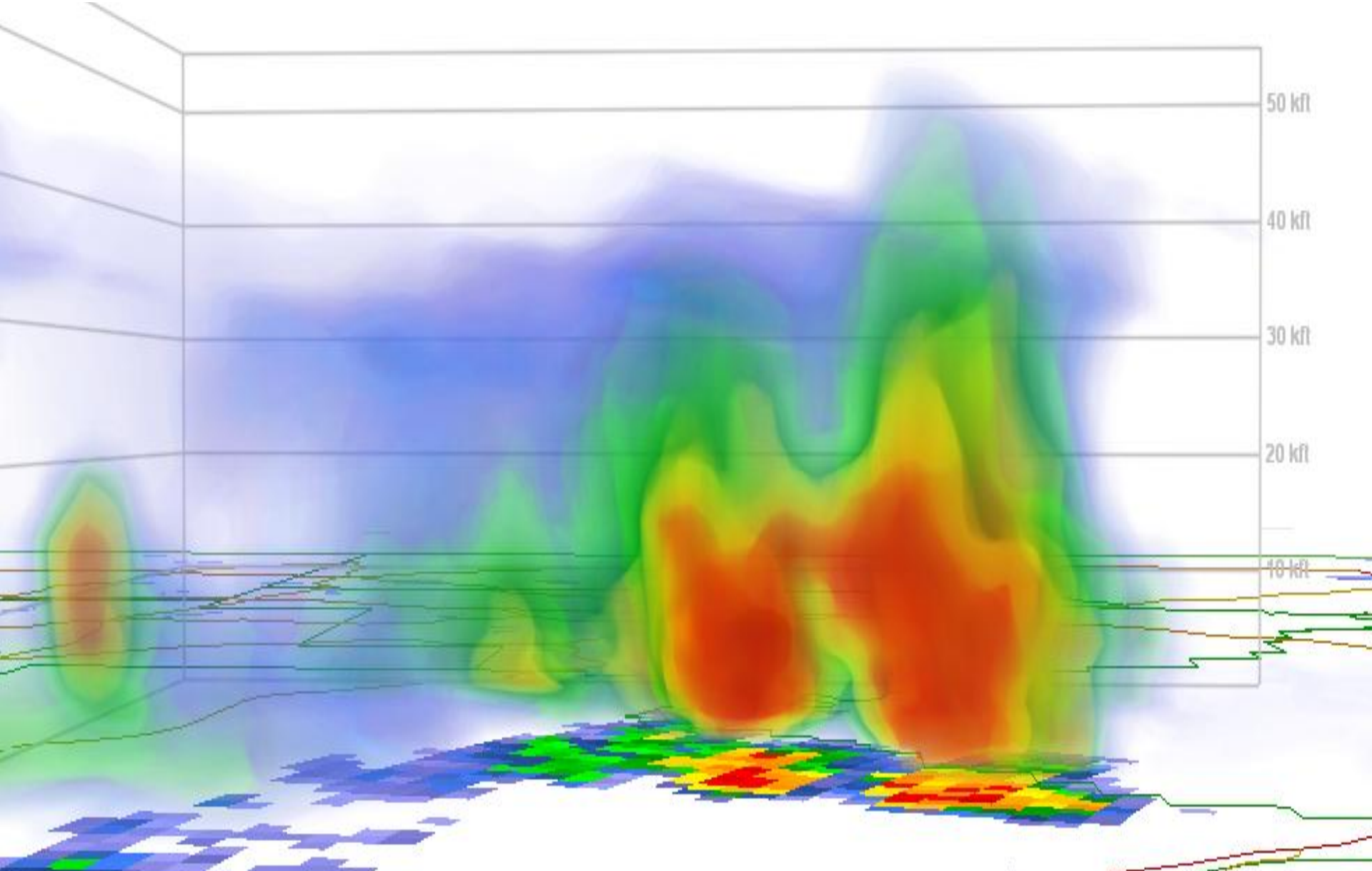
IMPROVING SUMMER PROBABILITY OF PRECIPITATION FORECASTING IN CENTRAL ALABAMA



Goals

Science Goals

- Add skill to summer PoP forecast - dispel random convection myth
- Collaboration with the research and operational community to integrate and combine datasets to improve NWS operations

Steps to Improvement

SUMMER 1

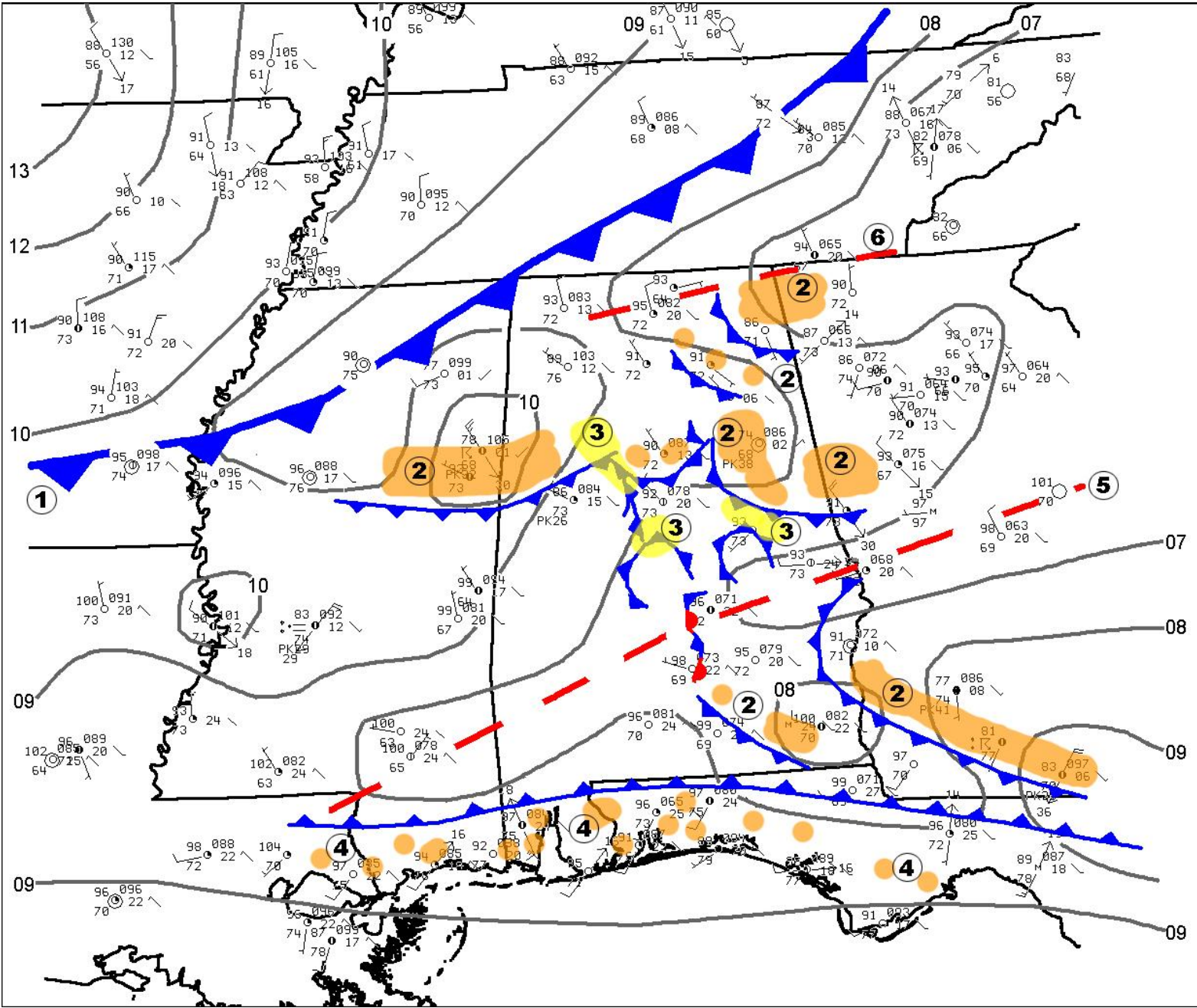
- Attempt to identify boundaries for summertime convection
- Dispel the myth of “Random” summertime thunderstorm development
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Collaborate with the SPoRT Center to develop an operational forecasting methodology using all available tools and future products

SUMMER 2

SUMMER 3

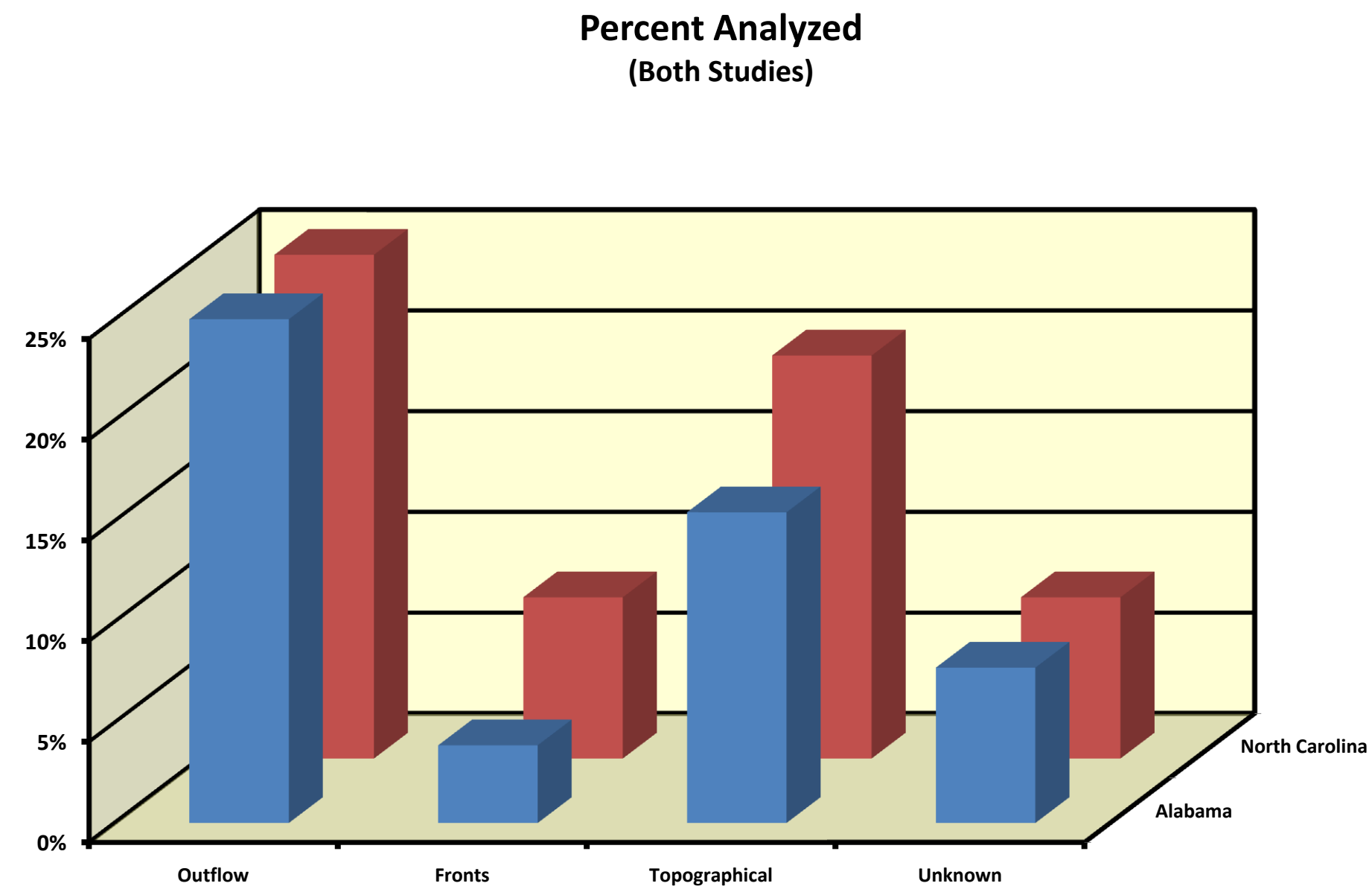
SUMMER 4

Surface Analysis



1. Cold front advancing slowly southward (surface, sat, radar)
2. Autoconvection occuring behind outflow boundaries, and present at the analysis time (surface, sat, radar)
3. Convection from outflow boundary collisions, from existing boundaries, or stationary boundaries (radar)
4. Autoconvection from inbound sea breeze (surface, sat, radar)
5. Prefrontal trough (surface)
6. Outflow from previous day convection (surface, sat)

Boundary Statistics from 2009



Steps to Improvement

SUMMER 1

- Attempt to identify boundaries for summertime convection
- Dispel the myth of “Random” summertime thunderstorm development
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Collaborate with the SPoRT Center to develop an operational forecasting methodology using all available tools and future products

SUMMER 2

- Identify several triggers for summertime convective initiation (1st Generation Only)
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Introduce SPoRT LIS data as a potential data source for identifying mainly unknown boundaries
- Develop experimental graphical short term forecasts with forecast polygon areas indicating where convective initiation is likely

SUMMER 3

SUMMER 4

Land Information System (LIS)

- LIS created
  - Land Surface Forcing:
    - soil type
    - vegetation and land cover
    - land mask
    - topography
    - vegetation fraction
    - albedo
  - Atmospheric Forcing:
    - Days -5 to -3: Stage IV precip. (~4.8-km) and North American Land Data Assim. System (NLDAS, ~14-km)
    - Days -3 to initialization time: Stage IV precip. and GFS Data Assim. System (GDAS, ~52 km)
    - Initialization to t + 15 hours: GFS (~52 km)

Land Information System (LIS)

SPoRT

Short-term Prediction Research and Transition Center

NASA

SPoRT is a NASA project to transition unique observations and research capabilities to the operational weather community to improve short-term forecasts on a regional scale.

Real-time 1km Land Information System over Alabama

Notes:

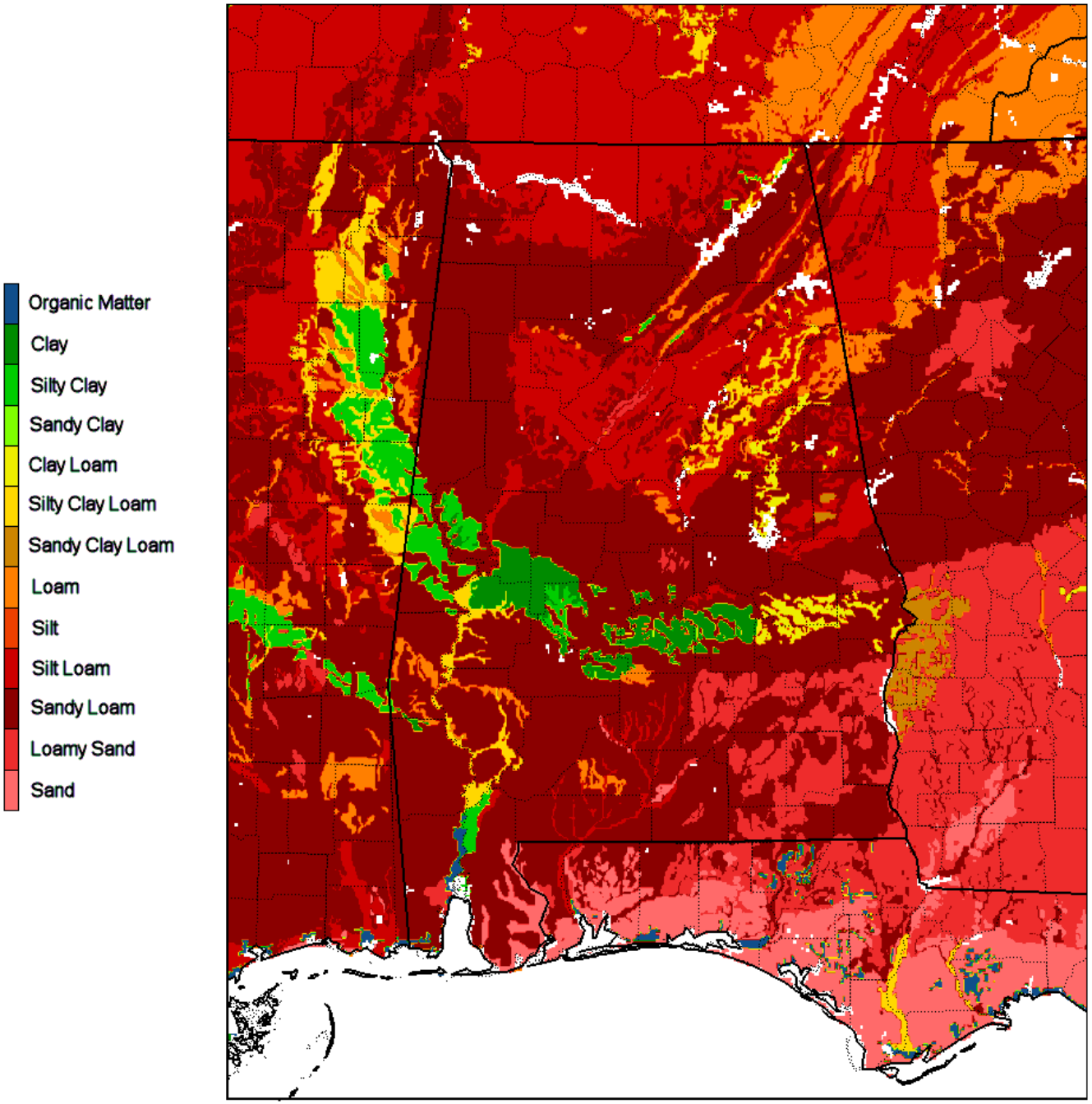
- The page is regenerated each morning, just after midnight, to include the new day.
- The hyperlinks on the page are "dumb", i.e. they will still link even if there's not yet data for that day, but the loop script will print "No data found".

Soil Type Vegetation Type

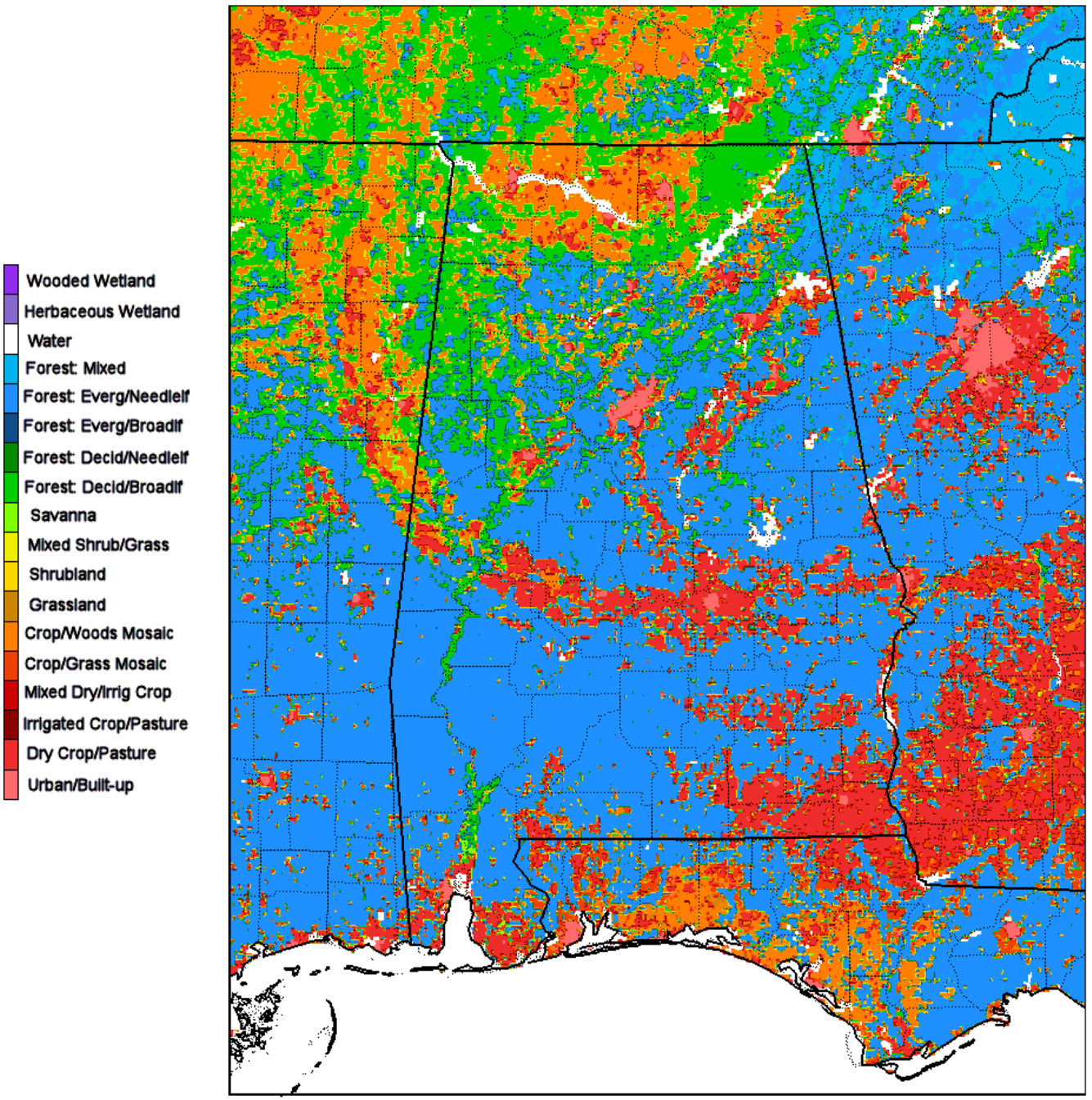
August 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	2 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	3 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	4 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	5 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	6 SOIM0-10 / SOIM40-10 / RSOIM / INT-RSOIM / LH / SHFX / TSKIN / VEGF
7 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	8 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	9 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	10 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	11 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	12 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	13 SOIM0-10 / SOIM40-10 / RSOIM / INT-RSOIM / LH / SHFX / TSKIN / VEGF
14 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	15 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	16 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	17 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	18 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	19 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	20 SOIM0-10 / SOIM40-10 / RSOIM / INT-RSOIM / LH / SHFX / TSKIN / VEGF
21 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	22 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	23 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	24 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	25 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	26 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	27 SOIM0-10 / SOIM40-10 / RSOIM / INT-RSOIM / LH / SHFX / TSKIN / VEGF
28 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	29 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	30 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR	31 SOIM0-10 / SOIM40-100 / RSOIM / INT-RSOIM / LHFX / SHFX / TSKIN / VEGFR			

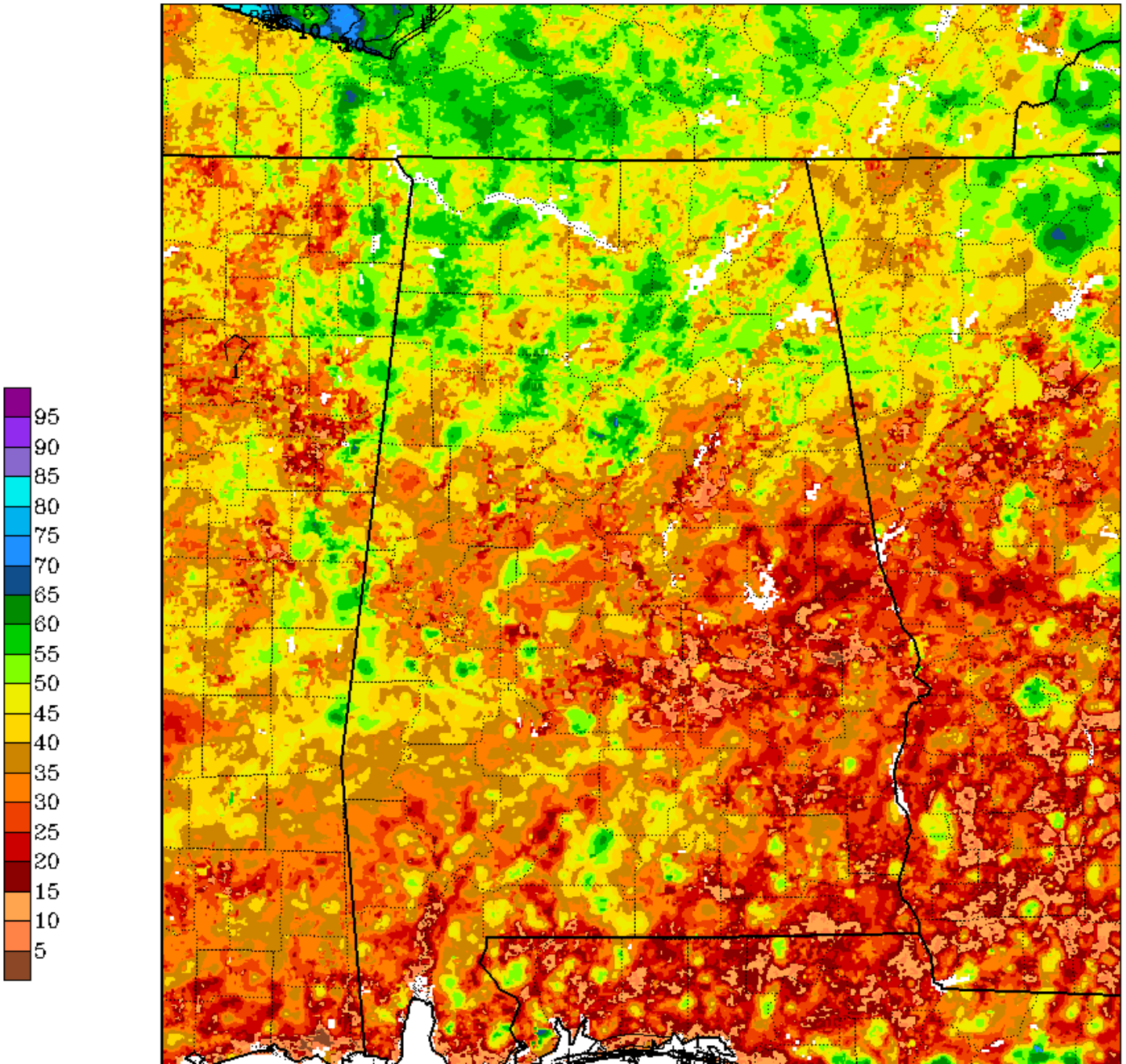
STATSGO Soil Class

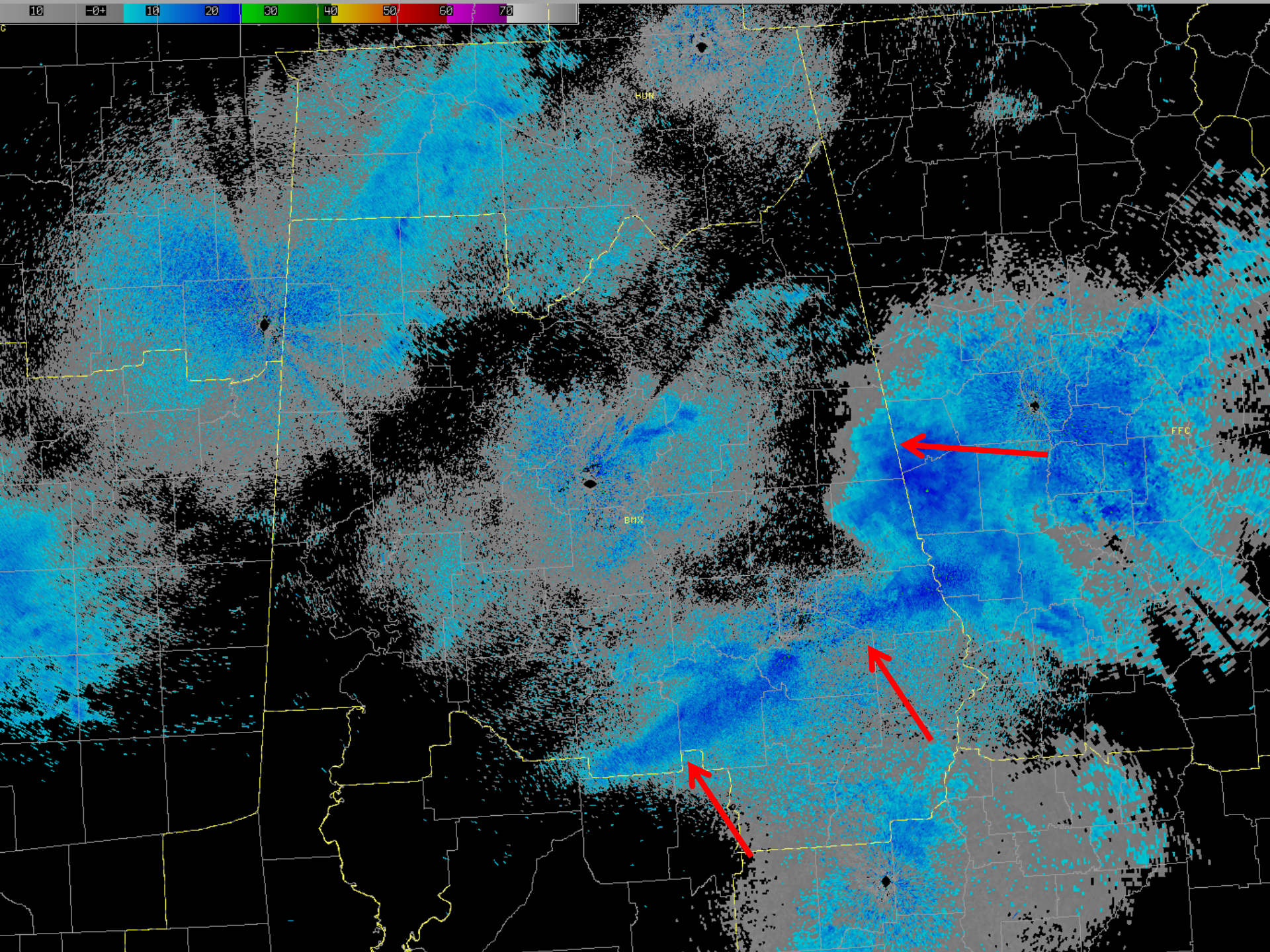


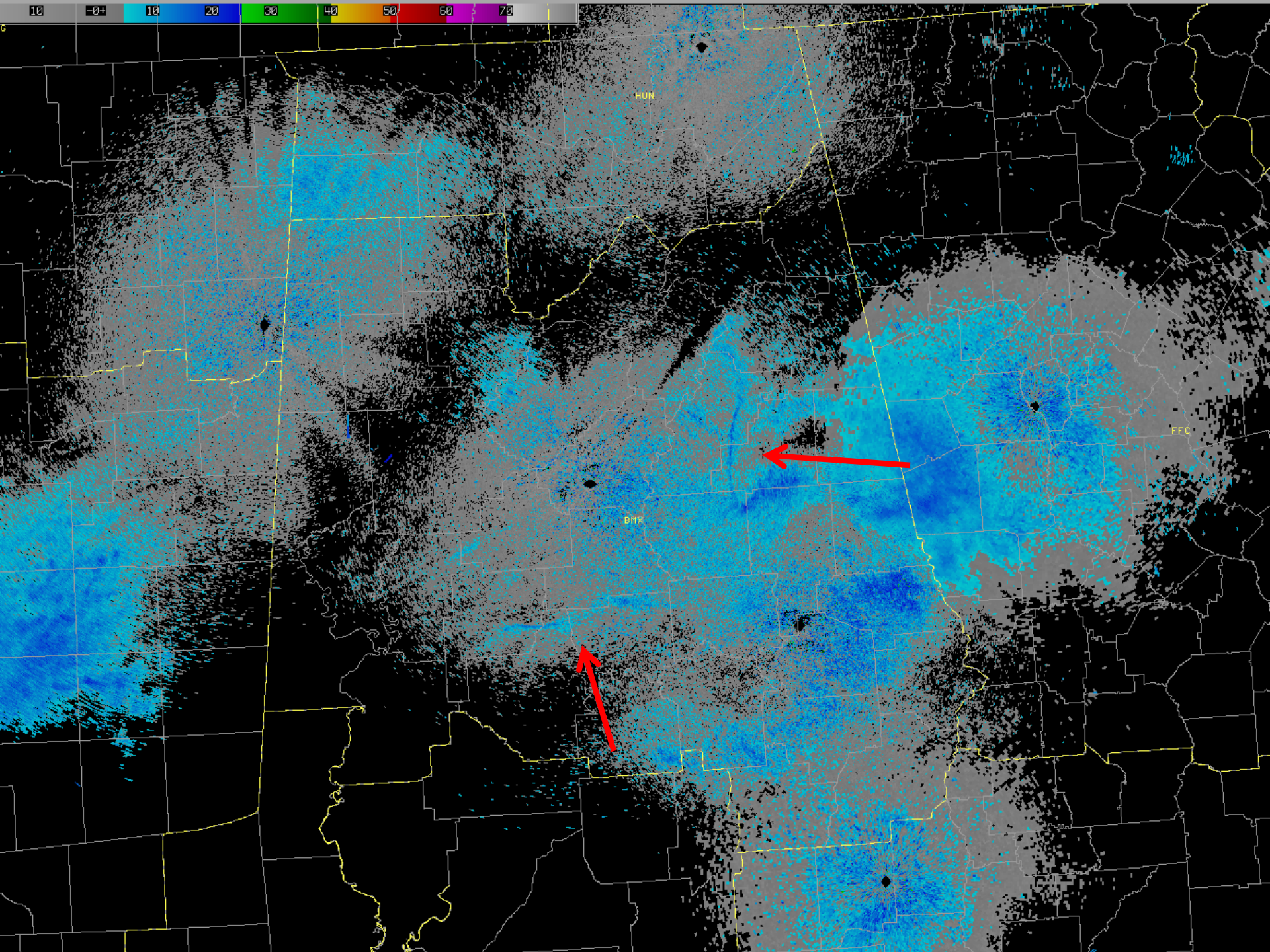
USGS Vegetation Class

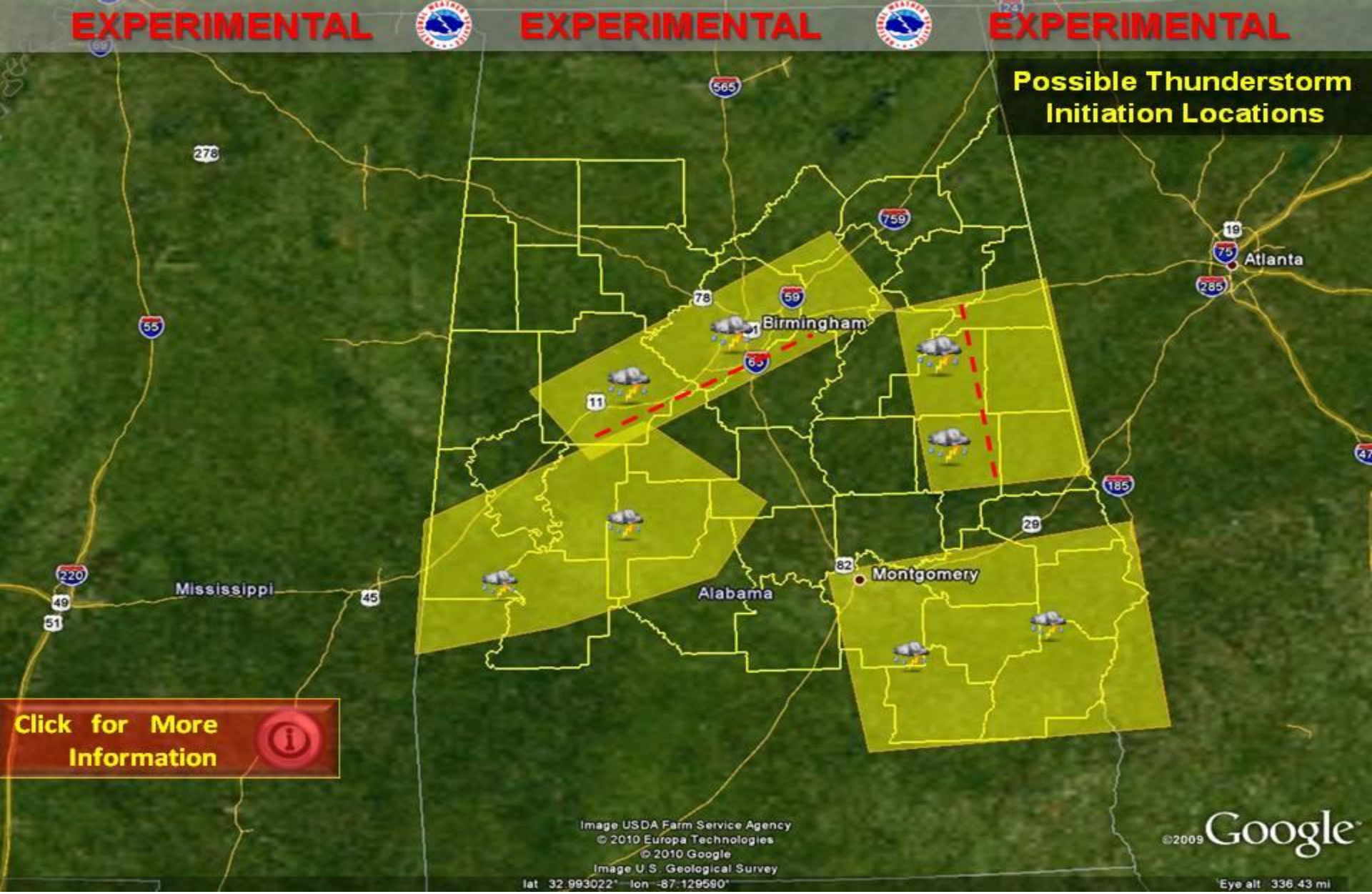


0–10 cm Relative Soil Moisture (%) at 110708/0900V000
Precip forcing (mm/hr, contours)



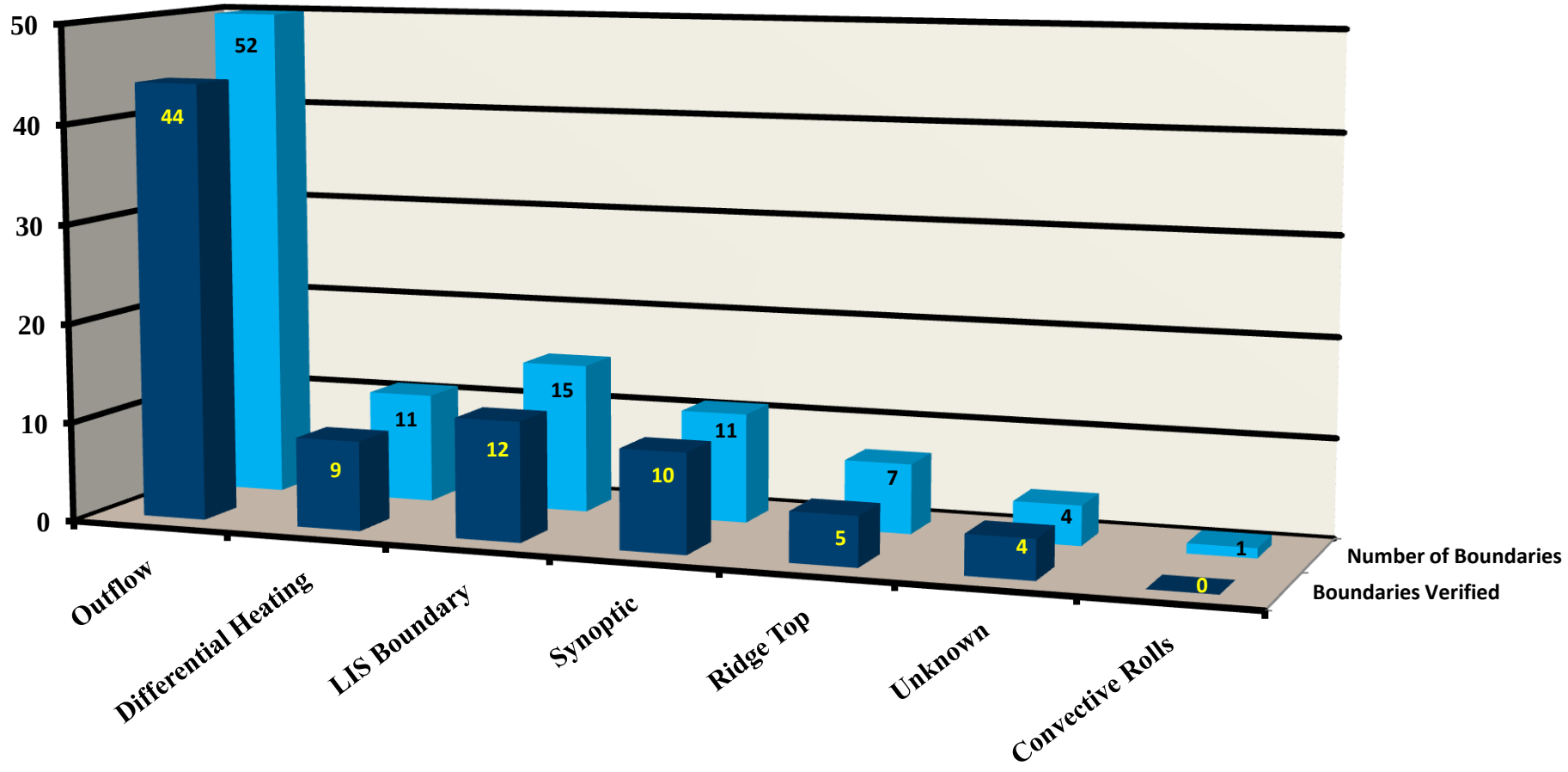

10
-0+
10
20
30
40
50
60
70
HUN
BMX
FFC


10
-0+
10
20
30
40
50
60
70
HUN
BMX
FFC



This is an experimental graphicast depicting the areas where thunderstorms could first develop this afternoon. The graphic is part of a larger project devoted to the improvement of summertime forecasting throughout the southeast.

Boundaries


50
40
30
20
10
0
52
44
11
9
15
12
11
10
7
5
4
4
1
0
Outflow
Differential Heating
LIS Boundary
Synoptic
Ridge Top
Unknown
Convective Rolls
Number of Boundaries
Boundaries Verified

Steps to Improvement

SUMMER 1

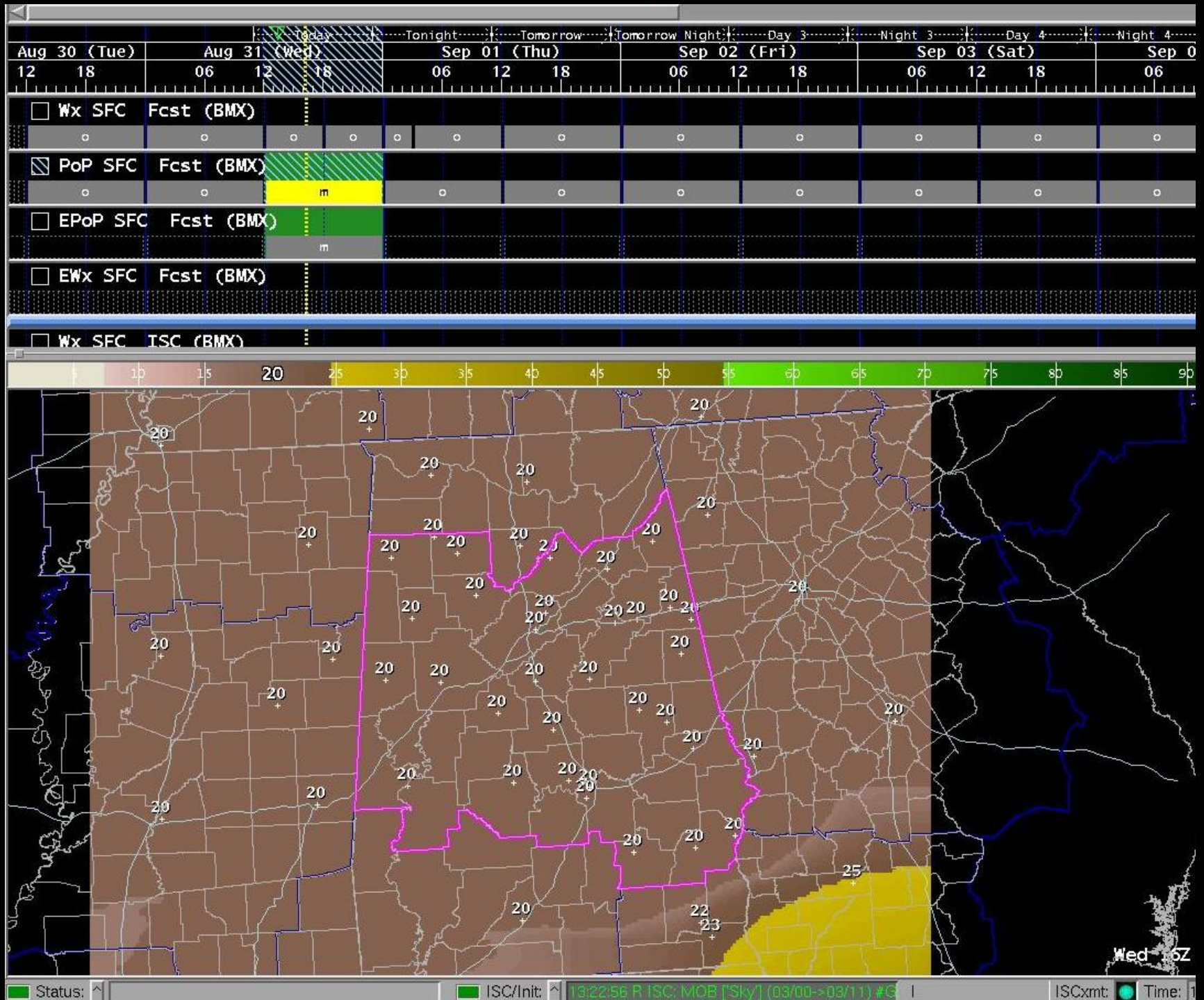
- Attempt to identify boundaries for summertime convection
- Dispel the myth of “Random” summertime thunderstorm development
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Collaborate with the SPoRT Center to develop an operational forecasting methodology using all available tools and future products

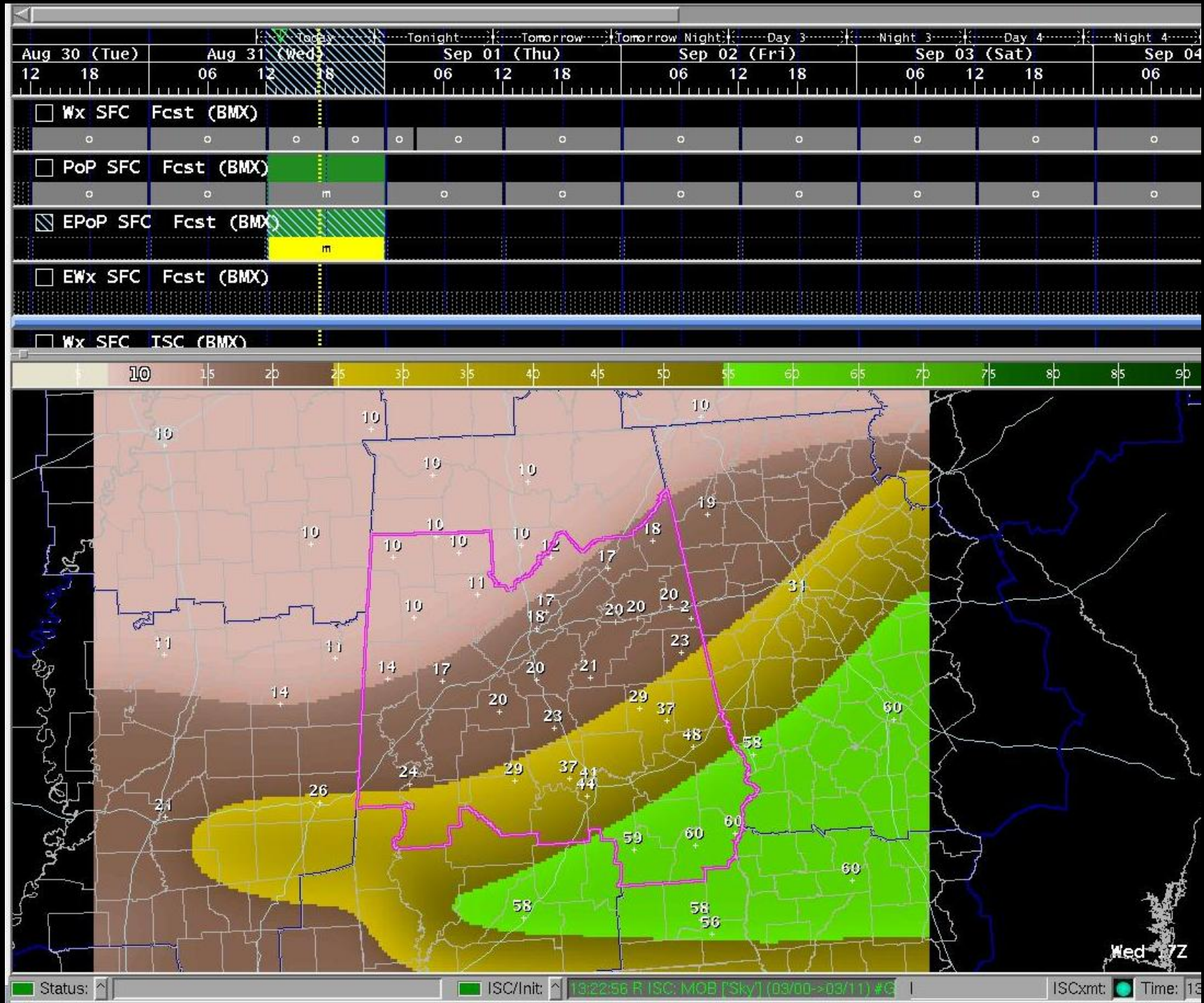
SUMMER 2

- Identify several triggers for summertime convective initiation
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Introduce SPoRT LIS data as a potential data source for identifying mainly unknown boundaries
- Develop experimental graphical short term forecasts with forecast polygon areas indicating where convective initiation is likely.

SUMMER 3

- Attempt to identify boundaries for convective initiation and determine where subsequent generation convection will occur
- Refine the use of products (surface analysis, NEXRAD, GOES, and featured LIS products.
- Introduce GFE experimental POP grids…go digital. Show improvement from the midnight shift to the morning update POP
- Bring in more operational forecasters


Today
Tonight
Tomorrow
Tomorrow Night
Day 3
Night 3
Day 4
Night 4
Aug 30 (Tue)
Aug 31 (Wed)
Sep 01 (Thu)
Sep 02 (Fri)
Sep 03 (Sat)
Sep 0
12 18 06 12 18 06 12 18 06 12 18 06 12 18 06
Wx SFC Fcst (BMX)
PoP SFC Fcst (BMX)
EPoP SFC Fcst (BMX)
EWx SFC Fcst (BMX)
Wx SFC ISC (BMX)
5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
Wed 15Z
Status:
ISC/Init:
ISCxmt:
Time:


Today
Tonight
Tomorrow
Tomorrow Night
Day 3
Night 3
Day 4
Night 4
Aug 30 (Tue)
Aug 31 (Wed)
Sep 01 (Thu)
Sep 02 (Fri)
Sep 03 (Sat)
Sep 04
12 18 06 12 18 06 12 18 06 12 18 06 12 18 06
Wx SFC Fcst (BMX)
PoP SFC Fcst (BMX)
EPoP SFC Fcst (BMX)
EWx SFC Fcst (BMX)
Wx SFC ISC (BMX)
10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
Wed 17Z
Status:
ISC/Init:
ISCxmt:
Time:

GFE: (klaws - MyConfig)

GFE WeatherElement Populate Grids Edit Consistency Products Maps Edit Areas Verify Hazards

Formatter Launcher

Products Data Source Processor Issued By Help

EAFM

File Edit Options CallToActions

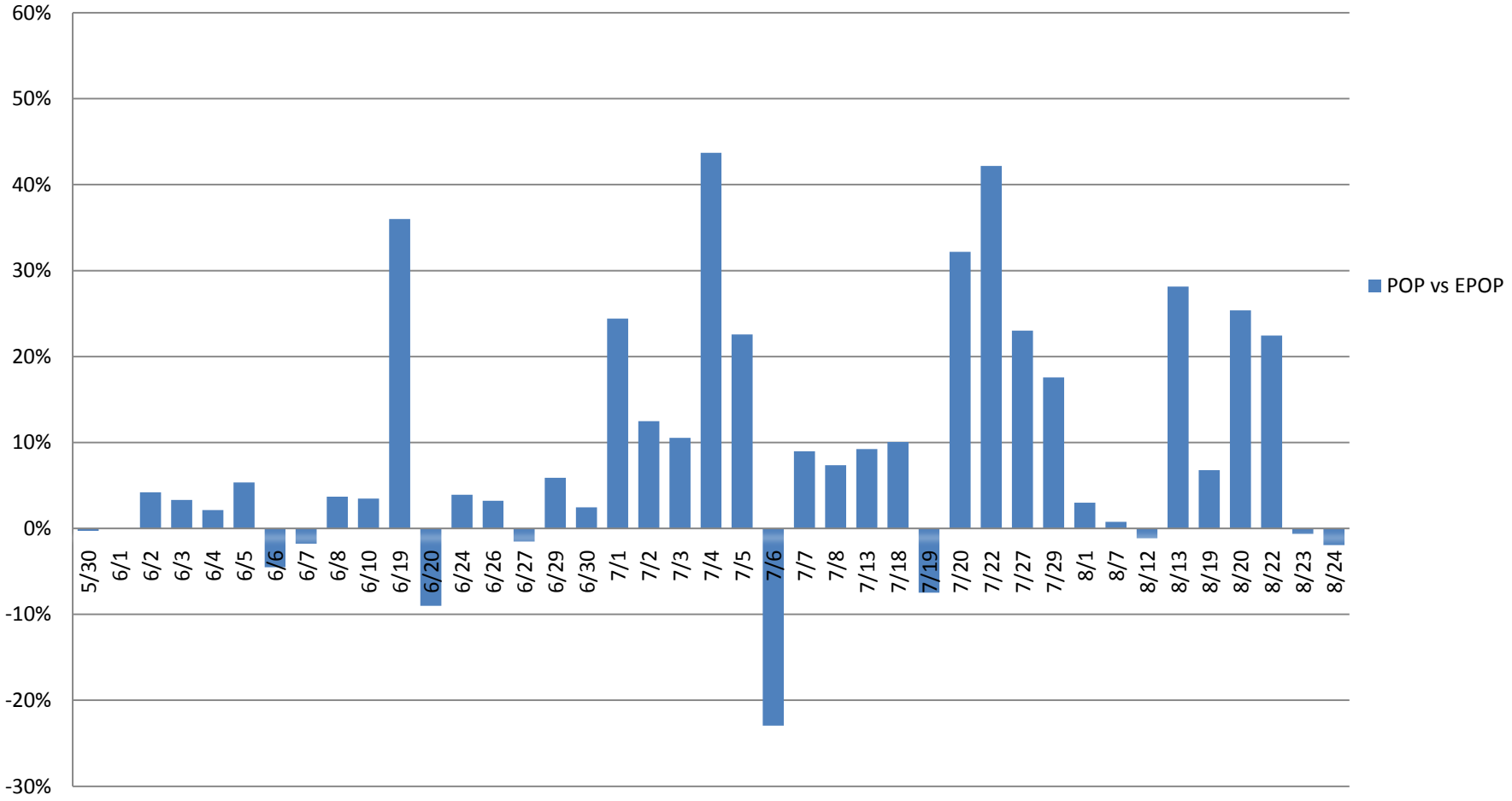
```
FOUS54 KBMX 311324
WRKAFM

AREA FORECAST MATRICES
NATIONAL WEATHER SERVICE BIRMINGHAM AL
824 AM CDT WED AUG 31 2011

ALZ011-312215-
MARION-
INCLUDING THE CITIES OF...HAMILTON
824 AM CDT WED AUG 31 2011

DATE             WED 08/31/11             THU
CDT 3HRLY     04 07 10 13 16 19 22 01 04 07
UTC 3HRLY     09 12 15 18 21 00 03 06 09 12

POP 12HR                    10           5
EPOP 12HR                   MM           MM

$$
ALZ014-312215-
WINSTON-
INCLUDING THE CITIES OF...DOUBLE SPRINGS
824 AM CDT WED AUG 31 2011

DATE             WED 08/31/11             THU
CDT 3HRLY     04 07 10 13 16 19 22 01 04 07
UTC 3HRLY     09 12 15 18 21 00 03 06 09 12

POP 12HR                    10           5
EPOP 12HR                   MM           MM

$$
ALZ017-312215-
BLOUNT-
INCLUDING THE CITIES OF...ONEONTA
824 AM CDT WED AUG 31 2011

DATE             WED 08/31/11             THU
CDT 3HRLY     04 07 10 13 16 19 22 01 04 07
UTC 3HRLY     09 12 15 18 21 00 03 06 09 12

POP 12HR                    10           5
EPOP 12HR                   MM           MM
```

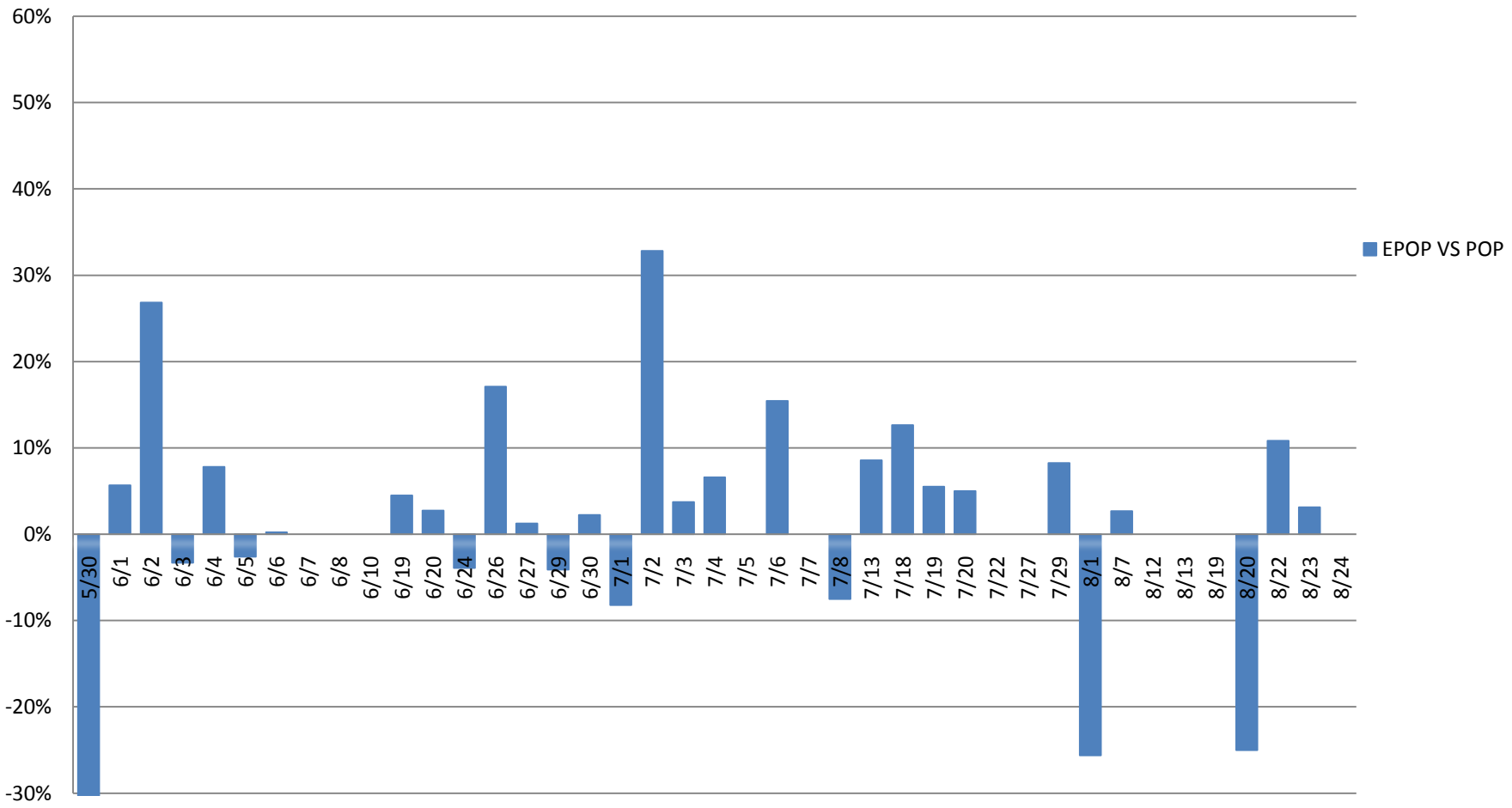
Save Draft Transmit... Type: rou Product expires in: 8.75 At: 22:15Z 31-Aug-11

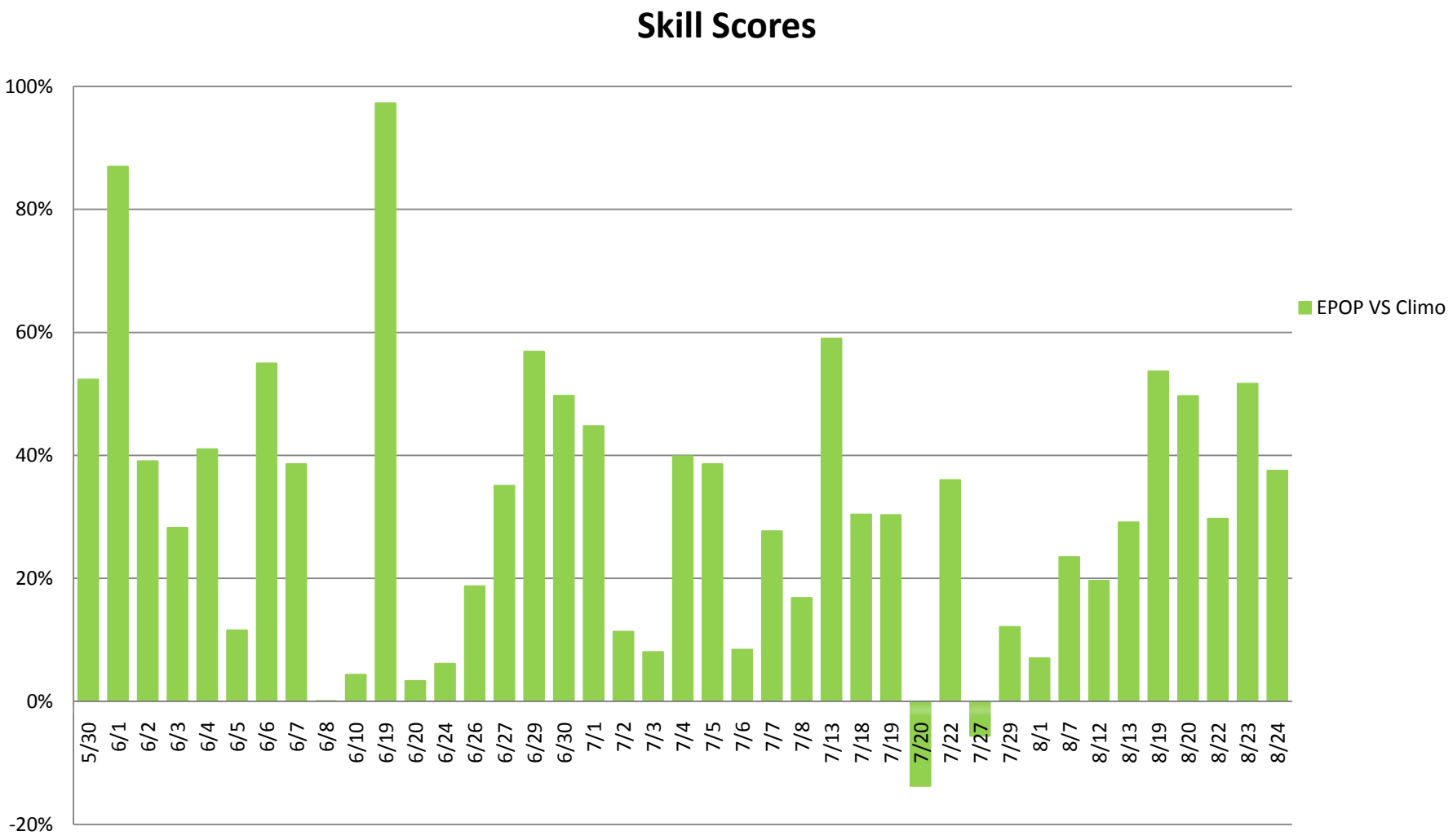
Text Status 13:24:54 R Formatter EAFM finished on server.

Hide

Status: ISC/Init: 13:22:56 R ISC: MOB ['Sky'] (03/00->03/11) #G ISCxmt: Time: 13:24Z 31-Aug


Afternoon Skill Scores
60%
50%
40%
30%
20%
10%
0%
-10%
-20%
-30%
5/30
6/1
6/2
6/3
6/4
6/5
6/6
6/7
6/8
6/10
6/19
6/20
6/24
6/26
6/27
6/29
6/30
7/1
7/2
7/3
7/4
7/5
7/6
7/7
7/8
7/13
7/18
7/19
7/20
7/22
7/27
7/29
8/1
8/7
8/12
8/13
8/19
8/20
8/22
8/23
8/24
POP vs EPOP


Evening Skill Scores
60%
50%
40%
30%
20%
10%
0%
-10%
-20%
-30%
5/30
6/1
6/2
6/3
6/4
6/5
6/6
6/7
6/8
6/10
6/19
6/20
6/24
6/26
6/27
6/29
6/30
7/1
7/2
7/3
7/4
7/5
7/6
7/7
7/8
7/13
7/18
7/19
7/20
7/22
7/27
7/29
8/1
8/7
8/12
8/13
8/19
8/20
8/22
8/23
8/24
EPOP VS POP


Skill Scores
100%
80%
60%
40%
20%
0%
-20%
5/30
6/1
6/2
6/3
6/4
6/5
6/6
6/7
6/8
6/10
6/19
6/20
6/24
6/26
6/27
6/29
6/30
7/1
7/2
7/3
7/4
7/5
7/6
7/7
7/8
7/13
7/18
7/19
7/20
7/22
7/27
7/29
8/1
8/7
8/12
8/13
8/19
8/20
8/22
8/23
8/24
EPOP VS Climo

Steps to Improvement

SUMMER 1

- Attempt to identify boundaries for summertime convection
- Dispel the myth of “Random” summertime thunderstorm development
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Collaborate with the SPoRT Center to develop an operational forecasting methodology using all available tools and future products

SUMMER 2

- Identify several triggers for summertime convective initiation
- Use detailed surface analyses, along with remote sensing operational tools (GOES, NEXRAD) for boundary identification
- Introduce SPoRT LIS data as a potential data source for identifying mainly unknown boundaries
- Develop experimental graphical short term forecasts with forecast polygon areas indicating where convective initiation is likely.

SUMMER 3

- Attempt to identify boundaries for convective initiation and determine where subsequent generation convection will occur
- Refine the use of products (surface analysis, NEXRAD, GOES, and featured LIS products.
- Introduce GFE experimental POP grids…go digital. Show improvement from the midnight shift to the morning update POP

SUMMER 4

- Attempt to improve upon midnight shift forecast…leaving the morning update to refine POP
- Introduce methodology through training modules and the Warning Decision Training Branch