

Isolating and Assessing Weather-related Air Traffic Delays

A closer-look at
what makes this
so difficult.....



Optimist



Pessimist



Realist

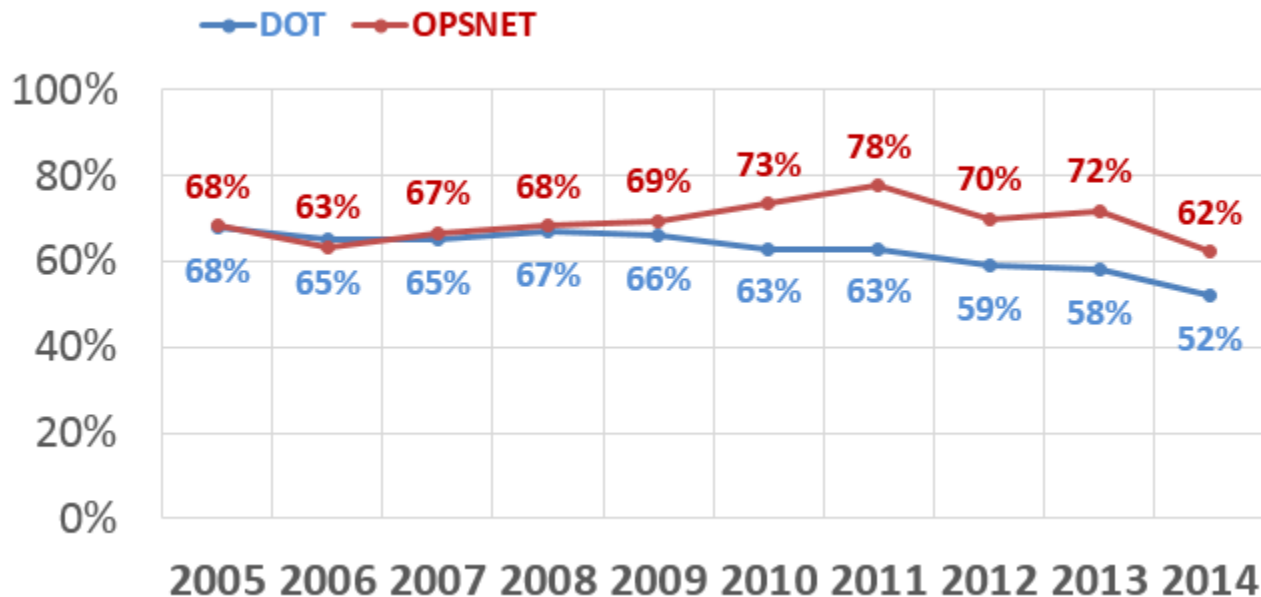
Is this me?

Mike Robinson
AvMet Applications, Inc.

What is a Weather Delay?

(It depends on who you ask....)

Annual % Flights Delayed due to Weather



DOT (BTS)

- Airline (required) reportable delays
- Strict guidelines for what to report, how to assign causality
 - E.g., “late-arriving” aircraft delay

OPSNET

- FAA’s official source of NAS ops and delay data
- Reported delays, with assigned causality, by FAA operations

What is Weather's Contribution to Delay?

(Also depends.....)

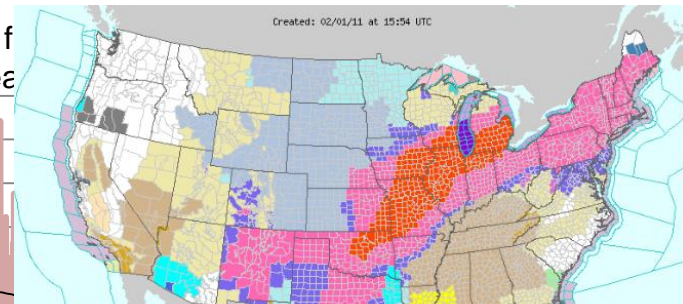
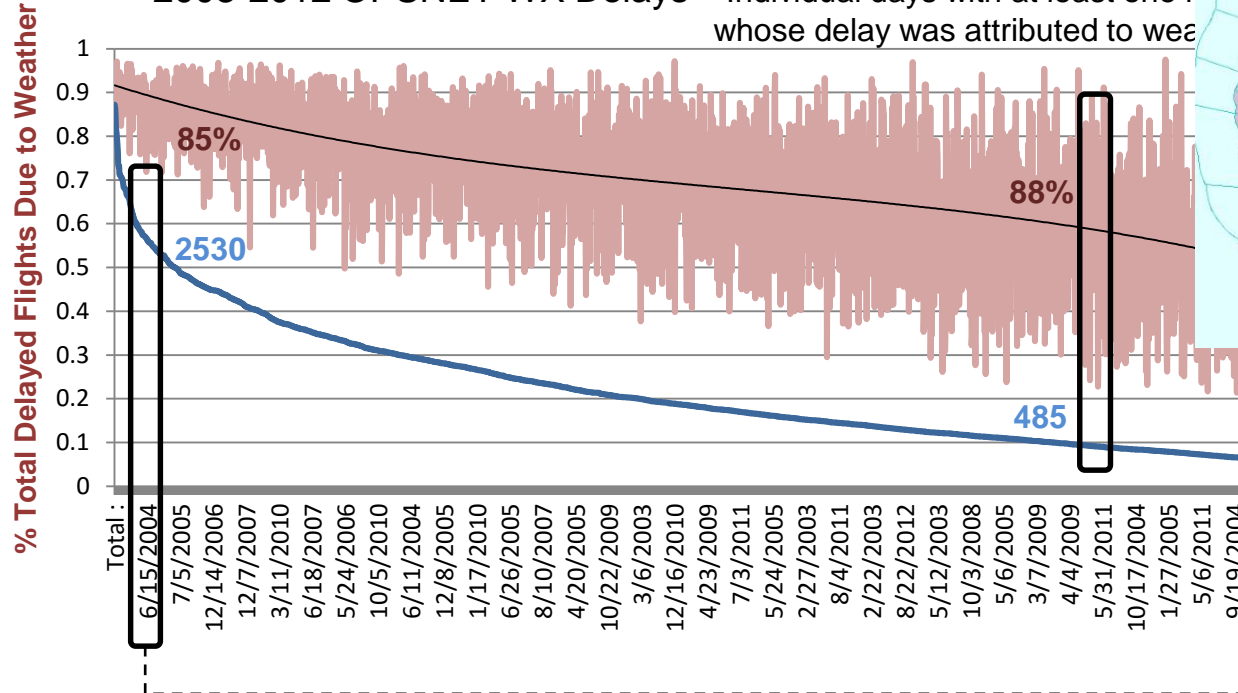
- FAA OPSNET** Delay Analysis (2005-2014):
% Total Flights Delayed due to Weather
% Total Delay Minutes due to Weather

** <https://aspm.faa.gov/opsnet/sys/>

69%

83%

2003-2012 OPSNET WX Delays – Individual days with at least one flight whose delay was attributed to weather



01 Feb 2011 Blizzard

† All but 5 days during entire 10 year period (99.9%)

When is a WX Delay Not a WX Delay?

(When it's something else of course)



Ryan McElhenny / boredpanda.com

23 Jan 2016 'Snowzilla'

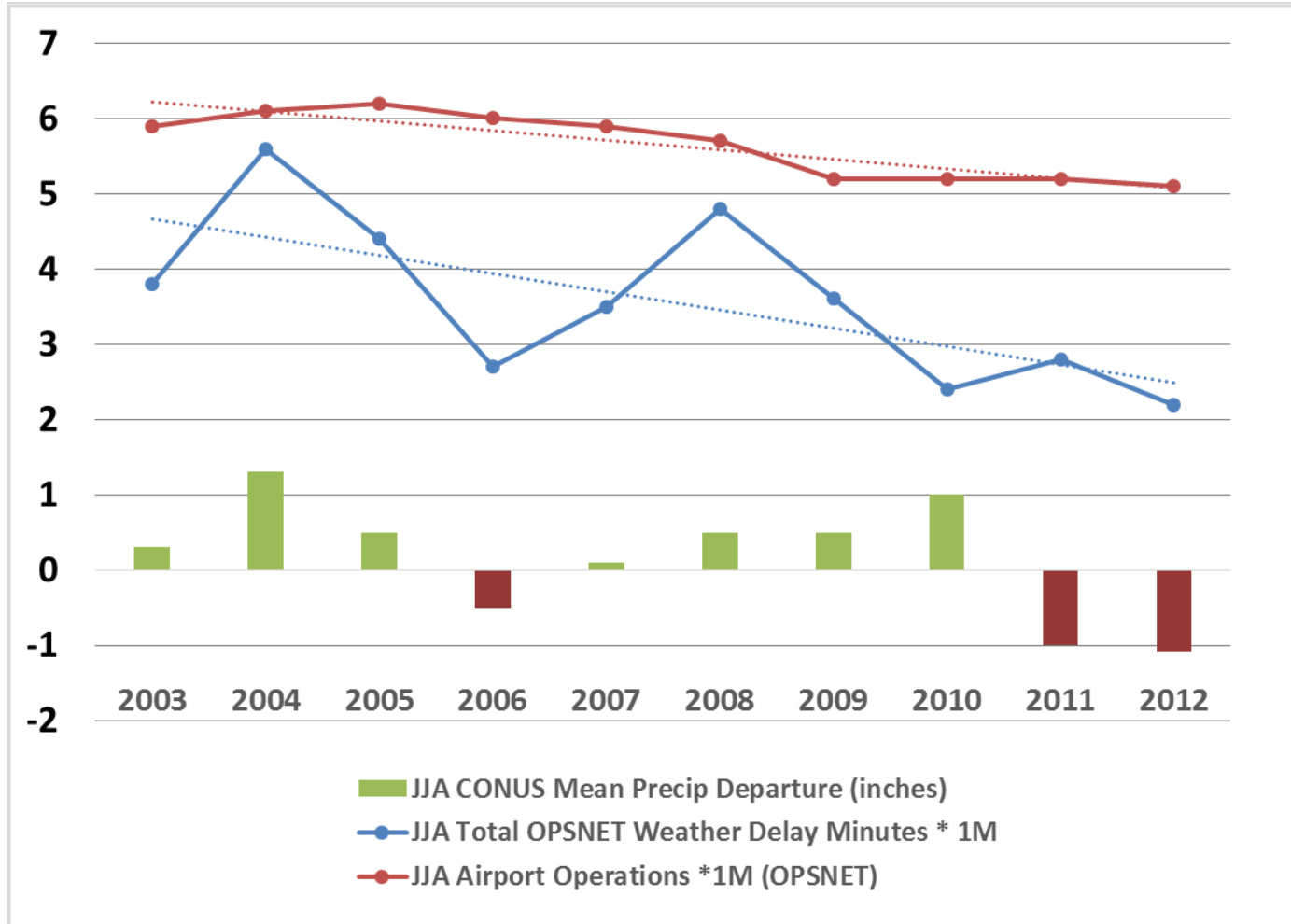
**Total OPSNET
Delayed Flights: 23**

**Total ASPM
Cancelled Flights: 3,083**

When may a WX Delay be MORE than just a WX Delay?

- When it is an airborne delay
- When it is an excessive tarmac delay
- When it is an unanticipated delay
- When it is inequitable delay
-

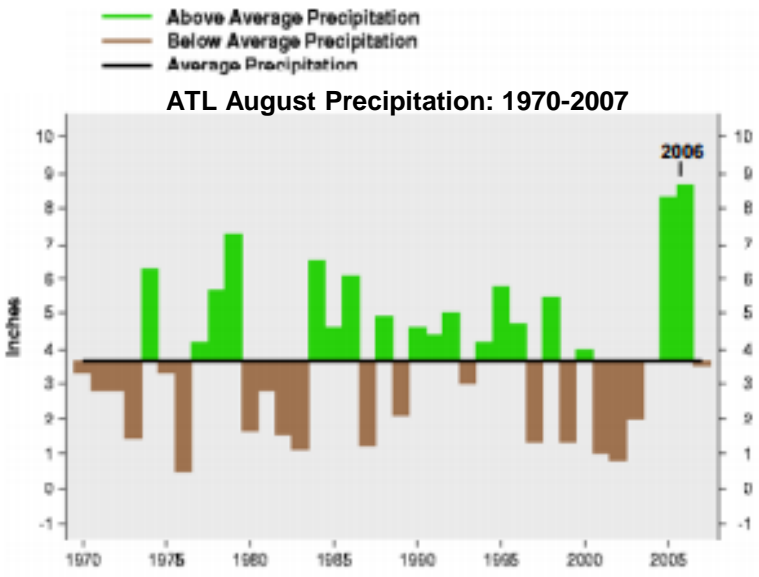
Trending Summer Weather Delays at a Macroscopic Level



Weather Events / Periods are Not the Same....so Don't Treat them as Such.....



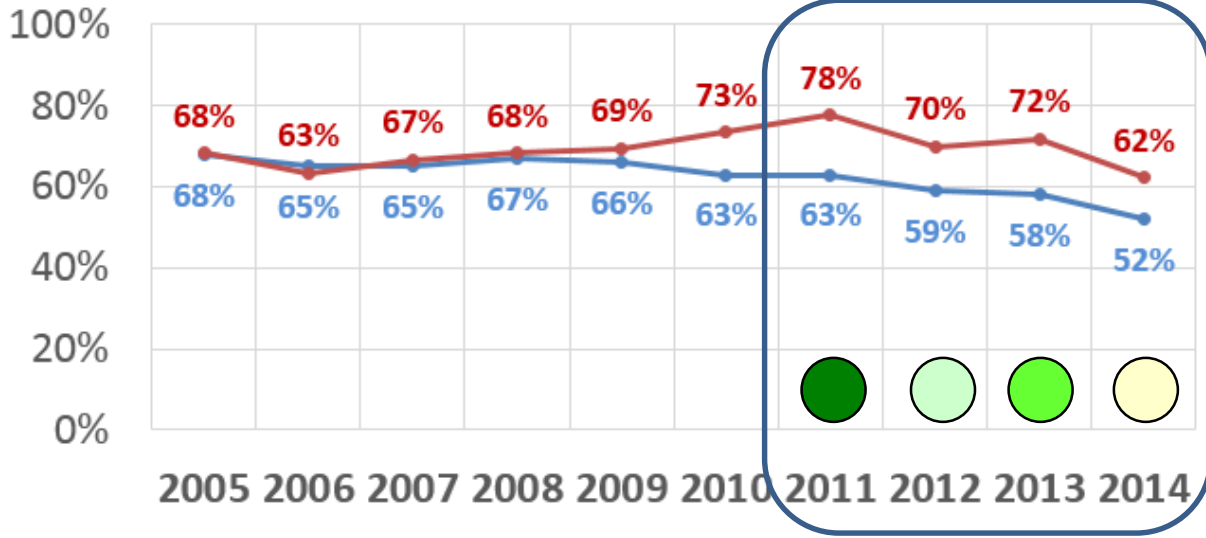
In 2006, Delta Air Lines Inc. reported losses of \$11 M during the month of August, the equivalent of 6 cents per share for company stockholders. In receipt of this news, investments in Delta decreased by 20% (*International Business Times, 2006*)



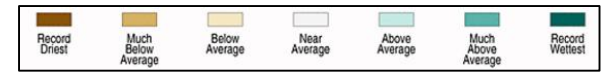
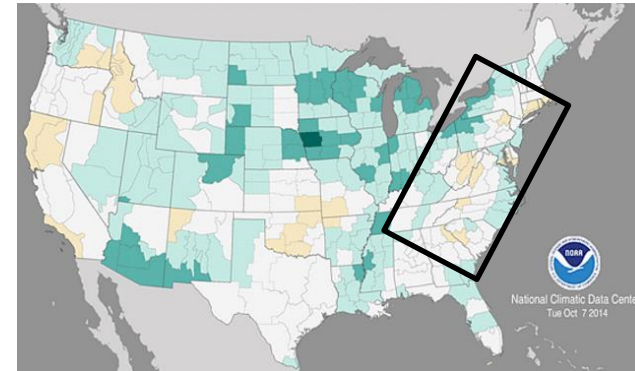
www.ncdc.noaa.gov



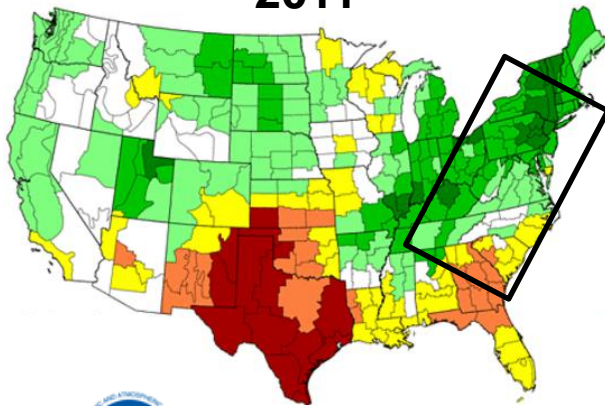
— DOT — OPSNET



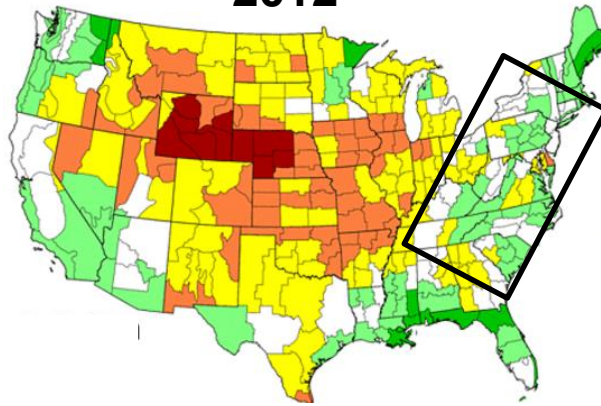
2014



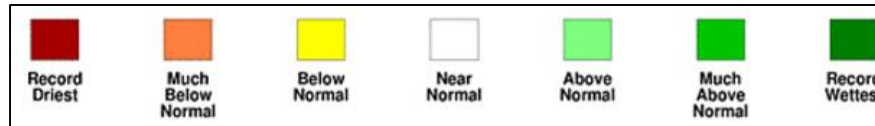
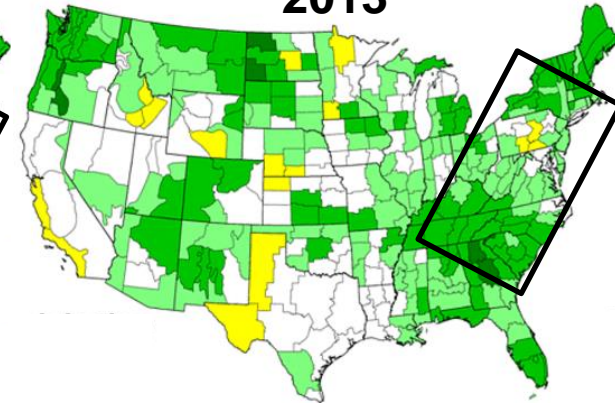
2011



2012



2013



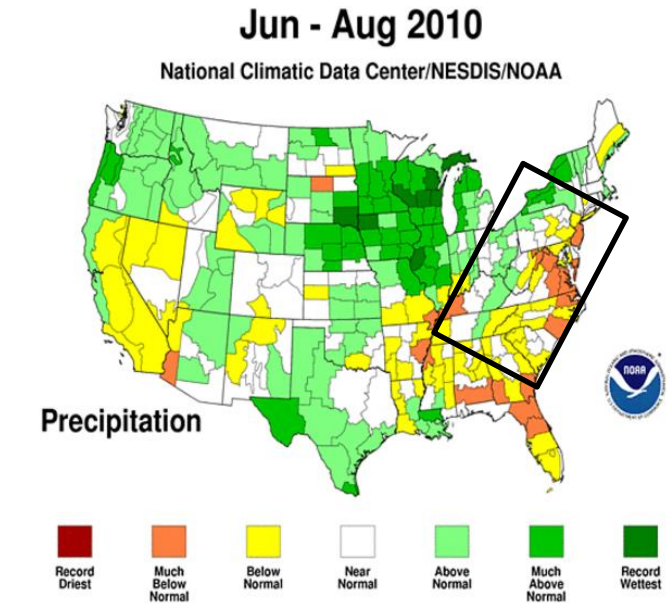
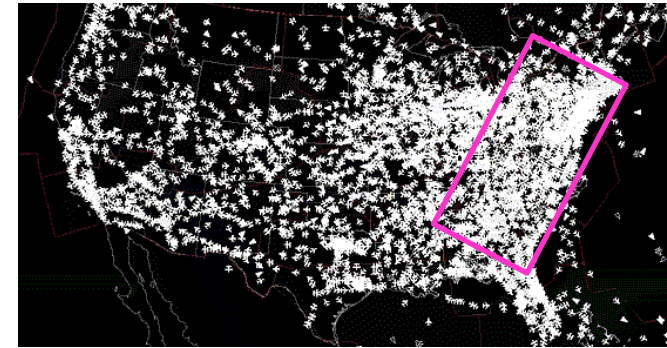
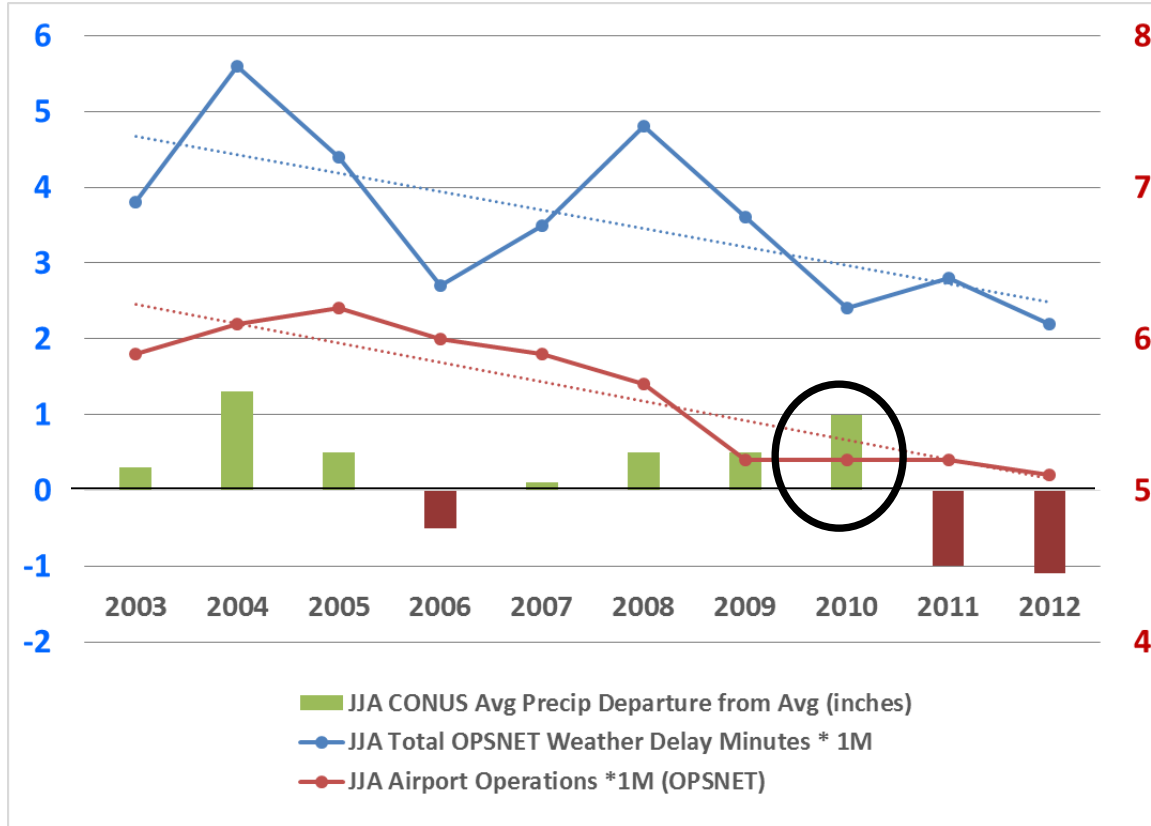
Apr – Sep (6 month)
Divisional Precip Rank



www.ncdc.noaa.gov

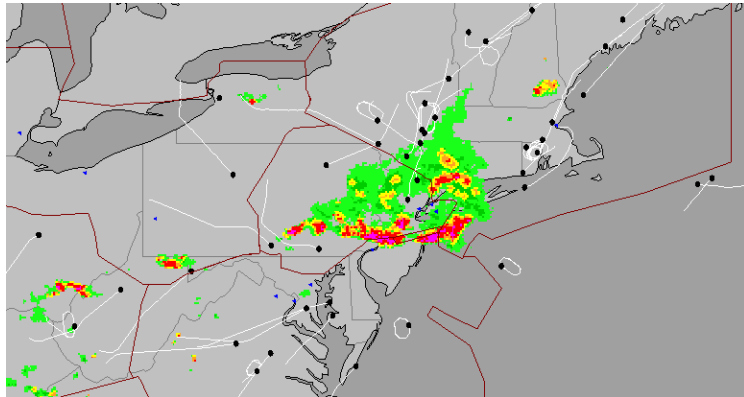


Remember This.....

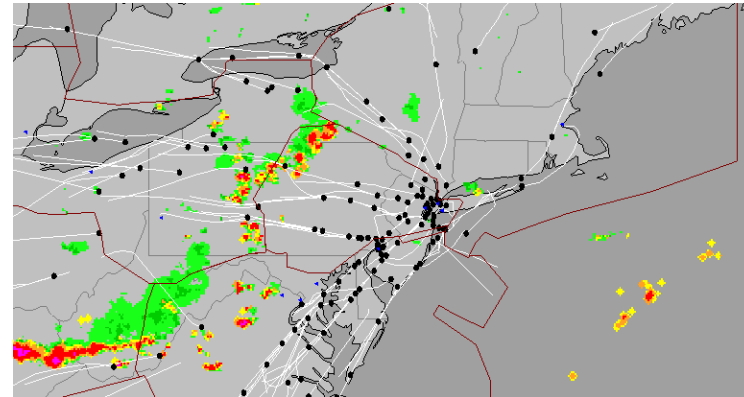


Considering WX Delays / Performance for *Only* NY “SWAP” Days.....Still Can Mislead

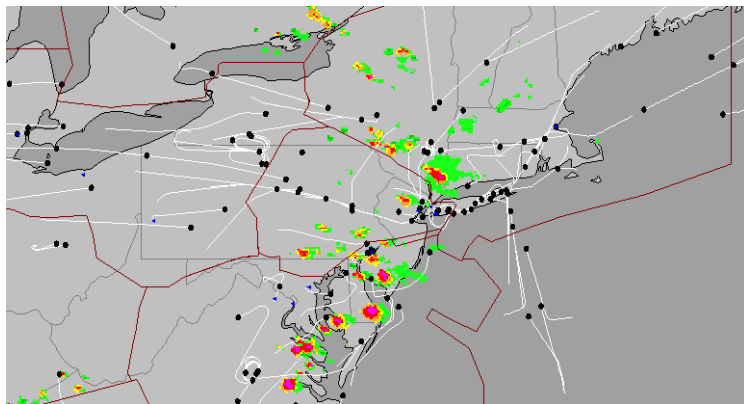
25 July 2016 – 2300 Z



14 July 2015 – 2330 Z



22 May 2014 – 2200 Z



Differences in storm event:

- Location
- Organization
- Evolution

....affecting different resources, requiring different responses, resulting in different impacts

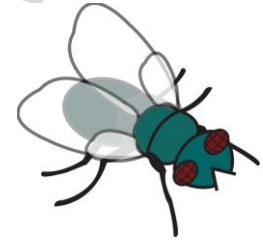
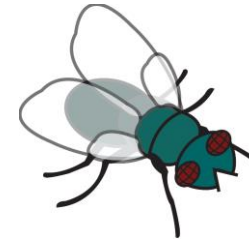
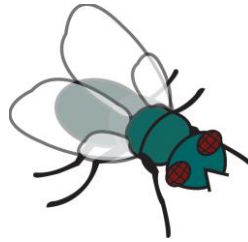
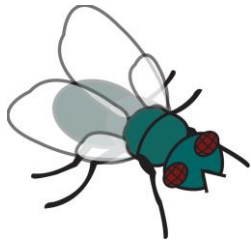
If You're Keeping Score.....

Several measures
for "Weather Delay"

Weather Impact may
not be "Delay"

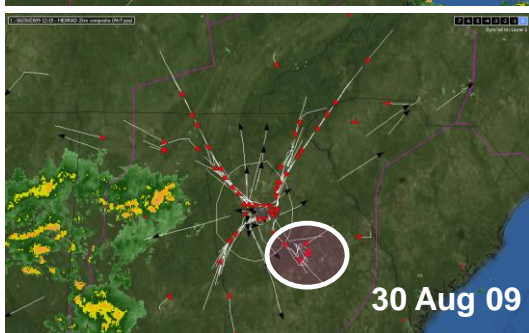
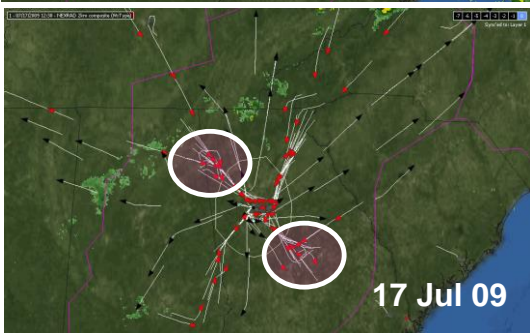
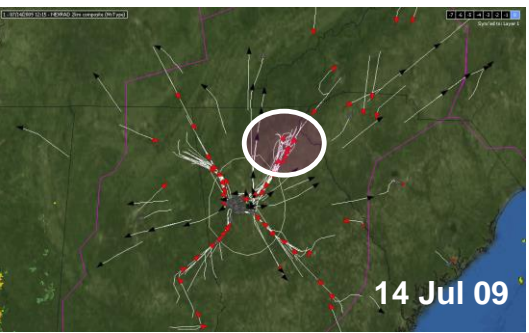
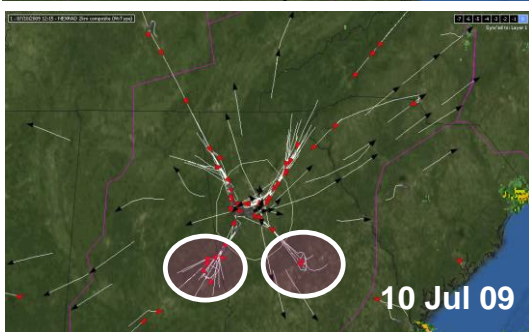
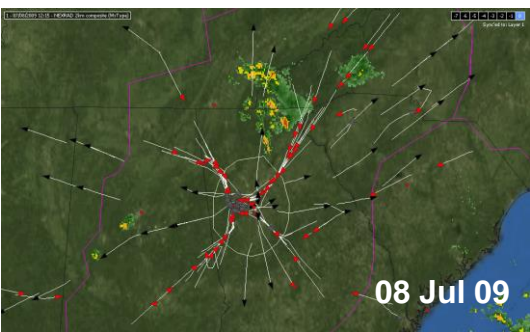
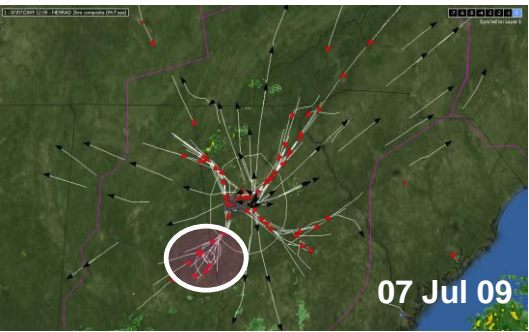
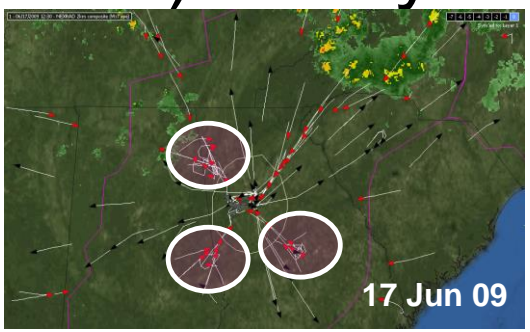
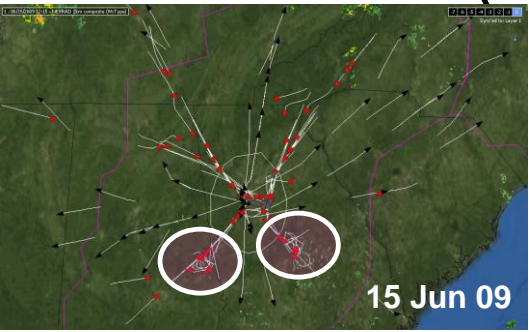
Demand may swamp
weather delay 'signal'

Not all weather
is the same



"Isolating and Assessing WX-related Air Traffic Delays"
Ointment

ATL Weather (Volume) Delays due to Haze.....



○ ATL Arrival Holding



integration
training
consulting
engineering

11

ATL 2009: Haze = Bad; ATL 2010: Haze =

ATL Arrival Event (11-13 UTC)	Morning GS?	Holding Stack(s)?	Number of Arrival Aircraft Holding
2009 15 Jun – Haze	YES	YES	14
17 Jun – Haze	YES	YES	12
27 Jun – Haze	YES	YES	20
07 Jul – Haze	YES	YES	10
08 Jul – Haze	YES	No	-
10 Jul – Haze	YES	YES	10
14 Jul – Haze	No	YES	10
17 Jul – Haze	YES	YES	5
30 Aug – Haze	YES	YES	4
09 Sep – Haze	No	YES	7
2010 07 Jul – Haze	No	No	-
23 Jul – Haze	No	No	-
24 Jul – Haze	No	No	-
04 Aug – Haze	No	No	-
05 Aug – Haze	No	No	-
08 Aug – Haze	No	No	-
09 Aug – Haze	No	No	-
24 Aug – Haze	No	No	-

Mean Number of Holding Aircraft (1145-1300 UTC)

2009 Haze Event: 8.2

2009 No-Haze Event: 1.7

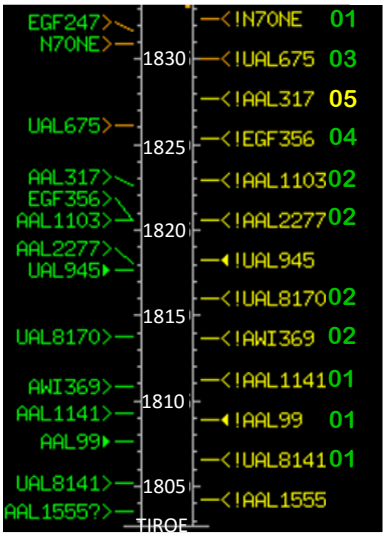
2010 Haze Event: 0



WX Folks Are Not the Only Ones Trying to Help Address NAS Efficiency Problems.....

New / Alternative TFM Procedures

TMA TGUI Display



2009 – ATL Metering began at 1500 UTC

2010 – ATL Metering at 1030 UTC controls early morning push (and primary haze impact period)

↑ Estimated Time of Arrival (ETA)
 ↑ Scheduled Time of Arrival (STA)

Airline Schedule Changes

ATL Scheduled Arrivals (Daily Average)

01 Jun – 31 Aug	2009	2010	% Change
1100-1200 UTC	78	66	-15%
1200-1300 UTC	121	100	-17%
0000-2359 UTC	1388	1337	-4%

• Delta Air Lines (DAL) “de-peaked” morning ATL arrival schedule in summer 2010 vs. 2009 *

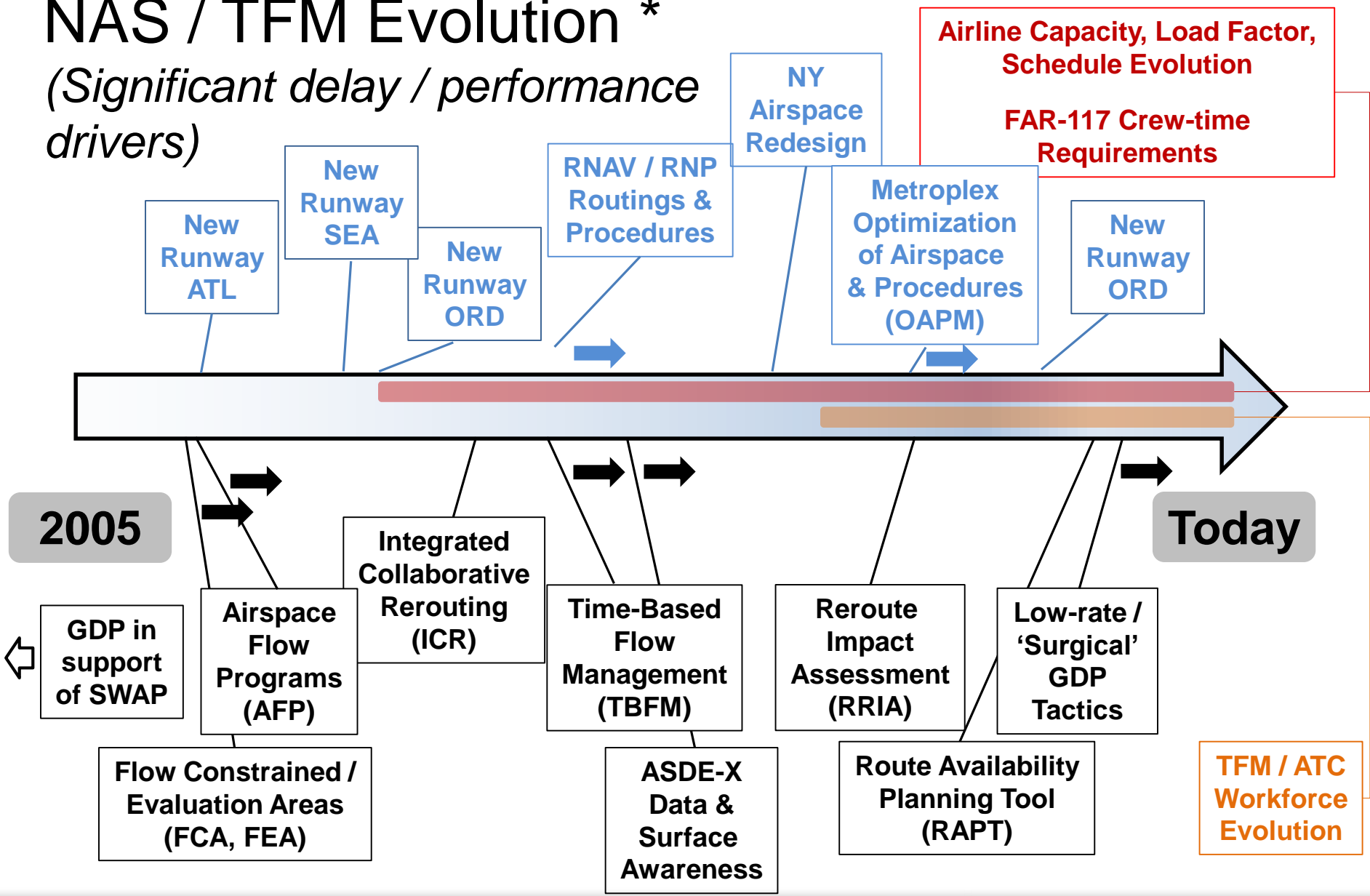
	2010	2009	2009-2010 % change
Jun-Sep	2692	2880	-6.50%
Jun	631	771	-18.20%
Jul	542	680	-20.30%
Aug	685	819	-16.40%
Sep	834	610	36.70%

* Schedule information courtesy of Delta Air Lines



NAS / TFM Evolution *

(Significant delay / performance drivers)

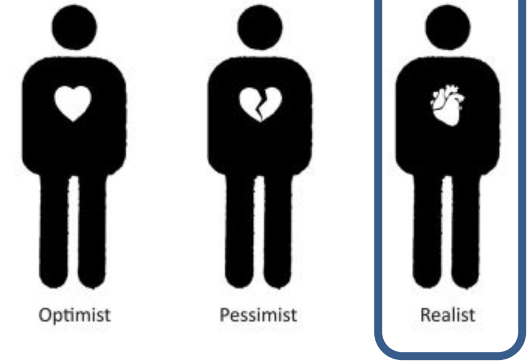


* This is a sampling



Takeaways.....

Assessing WX Impacts and Impact Management Performance IS DOABLE, but tread carefully.....



- Know your wx impact metric – what it is and what it is not
- WX impacts are more than delays; When they are delays they can be layered and nuanced
- Be mindful and account for fact that weather periods, events, scenarios are not the same – and these differences alone can drive performance differences
- WX-ATM performance excels (can be derailed), can trend towards improvement (degradation), for many reasons unrelated to weather / forecasts
- Didn't even get into forecast weather accountability, human factors issues, event unavoidability, etc....