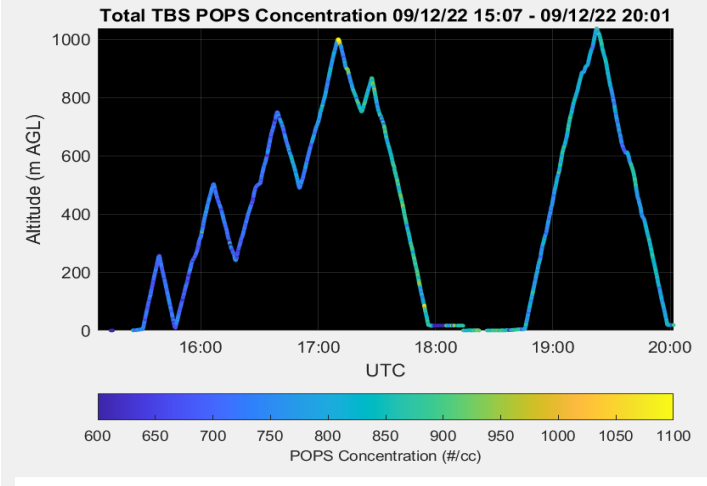


Launched 19:32.
STAC1, 19:32 - 20:31, 0m - 1025m, 0m ascending - 1025m descending
Small convective cells to NW at 20:00.
Ascended to 1025m at 20:20 and began descent.
Surfaced at 21:00.



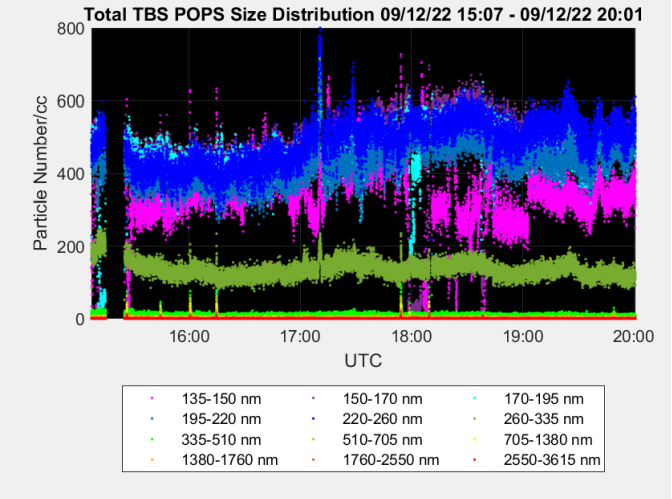
Daily HOU S3 TBS Flight Summary

Date: 09/12/22
Authors: Dexheimer, Storch, Whitson
Platform: TBS: 122 m^3 aerostat, Second Chance



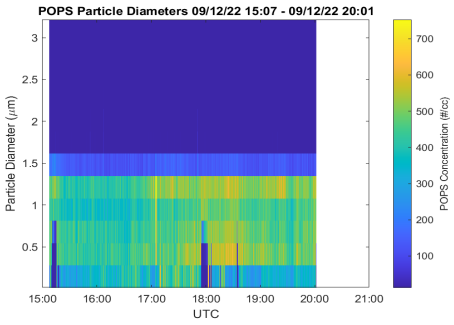
Conditions:
21 C, N wind 2-4 m/s, Clear
POPS bins 3-5 > 200 #/cc, bin4 max (> 700 #/cc).

Flight 1:
DTS
R1039 & XQ2 44483
POPS306 & iMet 402 MHz & Ozonesonde 2Z39551*
Changed to POPS308 for Profile 2.
STAC (3 minute delay at 13:31, 30 minutes sample, IM16-20)
TBAC (3 minute delay at 13:31, 30 minutes sample, V1-5)
CPC1
MAGIC CPC



Profile 1:
Launched 13:37.
STAC16, 13:34 - 14:03, 0m - 250m, 0m ascending - 250m ascending
TBAC1, 13:34 - 14:03, 0m - 250m, 0m ascending - 250m ascending
High winds aloft. Over 8 m/s at 250m.
Surfaced at 14:05.
High CPC concentrations at surface.

STAC (8 minute delay at 15:22, 30 minutes sample, IM17-20)
TBAC (8 minute delay at 15:22, 30 minutes sample, V2-5)
Changed iMet.
Changed to POPSSN308 because 306 quit reporting particles.
Profile 2:
Launched 15:27.
STAC17, 15:30 - 15:59, 0m - 250m, 0m ascending - 250m ascending
TBAC2, 15:30 - 15:59, 0m - 250m, 0m ascending - 250m ascending
STAC18, 16:00 - 16:29, 250m - 500m, 250m ascending - 500m ascending
TBAC3, 16:00 - 16:29, 250m - 500m, 250m ascending - 500m ascending
STAC19, 16:30 - 16:59, 500m - 750m, 500m ascending - 750m ascending
TBAC4, 16:30 - 16:59, 500m - 750m, 500m ascending - 750m ascending
STAC20, 17:00 - 17:29, 750m - 1000m, 750m ascending - 1000m ascending
TBAC5, 17:00 - 17:29, 750m - 1000m, 750m ascending - 1000m ascending
Surfaced at 17:57.

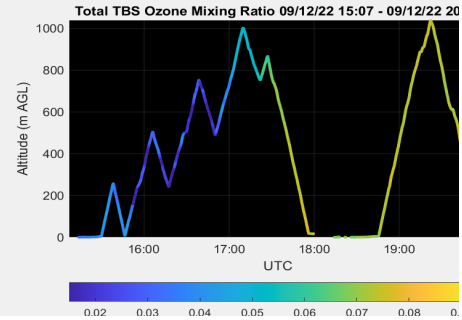


35 C, W wind 3-5 m/s, Clear
POPS bins 0-4 > 300 #/cc, bin1 max (> 500 #/cc).

Flight 2:
DTS
R1039 & XQ2 55512
POPS308 & iMet 402 MHz & Ozonesonde 2Z39545
STAC (3 minute delay at 18:36, 60 minutes sample, IM1)

CPC1
MAGIC CPC
MA200
*AE-51 at surface

Launched 18:40.
STAC1, 18:39 - 19:38, 0m - 1035m, 0m ascending - 1035m descending
Surfaced at 20:00.

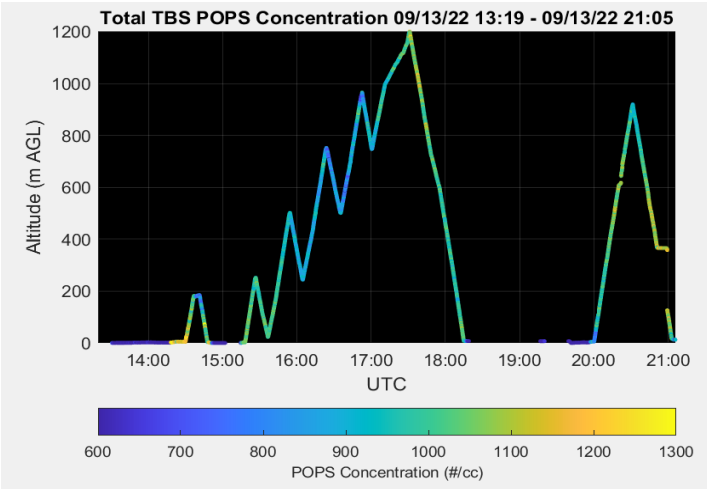


Daily HOU S3 TBS Flight Summary

Date: 09/13/22
Authors: Dexheimer, Storch, Whitson
Platform: TBS: 122 m^3 aerostat, Second Chance

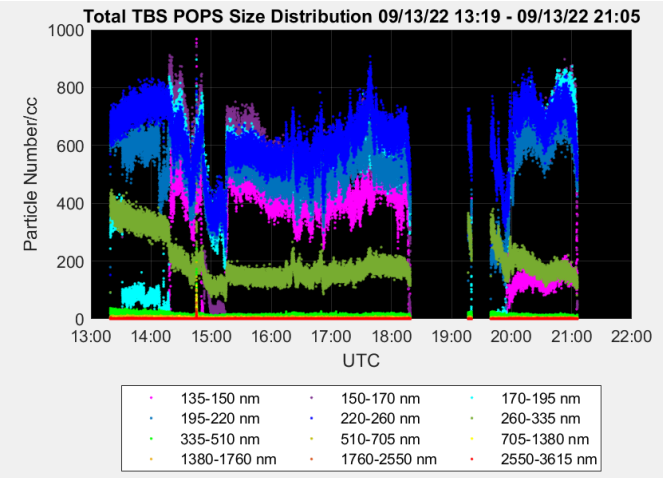
Conditions:
26 C, E wind 2-5 m/s, Clear
POPS bins 0-5 > 200 #/cc, bin1 max (> 800 #/cc).

Flight 1:
DTS
R1039 & XQ2 55512
POPS308 & iMet 402 MHz & Ozonesonde 2Z39551
STAC (3 minute delay at 14:13, bulk 60 minutes samples, IM1-3)
TBAC (3 minute delay at 14:13, 30 minutes sample, V1-5)
CPC1
MAGIC CPC



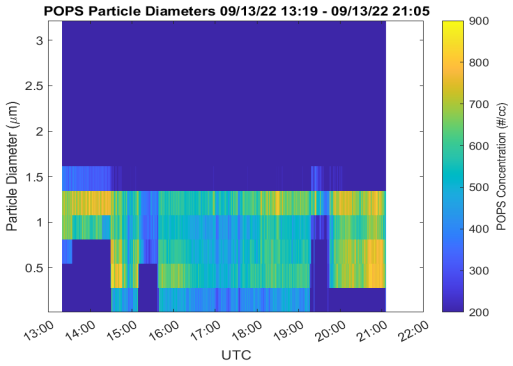
Profile 1:
Launched 14:19.
STAC1, 14:16 - 15:15, 0m - 180m, 0m ascending - 180m ascending
TBAC1, 14:16 - 14:45, 0m - 180m, 0m ascending - 180m ascending
Fiber broke at ~14:40 at 180m and very tangled.
Surfaced at 14:47 to change spooler.

Profile 2:
STAC (3 minute delay at 15:11, bulk 60 minutes samples, IM1-3)
TBAC (3 minute delay at 15:11, 30 minutes sample, V2-5)
Changed fiber to 1400m spool.
Launched 15:14.
STAC1, 15:14 - 16:13, 0m - 500m, 0m ascending - 500m ascending
TBAC2, 15:14 - 15:43, 0m - 250m, 0m ascending - 250m ascending
TBAC3, 15:44 - 16:13, 250m - 500m, 250m ascending - 500m ascending
STAC2, 16:14 - 17:13, 500m - 1000m, 500m ascending - 1000m ascending
TBAC4, 16:14 - 16:43, 500m - 750m, 500m ascending - 750m ascending
Intermittent Cu CB developed at 1 km.

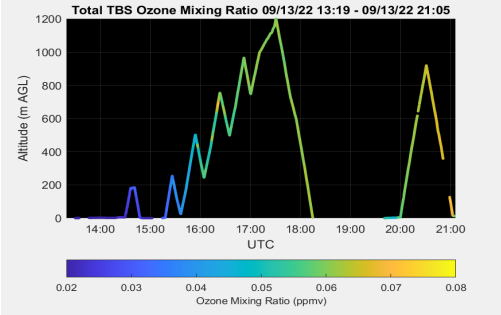


TBAC5, 16:44 - 17:13, 750m - 1000m, 750m ascending - 1000m descending
STAC3, 17:14 - 18:13, 1200m - 0m, 1200m descending - 0m descending
Ascended to 1200m and began descent.
Surfaced at 18:17.
CPC not powered on upon descent.

36 C, E wind 3-5 m/s, Intermittent Cu CB at 1.5 km.
POPS bins 0-5 > 200 #/cc, bin1 max (> 800 #/cc).



Flight 2:
R1039 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39545
STAC (3 minute delay at 19:50, bulk 60 minutes samples, IM1-2)
TBAC (3 minute delay at 19:50, 30 minutes sample, V1-5)
CPC1
MAGIC CPC
*AE-51 at surface
MA200 was not operated because tether mount broke at launch.

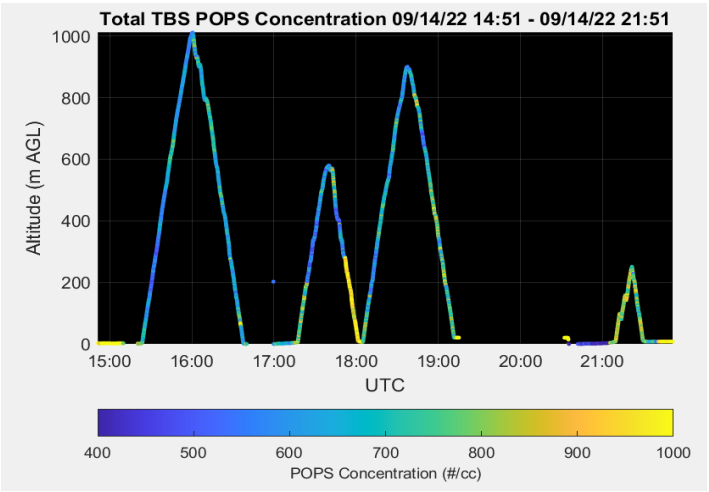


Launched 19:50.
STAC1, 19:53 - 20:52, 0m - 910m, 0m ascending - 910m descending
TBAC1, 19:53 - 20:22, 0m - 700m, 0m ascending - 700m ascending
Ascended to 910m and began descent due to developing tstorm to south.
TBAC2, 20:23 - 20:52, 700m - 200m, 910m descending - 200m descending
iMet radio powered off during descent.
TBAC3, 20:53 - 21:03, 200m - 0m, 200m descending - 0m descending
STAC2, 20:53 - 21:03, 200m - 0m, 200m descending - 0m descending
Surfaced at 21:03.

Daily HOU S3 TBS Flight Summary

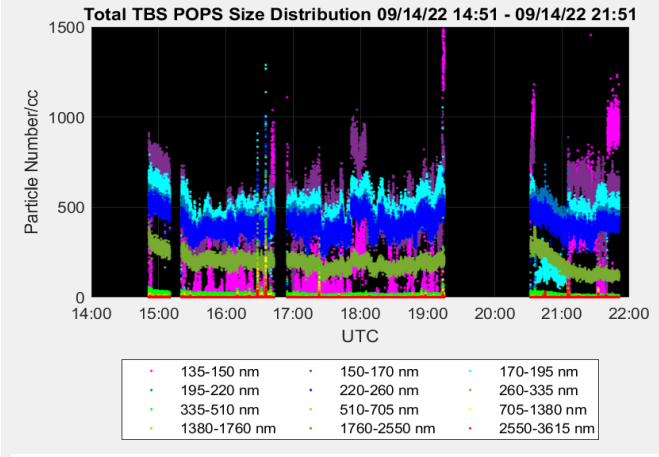
Date: 09/14/22
Authors: Dexheimer, Storch, Whitson
Platform: TBS: 122 m^3 aerostat, Second Chance

Conditions:
25 C, NE wind 2-5 m/s, Clear
POPS bins 0-5 > 200 #/cc, bin1 max (> 600 #/cc).



Flight 1:
DTS
R1039 & XQ2 55512
POPS308 & iMet 402 MHz & Ozonesonde 2Z39551
STAC (3 minute delay at 14:06, 30 minutes samples, IM1-2)
TBAC (3 minute delay at 14:06, 30 minutes samples, V1-2)
CPC1
MAGIC CPC

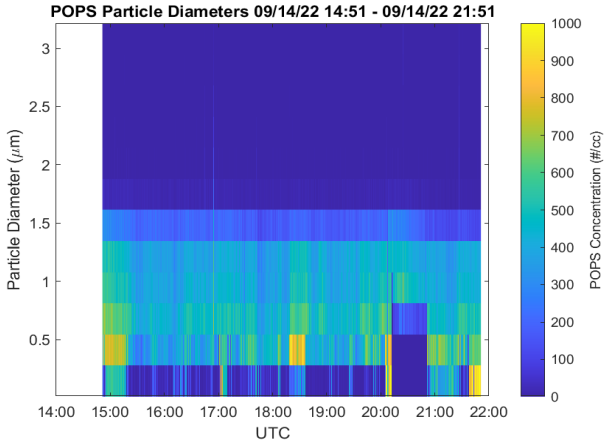
Launched 14:06.
STAC1, 14:09 - 14:38, 0m - 210m, 0m ascending - 210m ascending
TBAC1, 14:09 - 14:38, 0m - 210m, 0m ascending - 210m ascending
High winds aloft. POPS308
Surfaced at 14:43.



28 C, NE wind 4-6 m/s, Clear
POPS bins 0-5 > 200 #/cc, bin1 max (> 600 #/cc).

Flight 2:
DTS
R1039 & XQ2 55512
POPS228 & iMet 402 MHz & Ozonesonde 2Z39551
CPC1
MAGIC CPC

Launched 15:21.
Ascended to 1015m and began descent.
Surfaced at 16:40.



30 C, NE wind 4-6 m/s, Clear
POPS bins 0-5 > 200 #/cc, bin1 max (> 600 #/cc).

Flight 3:
DTS
R1039 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39545
STAC (11 minute delay at 17:10, 30 minutes samples, IM2)
TBAC (7 minute delay at 17:14, 30 minutes samples, V2)
CPC1
MAGIC CPC
MA200
*AE-51 at surface

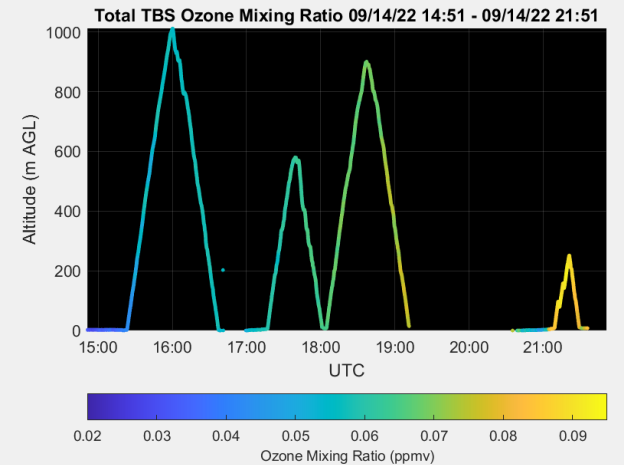
Profile 1:
Launched 17:10.
STAC2, 17:21 - 17:50, 130m - 275m, 130m ascending - 575m ascending
TBAC2, 17:21 - 17:50, 130m - 275m, 130m ascending - 575m ascending
Surfaced at 18:01.
Removed STAC and TBAC.

CPC and MA200 mistakenly not flown.
Profile 2:
Launched 18:04.
Ascended to 900m.
Hand brake was engaged and smoked and left metal shavings. Amps spiked to 23A.

Surfaced at 19:12.

Flight 4:
DTS
R1039 & XQ2 44483
POPS308 & iMet 402 MHz & Ozonesonde 2Z39545
CPC1
MAGIC CPC
MA200
*AE-51 at surface

Test flight after amperage spike to assess data worthiness.
Launched at 21:00.
Ascended to 250m at 21:21 and began descent.
Surfaced at 21:30.



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