

# Creation of a Comprehensive Sounding and Tornado Dataset from Recent Southeast Field Campaigns

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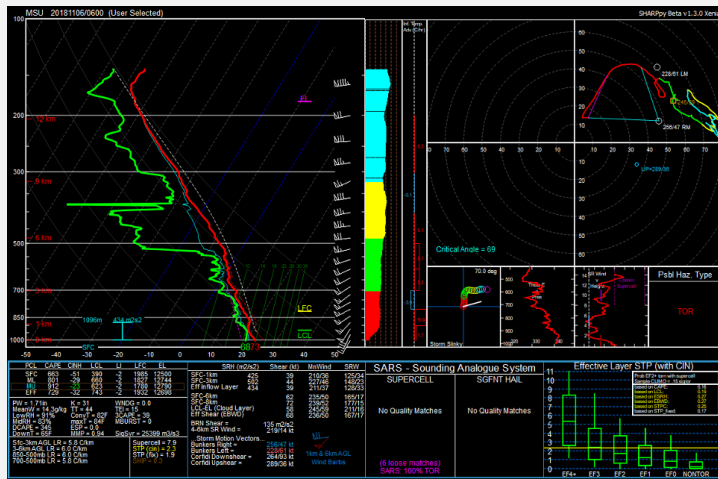
PERiLS Science Meeting  
Memphis, TN  
16-17 November 2023

# Our **research goals** include...

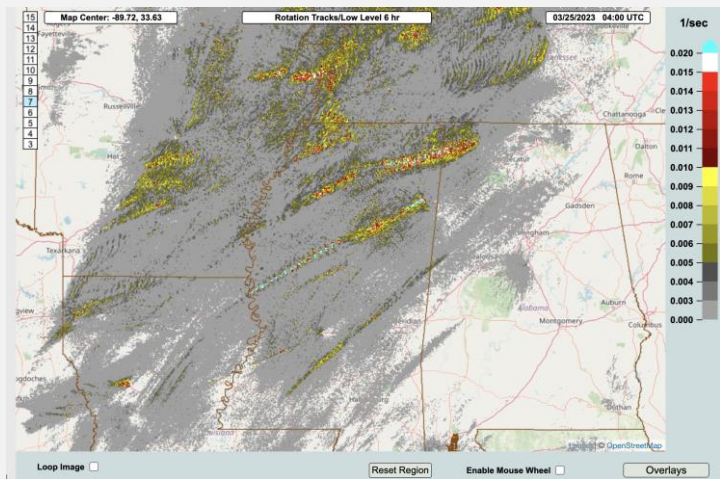
1. Relating sounding parameters to observed storm evolution
2. Understanding how those sounding parameters evolve in the vicinity of convection

# We plan to address these goals using...

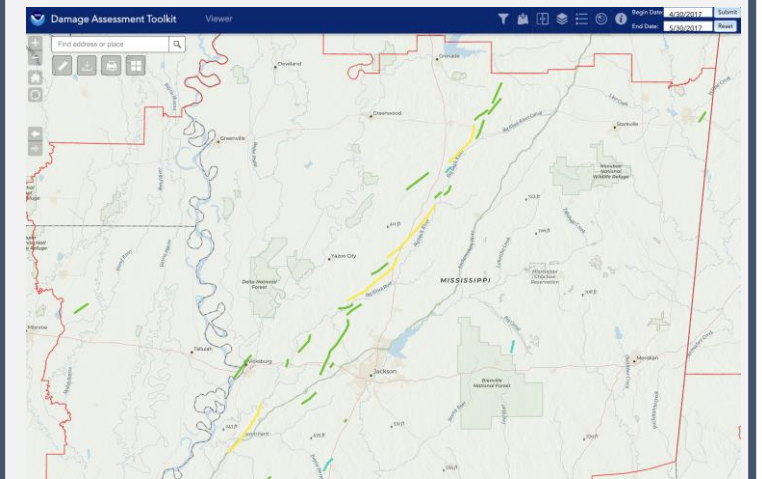
All the relevant VORTEX-SE, meso18-19, and PERiLS soundings



Multi-Radar Multi-Sensor (MRMS) Az-shear and reflectivity products



Tornado survey information from OneTor and the DAT

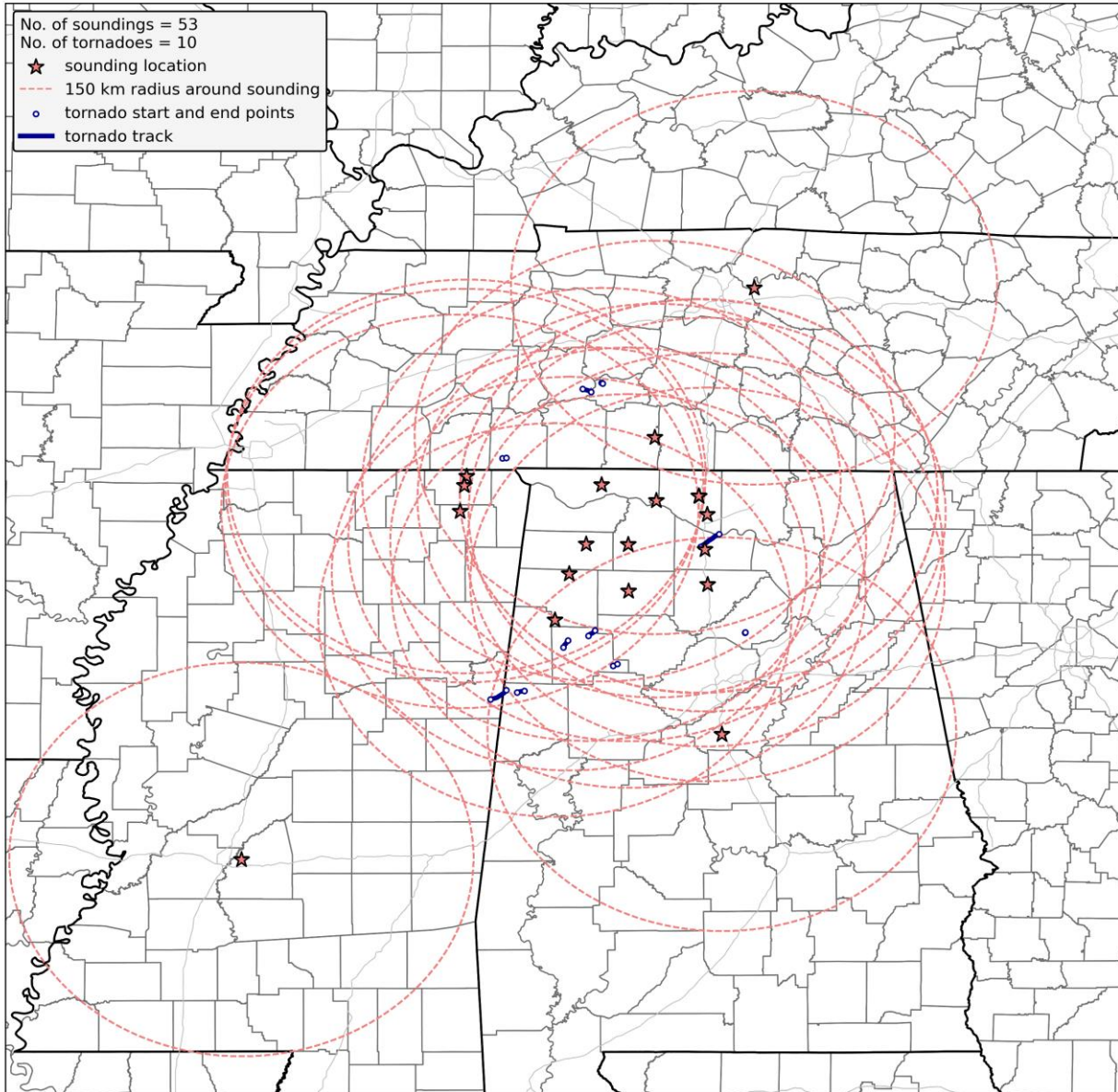


# We will have a large dataset of southeast cases

Case No.	Date	Project and IOP	Location	Storm Mode	No. Tornado	No. of Soundings
1	31 Mar 2016	VORTEX-SE 2016 IOP 3	North AL	mixed mode	10	53
2	29 Apr 2016	VORTEX-SE 2016 IOP 4b	North AL	clusters/QLCS	2	16
3	30 Apr 2016	VORTEX-SE 2016 IOP 4c	North AL	clusters/supercells	0	38
4	25 Mar 2017	VORTEX-SE 2017 IOP 1a	North AL	weak QLCS	0	33
5	27 Mar 2017	VORTEX-SE 2017 IOP 1b	North AL	clusters/QLCS	6	87
6	5 Apr 2017	VORTEX-SE 2017 IOP 3b	North AL	supercells/clusters	9	102
7	26 Apr 2017	VORTEX-SE 2017 IOP 4a	North MS/AL	QLCS	1	23

8	30 Apr 2017	VORTEX-SE 2017 IOP 4c	North AL	-	-	-
9	19 Mar 2018	VORTEX-SE 2018 IOP 1	North AL	-	-	-
10	28 Mar 2018	VORTEX-SE 2018 IOP 2a	central MS/AL	-	-	-
11	29 Mar 2018	VORTEX-SE 2018 IOP 2b	central AL	-	-	-
12	3 Apr 2018	VORTEX-SE 2018 IOP 3	North MS	-	-	-
13	6 Apr 2018	VORTEX-SE 2018 IOP 4	North LA	-	-	-
14	13 Apr 2018	VORTEX-SE 2018 IOP 5	North LA	-	-	-
15	5 Nov 2018	meso18-19 IOP 1	Fixed across SE	-	-	-
16	30 Nov 2018	meso18-19 IOP 2	Fixed across SE	-	-	-
17	6 Feb 2019	meso18-19 IOP 3	Fixed across SE	-	-	-
18	19 Feb 2019	meso18-19 IOP 4	Fixed across SE	-	-	-
19	23 Feb 2019	meso18-19 IOP 5	Fixed across SE	-	-	-
20	3 Mar 2019	meso18-19 IOP 6	Fixed across SE	-	-	-
21	9 Mar 2019	meso18-19 IOP 7	Fixed across SE	-	-	-
22	13 Apr 2019	meso18-19 IOP 8	Fixed across SE	-	-	-
23	18 Apr 2019	meso18-19 IOP 9	Fixed across SE	-	-	-
24	16 Dec 2019	VORTEX-SE 2020 IOP 1	North AL	-	-	-
25	29 Dec 2019	VORTEX-SE 2020 IOP 2	North AL	-	-	-
26	11 Jan 2020	VORTEX-SE 2020 IOP 3	North AL	-	-	-
27	5 Feb 2020	VORTEX-SE 2020 IOP 4	North AL	-	-	-
28	12 Feb 2020	VORTEX-SE 2020 IOP 5	North AL	-	-	-
29	3 Mar 2020	VORTEX-SE 2020 IOP 6	North AL	-	-	-
30	24 Mar 2020	VORTEX-SE 2020 IOP 7	North AL	-	-	-
31	28 Mar 2020	VORTEX-SE 2020 IOP 8	North AL	-	-	-
32	8 Apr 2020	VORTEX-SE 2020 IOP 9	North AL	-	-	-
33	12 Apr 2020	VORTEX-SE 2020 IOP 10	North AL	-	-	-
34	23 Apr 2020	VORTEX-SE 2020 IOP 11	North AL	-	-	-
35	22 Mar 2022	PERiLS 2022 IOP 1	Brooksville, MS	-	-	-
36	30 Mar 2022	PERiLS 2022 IOP 2	Amory, MS	-	-	-
37	5 Apr 2022	PERiLS 2022 IOP 3	Selma, AL	-	-	-
38	13 Apr 2022	PERiLS 2022 IOP 4	Kennett, MO	-	-	-
39	24 Mar 2023	PERiLS 2023 IOP 3	Lake Providence, LA	-	-	-
40	31 Mar 2023	PERiLS 2023 IOP 4	Tennessee Valley	-	-	-

## 31 March 2016



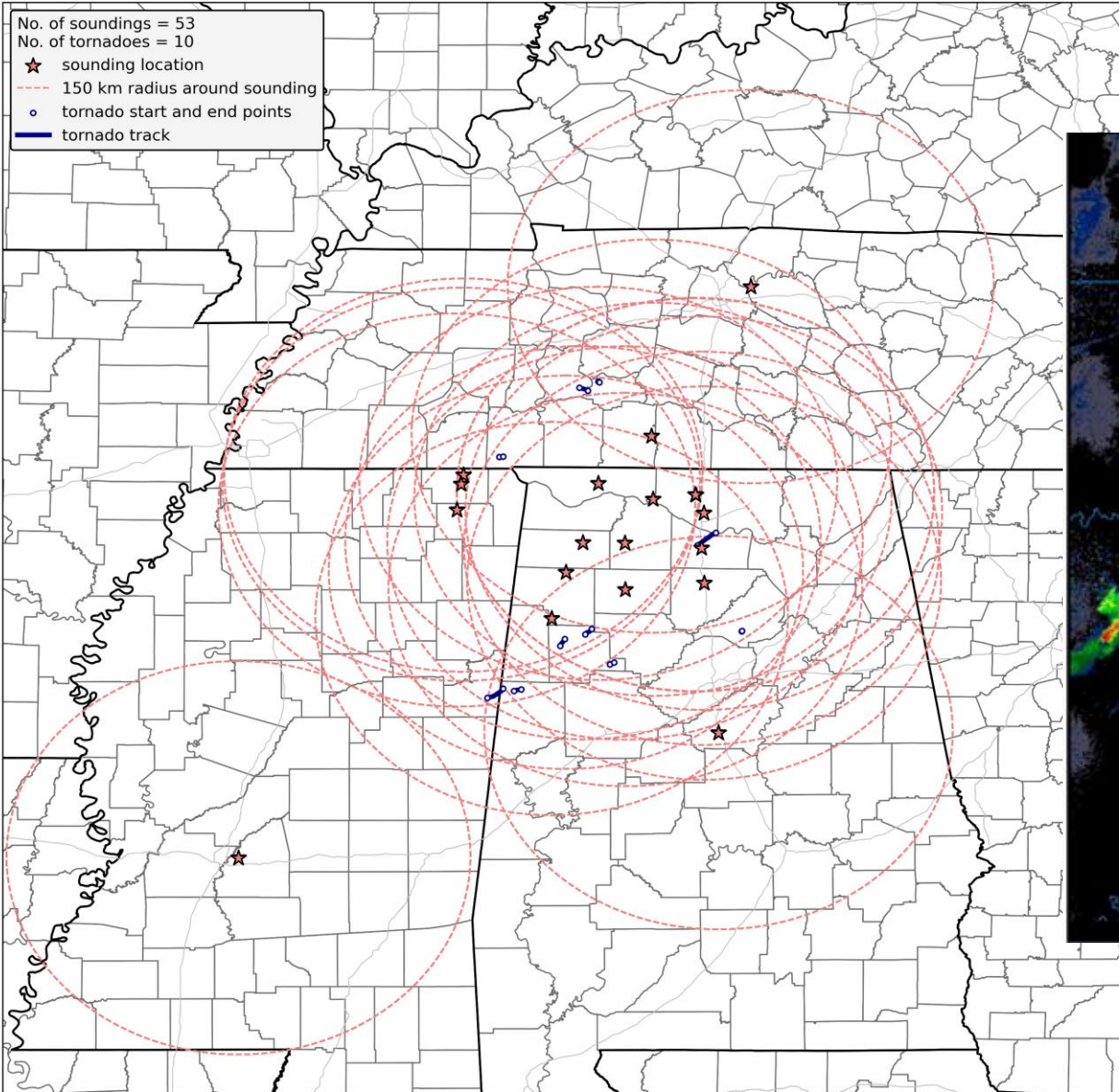
## Soundings:

Location	Organization	Sonde Type	No. Soundings	Sounding time (UTC)
Guin, AL	MSU	WindSonde SIHI	7	1801, 1903, 2001, 2102, 2201, 2301, 2333
Hackleburg, AL	MSU	WindSonde SIHI	6	1801, 1901, 2000, 2100, 2206, 2302
St. Florian, AL	NOAA ATDD	GRAW DFM-09	6	1800, 1900, 2000, 2100, 2200, 2300
Bella Mina, AL	NOAA ATDD	GRAW DFM-09	6	2100, 2100, 2200, 0000, 0100, 0200
Lawrenceburg, TN	ULM	iMet-1-ABxn	5	1757, 1856, 2001, 2101, 2201
Russellville, AL	Purdue	iMet-1-ABxn	3	1804, 2123, 2259
Russellville, AL	TTU	Vaisala RS-92-SGPD	3	2003, 2208, 2331
Booneville, MS	MSU	iMet-1-ABxn	2	1800, 2210
Birmingham, AL	NWS BMX	Lockheed Martin Sippican LMS-6	2	1917, 2300
Jackson, MS	NWS JAN	Lockheed Martin Sippican LMS-6	2	1724, 2303
Old Hickory, TN	NWS OHX	Lockheed Martin Sippican LMS-6	2	1730, 2301
SW Corinth, MS	MSU	iMet-1-ABxn	1	1902
NW Corinth, MS	MSU	iMet-1-ABxn	1	2012
Rogersville, AL	ULM	iMet-1-ABxn	1	0015
Moulton, AL	Purdue	iMet-1-ABxn	1	0100
Athens, AL	NOAA ATDD	GRAW DFM-09	1	0100
Hartselle, AL	TTU	Vaisala RS-92-SGPD	1	0101
Athens, AL	ULM	iMet-1-ABxn	1	0120
Double Springs, AL	MSU	WindSonde SIHI	1	0154
Cullman, AL	TTU	Vaisala RS-92-SGPD	1	0204

## Tornadoes:

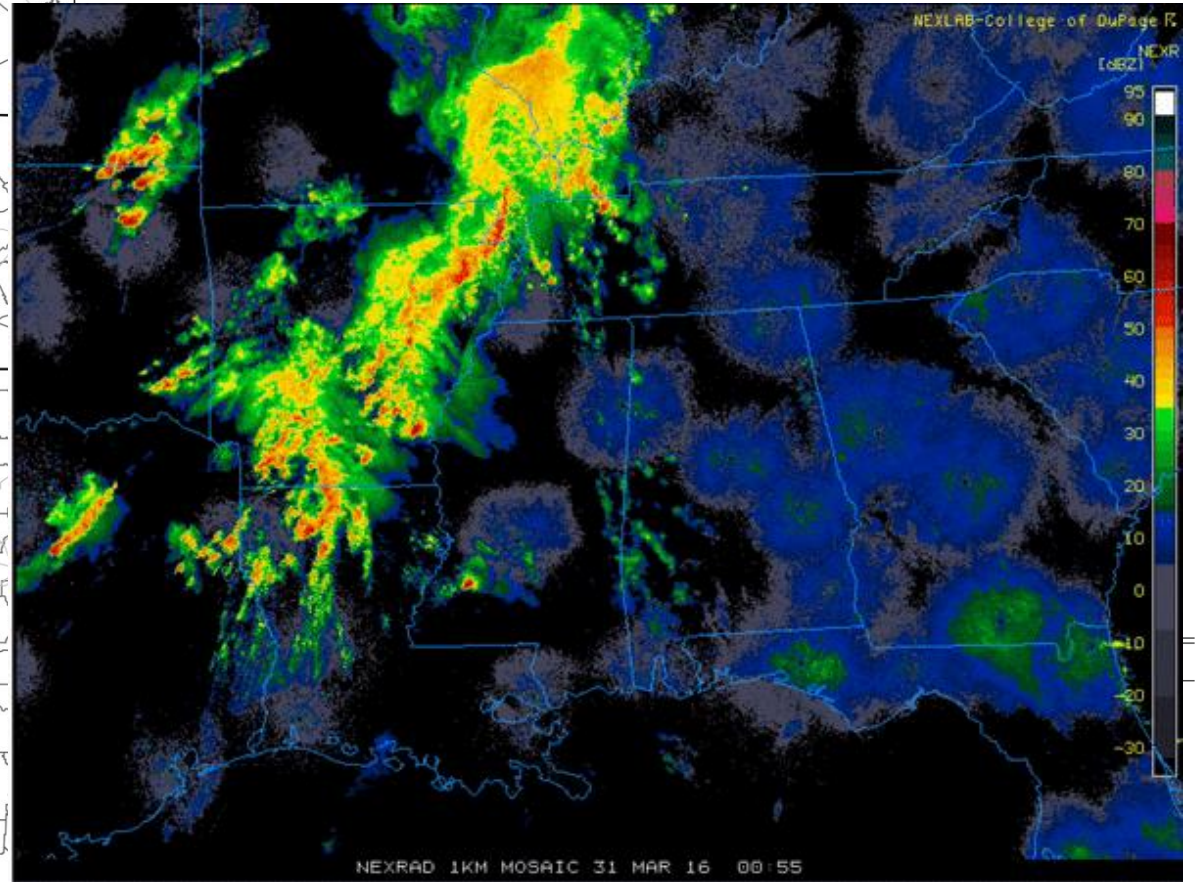
ID	State	County	Start Time (UTC)	Rating	Length (mi)	Width (yd)	Injuries	Fatalities
1-a	TN	Hardin	2128	EF-1	1.46	75	0	0
1-b	TN	Perry, Lewis	2131	EF-0	3.49	350	0	0
1-c	TN	Lewis	2145	EF-0	0.71	50	0	0
1-d	MS, AL	Lowndes, Pickens	2318	EF-1	2.88	350	0	0
1-e	AL	Pickens	2343	EF-1	7.78	600	0	0
1-f	AL	Fayette	0003	EF-1	3.72	650	0	0
1-g	AL	Fayette	0027	EF-1	3.70	500	0	0
1-h	AL	Fayette	0105	EF-0	1.88	400	0	0
1-i	AL	Blount	0242	EF-1	0.32	275	0	0
1-j	AL	Morgan, Limestone	0254	EF-2	9.55	200	0	0

31 March 2016



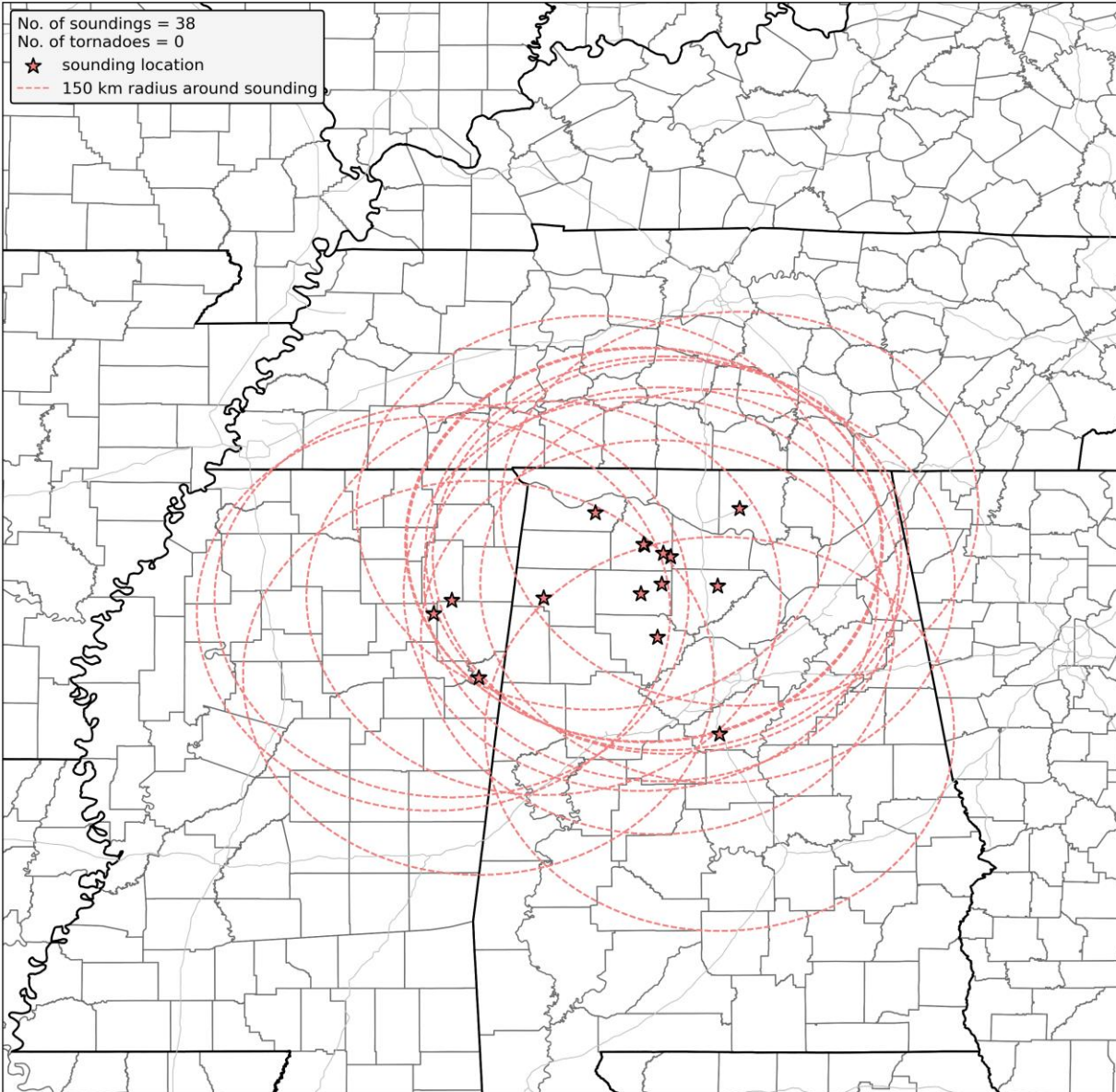
## Soundings:

Location	Organization	Sonde Type	No. Soundings	Sounding time (UTC)
Guin, AL	MSU	WindSonde SIH1	7	1801, 1903, 2001, 2102, 2201, 2301, 2333
Hackleburg, AL	MSU	WindSonde SIH1	6	1801, 1901, 2000, 2100, 2206, 2302
St. Florian, AL	NOAA ATDD	GRAW DFM-09	6	1800, 1900, 2000, 2100, 2200, 2300



ID	State	County	Time	Category	Wind Speed (mph)	Damage (ft)	Path Length (mi)	Start	End
1-f	AL	Fayette	0005	EF-1	3.72	650	0	0	
1-g	AL	Fayette	0027	EF-1	3.70	500	0	0	
1-h	AL	Fayette	0105	EF-0	1.88	400	0	0	
1-i	AL	Blount	0242	EF-1	0.32	275	0	0	
1-j	AL	Morgan, Limestone	0254	EF-2	9.55	200	0	0	

30 April 2016

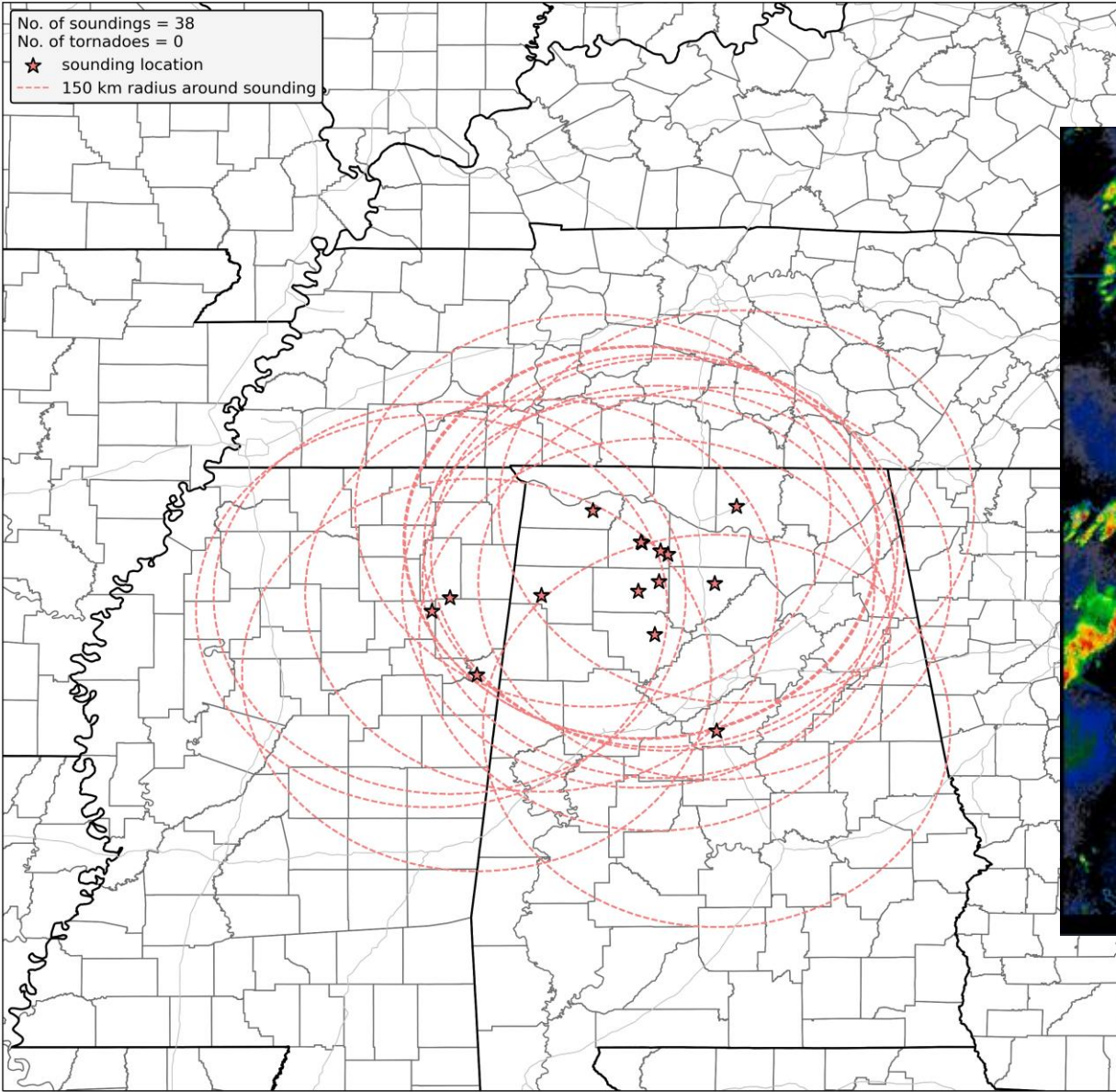


## Soundings:

Location	Organization	Sonde Type	No. Soundings	Sounding time (UTC)
Jasper, AL	NOAA ATDD	GRW DFM-09	5	1700, 1800, 2000, 2100, 2200
Columbus, MS	MSU	WindSond S1H2	4	1627, 1756, 1956, 2057
Double Springs, AL	ULM	iMet-1-ABxn	4	1644, 1801, 2000, 2102
Cullman, AL	NOAA ATDD	GRW DFM-09	4	1700, 1800, 2000, 2200
Hamilton, AL	MSU	iMet-1-ABxn	4	1711, 1803, 1931, 2102
Tuscumbia, AL	TTU	Vaisala RS-92-SGPD	3	1605, 1800, 2000
Nettleton, MS	MSU	WindSond S1H2	3	1646, 1757, 2030
Moulton, AL	Purdue	iMet-1-ABxn	3	1800, 2001, 2110
Addison, AL	ULM	iMet-1-ABxn	2	2145, 2226
Huntsville, AL	ULM	iMet-1-ABxn	1	1426
Moulton, AL	Purdue	iMet-1-ABxn	1	1632
Danville, AL	TTU	Vaisala RS-92-SGPD	1	2140
Okolona, MS	MSU	WindSond S1H2	1	2200
Speake, AL	Purdue	iMet-1-ABxn	1	2211
Birmingham, AL	NWS BHX	Lockheed Martin Sippican LMS-6	1	2302

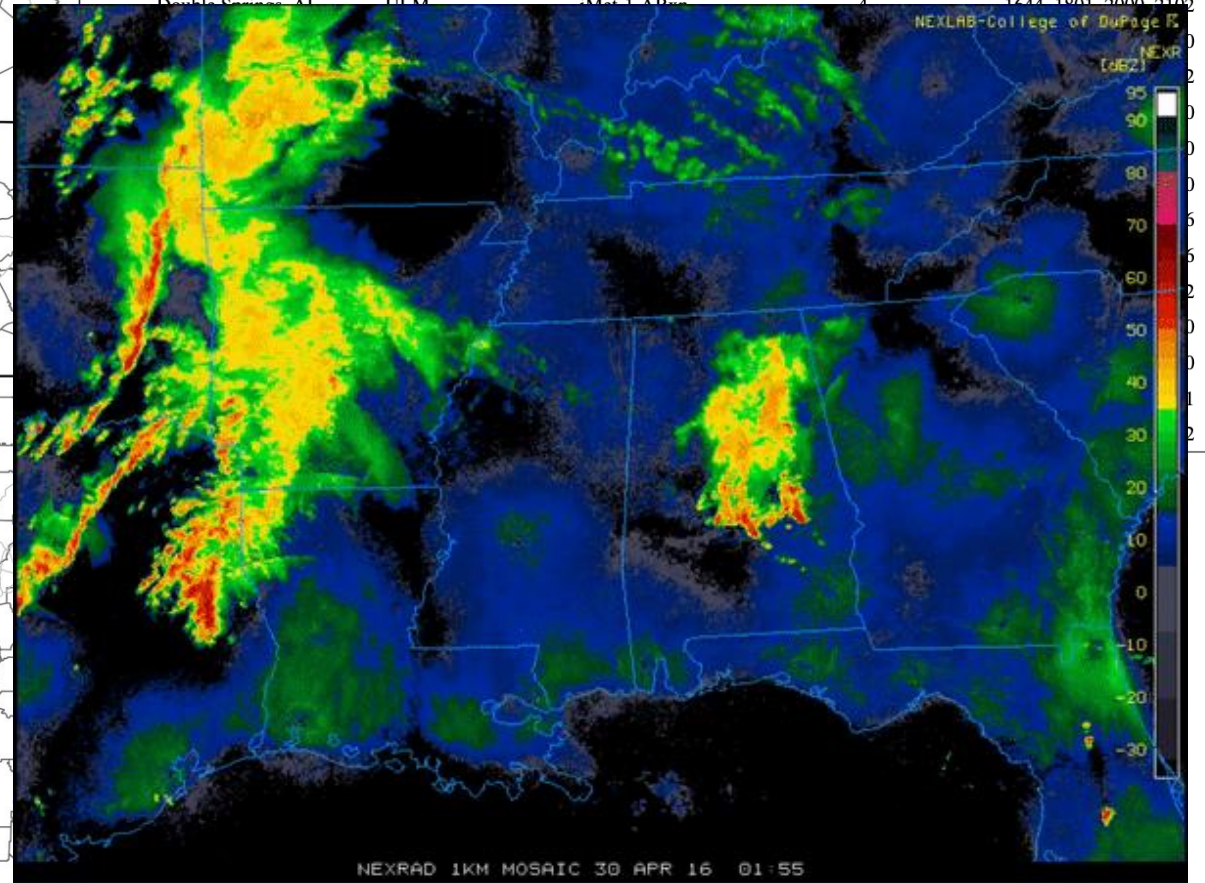
30 April 2016

No. of soundings = 38  
 No. of tornadoes = 0  
 ★ sounding location  
 --- 150 km radius around sounding



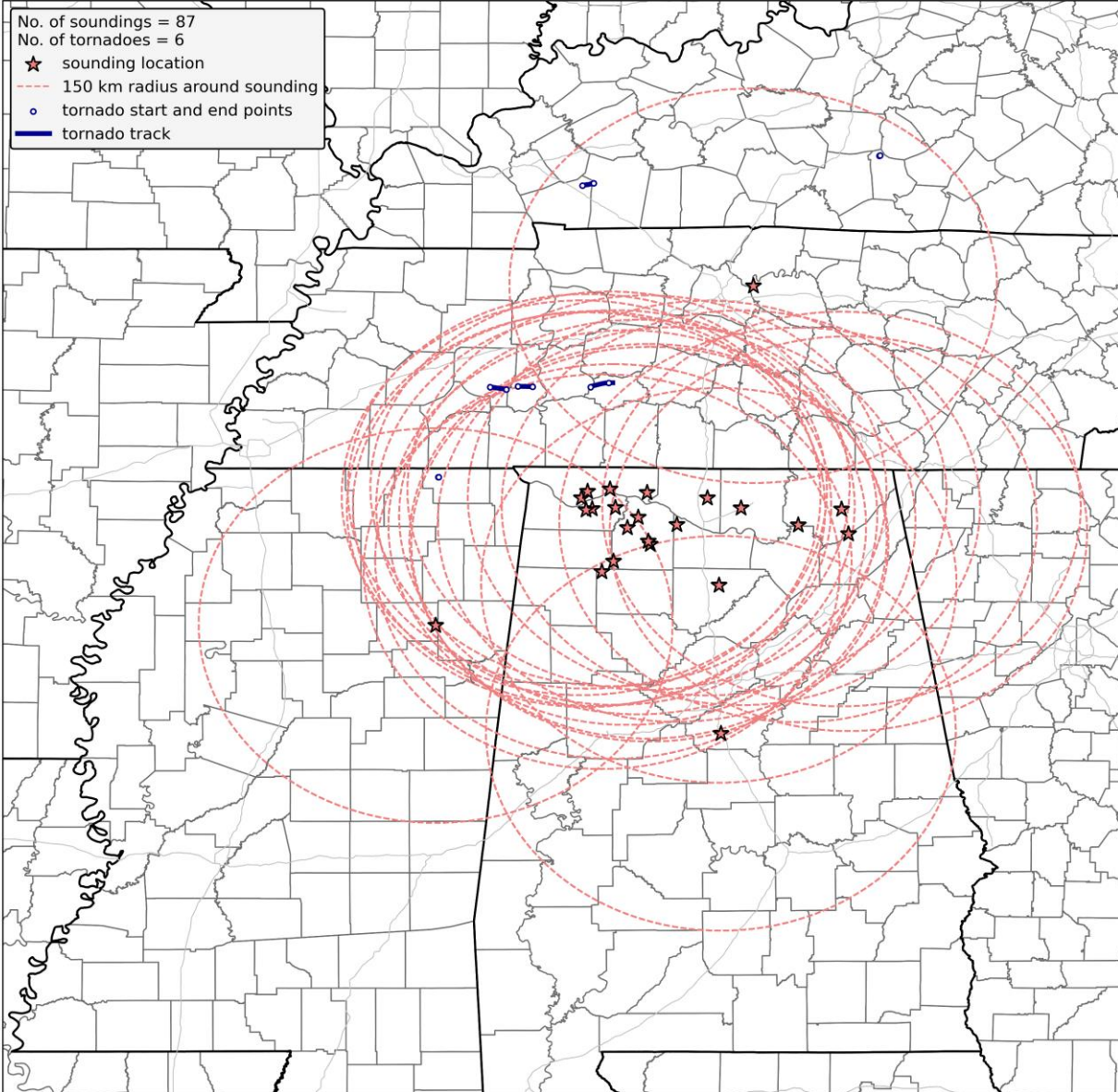
## Soundings:

Location	Organization	Sonde Type	No. Soundings	Sounding time (UTC)
Jasper, AL	NOAA ATDD	GRW DFM-09	5	1700, 1800, 2000, 2100, 2200
Columbus, MS	MSU	WindSond S1H2	4	1627, 1756, 1956, 2057
Douglasville, GA	ILM	Model AR...	4	1644, 1801, 2000, 2100





27 March 2017



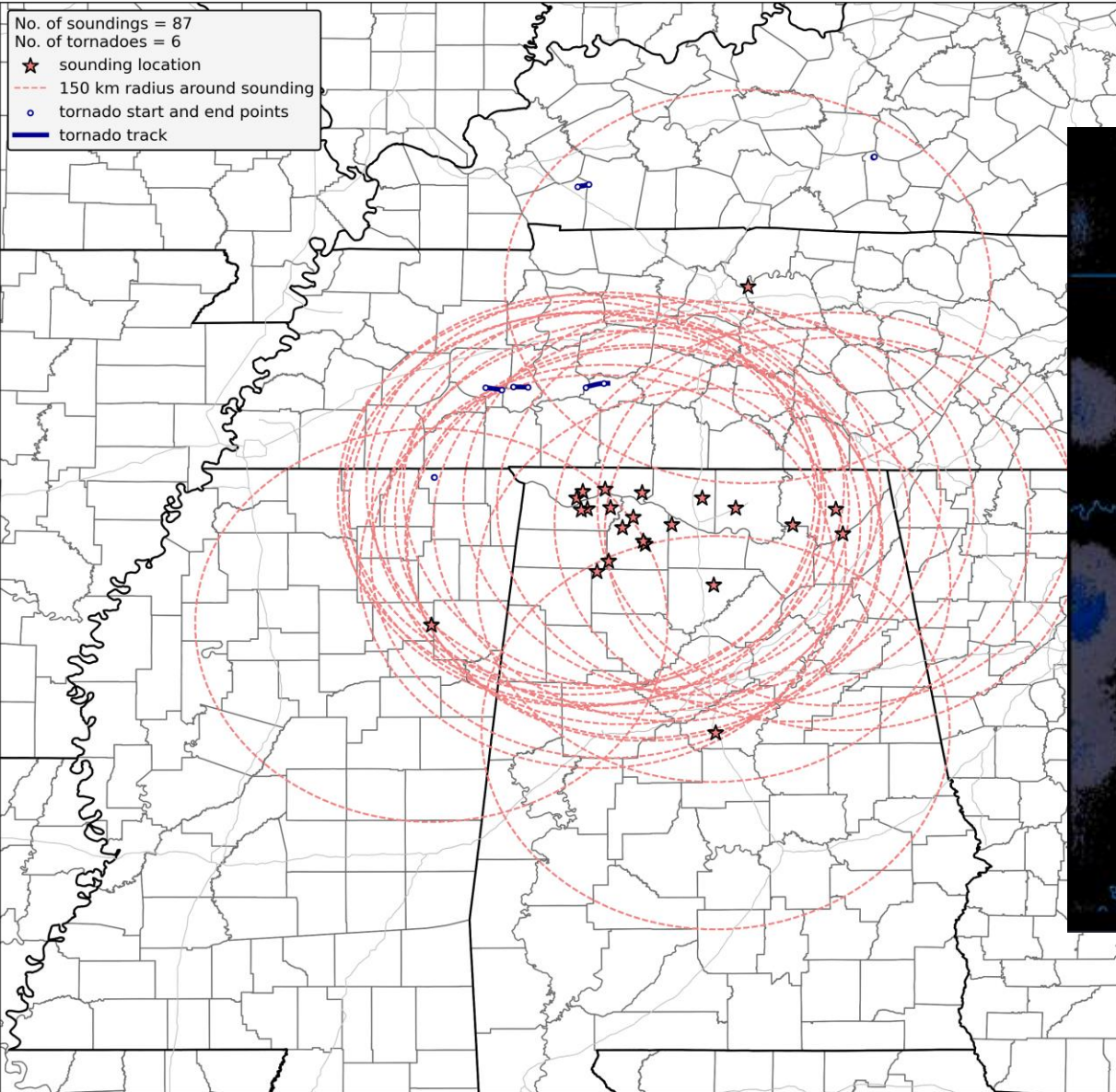
## Soundings:

Location	Organization	Sonde Type	No. Soundings	Sounding time (UTC)
Huntsville, AL	UAH	-	11	1159, 1321, 1505, 1513, 1700, 1900, 2005, 2105, 2139, 0218, 0240
Cullman, AL	NOAA ATDD	GRAW DFM-09	11	1200, 1500, 1700, 1900, 1952, 2042, 2134, 0000, 0100, 0200, 0304
Haleyville, AL	MSU	Windsond S1H2	11	1804, 1854, 1919, 1953, 2022, 2039, 2057, 2112, 2131, 2143, 2159
NE Haleyville, AL	MSU	Windsond S1H2	9	1748, 1852, 1924, 2005, 2025, 2040, 2130, 2141, 2202
Powell, AL	ULM	iMet-1-ABxn	7	1446, 1646, 1846, 1947, 2149, 2250, 0301
Hollywood, AL	NOAA ATDD	GRAW DFM-09	6	1222, 1500, 1700, 1900, 2200, 2302
Brownsferry, AL	UAH	Windsond S1H	6	1718, 1952, 2151, 0002, 0051, 0215
Courtland, AL	ULM	iMet-1-ABxn	3	1639, 1841, 1933
Old Hickory, TN	NWS OHX	Lockheed Martin Sippican LMS-6	2	1104, 2302
Birmingham, AL	NWS BMX	Lockheed Martin Sippican LMS-6	2	1109, 2304
Tuscumbia, AL	ULM	iMet-1-ABxn	2	1200, 1433
Leighton, AL	CSU	RS41-SGP	2	1701, 1900
Athens, AL	CSU	RS41-SGP	2	0109, 0230
Egypt, MS	MSU	WindSonde S1H2	1	1159
Courtland, AL	TTU	Vaisala RS-92-SGPD	1	1501
Muscle Shoals, AL	Purdue	Windsonde S1H3-S	1	1847
Town Creek, AL	CSU	RS41-SGP	1	2004
Woodville, AL	NOAA ATDD	GRAW DFM-09	1	2028
N Moulton, AL	TTU	Vaisala RS-92-SGPD	1	2058
Moulton, AL	ULM	iMet-1-ABxn	1	2100
Trinity, AL	ULM	iMet-1-ABxn	1	2113
W Florence, AL	ULM	iMet-1-ABxn	1	0005
N Florence, AL	ULM	iMet-1-ABxn	1	0115
Killen, AL	TTU	Vaisala RS-92-SGPD	1	0124
Hollywood, AL	ULM	iMet-1-ABxn	1	0134
Rogersville, AL	Purdue	Windsonde S1H3-S	1	0135

## Tornadoes:

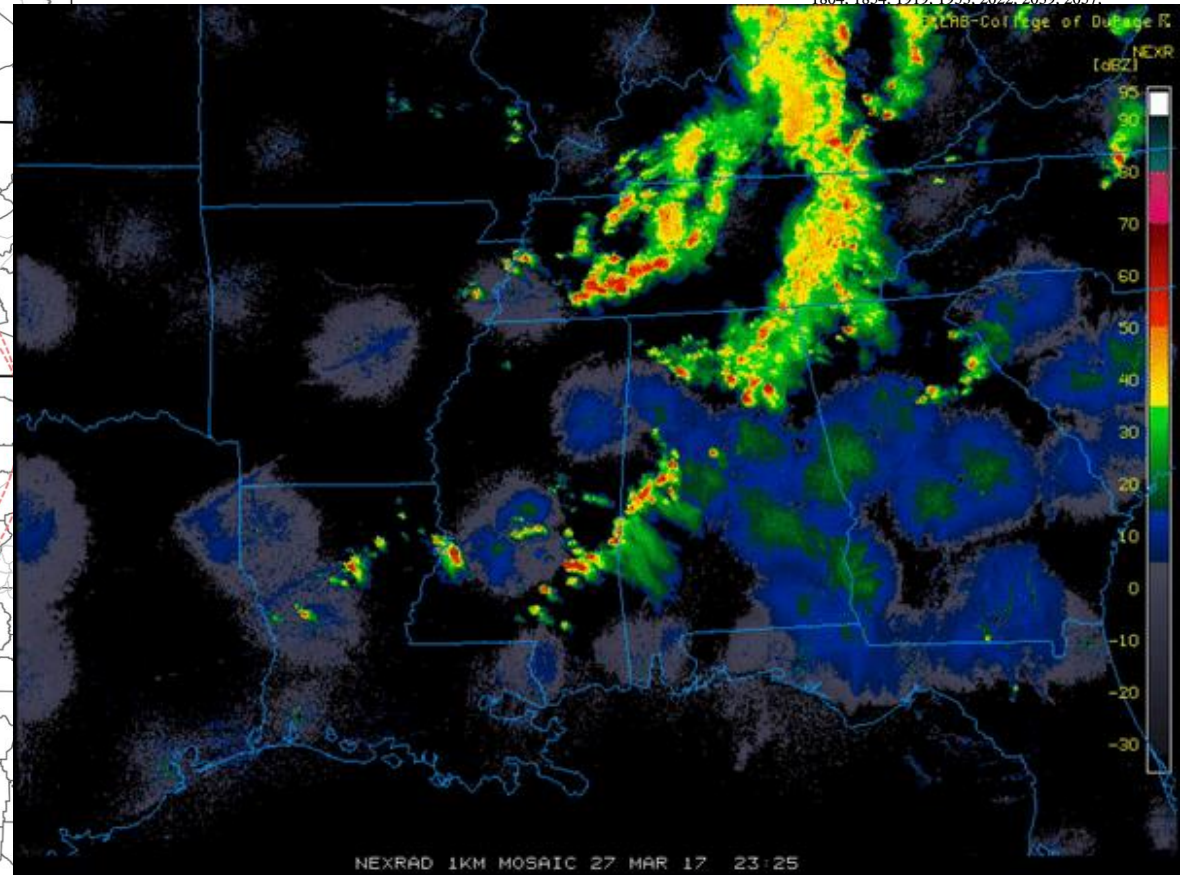
ID	State	County	Start Time (UTC)	Rating	Length (mi)	Width (yd)	Injuries	Fatalities
5-a	MS	Alcorn	1859	EF-0	0.19	50	0	0
5-b	KY	Trigg and Christian	1927	EF-0	4.40	125	0	0
5-c	TN	Henderson	2159	EF-0	6.42	50	0	0
5-d	KY	Metcalfe	2205	EF-1	0.31	100	0	0
5-e	TN	Decatur	2218	EF-1	5.50	100	0	0
5-f	TN	Perry and Lewis	2312	EF-1	7.26	300	0	0

27 March 2017



## Soundings:

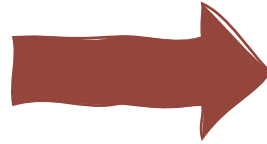
Location	Organization	Sonde Type	No. Soundings	Sounding time (UTC)
Huntsville, AL	UAH	-	11	1159, 1321, 1505, 1513, 1700, 1900, 2005, 2105, 2139, 0218, 0240
Cullman, AL	NOAA ATDD	GRW DFM-09	11	1200, 1500, 1700, 1900, 1952, 2042, 2134, 0000, 0100, 0200, 0304, 1804, 1854, 1919, 1953, 2022, 2039, 2057



5-a	MS	Alcorn	1859	EF-0	0.19	50	0	0
5-b	KY	Trigg and Christian	1927	EF-0	4.40	125	0	0
5-c	TN	Henderson	2159	EF-0	6.42	50	0	0
5-d	KY	Metcalfe	2205	EF-1	0.31	100	0	0
5-e	TN	Decatur	2218	EF-1	5.50	100	0	0
5-f	TN	Perry and Lewis	2312	EF-1	7.26	300	0	0

# We plan to **analyze the data** by...

1. Relating sounding parameters to observed storm evolution



2. Understanding how those sounding parameters evolve in the vicinity of convection

1. Classifying the proximity soundings

2. Identifying differences (if any) in tornadic/non-tornadic environments and how those differences evolve

3. Is storm mode the reason for these differences?

4. WHY?

