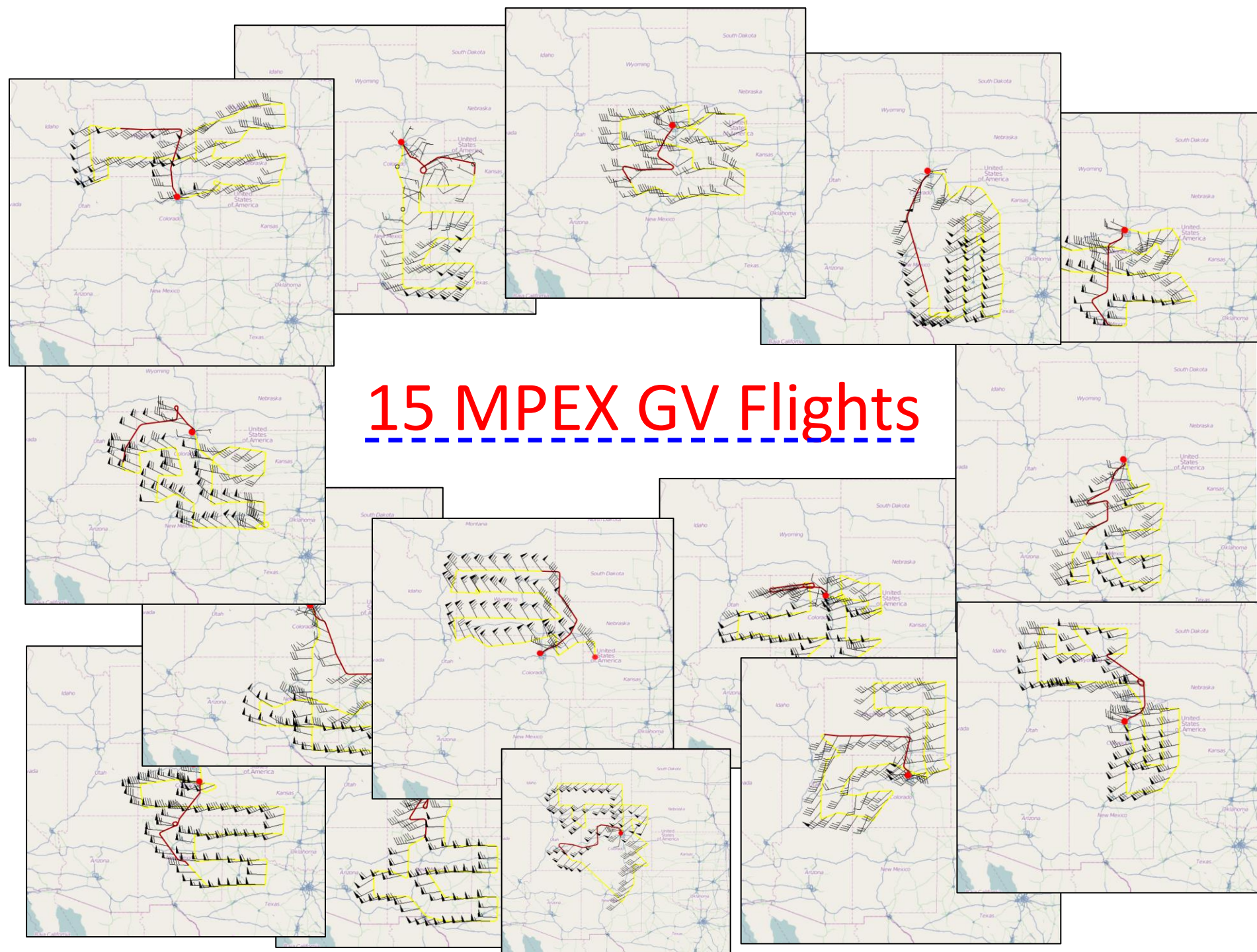


## Mesoscale Predictability Experiment:

NCAR-NSF  
NOAA-GSD-NSSL  
SUNY Albany  
Purdue  
Univ. Wisconsin-Milwaukee  
Colorado State University



# 15 MPEX GV Flights



# MTP in MPEX

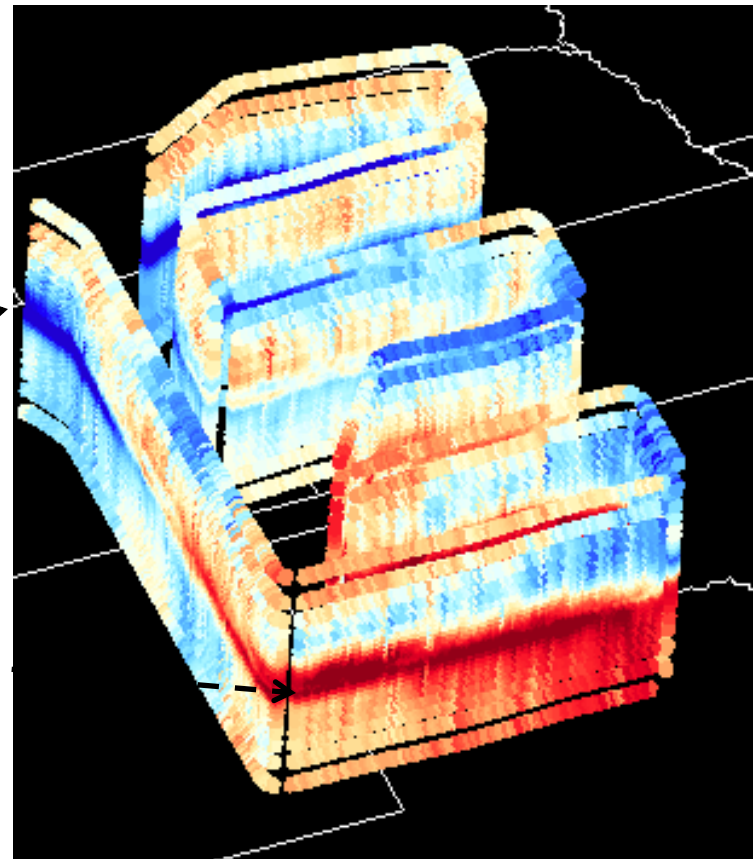
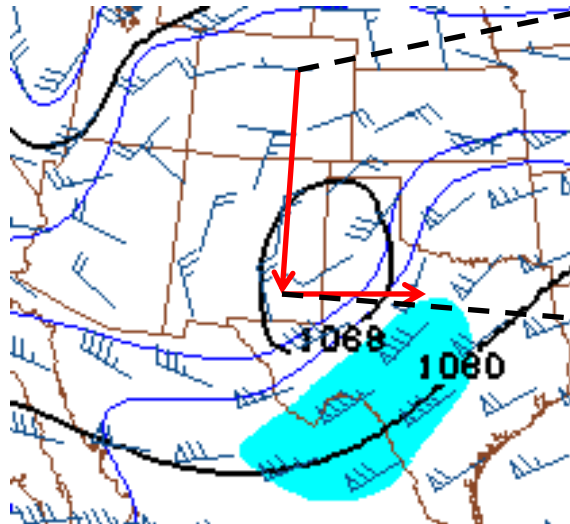
(Mesoscale Predictability Experiment)

- NSF/NCAR GV at 41 kft
- Centered on 12 UTC
- Examining upstream precursors to convection and upscale effects of organized convection

May 15, 2013

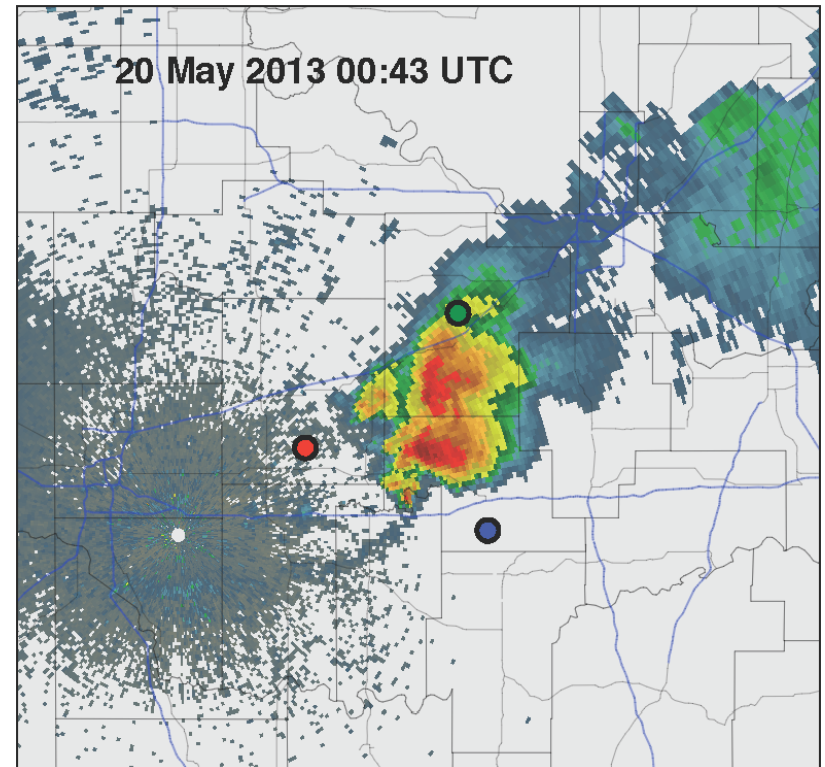
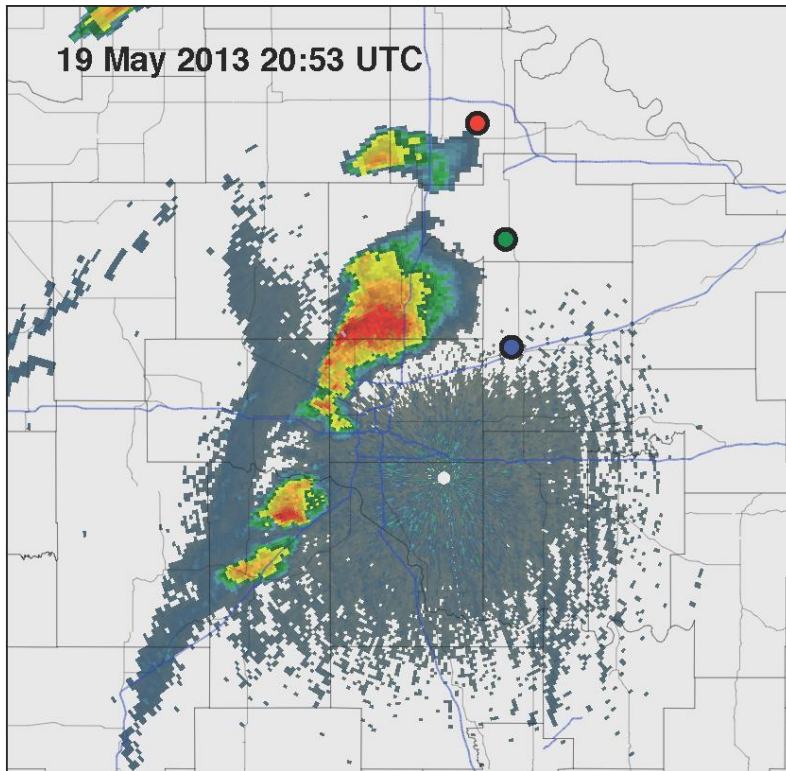
Flight through cut-off low

Temperature deviations from flight average



# 18 Mobile Sounding Deployments

Example deployment: 5/19



# Oklahoma Tornadoes 2013



El Reno, Oklahoma  
May 31, 2013

Moore, Oklahoma  
May 20, 2013



# MPEX Hypotheses:

**Hypothesis 1:** Enhanced synoptic and sub-synoptic scale observations and their assimilation into convection-permitting models over the intermountain region during the early morning will significantly improve the forecast of the timing and location of convective initiation as well as convective morphology and evolution during the afternoon and evening to the lee of the mountains and over the High Plains.

**Hypothesis 2:** Enhanced sub-synoptic scale observations in the late afternoon, over regions where the atmosphere has been/is being convectively disturbed, will significantly improve the 6-24 hr forecast of convection evolution and perhaps initiation in downstream regions. Enhanced observations of convective storm-environmental feedbacks will correspondingly improve the synoptic-scale forecast.

\*Can these be addressed with the data that was collected?

\*What other research opportunities are available?

**AGENDA**  
**MPEX Workshop : Nov. 19,20 2013**  
**(NCAR: FL1 EOL Atrium)**

**Tuesday Nov. 19:**

**8:15 AM: Bagels, cream cheese, fruit, etc.**

**8:30 AM:**

Morris Weisman: Intro and Dropsonde Cases Overview (52.5 min)

Jeff Trapp: Upsonde Cases Overview/Purdue Research Plans (37.5 min)

**10:00 AM Coffee Break**

**10:30 AM:**

Russ Schumacher: "CSU's MPEX research plans" (20 min)

Dave Stensrud: "Ability of models to reproduce upscale feedback from deep convection" (20 min)

Mike Coniglio: "Impact of MPEX Upsonde Data Assimilation on Short-Term Forecasts of Convection" (20 min)

Kate Young: "Dropsonde Processing and Access" (20 min)

Julie Haggerty, Dave Ahijevych, Chris Davis: "MTP Observations during MPEX" (30 min)

**12:20 PM Lunch**

**1:30 PM:**

Tom Galarneau: "MPEX Analyses with Dropsondes" (20 min)

Craig Schwartz and Kevin Manning: "Model Forecast Verification during MPEX" (30 min)

Glen Romine: "Impact of dropsonde observations on predictability of severe convection" (20 min)

Ryan Torn: "Application of Ensemble Sensitivity Analysis to Convective Predictability and Dynamics" (20 min)

**3:10 PM Coffee Break**

**3:40 PM PI Presentations (cont.)**

John Brown and David Dowell: "Example of MPEX dropwindsonde observation impact on HRRR forecasts" (20 min)

Lance Bosart: "The eastern Pacific cutoff cyclone: It's subsequent passage across the Rockies and High Plains and its role in the severe weather of 12-13 June" (10 min.)

Stan Trier: "Assessing Convective Inhibition with MPEX Soundings" (10 min.)

Steve Williams and Greg Stossmeister: "Data Management Update/Field Catalogue" (30 min)

Discussion: Is data suitably accessible? Do we have sufficient analysis tools?

**5:10 PM** End for the day

**6:20 PM Dinner: Agave Mexico Bistro** (2845 28<sup>th</sup> St.)





## Mesoscale Predictability Experiment (MPEX)

May 15, 2013 to June 15, 2013 **Project Location:**

From Nevada eastward to the Mississippi River, and South Dakota/Wyoming southward through Texas

**Project Phase:** Data Preparation

**What's New?:**

**Coming in November:** **MPEX Workshop Draft Agenda** (updated 14 November), 19 and 20 November, NCAR/EOL Atrium. See the **MPEX Case Review** presentation for more information.

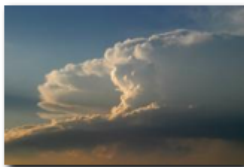
### Project Description:

The Mesoscale Predictability Experiment (MPEX) was conducted within the U.S. intermountain region and high plains during the late spring/early summer of 2013 and included the use of the NSF/NCAR GV, along with the new [Airborne Vertical Atmospheric Profiling System \(AVAPS\)](#) dropsonde system and the [Microwave Temperature Profiler \(MTP\)](#) system, as well as several ground-based mobile upsonde systems, for the field experiment which took place during a 4-week time period from **15 May to 15 June 2013**. The region of interest extended from Nevada eastward to the Mississippi River, and South Dakota/Wyoming southward through Texas (approximately 32.5°- 42.5° N latitude, 90°- 115°W longitude).



### Scientific Objectives

MPEX was motivated by the basic question of whether experimental, sub-synoptic observations could extend convective-scale predictability and otherwise enhance skill in regional numerical weather prediction over a roughly 6 to 24 hour time span. The experimental plan was guided by the following two scientific hypotheses:



Hypothesis 1: Enhanced synoptic and sub-synoptic scale observations and their assimilation into convection-permitting models over the intermountain region during the early morning will significantly improve the forecast of the timing and location of convective initiation as well as convective morphology and evolution during the afternoon and evening to the lee of the mountains and over the High Plains.

### DATA ACCESS

**MPEX Data Archive**  
MPEX Field Catalog

### FACILITIES & PLATFORMS

HIAPER

### DATA DOCUMENTATION

Data Policy  
Dataset Documentation Guidelines  
Data Submission Instructions

### PUBLICATIONS

MPEX Publications

### DOCUMENTS

MPEX Operations Plan  
MPEX Proposal  
MPEX Facility Request  
NSF/NCAR GV Documentation  
Summary

### MEETINGS AND PRESENTATIONS

Meetings and Presentations

### RELATED LINKS

MPEX Safety Document  
MPEX Pilot Flight Reports

# Welcome to Obamacare!!



## Colorado Health Insurance Exchange

© 11/04/2013  Colorado

If you live in Colorado you can use this calculator below to figure out your subsidy.

- If you get a subsidy you will need help to process your application.
- Once you determine your subsidy you will have to visit [Help Me Get My Health Insurance Plan](#).

### Colorado Exchange Plan Comparison

#### 1. Select where you live

County

#### 2. Household Size

Enter the total number of people in your household. Include everyone in the household even if they do not intend to purchase insurance on the exchange. This is used to calculate your subsidy eligibility.

#### Select Your State

[About Us](#)

[Alabama](#)

[Alaska](#)

[Arizona](#)

[Arkansas](#)

[California](#)

[Colorado](#)

[Connecticut](#)

[Delaware](#)

[District Of Columbia](#)

[Florida](#)

[Georgia](#)

[Hawaii](#)

[Idaho](#)

[Illinois](#)

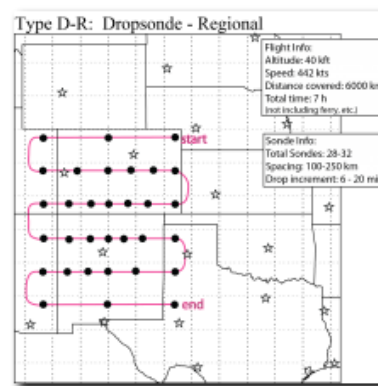
[Indiana](#)

[Iowa](#)

[Kansas](#)

The proposed observational strategy for each early morning mission was to release 28 to 35 dropsondes from an altitude of about 40,000 ft over a grid of spacing ~ 75-200 km. MTP observations continuously sampled the temperature structure through the mid- and upper troposphere in conjunction with the dropsonde data, enhancing the representation of any mesoscale or sub-synoptic scale features along the plane's path. The dropsonde and MTP data were incorporated into both realtime and retrospective data assimilation experiments using a variety of techniques (3DVAR, ENKF, etc.) to establish the potential benefits of such enhanced observations.

For the afternoon missions, 2-3 mobile upsonde units were positioned in the vicinity of convection to collect serial soundings as the storms developed and matured, thereby documenting both the immediate pre-storm environmental conditions as well as any subsequent storm-induced environmental modifications.



Example flight pattern and GPS dropsonde locations for the Type D-R deployment strategy

Figure from [MPEX Proposal](#)  
 (Click Image for Full Resolution)

*Unless otherwise noted, photos courtesy of Carlye Calvin, University Corporation for Atmospheric Research.*

#### PROJECT WEBSITES

[Memorable MPEX Quotations](#)

#### DIGITAL MEDIA

[View Media / Education & Outreach links](#)

#### PARTICIPANTS AND MAILING LISTS

[MPEX Mailing List](#)

#### CONTACT INFORMATION

##### Principal Investigators:

[Morris Weisman](#) NCAR/NESL  
[Chris Davis](#) NCAR/ASP  
[Jeff Trapp](#) Purdue University  
[Glen Romine](#) NCAR/NESL

##### Project Manager:

[Pavel Romashkin](#) NCAR/EOL/RAF

##### Data Manager:

[Steve Williams](#) NCAR/EOL



## Mesoscale Predictability Experiment (MPEX)

### *Memorable Quotes from the MPEX Ops Center*

- "Where are the test donuts?" - Morris 5/9/12
- "We are in good shape, for the shape we are in" - Anon
- "There is certainly some uncertainty with that feature" - Craig 5/17/13
- "I don't get excited about the NAM showing 'this or that' because in the next run it will show 'that or this'" - Lance 5/21/13
- "We are looking for incidents and accidents of upside" - Anon 5/31/13
- "I've lost all control here..." - Morris 6/5/13
- "Pesky inhomogeneous lowest boundary condition" - John B. 5/17/13
- All gradients are equal, but some gradients are more equal than others" - LB 6/11/13

**Wednesday, Nov. 20:**

**8:15 AM Pastries, etc.**

**8:30 AM: Research Discussion/Breakout Groups**

- 1) What are the research opportunities (e.g., specific cases, modeling or observational approaches, etc.)
- 2) Are there technical issues to be addressed for progress to be made?

**10:00 AM: Coffee Break**

**10:30 AM: Breakout Group Summaries and General Discussion**

**11:30 AM: BAMs Article/Future Plans**

**12:15 PM Workshop ends**

# Breakout Questions:

What research questions can be addressed with the observations that were obtained.

What modeling approaches offer the best opportunity for making progress?

Are there significant technical issues that need to be resolved for research to proceed (e.g., modeling capabilities, observational analysis tools, etc.)?

Which cases offer the most opportunity for addressing the various research goals?

What metrics should we use to judge forecast accuracy/value?

What changes in operational strategy might be considered for future programs?

# Breakout Groups:

**Upsonders:** Jeff Trapp, Dave Stensrud, Mike Coniglio,  
Russ Schumacher, John Peters, Stan Trier,  
Matthew Poulus

**Dropsonders:** Ryan Torn, Glen Romine, Craig Schwartz,  
Kevin Manning, David Dowell, Jenny Sun,  
Terra Thompson

**Others:** Chris Davis, Mike Baldwin, John Brown, Al Cooper,  
Dave Ahijevych, Tom Galarneau, Julie Haggerty



## Lance Bosart: Cases of Interest

1. 15 May: Significant forecast failure in OK and north TX. Possible issues with mesoscale upper-level cutoff cyclone
2. 23 May: Significant over forecast failure in west Texas. Possible issues with return moisture
3. 8 June: Significant over forecast failure in SW Iowa. Possible issues with return moisture. Prelude to CA cutoff cyclone development
4. 11 June: CA cutoff lifting NE across Intermountain west. Terrain-flow interaction issues
5. 12-13 June: Intermountain cutoff reaches northern Plains. High-end derecho that wasn't



