

WELCOME
TO



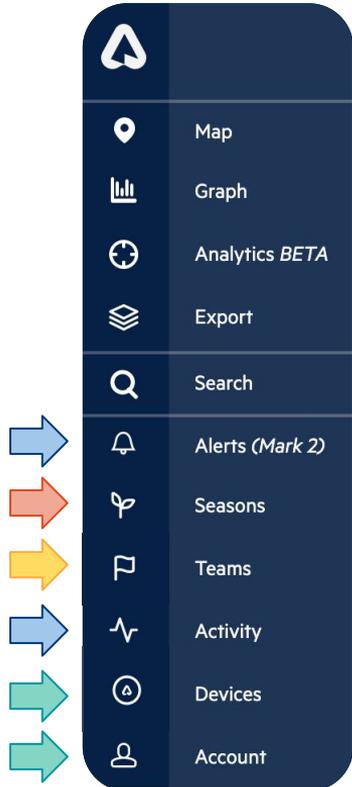
ARABLE

WEB ONBOARDING GUIDE
FEBRUARY 2021





When devices ship, the **Org Admin** will receive an email with account details, including how to log in from the web, and how to download the mobile app. When you deploy your device and log into the web app (<https://app.arable.com>), you will land on the **Map** screen. The deployed device will populate the **Map** as “New” and will need a name for the location. If you are invited to the account by an **Org Admin**, you will land on the **Teams** page first. Let’s get started with these four key pages:



1. Account & Devices

3. Seasons

2. Teams

4. Alerts & Activity

YOU ARE HERE: Arable Overview



Temperature ▼

Navigation bar

BEGIN HERE

°C | -23 4 14 25 38 60

Google

Imagery ©2021 NASA, TerraMetrics Terms of Use

Sort By A to Z ▼

Now Today's Forecast

Location	Temp	Rain	W/m ²	
4 Mac Ranch	16°C	17.2mm	245	13 mins ago
A001320	12°C	0mm	96	4 mins ago
Berg Enclave	-2°C	0mm	104	33 mins ago
Blueberry Corner	12°C	0mm	131	17 mins ago
By the creek	11°C	0mm	84	26 mins ago
Geiger Compound	11°C	0mm	83	30 mins ago
Hardy Homestead	-1°C	0mm	7	13 mins ago
Jans Backyard	12°C	0mm	82	49 mins ago
Lupine Lane	-1°C	0mm	39	46 mins ago
Mount Tamalpais	11°C	0mm		

? Help



First, head over to [Account](#). On this page, you should change your password, plus find a copy of the [Terms of Service](#) (covering Warranty and Replacement) and the [Arable Data Privacy Statement](#). You can also generate API Keys and ensure that you have access to the right account.

Here you will also add your mobile phone number to receive SMS- and phone- based alerts (in addition to push notifications), find the [Data Privacy Agreement](#), [API Key](#), and change [Unit Preferences](#).



Company Name Your company's name	Arable Data Science
datasci.arable.com Company Arable Link	datasci.arable.com <small>Version v8.2.3.build-g5d6bdd8f5</small>
Agreements & Policies Latest versions	Terms of Service Privacy Statement
API Key Generate or refresh	Generate Key
Name * First & Last	<input type="text" value="Arable"/> <input type="text" value="Demo"/>
Email Address Email Address	<input type="text" value="demo@arable.com"/>
Username * Usernames must be all lowercase and cannot be longer than 20 characters.	<input type="text" value="arable.demo"/>
Phone Number e.g. +1 999 999 9999	<input type="text" value="+1 510-992-4095"/>

Size	<input type="text" value="Inches"/>	or	<input type="text" value="Millimeters"/>		
Temperature	<input type="text" value="Fahrenheit"/>	or	<input type="text" value="Celsius"/>		
Pressure	<input type="text" value="Millibars"/>	or	<input type="text" value="Kilopascals"/>		
Speed	<input type="text" value="Miles per hour"/>	or	<input type="text" value="Kilometer per hour"/>	or	<input type="text" value="Meter per second"/>

To get started with the API, visit <https://developer.arable.com/>



The **Devices** page is meant to help you manage the status of each of your devices and monitor connected sensors.



Devices Syncing: Active

Named devices that are posting measurements to our servers at least once every 8.5 hours.

Devices Syncing: New

Devices from the factory will show up as Untitled upon first deployment. Once given a location name the status is updated to Active.



Inactive

Deployed devices experiencing a field problem. Main causes are battery <15% or the device has not posted measurements to our servers for 8.5 hours.

Dormant

Devices that have sent an undeployment message to the Arable system and are no longer collecting data.



Battery

Grouped by low, medium, and high percentage. Under 30% is in danger of losing power, and may need to be plugged into a power source to charge, then moved to a permanent location with more direct sunshine. Medium should be monitored for future dips in charge. High is fine, no action required.





Next, to get everything set up, navigate to the **Teams** page. This will allow you to set up your team, add additional users, change account permissions, and ensure that you have the right level of access to account information.

The screenshot shows the Arable platform's Teams page. On the left is a dark blue navigation sidebar with icons for Home, Location, Analytics, Add, Layers, Search, Alerts, Seasons, Teams (highlighted with a yellow arrow), Activity, Devices, and Account. The main content area has a top navigation bar with links for Alerts (Mark 2), Seasons, Teams (active), Activity, Devices, and Account. Below this are three summary cards: 'Teams' (0 Assigned, 0 Unassigned), 'Members' (0 Assigned, 0 Unassigned), and 'Devices' (0 Assigned, 0 Unassigned). A dropdown menu is set to 'Arable Data Science'. Below the cards is a table with columns for Team Name, Members, and Devices. The table lists one team: 'Administrators' with 7 total members. A 'View Team' link is at the bottom right of the table.

We've designed the Arable platform to be flexible enough to serve users with different needs, from granular operations to large-scale data collection across multiple geographies. On the **Teams** page, the **Org Admin** will be able to see all the **Teams**, **Devices** and **Members** associated with the account. **Teams** tie together users with devices. Within each team, Members will have access to the subset of devices associated with that **Team**. Please check this page and make sure you have access to the right **Teams** and right subset of **Devices/Locations**.



Select “View Team” to see any of the **Members** associated with each **Team**. You will be able to see Members, their email address, and their level of access. At Arable, we take data privacy very seriously. To make it easy for you to manage permissions, we have four levels of access: **Org Admin**, **Org Reader**, **Team Admin** and **Team Reader**.

▼ Team Name ▼ Members

Administrators (5) Org. Admin (2) Org. Reader

Team Members Information		
Name	Email	Role
Levon Minassian	levon@arable.com	Org. Admin
Loreli Carranza	lorel@arable.com	Org. Admin
Adam Wolf	adam@arable.com	Org. Reader

Org Admin will be able to see all the Devices associated with the account, can add **Members** to any **Team** and create new **Teams**.

Org Reader can see all the Devices, but cannot move Members, Teams and Devices.

Team Admins can invite New **Members** to their Teams.

Team Readers can view **Device**, **Team** and **Member** data for only their **Team**, and cannot invite new **Team Members**.

TEAMS: Inviting Members & Creating New Teams



Invite Member to Organization

Current New

Select Member

Select Role

Select Team(s)

Teams & Roles

Please select a member, assign a role and select a team or teams from the drop down above and click "add".

Unlimited users can join the Arable Platform. Click on “Invite Member” to add new **Members** (New) and to move existing **Members** to new **Teams** (Current).

Create New Team

Team Name

Add or Remove Members

Add or Remove Devices or Locations

By clicking “Create New Team” you can organize a new set of **Users** and subset of **Devices/Locations**. If you need help adding **Members** or **Teams**, please get in touch with support@arable.com.



Then, navigate to **Seasons** to add details about the crop at your location. We have variety-specific growth stages that will allow for growth-stage based alerting. It will also enable seasonal archives for year-over-year comparisons.

Even if a device is not deployed at a location at the start of the season, setting up a season retroactively will enable us to backfill with remotely sensed data to provide a better snapshot of the season as a whole.

We built Arable to understand interactions between the climate and crop productivity. To maximize the benefits of the system, we encourage users to add in their **Seasons** and track **Growth Stages**.

By inputting seasonal start dates, harvest dates and growth stages, we can combine measurements to allow users to monitor water availability during critical stages, or if different fields are maturing faster.

We have pre-populated the system with a standard list of varieties and growth stages, but can easily add custom varieties, temperature thresholds and growth stages for you if you let us know.

The screenshot shows a dialog box titled "Create New Season" with a close button (X) in the top right corner. Below the title is a subtitle "Please select a location and assign it a crop type and varietal." and a note "Once your new season has been created you will need to add growing dates and growth stages". The form contains three dropdown menus: "Location" with the placeholder "Select Location", "Crop Type" with the placeholder "Select Crop", and "Varietal" with the placeholder "Select Varietal". At the bottom, there are two buttons: "Cancel" and "Confirm".





If the standard growth stages for a Varietal does not match your specific needs or experience, you can easily add or remove growth stages yourself.

Once you enter your **Varietal** and **Growth Stages**, it's also easy to apply the same **Growth Stages** to multiple **Devices/Locations**. Make sure the Season start date is correct, even if it is in the past. Note that the absolute value of cumulative growing degree days will vary based on preferred unit (°C or °F).



The screenshot displays the 'SEASONS' application interface. At the top, there are two dropdown menus: 'Crop' (set to 'Corn') and 'Varietal' (set to 'RM109'). Below these, a threshold is shown: 'Threshold: Low 10 °C - High 30 °C'. The 'Growing Season' section features a date range '01-Apr-2021' to '27-Oct-2021' and a summary '01-Apr-2021 / 27-Oct-2021'. The 'Growth Stages' section is currently empty, displaying the message 'There are no growth stages that you can access on this season.' and a '+ Add New Stage' button. At the bottom, there are two buttons: 'Copy Growth Stages to New Season' and 'Save Season'.



Locations: Assigned

The number of locations assigned to at least one season in the organization.

Locations: Unassigned

The number of locations that are unassigned in the selected organization. *To best archive your historical crop data, this number should be zero.*

Seasons: Current

The number of seasons where today's date is currently within a growing season's start and stop dates.

Seasons: Completed

The number of seasons with stop dates in the past.

Seasons: Upcoming

The number of seasons with start dates in the future.

Growth Stages: Defined

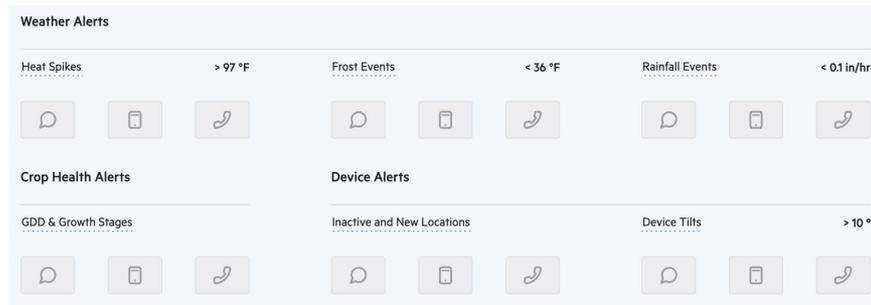
The number of locations with Seasons (planting and harvest date defined) that have incremental growth stages enabled, and therefore are able to receive Growth Stage based alerts.

Growth Stages: Undefined

Those without defined growth stages.



Now, select **Alerts**. Since you've already added your phone number, crop and season information, it will be easy to select different thresholds for unique locations to make sure you don't miss an event in your field!



Only **Org Admins** can change/set the Global Alert thresholds. There are options to receive alerts on the following Parameters:

- **Heat Spikes**
- **Frost Events**
- **Precipitation Rate**
- **Growth Stage / GDD** (new growth stage transition)
- **Device Alerts** (Tilt/Inactives)

All users can opt in to receive alerts three different ways, and will receive alerts for ALL devices assigned under their permissions:

- **SMS-based Text Alerts**, enter phone number on Account page.
- **Phone Calls**, enter phone number on Account page.
- **Push Notifications**, via the mobile app.





The Alerts system defaults to **Global Alerts**, setting the same thresholds across Devices/Locations.

By clicking “Add Alerts for Specific Location,” Org Admins will be able to set own thresholds for specific Devices/Locations. Similarly, any user can customize the method for receiving alerts with the same mechanism.

Notifications Settings Created for a Specific Location

Your new specific notification settings have been created for **Untitled Location**. You can now set specific parameters and notification channels for this location.

Close

Add Notifications Settings for a Specific Location

Please choose the location you would like to add specific notification settings

Name | Date

Device ID C005196 Deployment Date November 21, 2020	Device ID C005310 Deployment Date January 5, 2021	Device ID C004681 Deployment Date January 2, 2021	Device ID C004798 Deployment Date September 25, 2020	Device ID C005391 Deployment Date October 24, 2020
Hardy Homestead Device ID C005430 Deployment Date October 28, 2020	Lupine Lane Device ID C004527 Deployment Date December 13, 2020	Mount Tamalpais Device ID C003985 Deployment Date July 7, 2020	Neelys Device ID C005135 Deployment Date November 30, 2020	RD Backyard Device ID C004863 Deployment Date December 3, 2020
NEW Untitled Location Device ID C005137 Deployment Date November 15, 2020				

Cancel

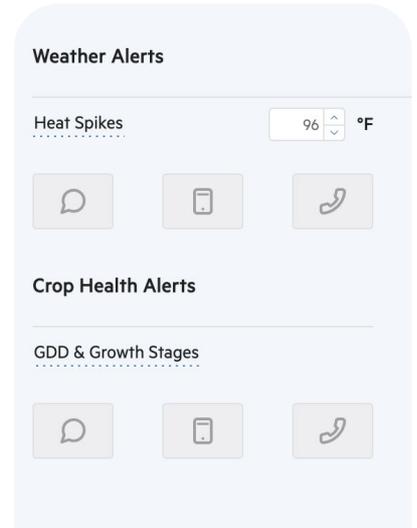
Confirm



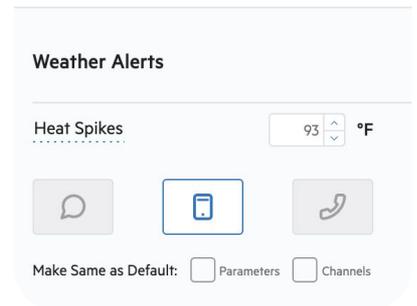
For each location, the alert settings will mirror the Global Settings as the default setting. Once a specific Location is selected, it will appear below the Global Settings (as shown for Weather Alerts on the right). Initially, both the Parameters and Channels boxes will be checked, indicating that that Location will mirror the Global Settings by default.

To set Location-Specific Alerts, uncheck the Parameters and Channels boxes. This will allow the user to change the thresholds and select different methods for receiving the alerts.

By rechecking the Parameters and Channels boxes, the user overrides the local settings and reverts to the default Global Settings.



Untitled Location





The **Activity** page is an easy way to check on current and historical alerts across Locations/Devices in your Org. Alerts on device location (movement > 200 meters), crop health and growth stage, weather threshold alerts and device and account activity will be logged here.

Alerts can be sorted by type:

- **Date** (chronological)
- **Weather**
- **Crop Health**
- **Device**
- **Account**

To get additional detail on each alert, click the + sign next to it.

Here, there will be a quick link to change Alert settings. Already read alerts will change to gray.

The screenshot shows the Activity page interface. At the top, there are navigation tabs: Alerts (Mark 2), Seasons, Teams, Activity (selected), and Devices. Below the tabs, there are filters for Date and Detail. The main content area displays a list of alerts:

Date	Detail	Date	
	GDD Alert Crop Health	Growth stage "stage_5" started at 51 Federal St .	08:00 AM +
	Frost Alert Weather	The temperature is below 36 F at PAM-garden M2.	04:34 AM +
	Frost Alert Weather	The temperature is below 36 F at Neelys.	03:41 AM +

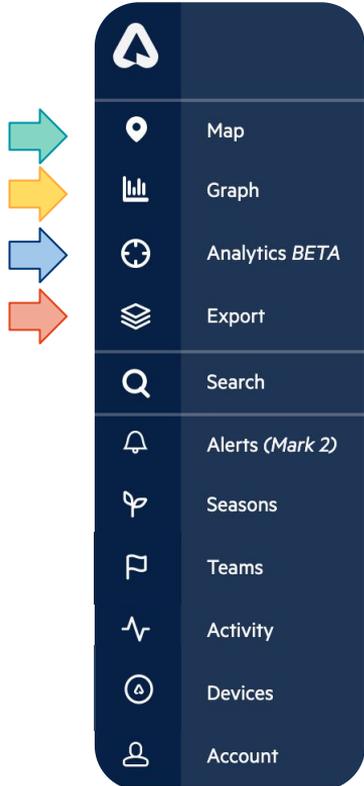
Below the list, there is a detail view for a Frost Alert:

- Type:** Frost Alert
- Category:** Weather
- Detail:** 01/18/2021 04:34 AM
The temperature is below 36 F at PAM-garden M2.
- Change subscription settings: [Account Settings](#)





Once you have the basics set up, you can begin to explore more functionality in the app.



5. Map & Details

7. Export

6. Graph & Rank

8. Analytics

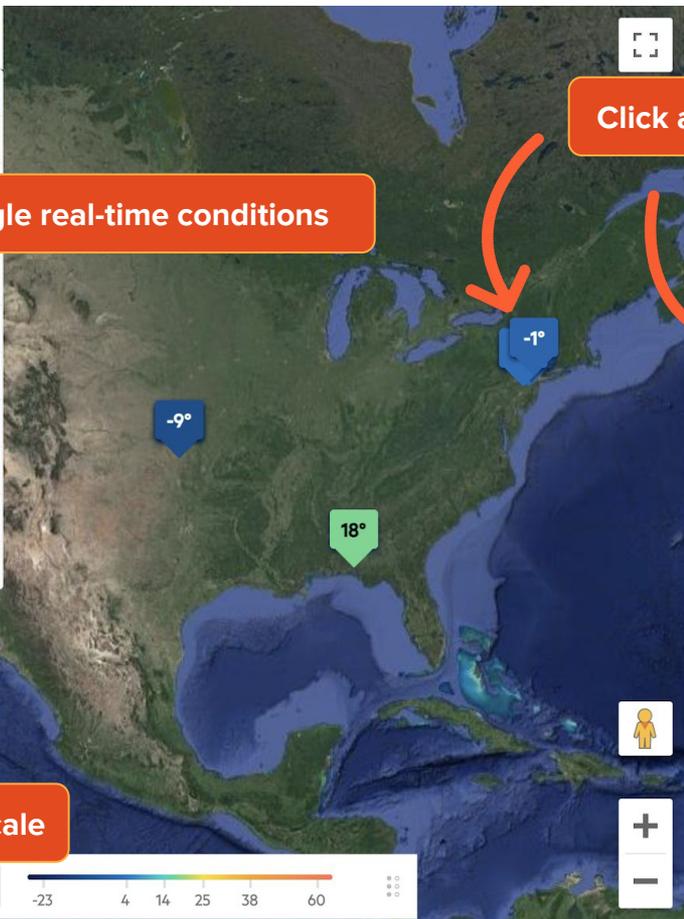


- Map
- Graph
- Analytics *BETA*
- Export
- Search
- Alerts (*Mark 2*)
- Seasons
- Teams
- Activity
- Devices
- Account
- Shop
- Help
- Log Out

- Temperature
- Humidity
- Solar Radiation
- Growing Degree Days
- Chlorophyll Index
- NDVI
- Precipitation (Since 12AM)
- Precipitation (Last 10 Days)
- ET (Last 10 Days)
- Wind
- Soil Moisture

Toggle real-time conditions

Measurement scale



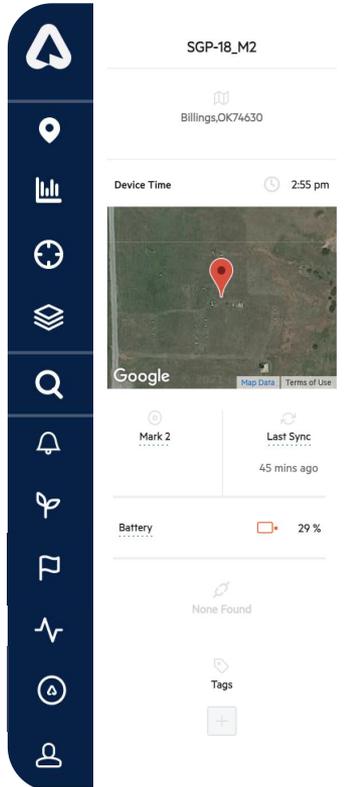
Click any location for details

Sort By A to Z

Now Today's Forecast

Location	Temp	Rain	W/m ²	
4 Mac Ranch	18°C	17.2mm	163	50 mins ago
A001320	17°C	0mm	231	41 mins ago
Berg Enclave	2°C	0mm	149	14 mins ago
Blueberry Corner	16°C	0mm	414	54 mins ago
By the creek	16°C	0mm	196	3 mins ago
Carpinteria CA	13°C	0mm	185	8 mins ago
Geiger Compound	15°C	0mm	172	7 mins ago
Hardy Homestead	-1°C	0mm	7	50 mins ago
Jans Backyard	14°C	0mm	183	26 mins ago
Lupine Lane	1°C	0mm		

Help



On the Map, click a location's name from the list on the right to be taken to that location's complete details page. A **Location** is a named Mark device; if you need to name your new device, this is where you do it.

All of the device's information can be found on the right side of this page, including the location name, device ID, GPS location, battery percentage, time of last sync, and any connected external sensors such as soil probes or anemometers.

Here you can add tags (e.g., alfalfa, strawberries, greenhouse) to the location; these tags can searched and referenced via the Search page.

Top right are quick links to the **Export** and **Graph** pages.

In the following slides we'll explore the **Weather** & **Plant** tabs. Click on any of the words underlined in blue (e.g., Current Conditions) to see detailed descriptions of the measurements and other helpful information.



Weather Plant Notes

Export Graph

Current Conditions

Temperature	-9 °C
Humidity	87 %
Pressure	102.9 kPa
Solar Radiation	107 W/m ²

Today's Temperature

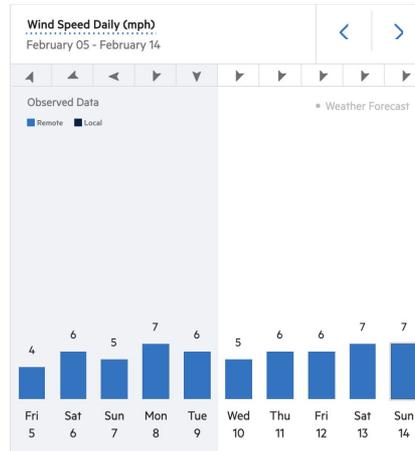
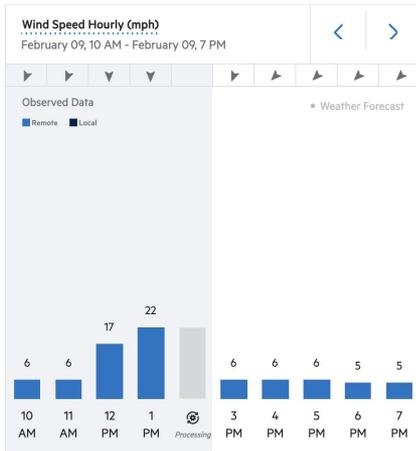
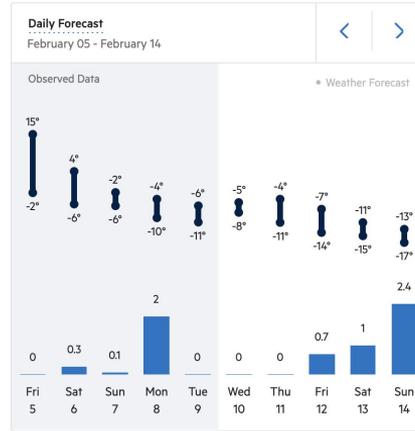
Freezing and Dry

Low	High
-11 °C	-6 °C

Forecasted Precipitation
Next 24 Hours
0mm

Detailed weather measurements can be found on this tab. **Current Conditions** shows climate conditions for the selected location, like humidity and solar radiation. **Today's Temperature** shows a low and high temperature for the day, as well as expected rainfall.

LOCATION DETAILS: Weather Tab (2 of 2)



The graphs at the bottom show **Hourly & Daily Rainfall** and **Hourly & Daily Wind Speed**. Without an attached anemometer, we will show remotely sensed wind.

Both observed (grayed, to the left) and forecasted (white, to the right) data are shown for the day selected. You can scroll to the left or right to see past and forecasted values. For hourly, we show 48 hours' observed data and 48 hours' forecast. For daily, we show 14 days' observed and 10 days' forecast data.

Use the blue <> arrows at the top of each graph to change the time/date.



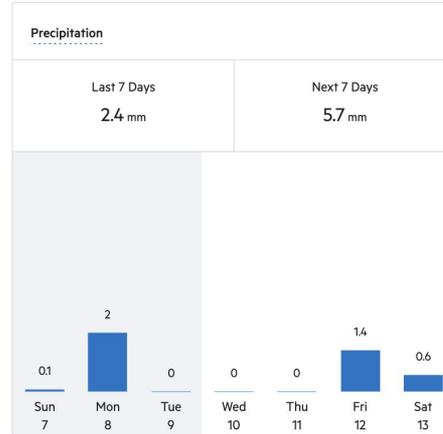
Weather **Plant** Notes

Export

Graph

Irrigation Overview

Type	Sat 6	Sun 7	Mon 8	Tue 9	Wed 10	Thur 11	Fri 12	Weekly Insights
ETc	0.1 mm	0.1 mm	0 mm	0 mm	0.1 mm	0.1 mm	0.1 mm	0.5 mm Total
Precipitation	0.3 mm	0.1 mm	2 mm	0 mm	0 mm	0 mm	1.4 mm	3.8 mm Total

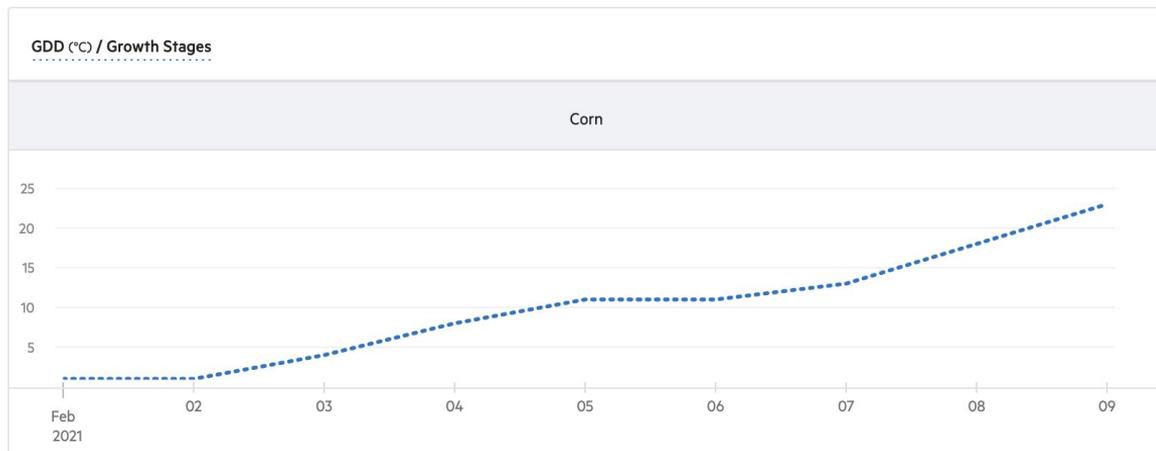


The **Plant** tab shows a location's plant measurements, a critical component to understanding crop outcomes.

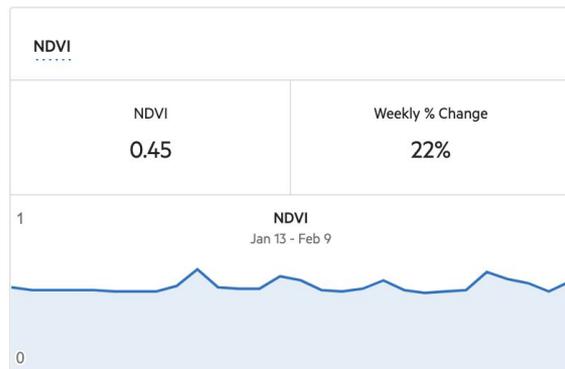
The **Irrigation Overview** provides a daily summary of both **Evapotranspiration** and **Precipitation**.

These two measurements are also shown below, with observed and forecasted accumulations.

LOCATION DETAILS: Plant Tab (2 of 2)



If a season has been defined for the location (set on the Seasons page), **Cumulative Growing Degree Days** and **Crop Growth Stages** will be displayed on this page.



Chlorophyll Index and **NDVI** are also shown on this page in absolute value and weekly percent change.

Hover your cursor over the graph to see daily values.

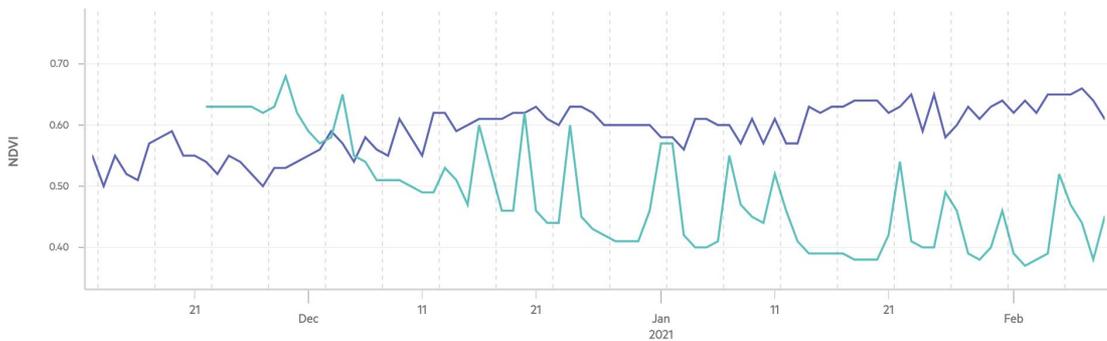


Time Rank

2 locations NDVI 12-Nov-2020 09-Feb-2021

Mount Tamalpais 4 Mac Ranch

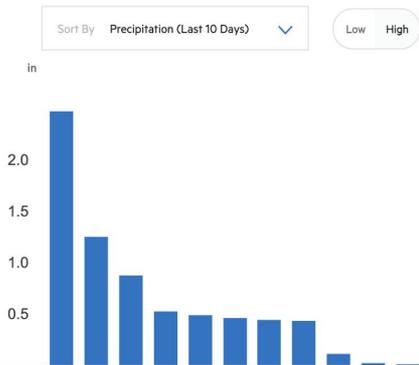
30D 90D YTD ALL



Select **Graph** from the left-hand menu to visit this page. Here you can combine weather and plant data at one or several locations, all in one view.

In the **Time** view, pick your location(s), measurement(s), and date range (e.g., last 30 days) before clicking Graph to view your data.

Most measurements have an Hourly option and allow the use of a slider at the bottom to focus in on specific time events.



Time Rank

To see how each location ranks against the others, toggle to **Rank** at the top of the page. Select your preferred measurement (e.g., growing degree days, solar radiation, NDVI, etc.) from the Sort By dropdown to rank your locations by that measurement.

Rank	Location Name	Tags	GDD Start Date	GDD (°F)	Last Sync	Current Temp	10 Day Precip
11	4 Mac Ranch		11/21/2020	41	49 mins ago	64°F	2.47"
10	Mount Tamalpais	corn	07/07/2020	--	14 mins ago	61°F	1.25"
9	Blueberry Corner		01/02/2021	--	53 mins ago	61°F	0.87"
8	Lupine Lane		12/13/2020	--	20 mins ago	32°F	0.52"
7	Berg Enclave		01/05/2021	--	17 mins ago	31°F	0.49"



Export

Locations
Select location: active, inactive, or dormant.

Select Location

Granularity
Select all, hourly, or daily data tables.

Measurements
Will change dependent upon granularity.
[Download Data Dictionary in PDF](#)

Date Range
From first deployment date to today.

Units
Select your measurement units.

or

or

or

or or

Format
Select export format.

To export raw data, visit the [Export](#) page and select the location, granularity, date range, and preferred units, then click Export to download data as a CSV. The file can be opened with all CSV-compatible platforms, e.g., Excel or Google Sheets.

The export contains summary information at the top (e.g., Date Range and Number of Records) and detailed time-series data below.

Select multiple locations in the Locations drop-down in order to export data for more than one location at the same time.



Select **Analytics BETA** from the left-hand menu to access the two dashboards we have recently written about, [Location Deep Dive](#) (single location) and [Compare Across Locations](#) (multi-location). Toggle between them here.

On both dashboards, you can select your **Org** and the **Team(s)** you want to graph.

Organization: arable-team | Team: All Dashboards

Water | Weather | Plant

Controls: [ALL] | Location [ALL] | Start Date: Sun Mar 01 202... | End Date: Wed Mar 31 20... | [Dropdown]

Compare Across Locations | Location Deep Dive

There are three tabs we will explore in the next slides, **Water**, **Weather**, and **Plant**.

On the **Controls** panel, you should also select which **Devices/Locations** you want to graph, and indicate a **Start Date** and **End Date**.

Interested in something specific? To request a specific model or dashboard (or to discuss feasibility for a data ingest/integration project), reach out your partnership manager.



Compare Across Locations, Water displays Precipitation, ETc Accumulation by Location, Crop Water Balance by Location, and Average Soil Moisture at Top Depth by Location. Top 3 locations for each measurement are in the right-hand column.

Organization: arable-team | Team: All Dashboards

Water | Weather | Plant

Controls: Device [ALL] | Location [ALL] | Start Date: Sun Mar 01 202... | End Date: Wed Mar 31 202...

Compare Across Location Version 1.0.0: Select multiple devices or locations and enter your date range in the control panel. Use Group By on X axis to drill up or down to view different time scales.

Cumulative Precipitation and Precipitation (in mm)

Legend: 4 Mac Ranch, Berg Enclave, Blueberry Corner, Carpinteria CA, Geiger Compound, Ginger Lab, Hardy Homestead, Jans Backyard, Lupine Lane, Mount Tamalpais, Neelys, RD Backyard, Untitled Location, Precip accumulated

Top 3 Locations with the highest Precipitation (in mm)

- 4 Mac Ranch with 5.11
- Blueberry Corner with 5.09
- Hardy Homestead with 3.74

Top 3 Locations with the lowest Total Precipitation (in mm)

- Untitled Location with 0
- Ginger Lab with 2.66
- Berg Enclave with 26.06

Help



Location Deep Dive, Water displays ETc plotted with Rainfall, Crop Water Balance, Top Depth of Soil Moisture with Refill Point and Field Capacity Lines, and Precip as a % of ETc. Extreme days are shown in the right-hand column.

Organization: arable-team | Team: All Dashboards | Compare Across Locations | Location Deep Dive

Water | Weather | Plant

Controls: Device [ALL] | Location Name [ALL] | Start Date: Sun Mar 01 202... | End Date: Wed Mar 31 20... | Field Capacity (%) 25 | Refill Point (%) 5

v1.0.1: Default view is a sum of all your Location data. Use the control bar to select Device ID, Location name, and start/end dates to populate the graphs. Use Group By on the X Axis to drill up or down to different time scales.

Evapotranspiration (ETc) vs. Rainfall (in mm)

■ precip ■ etc ● Precip Accumulated ● ETc Accumulated

Group By: time (DAY)

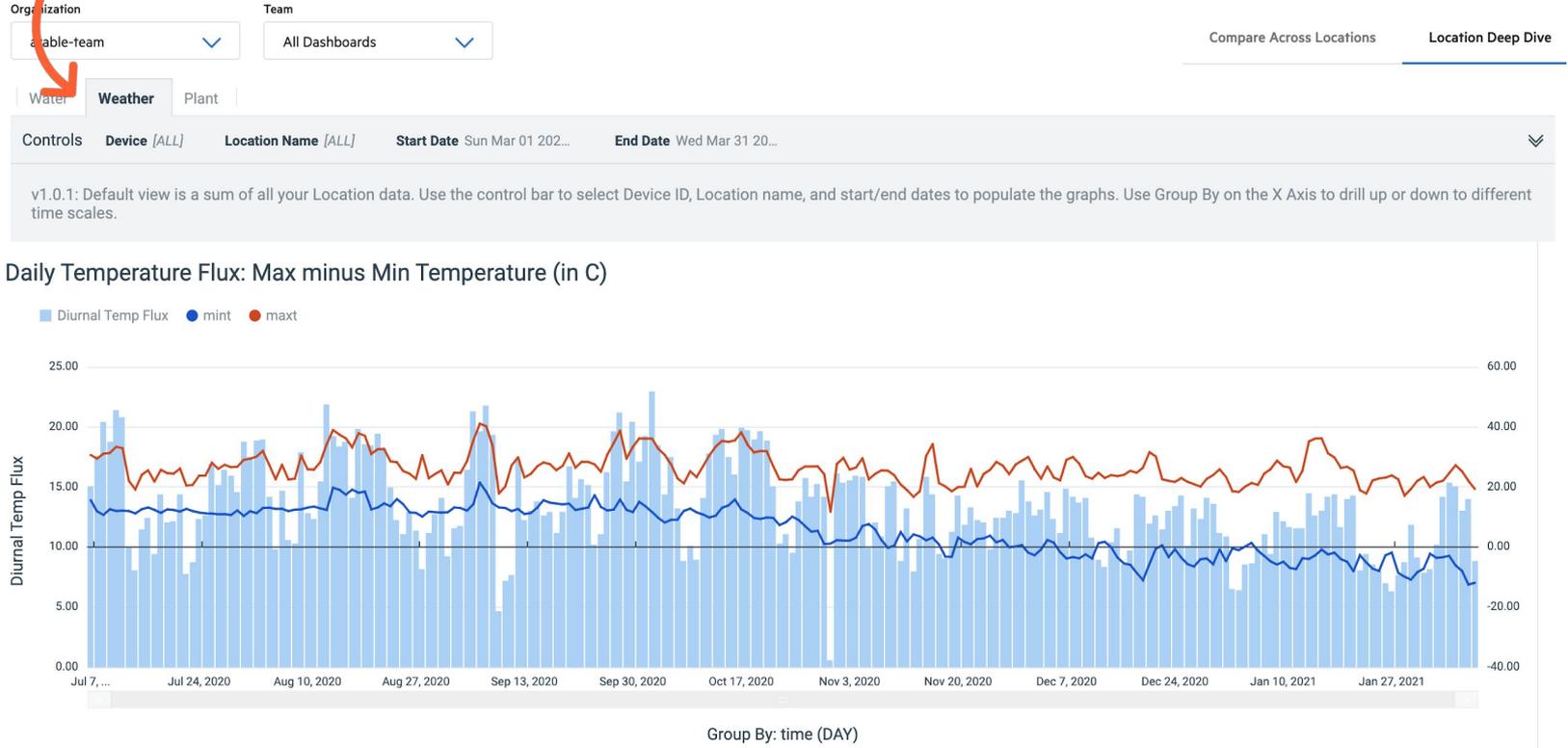
Day with Highest Total ETc
Jul 12, 2020
3.87 mm

Day with the Highest Average Precipitation
Jan 1, 2021
18.30 mm

Help

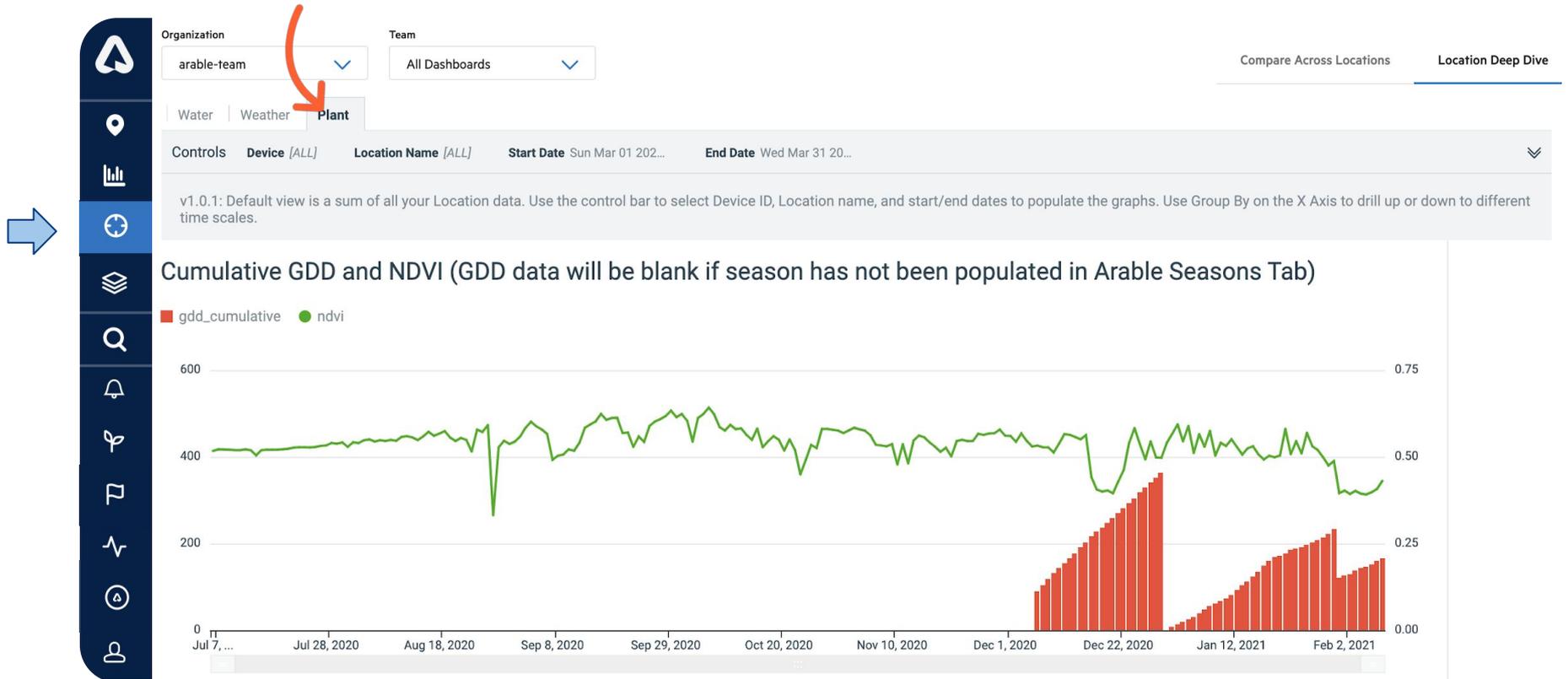


Location Deep Dive, Weather displays Cumulative & Daily Rainfall, Daily Temperature Flux, VPD, Heat Stress Days Freeze Days, Sunshine Duration, and Warm Nights/Cool Days. Extreme days are shown in the right-hand column.





Location Deep Dive, Plant displays NDVI, Cumulative GDD & NDVI (if seasons are set up), Sunlight Duration & Quality, and a Seasonal Growth Overview. Extreme days are shown in the right-hand column.





 **ARABLE**