AgroClimate: Climate Smart Agriculture

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University of Florida

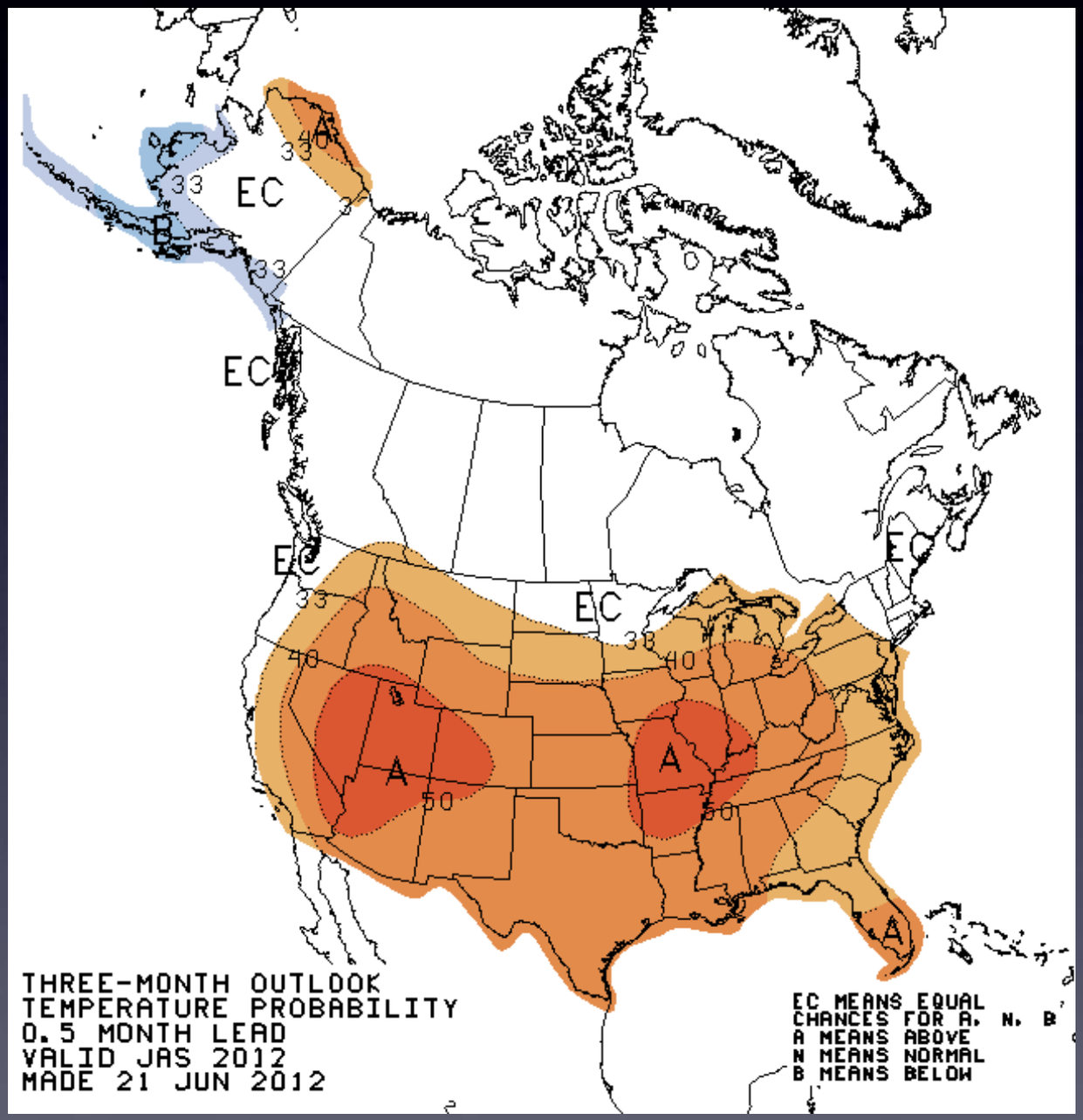
NRCS Technology Webinar
July 19, 2012

Southeast ClimateConsortium

UF UNIVERSITY of FLORIDA
IFAS Extension

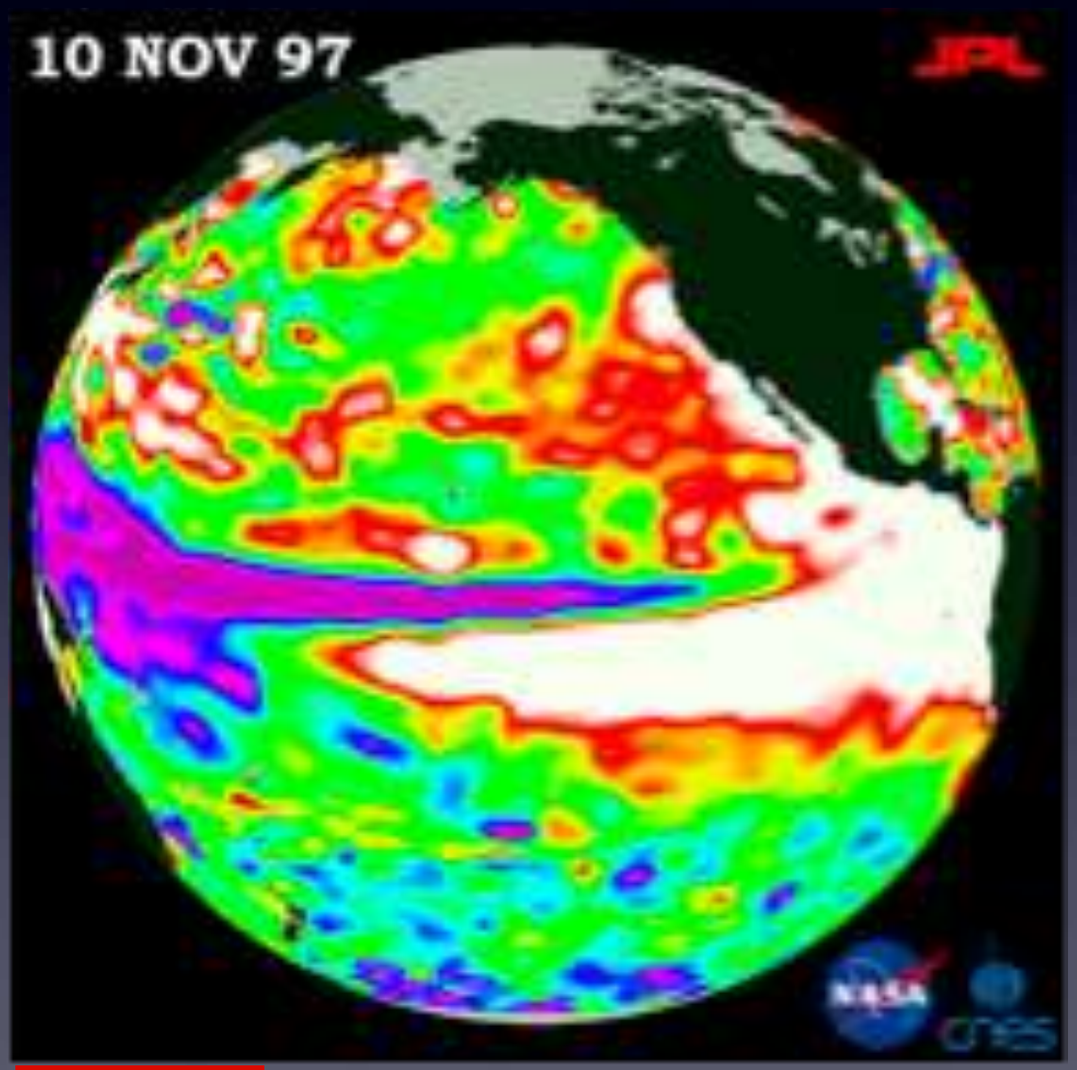
Our Vision

Agricultural producers will better cope with uncertainty and climate associated risks through routine and effective use of climate forecast and monitoring



El Niño - Southern Oscillation (ENSO)

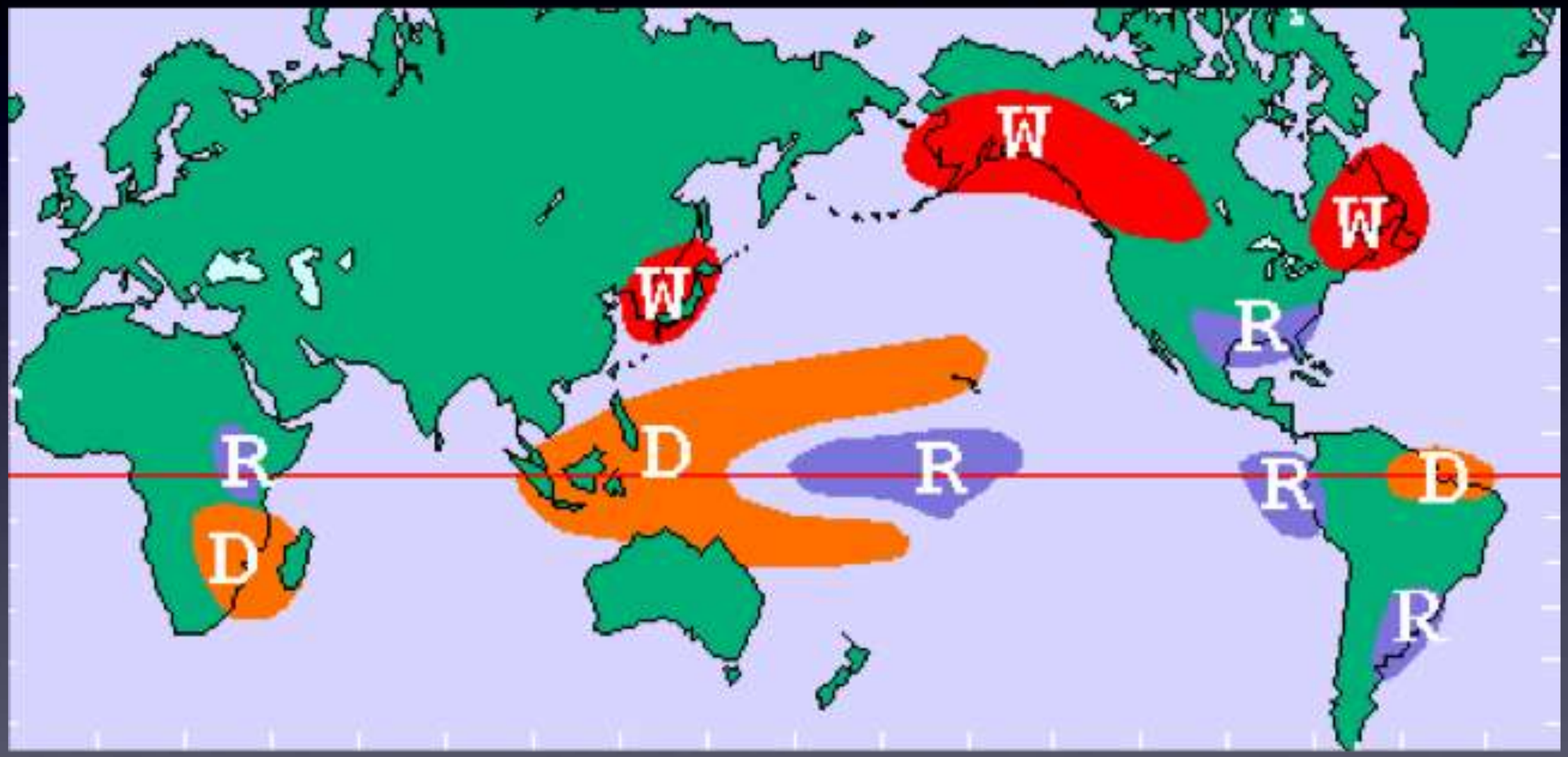
The El Niño / La Niña cycle is the predominant mode of year to year climate variability in the Southeast U.S.



El Niño

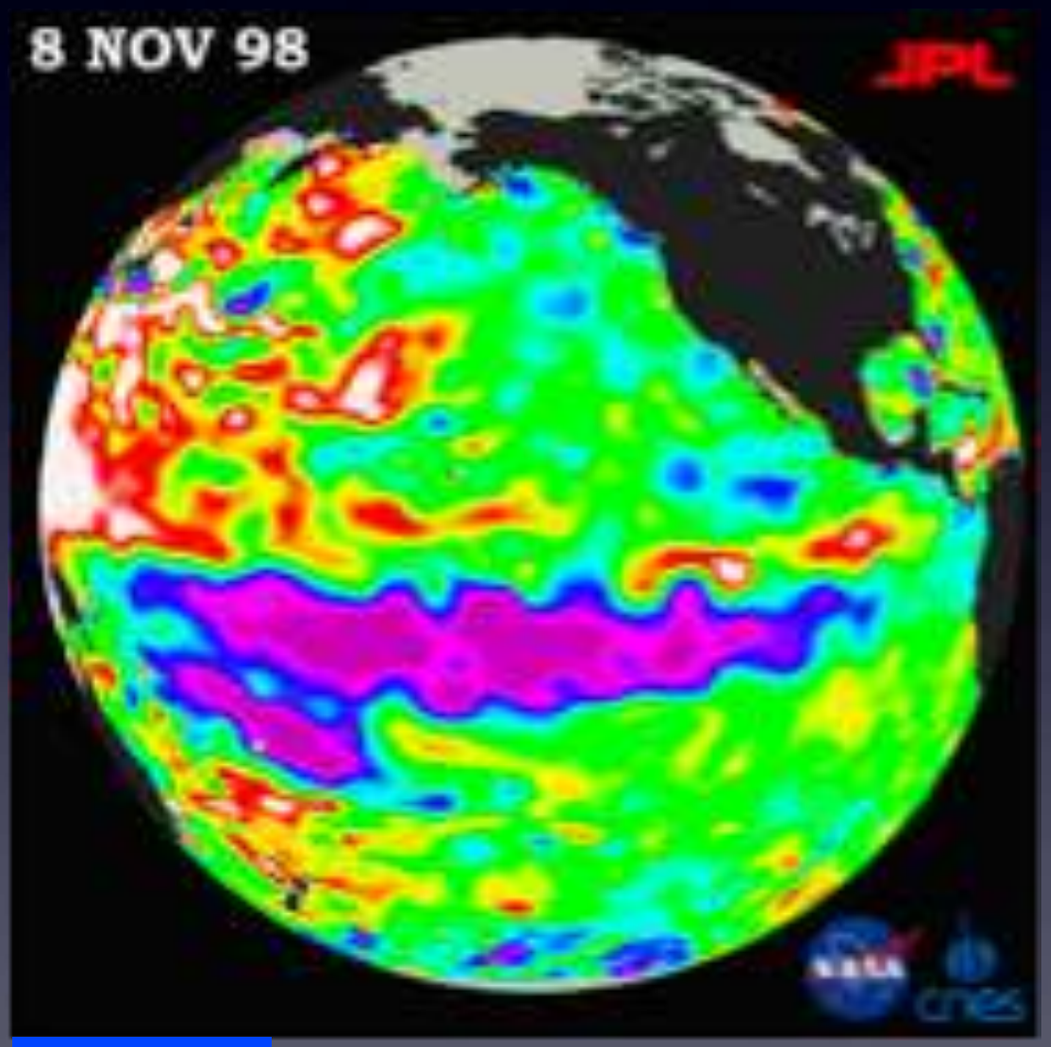
- Warmer than normal sea surface temperature (SST) across the eastern tropical Pacific
- Wetter and cooler winter and springs in the Southeast U.S.
- Fewer Atlantic hurricanes

El Niño - Global impacts



Source: Sustainable Development Department
UN - Food and Agriculture Organization (FAO)

Climate Variability in the SE
La Niña

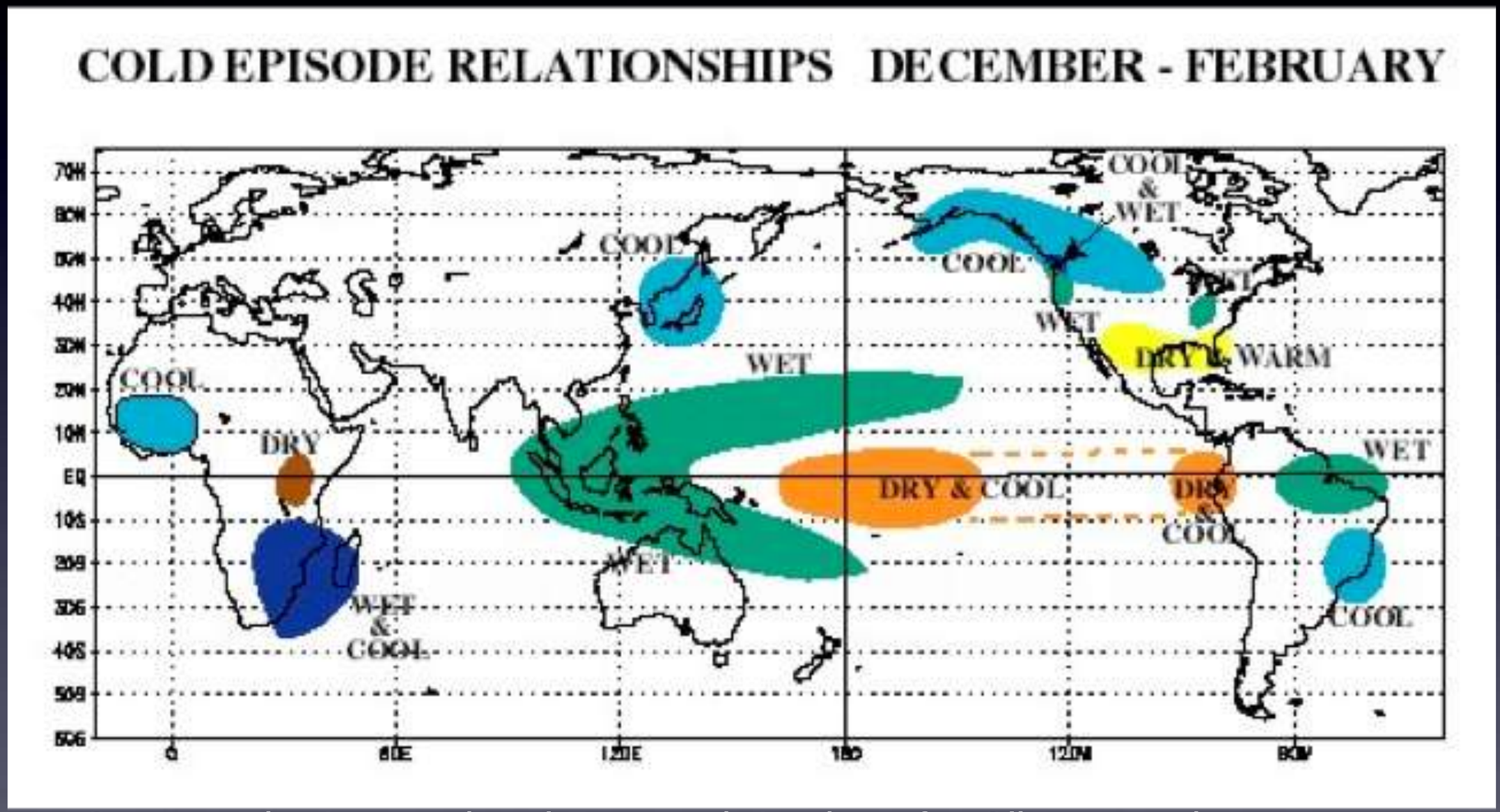


La Niña

- Below average sea surface temperature (SST) across the eastern tropical Pacific
- Warmer and drier winter and springs
- More active hurricane season

Neutral years: SST across the eastern tropical Pacific within +- 0.5 C

La Niña - Global Impacts



Source: The International Research Institute for Climate and Society - IRI

Our Challenge

- Implementing our vision requires going well beyond simply producing good climate forecasts. For climate information to benefit society, it must fit into a decision making process and must affect actions of decision-makers

Weather vs Climate-based Decisions in Agriculture

Weather Forecast

Operational or tactical decisions

Planting

Spraying

Fertilizing

Irrigation timing and amount

Harvesting

Cutting hay

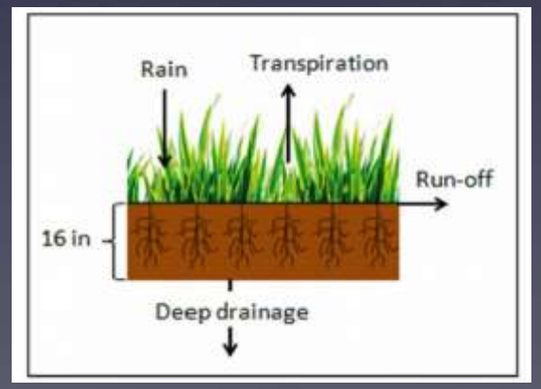
Cold protection

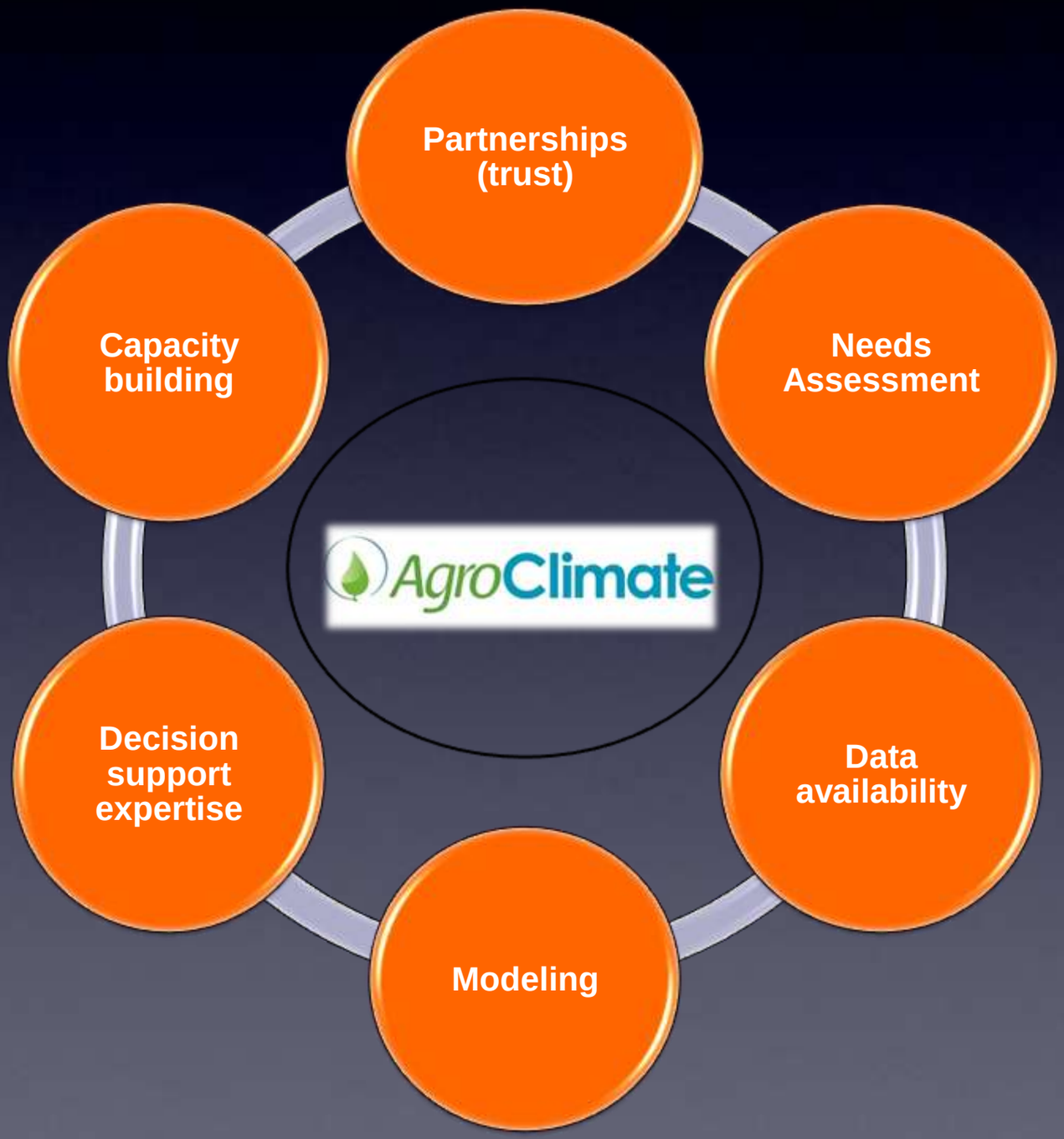
C. W. Fraisse, UF-IFAS

Weather vs Climate-based Decisions in Agriculture

Weather Forecast Operational or tactical decisions	Climate Forecast Strategic Decisions
Planting	Variety selection
Spraying	Best planting dates
Fertilizing	Acreage allocation
Irrigation timing and amount	Crop insurance
Harvesting	Marketing
Cutting hay	Purchase of inputs
Cold protection	Winter pasture & feed purchase

Key Components for Success





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Current Climate Phase: Neutral

Tropical Pacific Ocean returns to neutral conditions

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NIFA

National Institute Of Food And Agriculture

Latest News | AgroClimate Outlooks

Southern Senators See Farm Bill Imbalance (Fri. Jun 8, 2012)

NOAA predicts a near-normal 2012 Atlantic hurricane season (May 24, 2012)

2012 farm bill passes out of committee, heads to full Senate Concerns (Apr. 27, 2012)

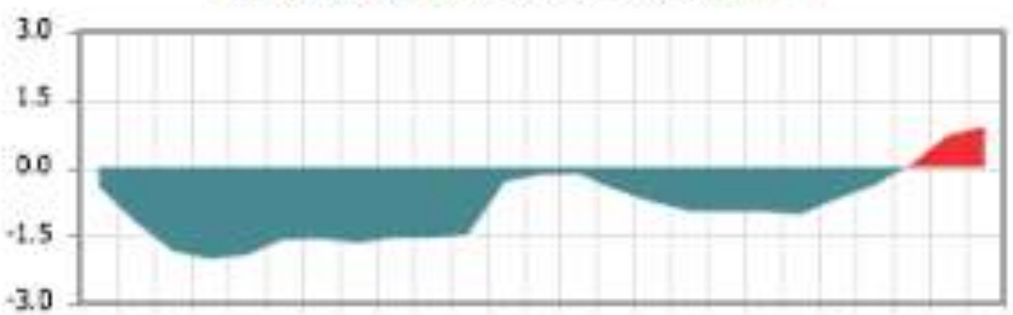
Impacts of Planting before Crop Insurance Earliest Planting Date (Mar. 20, 2012)

NCC: Risk management tools critical in future farm policy (Mar. 16, 2012)

News Archive»

AgroClimate Indicators

Multivariate ENSO Index – MEI (details)



Climate Phase Forecast for Aug-Sep-Oct

Provided by the International Research Institute for Climate and Society

AgroClimate Outlooks

SECC Summer Climate Outlook

Date updated: May 17th, 2012

DOWNLOAD PDF

Current Conditions: Drought impacting much of the Southeast. Florida began its dry season (November through April) relatively drought-free thanks to a fairly normal summer convective rainy season and two October storm systems. These systems restored water levels to Lake Okeechobee and the Kissimmee chain of lakes that feed it. However, due in large part to a second winter in a row with La Niña in the Pacific Ocean, drought has been once again developing over Florida and persisting in Georgia and Alabama over recent months.

The latest U.S. Drought Monitor shows drought conditions ranging from D0 and D1 (moderate drought) in the Carolinas to a broad area of D3 and even D4 in North Florida and Southwest Georgia. D4, or exceptional drought, is the highest designation for drought and corresponds to a 1 in 50 or 1 in 100 year event. The drought conditions in Georgia and North Florida are largely the result of two La Niña winters in a row, which are known to bring drier than normal climate patterns to the area. These regions depend on winter and spring rainfall to recharge surface and groundwater, so two dry winters in a row have had a cumulative effect.

For more detailed information on recent climatic conditions, please see our State climate summaries and press releases:

State Climate Summaries for Florida, Georgia, and North Carolina

Mild drought returns to parts of Georgia

Other climate monitoring resources

Florida Automated Weather Network

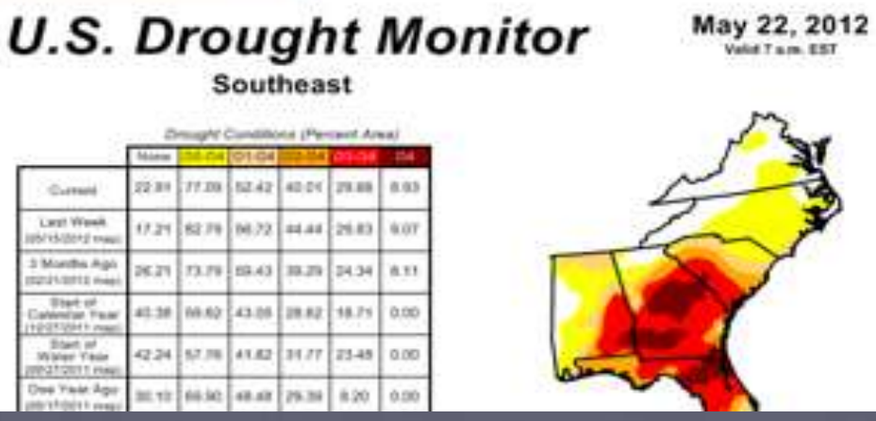
Georgia Automated Environmental Monitoring Network

Alabama Office of the State Climatologist

Alabama Office of the State Climatologist

Southeast Regional Climate Center

NWS Radar-derived Precipitation Totals



SECC Agricultural Outlook

Date updated: November 1, 2011

Prepared by Clyde Fraisse

La Niña Is Here Again!

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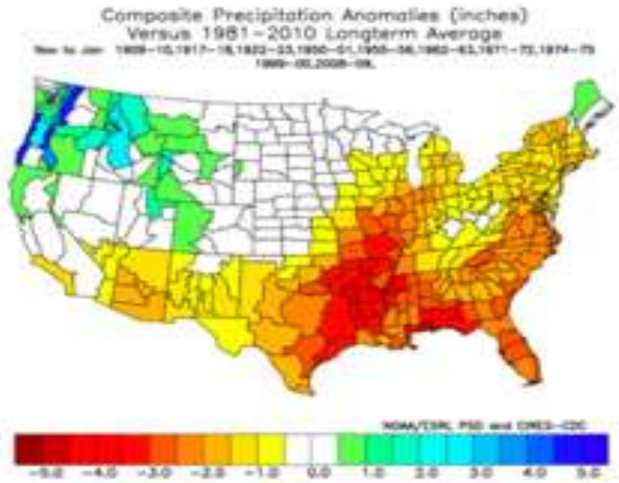
The El Niño-Southern Oscillation (ENSO) phenomenon is the biggest player in the game of year-to-year climate variability. El Niño and La Niña events tend to develop during April-June and tend to reach maximum strength during December-February. Typically they persist for 9 to 12 months. La Niña conditions take place when surface water temperatures in the tropical Pacific Ocean along the equator turns colder than normal. La Niña can be thought as the opposite of El Niño conditions, in which the same area of the Pacific is warmer than normal.

La Niña affects weather patterns in many areas of the world. In the case of the Southeast U.S.A. it usually brings a drier and warmer winter and spring (November through March). For Florida, central and lower Alabama, and central and southern Georgia rainfall may be 40 to 60 percent lower than normal and temperatures 3 to 4 degrees warmer than normal.

La Niña events may last more than one year, in fact, they do tend to last longer on average than El Niño events. Examples of events that lasted longer than one year include the La Niñas of 1954-56 (extreme drought in the southeastern U.S.), 1973-75, and 1999-2001.This year is the second year of a la Niña pattern that started back in July of 2010 and returned after a brief period of neutral conditions during the summer. Figure 1 shows average rainfall anomalies (Nov-Jan) observed during the 2nd year of La Niñas events in the past. Although La Niña events are never the same, it indicates that drier than normal conditions are generally observed in most of the southern U.S.A.

The current drought outlook for October 2011 through January of 2012 published by the NOAA Climate Prediction Center (CPC) confirms this trend signaling for drier conditions in most of the same areas (Figure 2).



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Current Climate Phase: La Niña
La Niña develops as the Pacific Ocean continues a rapid transition.

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- Climate Risk
- Drought Indices
- Crop Yield
- Crop Diseases
- Degree Days and Chill Hours
- Footprint Calculators

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Climate Risk
Air temperature and precipitation climatology and current observations

Freeze Risk Probabilities
Freeze probabilities based on El Niño Southern Oscillation (ENSO) phases

Drought Indices

Crop Yield

Crop Diseases

Degree Days and Chill Hours

Select rainfall/temperature

- Total rainfall (in)
- Average min. temp. (°F)
- Average max. temp. (°F)
- Absolute min. temp. (°F)
- Absolute max. temp. (°F)

Show rainfall data

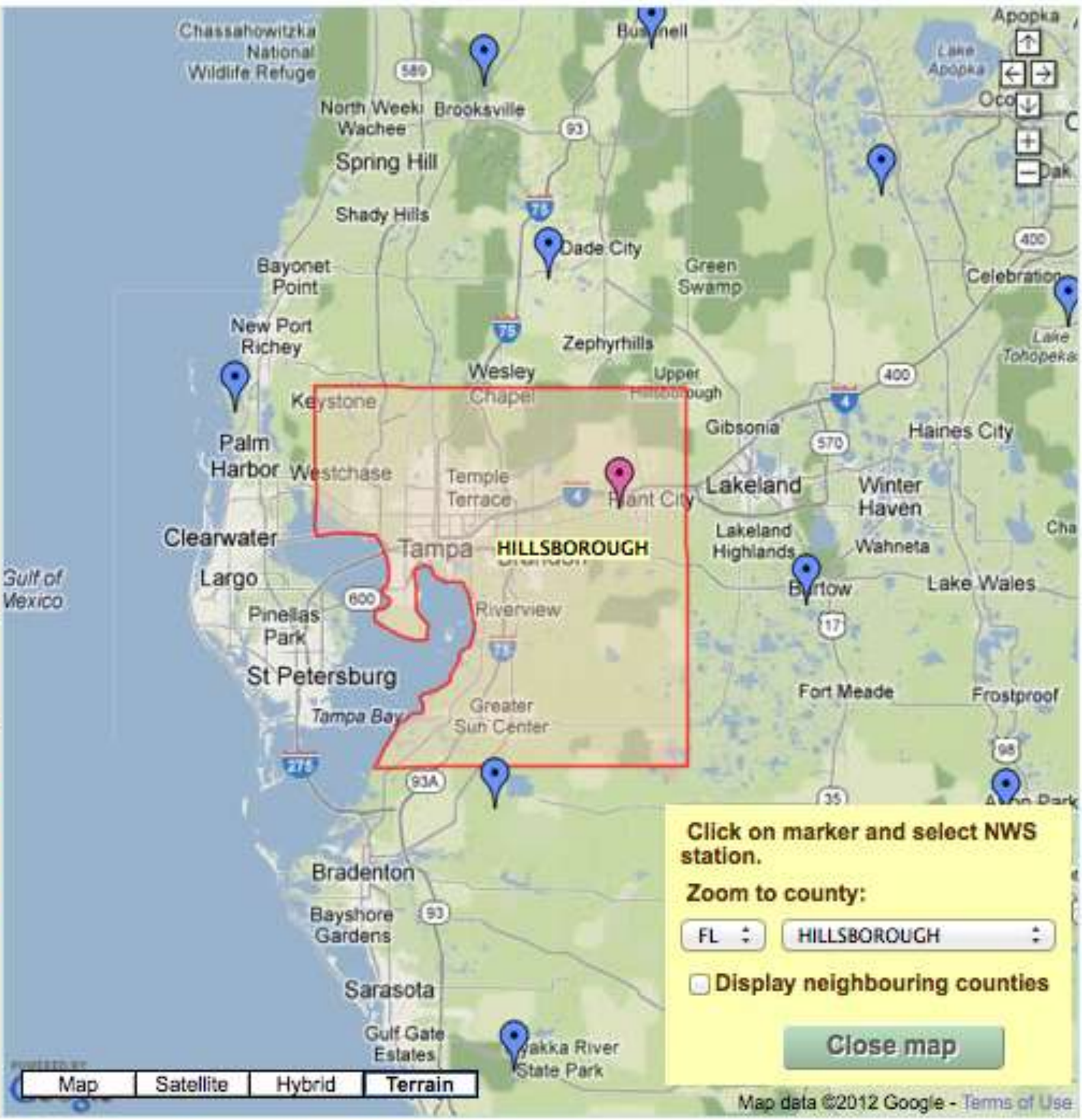
Selected NWS station:
PLANT CITY;
HILLSBOROUGH, FL

Select ENSO phase

- Neutral
- El Niño
- La Niña
- All Years

Compare ENSO phases

AgroClimate



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Select station on map

Selected NWS station:
PLANT CITY;
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Select ENSO phase

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- All Years

Compare ENSO phases

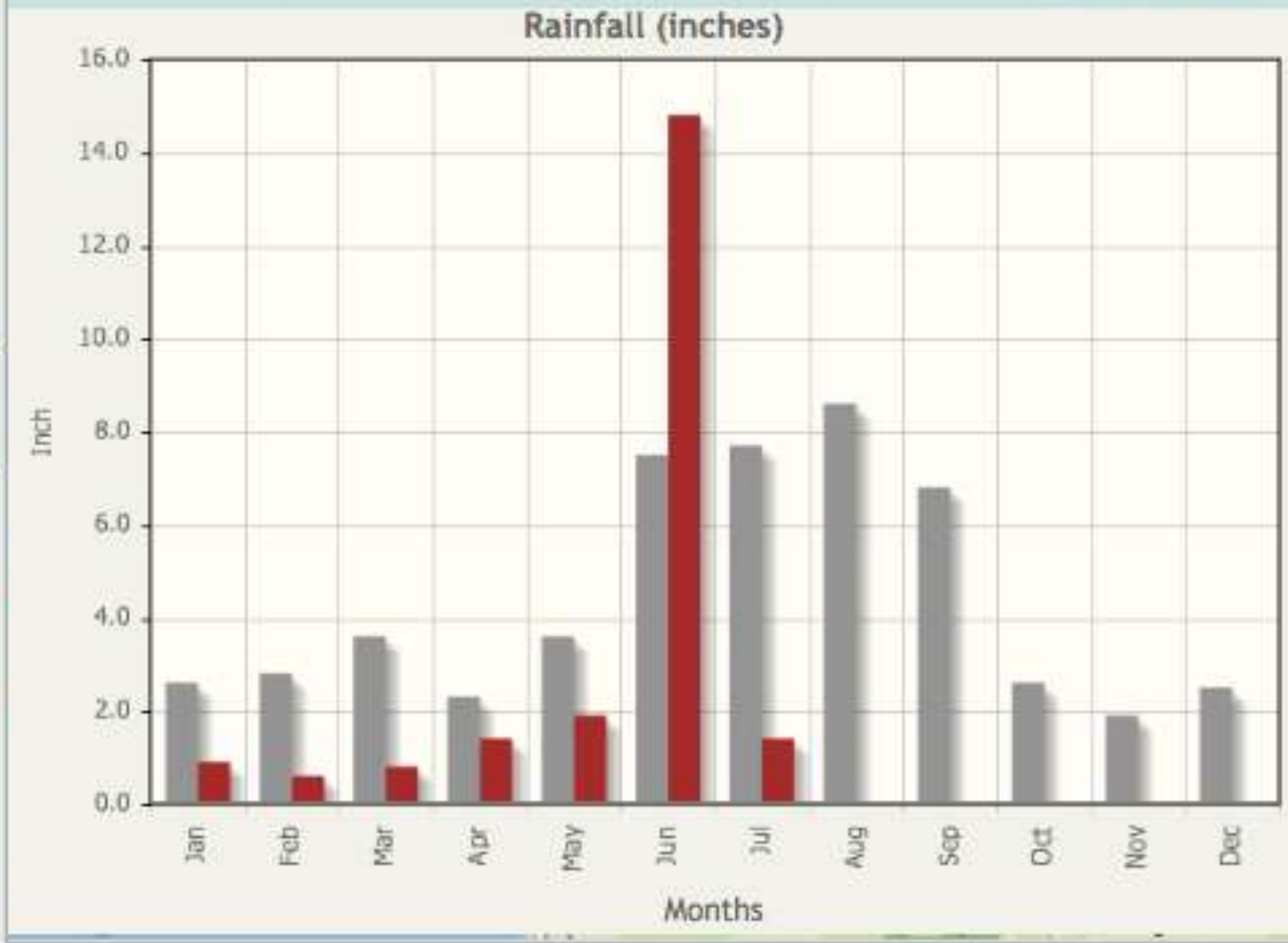
AgroClimate

Average and Deviation | Probability Distribution | Probability of Exceedance | Last 5 Years

All years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average	2.6	2.8	3.6	2.3	3.6	7.5	7.7	8.6	6.8	2.6	1.9	2.5	**52.5**
Deviation	0	0	0	0	0	0	0	0	0	0	0	0	**0**
This year rainfall	0.9	0.6	0.8	1.4	1.9	14.8	1.4	n/a	n/a	n/a	n/a	n/a	21.8
Deviation	-1.7	-2.2	-2.8	-0.9	-1.7	7.3	-6.3	n/a	n/a	n/a	n/a	n/a	-8.3

All years years, long-term climatology
Year: 2012; BALM; 18.6 mi. from NWS st.

▲ Select current year station



Select rainfall/temperature

- Total rainfall (in)
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- Average max. temp. (°F)
- Absolute min. temp. (°F)
- Absolute max. temp. (°F)

Select station on map

Selected NWS station:
PLANT CITY;
HILLSBOROUGH, FL

Select ENSO phase

- Neutral
- El Niño
- La Niña
- All Years

Compare ENSO phases

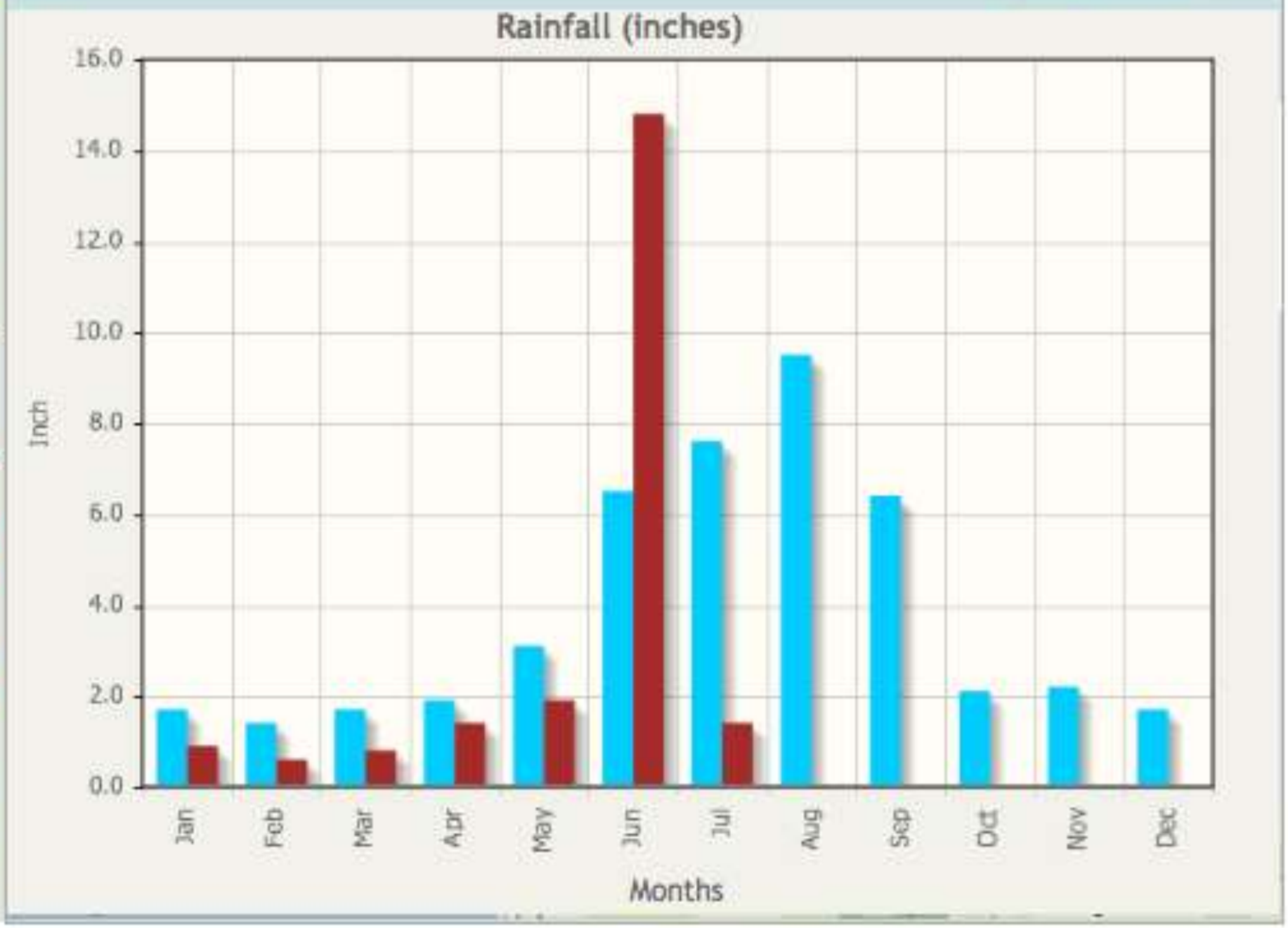
AgroClimate

Average and Deviation | Probability Distribution | Probability of Exceedance | Last 5 Years

La Niña	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average	1.7	1.4	1.7	1.9	3.1	6.5	7.6	9.5	6.4	2.1	2.2	1.7	**45.8**
Deviation	-0.9	-1.4	-1.9	-0.4	-0.5	-1	-0.1	0.9	-0.4	-0.5	0.3	-0.8	**-6.7**
This year rainfall	0.9	0.6	0.8	1.4	1.9	14.8	1.4	n/a	n/a	n/a	n/a	n/a	21.8
Deviation	-1.7	-2.2	-2.8	-0.9	-1.7	7.3	-6.3	n/a	n/a	n/a	n/a	n/a	-8.3

La Niña years, long-term climatology
Year: 2012; BALM; 18.6 mi. from NWS st.

▲ **Select current year station**



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Select station on map

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PLANT CITY;
HILLSBOROUGH, FL

Select ENSO phase

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Compare ENSO phases

AgroClimate

Average and Deviation | Probability Distribution | Probability of Exceedance | Last 5 Years

La Niña	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
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La Niña years, long-term climatology
Year: 2012; BALM; 18.6 mi. from NWS st.

▲ Select current year station

Select rainfall/temperature

- Total rainfall (in)
- Average min. temp. (°F)
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- Absolute min. temp. (°F)
- Absolute max. temp. (°F)

Select station on map

Selected NWS station:
PLANT CITY;
HILLSBOROUGH, FL

Select ENSO phase

- Neutral
- El Niño
- La Niña
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Compare ENSO phases

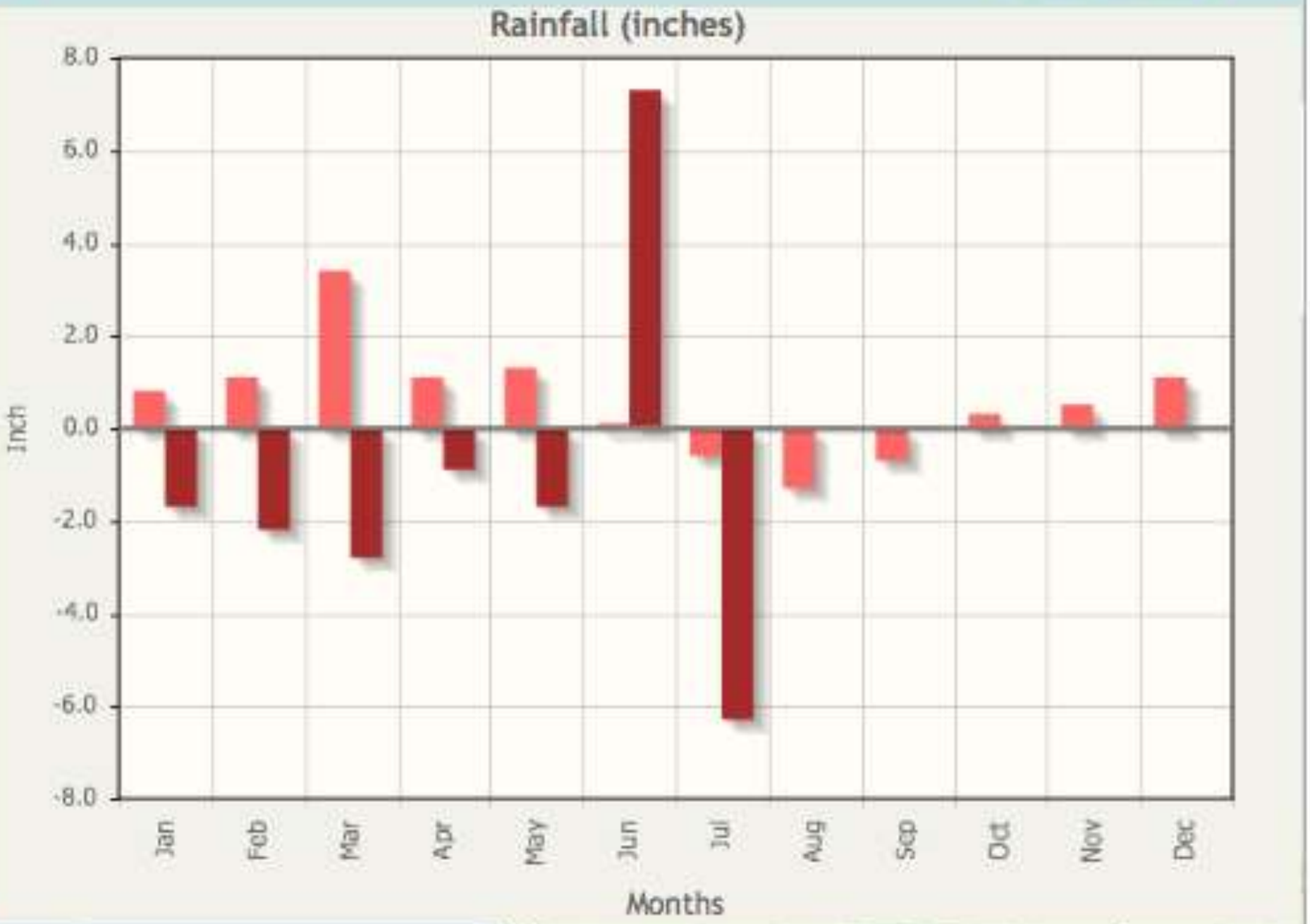
AgroClimate

Average and Deviation | Probability Distribution | Probability of Exceedance | Last 5 Years

El Niño	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average	3.4	3.9	7	3.4	4.9	7.6	7.1	7.3	6.1	2.9	2.4	3.6	**59.6**
Deviation	0.8	1.1	3.4	1.1	1.3	0.1	-0.6	-1.3	-0.7	0.3	0.5	1.1	**7.1**
This year rainfall	0.9	0.6	0.8	1.4	1.9	14.8	1.4	n/a	n/a	n/a	n/a	n/a	21.8
Deviation	-1.7	-2.2	-2.8	-0.9	-1.7	7.3	-6.3	n/a	n/a	n/a	n/a	n/a	-8.3

El Niño years, long-term climatology
Year: 2012; BALM; 18.6 mi. from NWS st.

▲ **Select current year station**



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- Average max. temp. (°F)
- Absolute min. temp. (°F)
- Absolute max. temp. (°F)

Select station on map

Selected NWS station:
PLANT CITY;
HILLSBOROUGH, FL

Select ENSO phase

- Neutral
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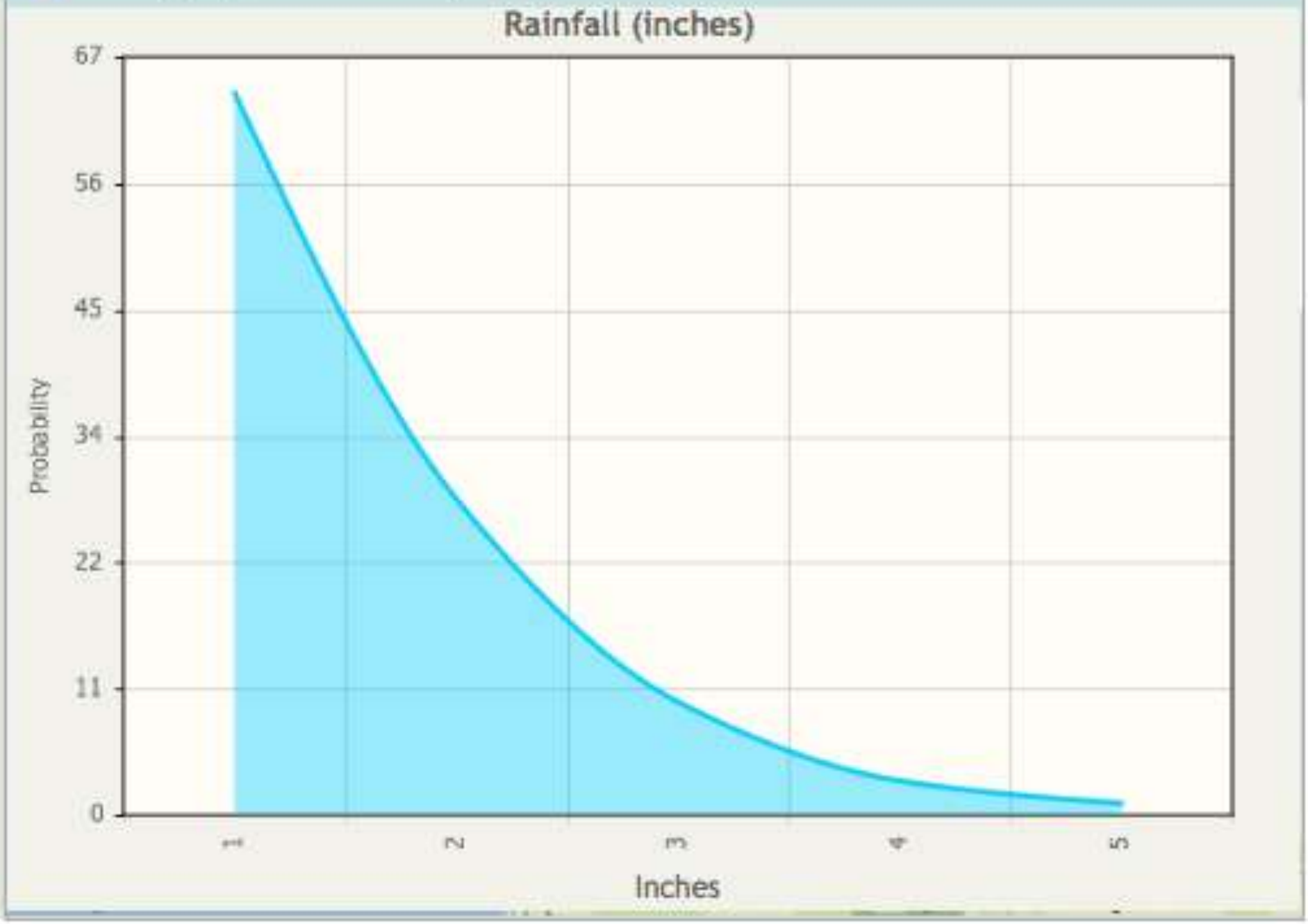
Compare ENSO phases

AgroClimate

Average and Deviation | Probability Distribution | Probability of Exceedance | Last 5 Years

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	67	47	64	69	94	100	100	100	100	86	69	72
2	31	25	28	29	71	97	100	100	99	63	42	46
3	15	14	10	10	47	90	98	100	94	36	25	24
4	5	12	3	3	30	76	94	99	85	18	14	12
5	1	7	1	0	17	63	86	97	74	9	8	6

La Niña years, station climatology data



Select rainfall/temperature

- Total rainfall (In)
- Average min. temp. (°F)
- Average max. temp. (°F)
- Absolute min. temp. (°F)
- Absolute max. temp. (°F)

Select station on map

Selected NWS station:
PLANT CITY;
HILLSBOROUGH, FL

Select ENSO phase

- Neutral
- El Niño
- La Niña
- All Years

Compare ENSO phases

AgroClimate

Average and Deviation | Probability Distribution | Probability of Exceedance | Last 5 Years

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	92	96	100	90	97	100	100	100	100	86	84	92
2	73	81	97	70	83	99	100	100	98	66	54	78
3	50	64	92	48	64	96	99	99	89	41	27	59
4	32	46	86	29	45	92	95	93	79	23	14	43
5	22	32	74	17	28	85	87	83	62	11	9	27

El Niño years, station climatology data

Freeze Risk Maps

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Temperature

28°F or less

ENSO Phase

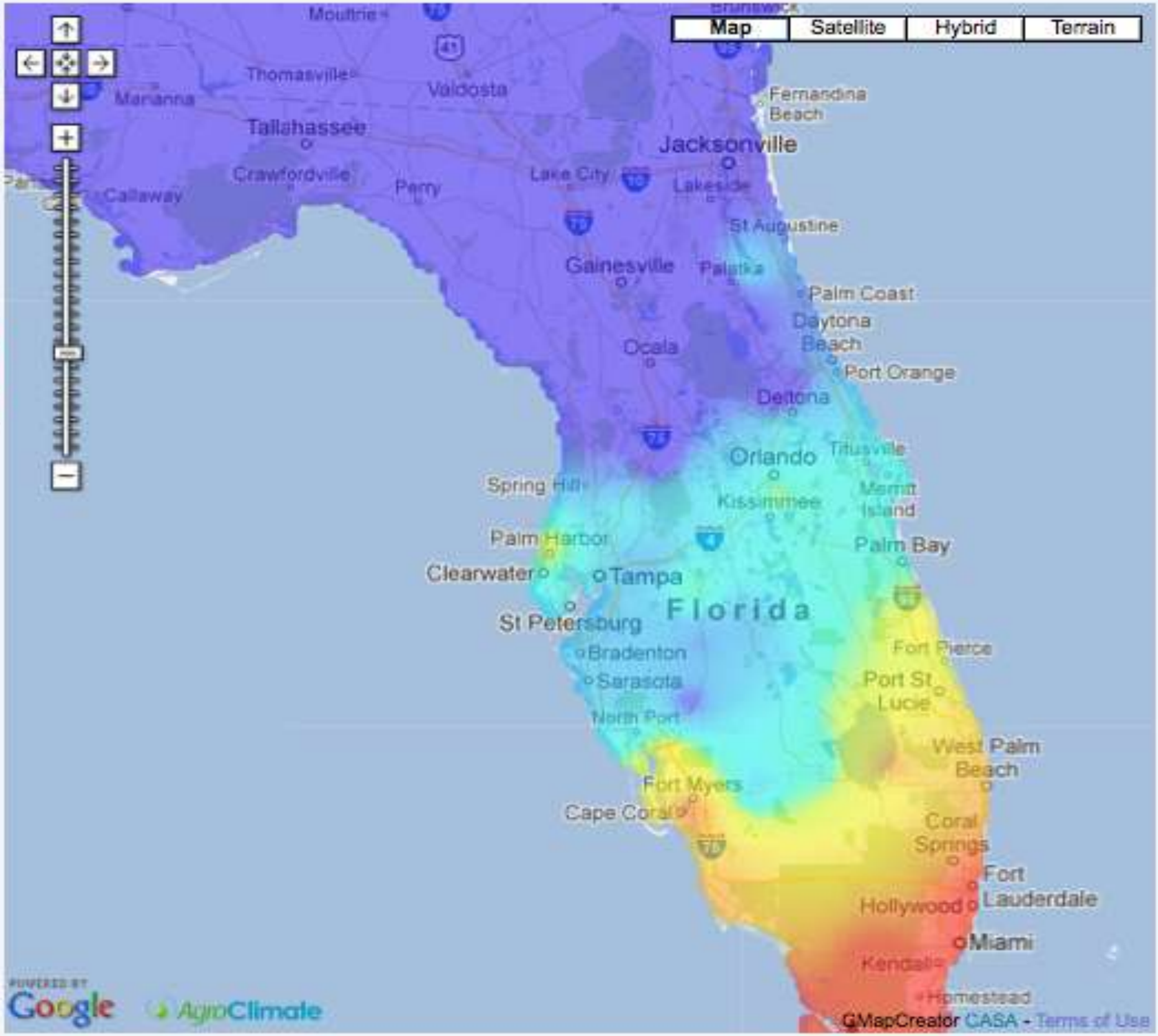
- Neutral
- El Niño
- La Niña

Freeze Probability (%)

- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100

Compare ENSO Phases

Download Map (PDF)



Map | 1/2 | Data

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La Niña develops as the Pacific Ocean continues a rapid transition.

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Climate Risk

Drought Indices

Crop Yield

County Yield Statistics

Crop yield series, trends and residuals at the county level

Regional Yield Statistics

Average yield residuals (%) for El Niño, La Niña, and Neutral years

Planting Date and Crop Yield Risk

Probability of low, medium, and high yields based on planting dates

Crop Diseases

County Yield Database

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Select Crop

Peanut	Potato
Sugarcane	Cotton
Corn	Soybean
Sorghum	Oat
Rye	Wheat
Tobacco	Hay

Data Type Display yield data

(•) Yield ( ) Residuals

Select location

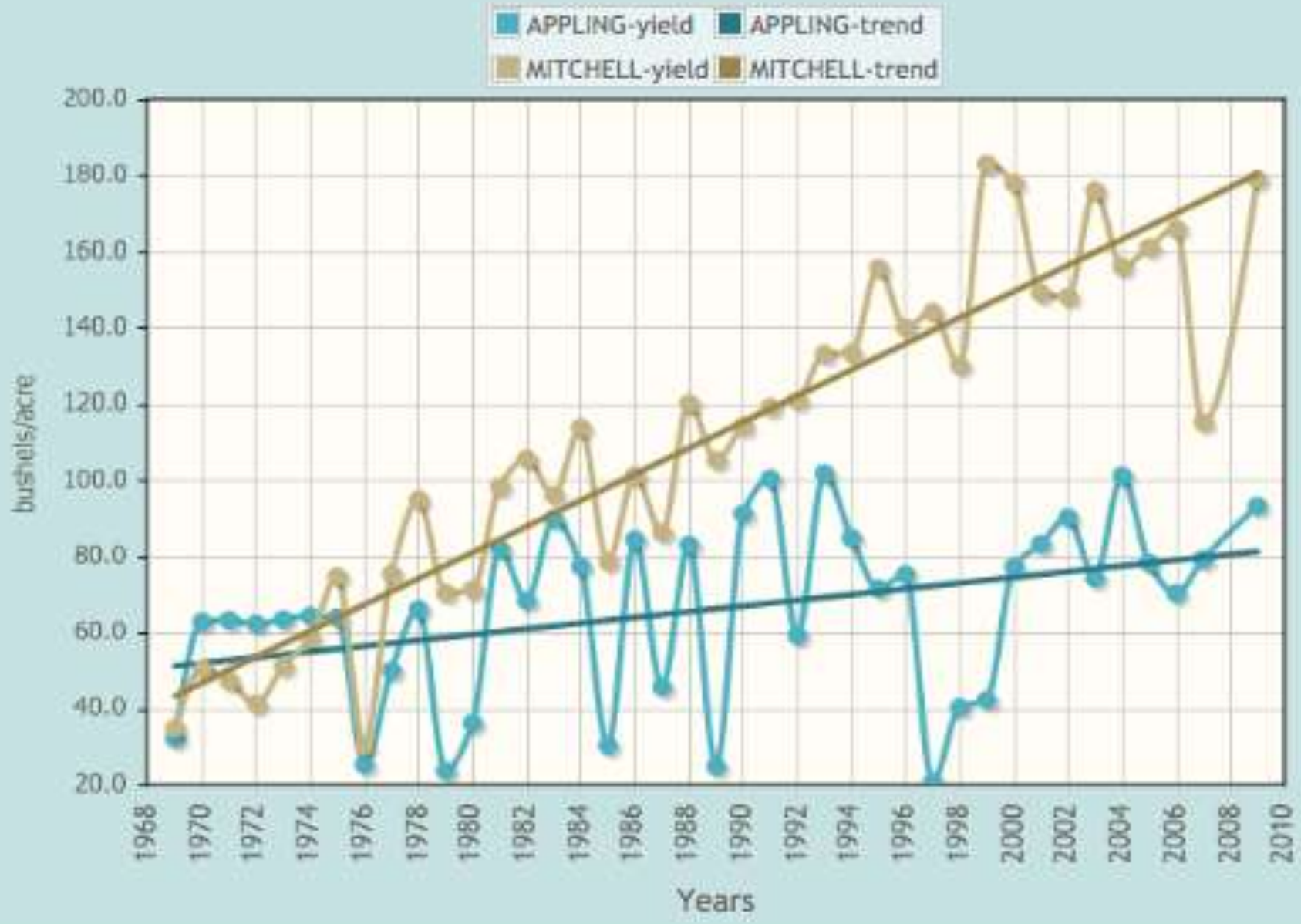
G

MILLER
MITCHELL
MONROE
MONTGOMERY
MORGAN
MURRAY
MUSCOGEE
NEWTON

CORN: USDA-NASS(bushels/acre)for selected county(ies).

	Neutral	El Nino	La Nina	All Years
Average	94.8	83.8	77.2	87.8
St.Dev.	39.1	45.6	36.2	41.1
Minimum	23.4	20.5	40	20.5
Maximum	178	179	183	183
Median	91	90	64.1	82.8

You can remove a line on the graph bellow by clicking on the legend item.



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County Yield Database

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Select Crop

Peanut	Potato
Sugarcane	Cotton
Corn	Soybean
Sorghum	Oat
Rye	Wheat
Tobacco	Hay

Data Type [Display yield data]
○ Yield ◉ Residuals

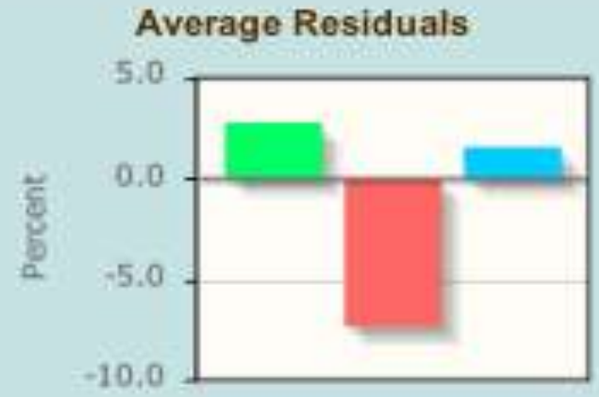
Select location

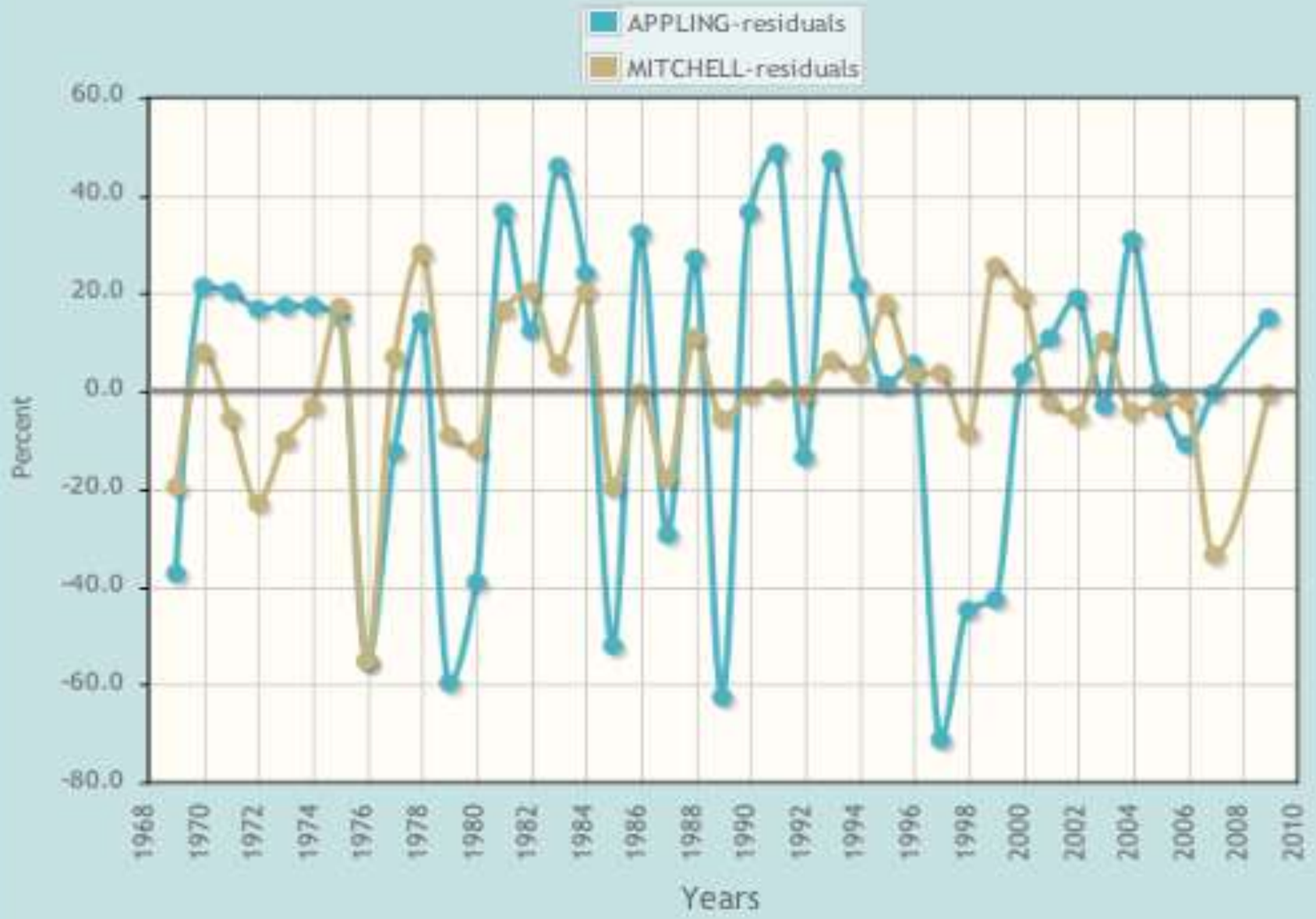
GA

MCINTOSH
MERIWETHER
MILLER
MITCHELL
MONROE
MONTGOMERY
MORGAN
MURRAY

CORN: Residuals (%)for selected county(ies).

	Neutral	El Nino	La Nina
Average	2.8	-7.4	1.6
Minimum	-62.9	-71.5	-45
Maximum	47.3	48.5	27





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Planting Date Planner

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Read about Yield Planning

Select Crop
PEANUT

Select Variety
MID-MATURITY

Select Location
FL | ESCAMBIA

Select Soil
Red Bay Sandy Loam

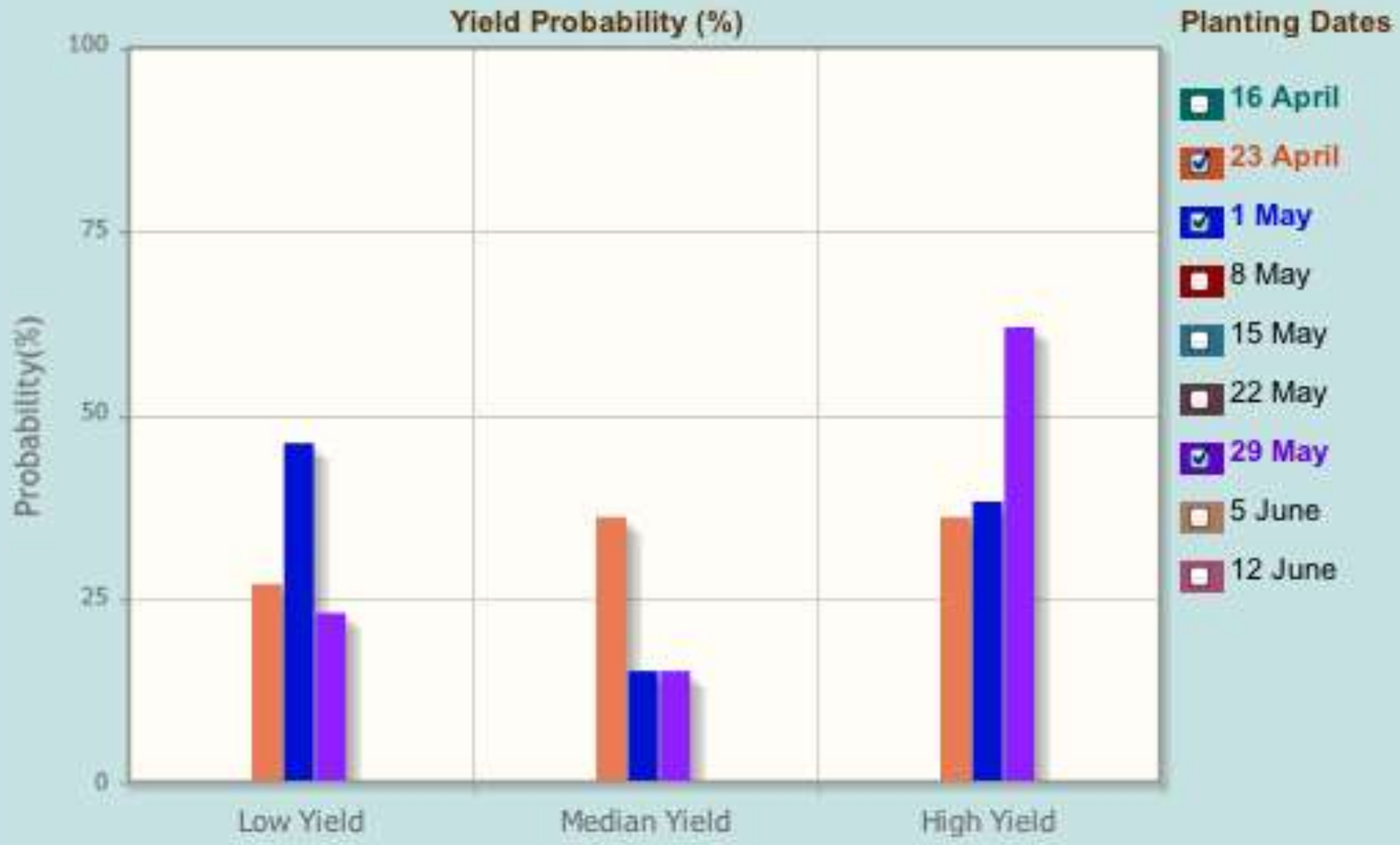
Irrigation Management
○ Irrigated ◉ Rainfed

Select Nitrogen
0 lbs/ac

Climate Phase
- ○ NEUTRAL
- ◉ El NIÑO
- ○ La NIÑA
- ○ All Years

Compare Climate Phases

Selected Climate Phase **El NIÑO**



Phenology Table

Planting date	Flowering period	Maturity period
16 April	21 May - 1 Jun	27 Aug - 8 Sep
23 April	27 May - 4 Jun	31 Aug - 12 Sep
1 May	2 Jun - 9 Jun	6 Sep - 14 Sep
8 May	8 Jun - 13 Jun	11 Sep - 19 Sep
15 May	15 Jun - 19 Jun	17 Sep - 24 Sep
22 May	21 Jun - 25 Jun	24 Sep - 1 Oct
29 May	28 Jun - 1 Jul	1 Oct - 11 Oct

Strawberry Advisory System (SAS)

« Back to Tools

Select station/county:

Balm/Hillsborough

Display County Boundary

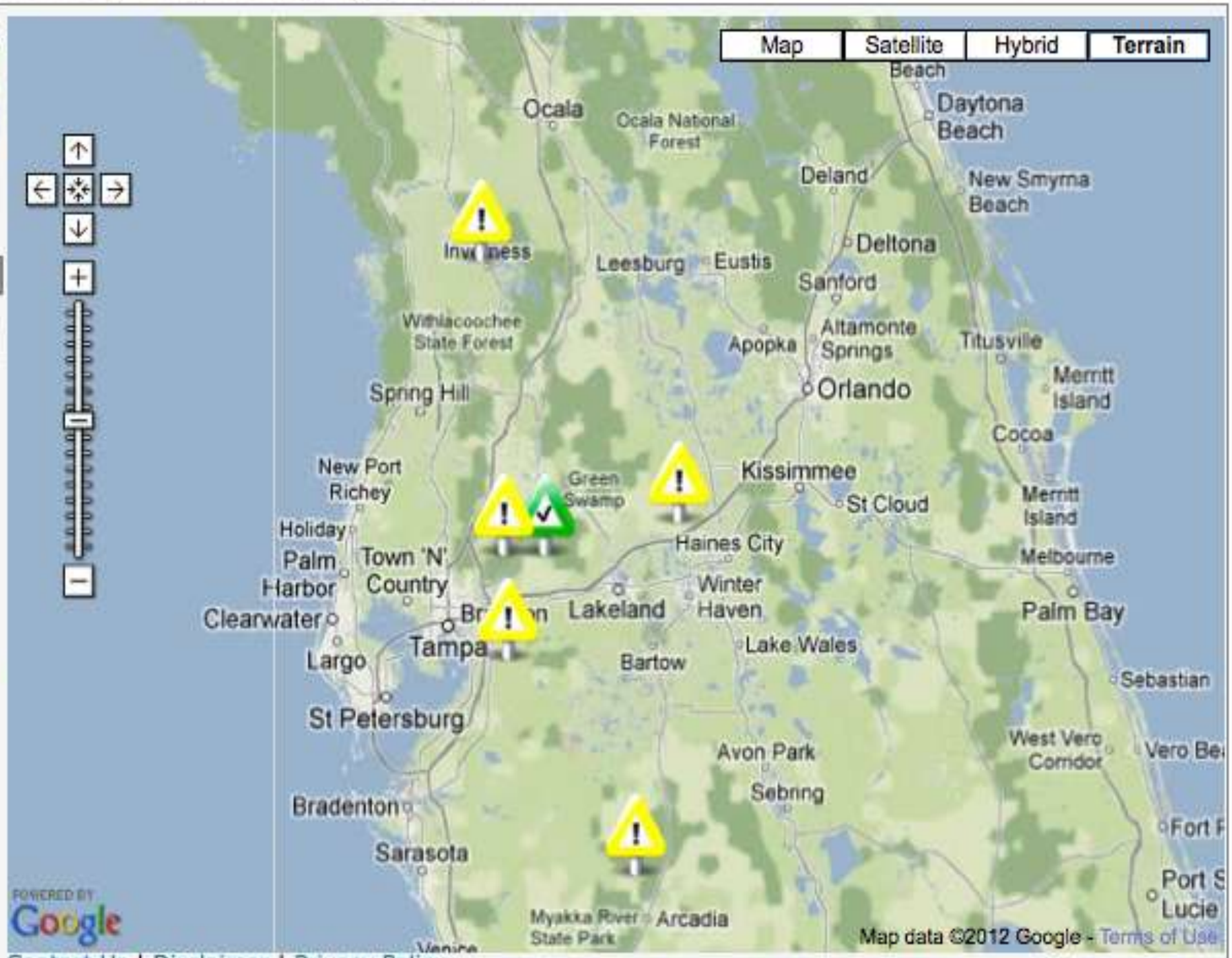
The Strawberry Advisory System provides recommendations for timing fungicide applications for control of Anthracnose and Botrytis fruit rots. For more information, click on the publications below:

* A Web-based Decision Support Tool - Plant disease decision support systems are management tools to help...

* **Anthracnose** Fruit Rot of Strawberry

* **Botrytis** Fruit Rot or Gray Mold of Strawberry

* Recommended Fungicides



High | Moderate | Low

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Strawberry Advisory System (SAS)

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Display County Boundary

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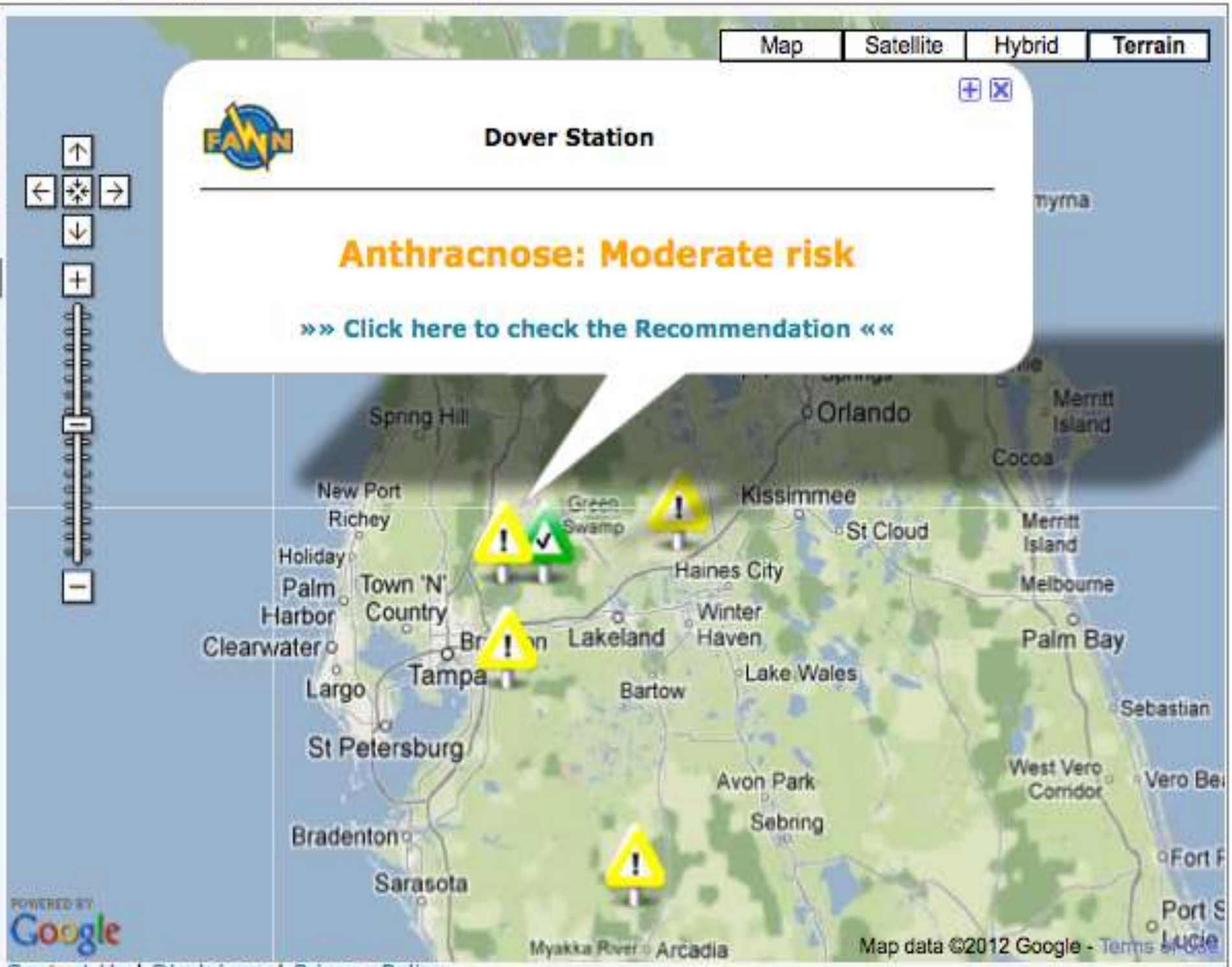

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High | Moderate | Low

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Strawberry Advisory System (SAS)

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* Recommended Fungicides

Dover Station

Recommendations | Disease Simulation | Weather | Contact | Disclaimer

Spray Recommendation

» When was your last fungicide application?

○ Last 7 days ◉ More than 7 days ○ None

» Select product(s) used*:

Abound
Cabrio

* Use Ctrl or Shift to select more than one.

View Recommendation

Botrytis: No Spray!
Anthracnose: Spray Contact Fungicide (Products recommended: Captan)

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High | Moderate | Low

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Strawberry Advisory System (SAS)

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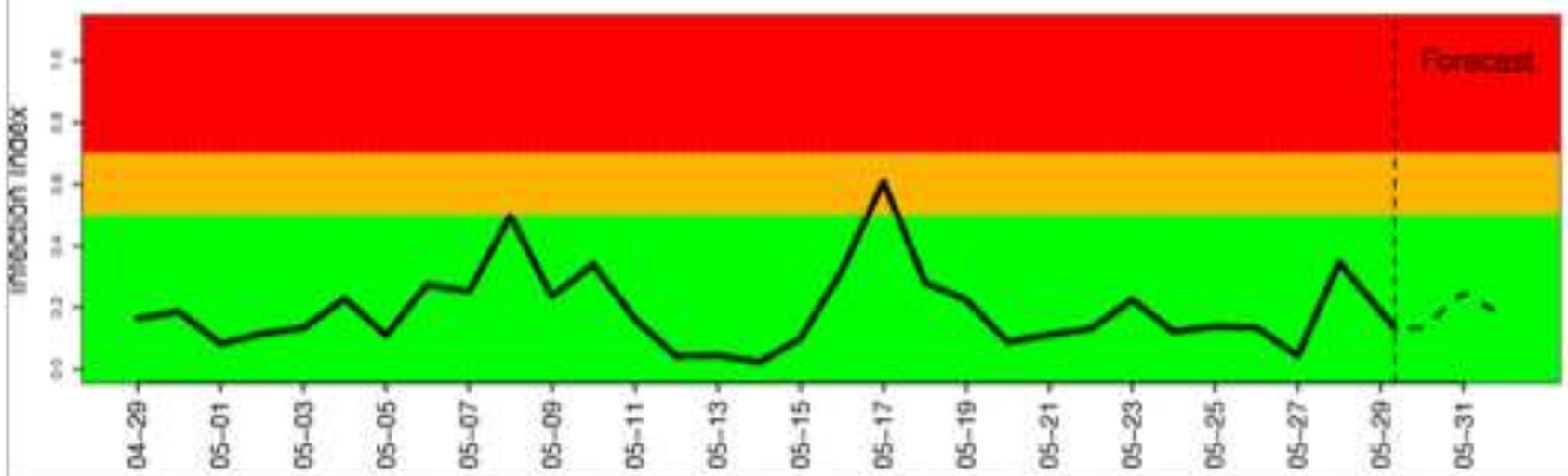
Dover Station

Recommendations | Disease Simulation | Weather | Contact | Disclaimer

» Botrytis | Anthracnose

Botrytis Simulation Output

High risk | Moderate risk | No risk
(Click on the graph to expand it)



Date	LWD	Temp (F)	Temp (C)	Infection Index	Description
2012-05-29 (today)	8.25	75.24	24.02	0.1333	No risk
2012-05-28	13.25	77.43	25.24	0.3462	No risk
2012-05-27	4.25	76.66	24.81	0.0441	No risk

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High | Moderate | Low

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Citrus Copper Application Scheduler

« Back to tools

The Citrus Copper Application Scheduler provides an estimated time period of remaining copper residue on various citrus cultivars. The estimate is based on inputs provided below. more...

> Help screencast

U.S. Units System

Select a weather Station:

Apopka

> Upload your weather data instead

Scion: Valencia

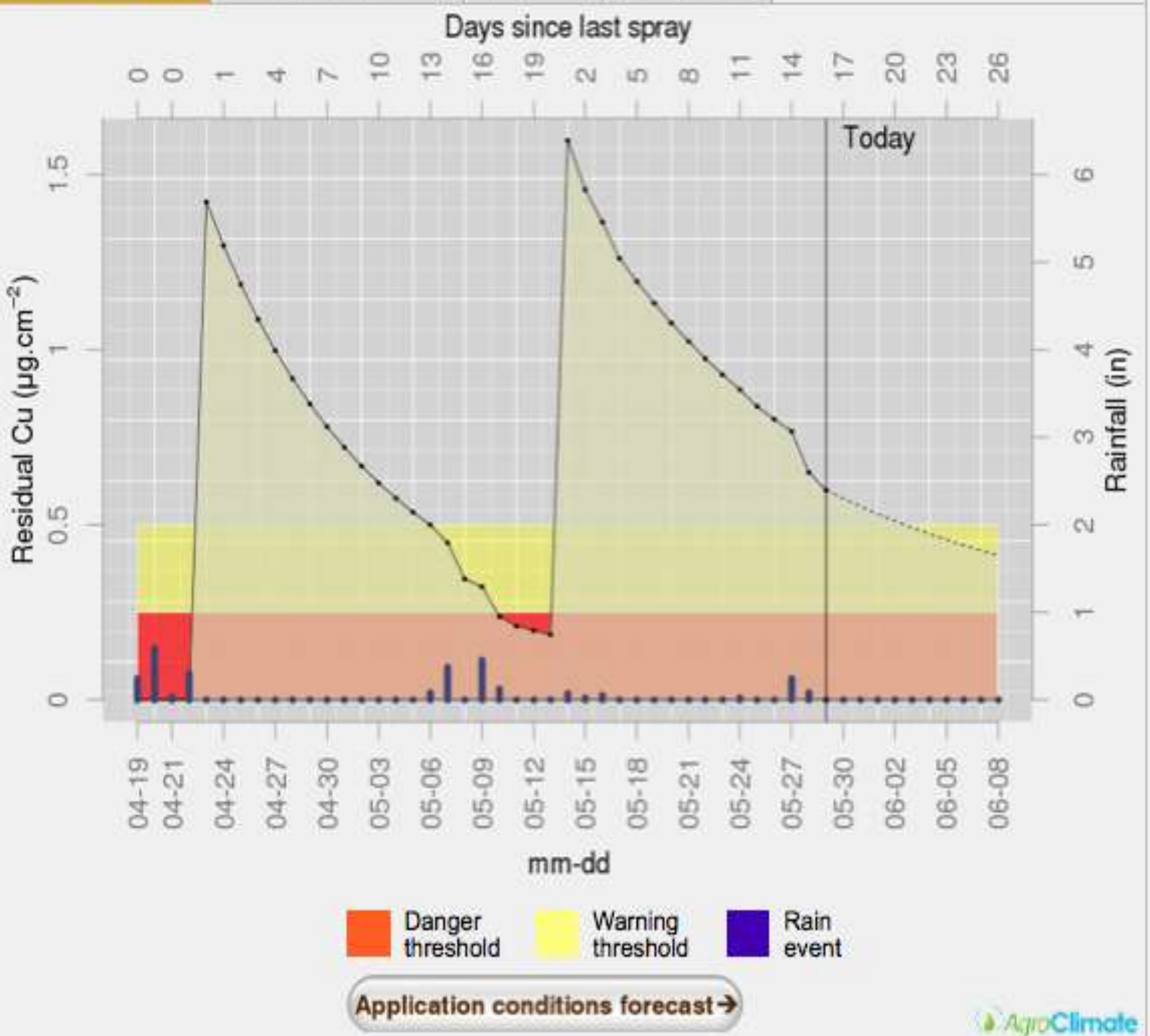
Bloom date: 04/01/2012

Sprays

Date	Conc.(lb/ac)	Vol.(gal/ac)
04/22/2012	0.75	125
05/13/2012	0.75	125

Simulate copper residue

Simulation Chart | Simulation Details | Contact | Disclaimer

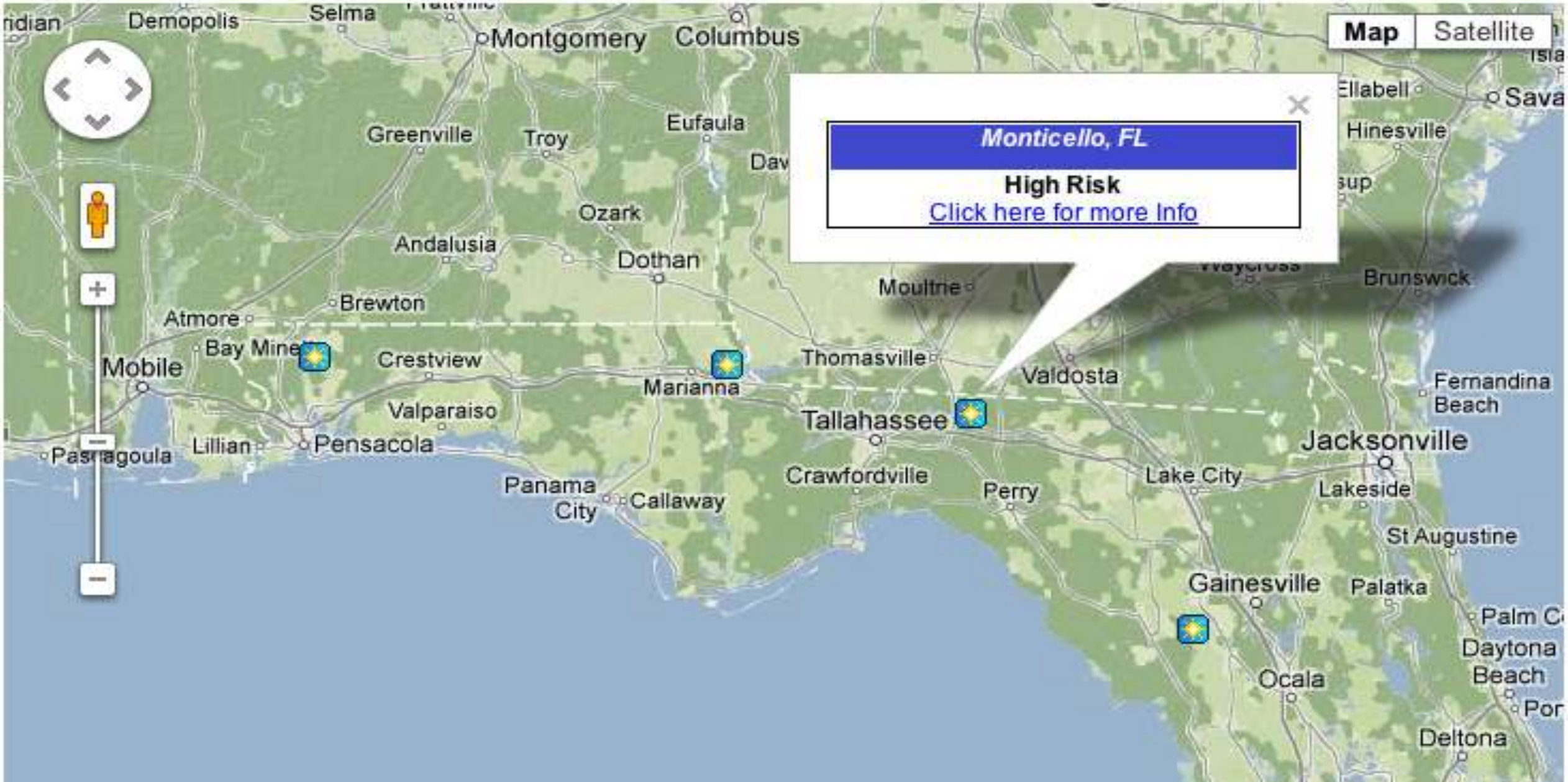


Application conditions forecast →

AgroClimate

Peanut Leaf-Spot Risk Advisory Tool

Click on a location to see current condtions for disease development



AgroClimate
A Service of the Southeast Climate Consortium

Current Climate Phase: Neutral
Tropical Pacific Ocean returns to neutral conditions

ARID - Agricultural Reference Index for Drought

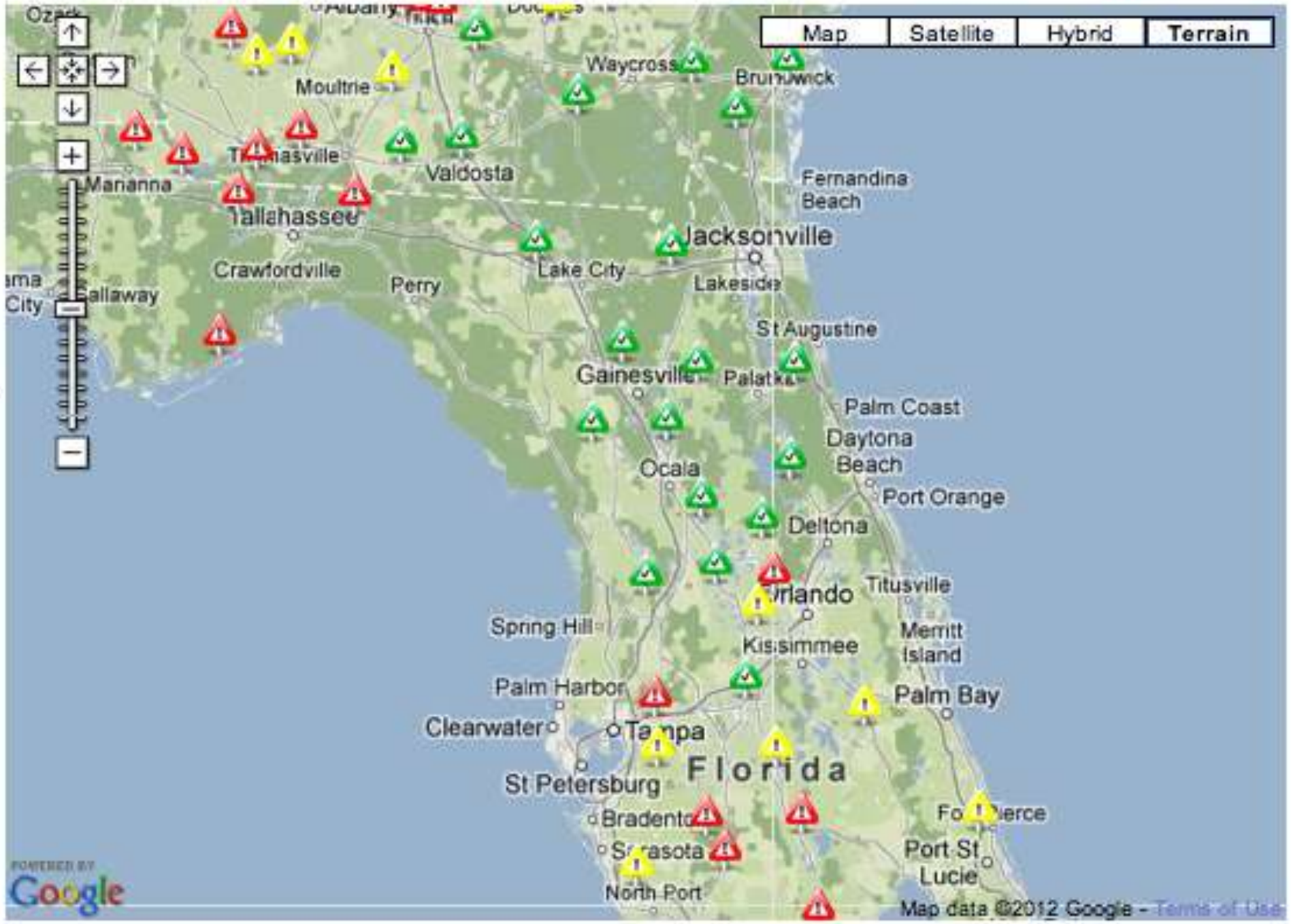
« Back to Tools

Select the station/county:

Jay/SANTA ROSA

Drought is the shortage of water with respect to a specified need. An agricultural drought occurs when the amount of water in the root zone is not sufficient to meet the need of a crop at a particular time. Generally, agricultural drought indices are developed to monitor crop water stress. However, ARID has been designed not merely to quantify crop water stress at a particular time or period but to estimate yield loss due to drought, in which farmers are ultimately interested...
» more details.

ARID - Climatology



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A Service of the Southeast Climate Consortium

Current Climate Phase: Neutral
Tropical Pacific Ocean returns to neutral conditions

ARID - Agricultural Reference Index for Drought

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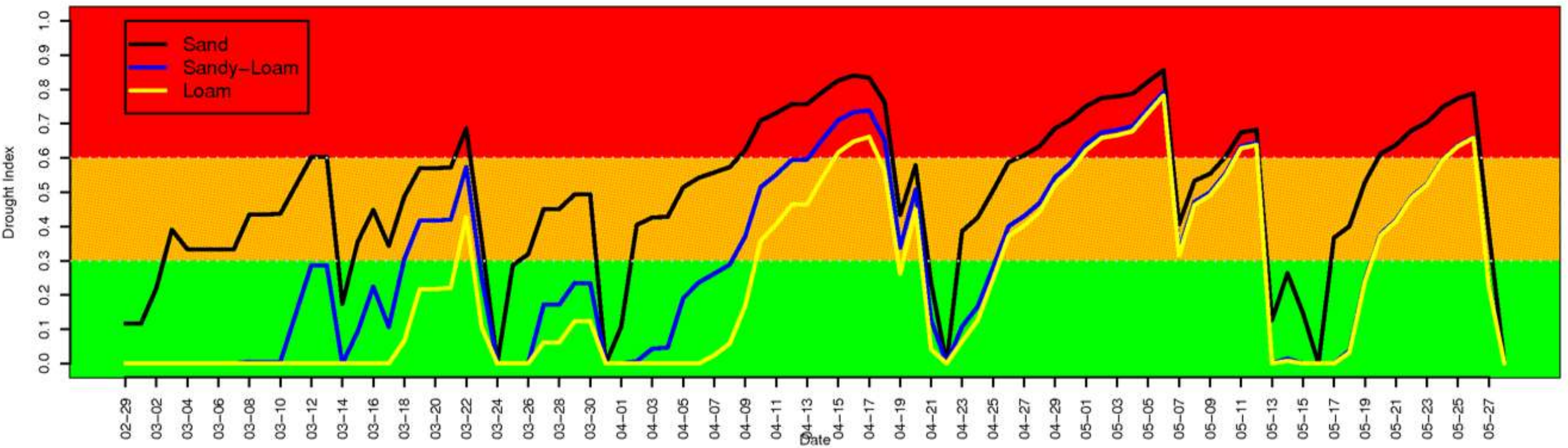
AgroClimate — Drought Index Tool

Drought Index Output

Stress Warning | Stress Watch | Little or No Stress

... Click here to close this window ...

Agricultural Reference Index for Drought – Alachua



ARID - Climatology

Google Maps | About US | Articles | Contact US | Advanced Users

Growing Degree Days (GDD) Calculator

« Back to tools

Read about GDD

Select base temperature:

40°F | 50°F | 56°F | 60°F

Select Location

A | GENEVA

Select a station (map)

- Marianna (FL) 43 miles
- Lake Seminole (FL) 61 miles
- Georgetown (GA) 65 miles
- Arlington (GA) 73 miles

Select Time Period

Start: 01-Jan-2012

End: 28-Jun-2012

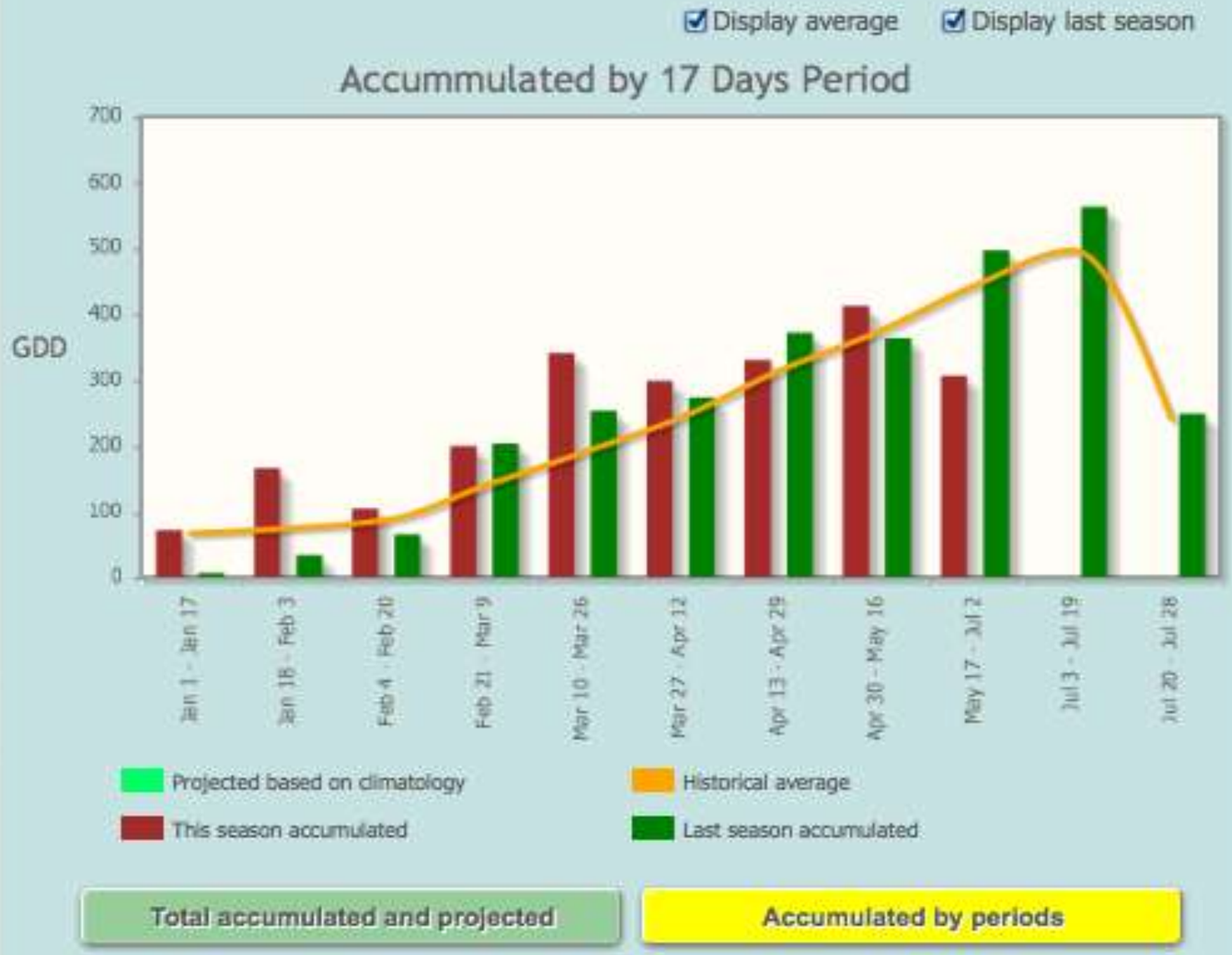
Set Date

AgroClimate

Location: MARIANNA (FL); Model: 50°F

Period: Jan 1 to Jun 28

This season, estimated:	**3133 ± 52 GDD**
Historical average:	**2662 GDD**
Last season, accumulated:	**2875 GDD**



Total accumulated and projected | **Accumulated by periods**

Chill Accumulation Calculator

« Back to tools

Read about Chill Accumulation

Select base temperature:

<45°F Hours

32-45°F Hours

Select Location

F | ALACHUA

Select a station (map)

- (•) Alachua (FL) 9 miles
- ( ) Citra (FL) 21 miles
- ( ) Putnam Hall (FL) 22 miles
- ( ) Bronson (FL) 24 miles
- ( ) Macclenny (FL) 44 miles
- ( ) Ocklawaha (FL) 51 miles

Select Time Period

Start: 01-Oct-2011

End: 14-May-2012

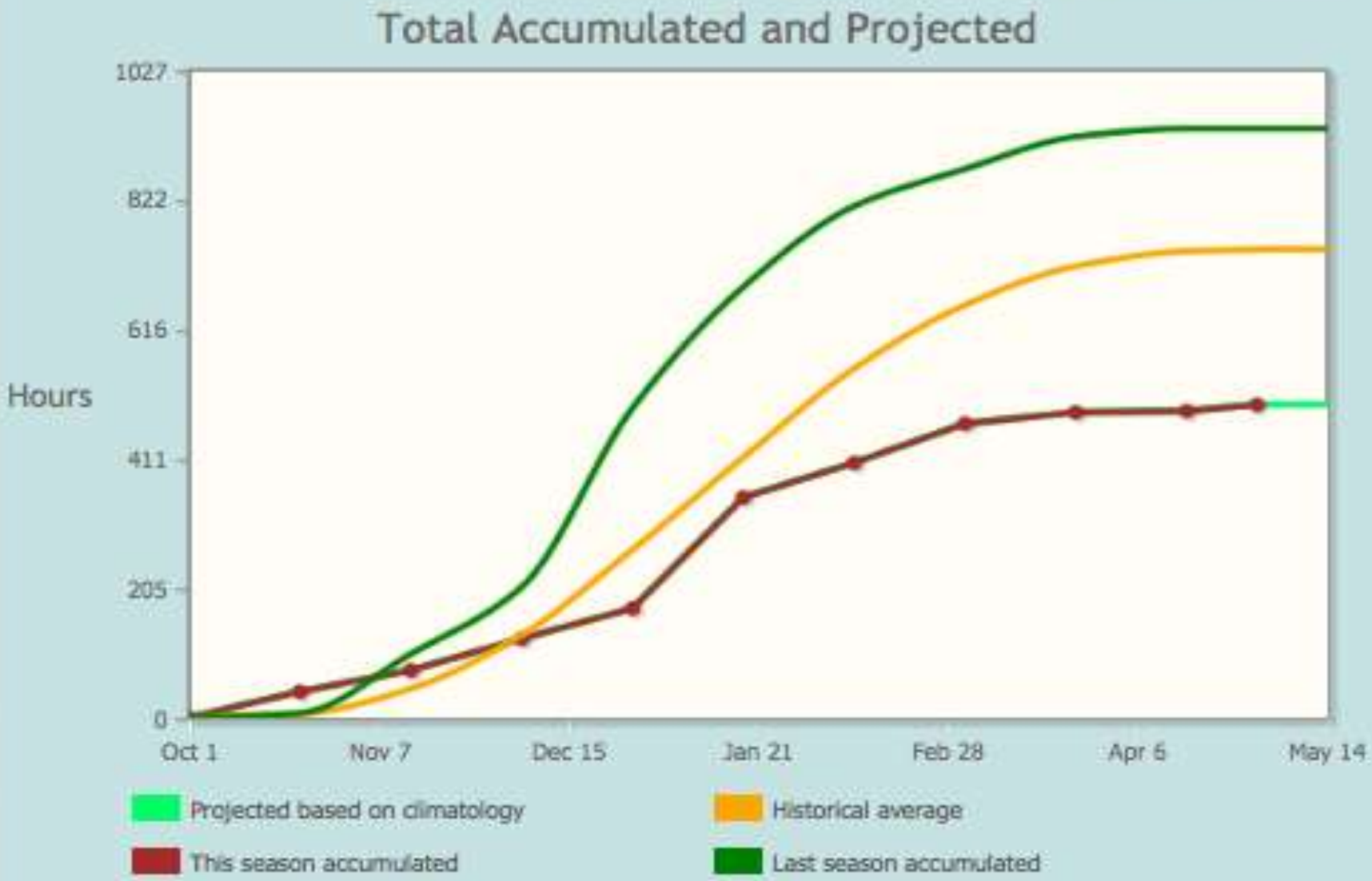
Set Date

Location: ALACHUA (FL); Model: <45°F

Period: Oct 1 to May 14

This season, estimated:	**496 Hours**
Historical average:	**743 Hours**
Last season, accumulated:	**934 Hours**

☑ Display average ☑ Display last season



Total accumulated and projected

Accumulated by periods

AgroClimate Español
Un Servicio del Southeast Climate Consortium

Fase Climática Actual: La Niña
La Niña en desarrollo a medida que el Océano Pacífico sigue en rápida transición.

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Humedad de Césped y Jardín
Control suministrado por la Oficina del Climatólogo del Estado del Estado de Alabama

Desarrollo de Cultivos

Grados-Día de Crecimiento
Pronóstico GDD, padrones históricos y probabilidades, asociados con las fases ENOS

Acumulación de Frío

What is next: Mobile Apps

html-based

iOS & Android
Smart Irrigation

Thank You!

- Clyde Fraisse
  cfraisse@ufl.edu
  352-392-1864 ext. 271

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