Wild fires in North and Central America as extra-CONUS-domain intermittent sources for NAQFC

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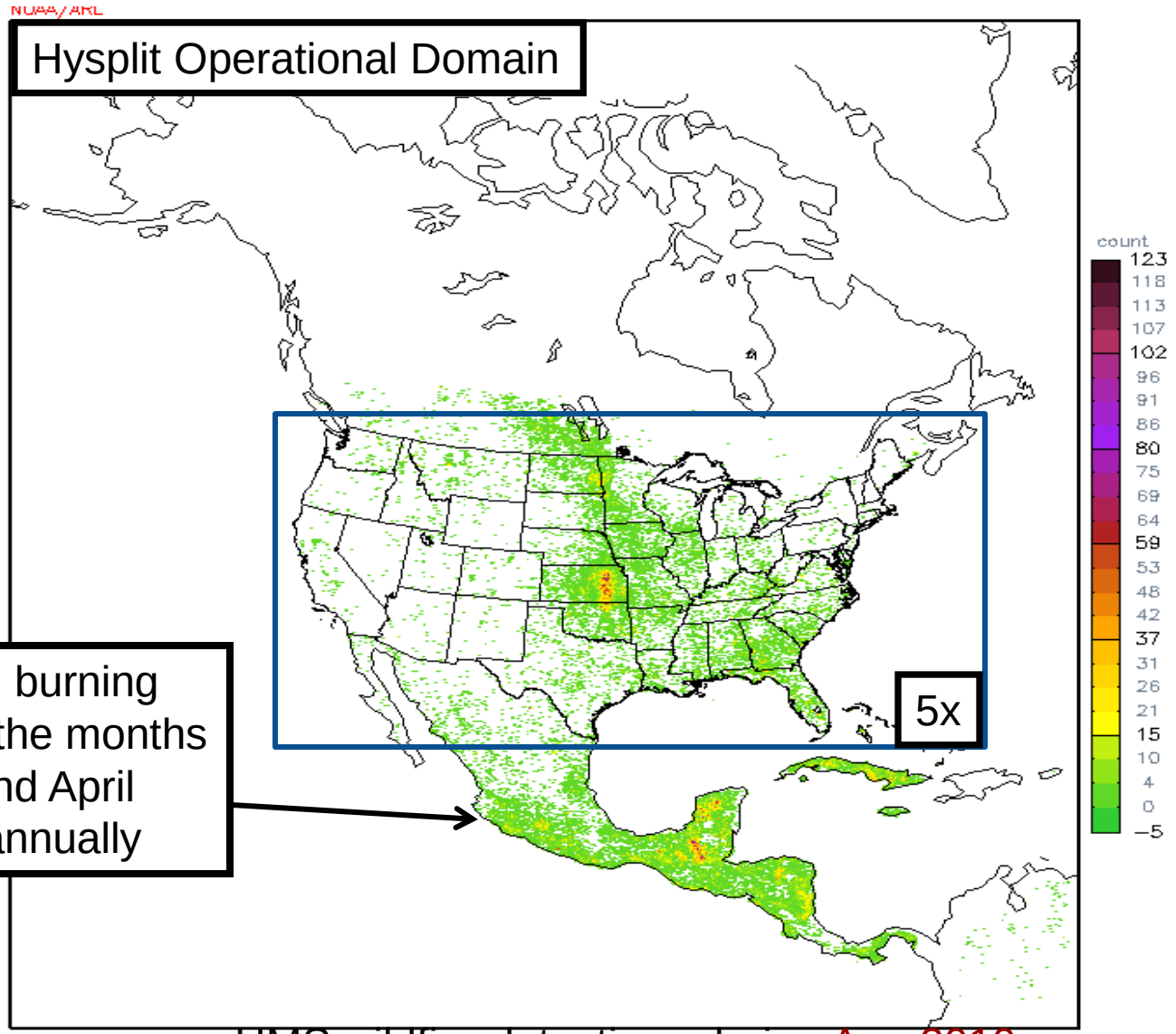
Emission should include Exo- and intra-domain wild fires



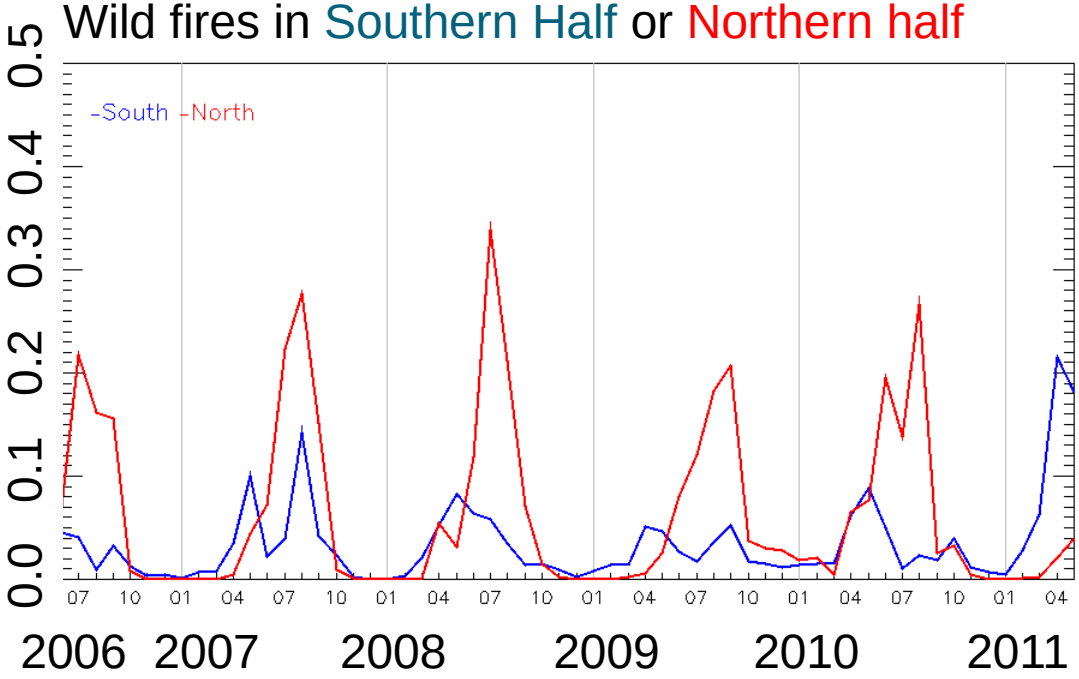
Agricultural burning prevails in the months of March and April in Mexico annually

HMS wildfire detections during Apr. 2010

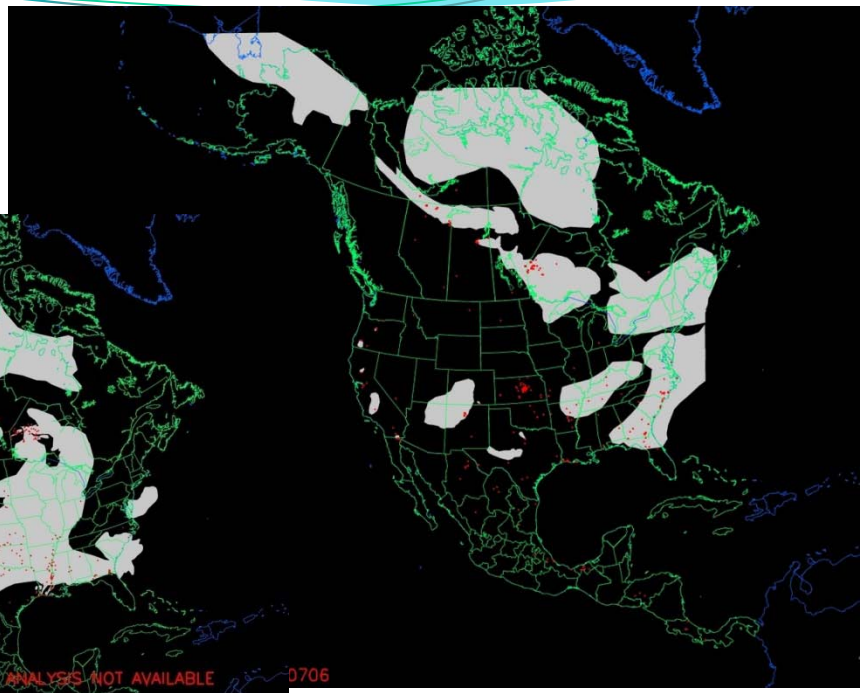
Intra-domain wild fire emissions

Time series of monthly mean event-count HMS/smoke fraction inside CONUS domain. Blue lines indicates bottom half of domain, and red color indicates upper half of the CONUS domain

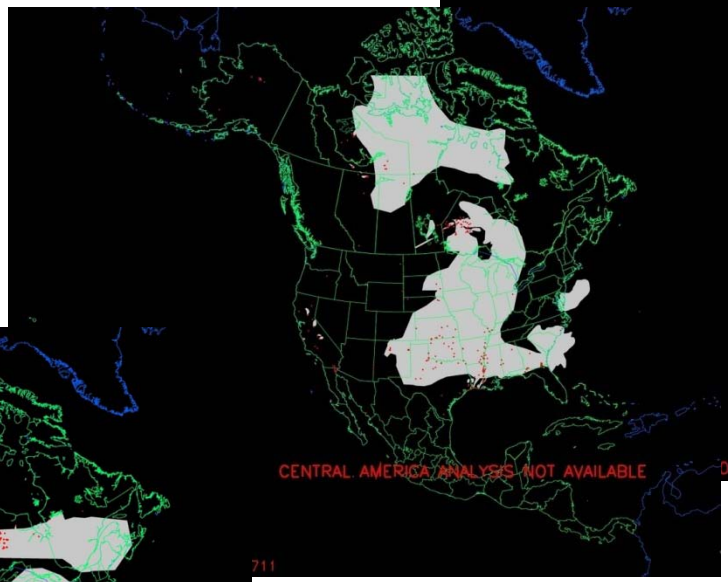
Hms/Bluesky/Smoke monthly mean fraction owing to Wild fires in Southern Half or Northern half



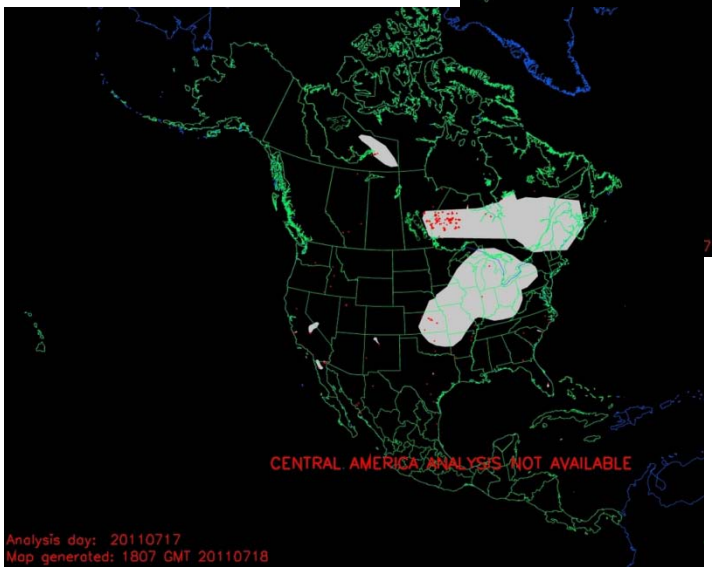
Exo-domain wild-fire emissions during last July



July 5 2011



July 10 2011

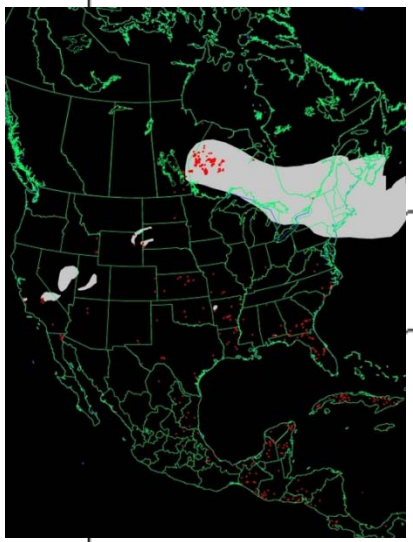


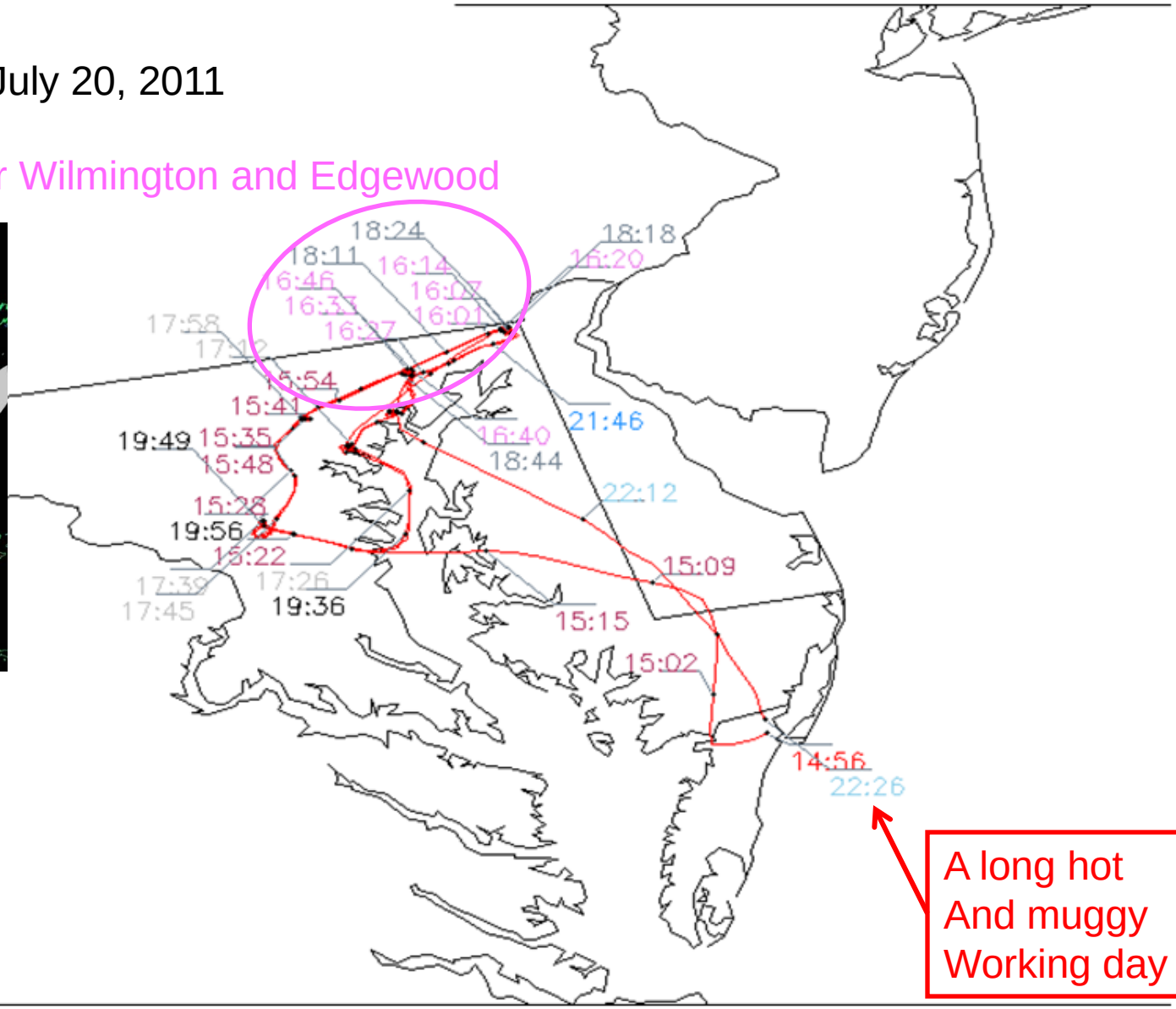
July 17 2011

Courtesy: Hysplit team, ARL/NOAA
http://ready.arl.noaa.gov

Flight track: July 20, 2011

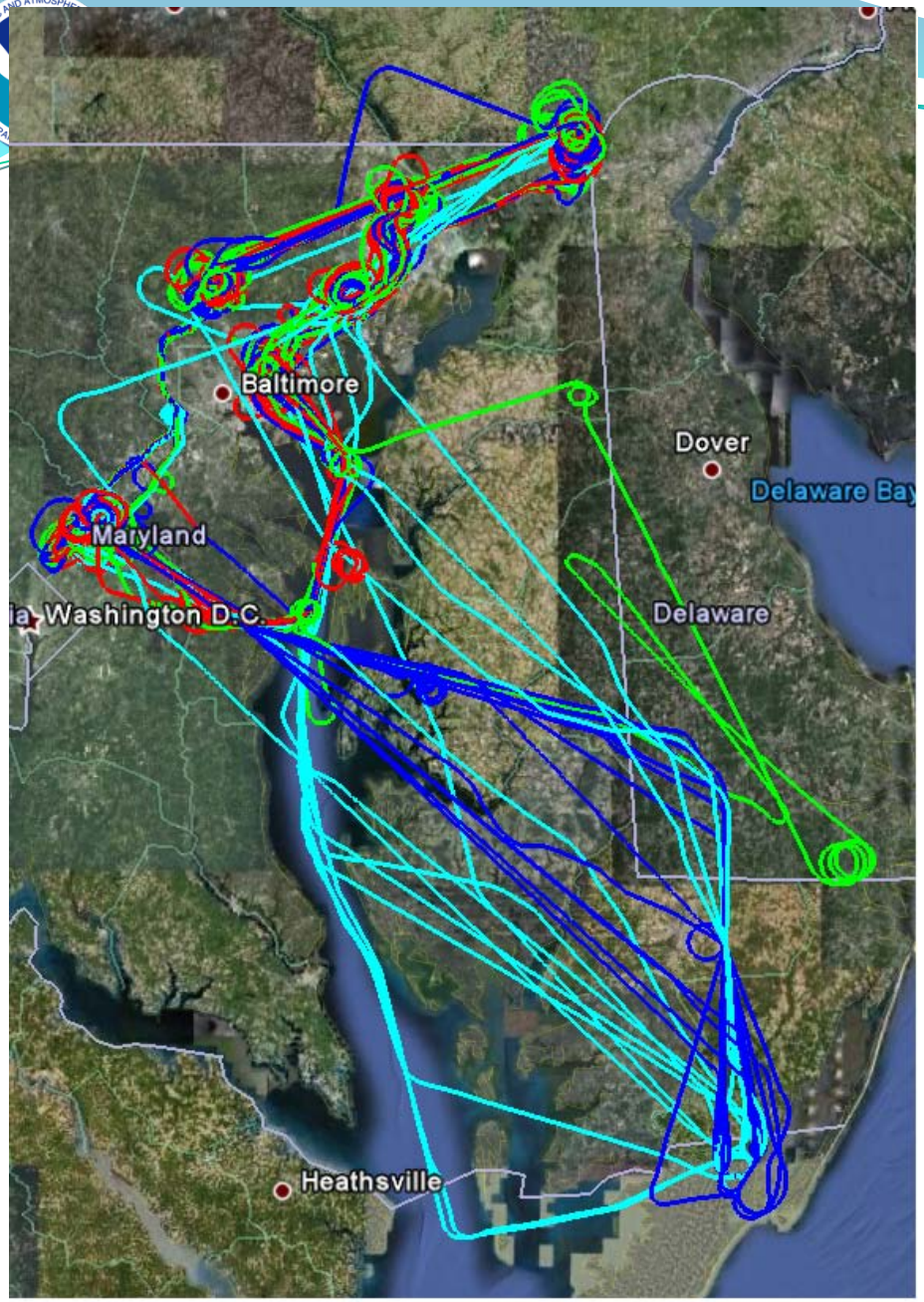
Spirals over Wilmington and Edgewood





NASA P-3B Flight Paths
July 1-29, 2011

http://www-air.larc.nasa.gov/missions/discover-aq/images/DISCOVER-AQ_2011_ALL_P3B_July1-July29.png

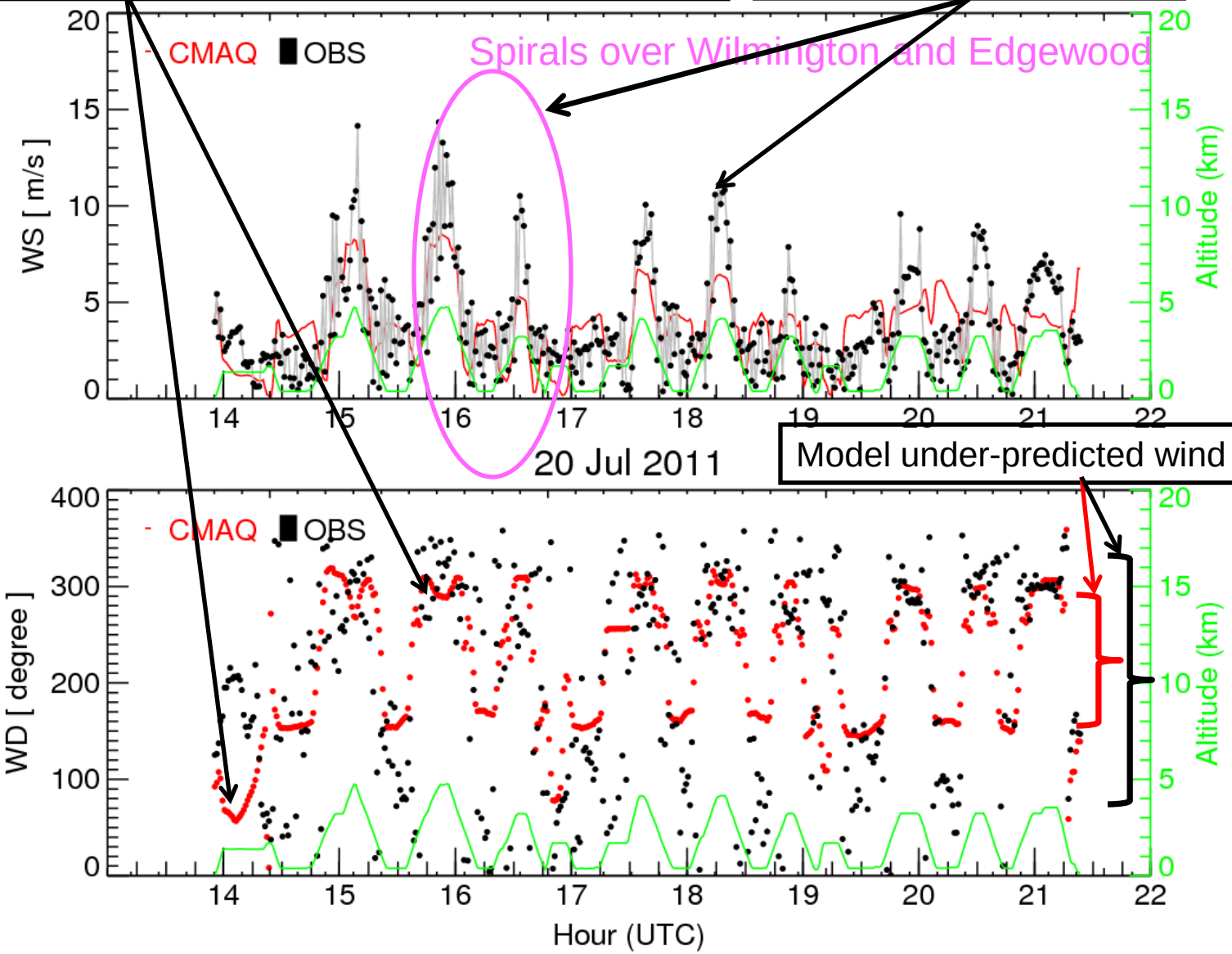


DISCOVER-AQ_2011_ALL_P3B_July1-July29

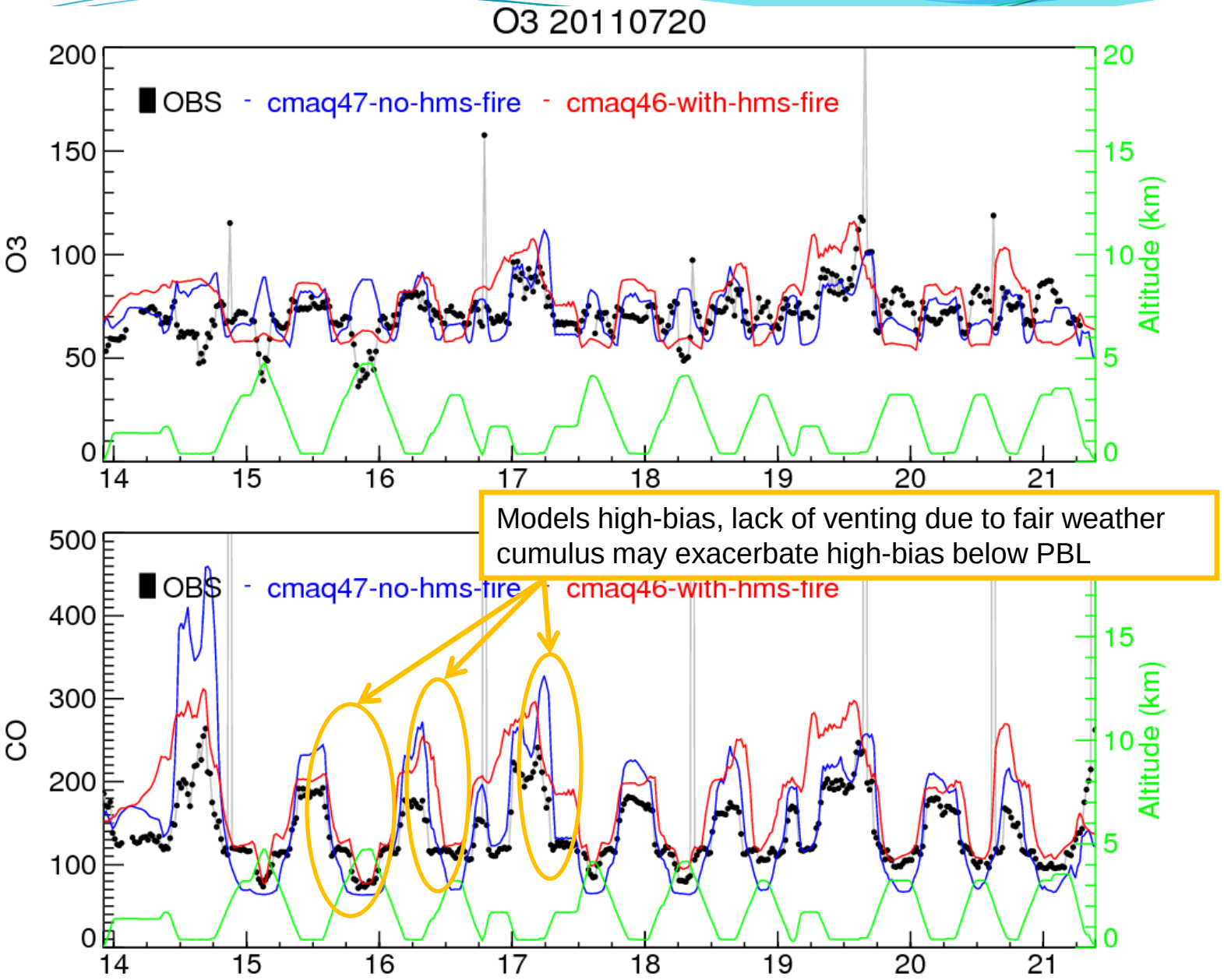
Comparison of Wind along flight track of P3B on July 20 2011

Less turbulence may not matter as PBL well-mixed, shallow-convection may matter.

More frequent low Bias in higher altitudes



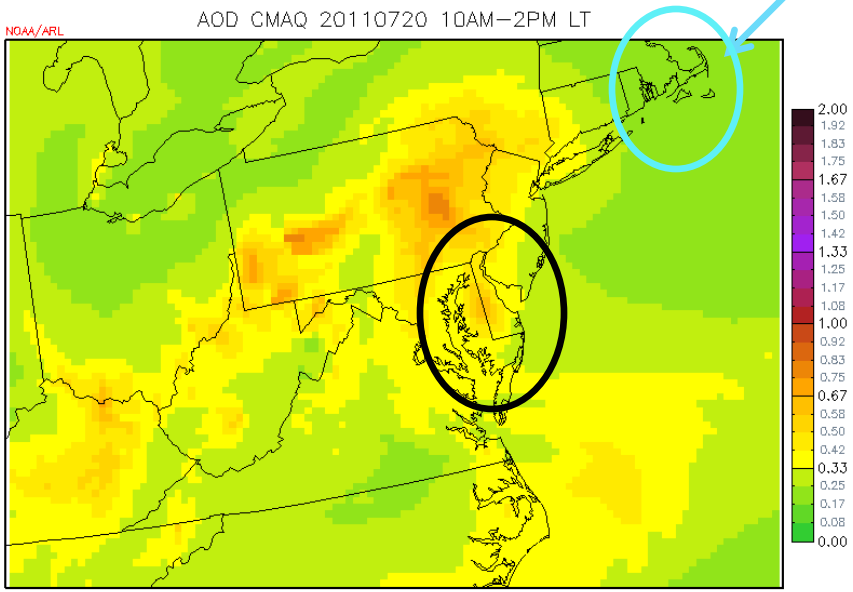
Comparison of Wind along flight track of P3B on July 20 2011



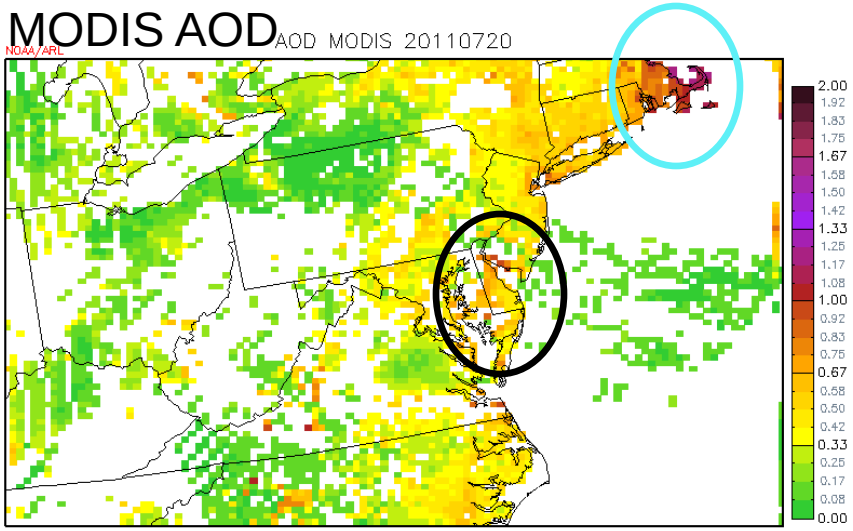
Spatial distribution of hourly avg. column-integrated AOD

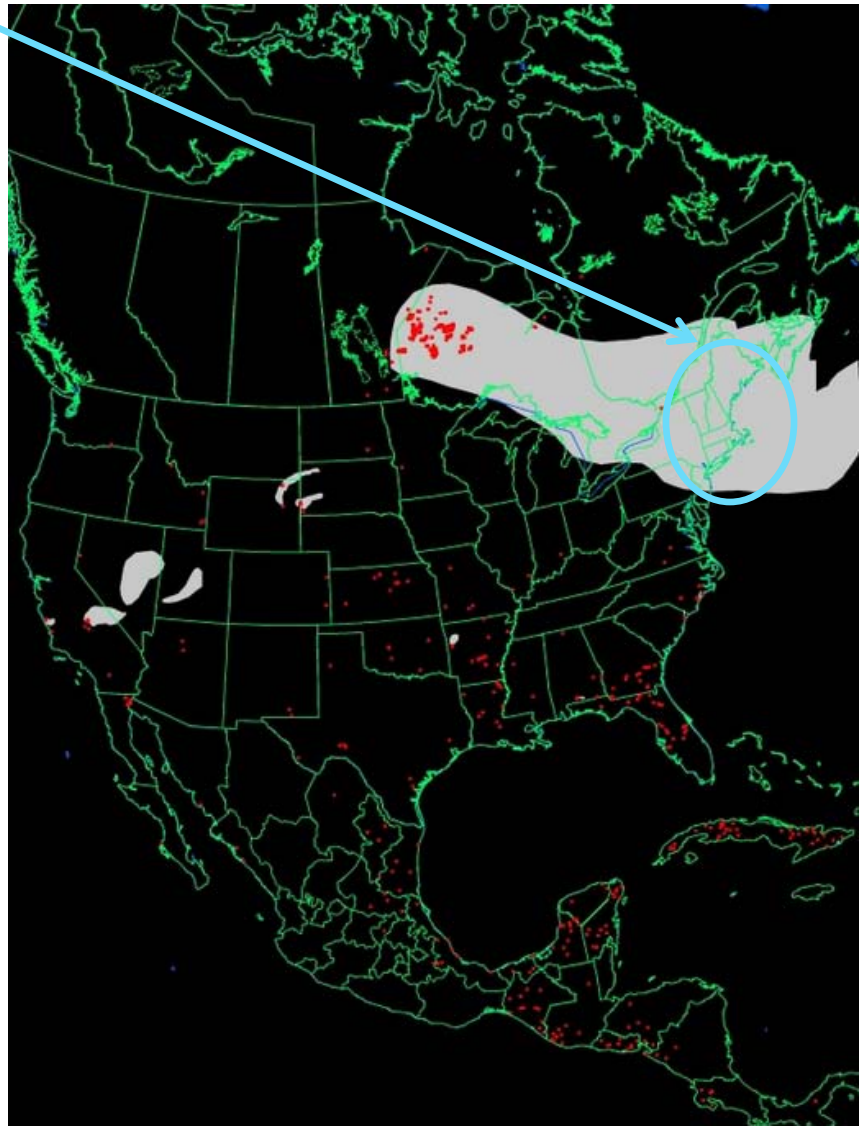
Satellite data was also attempted

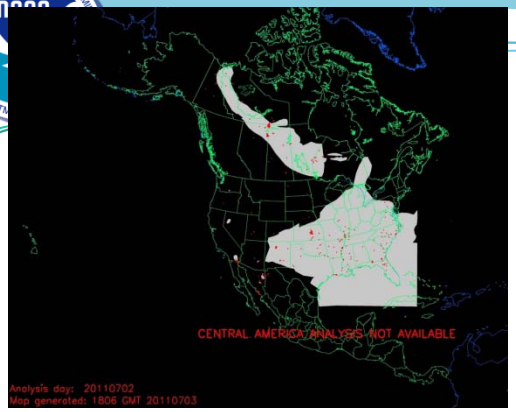
CMAQ471 no_hms_fire AOD



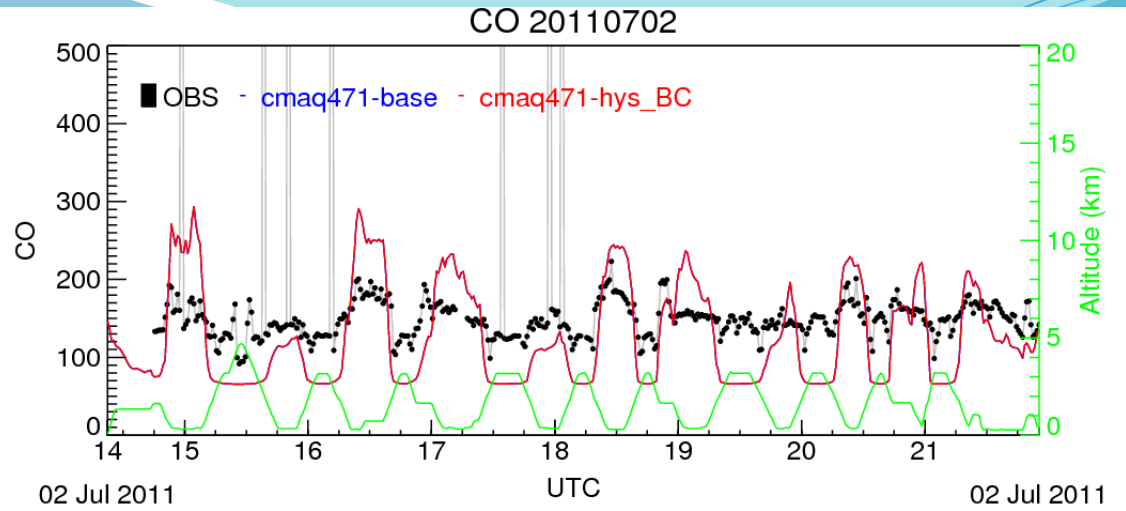
MODIS AOD

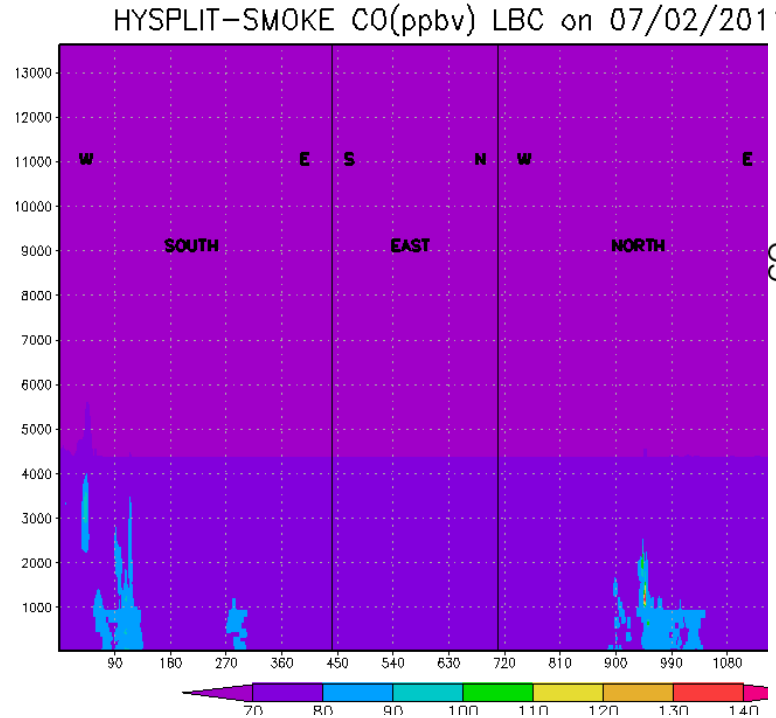


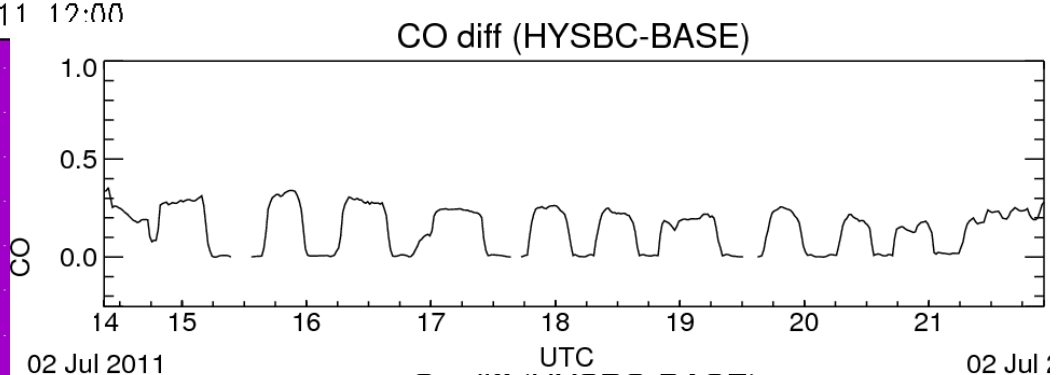


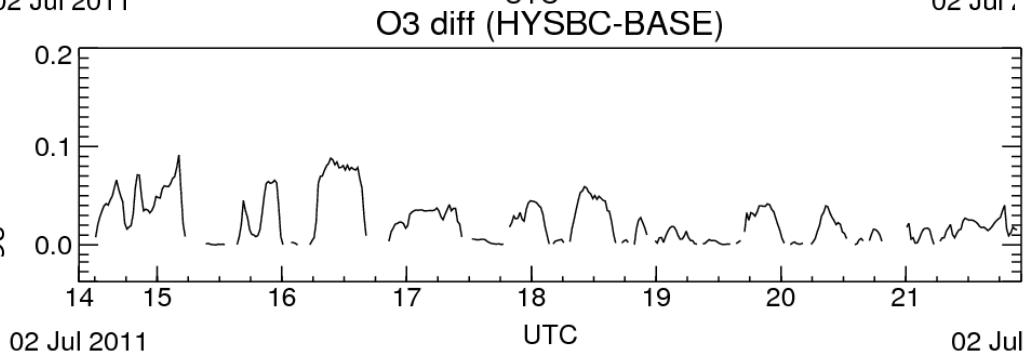


HMS report on July2, 2011

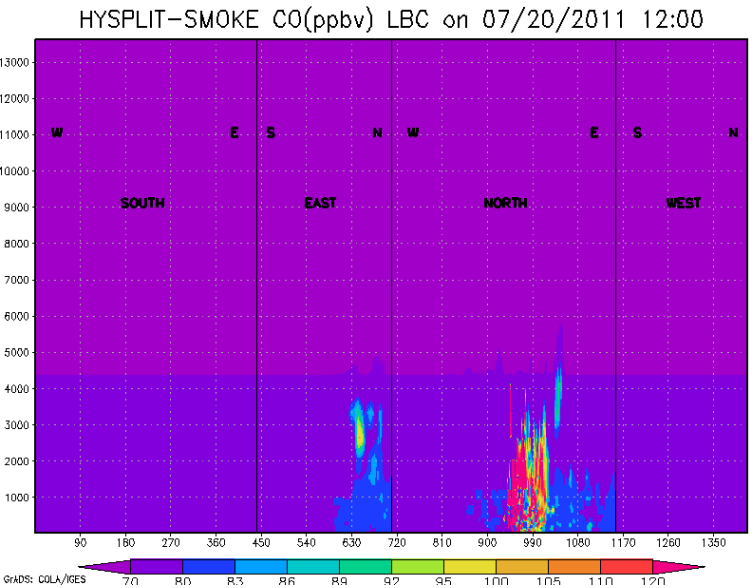


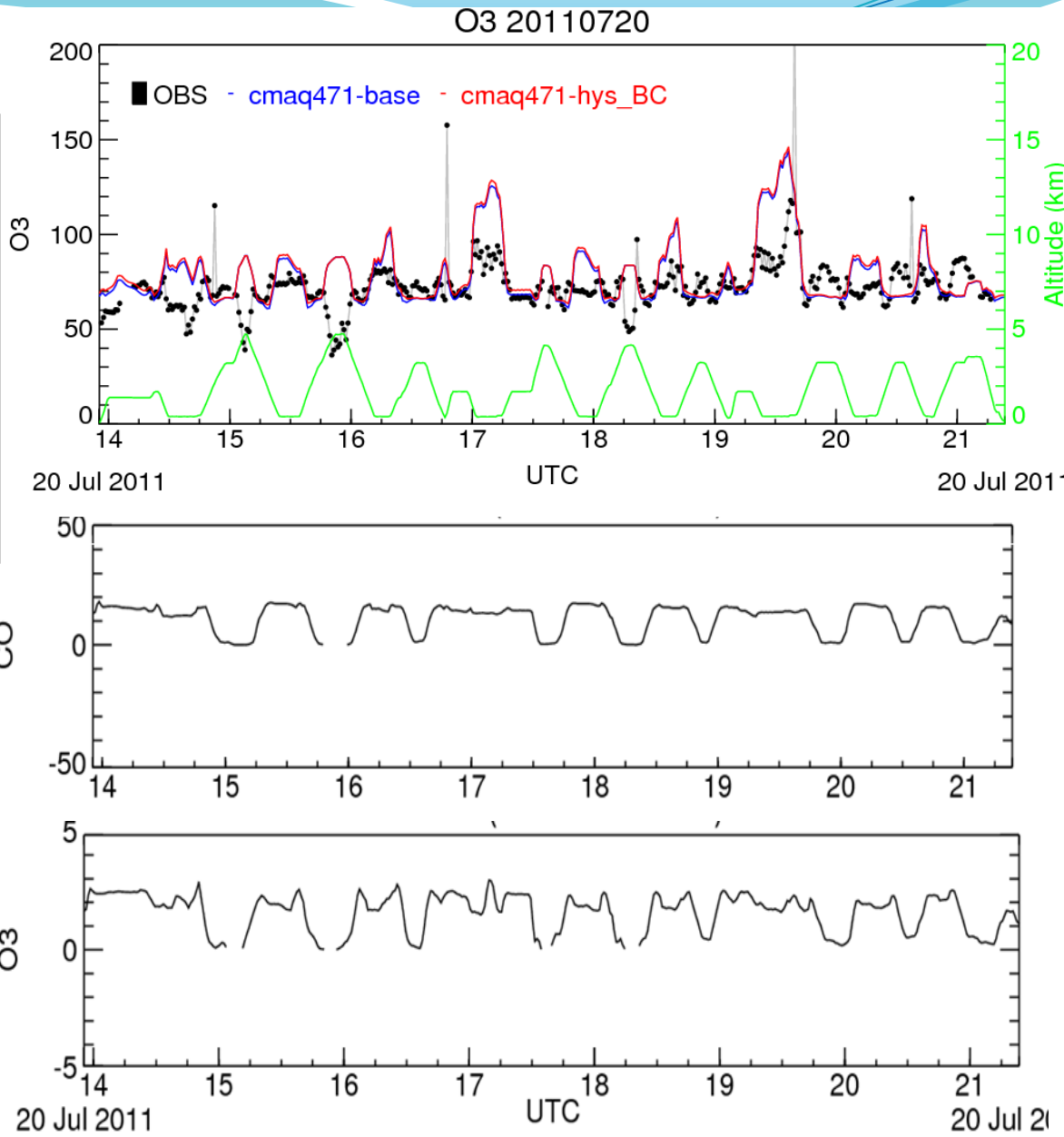






Apply ops HYSPLIT to capture exo-domain fire for 5 days starting 20110628





The pollutants emitted from wild fire can aggravate AQ conditions accumulatively

Apply ops HYSPLIT to capture exo-domain fire for 22 days starting 20110628

Summary

- **Important to account both intra- and Exo-domain wild fire Emissions:**
  - **Wide-spread in geographical areas and frequent over time**
  - **Rather good quality real time information on location of burns**
  - **Quantification of mass flux and heat are problematic**
  - **Injection heights of fire plumes seemed to be key**

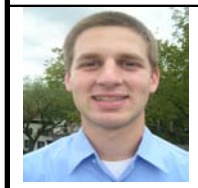
- **Utilized data from intensive measurement campaign to investigate vertical distributions of a few important fire-relevant species**

- **Tested operational feasibility of incorporating exo-domain fires to CONUS through LBC provided by Hysplit run in a parent domain**

Poster Session & Reception in Overland Room

Theme 1: Particulate Matter Forecasting Challenges and Progress	
Presenter	**Title of Poster**
 **Craig Stroud (Environment Canada)**	***Chemical Transport Model Predictions of Primary Organic Aerosol for Three Sites in Southern Ontario, Canada***
Jian Zeng (NOAA/NESDIS/STAR)	***Development of a MODIS Dust Mask Product for National Weather Service (NWS) Dust Forecast Verification***
 **Daniel Tong (ARL/NOAA)**	***CMAQ modeling of natural and anthropogenic dust aerosols in the United States***
Sapana Gupta (Central Institute of Technology, Raipur, India)	***Assessment of particulate matter present in the Atmospheric aerosol and its adverse health effects***

Theme 3: Emissions Forecasting Developments and Intermittent Sources	
Presenter	Title of Poster
 **Gregory Frost & Claire Granier* (NOAA/University of Colorado)**	***Addressing Science and Policy Needs with Community Emissions Efforts***
 **Hyun Kim (ARL/NOAA)**	***Development of IDL-based Geospatial Data Processor (IGDP) and its applications***
 **Yunsoo Choi (ARL/NOAA)**	***The uncertainty analysis of National Emission Inventory (NEI) 2005 NOx emissions over the lower middle United States by utilizing top-down approach***
Xiaoyang Zhang (ERT/NOAA)	***Near-real Time Global Biomass Burning Emissions from Multiple Geostationary Instruments and Its Application in GEOS-Chem Model***
 **Joseph Vaughan** **(Washington State University)**	***AIRPACT is Testing BlueSky Framework & SMARTFIRE for Wildfire Emissions for Air Quality Forecasting in the Pacific Northwest***
Sarah Lu (EMC/NCEP/NOAA)	***The impact of dynamic lateral boundary conditions on CONUS***
Sarah Lu (EMC/NCEP/NOAA)	***Simulations of 2010 Eyjafjallajokull eruption using NCEP and ECMWF global aerosol models***

Theme 3: Emissions Forecasting Developments and Intermittent Sources (cont'd)	
Presenter	Title of Poster
Jorba Oriol & Jose Baldasano* (Barcelona Supercomputing Center)	***Online air quality developments undertaken within the NMMB multiscale model at the Barcelona Supercomputing Center***
Theme 4: Evaluation and Post-Processing	
Presenter	**Title of Poster**
Weiqing Zhang (Environment Canada)	***Northwestern Ontario Forest Fire: July 17 to 22 2011***
Russell Dickerson (University of Maryland)	***Vertical distributions of trace gases and aerosols: Measurement-model comparisons to improve predictive capabilities***
Mike Newchurch (University of Alabama-Huntsville)	***Ground-based Ozone Lidar Network for Air-Quality Studies***
 **Chris Loughner (University of Maryland)**	***Evaluation of CMAQ boundary layer processes and air quality over the Chesapeake Bay and Maryland***
Timothy Canty (University of Maryland-College Park)	***NOx Emissions and Lifetimes: Using DISCOVER-AQ to Evaluate CMAQ NO2 Through Use of Field Observations and Satellite Retrievals***
 **Clare Flynn (U.of Maryland-College Park)**	***Correlation analysis of column and surface O3 and NO2 from CMAQ and DISCOVER-AQ observations***

Theme 4: Evaluation and Post-Processing (cont'd)	
Presenter	**Title of Poster**
 **Kenneth Pickering (NASA Goddard Space Flight Center)**	***Evaluation of CMAQ Forecasts of NO2 Column Amounts Using In-situ and Remote-Sensing Data from DISCOVER-AQ***
Linda Hembeck (University of Maryland-College Park)	***Investigation of the Community Multiscale Air Quality (CMAQ) model using the Climate Penalty Factor (CPF)***
 **Yunsoo Choi (ARL/NOAA)**	***Use of a satellite-based indicator of ozone production sensitivities to diagnose model bias***
Yunsoo Choi	***Weekly cycles of observed and modeled NOx and O3 concentrations as a function of land use type and ozone production sensitivity***
 **Fantine Ngan (ARL/NOAA)**	***Performance assessment of five years of the East Texas Air Quality Forecasting system (FTAQ)***
Jerry Gorline (MDL/NOAA)	***Performance of the National Air Quality Forecast Capability, Urban vs. Rural and Other Comparisons***
Li Pan (ARL/NOAA)	***Community Multiscale Air Quality (CMAQ) model supports North American Airborne Mercury Experiment (NAAMEX): Forecast and Post-data analysis***
George Grell (ESRL/NOAA/ University of Colorado)	***Evaluation of aerosol optical depth forecasts using the FIM-Chem (Flow-following finite volume Icosahedral Model)***

Theme 4: Evaluation and Post-Processing (cont'd)	
Presenter	Title of Poster
Andy Delcloo (Royal Meteorological Institute of Belgium)	***Evaluation of an experimental ensemble forecast system with the CTM CHIMERE, using the 50 members of the operational ECMWF EPS forecasts as NWP input***
Virginie Marecal (Météo-France CNRM/GAME)	***Retrospective evaluation of MOCAGE forecasts at Météo-France: towards higher resolution***
Joris Van Bever (Royal Meteorological Institute of Belgium)	***Evaluation of GEM-MACH15 in the free troposphere by comparison with global analyses and models***
Radenko Pavlovic	***Two years of operational air quality forecasting with GEM-MACH15: Performance Evaluation***
Stavros Antonopoulos (Environment Canada)	***Improving O3, PM2.5 and NO2 GEM-MACH15 surface fields by optimally interpolating Updatable MOS forecasts***
Qian Li & Weiqing Zhang* (Environment Canada)	***Automating the New Air Quality Health Index Forecast Verification in Canada***
 **Yulia Zaitseva (Environment Canada)**	***The Processing and Evaluation of Air Quality Data at the Canadian Meteorological Center***

Theme 5: Data Assimilation	
Presenter	**Title of Poster**
Kyle Hosley (University of Maryland)	***Temporal Evolution of the Climate Penalty Factor***
Qiang Zhao (IMSG/NOAA)	***Assimilating Satellite Derived Aerosol Optical Depth Products to Improve PM2.5 Predictions with Community Multiscale Air Quality Model (CMAQ)***
Mariusz Pagowski (NOAA/NCEP/EMC)	***Assimilation of Surface PM2.5 Observations using GSI within NAQFC: Initial Results for Summer 2011***

Poster-Session in Overland Room, Check-in Building

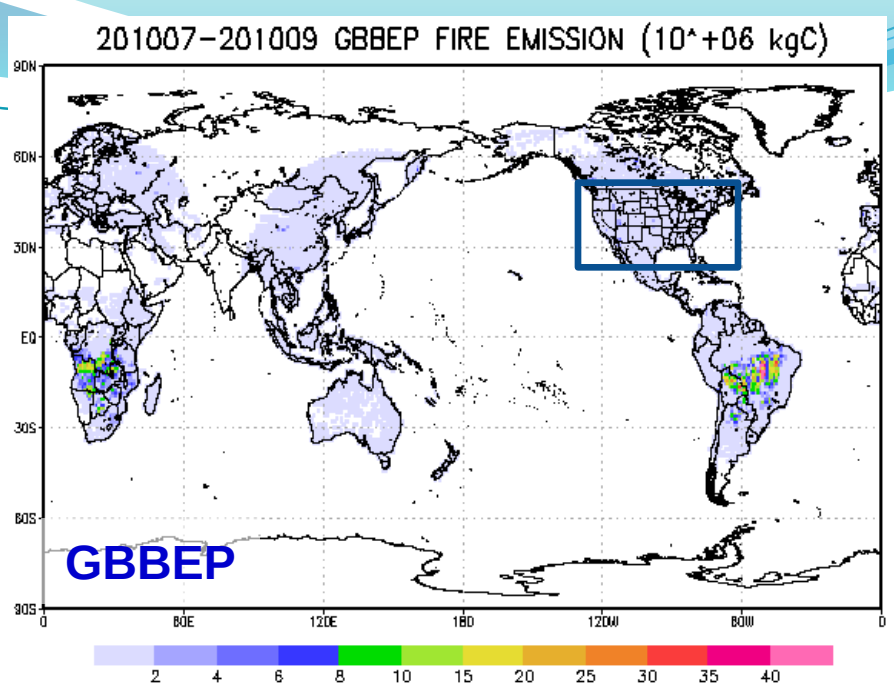
Backup slides

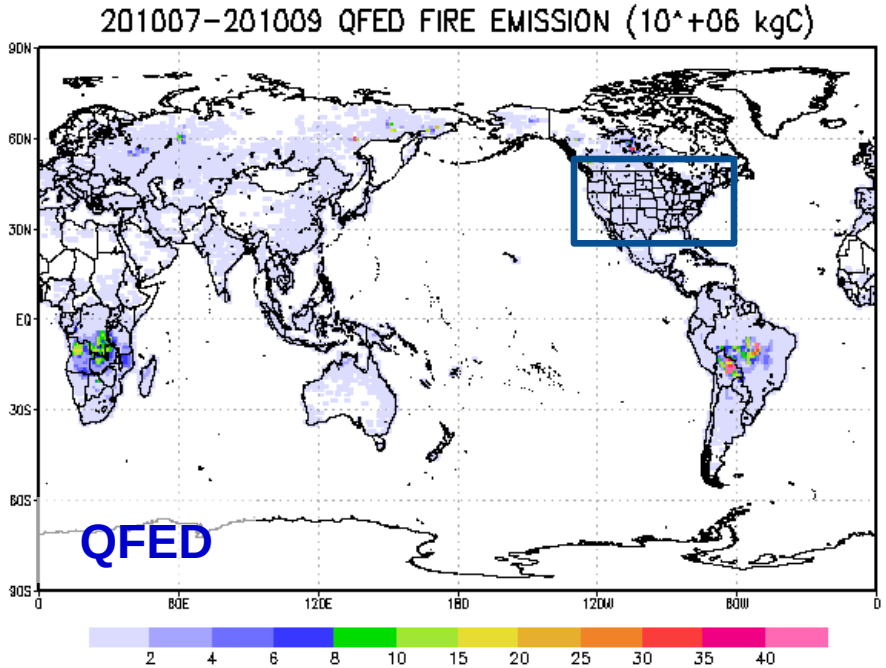
Total Carbon Emissions for GBBEP & QFED (JUL-SEP 2010)

QFED and GBBEP produced similar spatial patterns and monthly variation in total carbon (black + organic carbons) emissions. During the simulated period, both the South America and the Africa had frequent fire activities.

In general, QFED has smaller area of detected fires but with stronger carbon emissions while GBBEP has larger area of detected fires with weaker carbon emissions.

There is a limited spatial coverage for geostationary satellites at high latitudes. Thus, QFED detected more fires in the Russia, the Siberia, and the Canadian Boreal forest.





Hourly flux at 1°x1°