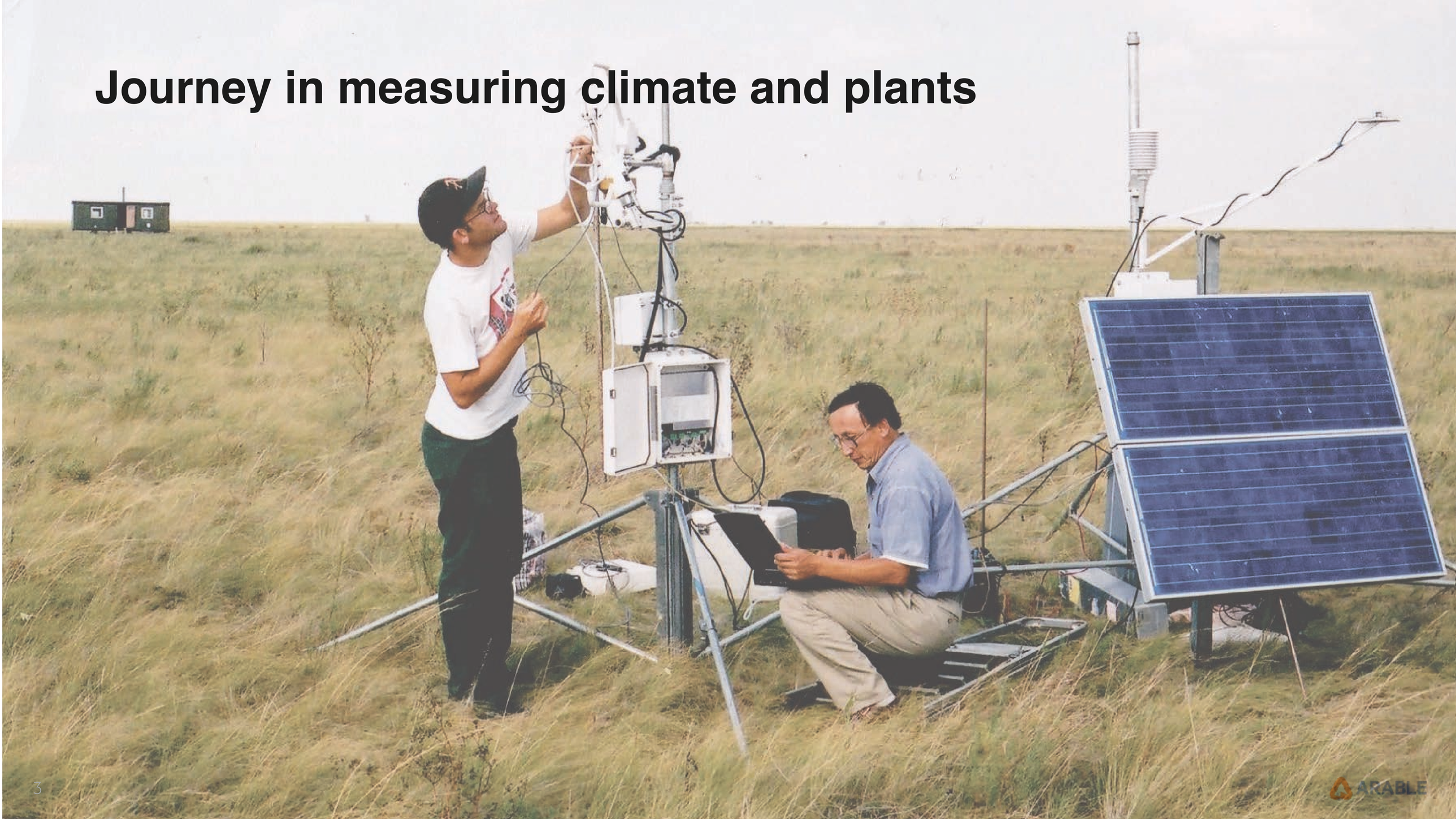
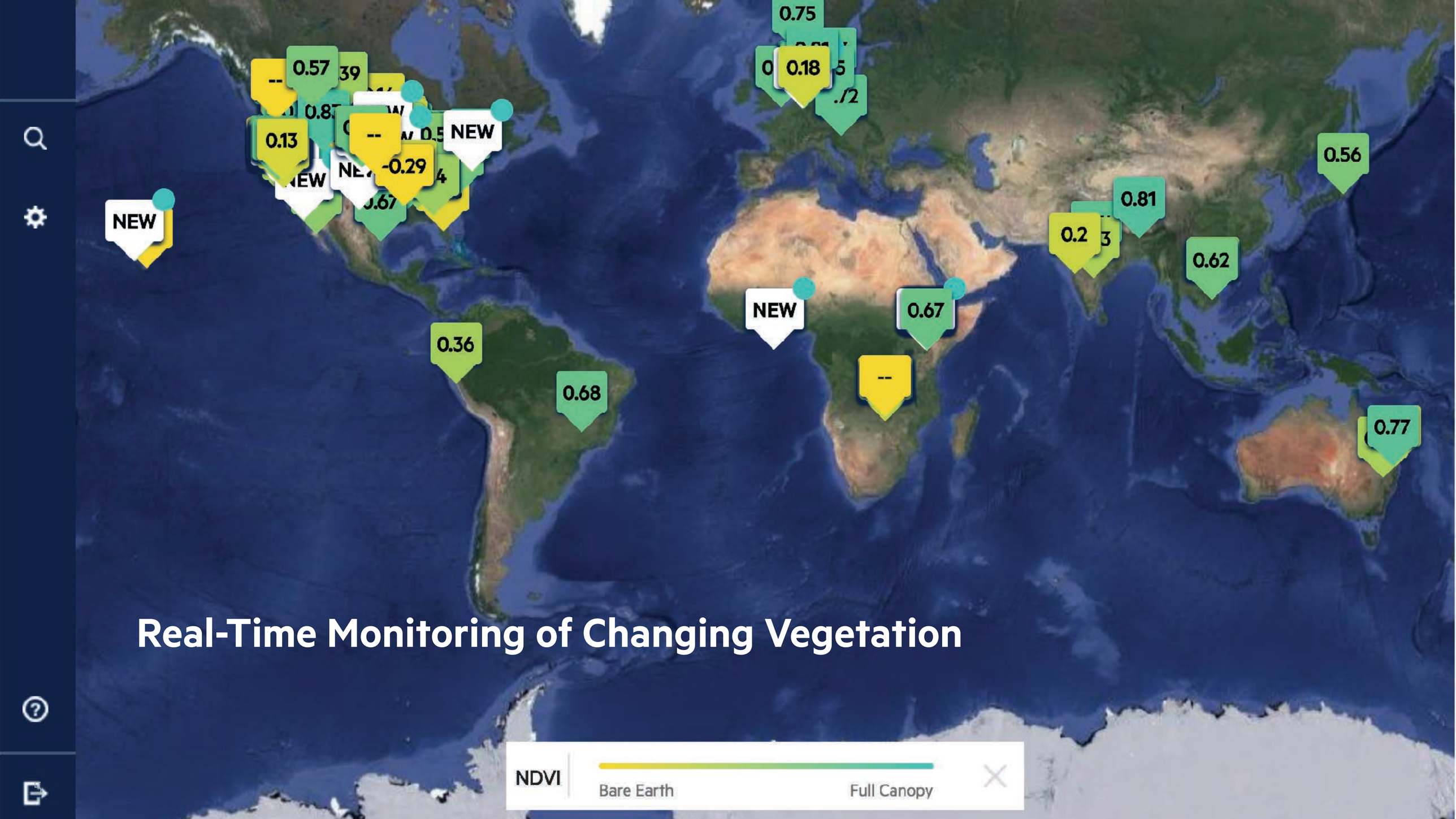

ARABLE


Arable is a **data analytics** company
that **reduces risk** throughout the
agricultural **supply chain**.

Journey in measuring climate and plants



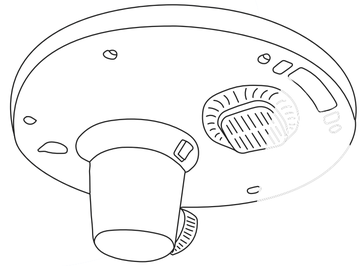


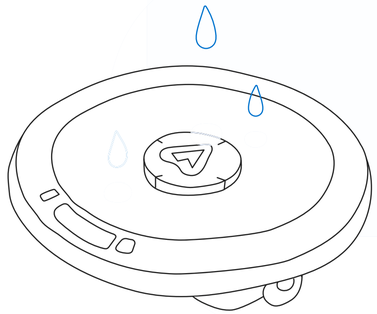
Real-Time Monitoring of Changing Vegetation

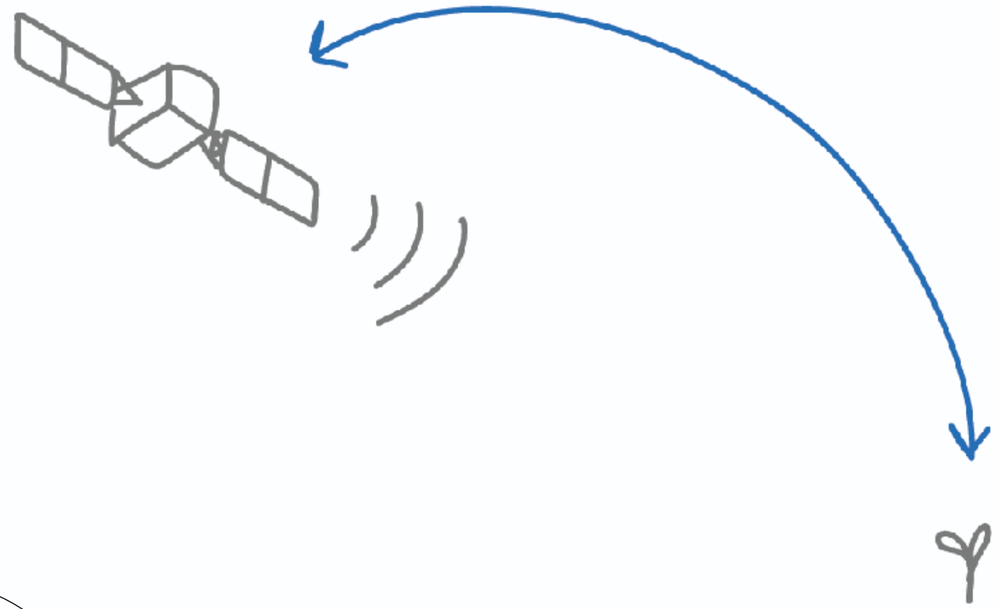
What is best technology for passive monitoring?

Air Temperature
Leaf Temperature
Relative Humidity
Atmospheric Pressure
Total Available Sunlight
4 Way Net Radiation
Precipitation
Drop Size Distribution
Leaf Wetness
NDVI
Chlorophyll Content
Leaf Stress
Water Stress
Auxiliary Port
Camera*
GPS

& More

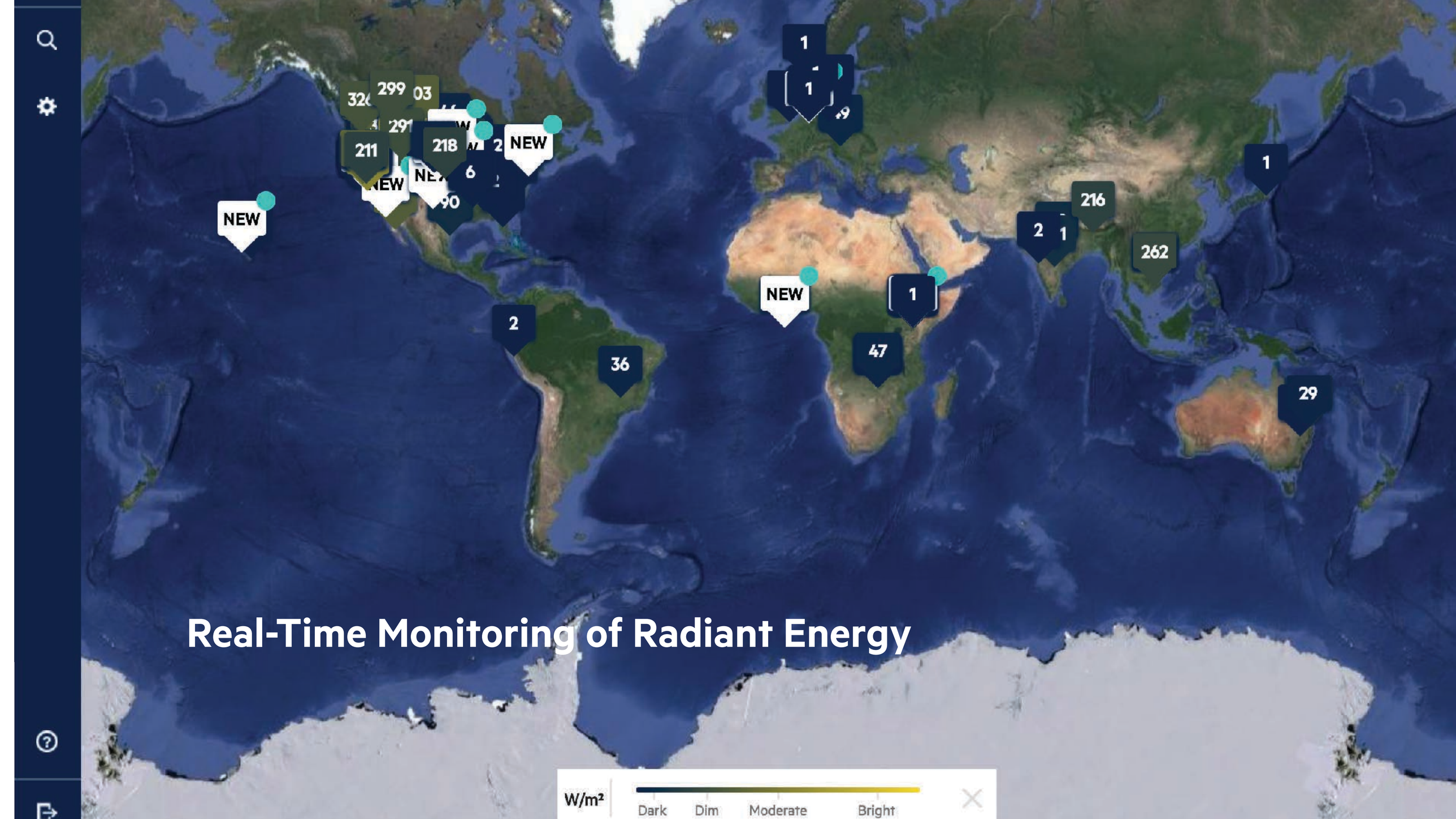






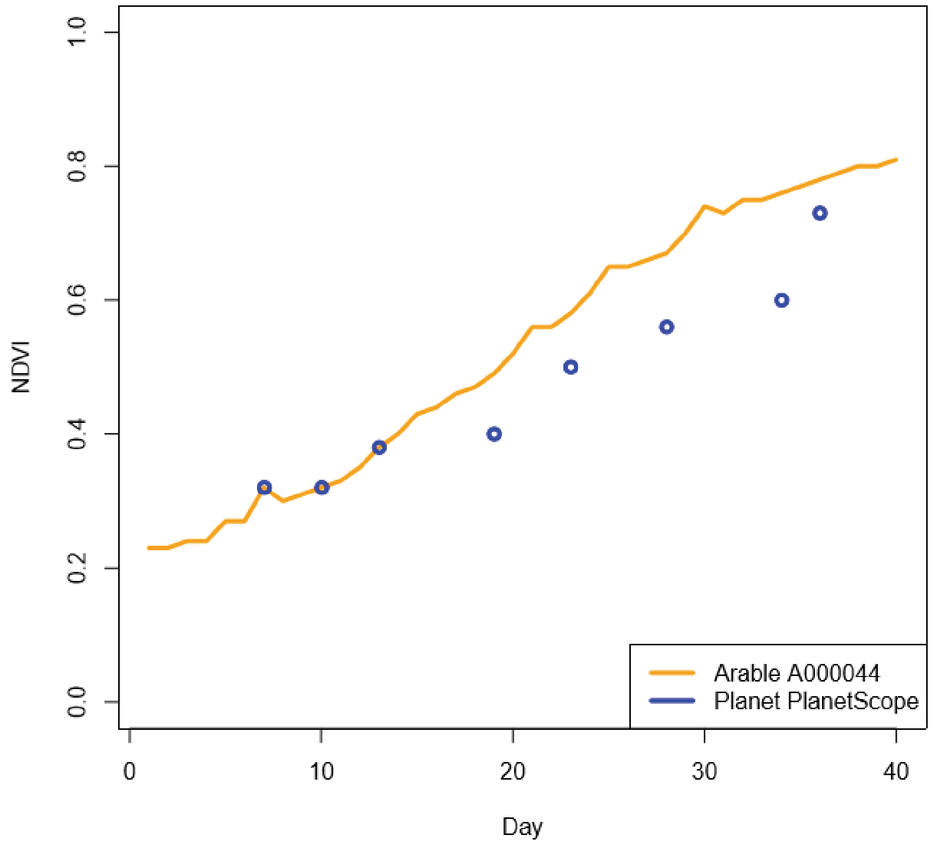
Differences from traditional weather station:

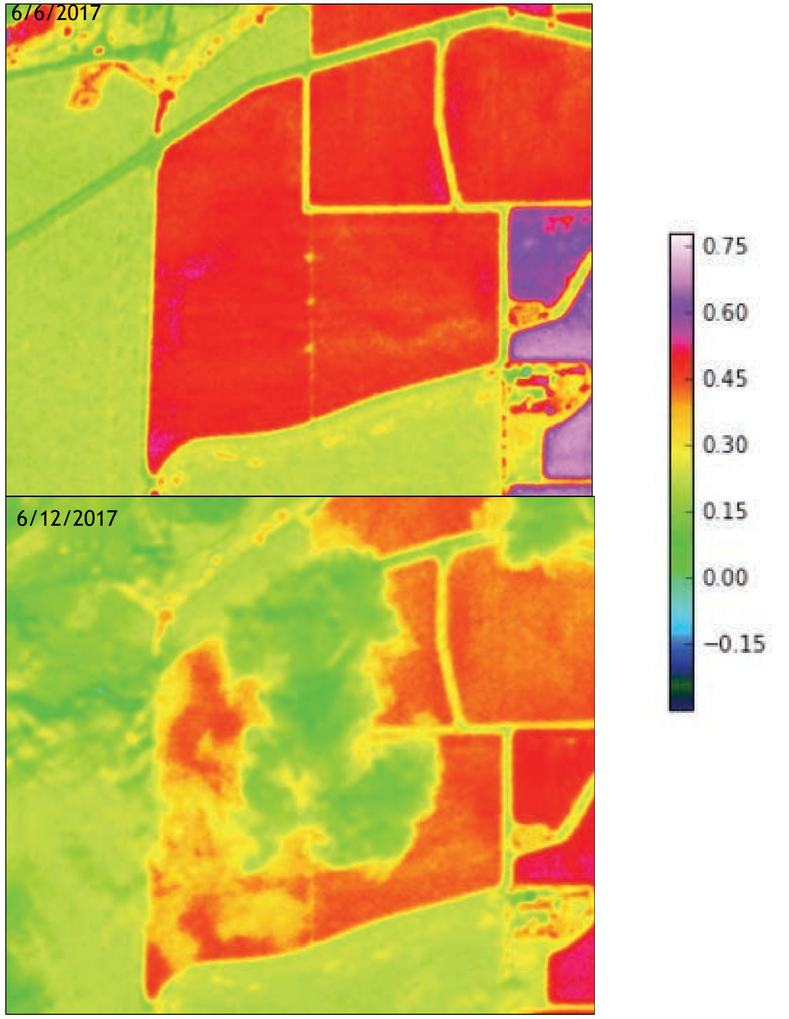
- Net Radiometer
- Seven-Band Spectrometer
- Acoustic Disrometer



Real-Time Monitoring of Radiant Energy

Connect the Dots in Vegetation Indices: Daily NDVI





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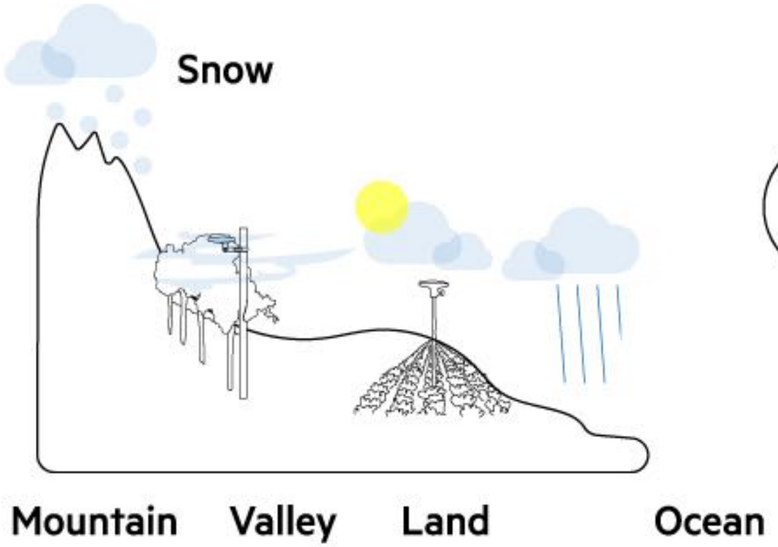
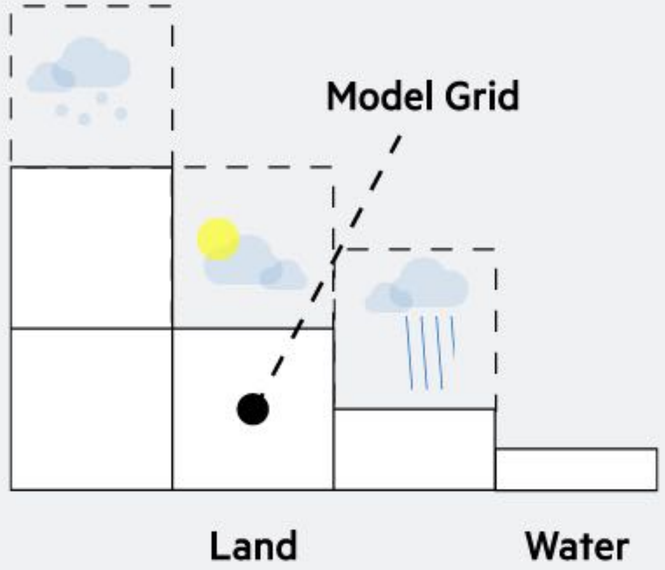
Point Forecasting: Field-Level Weather

Real World

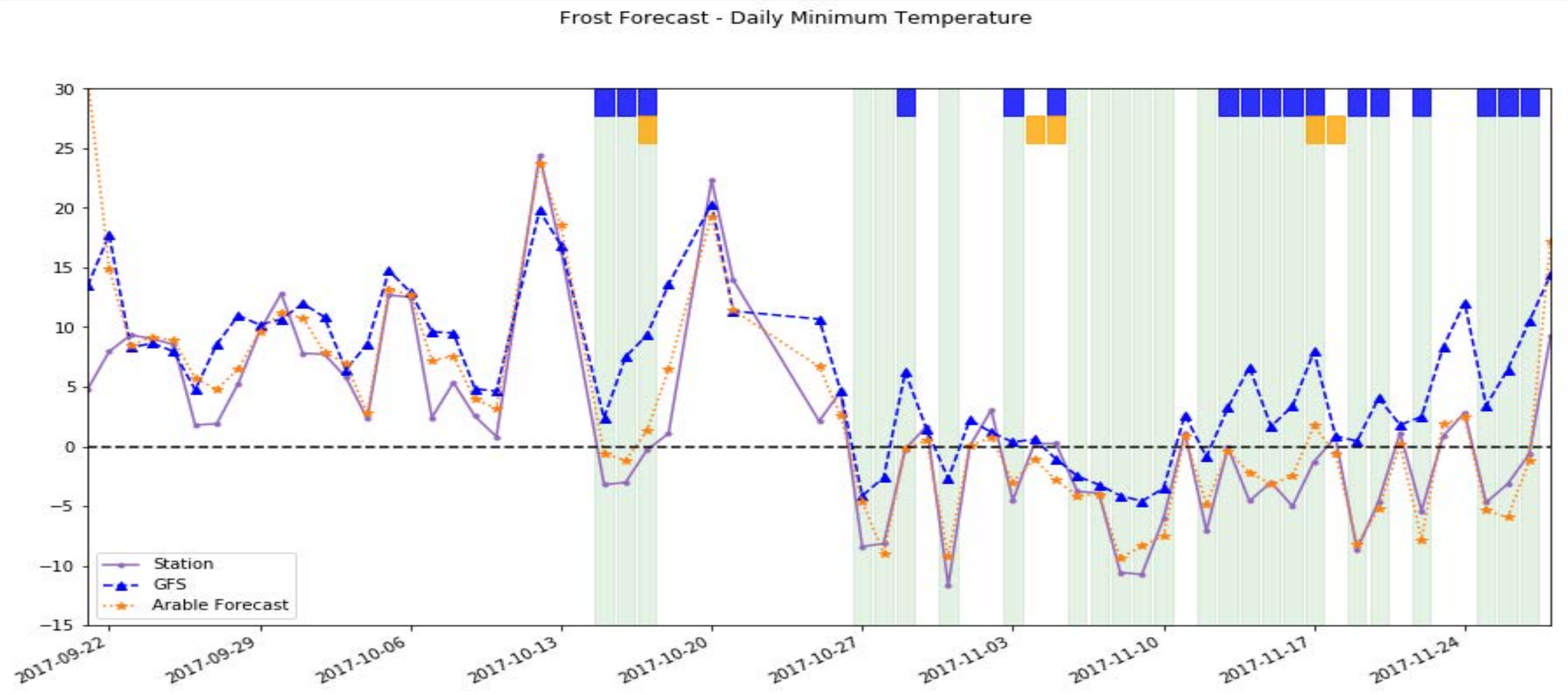


VS

Model World



More Accurate Weather Forecasting: Point Forecast



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Beta API Product & Aux Bridge

Sensor Type	Sensor
Flow Meters	Badger Meter Model 25
Soil	Acclima TDR-315L
Moisture	Decagon 5TM, 5TE, & GS3
	Decagon EC5, 10HS, GS1
	Irrometer Watermark 200SS
	Sentek EnviroSCAN (SDI-12)
Wind Speed	Davis Anemometer 6410
	Decagon DS-2 / Atmos 22
Pressure	Dwyer ADPS/EDPS Series

API Product with documentation allows for growers and organizations to share sensor data for integration in their own platform development. With the Mark as a base station, we can collect information from third-party devices in the field.

Water Balance: Irrigation Planning

Water In

Precipitation

Water Out

Radiation

Crop ET

Temperature

Humidity

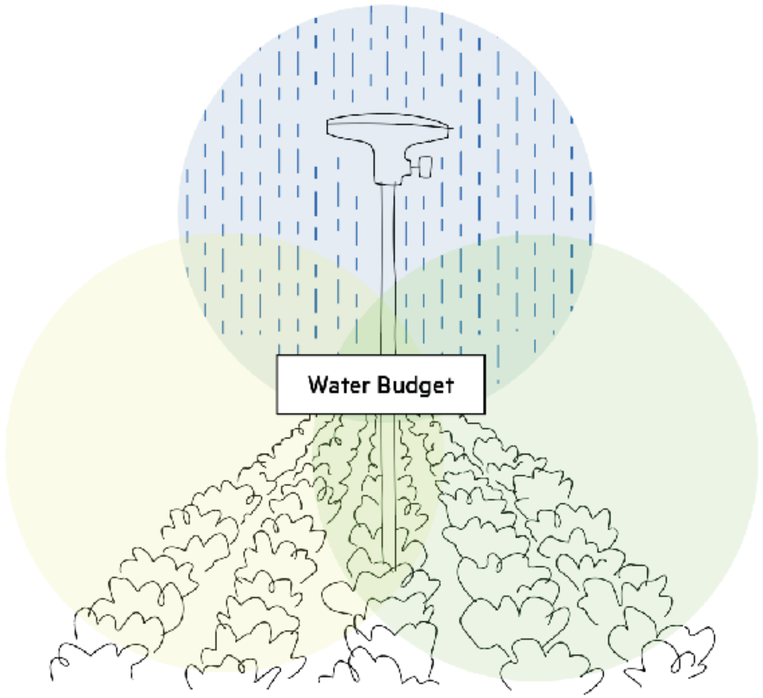
Effects

Water Stress

Canopy Size

+ Soil Moisture

+ Irrigation



Arable Weather Forecast Report.csv

Location	Tair	PAR	ETc	Radiation	RH	Pressure	Precip

Arable Plant Report.csv

Location	Tair	Tbelow	CI	NDVI	Wetness	PAR	Precip

Arable Water Report.csv

Location	Tair	Tbelow	Precip	ETc	NDVI	CI	Kc
Field_A	13.8492	14.3038	0.227863	ETc	NDVI	CI	Kc
Field_B	12.3122	11.5992	0.942948	ETc	NDVI	CI	Kc
Field_C	10.8608	9.84575	0.0100971	ETc	NDVI	CI	Kc
Field_D	10.1416	9.05977	0.0512403	ETc	NDVI	CI	Kc
Field_E	9.05044	7.96852	0	ETc	NDVI	CI	Kc
Field_F	8.03858	7.1139	0	ETc	NDVI	CI	Kc
Field_G	7.70766	6.81651	0	ETc	NDVI	CI	Kc

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Grower & Cooperative Partners

Individual Farmers

- Increasing water and input costs.
- Need disease / drought resistant seed variety improvements.
- Unprecedented consolidation - expected to ‘do more with less’.
- Increasing labor expenses.
- Increased fertilizer costs.
- Weather-dependent delivery date.

Cooperative Level

- Over supply situations and market volatility.
- Validation of new technologies to develop predictive analytics for grower network.
- Reliance on historical trends and public weather data.
- Want to deliver ROI to membership, and re-invest in right development pathway.

How can we help growers and processors?

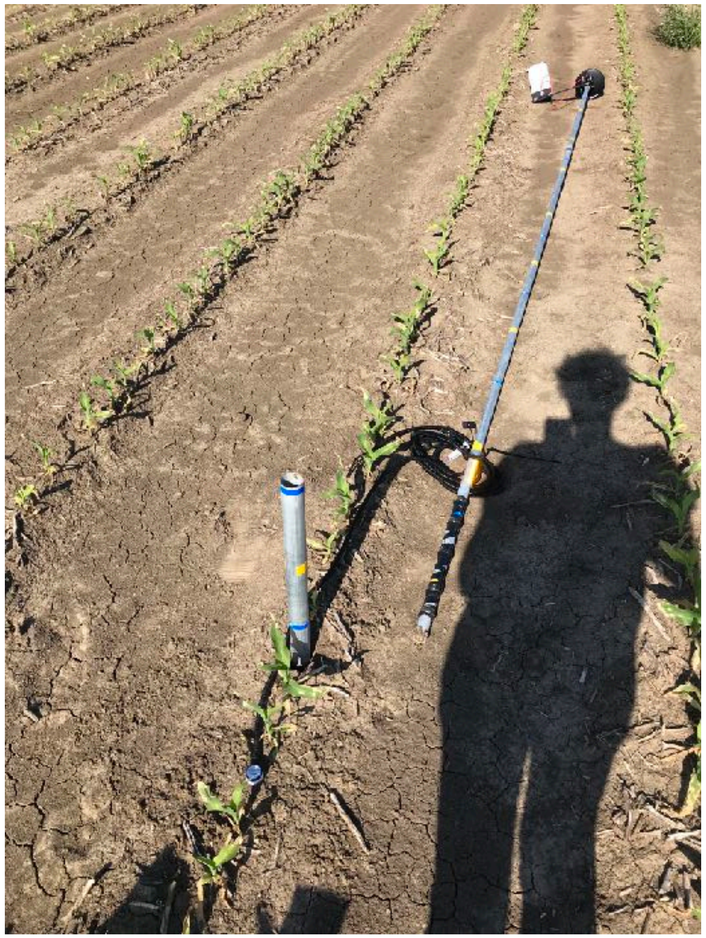
Agronomic Decision-Support

- Hourly data with field-level weather forecasts.
- Hourly precipitation, leaf wetness for disease risk, water stress, ETc and Kc.
- Daily averaged NDVI and chlorophyll content.
- Base station for third-party integrated devices through SDI-12, analog and pulse port for soil moisture probes, wind speed, etc.

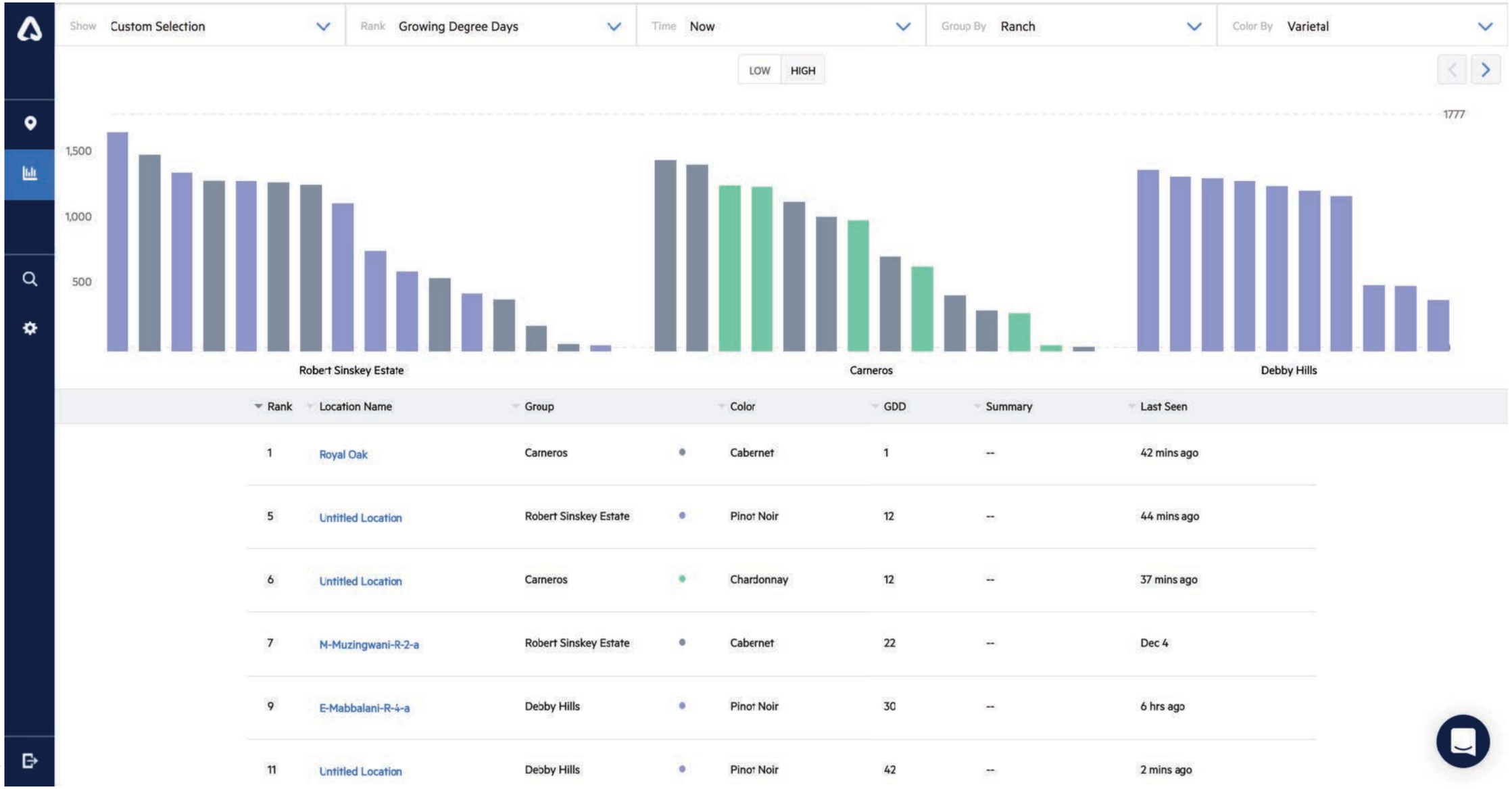
Upstream Data Sharing

- Alert procurement to field-level weather risks (frost, heat spikes, disease incidence) that could impact supply.
- Hourly updates on crop water stress, chlorophyll, GDD and canopy growth provide insight into quality and yield outcomes for input recommendations relative to environment and growth stage.
- Augment spatial data often constrained by revisit frequency.

In-Field Corn Installations



Field Benchmarking: GDD for Harvest Forecasting



Rank	Location Name	Group	Color	GDD	Summary	Last Seen
1	Royal Oak	Carneros	Cabernet	1	--	42 mins ago
5	Untitled Location	Robert Sinskey Estate	Pinot Noir	12	--	44 mins ago
6	Untitled Location	Carneros	Chardonnay	12	--	37 mins ago
7	M-Muzingwani-R-2-a	Robert Sinskey Estate	Cabernet	22	--	Dec 4
9	E-Mabbalani-R-4-a	Debby Hills	Pinot Noir	30	--	6 hrs ago
11	Untitled Location	Debby Hills	Pinot Noir	42	--	2 mins ago

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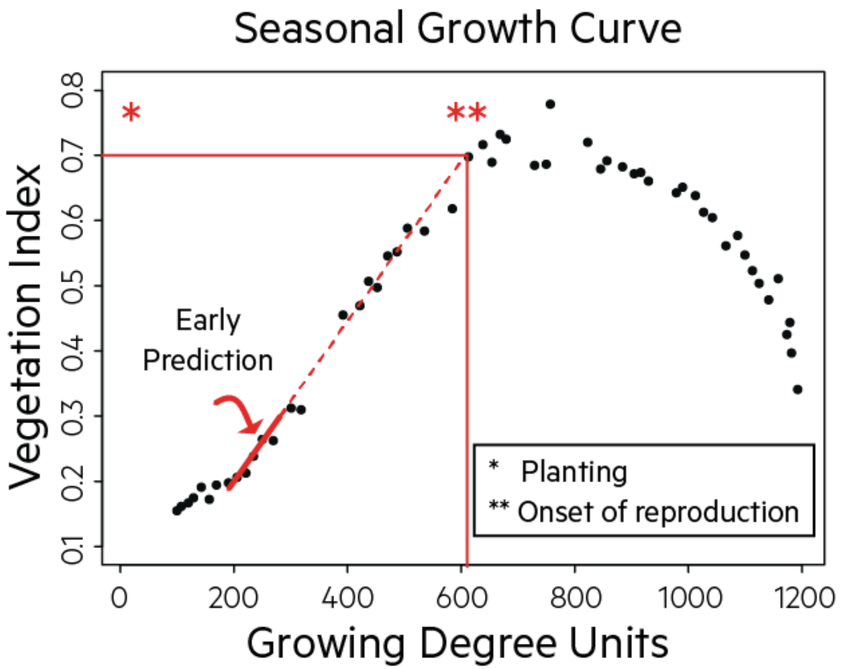
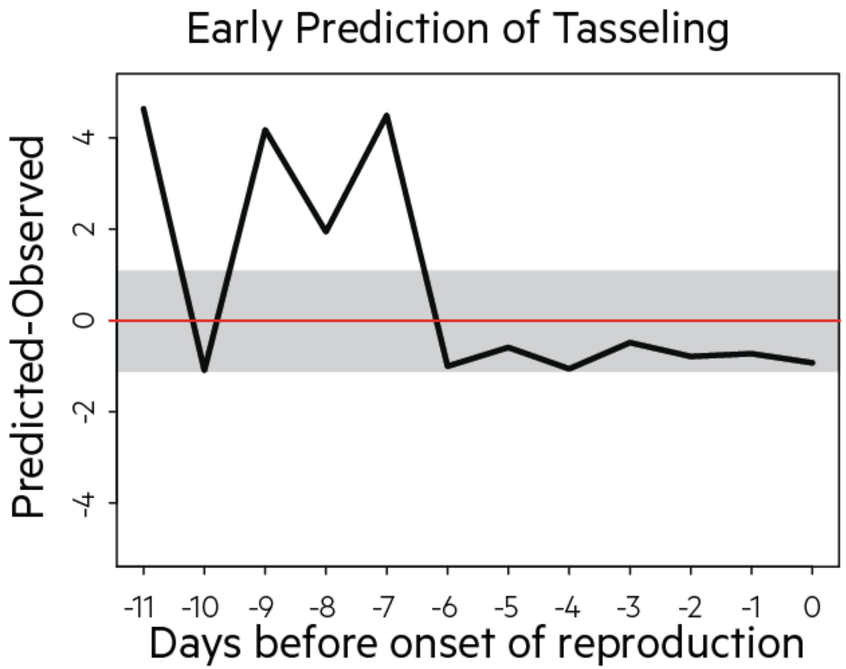
Data for Growth Stage & Yield Prediction

Arable crop monitor measures weather risk factors AND sensitive phenological moments





2018 Pilots to quantify pollination risk scoped in corn, nuts, spices, coffee

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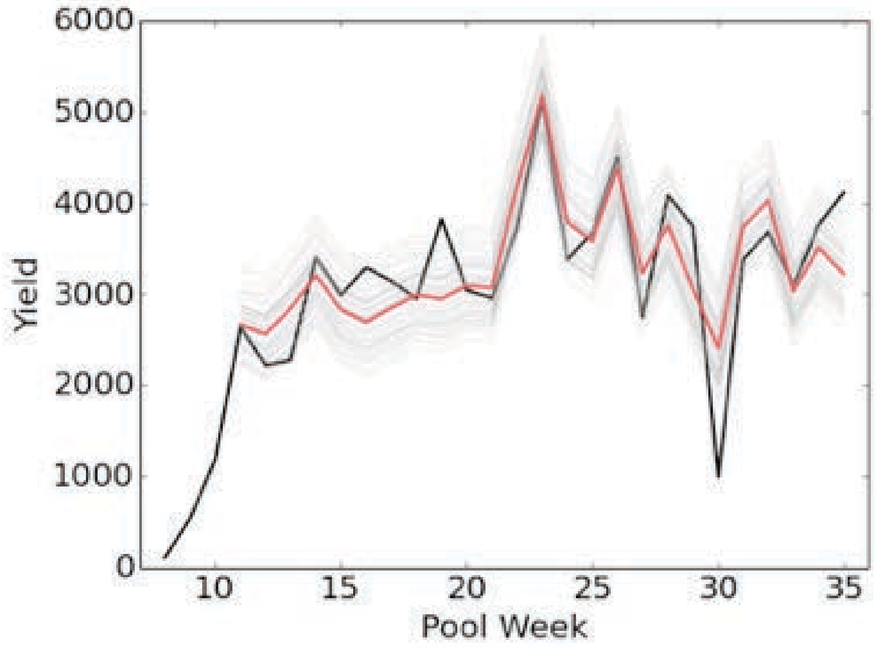
NSF SBIR: Case Study in Strawberries

10-20% avg
Customer Error

-$18,000
Loss per week per field

5% avg
Arable Error

+$12,000
Gain per week per field



Thank You.

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