CONTRAST DATA MANAGEMENT

Steve Williams and Scot Loehrer

NCAR Earth Observing Laboratory (EOL)

Computing, Data, and Software Facility (CDS)

Boulder, Colorado

CONTRAST Science Team Meeting

Boulder, CO

21-23 October 2013

EOL support sponsored by NSF

EOL DATA SERVICES

- Data Questionnaire
- Data Management Plan Documents (e.g. policy/protocol)
- Real-time Data Ingest/Display (e.g. Ops Center)
- Field Operations Catalog and GIS (e.g. Mapserver, GE)
- Data Tracking, Processing, and Quality Assurance
- Interactive Data Archive and Distribution (EMDAC)
- Web Services
- Special Media Products/Services (including Mail lists)
- Long-term Archive and Data Stewardship

CDS

EARTH OBSERVING LABORATORY

Development Deployment Data Services Discovery

Project Data Management Considerations

- Develop Data Management Plan
- Data Types
- Data Formats and Documentation
- Data Collection
- Real-time Data Requirements
- Data Quality Control
- Data Archival
- Data Distribution
- Coordination with other Programs

DC3 Data Management Web Site at NCAR/EOL

What's New?

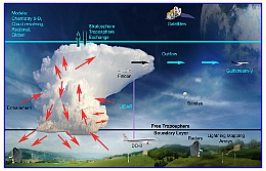
DC3 Science Team Meeting (Feb. 25-28, 2013 in Boulder, CO) Information

Aircraft Data Submission to NASA/LaRC server available 10AM EST 7 Jan 2013.
National Weather Service High Resolution Radiosonde Data Set
NEXRAD Radar with GV and DC8 Flight Track Movies
DC3 Data Policy - *Final*

Project Description

The Deep Convective Clouds and Chemistry Project (DC3) field campaign investigated the impact of deep, midlatitude continental convective clouds, including their dynamical, physical, and lightning processes, on upper tropospheric (UT) composition and chemistry.

The DC3 field campaign made use of extensively instrumented aircraft platforms and ground-based observations. The NSF/NCAR Gulfstream-V (GV) aircraft was the primary platform to study the high altitude outflow of the storms, and was instrumented to measure a variety of gas-phase species, radiation, and cloud particle characteristics. In addition, the DLR Falcon 20 supported the GV with measurements of trace species in the fresh anvil outflow.



(Click Image for Full Resolution)

The GV and Falcon were also documenting the downwind chemical evolution of the convective plume. The NASA DC-8 aircraft complemented the GV and Falcon with in situ observations to characterize the convective storm inflow and provided remote sensing to aid in flight planning and column characterization. Ground-based radar networks were used to depict the physical and kinematic characteristics of the storm and provided input to the aircraft operations. The impact of lightning on outflow composition was constrained through detailed measurements from lightning mapping arrays. The forecasting and analysis was improved through other observations such as radiosondes.

The observations were conducted in three locations: 1) northeastern Colorado, 2) west Texas to central Oklahoma, and 3) northern Alabama in order to gather data on different types of storms and with different boundary layer compositions as well as to ensure sampling of convection during the time period of the field campaign. The types of storms sampled were air mass, multicell, and supercell convection

Data Access

DC3 Data Archive *(under development)*

Dataset Documentation Guidelines
Data Submission Instructions
DC3 Data Policy - *Final*

Aircraft Only: Data Policy, Documentation Guidelines & Submission Instructions- *Final*
NSF/NCAR GV Documentation Summary

DC3 2012 Field Catalog
DC3 2011 Field Catalog - Dry Run

Publications

DC3 Publications

Documents

DC3 Operations Plan - Updated 28 April 2012

DC3 Scientific Project Overview
DC3 Experiment Design Overview
NCAR Risk Assessment for DC3
AEROS Documentation
AEROS Configuration File

(Click for Full Resolution)

Meetings

DC3 Meetings

ReadyTalk "how to" Instructions

Participants and Mailing Lists

- Project Description
- Data Access & Field Catalog
- Publications
- Documentation
- Meetings and Presentations
- Mailing Lists
- Education and Outreach
- Related Web Pages
- PI and Contact Information

http://www.eol.ucar.edu/projects/dc3/

TYPICAL DATA POLICY SUMMARY

- **All investigators must agree to promptly submit their data to the archive**
- **All data shall be provided to other Project Investigators upon request**
- **During the initial 1-year data analysis period, data may be provided to a third party only with the permission of the investigator(s) who collected the data**
- **All data will be considered public domain not more than 1-year following the end of the field phase**
- **Any use of the data will, at a minimum, include acknowledgment. Co-authorship TBD with the investigator(s) who collected the data**

DC3 DATA POLICY

DC3 Data Policy - Final

1. All investigators participating in DC3 agree to submit their preliminary data to either the DC3 Data Archive Center (DDAC) for ground-based data or to the Atmospheric Science Data Center at NASA Langley Research Center (LaRC ASDC) for airborne data (the data archived at LaRC ASDC are copied to the DDAC) at the latest by the end of the six-month period from the end of the field campaign (30 June 2012) to facilitate inter-comparison of results, quality control checks and inter-calibrations, as well as an integrated interpretation of the combined data set. Airborne instrument investigators are referred to the **Airborne Data Management Guidelines** for details about data submission. **The preliminary data submission period is from 1 July 2012 to 20 January 2013.**

2. DC3 Science Team members agree to submit their final data by the end of the one-year period from the end of the field campaign to either the DDAC for ground-based data or to the Atmospheric Science Data Center at NASA Langley Research Center (LaRC ASDC) for airborne data (the data archived at LaRC ASDC are copied to the DDAC). **The final data submission period is from 1 July 2012 to 30 June 2013.**

3. During the initial data analysis period, defined as the period from when the data are submitted to one year after the end of the DC3 Field Experiment, DC3 Science Team members will have exclusive access to these data. This initial analysis period is designed to provide an opportunity to quality control the combined data set as well as to provide the investigators ample time for initial analysis and preparation of publications. **The DC3 initial data analysis period is from 1 July 2012 to 30 June 2013.**

4. **All data will be considered public domain one year after the end of the field experiment (i.e., on 1 July 2013).** An individual data set within the DC3 archive can be shared with the investigator's colleagues at the discretion of the PI responsible for the requested data.

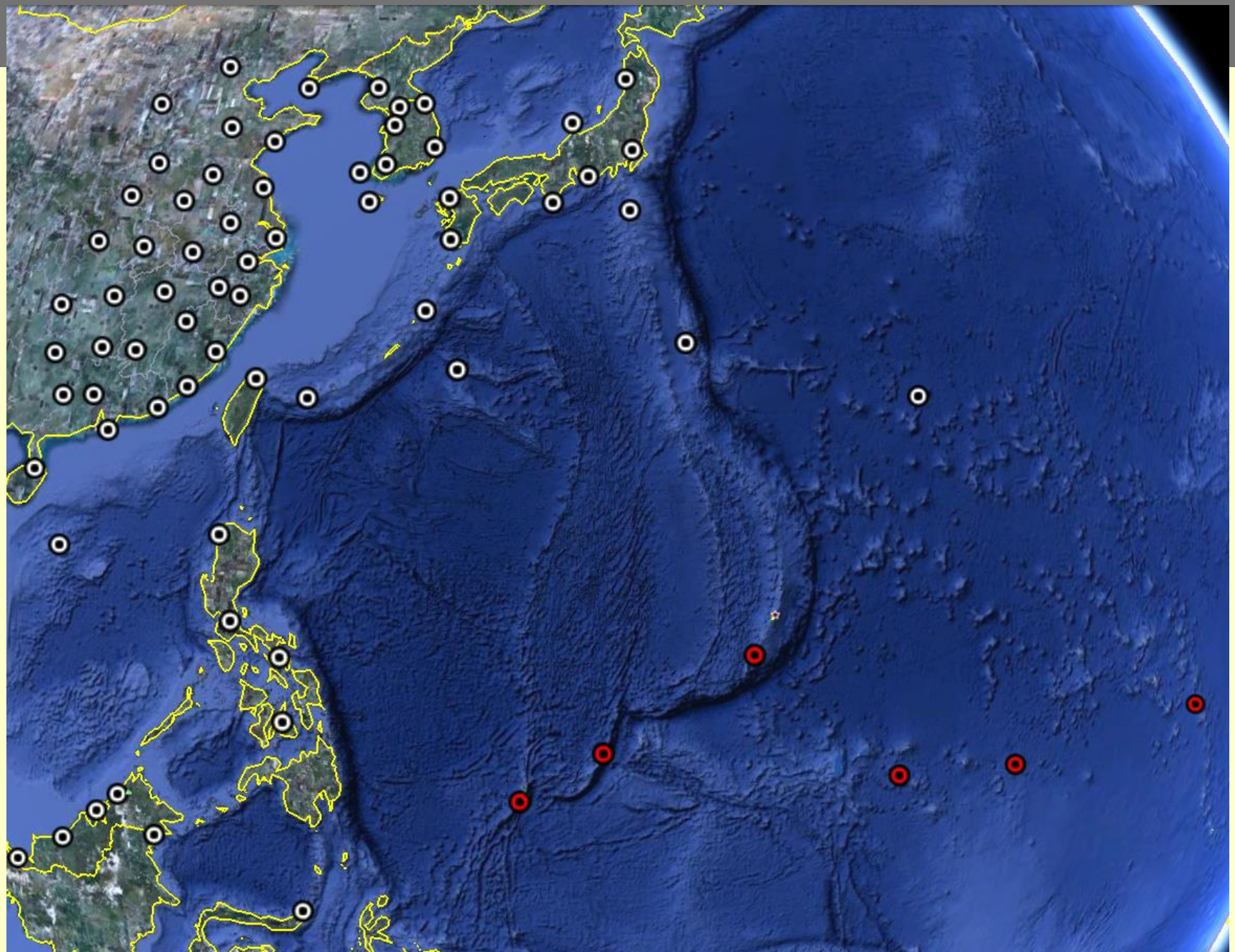
5. Prior to the data submission deadline and during the initial analysis period, all data shall be promptly provided to other DC3 Science Team members upon request. All DC3 Science Team members will have equal access to all data. A list of DC3 Science Team members will be maintained by NCAR/EOL and will include the DC3 Individual Investigators directly participating in the field experiment as well as collaborating scientists who have provided guidance in the planning and analysis of DC3 data.

6. During the initial data analysis period, the investigator(s) who collected the data must be notified first of the intent to use their data, in particular if data are to be provided to a third party (e.g., journal articles, presentations, research proposals, other investigators). It is strongly encouraged that Individual Investigators responsible for acquisition of data be invited to become co-authors and collaborators on any projects, publications and presentations. Significant use of an Individual Investigator's data warrants co-authorship on the publication for the investigator responsible for generating the data product. Any use of other investigator's data should include an acknowledgment and a citation.

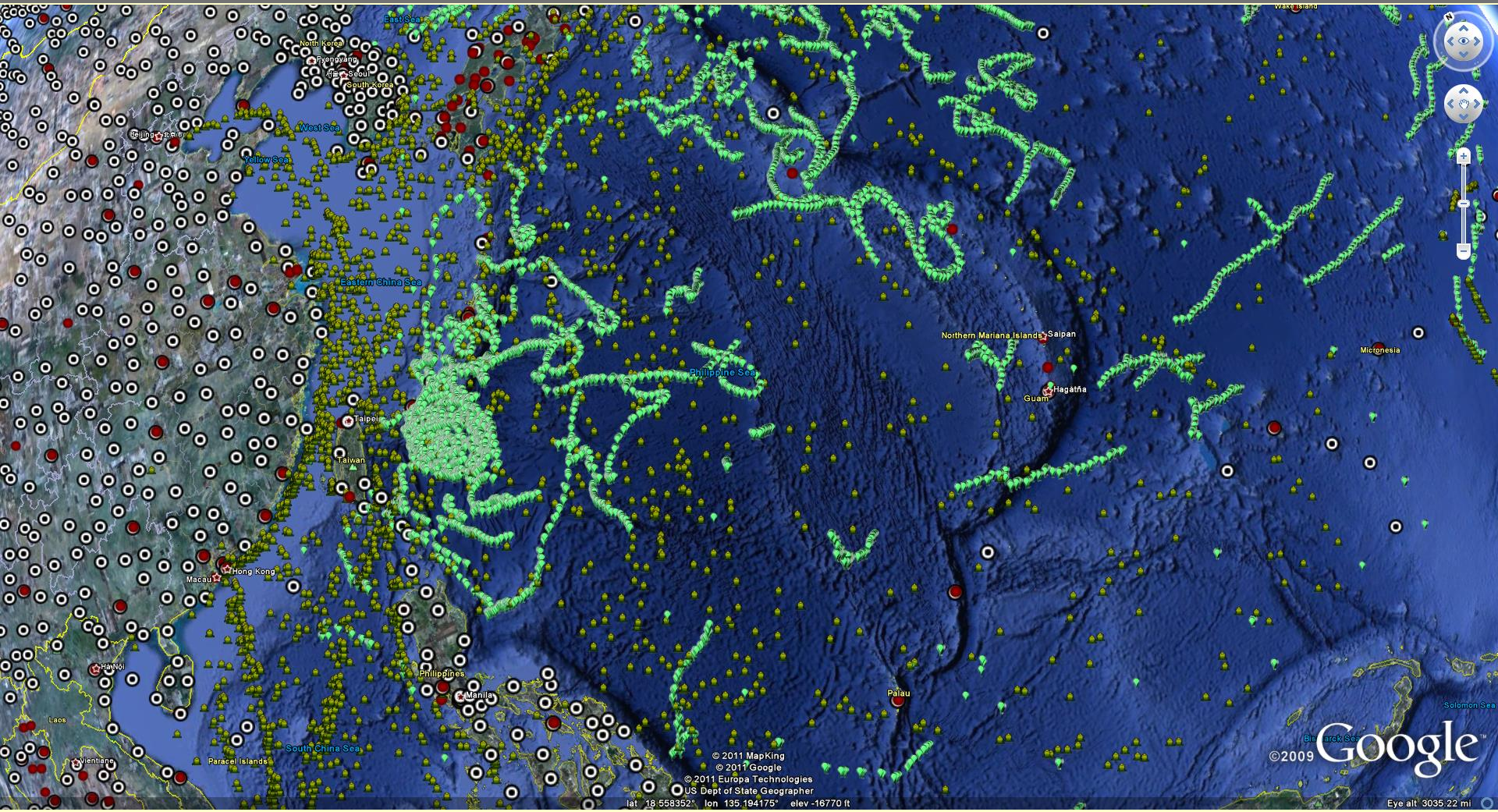
7. The following acknowledgement is suggested: The Deep Convective Clouds & Chemistry Experiment (DC3) is sponsored by the US National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the Deutsches Zentrum fur Luft- und Raumfahrt (DLR). This investigation was supported by *XXXX* [funding agency, grant number]. The following people are kindly acknowledged for their help with this study. [names, institutions] for providing *YYYY* data product.

Event	Deadline
End of Field Campaign	30 June 2012
Preliminary Data Submission Deadline	20 January 2013
Final Data Submission Deadline	1 July 2013
Initial Data Analysis Period (DC3 Science Team members have exclusive access to the data during this period.)	1 July 2012 - 30 June 2013
Data becomes Public Domain	1 July 2013

GTS (white) and High-Res (red) Radiosonde



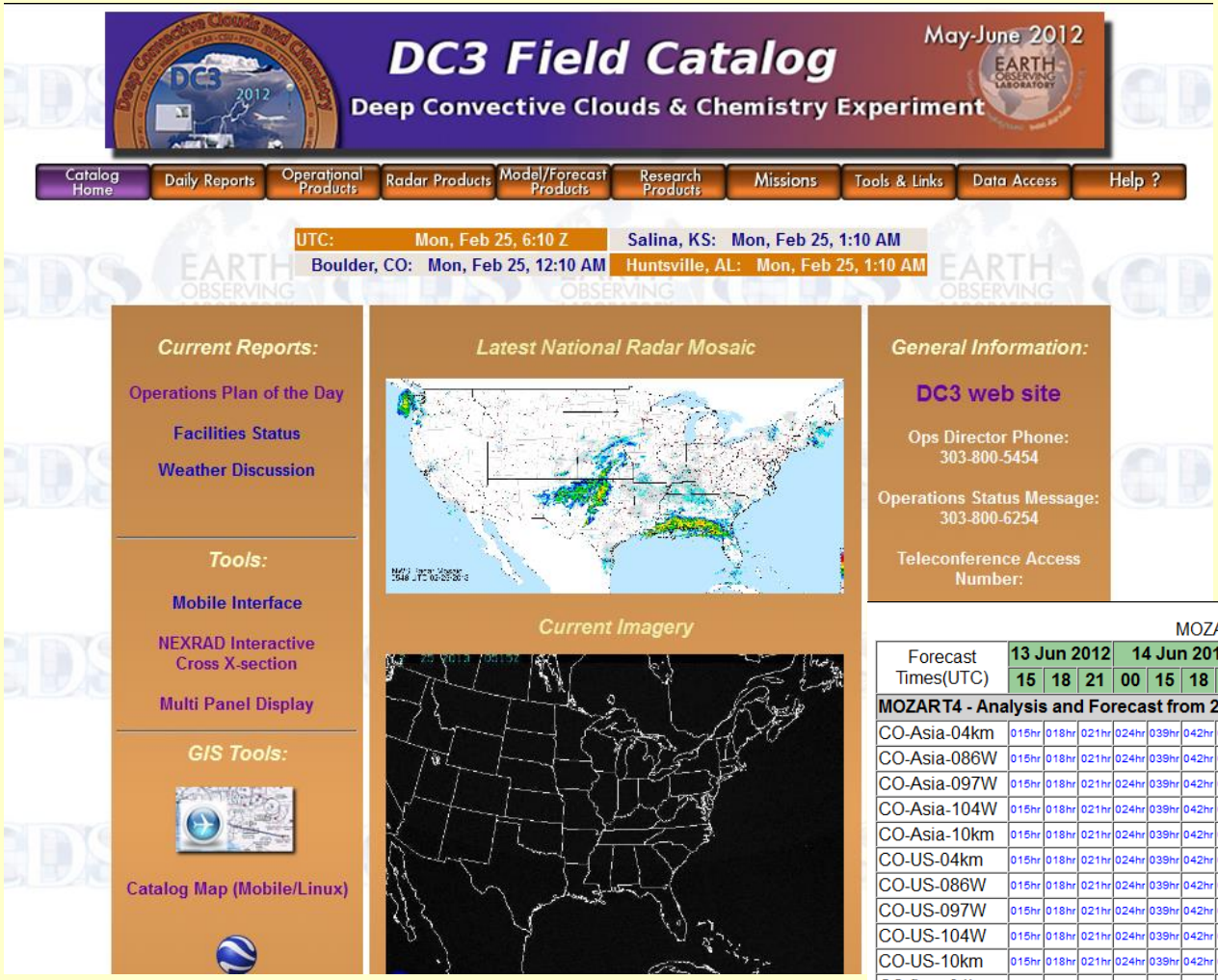
GTS METAR/SYNOP and Ship/Drifter Locations



- Buoy/Drifter
- Voluntary Observing Ships
- SYNOP
- METAR

VOS and Buoy/Drifter locations from October 2010.

DC3 Field Catalog



- Daily Reports
- Operational Products
- Model Products
- Research Products
- Mission Summary Table
- Catalog Earth GIS Tool

MOZART4 Chemistry Forecast products

Forecast Times(UTC)	13 Jun 2012			14 Jun 2012				15 Jun 2012				16 Jun 2012				17 Jun 2012		Forecast Times(UTC)
	15	18	21	00	15	18	21	00	15	18	21	00	15	18	21	00		
MOZART4 - Analysis and Forecast from 2012/06/13 00:00 UTC																		
CO-Asia-04km	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-Asia-04km
CO-Asia-086W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-Asia-086W
CO-Asia-097W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-Asia-097W
CO-Asia-104W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-Asia-104W
CO-Asia-10km	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-Asia-10km
CO-US-04km	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-US-04km
CO-US-086W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-US-086W
CO-US-097W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-US-097W
CO-US-104W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-US-104W
CO-US-10km	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-US-10km
CO-fires-04km	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-fires-04km
CO-fires-086W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-fires-086W
CO-fires-097W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-fires-097W
CO-fires-104W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-fires-104W
CO-fires-10km	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		CO-fires-10km
Isop-086W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		Isop-086W
Isop-097W	015hr	018hr	021hr	024hr	039hr	042hr	045hr	048hr	063hr	066hr	069hr	072hr	087hr	090hr	093hr	096hr		Isop-097W

http://catalog.eol.ucar.edu/dc3/

DC3 Field Catalog Statistics

- Reports/Summaries (Status, Mission, and Operations)

  1,032 documents and 2,571 image files (3.8 GB)

- Research Platform Products (Aircraft, Surface, Lidar, Upper Air)

  4,029,382 product files (180 .0 GB)

- Operational Products (Satellite, Surface, Radar, Upper Air)

  2,007,315 product files (491.0 GB)

- Model Output Imagery (Analysis and Forecast Fields)

  2,344,857 product files (271.0 GB)

- Google Earth and Map Products

  146,100 product files (132.9 GB)

- TOTALS: 8,528,686 Files (1,078.7 GB)

http://catalog.eol.ucar.edu/dc3/

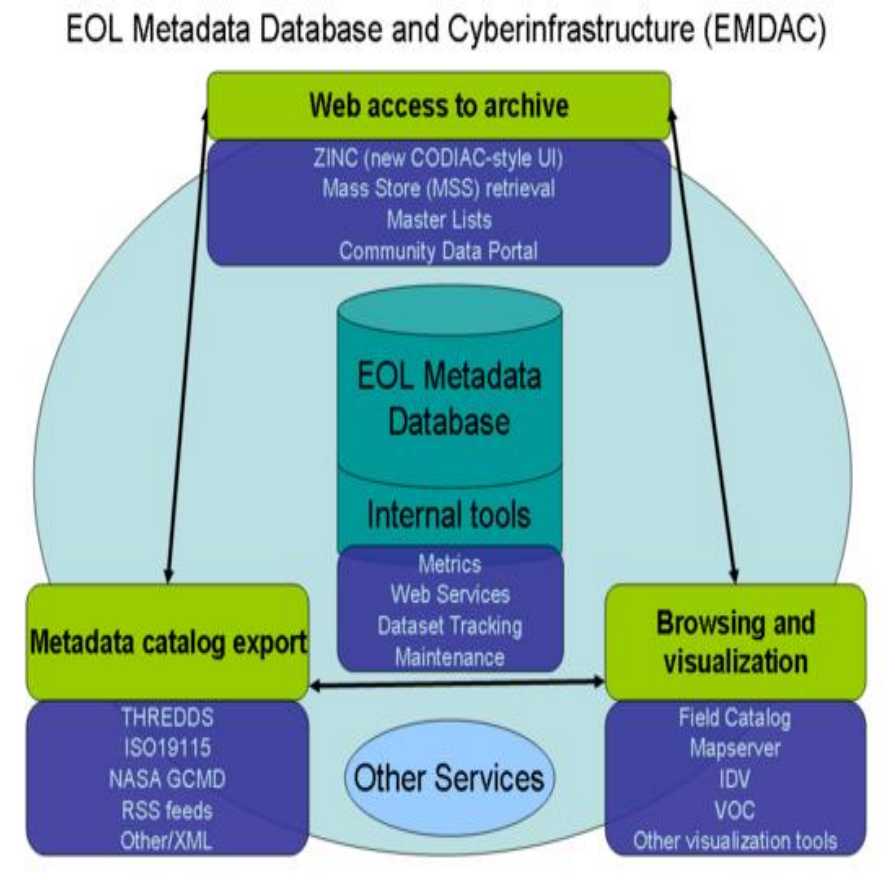
FTP site for “preliminary” or “field data”

- Active during the field campaign
- Password-protected to limit access to participants only
- Self-organized (planning required)
- Data removed after campaign ends
- Site deactivated after the campaign

Final archive at EOL

- After the campaign, this link is redirected to the archive pages for CONTRAST
- Datasets to be uploaded after the campaign ends do not use field FTP site
- See instructions for Dataset submission at href://www.eol.ucar.edu/projects/contrast

EOL DATA MANAGEMENT



EOL Data System (EMDAC)

Primary means for all project scientists and researchers to browse and retrieve data from any EOL-supported projects

Features:

- **Long-term field project data archival and distribution**
- **Interactive data browsing, subsetting, and format translation**
- **Web-based access**
- **Value-added datasets**
- **Data documentation**

DC3 Data Archive (Master List)

DATA BY CATEGORY

- Accompanying Archives
- Aircraft
- Ancillary
- Hydrology
- Land Based
- Lightning
- Model
- Photography
- Radar
- Satellite
- Upper Air

DATA BY SITE

- Alabama Region
- Colorado Region
- Oklahoma Region

Back to DC3

Email comments & questions

DC3 Data Sets

Data Set Name (Responsible Group/PIs shown in parentheses)	Date Posted	Info
Accompanying Archives		
NASA Langley DC3 Merged Aircraft Dataset Archive [Chen, Gao (NASA-LaRC)]	2012-08-02	README
Aircraft		
Aircraft Meteorological Data Reports (AMDAR) and Aircraft Communications Addressing and Reporting System (ACARS) Data [(ESRL-GSD)]	2012-07-24	README
Aviation Weather Center Convective, Icing, and Turbulence SIGMET Imagery [(NCAR-EOL)]	New 2013-01-07	
Aviation Weather Center Pilot Reports of Icing and Turbulence (PIREPs) Imagery [(NCAR-EOL)]	New 2013-01-07	
DC3 Field Catalog Earth Tool (Replay) [(NCAR-EOL)]	New 2013-01-07	
NASA Langley DC3 Merged Aircraft Dataset Archive [Chen, Gao (NASA-LaRC)]	2012-08-02	README
NOAA NWS Aviation Weather Center Aviation Digital Data Service (ADDS) [(NOAA-NWS-ADDS)]	New 2013-01-17	README
Aircraft: DLR Falcon		
DC3 Mission Summaries [(NCAR-EOL)]	2012-10-23	

http://data.eol.ucar.edu/master_list/?project=DC3

DC3 ARCHIVE DATA DOCUMENTATION

Data Set Documentation ("Readme") Guidelines

The documentation (i.e., the "Readme" file) that accompanies each project data set is as important as the data itself. This information permits collaborators and other analysts to understand any limitations or special characteristics of the data that may impact its use. Data set documentation should accompany all data set submissions, including both preliminary and final. The following outline and content is recommended and should be adhered to as closely as possible to make the documentation consistent across all data sets.

Data set Documentation/Readme Outline:

Title: This should match the data set name

Author(s):

Name(s) of PI and all co-PIs
Complete mailing address, telephone/facsimile numbers,
E-mail address of PIs, and web address (if applicable)
Similar contact information for data questions (if different than above)

1.0 Data Set Overview:

Introduction or abstract
Time period covered by the data
Physical location (including lat/lon/elev) of the measurement or platform
Data source if applicable (e.g., for operational data include agency)
Any web address references (i.e., additional documentation such as Project web site)

2.0 Instrument Description:

Brief text (i.e., 1-2 paragraphs) describing the instrument with references
Figures (or links), if applicable
Table of specifications (i.e., accuracy, precision, frequency, resolution, etc.)

3.0 Data Collection and Processing:

Description of data collection
Description of derived parameters and processing techniques used
Description of quality assurance and control procedures
Data intercomparisons, if applicable

4.0 Data Format:

Data file structure and file naming conventions (e.g., column delimited ASCII, NetCDF, GIF, JPEG, etc.)
Data format and layout (i.e., description of header/data records, sample records)
List of parameters with units, sampling intervals, frequency, range
Data version number and date
Description of flags, codes used in the data, and definitions (i.e., good, questionable, missing, estimated, etc.)

5.0 Data Remarks:

PI's assessment of the data (i.e., disclaimers, instrument problems, quality issues, etc.)
Missing data periods
Software compatibility (i.e., list of existing software to view/manipulate the data)

6.0 References:

List of documents cited in this data set description. Please provide links for any publications, if available

DC3 DATA SUBMISSION

DC3 Data Submission Instructions

The DC3 Data Archive contains a master list of all DC3 international data sets (with links) and has been compiled to provide easy access to all DC3 data sets (both operational and research). Data sets are grouped by platform and sorted by data type (*i.e.,* aerosol, cloud properties, radar, satellite, *etc.*). This list will be updated frequently and is linked in the Data Access section of the **DC3 Project Page**. It is available directly at **DC3 Data Archive**. Please e-mail all corrections, additions, or deletions to the DC3 Data Archive list directly to **Steve Williams**.

If you already have your data sets available on-line, please provide the web link or FTP access information to NCAR Earth Observing Laboratory (EOL). Once your data set (with metadata) is available, a link will be provided from the DC3 Data Archive along with a submission date to track future data set upgrades or revisions (if needed).

Please submit both your data set(s) and accompanying metadata or documentation files to the DC3 Data Archive. Data set documentation guidelines are available by direct link **here**. NCAR EOL has established an anonymous FTP to accept your DC3 data set(s). **To FTP data to the NCAR EOL DC3 anonymous FTP, please use the following instructions:**

FTP: ftp.eol.ucar.edu
Login: anonymous *(No password required.)*
cd /pub/data/incoming/dc3

Once you have FTPed your data set to NCAR EOL, **it is very important to send an e-mail to sfw at ucar.edu** indicating that the data file(s) have been FTPed, along with the file(s) names, data contact information, any data restrictions, and appropriate file documentation (*i.e.,* data formats, descriptions, acknowledgments, and metadata). Documentation files may be e-mailed to sfw at ucar.edu directly if preferred. **If password protection is required for these data, please indicate this at the time of submission.** You will receive a unique "user ID" and "password" that can be changed at any time upon request. For users without direct Internet access, or if your data set(s) are too large to FTP, you may send digital file(s) on magnetic or optical media (with documentation) by conventional mail to the EOL shipping address below.

Thank you very much for your assistance in providing final data to the DC3 archive. Feel free to contact us should you encounter any problems or have any questions.

Steve Williams
DC3 Data Manager

DC3 PROJECT PUBLICATIONS LIBRARY

DC3 Publications

How to Submit Publication References to this List

Publications | Conferences | Reports | Theses | Other Citation Links

Publications

A-D | E-H | I-L | M-P | Q-T | U-Z | *Back to Top*

Conference Proceedings

A-D | E-H | I-L | M-P | Q-T | U-Z | *Back to Top*

- Arkinson, Heather, T. Hanisco, M. Cazorla, A. Fried, J. Walega, 2012: In Situ Airborne Measurement of Formaldehyde with a New Laser Induced Fluorescence Instrument. Poster. AGU 2012 Meeting, San Francisco, California, U.S.A., A21H-0154.
- Barth, Mary C., M. Bela, K. Cummings, K. Pickering, T. Lyons, M. Weisman, K. Manning, G. Romine, W. Wang, F. Flocke, A. Weinheimer, T. Campos, T. Ryerson, G. Diskin, G. Sachse, 2012: Tracer and Chemistry Modeling of Thunderstorms for the DC3 Field Experiment. Poster. AGU 2012 Meeting, San Francisco, California, U.S.A., A21H-0152.
- Brock, Charles A., B. Anderson, L. Ziemba, K. Thornhill, R. Moore, A. Beyersdorf, E. Winstead, S. Crumeyrolle, N. Wagner, J. Langridge, M. Richardson, D. Lack, D. Law, T. Shingler, A. Sorooshian, 2012: Continuous Measurement of Particle Hygroscopicity as a Function of Diameter. Poster. AGU 2012 Meeting, San Francisco, California, U.S.A., A11A-0016.
- Bruning, Eric, R. Thomas (2012), Fractal-based lightning channel length estimation from convex hulls of VHF sources, Abstract AE12A-03 presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Campuzano Jost, Pedro, D. Day, B. Palm, A. Ortega, P. Hayes, J. Jimenez, 2012: Submicron Aerosol Transport and Aging by Convective Storms During the DC3 Campaign. Poster. AGU 2012 Meeting, San Francisco, California, U.S.A., A21H-0155.
- DiGangi, Joshua, A. O'Brien, M. Diao, C. Hamm, Q. Zhang, S. Beaton, M. Zondlo, 2012: Calibration and Field Deployment of the NSF G-V VCSEL Hygrometer. Poster. AGU 2012 Meeting, San Francisco, California, U.S.A., A31E-0078.
- Hall, Samuel, K. Ullmann, S. Schmidt, B. Kindel, J. Hair, 2012: Actinic flux measurements and photolysis frequencies enhancements near clouds during DC3 and TORERO. Poster. AGU 2012 Meeting, San Francisco, California, U.S.A., A51E-0116.

DC3 and SEAC4RS Joint Science Teams Meeting

February 21-23, 2012
Center Green Auditorium, NCAR, Boulder, Colorado

List of Attendees (Updated 17 Feb 2012)

Tuesday, February 21, 2012

7:30	**Registration begins**
	Introduction (Main Auditorium) **ReadyTalk 4978380**
8:30	Welcome (M. Barth, W. Randel, A. Pszenny, H. Maring)
9:00	Overview of the DC3 Science Plan & Experimental Design (M. Barth)
9:40	Forecasting Plans [PPS] [Movie A] [Movie B] (M. Weisman)

10:00 Break

Ground Facilities (Main Auditorium) ReadyTalk 4978380

10:30	Colorado (S. Rutledge)
10:45	Alabama [PPS] (L. Carey)
11:00	Oklahoma (D. MacGorman)

Aircraft Facilities (Main Auditorium) ReadyTalk 4978380

11:15	GV payload and flight patterns (C. Cantrell)
11:30	DC-8 payload and flight patterns (W. Brune)
11:45	Falcon payload and flight patterns (H. Huntrieser)

12:00 Lunch

General Operations (Main Auditorium) ReadyTalk 4978380

13:00	Operations Base (J. Moore)
13:30	Communications among Facilities (V. Salazar)

…. Finally, please provide a copy of your PPT presentation for Workshop Documentation.

A PDF copy of your presentation (not the PPT file) will be posted on the CONTRAST web pages

EARTH OBSERVING LABORATORY
Development Deployment Data Services Discovery

"We back up our data on sticky notes because sticky notes never crash."

THANK YOU!

ANY QUESTIONS?

Contact: Steve Williams (sfw@ucar.edu)