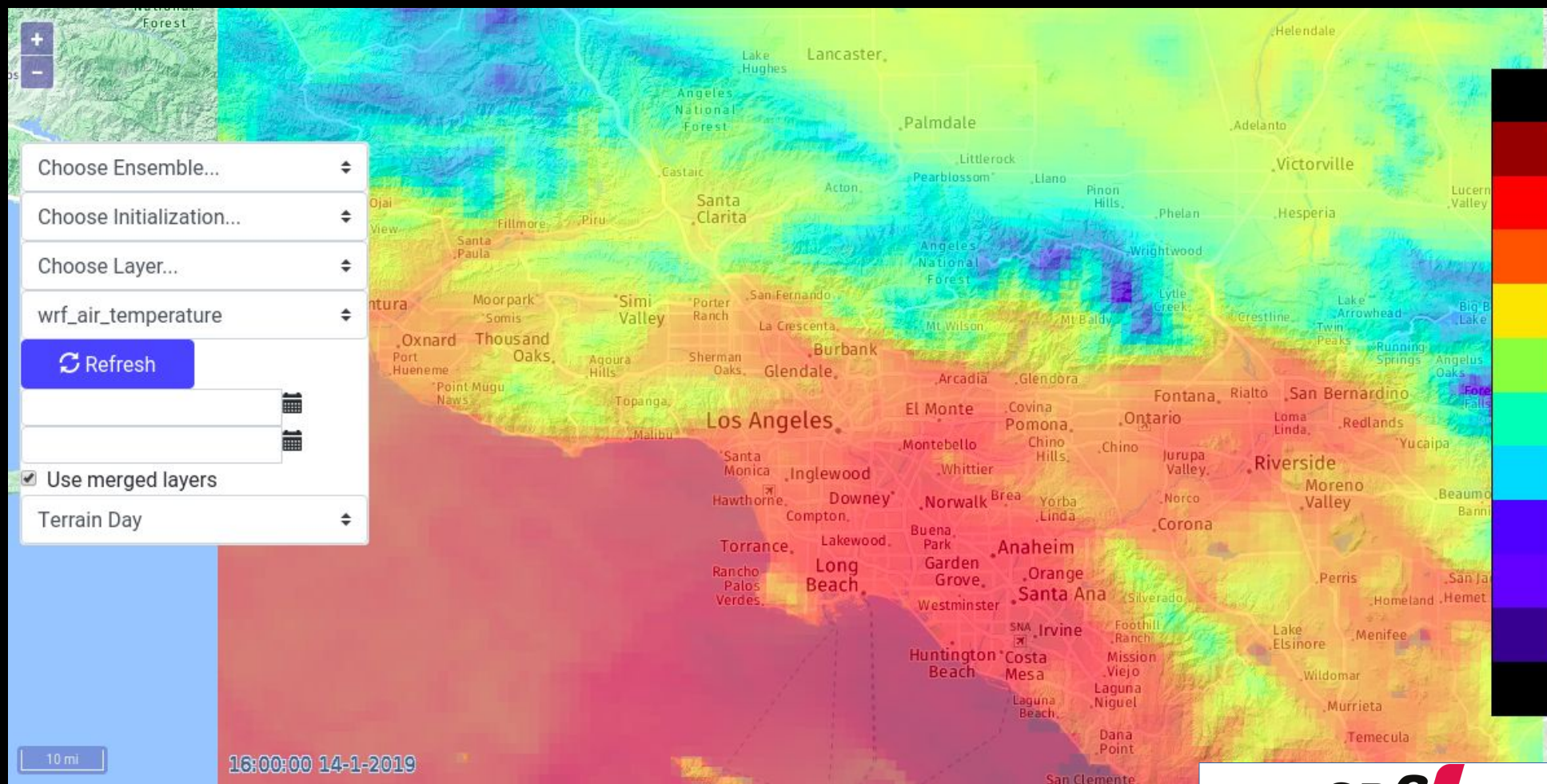


# Producing Gridded Weather and Wildfire Fuel Moisture

Presented By:  
Scott Capps, Ph.D.  
Atmospheric Data Solutions, LLC



# Southern California Weather and Wildfire Collaborative

In 2011, a regional collaborative was formed to meet common objectives.



UCLA



Research



Applied Science



**Predictive Services**

## Common Objectives:

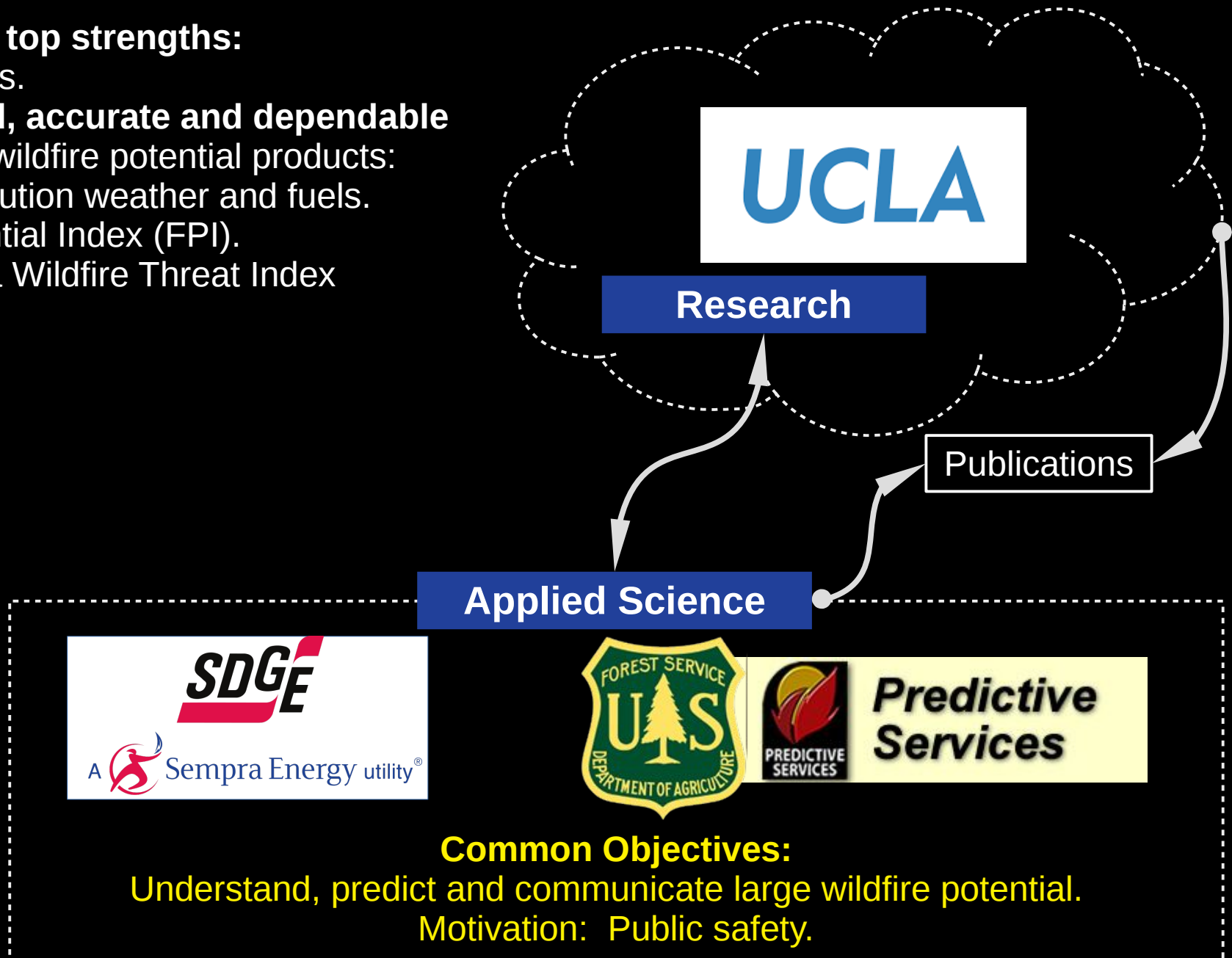
Understand, predict and communicate large wildfire potential.

Motivation: Public safety.

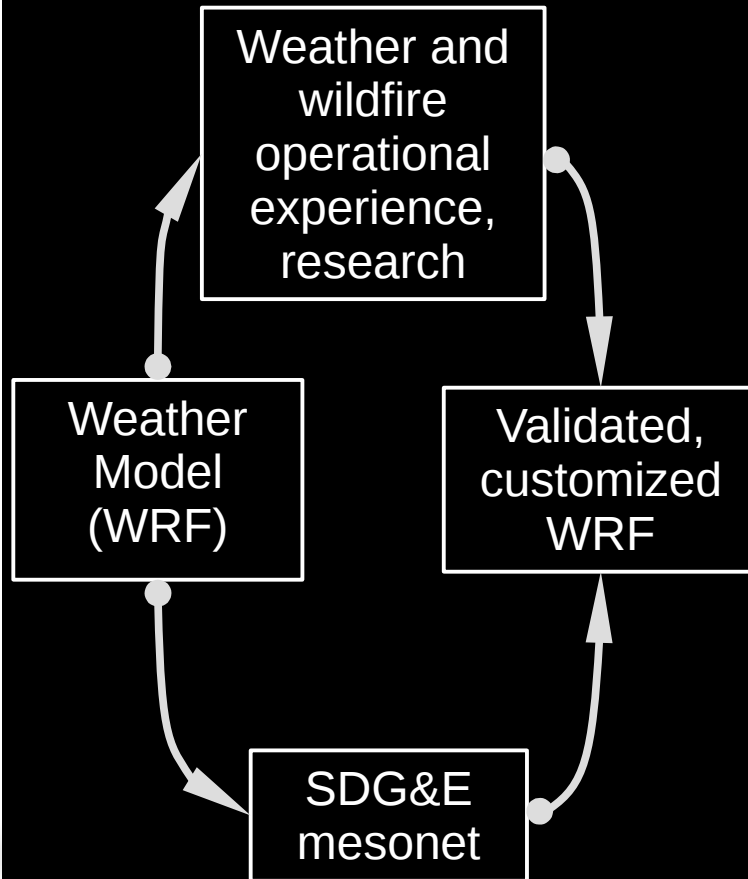
# Southern California Weather and Wildfire Collaborative

## Collaborative top strengths:

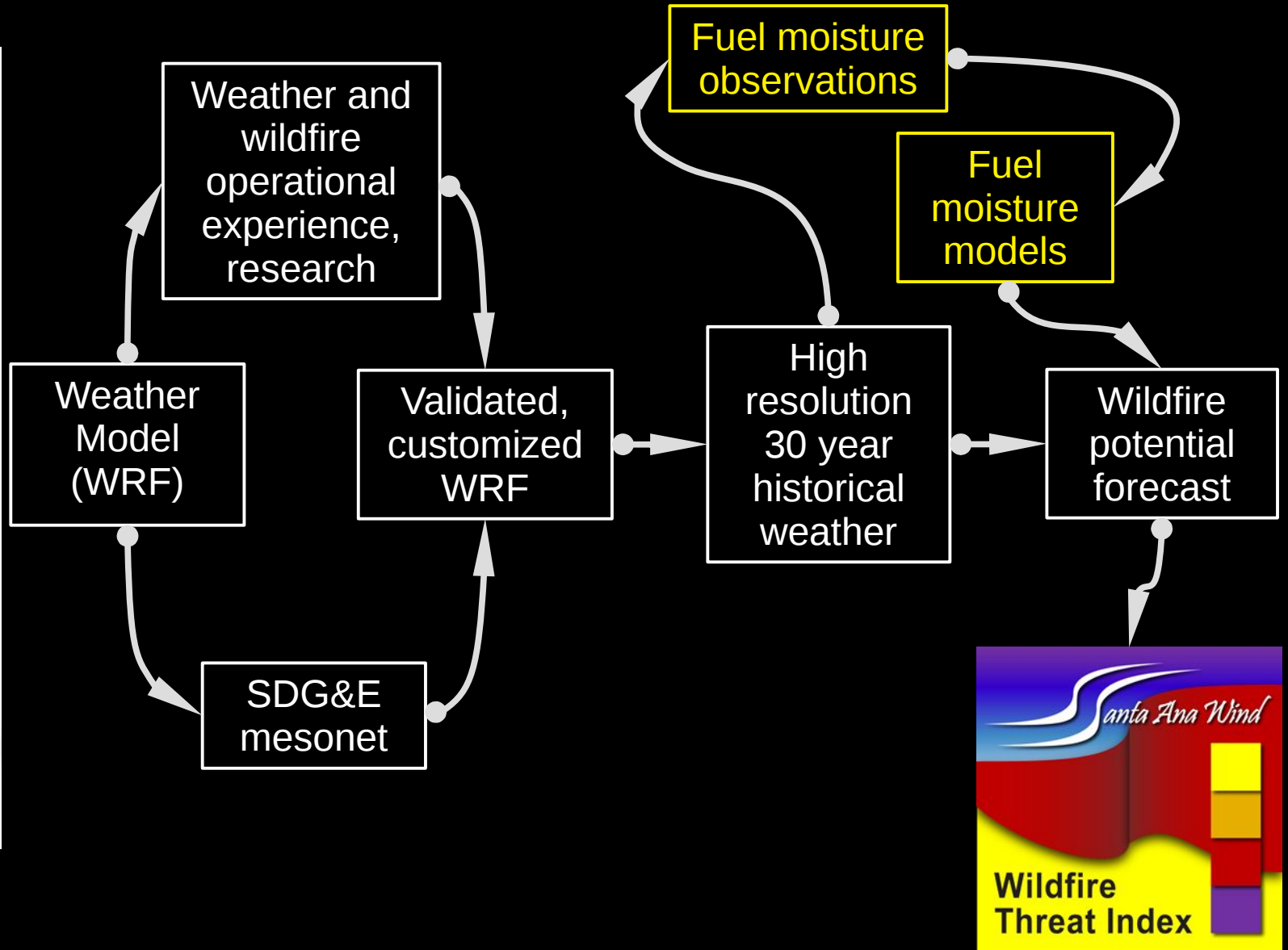
- Local experts.
- **Customized, accurate and dependable** operational wildfire potential products:
  - High resolution weather and fuels.
  - Fire Potential Index (FPI).
  - Santa Ana Wildfire Threat Index (SAWTI).



# High Resolution Gridded Weather



# High Resolution Gridded Weather



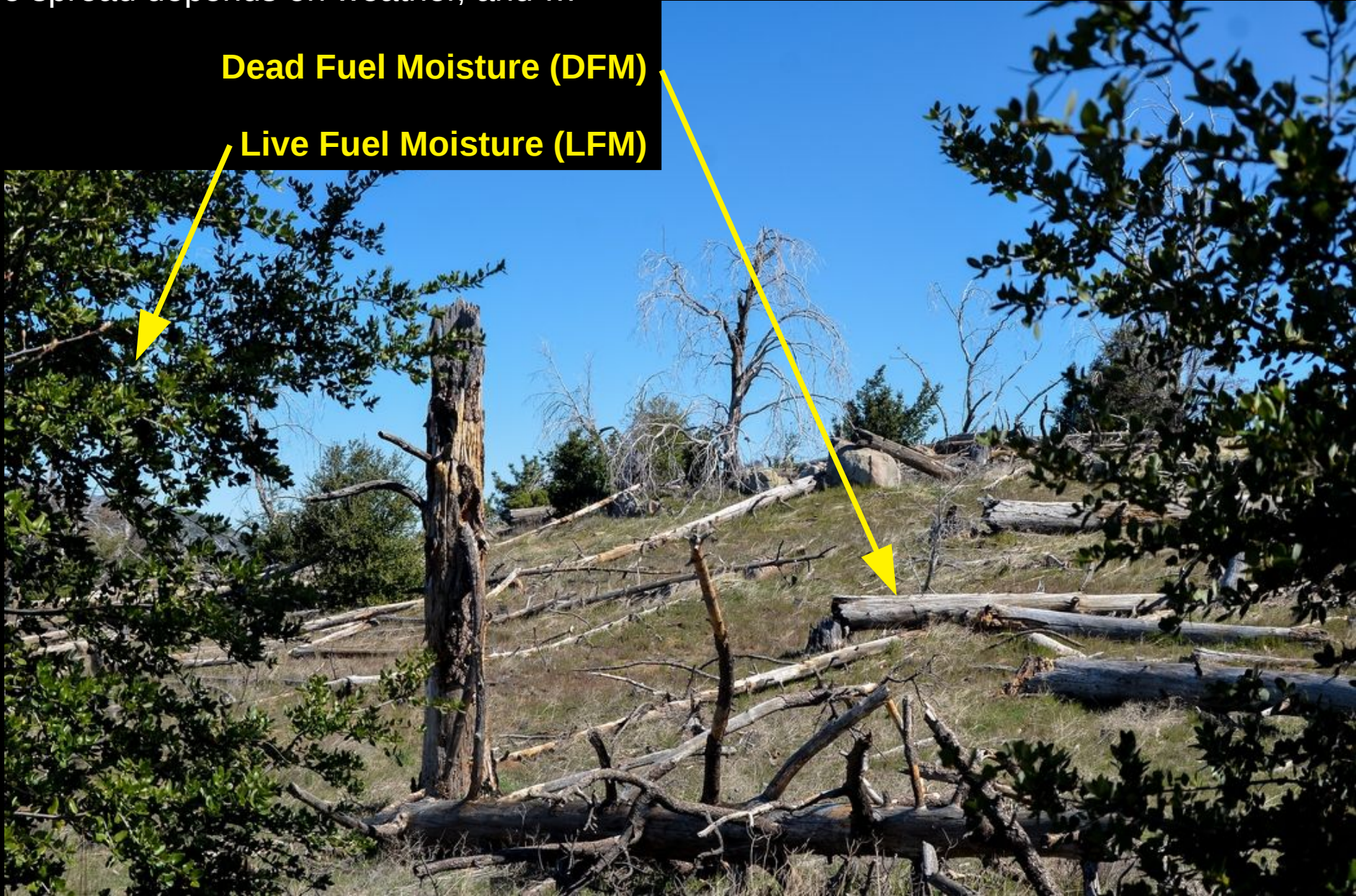
# Wildfire Fuel Moisture

Validated weather model: **Operationalized**

Wildfire spread depends on weather, and ...

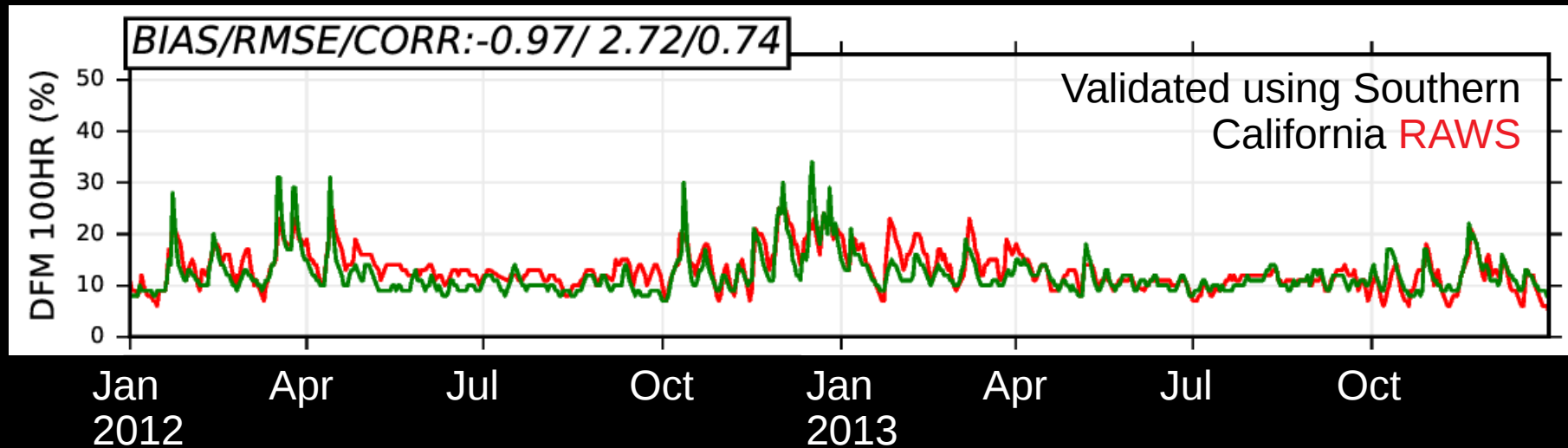
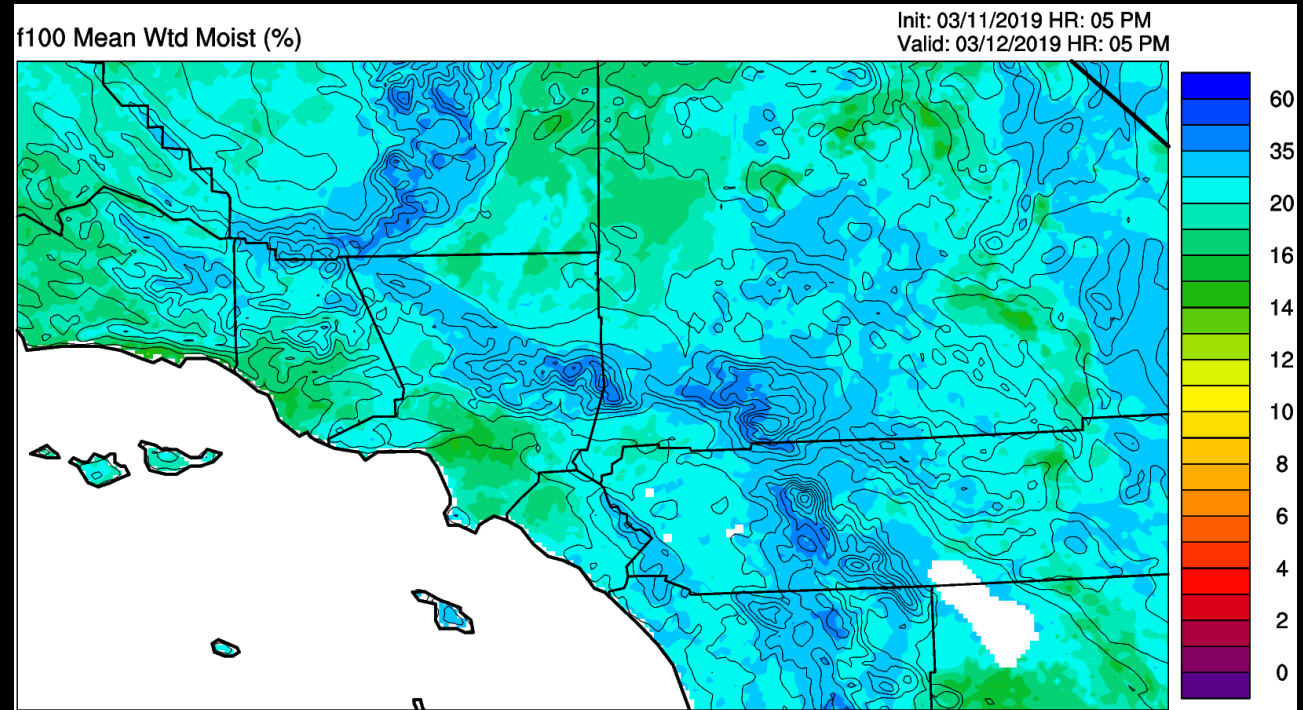
**Dead Fuel Moisture (DFM)**

**Live Fuel Moisture (LFM)**



# Dead Fuel Moisture

1, 10, 100 and 1000 hour Dead Fuel Moisture modeled at every high resolution gridcell using a modified, validated Nelson model.

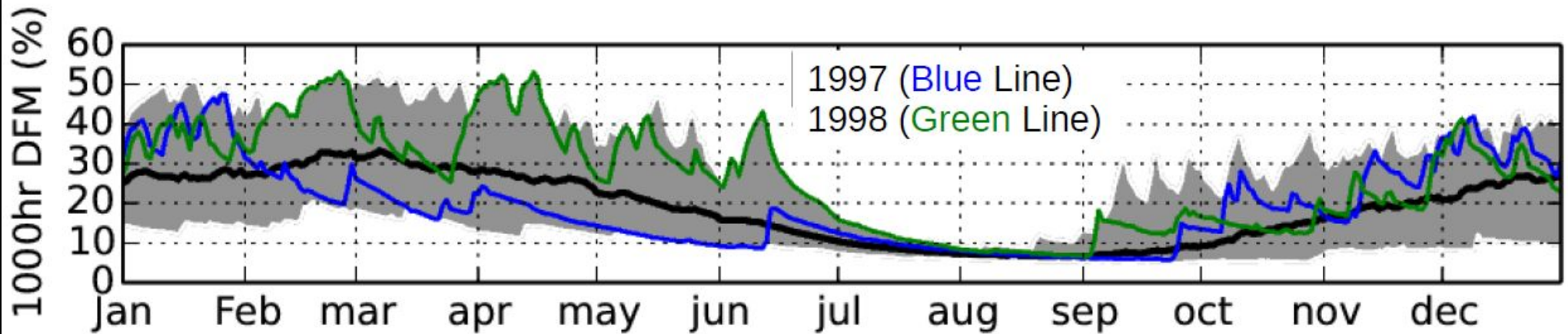


# Producing Operational Cumulative Indices

Fuel moisture evolves over a long period of time (days, weeks, months):

- A function of **cumulative** precipitation, temperature, RH, etc..
  - **Challenge: Must be cycled among operational weather model forecasts to capture the long-term evolution.**
  - **Need to maintain consecutive weather model forecasts.**

30yr (01/1984 through 12/2013) avg (Black line), max and min 1300LST 1000hr DFM for station:Sill Hill





# Live Fuel Moisture

## Live Fuel Moisture Models:

- Trained and tested against the National Fuel Moisture Database **observations**.
- Chamise new and old Growth.

High resolution historical weather data

Aggregation, scrubbing and machine learning

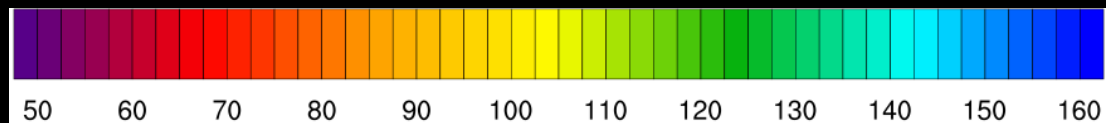
Sparse observations

New growth LFM (%)

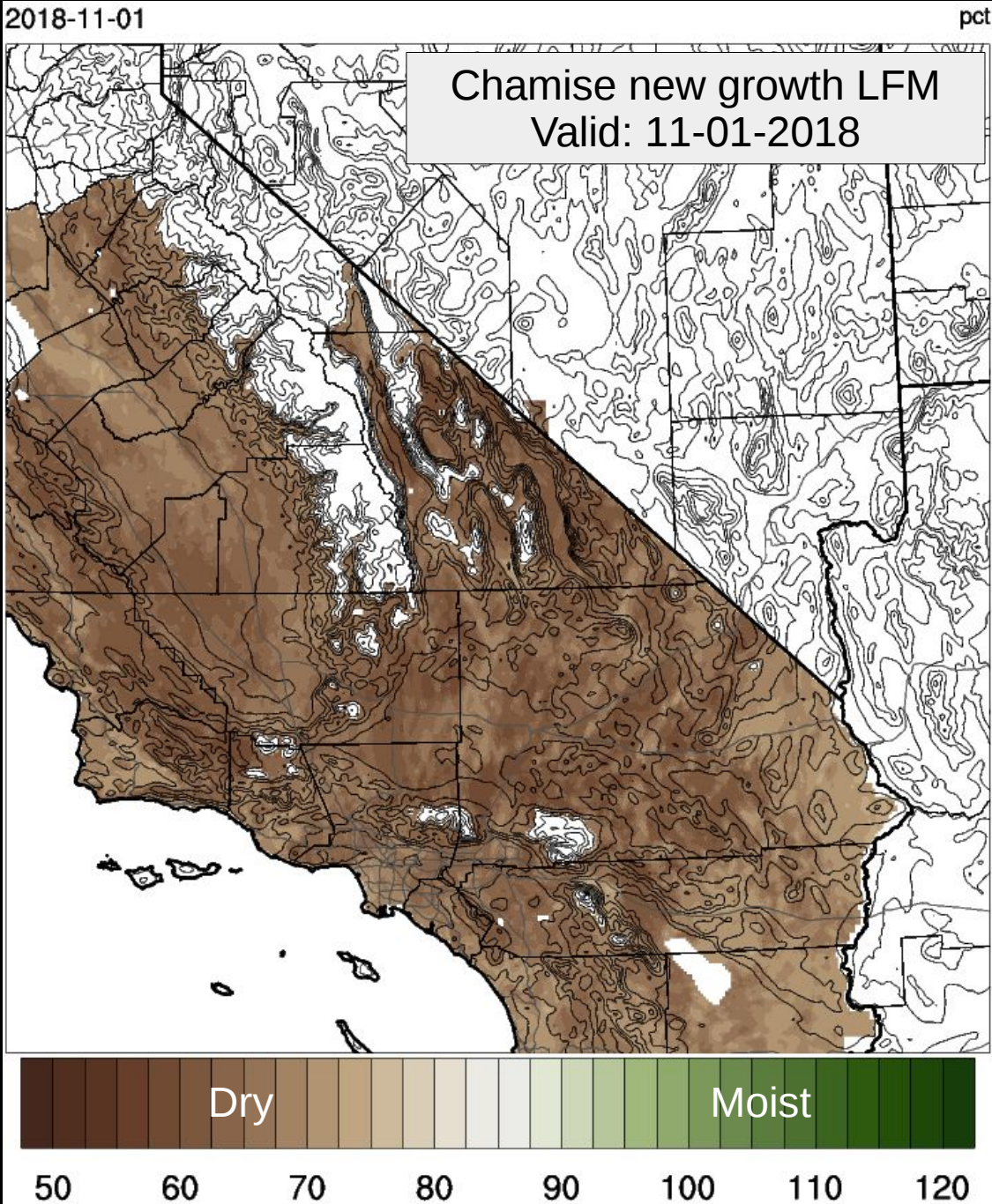
Valid: 03/12/2019

Old growth LFM (%)

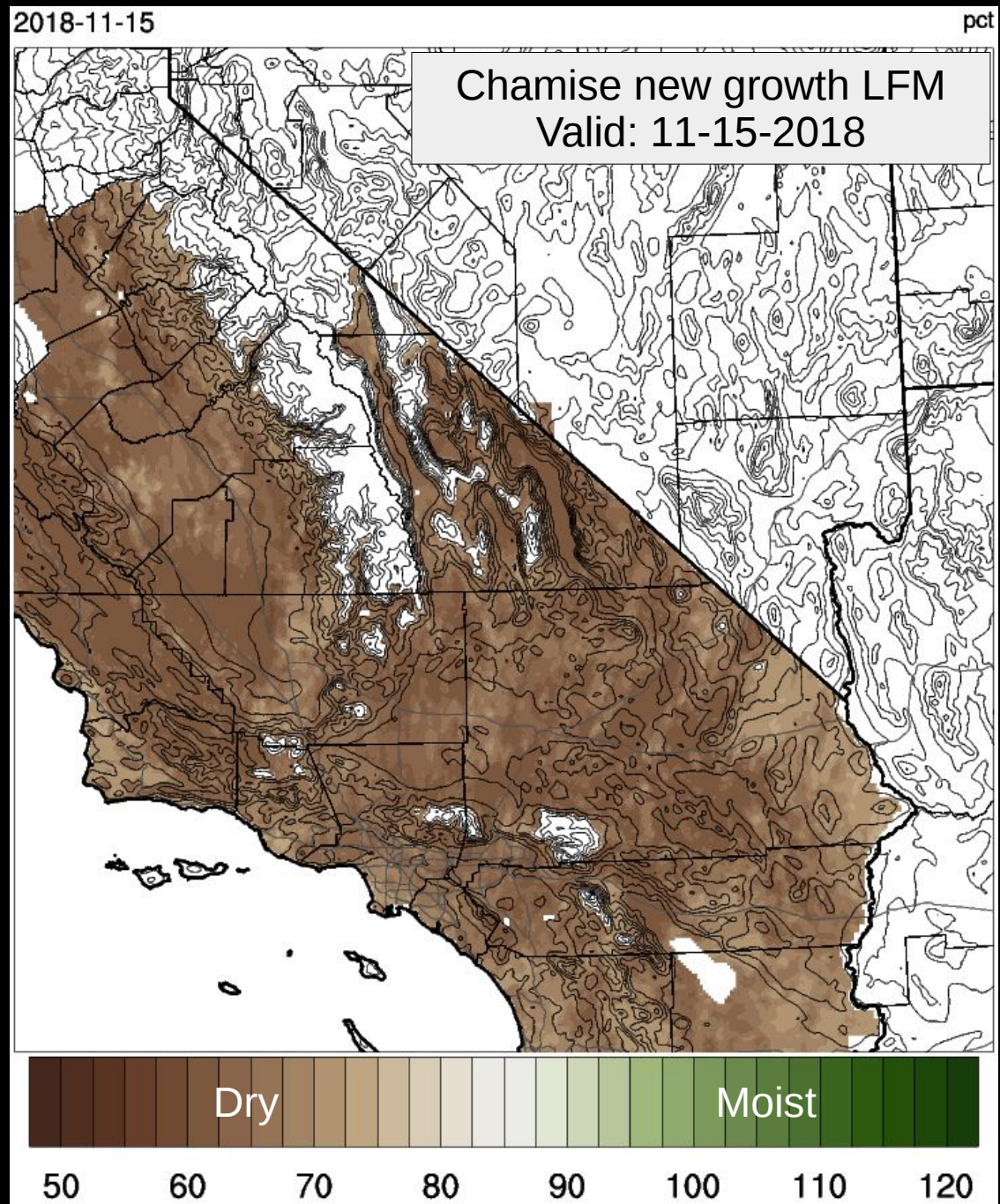
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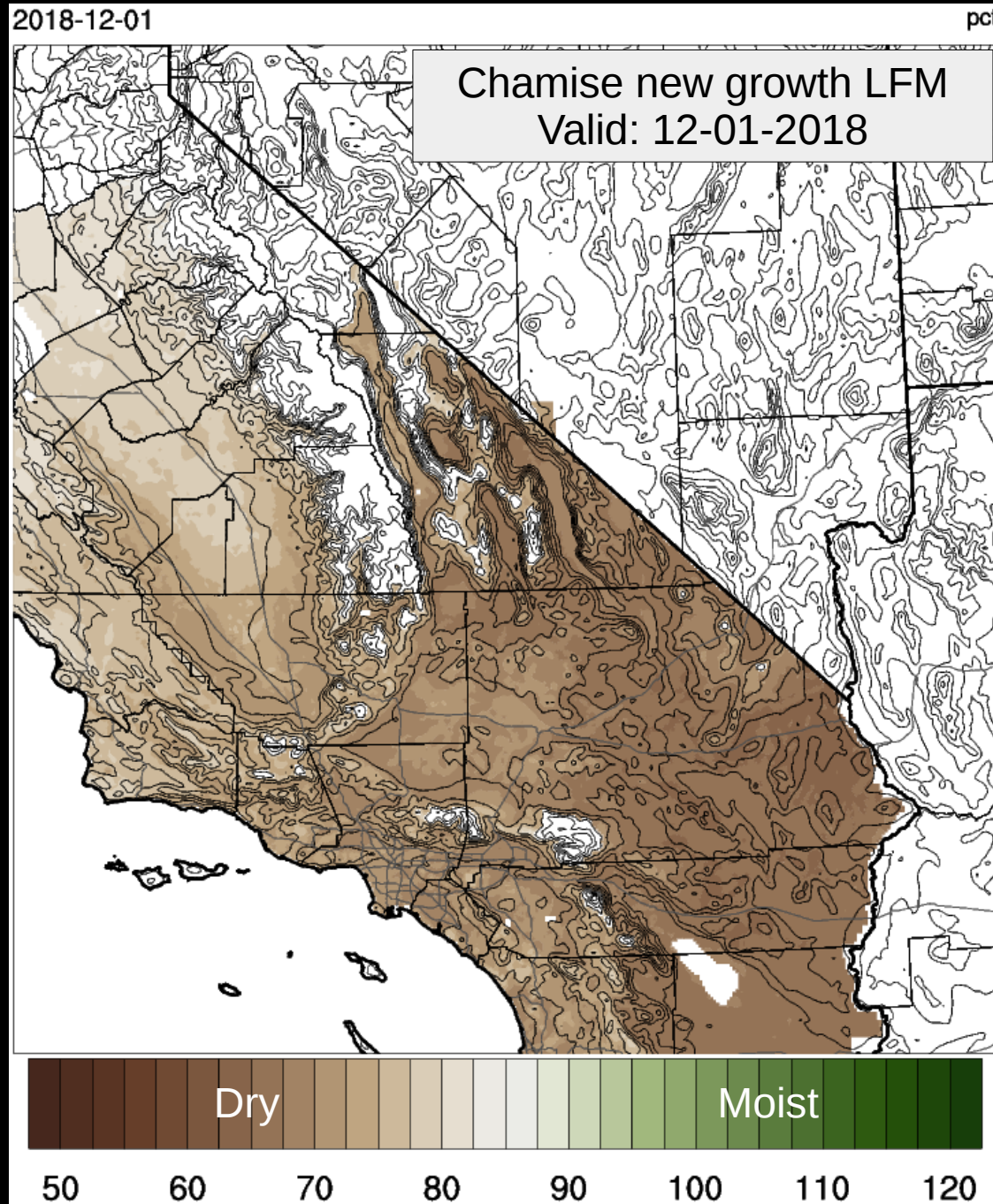
# Live Fuel Moisture



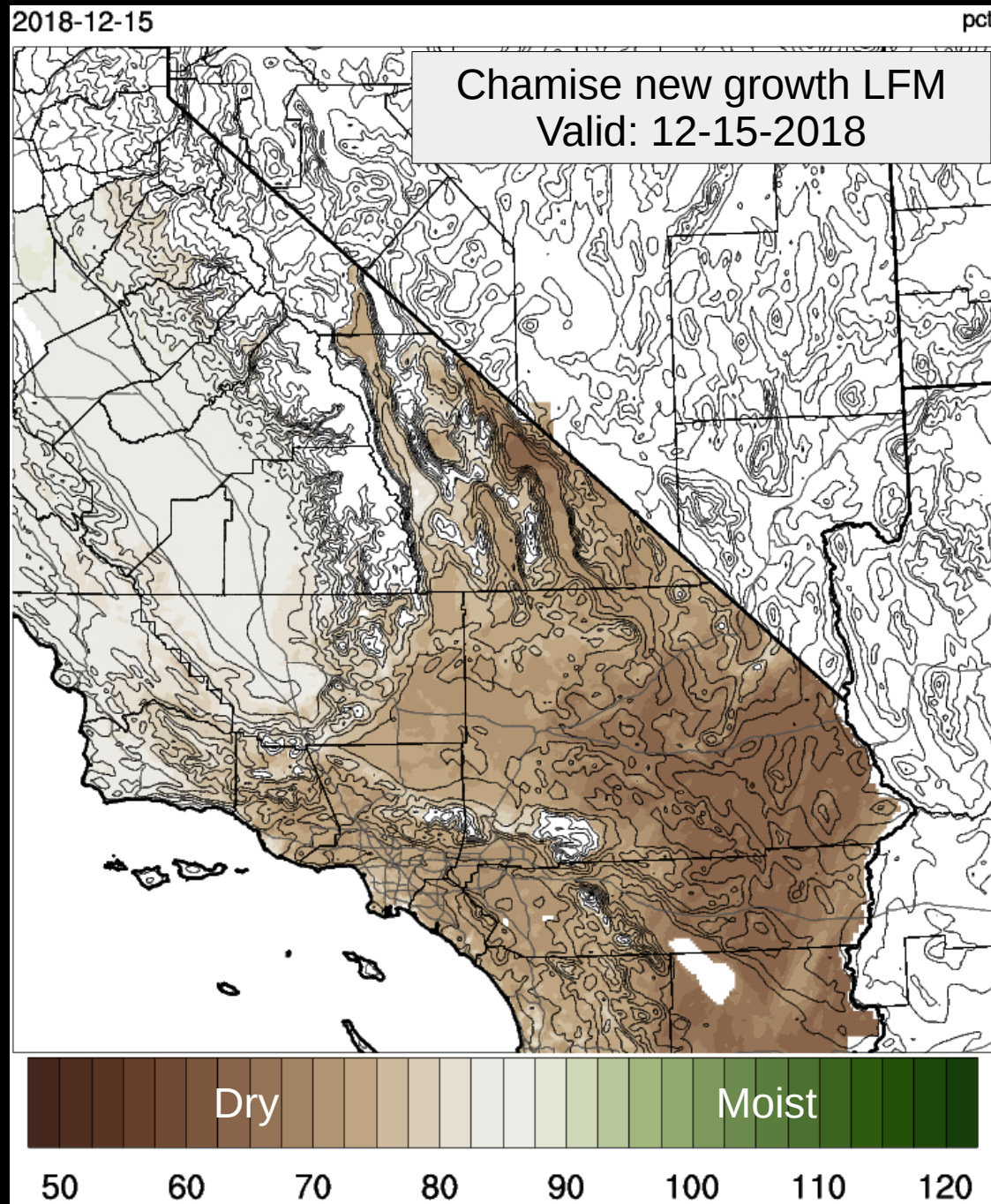
# Live Fuel Moisture



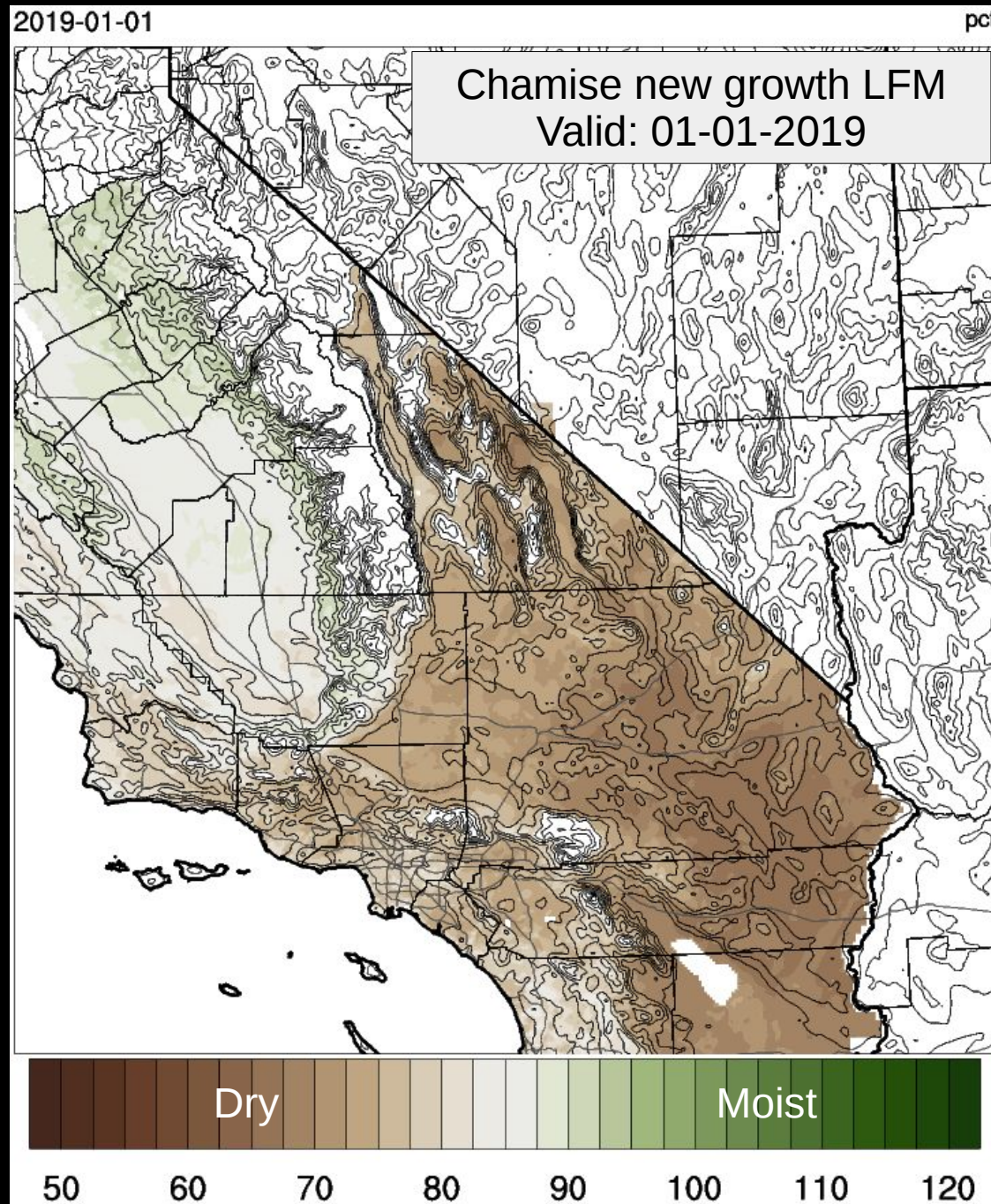
# Live Fuel Moisture



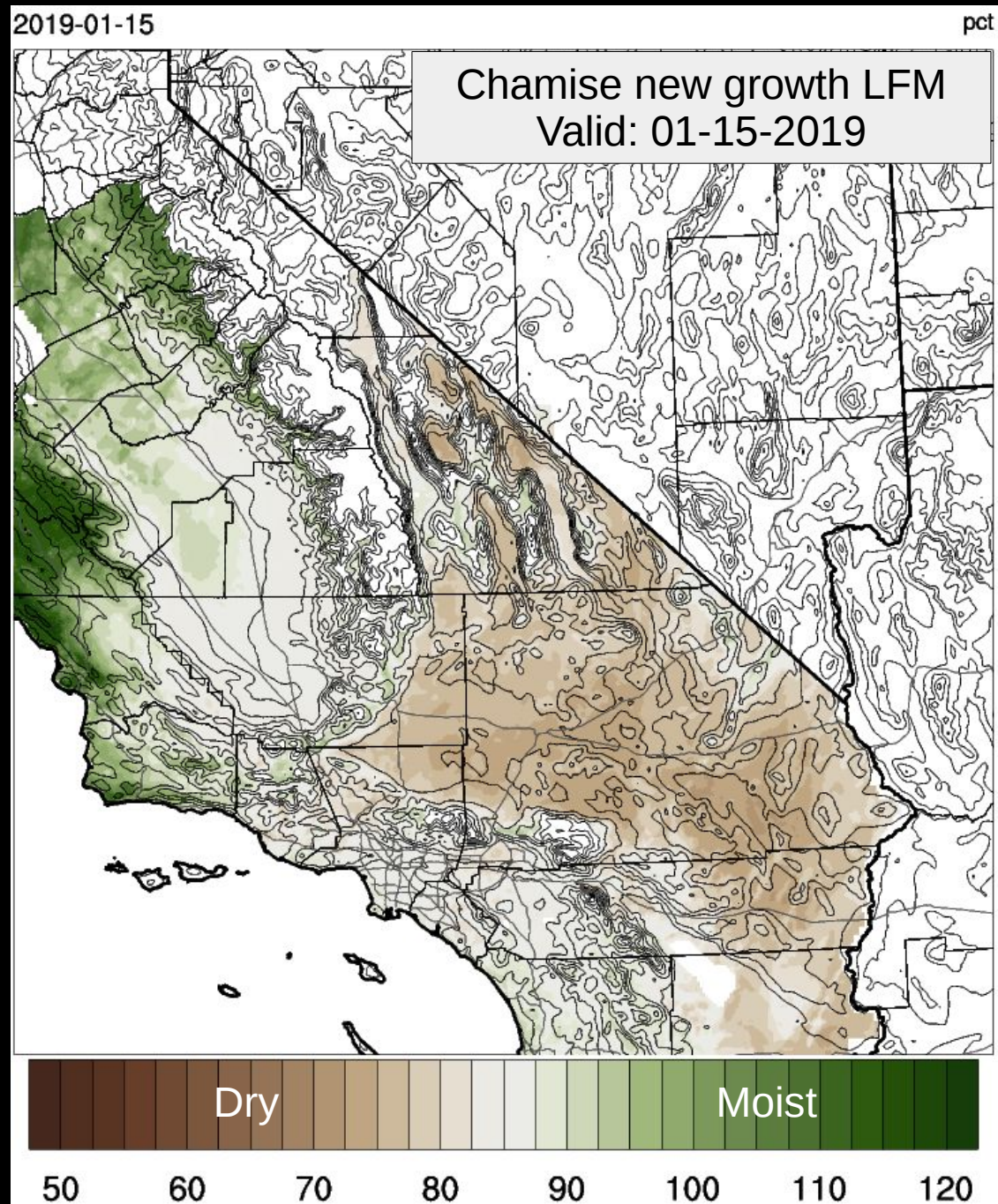
# Live Fuel Moisture



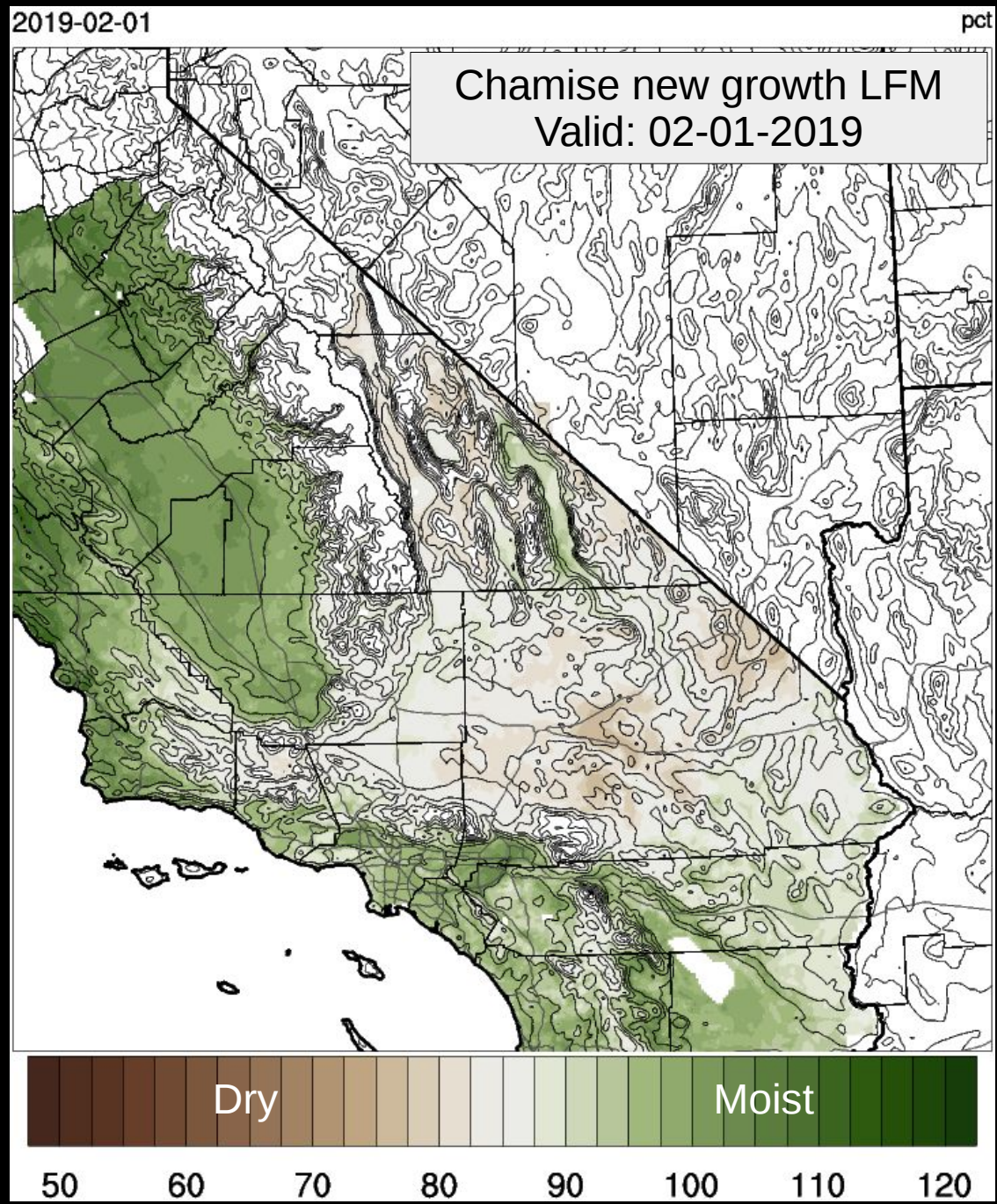
# Live Fuel Moisture



# Live Fuel Moisture



# Live Fuel Moisture

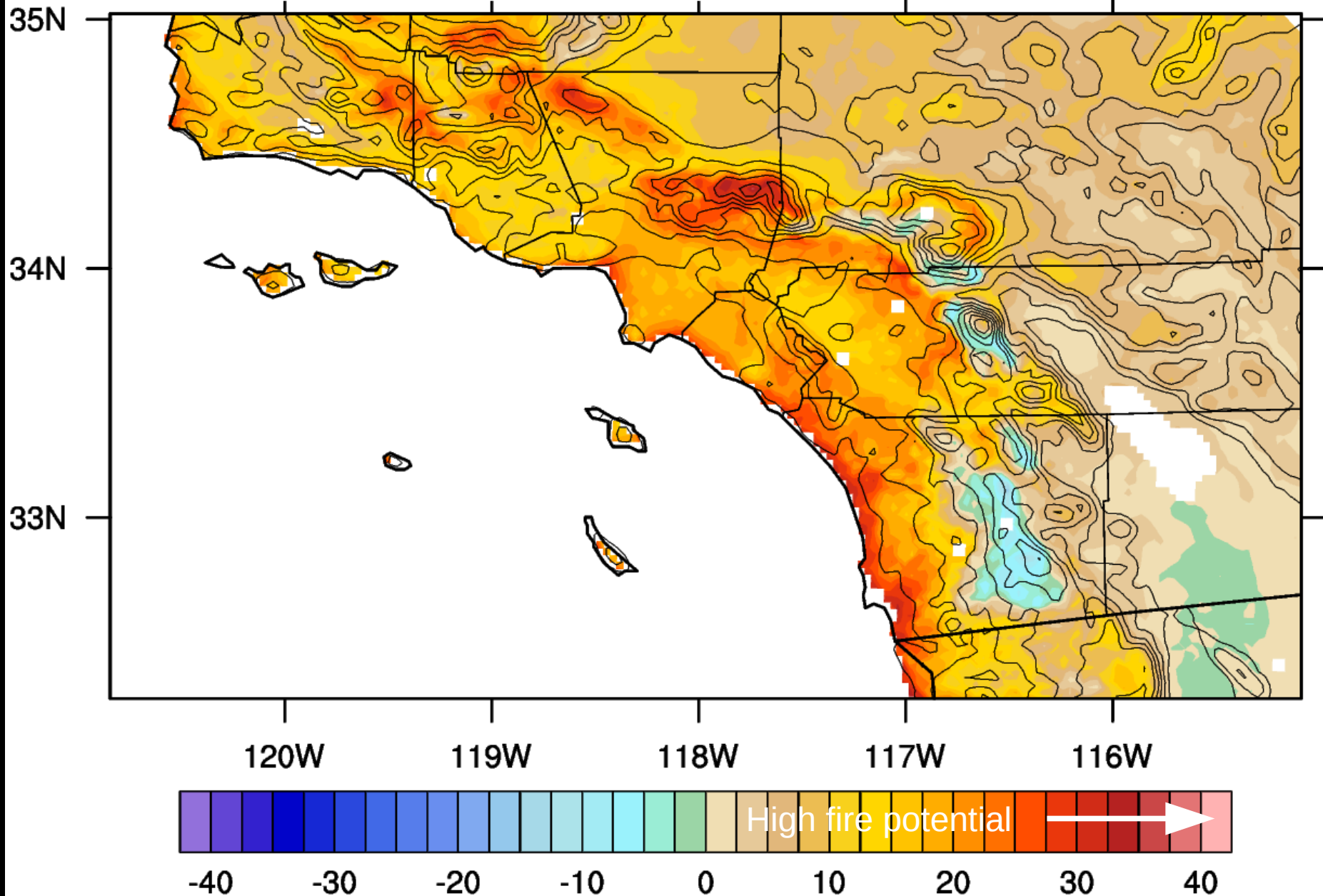




# Historical Perspective

Energy Release Component Departure  
from 30 Year 90<sup>th</sup> Percentile

Init: 05/11/2014 HR: 05 AM  
Valid: 05/14/2014 HR: 02 PM

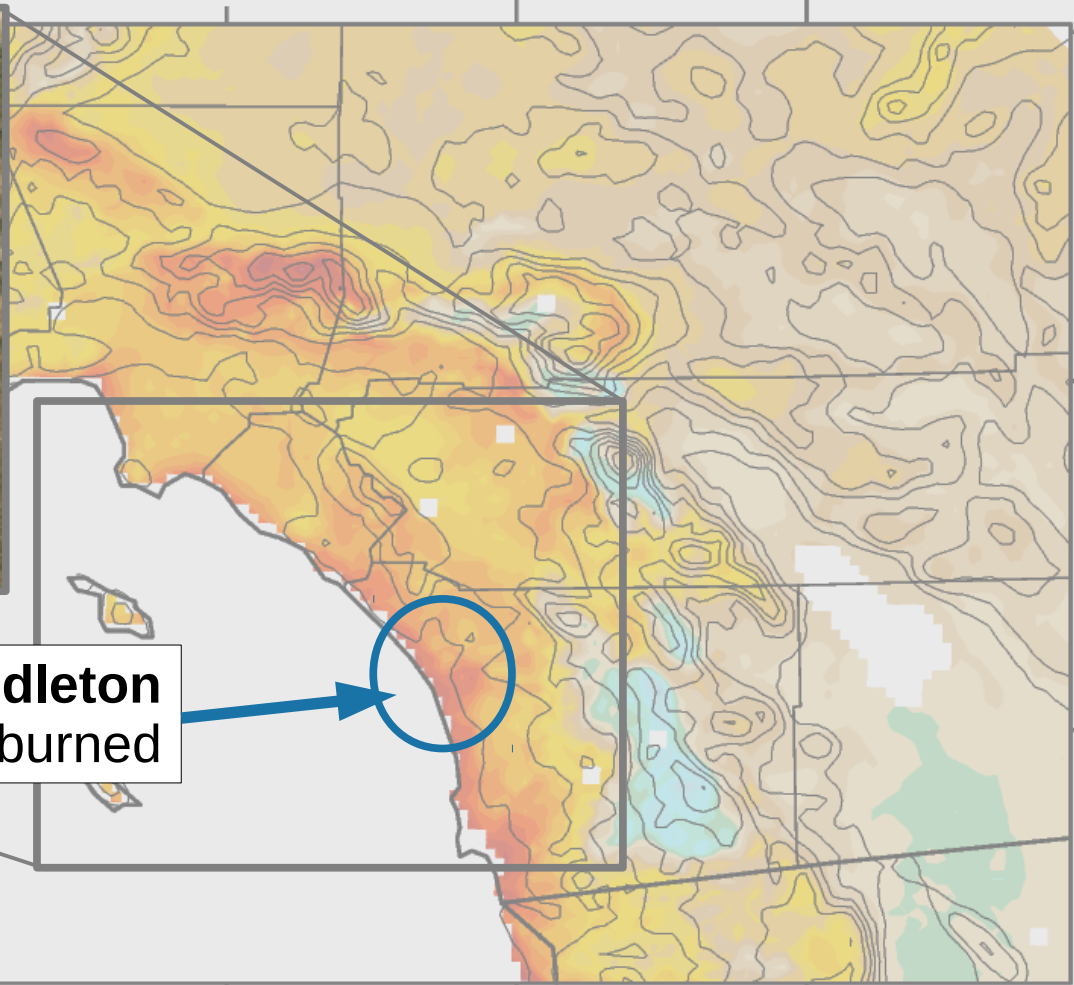


# Historical Perspective

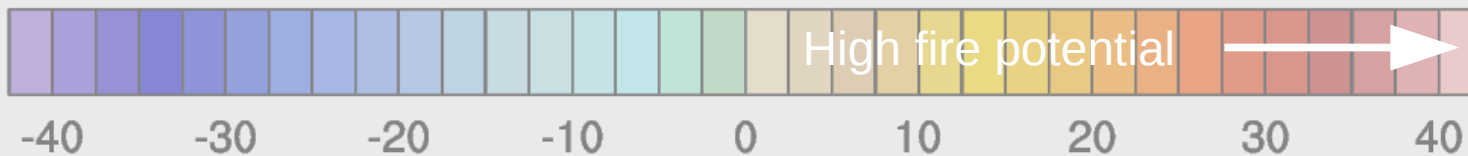
Energy Release Component Departure  
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Init: 05/11/2014 HR: 05 AM

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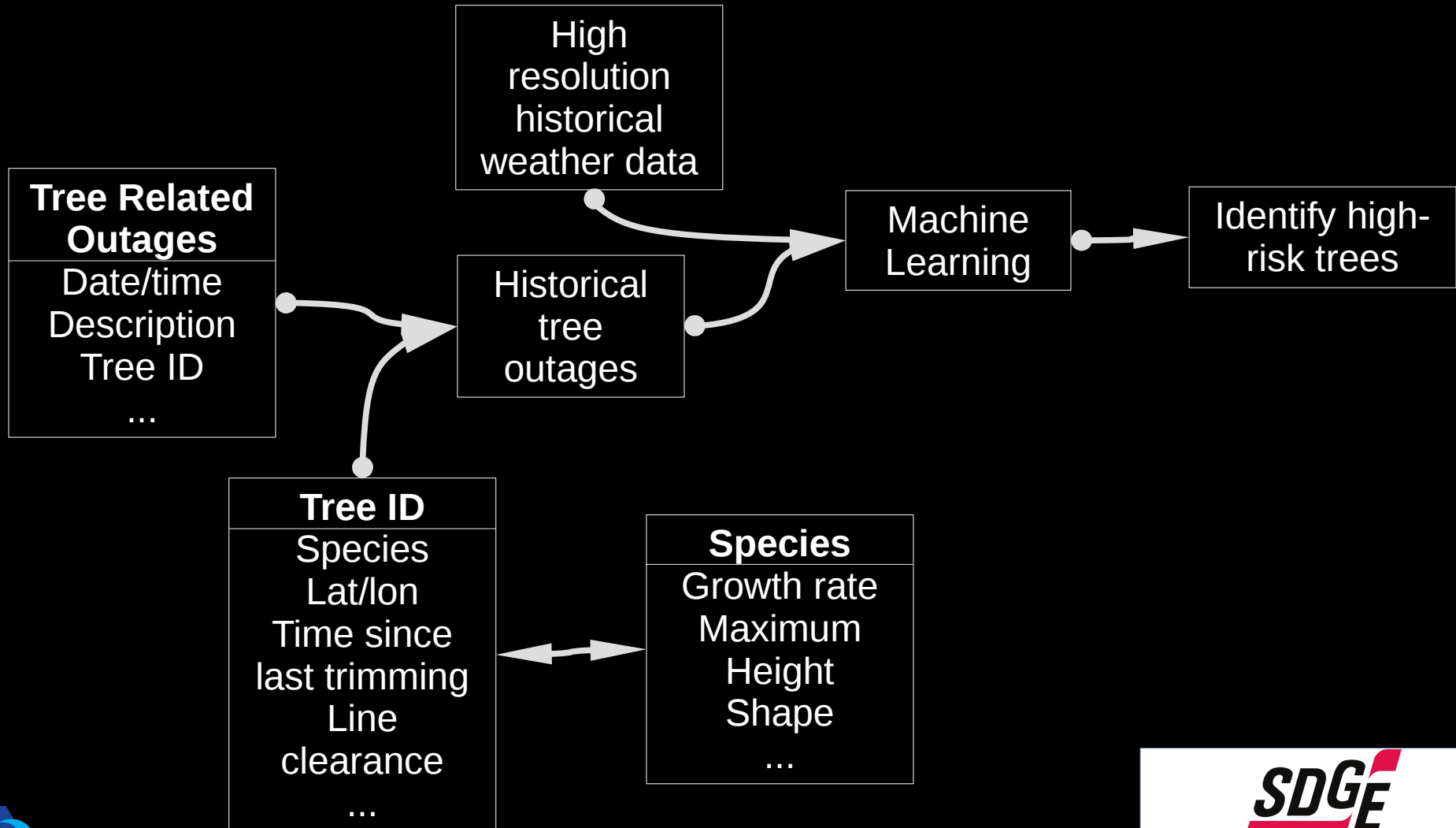
**San Marcos and Camp Pendleton  
Fires: 27,000 acres burned**



# Current and Future Work

## Vegetation Risk Profile Model:

Identify areas where tree maintenance is warranted to mitigate fire risks well-ahead of fire season.



# Thank you

## Acknowledgements:

Pouya Vahmani (ADS)

Wei Zhuang (ADS)

Rui Liu (ADS)

Jerry Kalkhof (ADS)

Xin Qu (ADS)

Brian D'Agostino (SDG&E)

Steve Vanderburg (SDG&E)

Tom Rolinski (SCE)

Rob Fovell (SUNY)



**Predictive  
Services**

