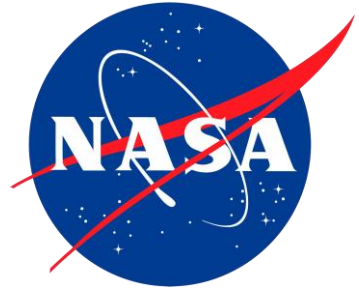




KORUS → **AQ**



Science Team Tag-up, 17 February 2016

Agenda

Travel Update

Other Logistics

Schedules for Korean-led activities

KORUS-OC Update

Research Plans for Upwind Flights over China

KORUS → **AQ**



Travel (1): Support for Civil Servant and Contract Travelers

- **Thanks to everyone for responding to the recent request for information on your travel intentions. It was absolutely critical to getting the appropriate level of funding and support in place.**
- **The majority of travelers will be supported through SSAI. Many of you have experience with them. An email with explicit instructions will be coming from Diane Zeimet very soon.**
- **A WBS for LaRC civil servants is expected to be available sometime next week. An email will be sent to those specific travelers when it is ready.**
- **Barry Lefer will work with other civil servant travelers to make sure that an appropriate amount of travel funding is sent to your organization (i.e., GSFC, ARC, NOAA, and NRL).**
- **While we now have enough information on the schedule to enable travel arrangements to begin, there is at least one open item that may require some of you to wait. We are still resolving the passenger manifests for the transit flights to and from Osan AB. Note: with the removal of the Korean instruments, we anticipate additional seats to be available on the return. This issue should be resolved by the next telecon (29 February).**

Travel (2): Lodging

- Travelers will be responsible for making their own hotel reservations.
- The only specified room block will be at the Turumi Lodge at Osan Air Base during the deployment. For integration and download in Palmdale as well as other sites in Korea, there are no specific room blocks or assigned hotels. If you are unable to find accommodations within per diem, please notify us. (Per diem rates will be listed on the KORUS-AQ website).
- The Turumi room block is limited to 150 rooms. For those staying in the Turumi Lodge, it is critical that we gather information on your arrival and departure dates. Specific instructions on providing this information will come via email. Please be prepared to respond quickly as this information will be needed by 4 March.
- For those who are not aware, Korean participants are also eligible to stay at Turumi Lodge, so everyone should prepare to respond to the email requesting dates for your stay at Turumi.

Travel (3): 30-day waiver for travel has been granted. Per diem will not be reduced for stays over 30 days.

Based on current data, the following travelers are expected to exceed 30 continuous travel days during the deployment. Civil servant names must be provided to NASA HQ. Does AFRC have a separate agreement, or would they like to provide any names? If circumstances dictate, other names can be added later, but we do not want to add any names based solely on the possibility that they may exceed the 30-day limit. If your name should be added or removed, please let us know as soon as possible.

LaRC Civil Servants	SSAI Travelers			
Al-Saadi, Jassim	Brune, William	Jeong, Daun	Sanchez, Dianne	Walega, James
Crawford, James	Campuzano Jost, Pedro	Kim, Michelle	Scheuer, Eric	Weinheimer, Andrew
Diskin, Glenn	Castellanos, Patricia	Kim, Saewung	Schroeder, Jason	Wooldridge, Paul
Haynes, Andrew	Choi, Yonghoon	Lamb, Kara Diane	Sullivan, John	
Notari, Anthony	Dibb, Jack	Nault, Benjamin	Sumnicht, Grant	
GSFC Civil Servants	Emmons, Louisa	Perring, Anne	Teng, Alexander	
McGee, Thomas	Fried, Alan	Peterson, David	Thames, Alexander	
Thompson, Anne	Hughes, Stacey	Romer, Paul	Twigg, Laurence W.	

Other Logistics (1): Registration and Processing for Osan Access

- **Late registration: We are not submitting any more base access requests until we hear that the ones we submitted before are approved. We should hear something by beginning of March. Nevertheless, new people (or people receiving their new passports/visas) should upload this information as soon as they have it. We will send out the second batch as soon as we hear that it is appropriate to do so.**
- **Mission foreign nationals not residing in the US should understand their own visa requirements to enter South Korea.**
- **Designated Country Personnel: Osan AB has received favorable investigation results for all Designated Country Personnel for whom we have requested access. They have requested approval from USFK. Final approval is still pending.**

Other Logistics (2): Shipping

- **Sea Shipment Update:** Steven is at Palmdale and all cases have been accounted for. Shipment is anticipated to arrive in Korea around 15 April. He is still tracking down a few cylinders (he has already contacted you if it is your cylinder).
- **Air Shipment Update:** Revisions for departure and arrival on the website. Due date for paperwork is on the website. Paperwork (spreadsheet) will download in the same way as for the sea shipment. Current date for shipment is 25 April and arriving on 2 May. Sea shipment is only half of what was anticipated...does this mean material has been shifted to air shipment? If so, things were tight for the sea shipment, so please get your paperwork submitted. Any advance packing will be a big help.
- **Return Shipment Update:** This will be addressed during the next telecon. This item is particularly important for ATom and ORACLES. ATom must ship to New Zealand by 24 June. Jack Dibb notes that spares can be shipped back before the end of the deployment.

Other Logistics (3):

Hanseong King Air Permission to Base at Osan

- **Jhony and Joon-Young have completed the forms and consulted with Osan AB. They have been advised to wait and submit them as soon as the insurance policy is renewed in early March.**

Mailing List

- **We continue to get requests for additions. Please let us know if we are missing anyone.**
- **Also let us know if you have any problems or suggestions.**

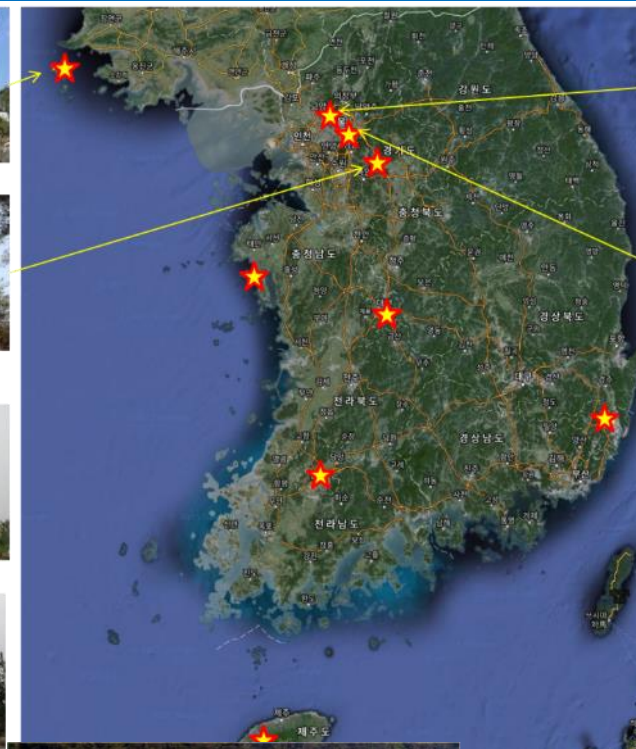
DC-8 Medical Clearance and Flight Permission Forms

- **Expect an email on this very soon. Both will be available from the ESPO website and they come with instructions. Please plan to fill these out if you have any intention of flying on the DC-8.**
- **Please also pass forms along to dignitaries or media that you know wish to be considered for a flight.**

Field observations

Field observations

- Ground sites: 8 sites
- Aircraft: Hanseo King-Air
- RVs: Kisang I & Onnuri



- Gas & aerosol physical and chemical properties



해양기상관측선
기상호
KMA: Kisang I
Focusing on met. and AQ research

주요계량	
총톤수	600톤
총길이	66.13M
높이	5.40M
중량	4,300t
속력	16.5km/h (10.2 knots)
수심	2,332m X 3.2
추진력	PPP X 3대
전원장치	991kW
발전기	991kW X 2, 200kW X 1
항해장치	4,000 MLC 이상
관측장치	250종 이상
항해장치	200종 이상
승인번호	3008
선장	김기
주요인원	2011년 1월 31명
건조업체	한국조선해양(주)



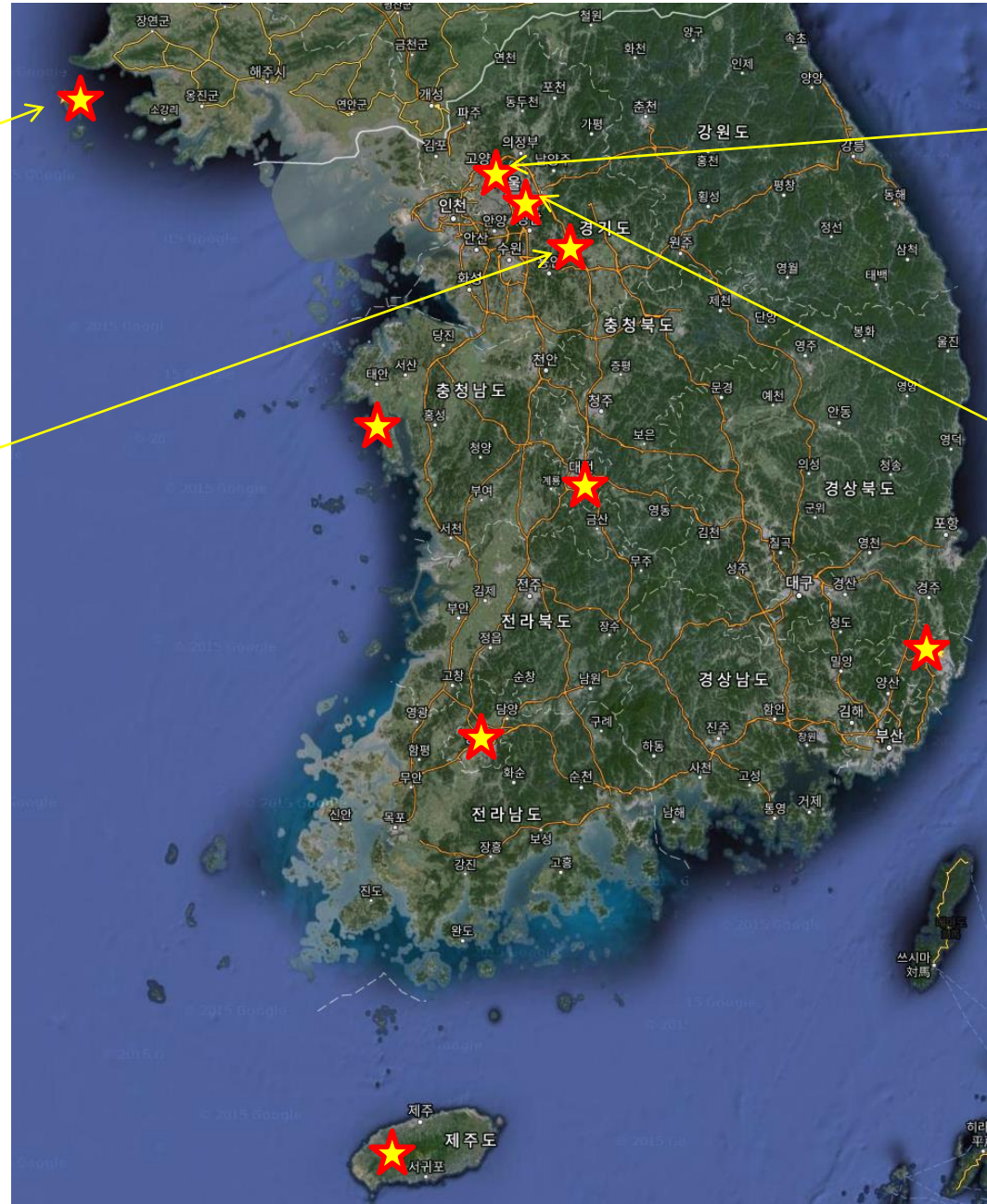
KIOST: Onnuri
Focusing on ocean color and AOD research

Length (M)	63.80	Range (n. mi.)	10000	Crew	7
Beam (M)	12.00	Endurance (days)	40	Officers	8
Draft (M)	5.15	Cruise speed (kt)	15.0	Scientists	25
Gross Tons	1370	Max. speed (kt)	15.8	Air Cond.	yes
Power (kW)	2100	Aux. Power (kW)	1245		

2016 KORUS-AQ ground observation sites.



Mt. Taehwa



Olympic Park



Seoul

Daejeon

Ulsan

Jeju

3 Main Upwind, Urban and Downwind ground observation sites.

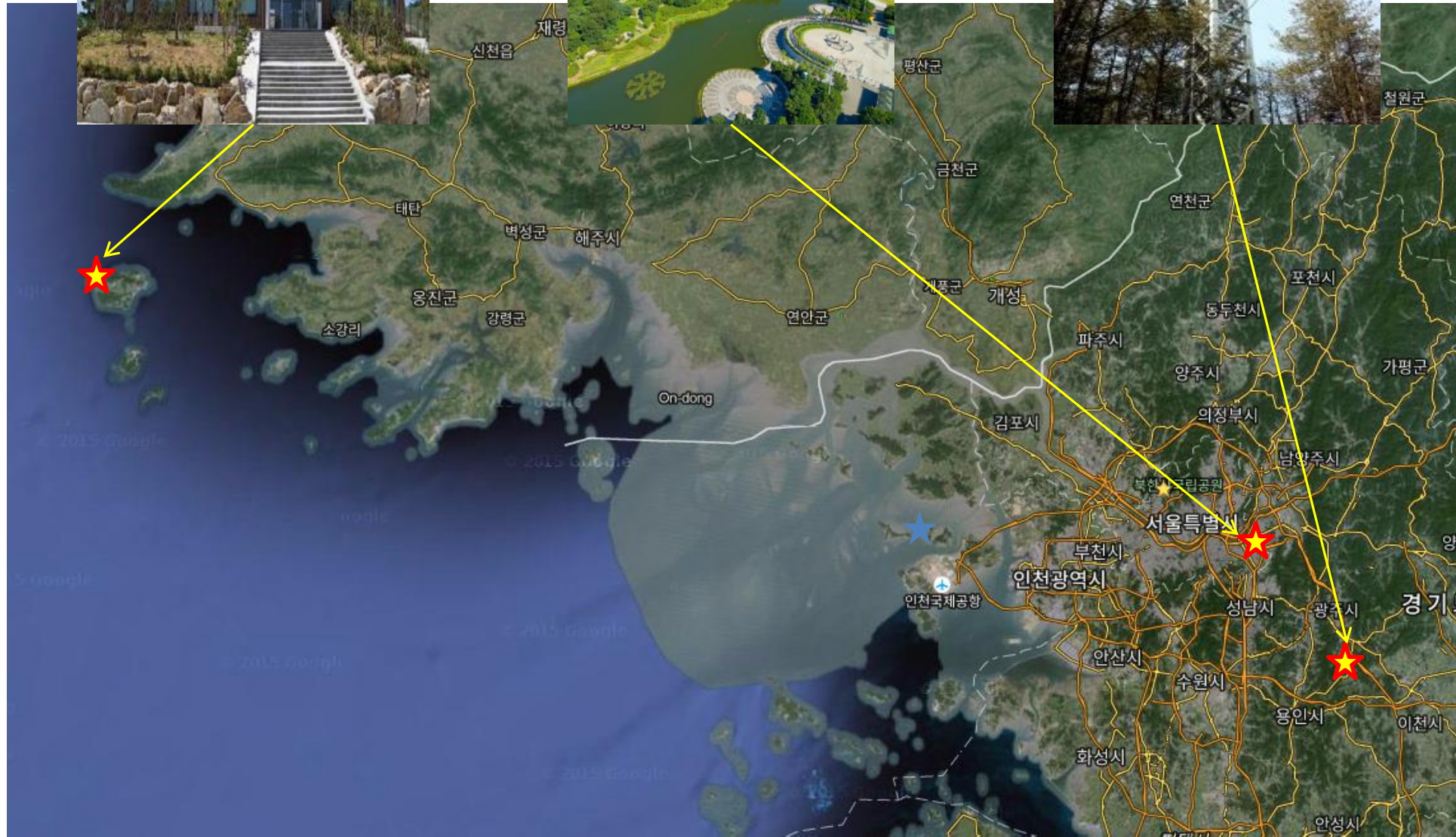
Baeogneong



Olympic Park

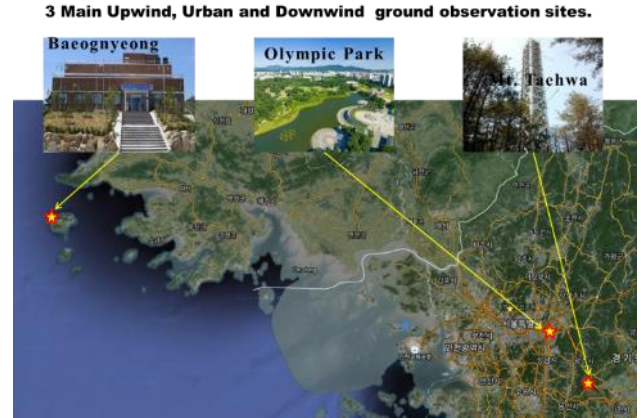


Mt. Taehwa

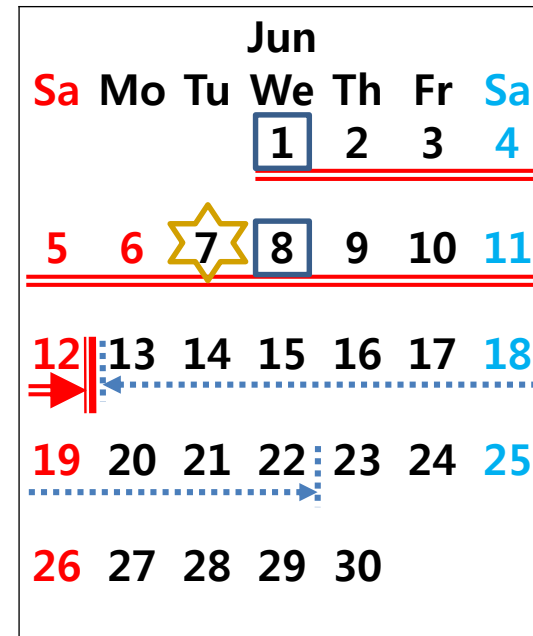
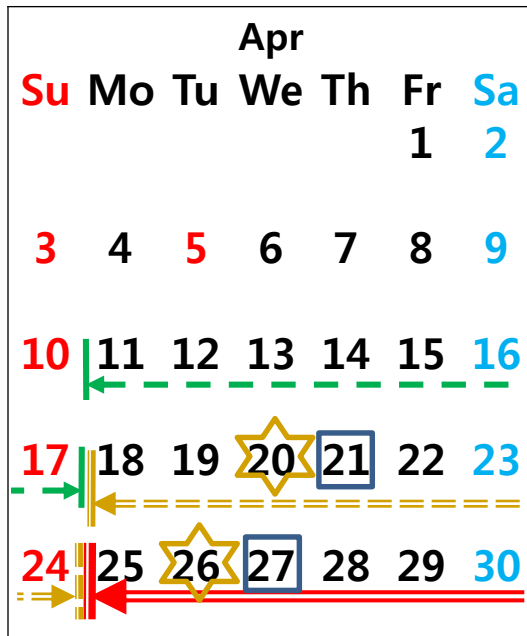


I

Ground sites



- Schedule for ground sites
Infrastructures will be ready by April 10.
- **Preparation & deployment**: Apr 11 – Apr 17
- **Pre-measurement**: Apr. 18 – Apr 24
- **Intensive measurement**: Apr 25 @ 0 AM – June 12 @ 23:59PM
 - ※ Sharp time line & pre-taking down prohibited
- **Taking down**: June 13 – June 22



□ Meeting & safety inspection

○ **A meeting for final check**

- Apr. 21 at 2 PM (Place: TBD)

○ **Science Team Meeting**

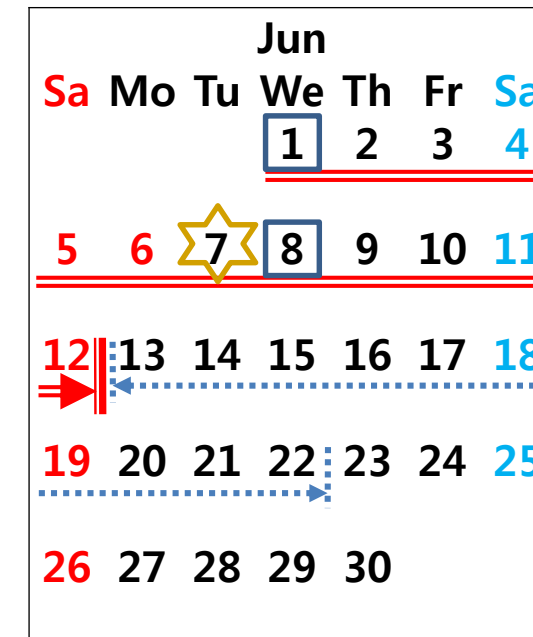
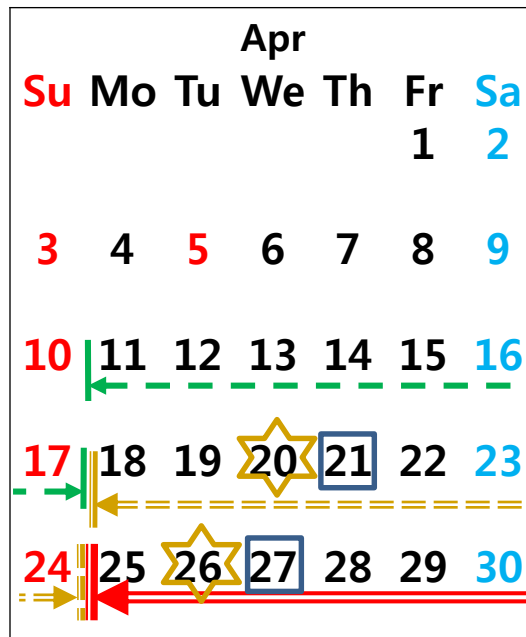
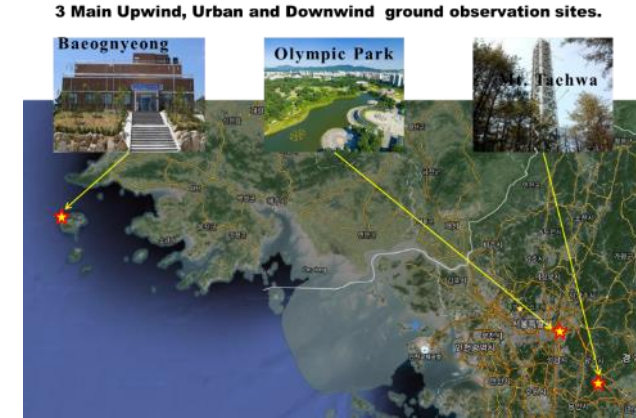
- Every Wed. at 2 PM during intensive measurement.

- Up to 3 slides for each group.

○ **Regular Safety Inspection**

- Every Tue. (exception on Apr 20)

- If any issue identified, it will be announced at the next day's science team meeting.



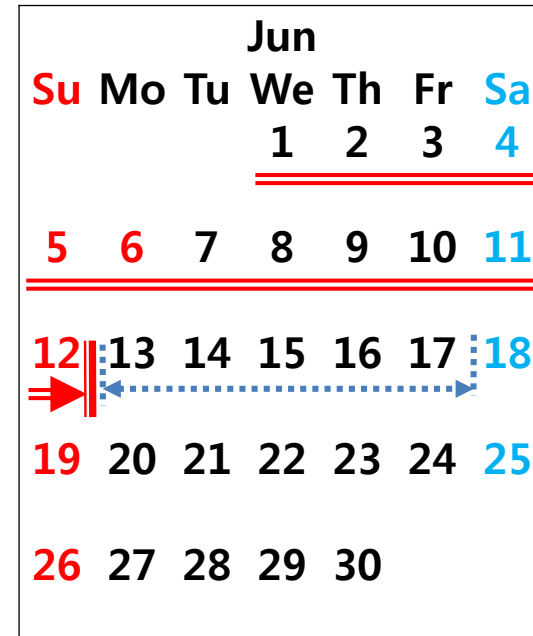
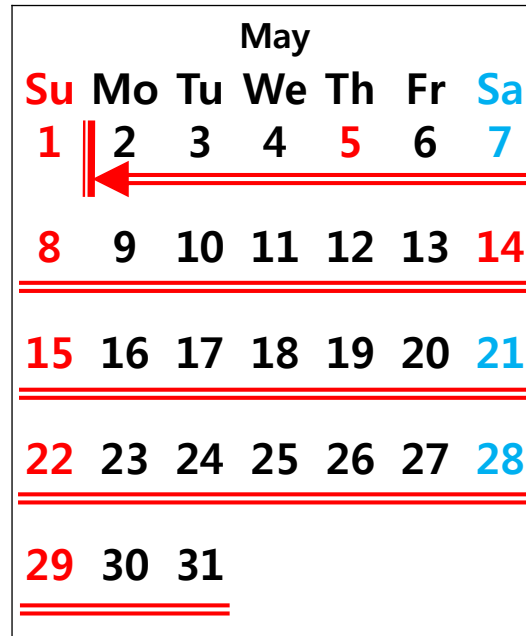
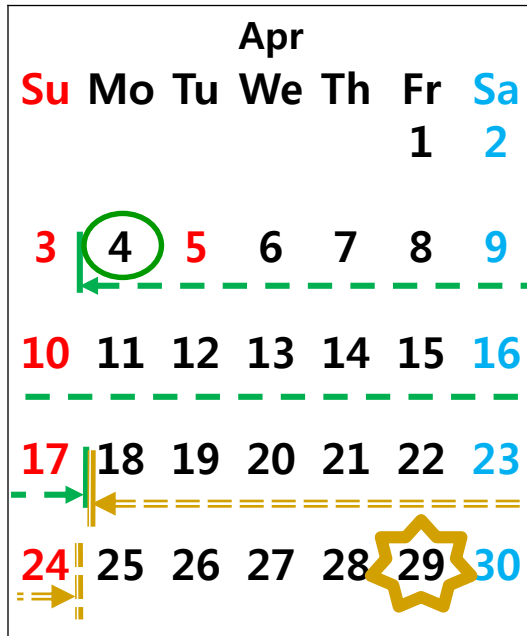
II

Hanseo Univ. King-Air



□ Hanseo King-Air Schedule

- **Integration** (Hanseo Univ. Taeon airfield)
Apr 4 – Apr 17
- **Shake down/Test flight**: Apr 18 – Apr 24, 8 hrs for twice
- **Media Day**: Apr 29, Seoul airport (TBD)
- **Main flights**: May 2 – June 12
 - Total 120 hrs (4hrs for one time, about 30 times of flights)
- **De-integration**: June 13 – June 17 (June 13 at Osan for the U.S. instruments)



Integration

Test Flight

Media Day

Flight

De-integration

III

Research Vessels

□ KMA Kisang I, KIOST Onnuri

※ Specific plan has not been specifically decided (TBD in March)

해양기상관측선 **기상1호**
KMA: Kisang I
 Focusing on met. and AQ research

주요제원

총톤수	498톤
총길이	64.32M
넓이	9.40M
깊이	4.30M
속력	16.5노트, 최대 18.0노트
주기관	2,332PS X 2대
추진기	FPP X 2축
선수추진기	CPP1축
발전기	주발전기 X 2, 정박발전기 X 1
항해거리	4,000 MILE 이상
연속항해	25일 이상
항해구역	근해(국제포함)
승선인원	32명
선급	KST
취항식	2011년 5월 30일
건조조선소	(주)고려조선소




KIOST: Onnuri
 Focusing on ocean color and AOD research



Length (M):	63.80	Range (n. mi.):	10000	Crew:	7
Beam (M):	12.00	Endurance (days):	40	Officers:	8
Draft (M):	5.15	Cruise speed (kt):	15.0	Scientists:	25
Gross Tons:	1370	Max. speed (kt):	15.8	Air Cond.:	yes
Power (HP):	3100	Aux. Power (HP):	1265		

AQ/MET Modeling

AQ/MET Model

- NIER AQ forecast
- KMA/NIMS Met. forecast
- GEOS/GRIMs-Chem
- WRF-CMAQ
- WRF-Chem
- WRF-CAMx
- SMOKE
- MEGAN/BEIS

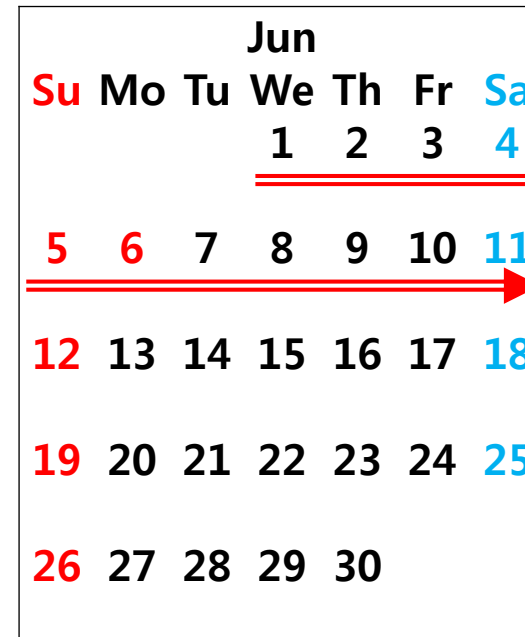
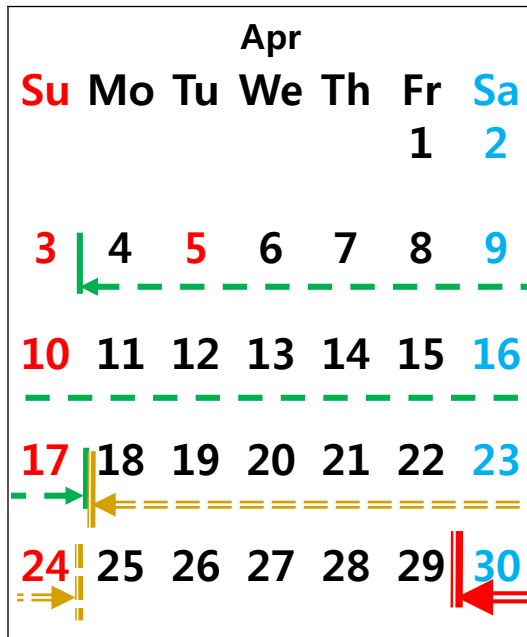
The screenshot displays the MAPS Forecast site interface. At the top, it features the site logo and navigation links: Home, Forecast Groups, Links, and Contact. The main content area is divided into several sections:

- Map Section:** A map of South Korea showing monitoring sites: NIER Supersites, NIER Forest, and (Jeju). It also includes images of aircraft (KMA King Air, Hanseo King Air) and a ship (KMA R/V Kisang I).
- Proposed Platforms:** A sidebar on the right lists key elements of the MAPS field campaign:
 - The proposed platforms in the MAPS field campaign
 - Proposed flight plans for two units of King-Air and DC-8
 - Global air quality satellite constellation
 - Observing system framework of KORUS-AQ
 - Special use airspace within the South Korean FIR
- Model Forecasts:** A grid of six PM10 forecast maps from different models:
 - AJOU: PM10 forecast by AJOU (Sontae Kim)
 - GIST: PM10 forecast by GIST (Chul Han Song)
 - PNU: PM10 forecast by PNU (Cheol-Hee Kim)
 - SNU ACMG: PM10 forecast by SNU ACMG (Rokjin J. Park)
 - KMA: PM10 forecast by KMA
 - ENSEMBLE: ENSEMBLE forecast
- UPLOADED FILES:** A list of research flight reports:
 - [RF02_First_look_Aerosol_Chemical_Composition.pdf](#)
 - [ResearchFlight02_060215.pdf](#)
 - [ResearchFlight_RF03_060615.pdf](#)
 - [ResearchFlight_RF03_04_060715.pdf](#)

IV

Met./AQ Modeling

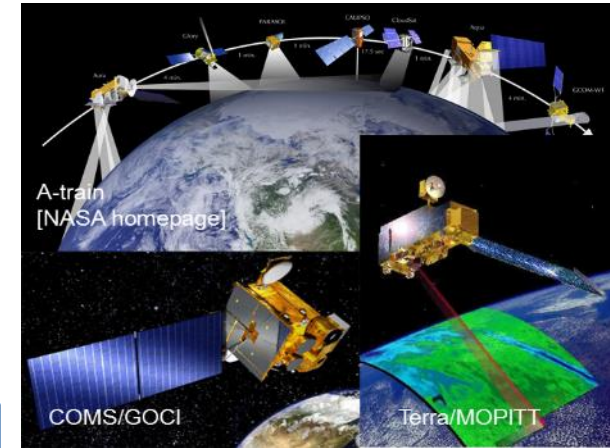
- Meteorological/Air quality model groups' schedule
 - **Warming up**: Apr 4 – Apr 17; Pre-operating each Korean group's own model(s)
 - **Test forecast**: Apr 18 – 24; Model groups will support Hanseo King-Air test flights
 - **Intensive forecast**: Apr 30 – June 11
 - Daily briefing for supporting flight plan (everyday at 8 – 10 AM)
 - Need to determine the best flight track and altitude by 2 days prior to the actual flight due to Korean air force's minimum requirement, but still in negotiating.



Satellite / Remote Sensing

Satellite/ Ground based Remote Sensing

- Pandora: > 9 sites
- AERONET: ~19 sites
- LIDAR : 9 sites
- Satellite
(Ex. GOCI, MI, etc...)



V

Satellite/Remote Sensing

- Schedule for satellite and remote sensing groups
 - **Deployment/Ready:**
 - Apr 5 – Apr 17: Pandora, AERONET
 - Korean LIDAR network (~9 sites) is ready for intensive measurement.
 - **Test run:** Apr 18 – May 1 PANDORA, AERONET, LIDAR network test run
 - **Intensive measurement:** May 2 – June 12
 - This will also include satellite observation and retrieval
 - **Yearly based observation:** After June 13 (The end date will be TBD.)



KORUS-OC Update

- **18 days: 20 May – 6 June (includes 3 weekends in hopes of fewer flight restrictions)**
- **Still working to resolve sampling in Territorial Waters (working multiple solutions in parallel).**
- **Logistics details are being finalized.**
- **Need to talk more about how to connect KORUS-AQ and KORUS-OC**
- **Ship can camp in unrestricted airways and increase probability of overflight**
- **Planning a group meeting to draw up the cruise lines.**
- **May need to use text messages or sat phone during flight planning**
- **It would be good to have a KORUS-OC rep at Osan AB (Will Carolyn Jordan be in Korea?)**

Other items or issues?

Data sharing with Japanese researchers (e.g, Fukue Island, Dr. Takani.) Please forward names and emails so that we can add them to the KORUS-AQ mailing list.

**Air Chemistry Research In Asia, ARIAs:
Aerosol and Trace Gas Emissions and Transformations over the North China Plain**

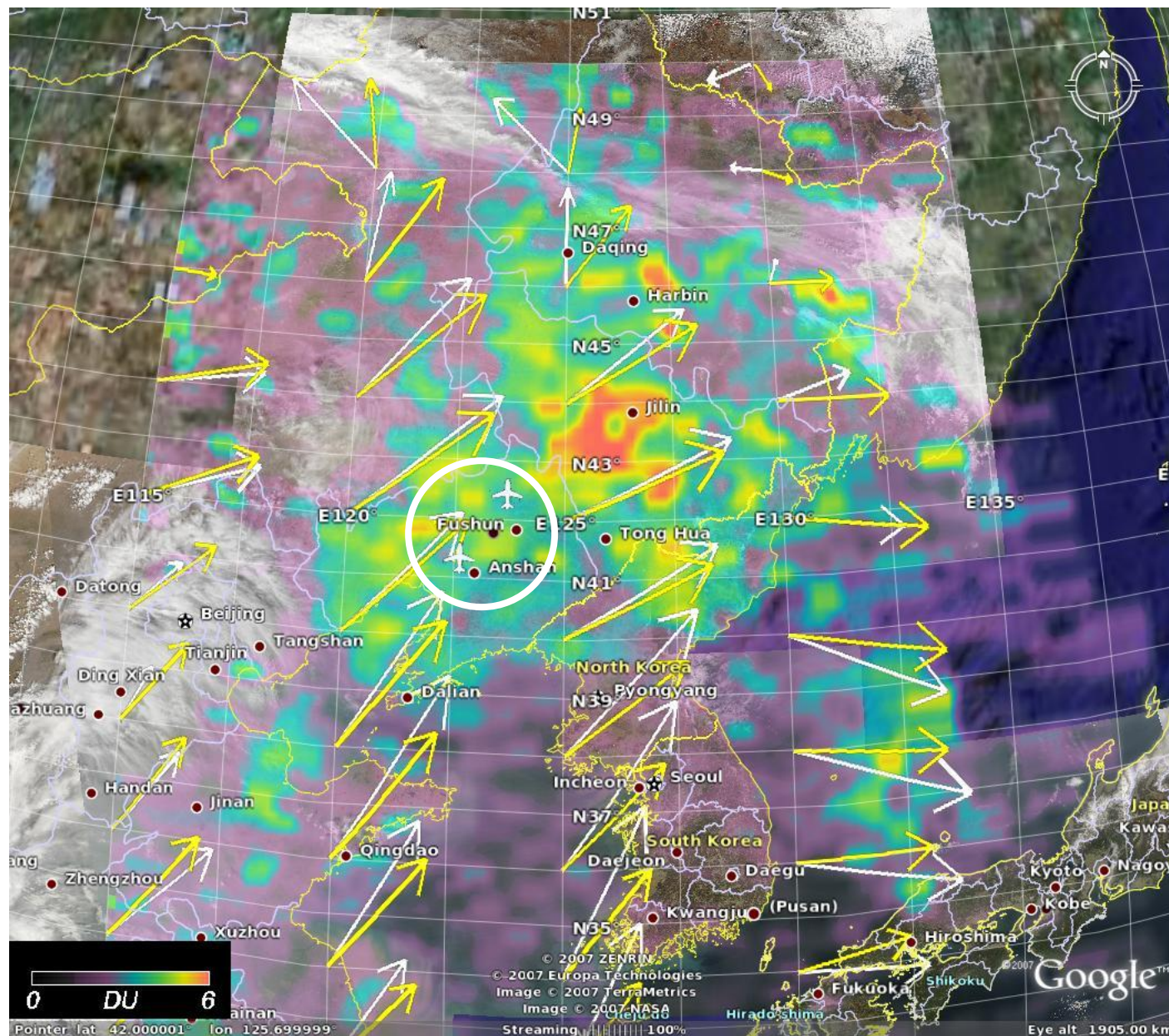
**Russ Dickerson, Xinrong Ren, Zhanqing Li, Hao He
The University of Maryland**

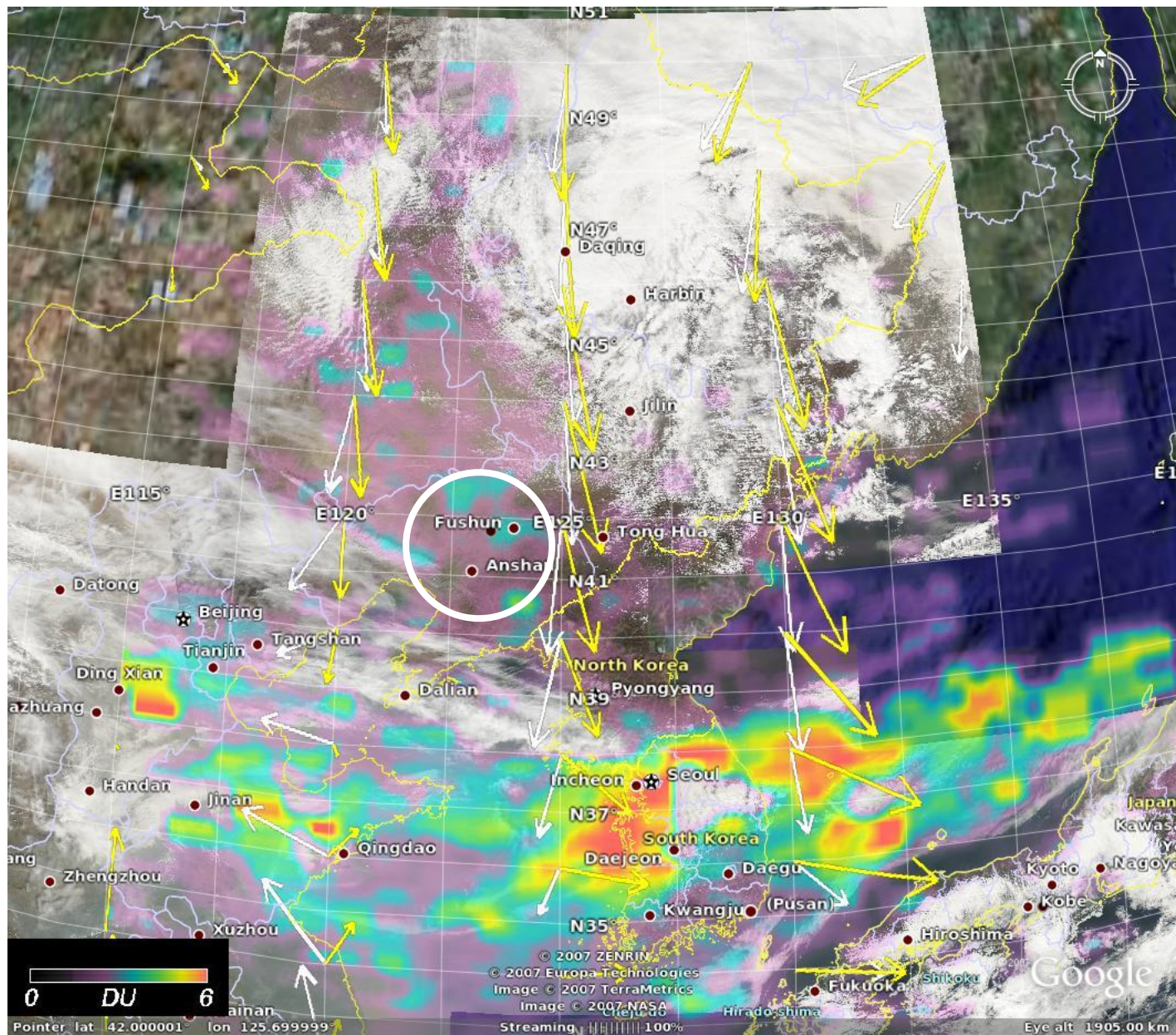
Thank you NSF



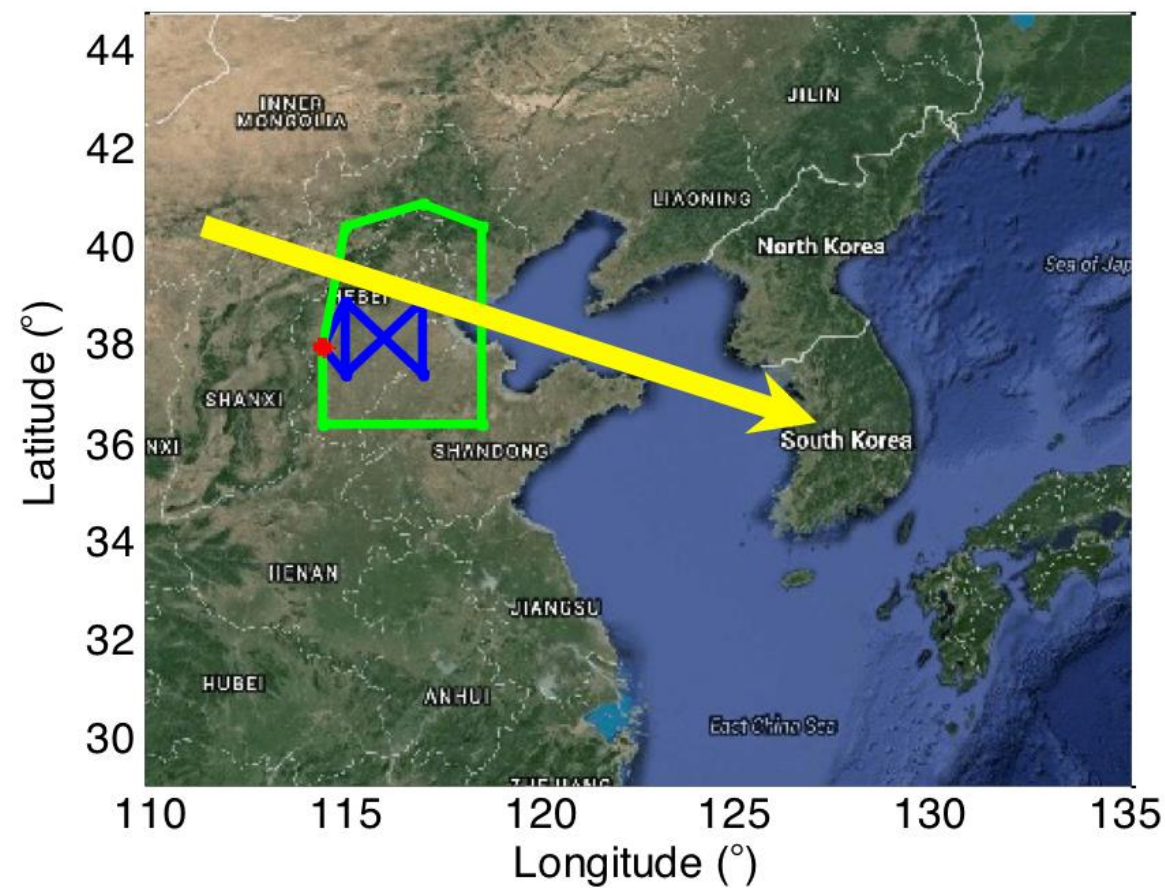
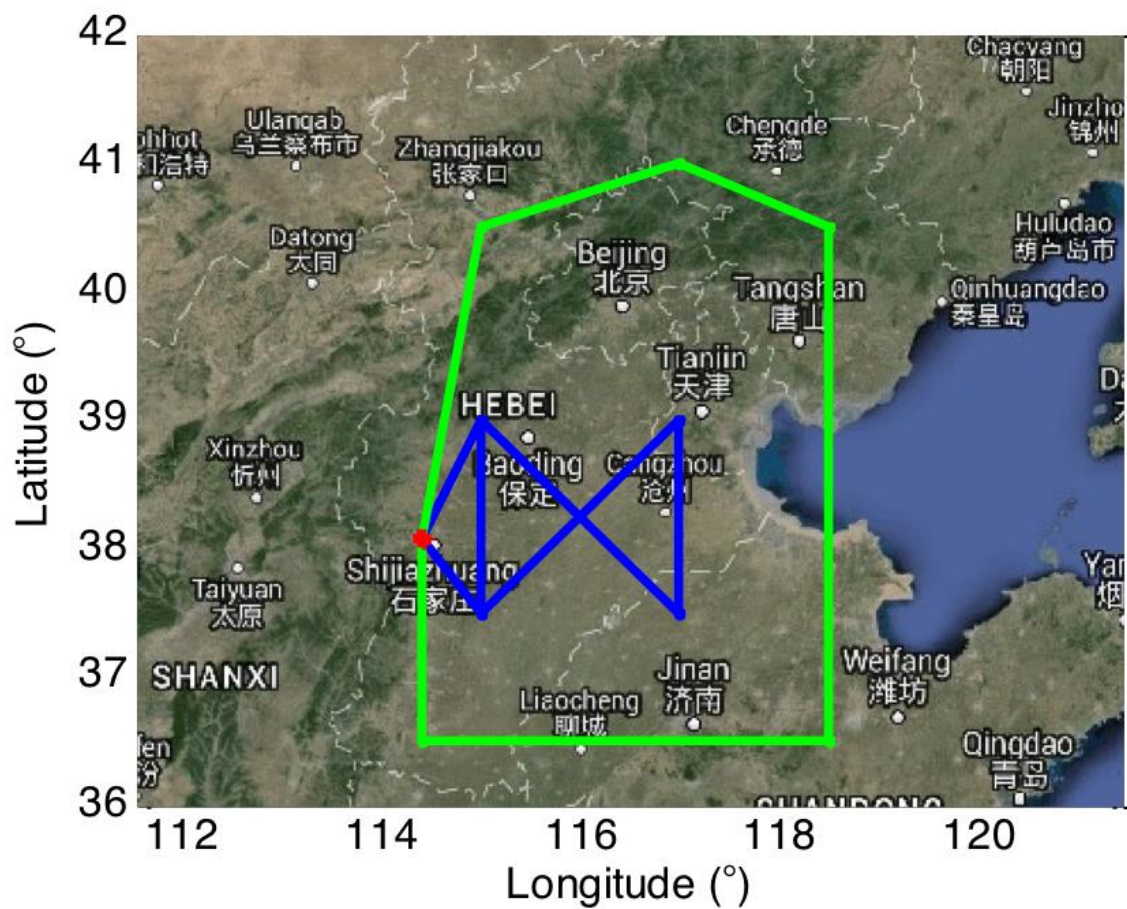
Chinese Y12 (Twin Otter) for the EAST-AIRE campaign over NE China April 2005

The comparison demonstrates that operational OMI algorithm can distinguish between heavy pollution (April 5 ahead of cold front):





Proposed Flight Track and transport pattern.



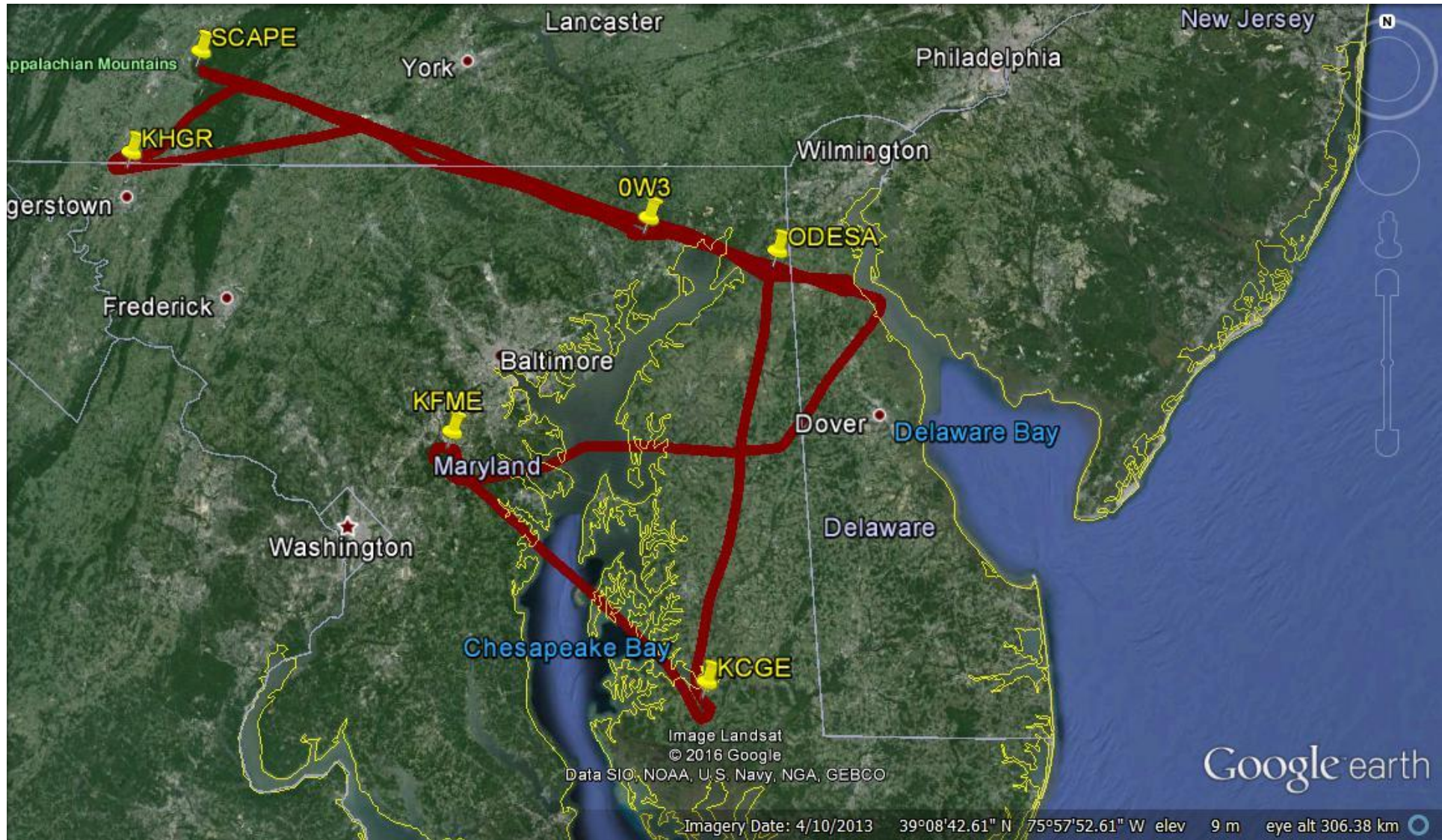
Aircraft Instrumentation from Hebei Province, PKU, and/or UMD.

Variable	Method
Position	GPS
Meteorology (T, RH, P, 2-D Wind)	Thermistor Hygristor, Capacitance Manometer, Garmin G600 system
Fast Greenhouse Gas Analyzer (CH ₄ /CO ₂ /CO/H ₂ O)	Cavity Ring Down Spectroscopy Picarro Model 2401-m
Ozone (O ₃)	UV Absorption
Sulfur Dioxide (SO ₂)	Pulsed Fluorescence
Nitrogen Dioxide (NO ₂)	Cavity Ringdown, Los Gatos
Total Reactive Nitrogen (NO _y)	Heated (600°C) inlet and CRD.
Aerosol Scattering, b_{scat} (450, 550, 700 nm)	Nephelometer
Aerosol Absorption, b_{abs} (565 nm)	Particle Soot Absorp. Photometer (PSAP)
Black Carbon (seven wavelengths)	Aethalometer
VOC's	Grab samples
H ₂ CO	AeroLaser (Thanks, Houston & BL)
Aerosol Composition	Bulk sampler and lab analysis via IC etc.
Cloud Microphysics	Second Y12 aircraft

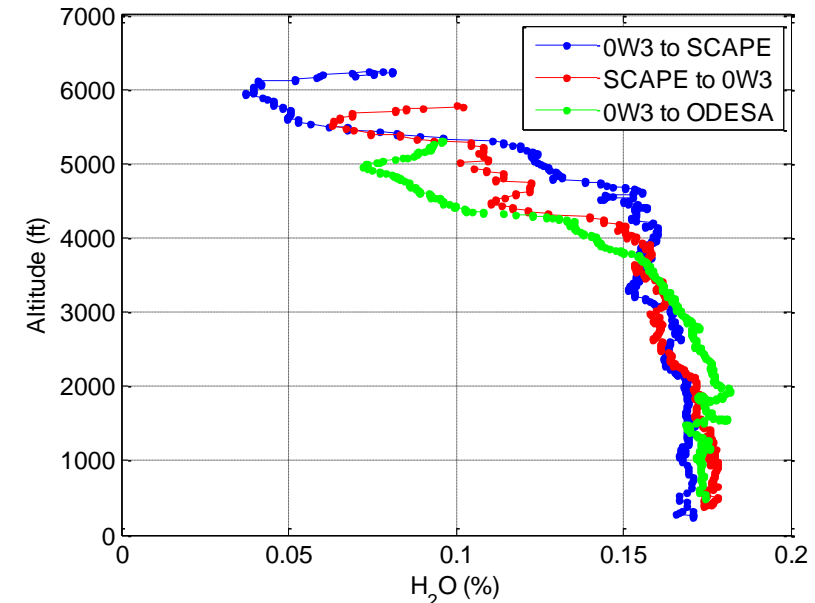
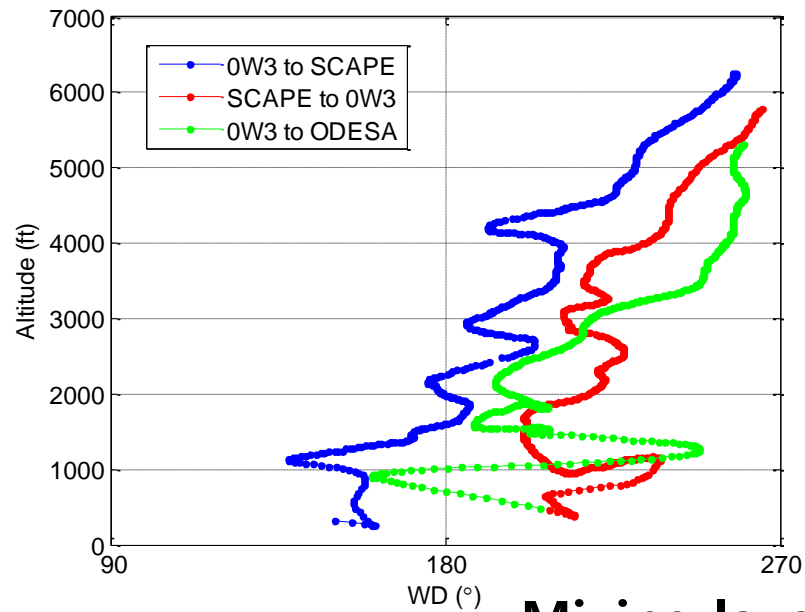
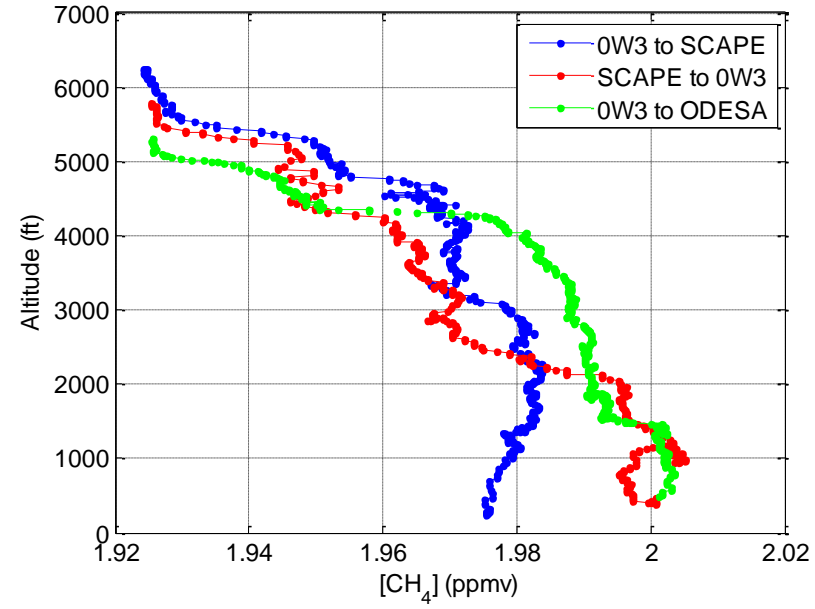
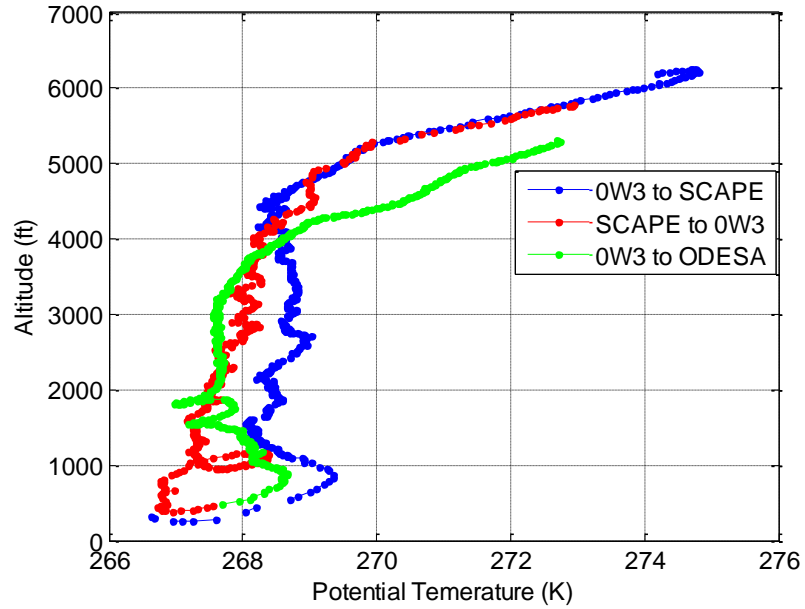
Preliminary Results from Cessna RF2

02/12/2016

RF2 Flight Track

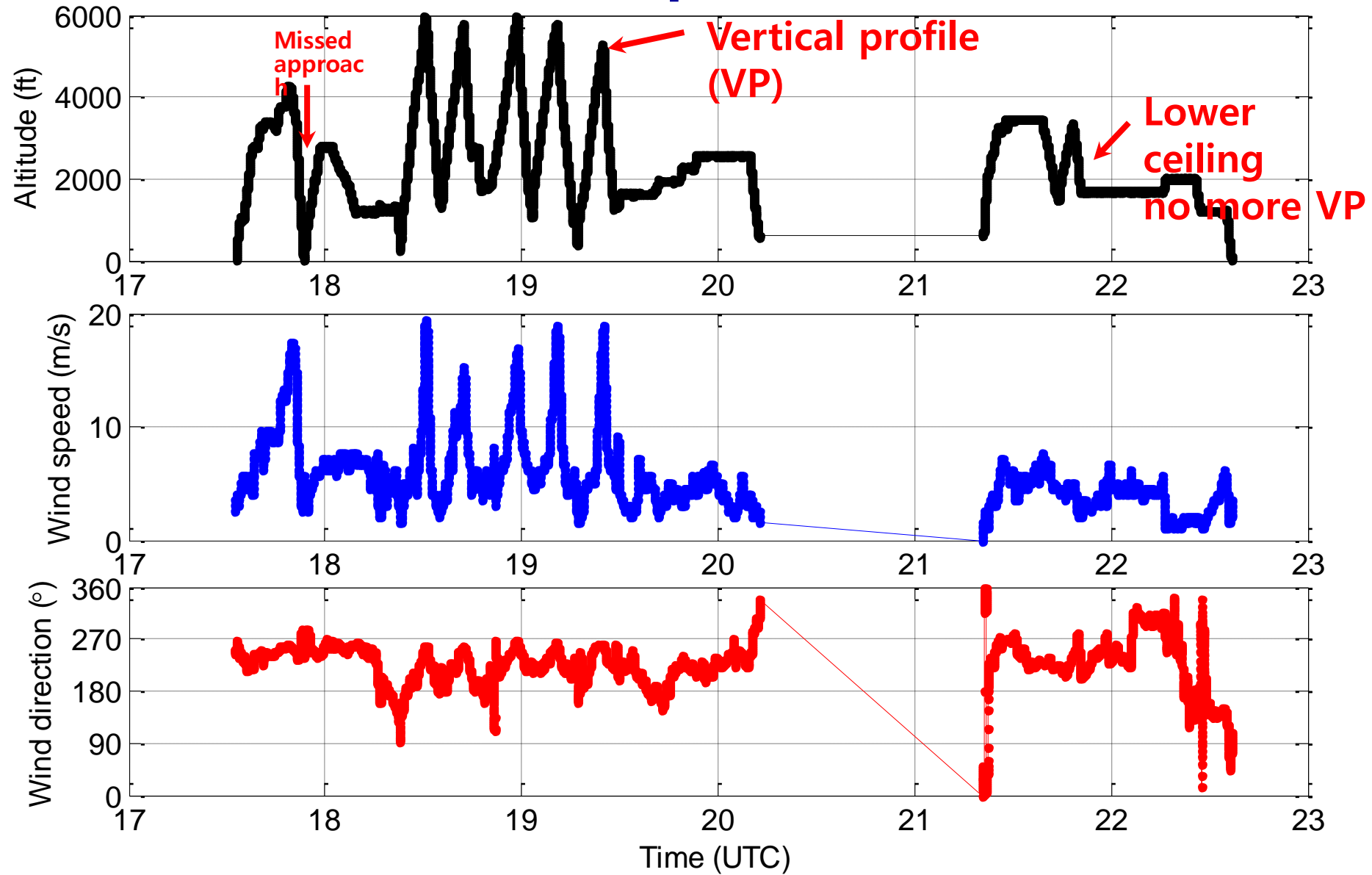


Three Vertical Profiles

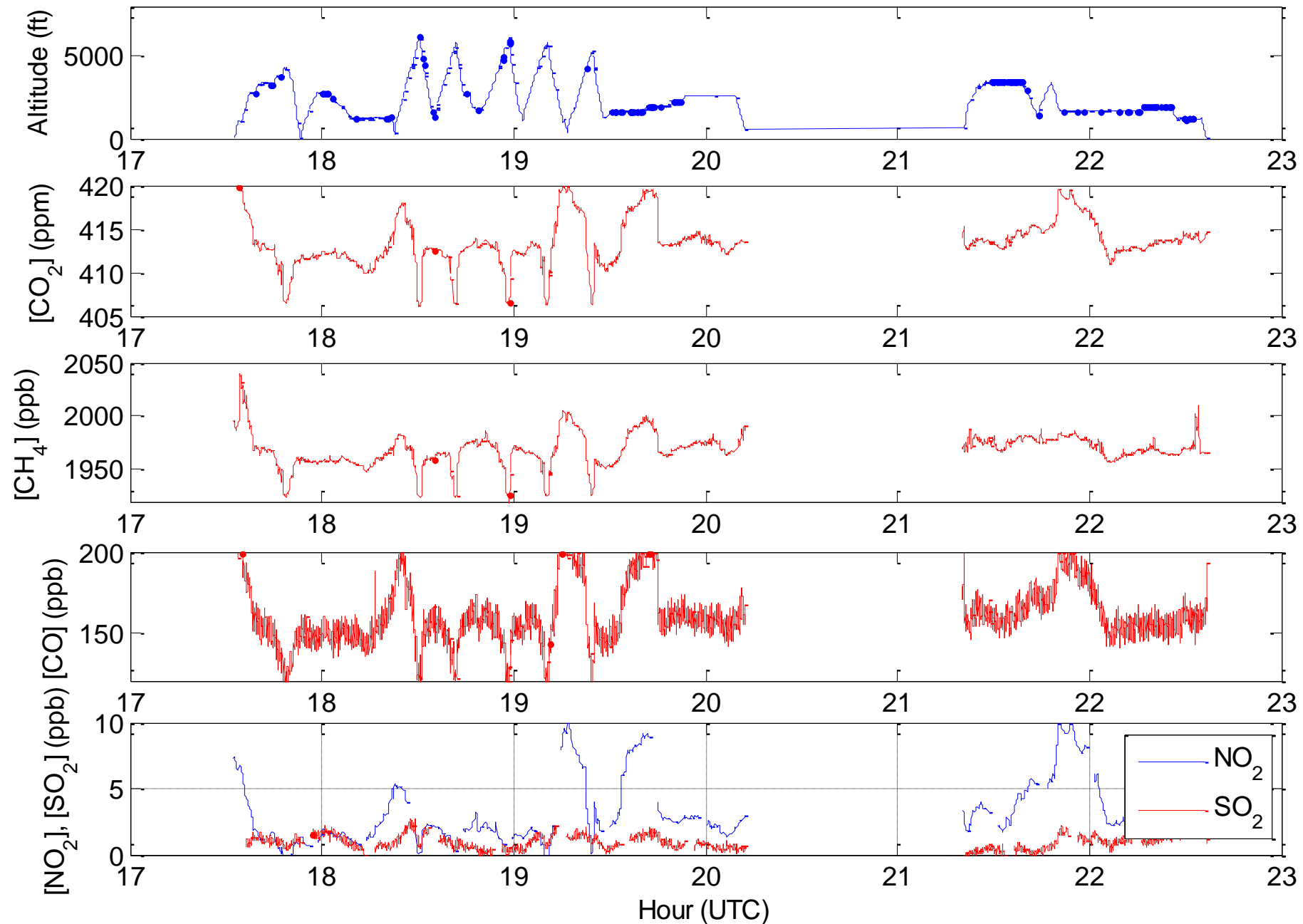


Mixing layer depth ~4000-5000 ft

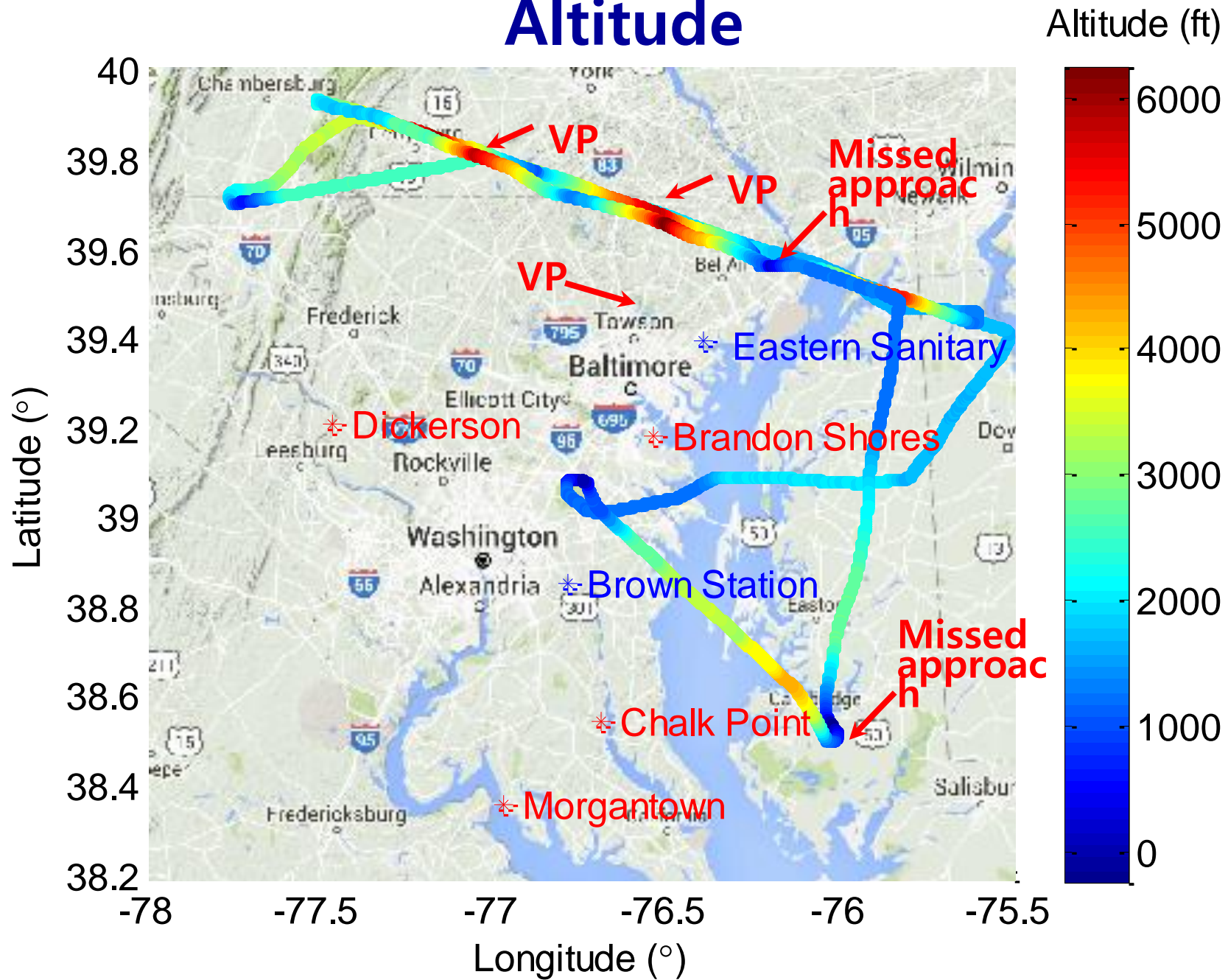
Altitude, Wind Speed and Direction



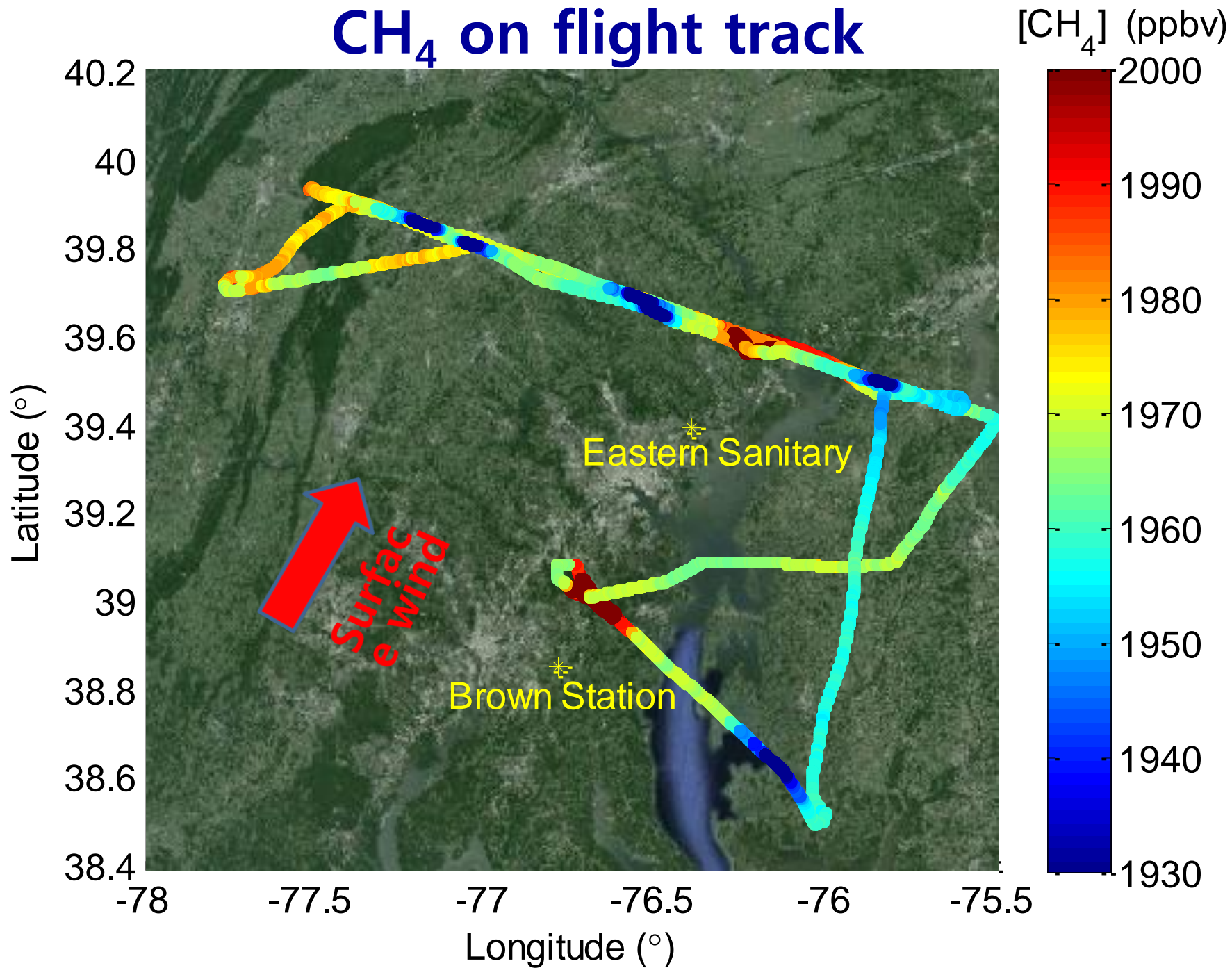
Time Series of CO₂, CH₄, CO and NO₂



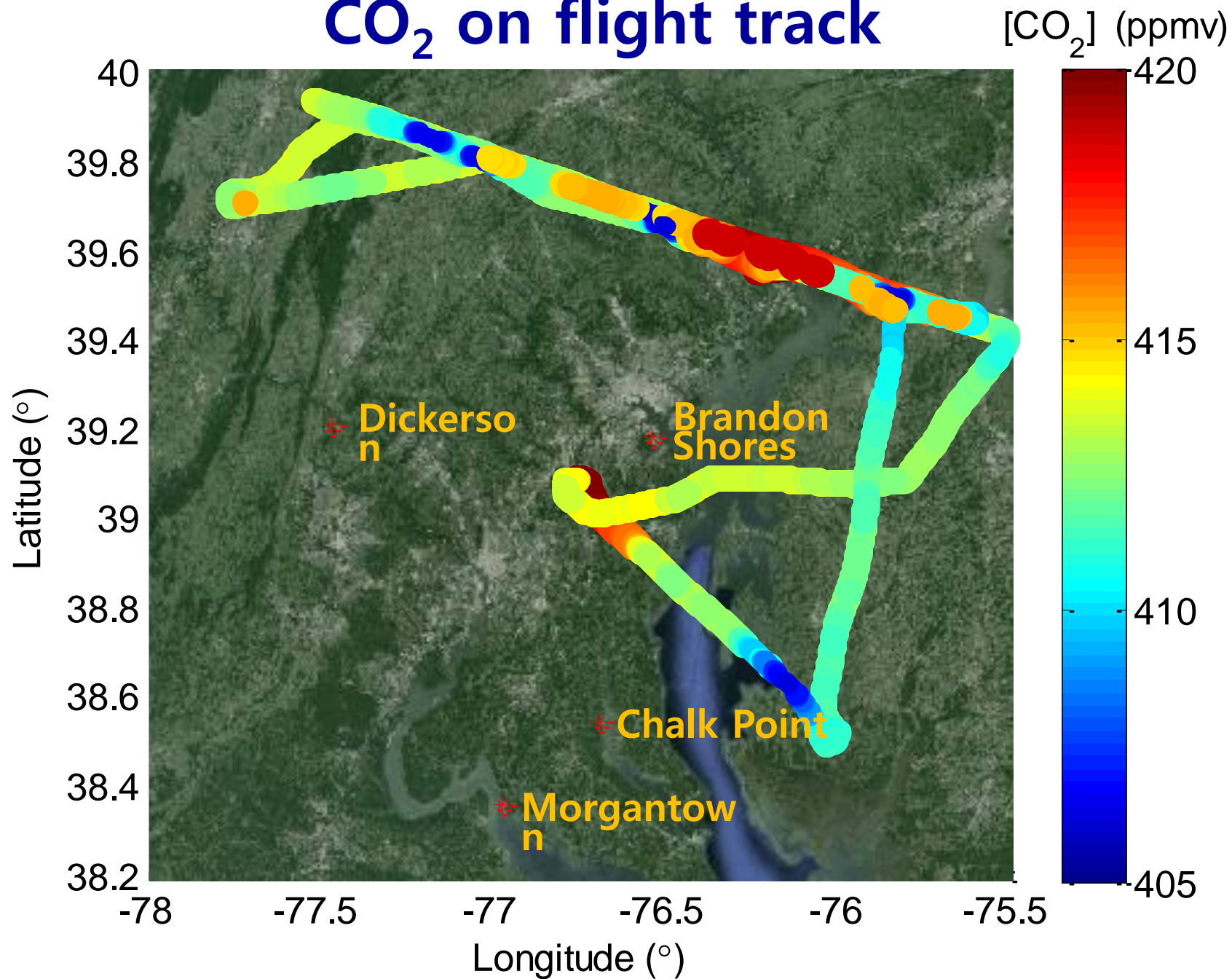
Altitude



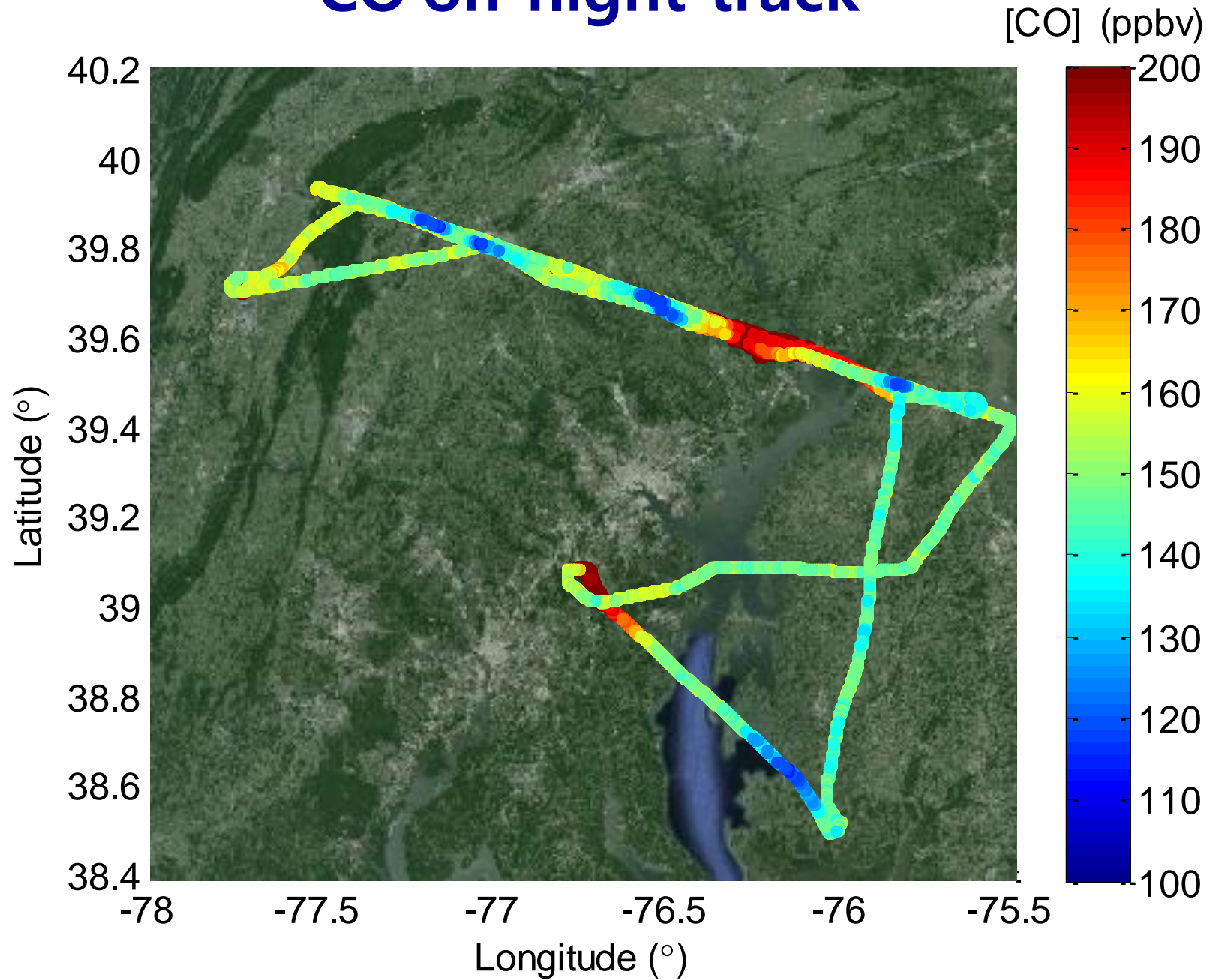
CH₄ on flight track



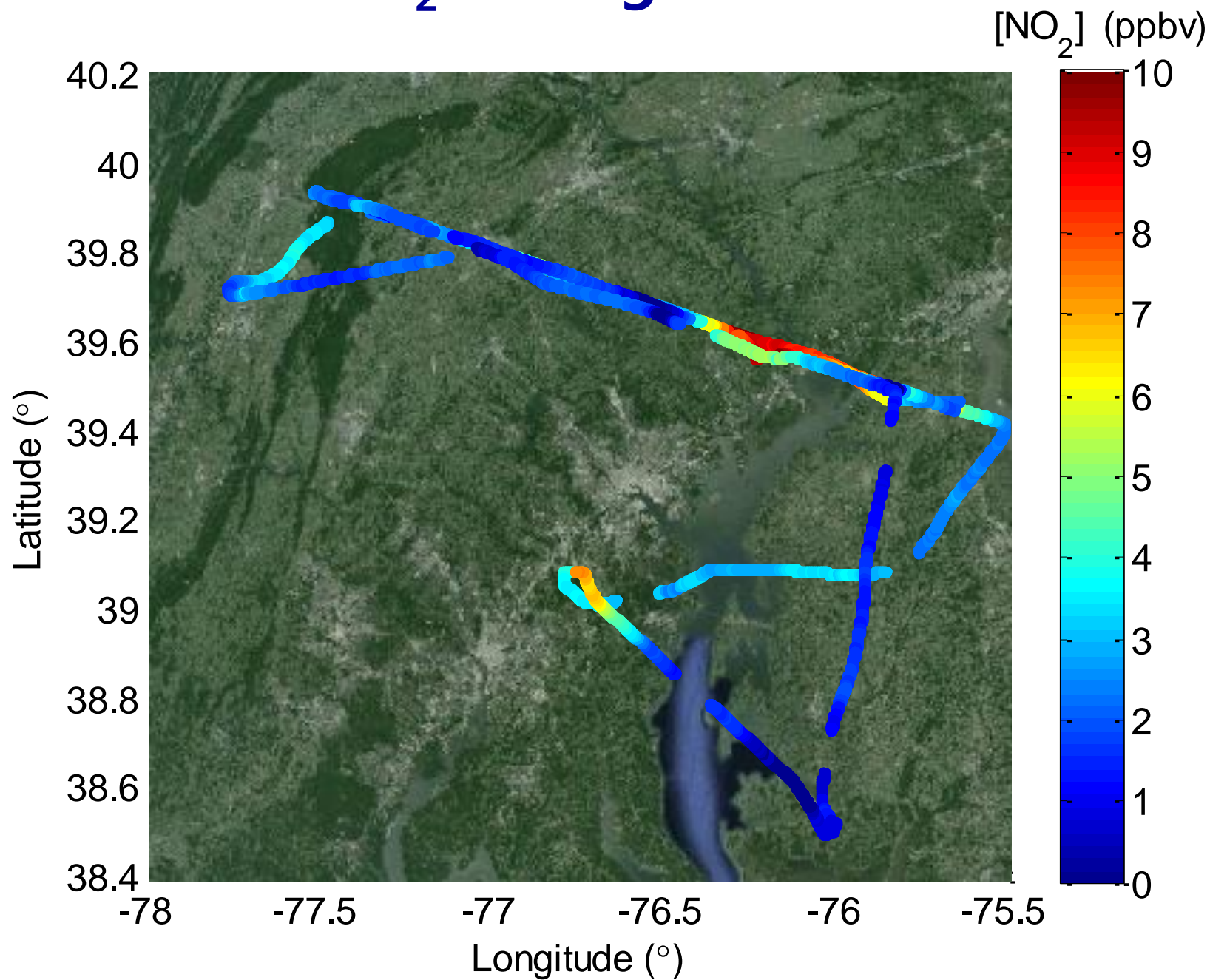
CO₂ on flight track



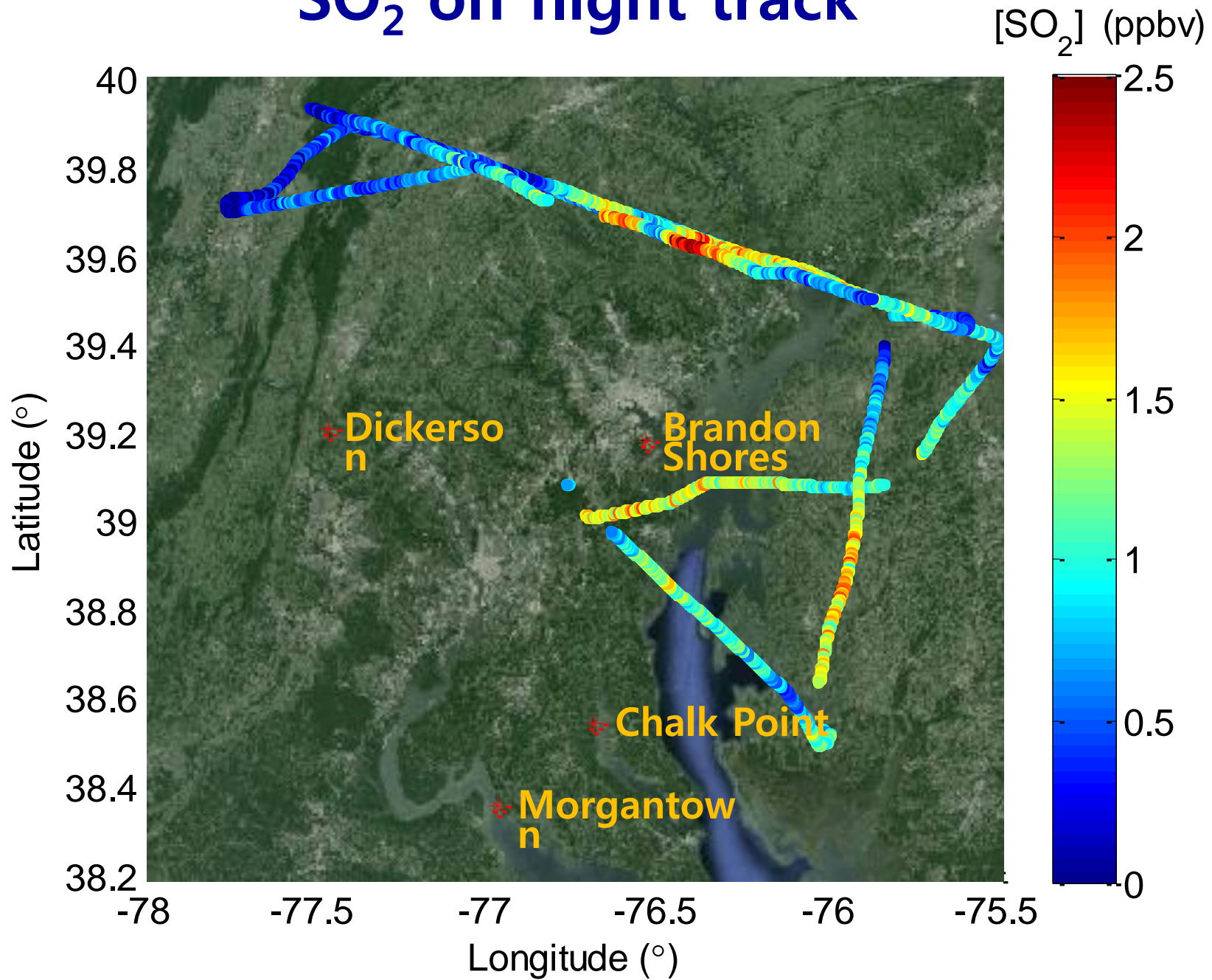
CO on flight track



NO₂ on flight track



SO₂ on flight track



CH₄ vs. CO₂ colored with SO₂

