BENCHMARK

YOUR ASSET, **YOUR FORECAST**

H2020 SECLI-FIRM – Webinar

Complementing the U.S. Public Sector's
Climate Services: The role of Machine
Learning and Cloud Computing

CARLOS F. GAITAN, Ph.D.
CTO
Benchmark Labs, Inc.

AMBASSADOR™
WRN
WEATHER-READY NATION

Quick intro – About us:

Benchmark Labs provides IoT forecasting solutions by delivering asset-specific forecasts for the agricultural sector and beyond, to optimize management strategies, reduce water consumption and improve operational margins.

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THE IMPACT ON
FORECAST ACCURACY

TEMPERATURE FORECAST ERROR
(Root Mean Squared Error °C)

100%
RELATIVE ERROR

GRIDDED FORECAST

65%
RELATIVE ERROR

-35%
FORECAST ERROR

IN-FIELD FORECAST

THE PROBLEM: where is the data?

THE SOLUTION

Public – private partnerships between the federal government and leading cloud providers (e.g., Microsoft, Amazon, Google)

USE CASE: AGRICULTURE - CGDD

Problem statement: Can we obtain actionable information from seasonal forecasts about potential harvest dates based on cGDD?

Data: Maximum and Minimum temperatures from NMME

Weather Station data

Constrains: Average cGDD needed for a given crop (e.g., wine grapes)

USE CASE: AGRICULTURE - CGDD
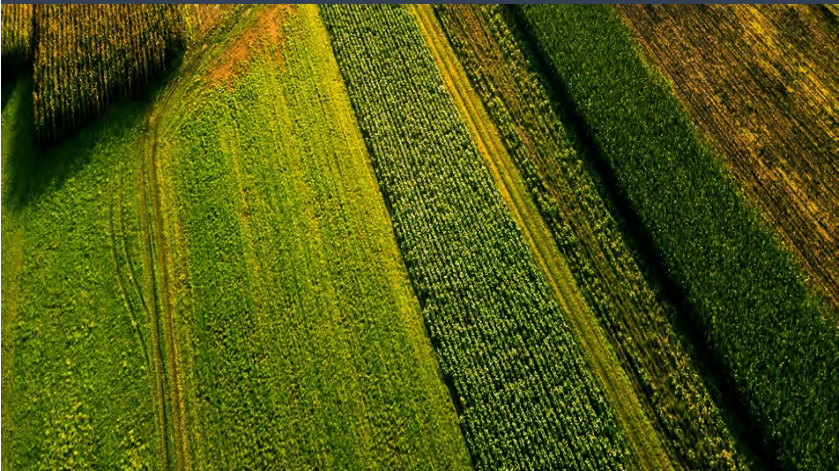
Example: Seasonal forecast versus climatology and analog year – Wine grapes
May forecast
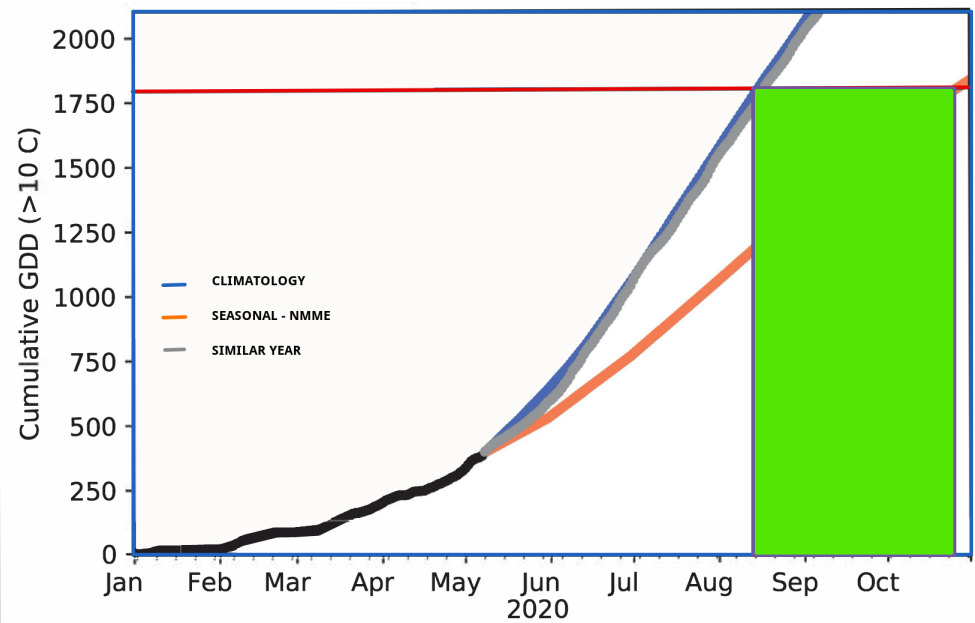
USE CASE:
AGRICULTURE - CGDD

Example: Seasonal forecast versus climatology and analog year – Wine grapes
September forecast
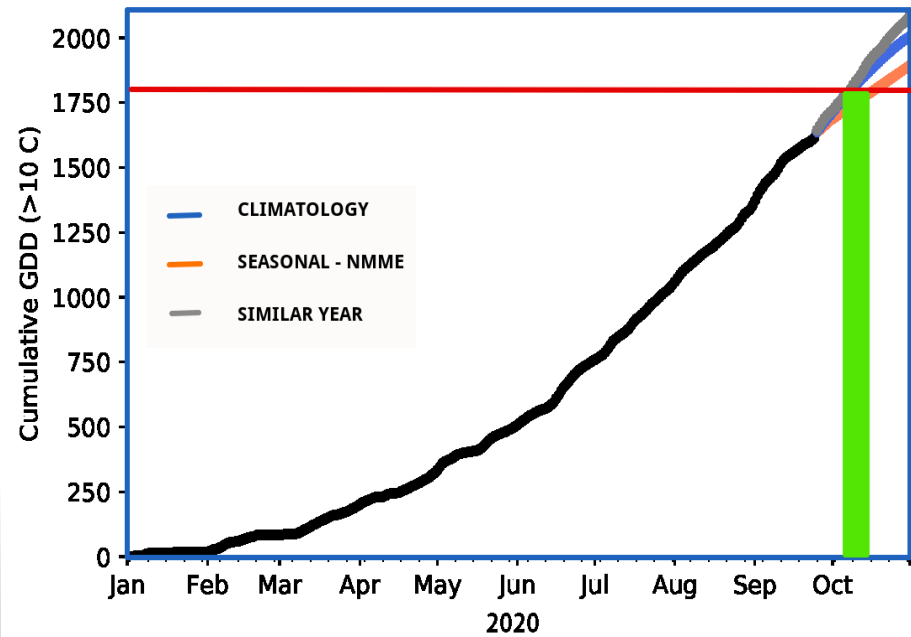
USE CASE: FOREST FIRE INDEX FORECASTS

Problem statement: Can we calculate KBDI (drought index) from NASA's GOES-S2S model output?

Idea :
- Get daily outputs of precipitation and maximum temperature
- Statistically downscale the output
- Calculate KBDI
- Compare output with historical fires

Infrastructure :
- **Saturn Cloud Server**
  - 2 cores, 16 GB RAM, 40 GB disk

- **Dask Cluster**
  - 2 cores
  - 64 workers

FOREST FIRE INDEX FORECASTS

July 13 model run –
September 2020 (left) & December 2020 (right)

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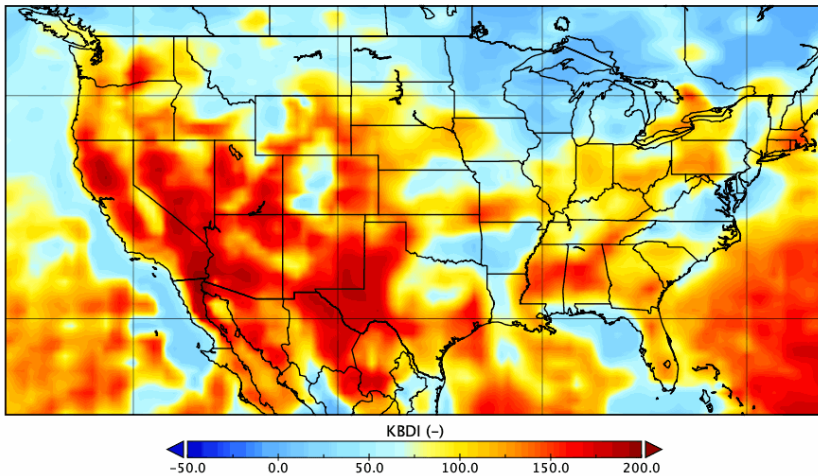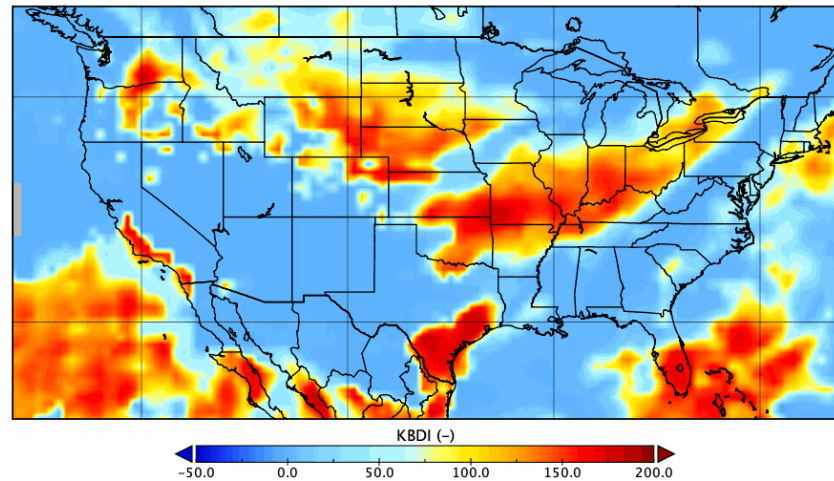
NEXT STEPS:
SEASONAL INFORMATION IN THE CLOUD

Registry of Open Data on AWS

aws

NOAA Unified Forecast System Subseasonal to Seasonal Prototype 5

`agriculture` `climate` `disaster response` `environmental` `meteorological` `oceans` `sustainability` `weather`

Description

The Unified Forecast System Subseasonal to Seasonal prototype 5 (UFS S2Sp5) dataset is reforecast data from the UFS atmosphere-ocean coupled model experimental prototype version 5 produced by the Medium Range and Subseasonal to Seasonal Application team of the UFS-R2O project. The UFS S2Sp5 is the first dataset released to the broader weather community for analysis and feedback as part of the development of the next generation operational numerical weather prediction system from NWS. The dataset includes all the major weather variables for atmosphere, land, ocean, sea ice, and ocean waves.

Acknowledgment - The Unified Forecast System (UFS) atmosphere-ocean coupled model experimental version 5 (UFS S2Sp5) data used in this study are made available through the UFS Research to Operations (UFS-R2O) project sponsored by the National Weather Service (NWS) Office of Science and Technology Integration (OSTI) Modeling Program Division and the National Oceanic and Atmospheric Administration (NOAA) Oceanic and Atmospheric Research (OAR) Weather Program Office (WPO).

Update Frequency

Prototype 5 is a retrospective run for the period from 2011 to 2018. The runs are initialized twice per month (1st and 15th) and the length of the forecast is 35 days with an output frequency of 6 hours.

Resources on AWS

Description
UFS prototype files

Resource type
S3 Bucket

Amazon Resource Name (ARN)
`arn:aws:s3:::noaa-ufs-prototype5-pds`

AWS Region
`us-east-1`

AWS CLI Access (No AWS account required)
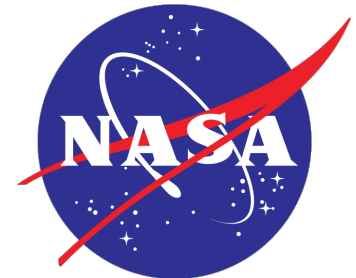`aws s3 ls s3://noaa-ufs-prototype5-pds/ --no-sign-request`

Explore
Browse Bucket

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SPECIAL THANKS TO:

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https://www.benchmarklabs.com

admin@benchmark.com