

STRABOSPOT



HELP GUIDE

Version 1

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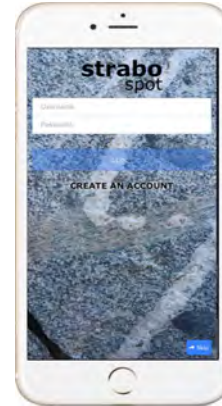
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INTRODUCTION

StraboSpot ... Collect, Store, and Share Geologic Data

This document describes data structure, project development, backup, data entry, uploading and downloading projects, and editing for the StraboSpot data system. It has FAQs that help explain common tasks.



Tectonics describes the architecture of the Earth, a significant part of which are deformation features — faults, folds, fractures, fabrics, and microstructures — that are integral to forming the lithosphere. Structural Geology and Tectonics (SG&T) together are a four dimensional science that include geometry, kinematics, dynamics, rheology, and both relative and absolute timing data, all of which together allow us to piece together the history of our planet. The data that reveal that history span many orders of magnitude of both temporal and spatial scales. At present, those data are available to the community only in the published literature, which is necessarily a highly abstracted subset of all the information collected. It is also filtered by why the study (purpose of research) is done.

Why Strabo?

There is no uniform mechanism to post or search digitally for SG&T data. Such data form perhaps the most basic dataset about the solid Earth, insofar as it captures that part of the Earth exposed to direct observation and is the fundamental ground truth against which all models of Earth development must be compared. In particular, in the past:

- There has been no digital Data System (acquisition and database) for SG&T data. Further, there is no widely accessible way to archive structure data digitally, with the result that structural data cannot be discovered or easily reused.
- A community effort to standardize data collection would result in a tremendous saving of time and provide a focus for the community to improve data collection and quality.
- The ability to make data available for download to all other interested researchers across disciplines would facilitate an improvement in the quality of science.
- Other fields of the Earth Sciences are at the similar stages of development for digital data.

StraboSpot is being developed as an open source mobile app and web application to address these needs for the Earth Sciences. It is developed using NSF funding from the EAR and EarthCube programs.

DISCLAIMER

This app uses GPS coordinates to pinpoint your location. The app uses the coordinates provided by the device, and gives no assurance of the accuracy or precision of these measurements. Users must rely on their own checks of location. This also applies to measurements from the devices compass using StraboSpot. Not all devices have the compass capability.

Before entering the field make sure to fully charge your device and bring an external battery.

It is important to have knowledge and training in using maps and a compass when entering the field. It is also safe practice to keep in mind basic wilderness appreciation.

Strabo relies on the user's Wi-Fi or data plan, but can work without connection.

The compass functionality can be intermittent. Please use some external compass to check orientation data.

StraboSpot is built using Angular/Ionic cross-platform technologies. It runs on iOS and Android platforms, and has a desktop version that runs on most common browsers regardless of OS.

All data in StraboSpot is stored using an identifier (every item from Project to Spot) based on UnixMicroTime.

DEFINITIONS

StraboSpot uses specific definitions for data collection and classification. These terms were developed by carefully analyzing how geologists work in the field – following the workflow of many users. We define the most impactful ones first, and then list items that need some explanation.

SPOT

A Spot can be a single measurement, an aggregation of individual measurements, or can even establish relationships between numerous other Spots. A Spot defines the area over which a measurement or quantity is applicable (e.g., a **domain** in the structural geology literature): To borrow a phrase from the numerical modeling community, it a representative volume [area] element. A Spot, in this sense, is analogous to the beam size of analytical equipment used for *in situ* analysis. A more detailed explanation and examples are at <https://strabospot.org/>

TAG

A Tag is effectively a sticky note or keyword that you can attach to a Spot. For example, a rock unit with all of its age and lithologic information can be made into a Tag. The name of the Tag would just be the rock unit abbreviation (e.g., Ds for Devonian Sultan Formation), sedimentary facies designation (e.g., cgs for coarse grained sandstone), or any other characteristic or information that might be in common between many spots (BRX – brecciated rock). Tags can be searched. Tags are basically conceptual labels or groupings. Spots can have any number of Tags. In addition, features under Spots, such as individual orientations, can have separate Tags.

NEST

A Nest is based on location. For example, if you add a Spot (polygon) and then place Spots (points) within the polygon Spot they are automatically Nested under the polygon Spot. In this way, users can keep track of spatial relations or groupings. Another example, you can walk down a canyon and nest all of the Spots associated with the canyon into a single nest. Nests are spatial and generated automatically. Nests can also apply to a hierarchy of spatial Spots, meaning that Spots can fit spatially within or around other Spots. A thin section, for example, is contained in the Spot where it was collected.

PURPOSE

It is important to know why someone collected data. This is the Purpose. A simple example is that someone collecting information on ductile fabrics may not notice the spacing of joints – they did not focus on the joints to concentrate on the fabrics. Knowing why data is collected adds the critical context for the information.












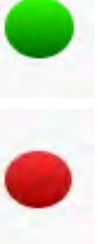



SOME TERMS YOU WILL SEE IN THIS GUIDE

- **Attribute** – some quality of the observation. For example, dip and strike, fold shape, or shear zone thickness.
- **Downward Nest** –also downward nesting. Fitting Spots within a larger Spot spatially, with subsequent observations having the same or smaller Spot size, contained within the starting Spot. For example, establish a structure and then automatically related further observations or measurements (Spots) to it.
- **Edge** – anything connecting two nodes. This is typically a relationship with some logic (e.g., same bed). Edges can also have attributes – e.g., same bed at distance of 1m.

- **FAQ** – Frequently Asked Question.
- **Field** – same as attribute.
- **Image** – any raster data. This includes photos and sketches. Sketches and pictures can originate with device camera or storage. Image is almost any layer that cannot be altered by Strabo. Spots can be overlain on images or nested in them.
- **Image Basemap** – a raster image used for mapping. This is always an Image taken and associated with a Spot. You can then add Spots (as full data) to the Image Basemap that is itself a Spot.
- **Node** – entry in the database. This is an observation, photo, sample, or anything of this sort. It can also be the start of a relationship or Nest. For example, setting a point on the map and collecting several Spots connected with this point/Spot.
- **Offline Basemap** – a map downloaded to use with GPS in the field. This is usually from OpenStreetMaps (OSM), MapBox (satellite or topography), or Map Warper (any map or image that you georeferenced). You can define any Basemap you want in MapBox (Mapbox.com) and import it to Strabo. You can then download tiles to use offline at many levels of zoom. This is similar for Map Warper (mapwarper.net), but you must manually georeferenced the map.
- **Other Basemap** – a map downloaded from MapBox or Map Warper. Map Warper allows you to register any image to real world coordinates and create tiles from them. You can then map on these.
- **Overlay** – a Basemap that is set to overlay other maps. These Images can have variable transparency, so they can be displayed above another data.
- **Private** – your data is stored in StraboSpot but cannot be searched for by other users.
- **Public** – your data is stored in StraboSpot, but other users can search and find it.
- **Relationship** – see Edge.
- **SG&T** – Structural Geology and Tectonics.
- **Tab** – the main navigation bar of the application. Appears for the appropriate data types as described in the Notes document.
- **Tiles** – the organization of map images on the Internet for use in mobile devices. These are done in levels that have increasing detail with increasing level number. Each tile is 256 by 256 pixels, so maps at each higher zoom level require 4 times the number of tiles.
- **Vertex** – see Node.

SYMBOLOLOGY

A general list of symbols used in Strabo. Some of these symbols display different screens depending on which screen you are on while using Strabo.

	Point By pressing this tool, you will add a Point to your map.		Map Layers Toggle between which map is showing, which datasets are displayed, and turn overlays on and off.		Filter Filter what Spots are displayed. Filter according to
	Line By pressing the Line tool, add a line by continually pressing on your map, double tap to end		GPS Pressing the GPS button locates your location on the map.		Add... Press to add content to Spots or which ever page this is displayed on.
	Polygon The polygon tool allows you to make an area into a Spot. This will also nest Spots within the polygon.		3 Line Menu Pressing this displays the main menu.		Toggles Zoom between zoom levels either zoom in, or zoom out.
	Edit Tool The Edit tool allows you to change locations of your Spots. Press the Edit tool, move the anchor point/spot to new location and save.		3 Dot Menu The 3 dot menu allows you to save tiles for offline downloading along with other options. This will also change depending on the page.		Wi-Fi on/off This tells you if you are currently connected to a source of data being either Wi-Fi or cellular data.
	Image Basemap: Point This appears in the Spot listing. This means the Spot is on an Image Basemap		Image Basemap: Line This appears in the Spot listing. This means the Spot is on an Image Basemap		Image Basemap: Polygon This appears in the Spot listing. This means the Spot is on an Image Basemap

HOW STRABO IS ORGANIZED

The following explains how users organize their Account, Projects, Datasets, and Spots within Strabo.

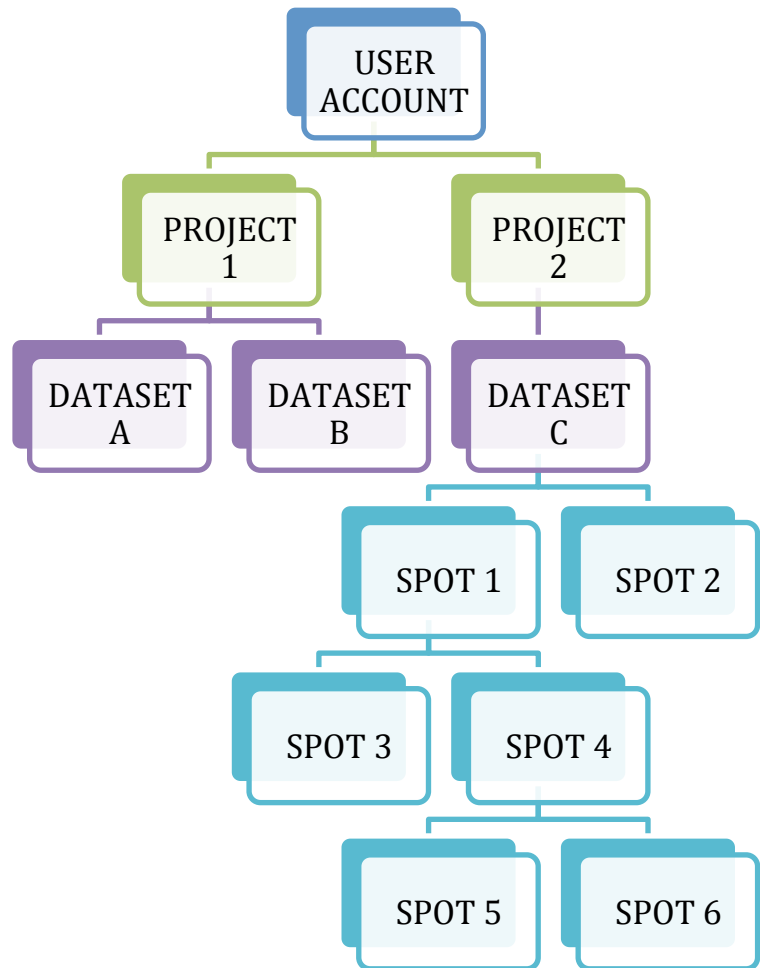
What are a User, a Project, a Dataset, and a Spot?

A **Spot** is the basic element of data collection. It is an **observation, relation, analysis, age, or anything that the geologist determines**. Spots are fully hierarchical in that a Spots can contain Spots that contain Spots....

Datasets are the next organizational unit. Datasets contain Spots, and for most workers, will correspond to a **map area**, restricted location, outcrop, or thin section.

A **Project** in Strabo contains Datasets and Spots. A Project holds Datasets and is made up of a single, or multiple Datasets. The Project contains all the **Datasets, vocabulary and custom features** associated with the Datasets.

The **User Account** is the **largest element**. It allows the User to manage all Projects and Datasets. This management is somewhat limited on the Mobile app, but is fully supported on the Online version (strabospot.org).



FAQ)- I GOT A NOTICE FOR AN UPDATE TO STRABOSPOT, OR I FOUND IT ONLINE. WHAT SHOULD I DO BEFORE I UPDATE, OR SHOULD I JUST GO FOR IT?

-DO NOT UPDATE until you have backed up the project either to the device or online. It is really **BETTER** to never update until you have uploaded your project. **DO NOT** update while you are in the field unless there is a **serious bug fix that you have to use**.

FAQ)- WHY SHOULD I MAKE MULTIPLE DATASETS?

-In projects it is useful to separate map areas or outcrops. A large number of Spots may make a single Dataset less responsive on mobile devices. A Dataset with 1000s of Spot may be slow to respond. Datasets can be turned on or off in several ways.

FAQ)- CAN I SEE MULTIPLE DATASETS AT THE SAME TIME?

-Yes. Any Dataset active in a project will be displayed on the main map. You make Datasets active in the Manage Project and Layer Manager parts of the interface. You can see multiple Datasets within a Project.

HOW STRABO IS ORGANIZED (Cont.)

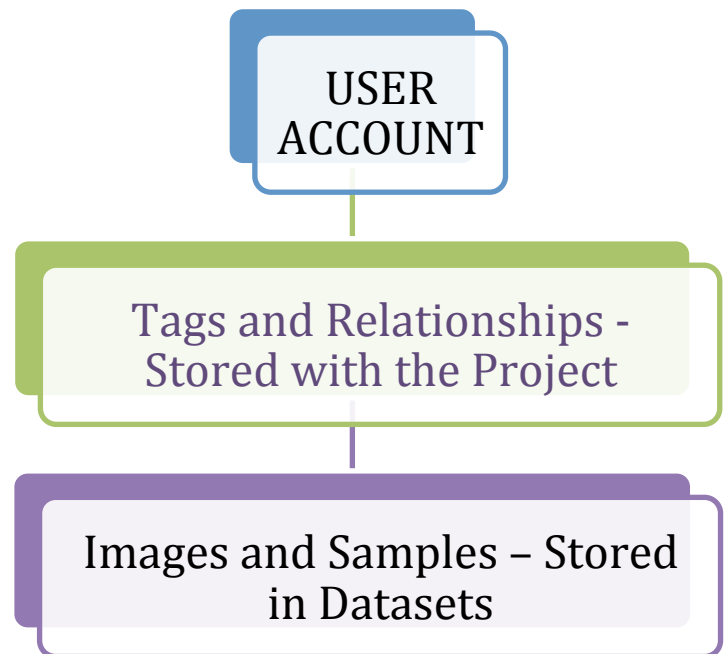
What are Tags, Relationships, Images, and Samples?

A **Tag** is similar to a sticky note in that it can be attached to a Spot. For example, a rock unit with its age and lithologic information can be made into a Tag. Tags are saved at the project level, so every tag added to a project is available to all Datasets. A Tag can be a geologic unit, concept, some item of common documentation (fine-grained), or any other category that the user wants.

Relationships are logical relationships between Spots, for example: Fabric A cuts Fabric B. Relationships are saved at the project level, so every Relationship added to a project is available to all Datasets.

Images are any photo, drawing, or raster document. These are entered in with a Spot and are stored at the Dataset level.

Samples refer to physical samples collected in the field. It can also refer to any subsample, such as a mineral grain analyzed for composition or age. Samples are associated with a Spot and are stored at the Dataset level.



FAQ)- WHY ARE TAGS AND RELATIONSHIPS STORED AT THE PROJECT LEVEL?

-This is so the same Tags and Relationships can be reused in separate Datasets throughout the project- a helpful feature for projects where the same geologic units are encountered in separate mapping areas.

FAQ)- WHERE DO I ENTER INFORMATION FOR TAGS AND RELATIONSHIPS?

-Create new Tags and Relationships under their respective tabs for a Spot. Once a new tag or relationship is added, it will appear in a dropdown menu in its tab across all Datasets in the project.

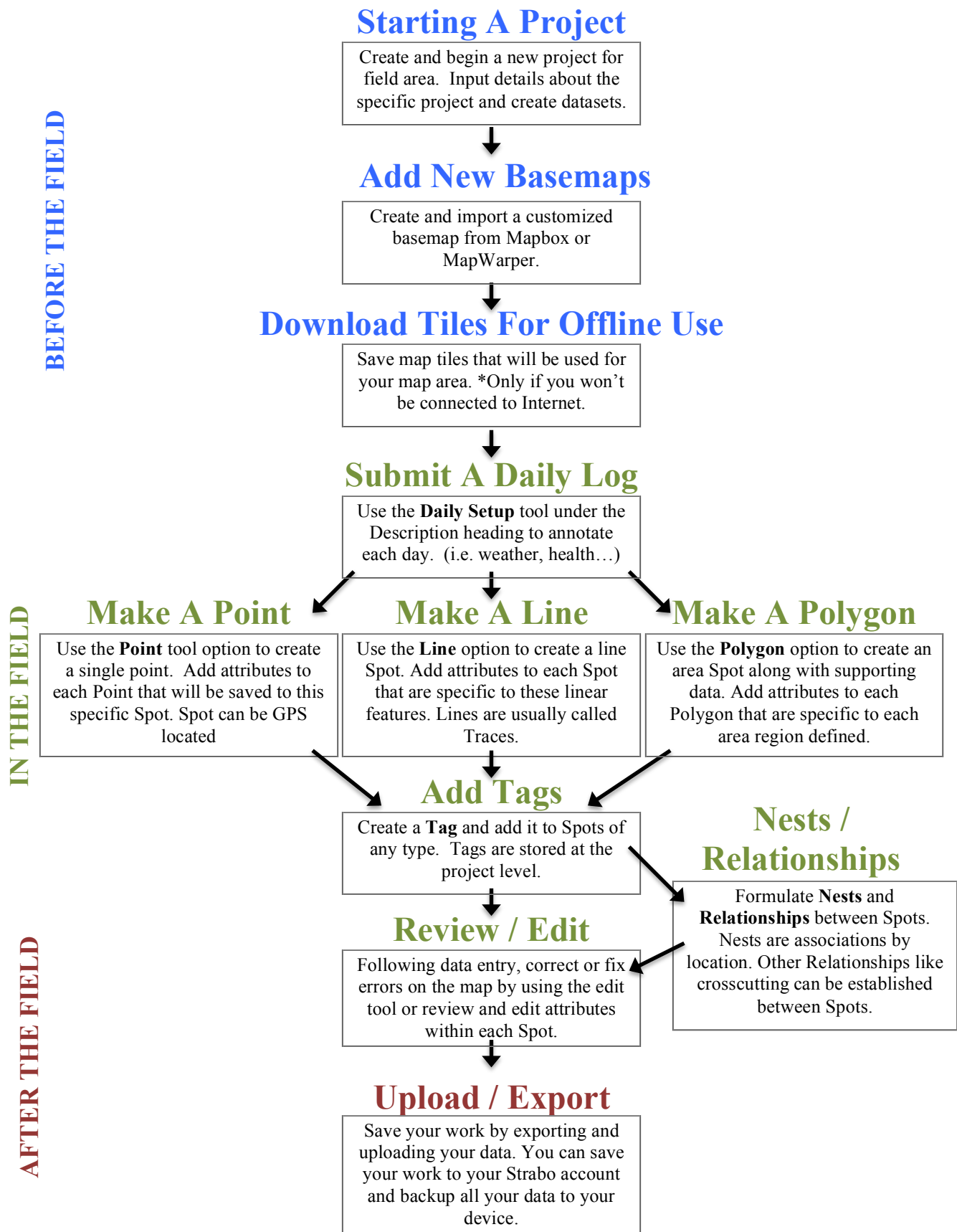
FAQ)- WHAT ARE SOME USES OF TAGS?

-You can set up Tags for rock units. In this way, every rock of the same formation or member gets the same information associated with it. Tags can also be rock facies or any other feature shared by Spots.

FAQ)- WHY WOULD I WANT TO CONTINUOUSLY TAG?

-Continuous Tagging is very useful if you are making measurements in the same rock unit or of the same type of structure. You could continuously apply the same Tag, such as S1 foliation, to a large set of measurements you are making at the same time.

STRABO WORKFLOW



SPOT WORKFLOW

BEARINGS

FEATURES

INFERENCE

Create Point / Line / Polygon Spot

Decide to make your Spot, either a Point (one GPS location), a Line, or a Polygon (an area).

Orientations

Add a Plane, a Line or a Tabular Zone. Most of these will display on the main map.

3D Structures

Add a Fabric, a Fold, a Tensor, or Other Structure.

Other Features

Add a feature of your own creation not included in the menus/Tabs.

Images

Take a picture and add it as an image. Give the image a title and a description.

Image Basemap

Assign an Image Basemap. You can also find this in the main menu section.

Samples

Keep a record of the samples you collect, along with details about each sample.

Tags

Add, define, and remove Tags. Tags can be created and changed in the Main Menu as well.

Relationships

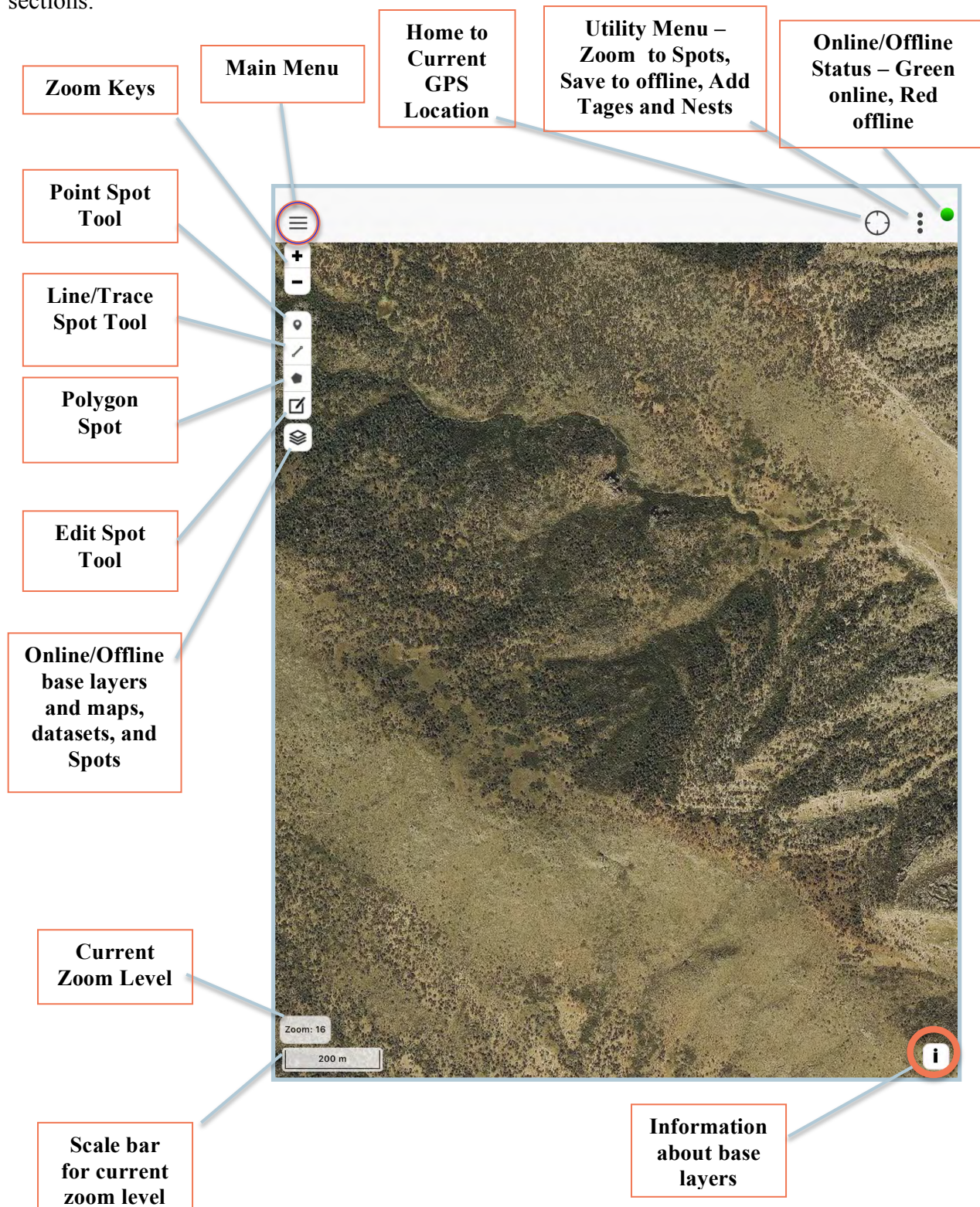
If there are relationships between the Spot and others you can create, add, or edit them.

Nesting

Nest the Spot, and toggle Continuous Nesting on and off.

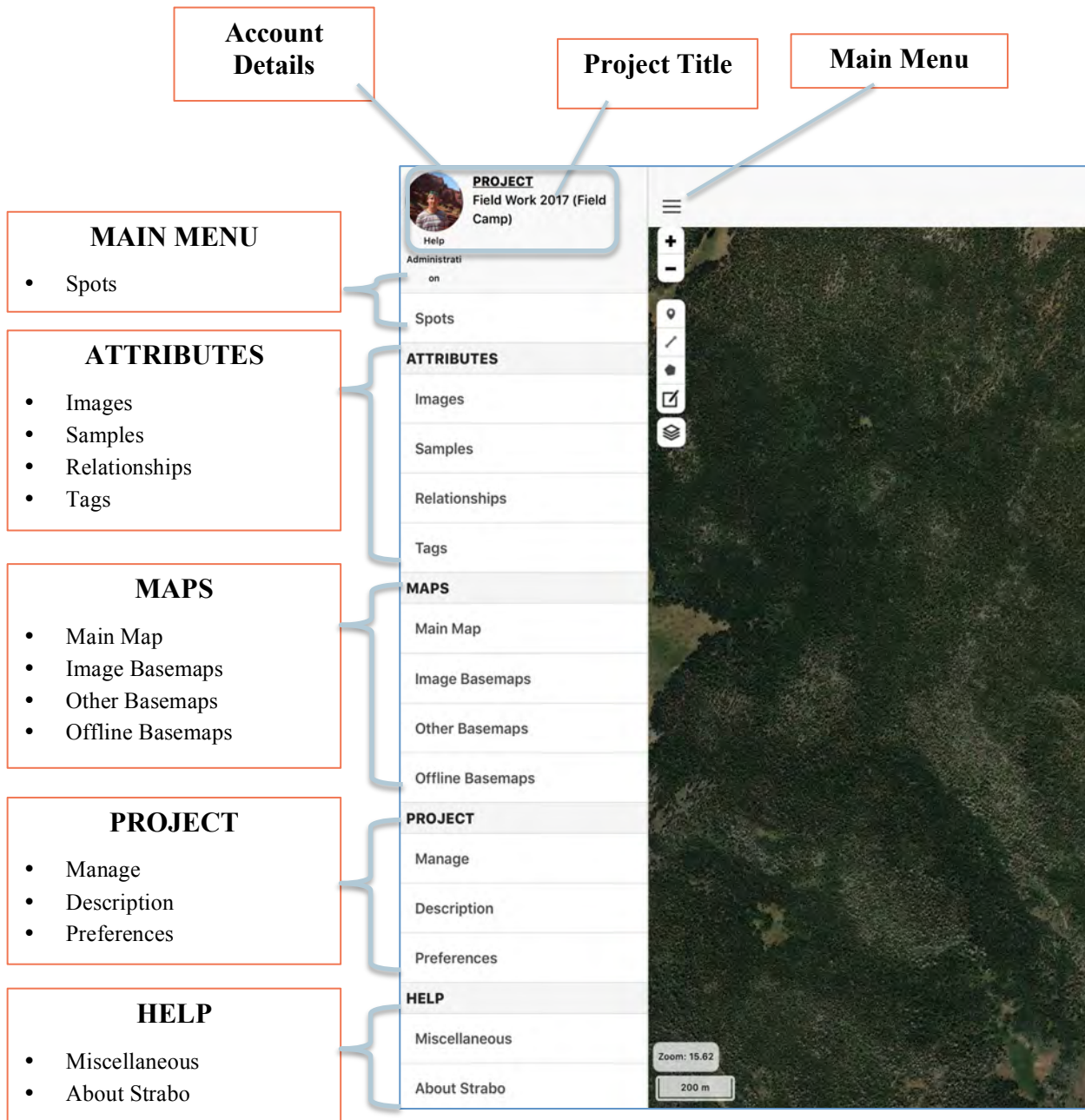
MAIN MAP

The image below is the **Main Map** that appears while using Strabo, along with the names of the tools. This is where you do a lot of your work while using Strabo. Items are explained in detail in other sections.



MAIN MENU

Once the **Main Menu** is selected this menu appears. These are the main options in StraboSpot for managing your Spots, Dataset, Projects, Datasets, Maps, and other items.



FAQ)- WHAT CAN I NOT DO AT THE MAIN MENU?

-You cannot manage your account. That is done from the StraboSpot.org webpage.

FAQ)- DO I HAVE TO HAVE A PICTURE WITH MY ACCOUNT?

-No. But it is good idea because you can make sure you are logged on to StraboSpot.

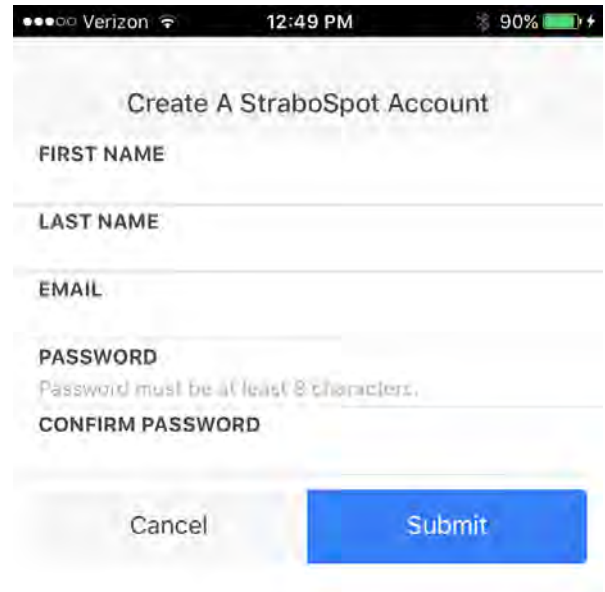
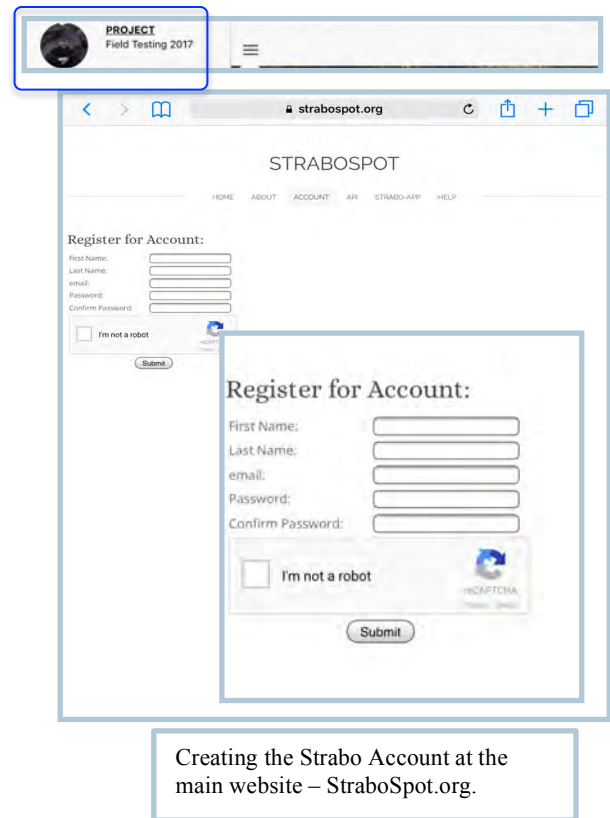
ACCOUNT SETTINGS

In the top left corner of the device's screen is your account profile picture and username. Pressing either your picture or username allows you to access your user settings (circled in blue in the top figure).

Creating Your Account

When you first begin using Strabo, you will need to create an account. Your data will be stored and accessed in your account.

You can create an account by going to strabospot.org and pressing the account tab, and selecting **Create an Account**. Fill out the lines to **Register for Account** (seen in bottom figure). You will receive an email to verify. **You must respond** to the email for your email address to be verified and for your registration to be complete. You can do the same operation from the login screen on the StraboSpot app. This is shown in the lower right.



FAQ)- DO I NEED TO CREATE A PROFILE BEFORE I START MAPPING?

-No, you can map without being signed in, but consequentially your data will not be saved to the StraboSpot database until you get an account.

FAQ)- DO I HAVE TO CREATE AN ACCOUNT AT THE WEBSITE?

-No, you can create an account at the application. You have to manage your Datasets and Projects and StraboSpot.org.

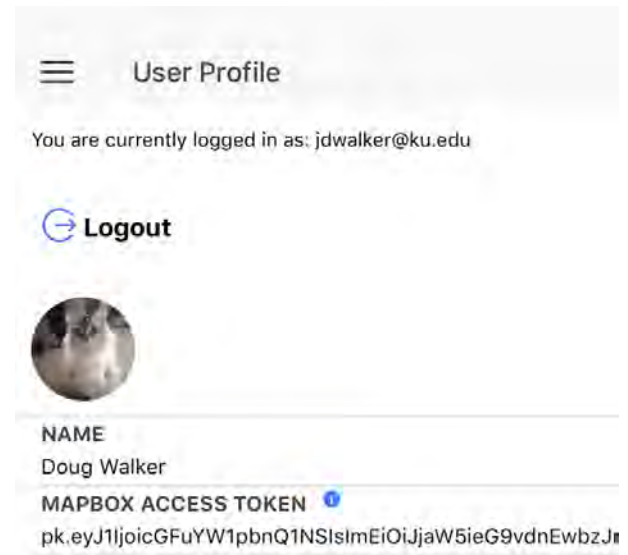
ACCOUNT SETTINGS (Cont.)

User Profile

The User Profile is what all of your data will be saved under. If either the **Profile Picture** or **User Name** is pressed, you will be directed to a screen where you may change your user name and profile picture. In addition, you will see the user name confirming data is being stored under your newly created project.

Having a User Profile is also important for entering your information for custom maps created in MapBox and MapWarper.

Enter your MapBox token here and it will be used for any maps you want to bring in the project.



FAQ)- WHAT IS THE USER PROFILE INFORMATION USED FOR?

-Communication and attribution. You may get messages from StraboSpot about your account and changes to the website and updates to the application. When data are made public, your username is exposed with your data. Of course, you need to have an account to store data. No user data is sold or conveyed to anyone else.

FAQ)- DO I HAVE TO USE A PICTURE OF A PET?

-Yes. If not, you need permission from the StraboSpot Team to use an alternate picture ☺. Cats and dogs are cute. Baby pictures are usually approved without review.

STARTING A PROJECT


Starting A Project

When you first start Strabo you will be prompted to create a new Project. The Project is the largest organizational unit in Strabo. When you create a Project it will have a dataset called “Default” to ensure you can enter information. You can add more datasets using the “+” button, and delete the default one if you want. One or more datasets must be active at any time. You can also use this screen to set which dataset is the target for adding new Spots.

The **Project Name** is the only data line that must be filled in. Remember that your Project will consist of a number of Datasets and Spots.

All of these entries can be edited later, including the Project name. This can be found in the main menu under the **Manage** heading.

IMPORTANT – if you have an active Project and create a new one, the old one is dropped from the device. You must save the Project to your device or upload it to strabospot.org to ensure you do not lose data. There will be warning about this as you go through the process of creating a new Project.



This is what the screen will look like when a New Project is being created.

FAQ)- WILL I BE ABLE TO EDIT MY PROJECT DETAILS AFTER I CREATE IT?

-Yes! You can review and edit your data under the “project manage” tab.

FAQ)- WHY DOES THE EXISTING PROJECT GET DELETED?




-You can only have one active project at a time. Also, if you are sharing your device and change projects you retain security on your data. You have to save to strabospot.org to ensure that your data are backed up.

SPOTS

Spots

Spots are observations, measurements, or images associated with a spatial region. **Everything is a Spot**, including a Point, Line and a Polygon. For example, a single strike and dip of bedding can be a Spot. **Spots** in the Main Menu is a list of all the Spots you have entered **for this Project and active Datasets**. Pressing this shows all the active Spots in the active datasets.

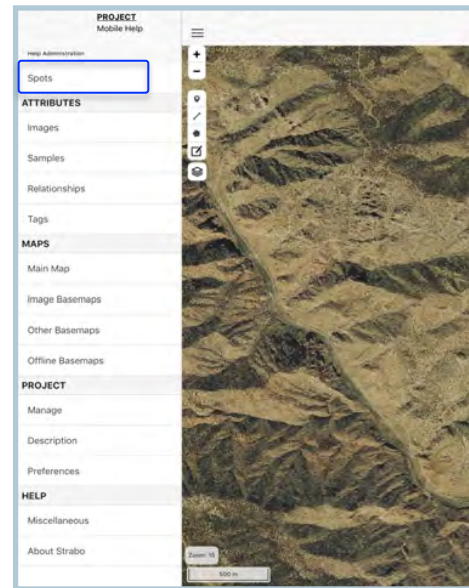
The figure to the lower right is an example list of Spots. To the left of the list is an image indicating the spot type:

-  Indicates a Point
-  Indicates a Line
-  Indicates a Polygon

The button circled in **RED** (bottom figure) filters all spots by dataset. Using this tool, you are able to toggle on and off visible datasets if you have more than one activated.

The Plus button circled in **BLUE** (bottom figure) allows you to add a new spot, line, or polygon. If selected, it prompts you to fill out a new spot. If no location is assigned to the Spot, the Spot does not appear on the map and a question mark takes the place of the spot type indicator.

The button circled in **GREEN** (bottom figure) allows you to either set list details or export all Spots to CSV. You can set the list detail to either show the elements that each spot includes or not, or show the tags each spot is assigned to.



Circled is the heading referenced under the **Main Menu** title. (There is no heading seen).



This is the **Spots** tab. This is an example list of Spots with elements each spot contains.

FAQ)- WHY SPOT?

-A Spot is the basic data element in Strabo. It is the node in a graph database, and that is the approach for Strabo.

ATTRIBUTES

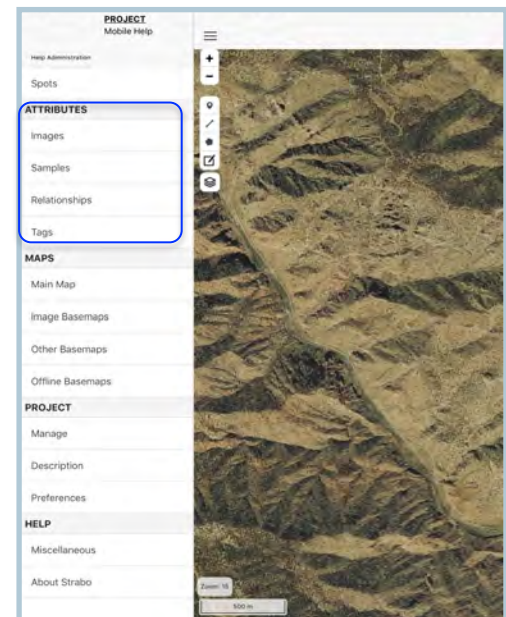
The **Attributes** heading on the Main Menu corresponds to data that applies across datasets. The attributes heading displays 4 different options: Images (pictures, drawings, or any raster item associated with a spot), Samples (documentation of a sample, but specifically a Spot that contains a sample), Relationships (associations between Spots), and Tags (data that can be shared between Spots and Datasets).

Images and Samples are only displayed for active datasets. Tags and Relationships apply to the **entire project**.

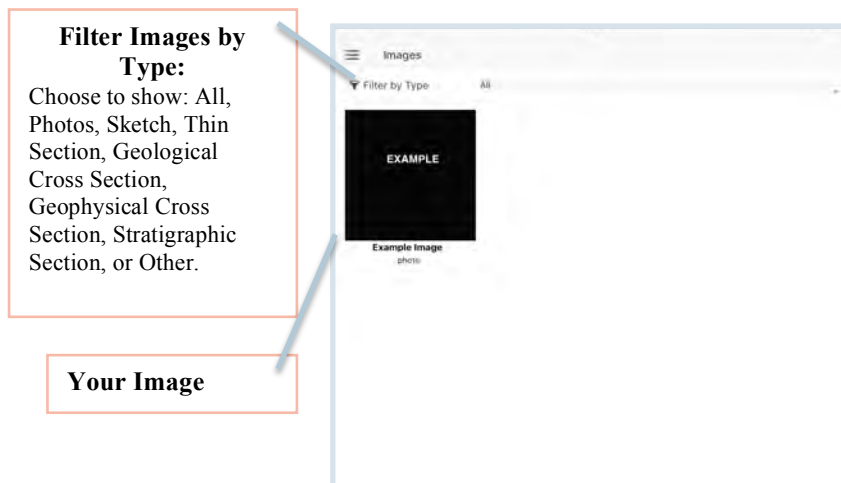
Images

The **Images** bar under Attributes allows you to see all images within the active datasets in a project. Pictures you take are images. You can add, edit and annotate the images you have assigned to your Spots. When editing your image, you must go back to the Spot the image is originally attached to. To access the Spot that your image is associated with, simply press on the image and it will take you to the Spot.

Images can also be made into **Image basemaps** and can be used in mapping.



Circled is the list of headings referenced under the **Attributes** title.



FAQ)- WHAT CAN BE AN IMAGE?

-Any picture, drawing, annotated photo, or raster of any type. If it can be seen on a mobile device in the pictures folder it is an image. If you use a program to draw lines on a picture it is still an image. You can pull images out of DropBox if you want.

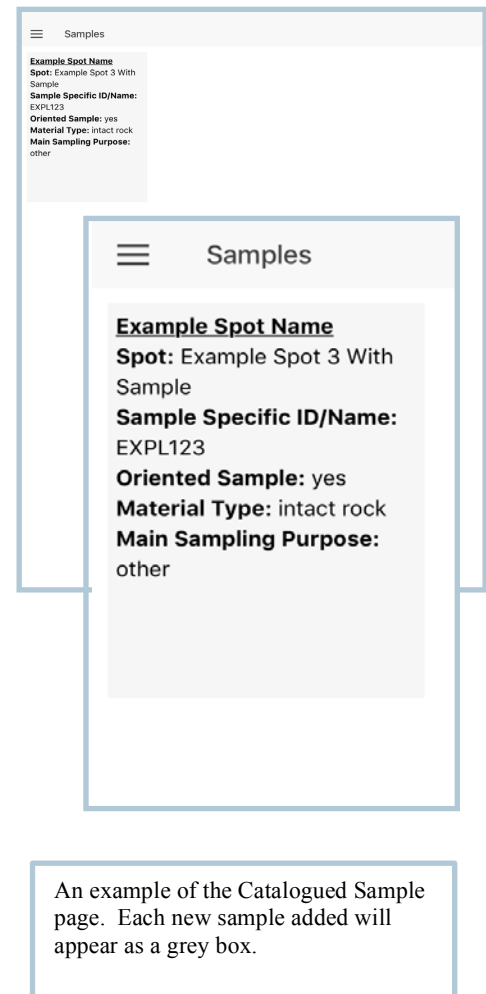
ATTRIBUTES (Cont.)

Samples

The **Samples** tab is where you can find, add, edit, and annotate the samples you have assigned to your Spots. In the figure to the right, you see an example sample titled “Example Spot Name” seen underlined at the top of the grey sample box. Following the title you will see a full list of all the data you entered for that specific sample at that specific Spot.

If pressed, the individual sample box will bring you to the Spot the sample is assigned to. There you can see and edit the characteristics for your sample.

You can use International Geosample Identifiers (IGSNs) for sample names and upload them when connect to the Strabo Database. IGSN information can be set in Project Preferences. You can set up your IGSN information or find out more about them at <http://www.geosamples.org>.



An example of the Catalogued Sample page. Each new sample added will appear as a grey box.

FAQ)- WHY WOULD SAMPLES BE A SEPARATE ATTRIBUTE?

-For most workers, samples are special in that more is done with them away from the field. Users may want to create a sample list or get an output of sample locations.

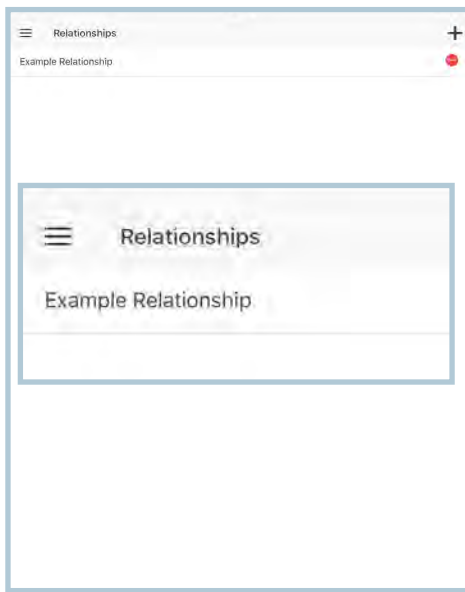
FAQ)- WHY USE IGSN?

-IGSN are an internationally maintained list of samples. The IGSN starts with a prefix for an individual user, and then uses sequential numbering.

FAQ)- IF I USE AN IGSN CAN I HAVE MY OWN SAMPLE NUMBER?

-Absolutely. You can enter the sample information for the sample with any naming convention you want. You can assign these to IGSNs later.

ATTRIBUTES (Cont.)



Relationships page under Attributes. Each new relationship added will appear on this page.

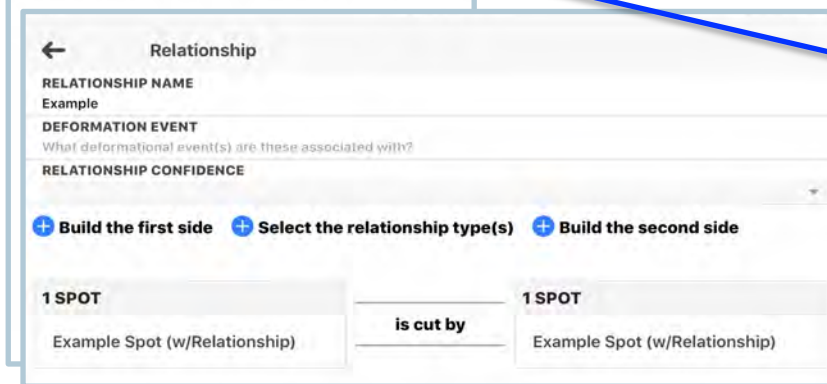
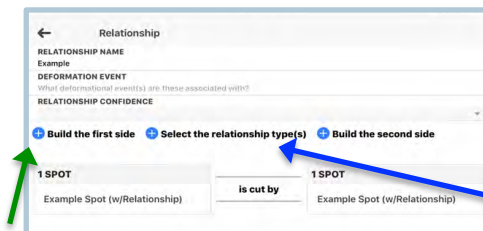
Relationships

The **Relationships** tab is where you add and edit relationships that have been established between your Spots. In the figure to the left, you see an example relationship.

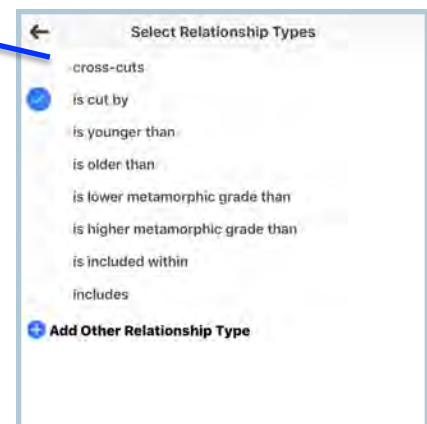
If pressed, the individual relationship box will bring you to a page where you can add a Relationship Name, Deformation Event, Relationship Confidence, and to select a relationship type. Once a relationship is assessed you are then prompted to select the Spots that the relationship is between.

In the bottom figure, we see the screen to add a relationship. The first step is to **Build the first side**. By pressing this (represented by the green arrow) you can select for your currently active Spots, Features, or Tags. Once your first side is added (seen in the bottom figure as “Example Spot w/Relationship”), select the relationship between your sides by pressing the “Select the relationship type(s)” button. You also have the ability to build your own relationship type by pressing the **Add Other Relationship Type**. Lastly, Press the **Build the second side** button (represented by the blue arrow) and select your Spot, Feature, or Tag.

You can add relationships of any type using the “+” blue button.



Creating a Relationship



FAQ)- WHY WOULD I WANT TO ADD A RELATIONSHIP?

-Relationships allow you to enter crosscutting relationships (space for time). The dike documented at Spot A cross cuts fabric at Spot B.

FAQ)- WHAT ARE EXAMPLES OF RELATIONSHIPS?

-Axial planar foliation cutting bedding, included fragments of underlying rock in overlying one, xenoliths of recognizable rocks in a pluton, nonconformity.

ATTRIBUTES (Cont.)

Tags

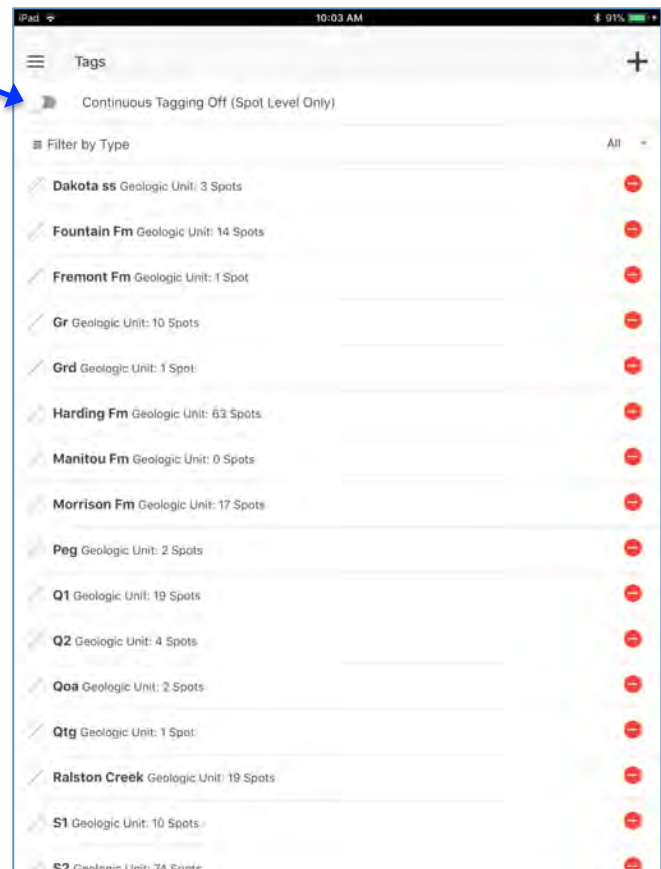
The **Tags** tab under the Attributes gives a list of all Tags in a Project. Remember, Tags are stored at the Project level. This also lists how many Spots are associated with each Tag.

You can add or edit types of Tags under this menu. Remember, a Tag is basically a sticky note that you can attach to a Spot. For example, a rock unit with all of its age and lithologic information can be made into a Tag. The name of the Tag would just be the rock unit abbreviation (e.g., Ds for Devonian Sultan Formation), sedimentary facies designation (cgs for coarse grained sandstone), or any other characteristic or information that might be in common between many Spots (BRX – brecciated rock). Any number of Spots can be assigned to a Tag, and any number to Tags can be assigned to a Spot.

When creating a Tag select the “+” button in the top right of your device screen. You will then be prompted to name your new tag and select the type of Tag, either the Geologic Unit, Concept, Documentation, or Other where you can create your own tag.

The **arrow** in the upper figure points to a button that allows you to continuously tag. While activated, every spot created will automatically be included in this **Tag Group**.

You can also filter Tags so that you only see on type of Tag, e.g. Geologic Units.



Is a picture of the Tags page. All new tags will appear where it shows “Example Tag”

FAQ)- WHAT ARE SOME USES OF TAGS?

-You can set up Tags for rock units. In this way, every rock of the same formation or member gets the same information associated with it.

FAQ)- WHY WOULD I WANT TO CONTINUOUSLY TAG?

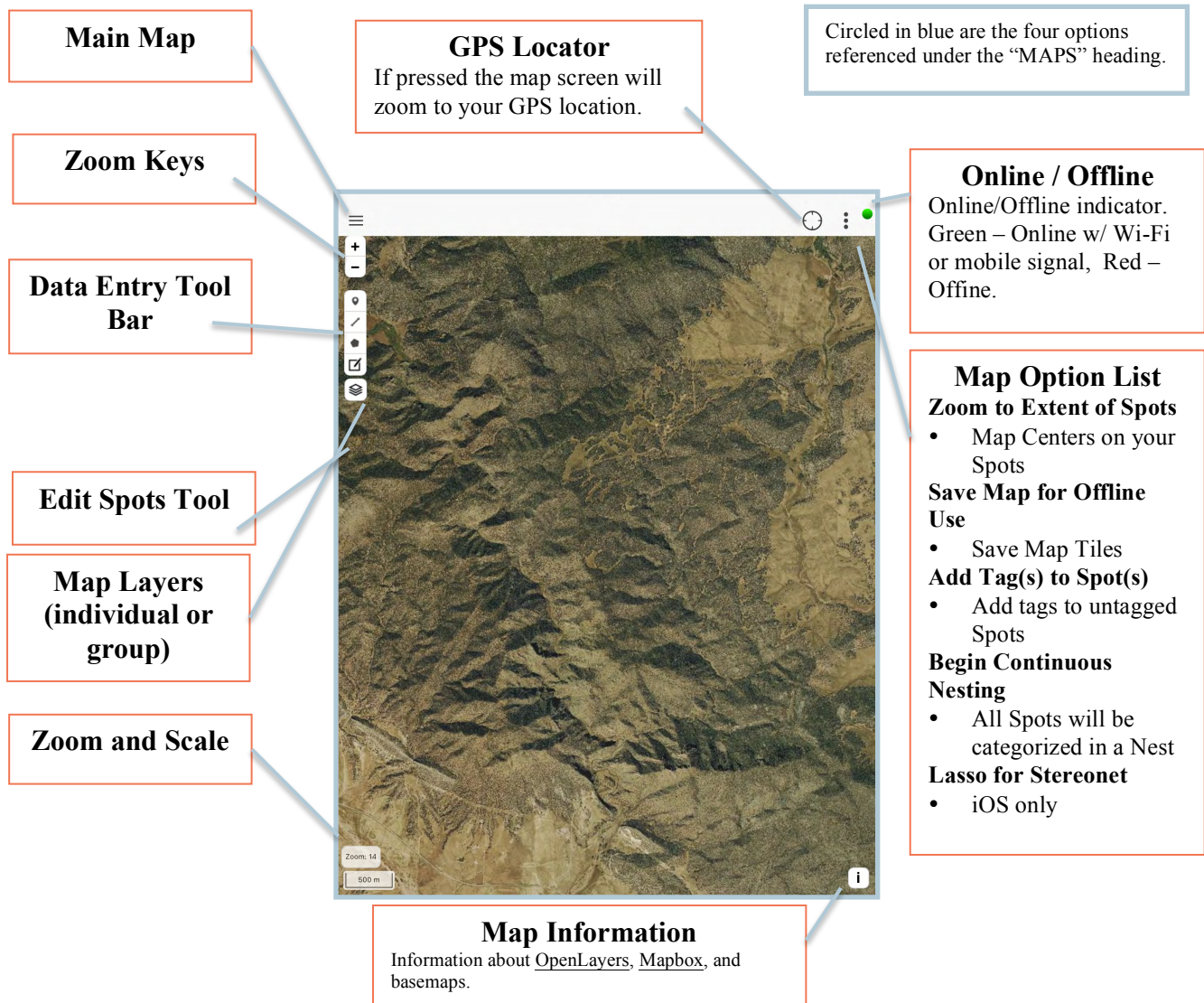
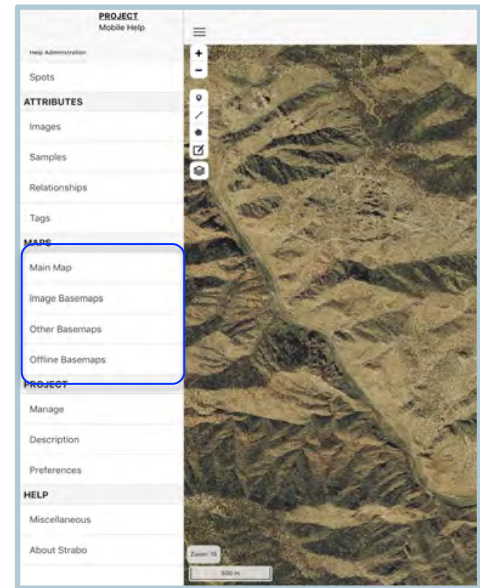
-Continuous Tagging is very useful if you are making measurements in the same rock unit or of the same type of structure. You could continuously apply the same Tag, such as S1 foliation, to a large set of measurements you are making at the same time. Tags can work a lot like labels in a normal GIS system.

MAPS

Maps consists of four selections: Main Map, Image Basemaps, Other Basemaps, and Offline Basemaps.

Main Map

The **Main Map** heading is the main screen used to add data, points, lines or polygons. When Wi-Fi is accessible, you have the ability to scroll by pressing and dragging around the map. You can zoom in on your map tiles by using two fingers and moving them in a separation motion, or the “+” and “-” **Zoom Key** buttons indicated below.



MAPS (Cont.)

Main Map (Cont.)



Map Layer Options

This list allows you to show or hide **Spots**, **Datasets**, **Overlays**, or **Baselayers**.

Under the **Spots** list, different types of Spots can be toggled to display or be hidden depending on type of Spot (Orientation or 3D Structure).

Under the **Datasets** list, you can select which datasets you want displayed on your map.

Under **Overlays** you can select layers of images that can be used as overlays with variable transparency. This is for **Other Basemaps** in your Project.

Under the **Baselayers** list, you have choices of style of map for your area. If you download more maps, those will also be displayed here.

You can pick individual layers in each of the lists above, or turn the entire selection on or off using the “-” to collapse the list.



The Map Layer Options menu. This is displayed when button is pressed. From here you can toggle on and off your data spots or types of maps and overlays.

FAQ)- HOW DO I TURN OFF ALL OF THE LAYERS OF ONE TYPE?

-Use the uncheck the heading box above the layer list.

FAQ)- CAN I SELECT SPOTS THAT ARE NOT DISPLAYED?

-No, This is a handy way to limit your possible selections or hide spots such as polygons in the layer list.

FAQ)- I AM OFFLINE BUT MY BASELAYERS DO NOT SHOW.

-This can be complicated. The most common causes are 1) you do not have the offline Baselayer selected (your map is on street map and you need satellite to be selected), or 2) you are at a zoom level that you did not download. Another cause is that you need to be in airplane mode to ensure you are really offline. Turning off Wifi alone may not be enough. Restart if the problem persists.

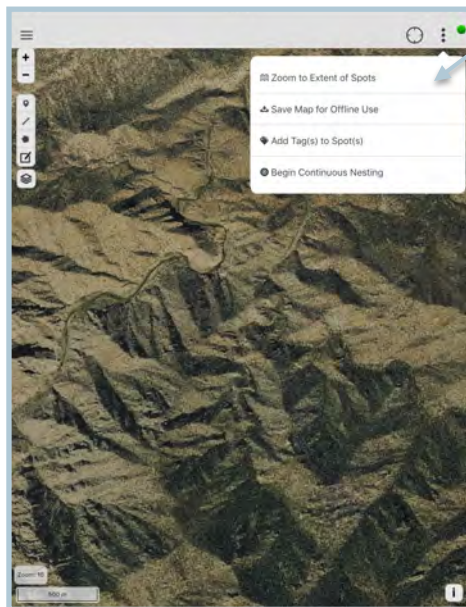
FAQ)- ARE THESE THE ONLY CHOICES FOR BASELAYERS?

-OSM streets, Mapbox satellite, Mapbox Topo, and No basemap are the only options built into Strabo natively. You can add any other and as many Baselayers as you want using the websites for Mapbox or MapWarper. There are instructions for doing this in the appendices.

FAQ)- CAN I ADD OTHER BASELAYERS?

-Yes, using Mapbox and MapWarper.

MAPS (Cont.)



The arrow is pointing to the **Map Option List** menu. This is displayed when button is pressed.

Map Three-Dot List

The Map Three-Dot List allows you to **Zoom to Extent of Spots**, **Save Map for Offline Use**, **Add Tag(s) to Spot(s)**, and to **Begin Continuous Nesting**. For iOS you can **Lasso Spots for Stereonet** app.

The **Zoom to Extent of Spots** option automatically scales and locates ALL of the Spots associated with the active datasets, regardless of the how large the map scale will be.

Select the **Save Map for Offline Use** option to save map tiles for offline use. First, make sure you are online (green Online/Offline button). You are prompted to enter a Map Name, then select which zoom level you would like downloaded. Finally, press the blue button to download tiles. You can continue adding more tiles to any map area.

To include all Spots to a specific Tag Group, Press the **Add Tag(s) to Spot(s)** option and draw a polygon around all the Spots that are being assigned a Tag Group.

Press **Begin Continuous Nesting** to nest all new Spots. This will place them all in the same nest or Spot. If this is on, you can press **End Continuous Nesting** to stop nesting.

On iOS version you will see an option to **Lasso Spots for Stereonet**. This allows you to select the orientation data for displayed datasets and copy them to the Clipboard where they can be brought directly into Rick Allmendinger's StereonetMobile iOS application.

FAQ- I CANNOT FIND MY DATA OR MY MAP AREA BECAUSE I HAVE NO SPOTS

-A good idea is to place a Spot in the middle of the area of interest once you start making a project or dataset. That way you can always zoom back to the location. You can also zoom to offline maps under that menu.

MAPS (Cont.)

Data Entry Tools

Point

A **Point** has a single location coordinate (lat/long, pixels). The **Point** will be a black dot when first created, but after you enter an orientation, the **Point** will be displayed as a planar or linear symbol. If a strike and dip planar feature is entered, an oriented strike and dip symbol will appear in the location of your spot. The bottom figure shows an example of a Spot.

Line

A **Line** or **Trace** can be used to draw a contact, fault line or anything with LineString geometry. **Lines** can cross cut one another. When a line is created, the Spot Name that you entered earlier will be displayed on your main map. An example of a line can be seen to the right in the bottom figure.

Polygon

A **Polygon** maps an area on the Main Map that encompasses a large zone. Within the **Polygon** Spots can be added, nesting these Spots into the **Polygon**. Examples uses of the **Polygon** would be to map geologic unit. The bottom shows what a **Polygon** would look like on your Main Map.

Edit

By pressing the **Edit** tool you can reposition your Spots and anchor points for each line or polygon. Select the **Edit** button, then press, hold, and then drag the anchor point in which you are repositioning. Then click to save edits

Data Entry

After the Spot is placed or the line/polygon is finished being placed, you enter in spot specific data. Once finished creating a Spot, whether it is a Spot, Line or Polygon, all entries are located in the Spots heading in the Sidebar Menu. Remember, **everything is a Spot**.



The arrow is pointing to the four **Data Entry Tools**. This is displayed when button is pressed.



Save Edits to preserve your editing. If you just press the edit button and switch off editing nothing will be changed. This is helpful if you make a mistake while editing

FAQ)- CAN I EDIT ANY SPOT REGARDLESS OF TYPE

-Yes. Editing points will move them. By editing lines or polygons you can move vertices, add more vertices, or delete vertices. You have to save your edits if you want them to stick.

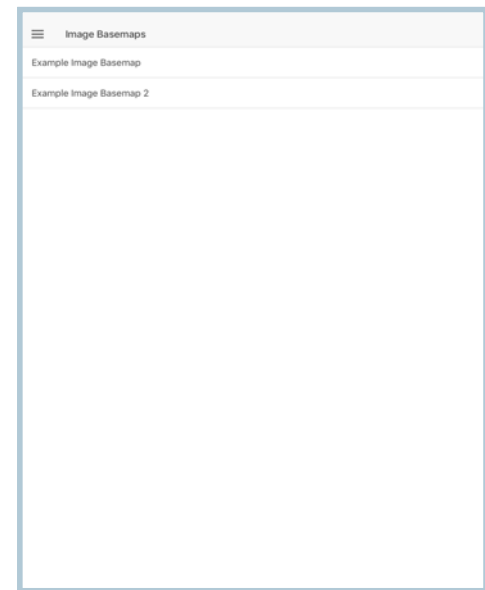
MAPS (Cont.)

Image Basemaps

The **Image Basemaps** heading lists all images that have been saved as an Image Basemap. Any image can be set to become an Image Basemap. You can add Spots to an Image Basemap. Your list will look similar to the list seen to the right.

After pressing the Image Basemap you will be working with, the image will take the place of the map you were working with prior.

Once your image has replaced the map, you have the ability to create Spots and map on your image. This feature helps when mapping features like outcrops, thin section pictures, images of microstructures and any others.



This figure is an example list under the **Image Basemap** tab. This will look similar to your list.



This figure is an example **Image Basemap**. Notice the tool bar on the upper left.

FAQ)- WHY WOULD I WANT TO HAVE AN IMAGE BASEMAP?

-You can locate a Spot using GPS and then take a picture on your phone or tablet at that Spot. You can then map or document the Image Basemap with Spots that are same sort of data as if they are on a Satellite image.

FAQ)- WHAT COORDINATE SYSTEM DOES AN IMAGE BASEMAP USE?

-Data entered are in pixel coordinates relative to the Image Basemap. The Image Basemap is referenced to the Spot where it was taken or entered. That can be pixel coordinates if the Image is a Spot on another Image. Ultimately, the Image Basemap is related to the real-world coordinates of a parent Spot with such coordinates.

FAQ)- WHAT SORT OF IMAGE CAN BE AN IMAGE BASEMAP?

-Any image can be used as an Image Basemap. If you add an image to a spot you can place Spots on it.

FAQ)- HOW DOES AN IMAGE BECOME AN IMAGE BASEMAP?

-You can set this up when you add the image. You can also go to Images under Attributes and go it directly to set it as a basemap by checking a box.

MAPS (Cont.)

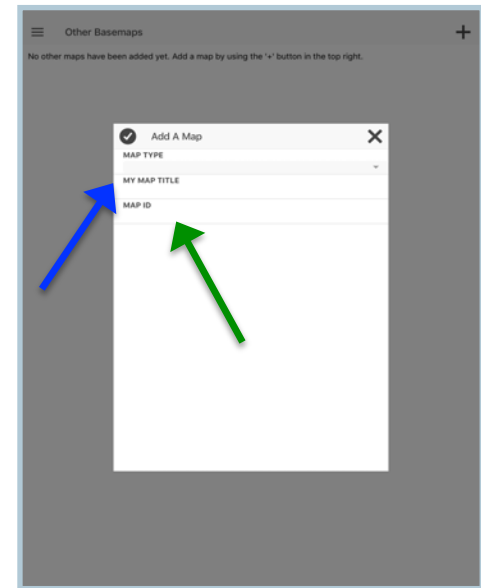
Other Basemaps

Other Basemaps is a way to add almost any georeferenced image and import/tile it directly to Strabo. Basemaps have real-world coordinates.

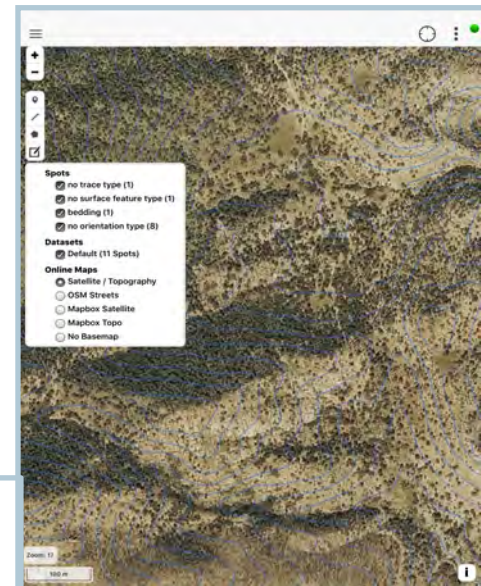
Other Basemaps must come from an Internet source that can provide a Tiling Service. At present, Strabo supports MapBox (<https://www.mapbox.com>) and MapWarper (<http://mapwarper.net>) services. A combination of these services will allow you to upload any map, make sure it is georeferenced, and then use it in Strabo as a Baselayer. If you are using MapBox you must set your MapBox Access Token in the StraboSpot User Profile.

Navigate to the Other Basemaps heading on the Main Menu. Once at the Other Basemaps screen, press the “+” symbol seen in the top right of the screen. A screen will pop up seen in the top figure. On your computer go to Mapbox or MapWarper, and design your map. Once you are finished, return to Strabo and enter your own personalized map title in the box indicated in the top figure by a **blue arrow** and the map ID indicated by a **green arrow**. You can see your map on the main menu by pressing the **Layers** button seen in the bottom figure. You can see my example titled Satellite / Topography, which is selected. You can add more and remove your own basemaps at any time, this will not affect the data you have recorded.

Using a combination of MapWarper and MapBox should allow you to make any image, map, or digital object you can georeference into Basemap/Baselayer for Strabo.



This figure is the screen to enter the details about your own map.



This is what your screen should look like once you have successfully added a new basemap.

FAQ)- WHAT IS THE DIFFERENCE BETWEEN AN OTHER BASEMAP AND AN IMAGE BASEMAP?

-Other Basemaps must have real-world coordinate – they are georeferenced. Image Basemaps have pixel coordinates but are referenced to some spot with a latitude and longitude.

FAQ)- WHY MAPBOX AND MAPWARTER?

-These are free services that allow users to download tile.

FAQ)- HOW DO I USE THESE SERVICES?

-Each group has instructions and help. We include some simple paths in the Appendices of this document.

FAQ)- I HAVE A LOT OF GEOREFERENCED MAPS. HOW DO I USE THEM?

-The easiest way is to bring these into MapBox, create a map, and download tiles.

FAQ)- WHY TILES?

-Strabo programming requires that back images are tiled – organized as smaller individual files. This is common on mobile applications.

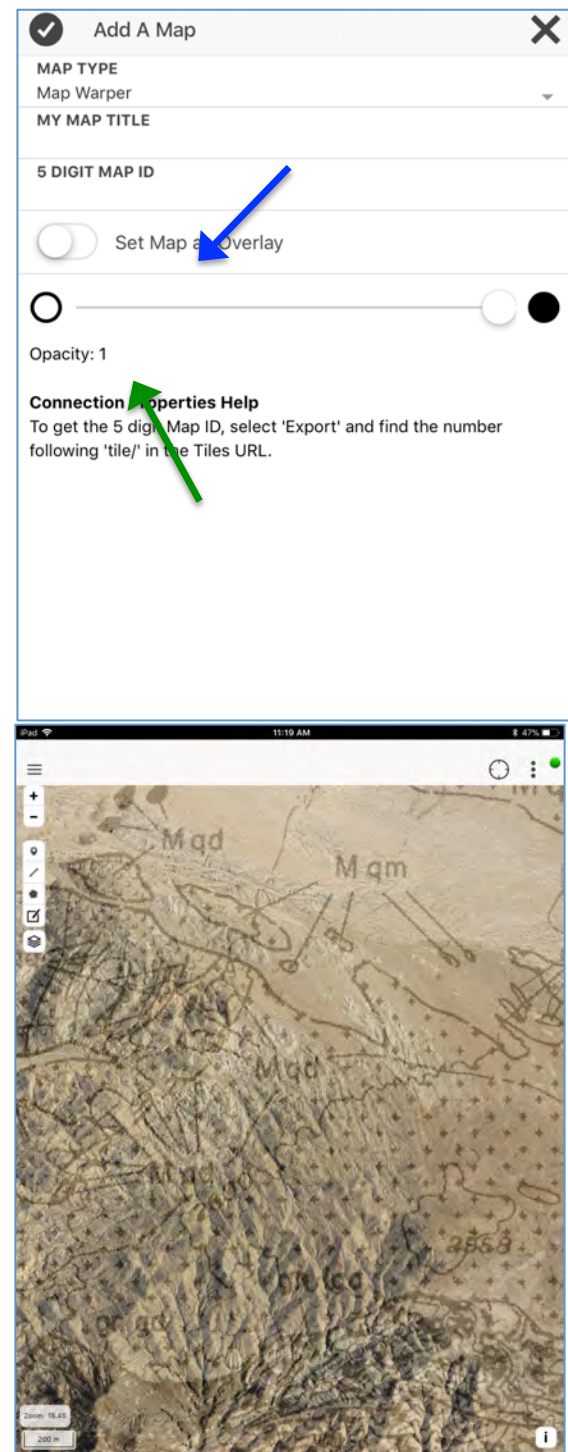
MAPS (Cont).

Overlays

When you add an **Other Basemap** you have the option of making it an **Overlay**. Overlays mean that you can set it to be transparent and appear above your Base Layers. This can be useful to put a geologic map over the top of a satellite image.

Example to the right shows where to set the map as an Overlay and set its Opacity. Below shows a Geologic map overlain on a satellite image.

Overlays are in a separate section of the Layer Manager.



FAQ)- HOW DO I GET TO THE OVERLAY FEATURE?

-It is an available option once you enter a map type.

FAQ)- HOW MANY OVERLAYS CAN I HAVE

-You can have as many as you want, but they will get confusing if you have a lot of them. You can have many, but then switch them on and off, several at a time.

FAQ)- HOW DO I CHANGE THE OPACITY OF AN OVERLAY?



-Go to Other Basemaps on the main menu, select the map, and you will have the option to change opacity.

MAPS (Cont.)

Offline Basemaps

The **Offline Basemaps** heading allows you to manage and see your Downloaded and Saved map tiles that are accessible when not connected to WIFI or a data plan. **This is the most important setup operation if you are going to use Strabo offline in the field.** Next most important is backups (see below)

Downloading Maps for Offline Use:

1. Center your Main Map on the area you will be working with in the field.
2. Make sure the map layer option or online map that you will want to work with is currently in view. If not, on the Toolbar press the **Map Options**  button and select your preferred map style (satellite image, topography, or any custom map you have created).
3. Press the **Map Options List**  and Press the **Save Map for Offline Use** option.
4. Enter a name for your map in the **Map Name** box (top figure). Select which zoom levels you would like to download.

NOTE: Only zoom levels selected will download, they will not “auto-fill” and download above or below.

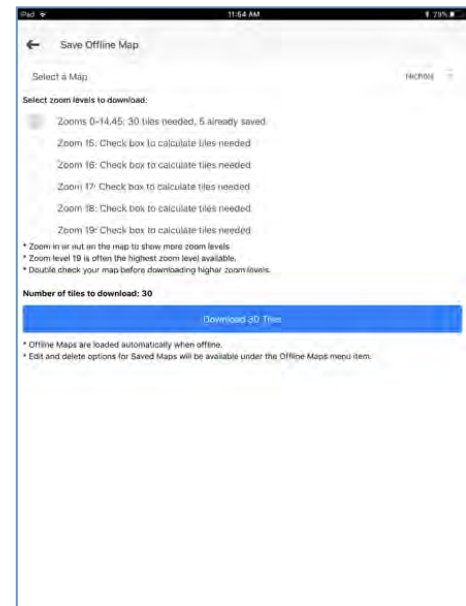
NOTE: Try to download no more than 5000 tiles at a time for best and most efficient results.

NOTE: Tiles for lower level zooms will be automatically downloaded. This will provide any needed overview.

5. Press the blue “Download ____ Tiles” button and wait for the tiles to download.

NOTE: If there are any failed tiles repeat step 5 until there are no longer failed tiles.

6. To make sure all tiles are downloaded for offline use, put your device in airplane mode and zoom in and out in the area you just downloaded.
7. Once your tiles are downloaded navigate to the **Offline Basemaps** area on the Sidebar Menu and see your saved map (see bottom figure).



This is the page seen when saving a map for offline use.



Once map tiles have been downloaded, a list of maps you have save can be seen here.

FAQ)- WHAT IF I AM OFFLINE AND DO NOT HAVE TILES?

-You will get a blank background screen.

FAQ)- I AM OFFLINE AND THE MAP DOES NOT SHOW. I KNOW I DOWNLOADED THE TILES?

-Make sure you have the right Baselayer selected.

FAQ)- WHAT HAPPENS IF I ZOOM IN AND HAVE NOT DOWNLOADED THAT LEVEL?

-You will still get an image, but it will be at the highest resolution available. You may just see some pixels if you do not have high-resolution tiles. Also, see section for tiles in the definitions page.

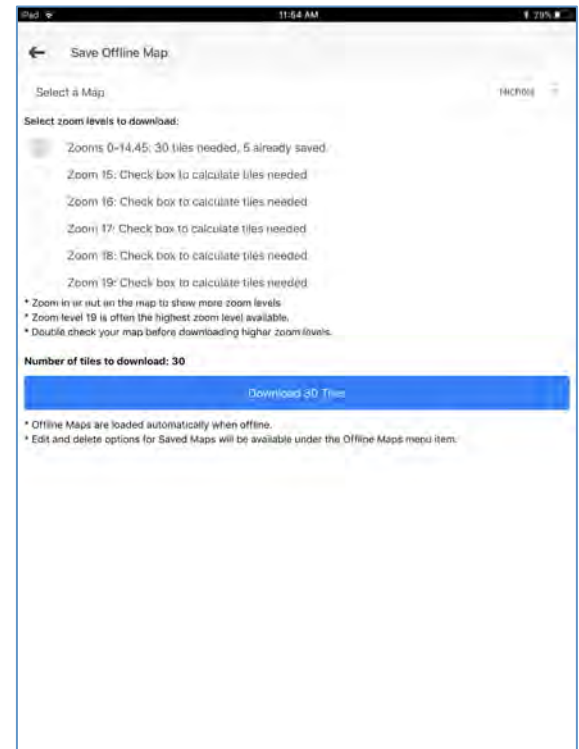
MAPS (Cont.)

Offline Basemaps (cont.)

Offline Basemaps are critical to working in the field out of network or cell phone contact. There are several things to consider when downloading and a lot of ways to do this.

Some Strategies:

- Be sure to start in the center of the area and put a spot in to relocate yourself if needed.
- You can download as many tiles as your device can hold. Go to a zoom level like 15, and then just scroll around the area you want and download all the zoom levels. You will only download the ones needed – saved ones will already be there.
- Then zoom out to higher levels that cover the area and download only those tiles (Level 12, 13, 14, or whatever you need).
- Tiles will ONLY appear in full resolution at zoom levels you have downloaded when offline.
- You can always make any new Base Layers using MapBox or MapWarper.
- Regardless of your platform (PC, Tablet, Android, iOS) you will have to download data for offline use. Strabo uses the tile scheme for applications.
- You can zoom in and out and still have the background image, but it may become pixelated at high zoom levels.



FAQ)- WHAT HAPPENS TO BASELAYERS WHEN I CHANGE AREAS OR PROJECTS?

-All baselayers are saved. Changing projects does not matter.

FAQ)- ARE BASELAYER TILES UNIQUE?

-Yes, every Baselayer has a type (satellite, streetmap), zoom level, and identifier.

FAQ)- I AM OFFLINE AND HAVED SAVED OFFLINE MAPS BUT NOTHING APPREARS?

-You may not have the right layer selected or you are not at a tiled zoom level.

FAQ)- IN MY GIS I DO NOT HAVE TO WORRY ABOUT TILES. WHAT IS UP WITH STRABO?

-Strabo is not a GIS and does not have all of the image processing built into those applications.

PROJECT

The **PROJECT** title shows three headings: **Manage**, **Description**, and **Preferences**.

Manage

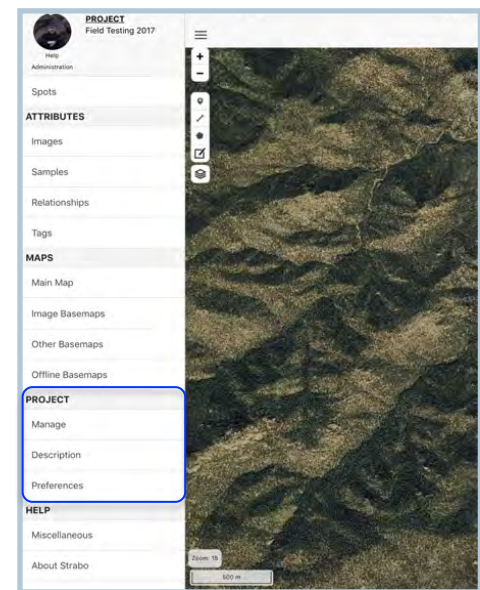
The **Manage Project** screen shows the name of your project at the top of your screen, in the bottom figure, it is shown as “Field Testing 2017”. Double tapping your Current Project name will direct you to the **Description** screen).

On the main **Manage Project** page you are able to manage your datasets. **Datasets** are groups in which spots are located. In the figure to the right, notice two **Datasets** are toggled on (Capitol Reef and Utah: Chimney Rock). Any active datasets will be shown on the main map. Toggling on and off your **Datasets** helps de-clutter your map and helps keep the program running faster. The last line is the default dataset for new Spots. Any new Spot is placed in the dataset selected on this line. To add a new **Dataset**, press the “+” button to the right of the **Dataset** title.

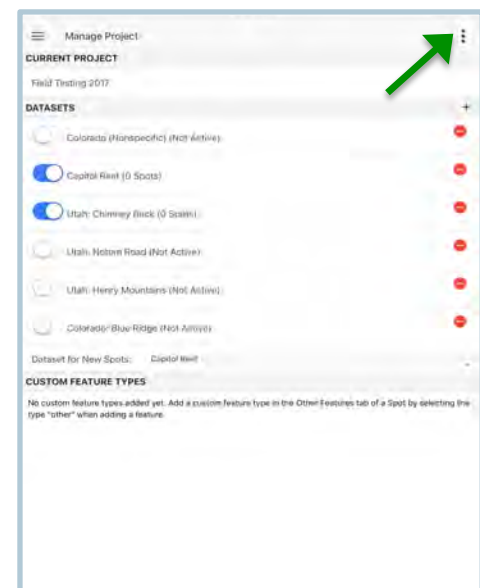
The bottom most heading, **Custom Feature Types** shows a list of features you have added while mapping.

The **Green Arrow** is pointing to the **three-dot** option menu. This is where you can create a New Project, Switch Projects, Upload Project, Download Project, Export Project to Device, and Import Project from Device. You can only Upload and Download a project if you are online. When you are offline you can create a New Project, Export Project to Device and Import Project from Device.

****It is recommended that when saving your project, you save to the device and upload your project online.****



Circled are the three options referenced under the “PROJECT” heading.



This is the screen displayed when managing your Project.

FAQ)- DO I REALLY NEED TO WORRY ABOUT MANAGING MY PROJECT?

-YES! Management can keep your data safe.

FAQ)- IF I AM OFFLINE CAN I SWITCH PROJECTS EASILY?

-NO! You can, but it is tricky and will be explained. If you switch projects the current project will be lost. There are lots of warnings to help you avoid this.

PROJECT (Cont.)

The three dot menu for Manage

Be careful, because this is the only menu to ensure your data is safe and backed up, or where you can lose data! Downloading another Project will replace your current Project!

New Project gives the option to create an entirely new Project in Strabo. If you create a **New Project** the existing project will be deleted. That means, if you have not uploaded or saved to the device all your data are gone. You will get warnings about this at several steps. **New Projects** can be created either offline or online, but you will not be able to upload your project if offline.

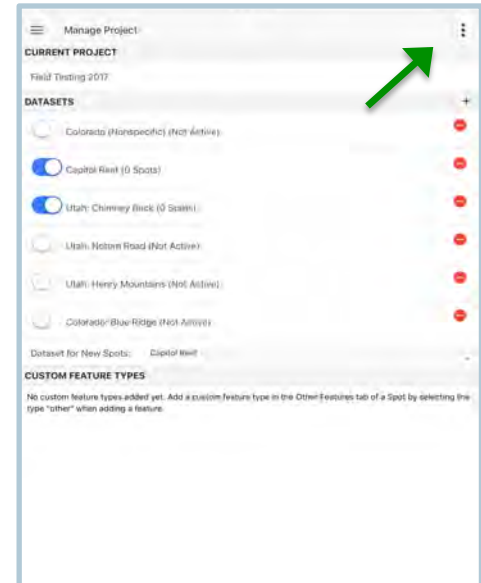
Switch Projects does just what is says. You can change the project you are working on at the time. If you Switch Projects then the current project you are on is deleted. That means, if you have not uploaded or saved to the device all your data are gone. You will get warnings about this at several steps. You have to be online to Switch Projects.

Upload Project works if you are online. You can upload the Project to the StraboSpot database. When you **Upload Project**, a copy or Version of the existing project is saved in the database. That means if you upload a project the StraboSpot copy is the current one. You can go onto the online system to get any older version. You will get warnings about this at several steps.

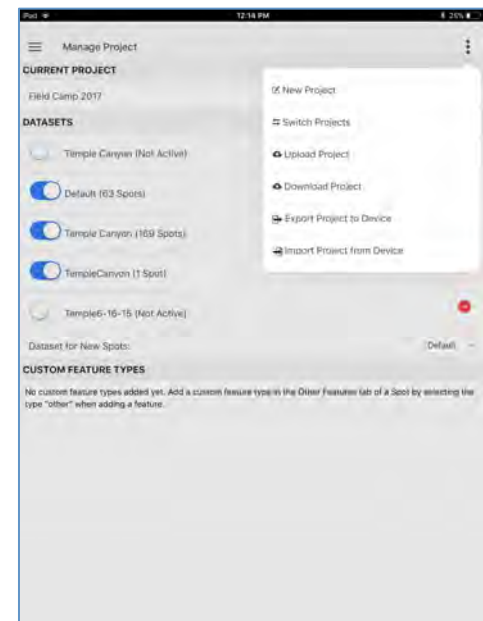
Download Project places a new copy of a Project on your device. That means, if you have not uploaded or saved to the device all your data are gone. You will get warnings about this at several steps.

Export Project to Device puts a copy of your current project on whatever device you are using (iOS or Android). This will ensure you have a copy of the data and images.

Import Project from Device you can reimport a project from an export. If you start some work and really mess up your project you can reimport an older version.



This is the main screen allowing you to toggle on and off the Tabs you want visible when entering data.



FAQ)- THIS SOUNDS REALLY COMPLICATED AND DANGEROUS. I COULD LOSE MY DATA!!!! CAN YOU EXPLAIN MORE? PLEASE?

-Read the next page! You can backup your data and never lose it (unless, perhaps, you lose your mobile device).

PROJECT BACKING UP DATA

How do I backup my data!?!?! I do not want to lose anything.

This is perhaps the most frequently asked question. For a field geologist, this is also the most important concern of using StraboSpot. The previous page described several options, both online and offline. This FAQs is more detailed.

I am online with a good Internet connection. What do I do?

Upload your project. When you upload, a copy of the current copy of your project on the server is saved as a Version on the server. You can always go back to the previous copy/version, but your new copy will be saved with all Spots and Images and become the information used in the active project. This is the best way to ensure backup and data integrity.

I am offline, in the middle of nowhere, and using Android. What do I do?

Use the **Export Project to Device**. You now have a copy of your project data and images in a folder. You can then copy this to an external memory card and keep it safe. You can always copy the folder to a file system on a computer if you have one with you.

I am offline, in the middle of nowhere, and using iOS. What do I do?

Use the **Export Project to Device**. You now have a copy of your project data and images in a folder. This is on your device. If you can, export or read the files to an external computer using iTunes. Otherwise, you are living in the world of notebooks and maps – if you throw them off a cliff they are gone. **Your Project is backed up, but do not update StraboSpot at the App Store until you have uploaded your data.**

How are the Exports stored?

The Spot data is stored as GeoJSON. This is an ASCII format that is very **readable** (QGIS, GitHub). You should always be able to read and restore any GeoJSON file. Images are just stored as images in the format taken. GeoJSON is becoming a standard way to store and transfer data.

What else can go wrong?

Make sure if you get a warning on Download Project, Switch Project, or New Project you really are sure of what to do. Upload Project replaces the project on the server, but these are all versioned so you can recover.

I am really paranoid. What is the minimum I can do?

Export your project to the device. Solid state devices are very reliable and recoverable. You can also have a laptop with you and backup to it. That means having an extra computer.

PROJECT (Cont.)

Description

The **Description** heading allows you to make changes and edits to your project, after the project has already been created. See figure at right for detailed options.

By pressing the **Set up a new day** under the **Daily Setup** heading, you can create logs for each day.

Preferences

The **Preferences** screen gives you the option to customize your **Add a Spot** screens. The top section, **Tab Control**, allows you to turn on or off each data entry window when adding a spot.

TAB CONTROL:

These are the tabs you can toggle on and off, and their functions.

Orientations: Add a Plane, Add a Line and Add a Tabular Zone

3D Structures: Add a Fabric, Add a Fold, Add a Tensor, and Add Other

Images: Add a Photo or Image

Nesting: (Displays what nests each Spot is in)

Samples: Add a Sample

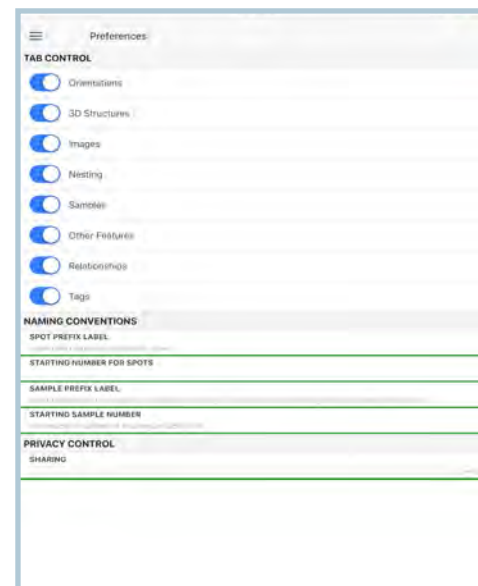
Other Features: Add a Feature

Relationships: Add/Edit a Relationship

Tags: Add/ Remove a Spot level Tab, (Displays what Tags each Spot has)



This is where you change the details about your project.



This is the main screen allowing you to toggle on and off the Tabs you want visible when entering data.

FAQ)- DO I ALWAYS HAVE TO USE PREFEENCES TO CHANGE TABS?

-No. You can use the “More” at the end of the tab screen to turn on or off additional Tabs.

PROJECT (Cont.)

Naming Conventions

Under the **Spot Prefix Label** and **Starting Number for Spots** you have the ability to customize how all your spots are named in a project. If this area is left blank, a unique Unix number (an identification based on Unix-time in milliseconds) will be assigned. This is **always used** as the **Strabo identifier** in the Strabo database, but you can choose to display another readable or informative name. If customized, (for example in the top figure: mm), each spot you create will start with your prefix followed by a number. For example your first spot will be (mm1) your second will be (mm2) and so on.

Under the **Sample Prefix Label** and **Starting Sample Number** you have the ability to customize how all your samples are named in a project. If you are using IGSNs, then you can set the Prefix to your **IGSN identifier** and then increment samples accordingly. Strabo will eventually allow you to automatically sync with the IGSN network when you login to your online account from the desktop/web application.



The screenshot shows a 'Project Description' form with the following fields and values:

Field	Value
PROJECT NAME	East Texas 2017
START DATE	May 13, 2017
END DATE	Jun 05, 2017
PURPOSE OF STUDY	Seismic Testing
OTHER TEAM MEMBERS	
AREA OF INTEREST	Front Range Colorado / Eastern Utah
INSTRUMENTS USED	Strabo Computers
GPS DATUM	NAD83
MAGNETIC DECLINATION	+8
NOTES	

This is where you change the details about your project.

Privacy Control

There are two options here – **Public or Not Public (on or off on the toggle)**. **Not Public** means that these data can only be accessed and seen by the user on the StraboSpot website.

Public means that they will appear on the StraboSpot website and anyone can see them.

FAQ)- WHAT IS AN IGSN?

-IGSN is a unique sample identified that is supplied by IEDAdata.org through the SESAR.org system (Solid Earth Sample Registry). This is a unique and persistent sample identifier. These will follow your samples forever and give the ability to link data – age, chemistry, structural – for a sample even if in different data systems.

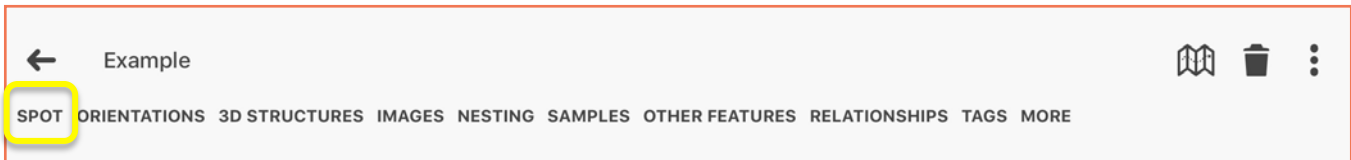
FAQ)- WHY SHOULD I MAKE MY PROJECT PUBLIC?

-Keep your project private if you are in the process of getting or interpreting data. Once you are ready, make it public and everyone can see it! Your hard work will be available to the Earth Science Community.

DATA ENTRY

When making a Point, Line or Polygon, there are tabs for different types of data entry. Everything is a Spot, so they can all have the same attributes. These tabs can be toggled, either be seen or hidden in the preferences tab. The tabs that can be used are **Spot**, **Orientations**, **3D Structures**, **Images**, **Nesting**, **Samples**, **Other Features**, **Relationships**, **Tags**, and **More**. More also activates the Preferences Tab.

Spot Tab



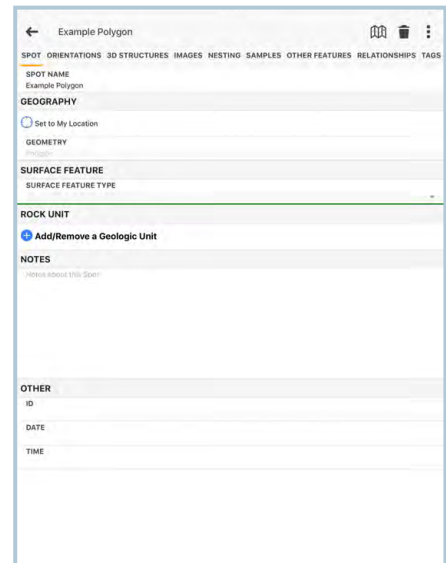
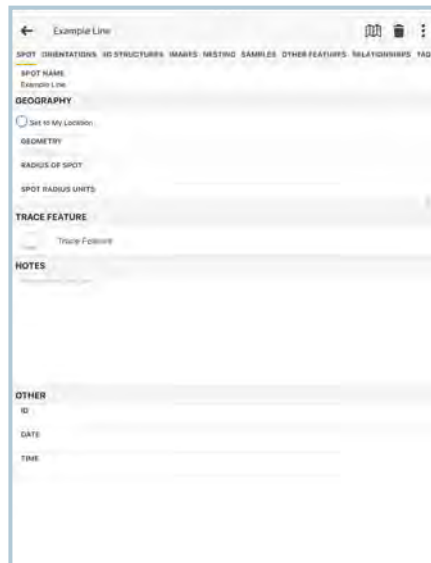
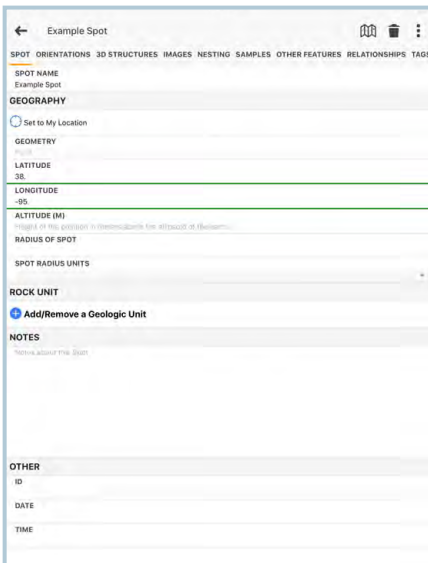
The **Spots Tab** is the only tab that is different when creating a Point, Line and Polygon.

Spot Name

This is customizable, appears on the Map (unless an orientation is associated).

Geometry

This explains how the spot will appear on the map, either as a point, line or polygon.



Latitude / Longitude

Point specific, the latitude and Longitude show exactly where the Point is.

Radius of Spot

Specific to Spots and Lines, the “Radius of Spot” can be altered to include a larger area. For example, if you were including an outcrop with an estimated area.

Trace Feature

Assign this specific Line as a Trace Feature, then enter in “Trace Quality” and “Trace Type”

Add/Remove a Geologic Unit

Specific to Points and Polygons, you have the ability to create a Geologic Unit. Once created these units can be used in the future to “Tag” other Spots.

Other

These IDs are unique 14 digit Unix IDs. The Date and Time you created your spot is also displayed here.

DATA ENTRY-Point

Points

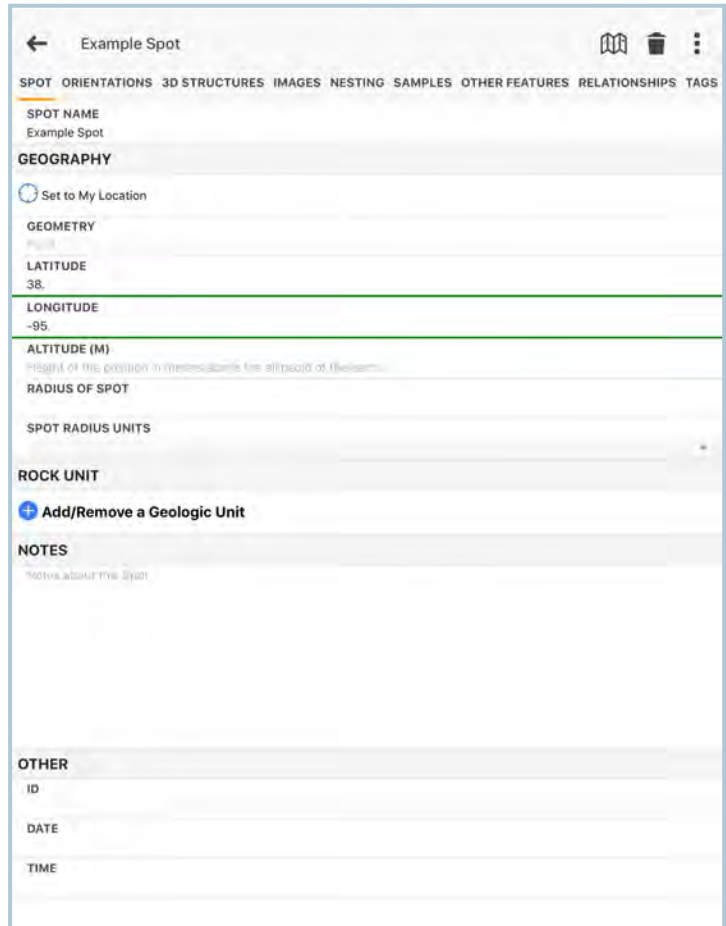
A **Point** is a specific GPS location that is displayed on the map as a single dot or a single point on an Image Basemap with pixel coordinates. You can also enter external coordinates if you have those. Entering an orientation measurement, such planar feature such as a bedding plane, the Point will appear as a correctly oriented strike and dip/trend and plunge symbol with degree dip. You can also display just the name of the point for rock units or other purposes.

Once the Spot has been assigned to a location on the main map, the figure to the right appears. The heading appears listing the attributes that can be assigned to the spot.

Under the **Geography** heading, pressing the **Set to my location** button will set the point to the current GPS location of the device. This will be displayed lower in **Latitude** and **Longitude** sections.

Under the **Rock Unit** heading, the Add/Remove a Geologic Unit allows you to create a Geologic Unit as a Tag. (This can be seen under the **Tags** attribute heading).

When mapping you can improve the speed of adding spots and points by copying spots. Do this by pressing the “three dot menu” on the top right of your screen. From here you can duplicate your spots. The Spot will also duplicate your orientation information (e.g., bedding, but not the actual strike and dip) and your tag group. Any other attribute associated with the spot will not be copied.



FAQ)- WHAT IF I WANT TO ADD MULTIPLE ROCK UNITS OR TAGS?

-You can do this from both the rock unit menu on this page and the Tag Tab.

FAQ)- I HAVE A LOT OF POINTS WITH THE SAME METADATA. DO I HAVE TO KEEP RE-ENTERING THE SAME STUFF AGAIN AND AGAIN?

-No. Select a Spot that has the same information you are going to use and then “Set to My Location.”

DATA ENTRY-Line

Lines

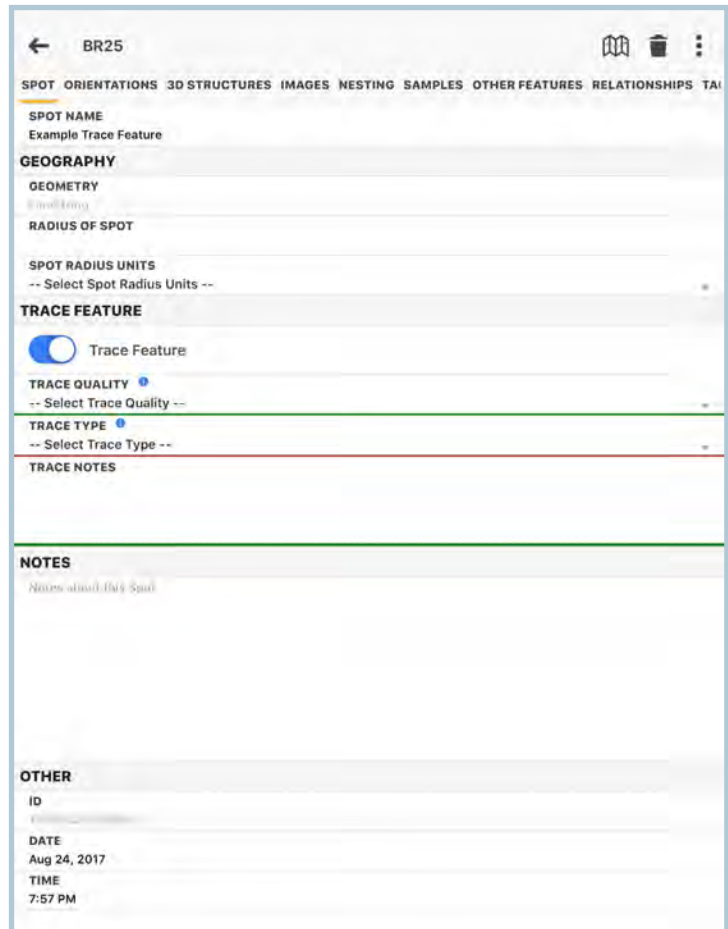
When using the Line feature, you have the ability to assign your line as a trace feature. This is halfway down the input screen under the title **Trace Feature**. Pressing the blue toggle button, activates your spot as a trace feature. You can add information and details about your trace feature in the following data entry lines. In StraboSpot we consider any line on a map that has some sort of classification (e.g., Fault) to be a Trace.

Once a Spot has been assigned as a Line feature on the main map, the Line attributes window appears. All the attributes are the same as a Point and a Polygon. The “Spot” window, on the other hand, is different.

Under the **Geography** heading, the Radius of Spot and Spot Radius Units are the only things listed.

The **Trace Feature** can be toggled on to assign to the current line. Once toggled on, you are required to select the type of trace feature. In addition, notes and other elements can be assigned to this spot.

Trace Quality is required.



The screenshot shows the data entry form for a Line feature. At the top, there is a back arrow and the identifier 'BR25'. Below this is a horizontal menu with tabs: SPOT, ORIENTATIONS, 3D STRUCTURES, IMAGES, NESTING, SAMPLES, OTHER FEATURES, RELATIONSHIPS, and TAGS. The 'SPOT' tab is selected. The form is divided into several sections: 'SPOT NAME' with the value 'Example Trace Feature'; 'GEOGRAPHY' section containing 'GEOMETRY' (with a '5m (1km)' value), 'RADIUS OF SPOT', and 'SPOT RADIUS UNITS' (with a dropdown menu showing '-- Select Spot Radius Units --'); 'TRACE FEATURE' section containing a blue toggle switch labeled 'Trace Feature', 'TRACE QUALITY' (with a dropdown menu showing '-- Select Trace Quality --'), and 'TRACE TYPE' (with a dropdown menu showing '-- Select Trace Type --'); 'TRACE NOTES' section; 'NOTES' section with a placeholder 'Notes about this Spot'; and 'OTHER' section containing 'ID', 'DATE' (Aug 24, 2017), and 'TIME' (7:57 PM).

FAQ)- WHY WOULD I USE A SPOT RADIUS FOR A LINE?

-Lines are Spots too, and Spots have an area to which they apply. You could map a fault, for example, and want measurements with 5m to be associated with that fault. This is like buffering in a GIS.

FAQ)- I HAVE DRAWN A LOT OF FAULTS AND KEEP CLASSIFYING THEM THE SAME WAY. DO I HAVE TO SPEND THE TIME TO CLASSIFY EVERY STRUCTURE THE SAME WAY?

-No, you can just copy the Spot, in this case a line, and then use the option to Set From Map. In this way you can simply draw a new line that will have the same basic attributes and metadata. This is the fastest way to add new Spots with the same metadata.

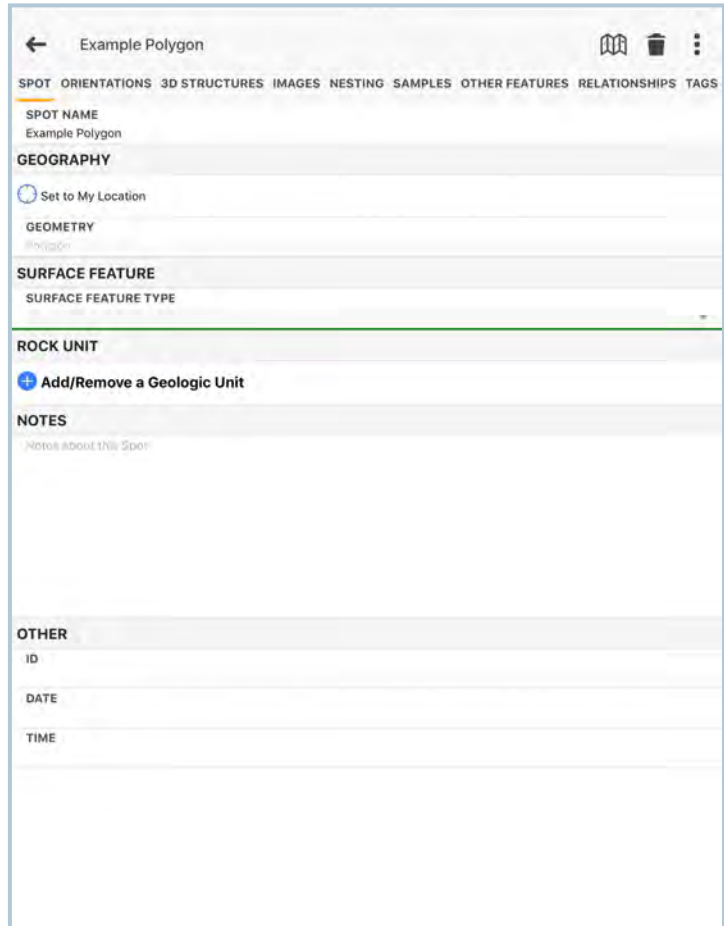
DATA ENTRY-Polygons

Polygon

A Polygon is a Spot that covers some area of the map. For this reason, you have to pick a surface feature type. This can be a geologic unit, zone of exposed brecciation, etc. Polygons also automatically form Nests. All features spatially within the Polygon are considered to be in its Nest, and can be identified at the Nesting tab. A Polygon could be a feature like hinge region of a fold or northwest part of the map area.

Once a Polygon has been created, the window to the right appears. Similar to a Point and a Line, assigning attributes to the Spot is the same.

Under the **Surface Feature** heading, assign a type of surface feature being described by the polygon. This includes Rock Units, Contiguous Outcrop, Geologic Structure, Geomorphic Feature, Anthropogenic Feature, Extent of Mapping, Extent of Biological Marker, Subjected to Similar Processes, Gradients, or Other.



The screenshot shows the 'Example Polygon' data entry form. At the top, there's a title bar with a back arrow, the title 'Example Polygon', and icons for a book, trash, and a menu. Below this is a horizontal tab bar with 'SPOT', 'ORIENTATIONS', '3D STRUCTURES', 'IMAGES', 'NESTING', 'SAMPLES', 'OTHER FEATURES', 'RELATIONSHIPS', and 'TAGS'. The 'SPOT' tab is selected. The form has several sections: 'SPOT NAME' with the value 'Example Polygon'; 'GEOGRAPHY' with a 'Set to My Location' button; 'GEOMETRY' with the value 'Polygon'; 'SURFACE FEATURE' with a dropdown menu for 'SURFACE FEATURE TYPE'; 'ROCK UNIT' with a '+ Add/Remove a Geologic Unit' button; 'NOTES' with a text area containing 'Notes about this Spot'; and 'OTHER' with fields for 'ID', 'DATE', and 'TIME'.

FAQ)- ARE ALL POLYGONS NESTS?

-Yes. Anytime you add a polygon you can go to the Nesting Tab and see Spots within it.

FAQ)- CAN I MAKE POLYGONS BY SNAPPING TO LINES LIKE IN A GIS?

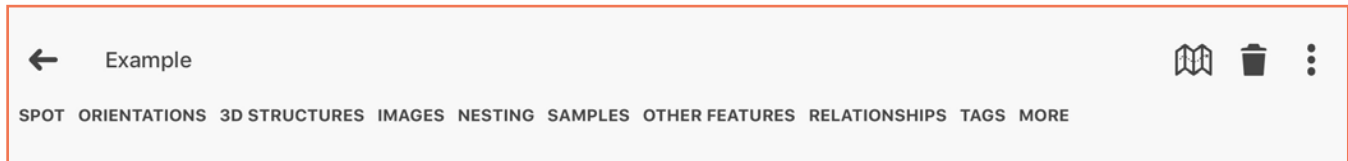
-No. StraboSpot is not a GIS and does not support snapping or topology. You can export your data to a ShapeFile or use a Strabo Plugin for ArcGIS or QGIS to do more advanced operations.

FAQ)- THE POLYGON COVERS OTHER SPOTS AND THE MAP. CAN I TURN IT OFF?

-Use the layer options on the map to turn polygon layers off or on.

TABS

Tabs are used to enter detailed data about Spots



Tabs

Tabs give the ability to enter detailed information or attributes about any Spot. Tabs are divided so that they represent families of attributes or metadata.

Orientation applies to strikes and dips/dip azimuths, trends and plunges. It records the features that are measured.

3D Structures includes folds, tectonics, and other features.

Images are any picture or raster you want to bring in. You can take pictures at this tab without exiting the app.

Nesting gives the ability to spatially group data.

Samples is intended for any sort of sample that might be collected.

Other Features if nothing in Strabo fits, you can use this Tab.

Relationships establishes cross-cutting relationships between geologic or fabric elements.

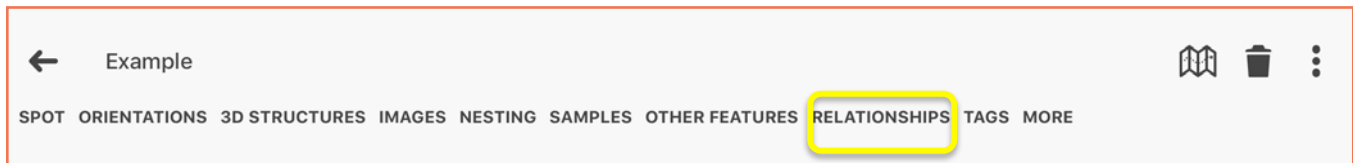
Tags is a way to enter attributes, such as rock type or formation, that may apply to many Spots.

More allows you to quickly turn off or on Tabs.

FAQ)- DO I HAVE TO HAVE THE TABS TURNED ON THE WHOLE TIME I AM WORKING?

-No. Just turn on the ones you are using most. If you need to have one of the others active you can just select the MORE tab and turn them on.

ORIENTATIONS



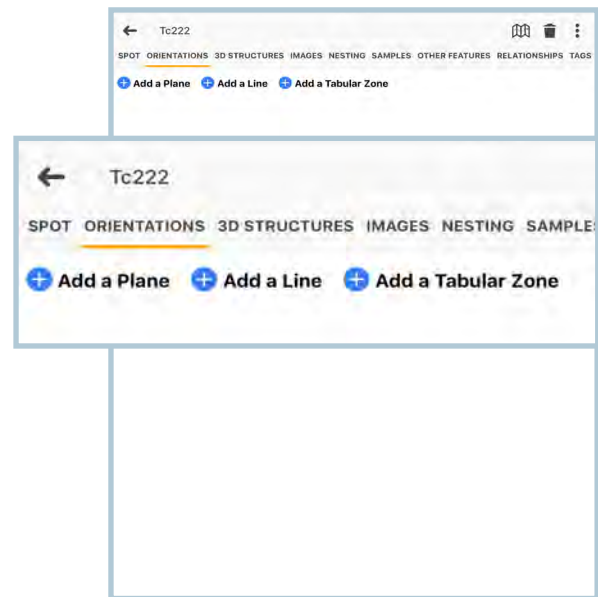
Orientations Tab

The Orientations Tab is where most of the work is done on adding strikes and dips, trends and plunge, and rakes. It is also where you should classify most fabric elements you are measuring, whether bedding or an intersection lineation of two other fabrics. It is very flexible. You can enter either planar or linear data. You can also enter any number of planes or lines for the same Spot, or you can enter multiple plans for lines and multiple lines for planes.

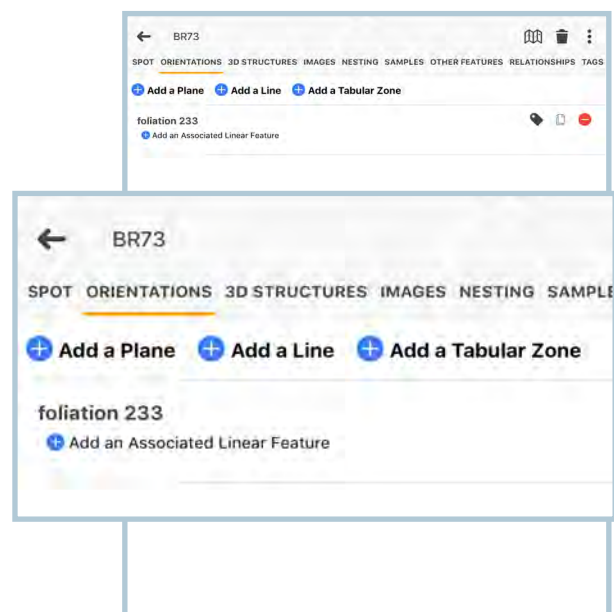
You have options to **Add a Plane**, **Add a Line**, **Add a Tabular Zone**. Pressing any of these will bring up a dialog to add data. The attributes you can enter include not just the orientation (strike and dip or dip azimuth) but also a large selection of classification items (bedding, foliation, mineral lineation, etc.). Use these to populate all the appropriate metadata and description you need.

Any time you add a Plane, Line, or Tabular Zone you have the option of adding any number of associated features (lines for a plane or planes for a line). So, a fault surface can get a strike and dip for orientation, but you can also add the orientation of slickenlines to the planar measurement. Likewise, you can enter an intersection line of a fault and R-shears, but then add the fault and shear orientations to that line. They will all be associated. You can add any number of measurements to a Spot. If you are making a number of foliation and lineation measurements at essentially the same location, you can just keep adding orientations to a single spot. This is called Randy Style in the glossary.

You will also get a **Compass** option for each measurement. This will take an orientation based on your mobile device. This is not always reliable or correct, so you will want to check before you finalize the measurement using known orientations or another compass.



Orientation tab and closeup of options.

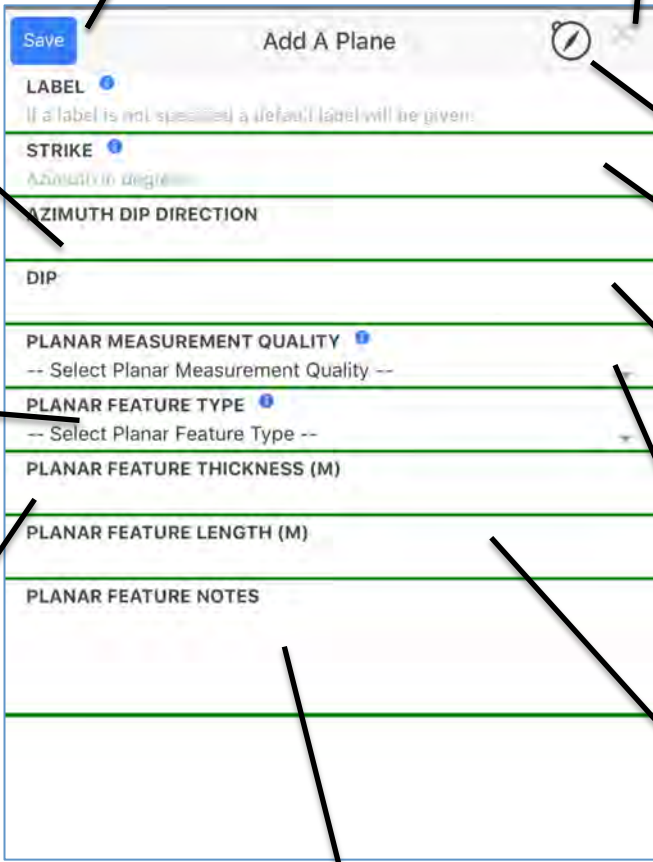


Adding an associated feature.

ORIENTATIONS (Cont.)

Add a Plane

The **Orientations Tab** includes three types of orientations: **Add a Plane**, **Add a Line**, and **Add a Tabular Zone**.



LABEL:
Add a label. If left blank the Planar Feature Strike and Dip will be the title.

SAVE:
Save the measurement and move on to the orientations page.

X
Do not save and go back to last screen.

COMPASS:
Pressing the compass button, and keeping **device with home button down dip**, Strabo will calculate and record strike, dip direction, and dip.

DIP DIRECTION:
The direction the planar feature is dipping. (90 degrees from strike when using right hand rule).

PLANAR FEATURE TYPE:
Select the type of planar feature (e.g. bedding, contact, fault...). The corresponding symbol appears on the main map. More options appear once feature type is assigned.

PLANAR FEATURE THICKNESS:
How thick the plane of measurement is. (In

STRIKE:
The strike in azimuth either with the compass tool or manually input the strike.

DIP:
The degree the planar feature is dipping from horizontal.

PLANAR MEASUREMENT QUALITY:
Determine the quality of the measurement, from 1 being poor/irregular/uncertain, to 5 being best/accurate.

PLANAR FEATURE NOTES:
Only write notes about this feature.

Form Fields:
The form titled "Add A Plane" includes the following fields: LABEL (with a help icon), STRIKE (with a help icon), AZIMUTH DIP DIRECTION, DIP, PLANAR MEASUREMENT QUALITY (with a help icon and a dropdown menu), PLANAR FEATURE TYPE (with a help icon and a dropdown menu), PLANAR FEATURE THICKNESS (M), PLANAR FEATURE LENGTH (M), and PLANAR FEATURE NOTES.

FAQ)- WHAT IF I GET TO THIS SCREEN AND DECIDE NOT TO TAKE A MEASUREMENT?

-Just hit the X on the upper right.

FAQ)- I GOT IT. WHAT DO I DO TO GET BACK TO THE ORIENTATIONS?

-Hit Save.

FAQ)- THE COMPASS READING SEEMS WRONG. DO I HAVE TO KEEP THIS MEASUREMENT?

-You can always type in measurements for strike, dip, and dip azimuth. The compass is not always reliable on mobile devices, so you should probably check with another compass.

. FAQ)- I WANT TO ENTER THAT THE MEASUREMENT IS ON BEDDING. WHAT DO I DO?

-Once you hit Planar Feature Type you will get a lot of options for more detailed information.

ORIENTATIONS (Cont.)

Add a Line

SAVE:
Save the measurement and move on to the orientations page.

X
Do not save and go back to last screen.

COMPASS:
By pressing the Compass button, and keeping device with home button down plunge, Strabo will calculate and record trend, plunge and rake.

TREND:
The trend in azimuth either with the compass tool or manually input the trend.

PLUNGE:
The degree the linear feature is dipping from horizontal.

LINEAR FEATURE TYPE:
Select the type of linear feature (e.g. boudins, striations, fold hinge). The corresponding symbol appears on the main map. *More options appear when feature type is assigned.

LINEATION DEFINED BY:
What information led to the determination of the lineation?

LINEAR MEASUREMENT QUALITY:
Determine the quality of the measurement, from 1 being poor/irregular/uncertain, to 5 being best/accurate.

RAKE:
Enter rake using the compass or manually input the rake.

LABEL:
Add a label. If left blank the Planar Feature Type and Dip will be the title.

LINEAR FEATURE NOTES

Form Fields:

- Save
- Add A Line
- Compass icon
- LABEL ⓘ (If a label is not specified a default label will be given)
- TREND ⓘ (Azimuth in degrees)
- PLUNGE
- RAKE ⓘ (down dip angle from strike on plane (0=180)?)
- LINEAR MEASUREMENT QUALITY ⓘ (Select Linear Measurement Quality --)
- LINEAR FEATURE TYPE ⓘ (-- Select Linear Feature Type --)
- LINEATION DEFINED BY
- LINE NOTES

FAQ)- WHAT IF I GET TO THIS SCREEN AND DECIDE NOT TO TAKE A MEASUREMENT?

-Just hit the X on the upper right.

FAO)- I GOT IT. WHAT DO I DO TO GET BACK TO THE ORIENTATIONS?

-Hit Save.

FAO)- THE COMPASS READING SEEMS WRONG. DO I HAVE TO KEEP THIS MEASUREMENT?

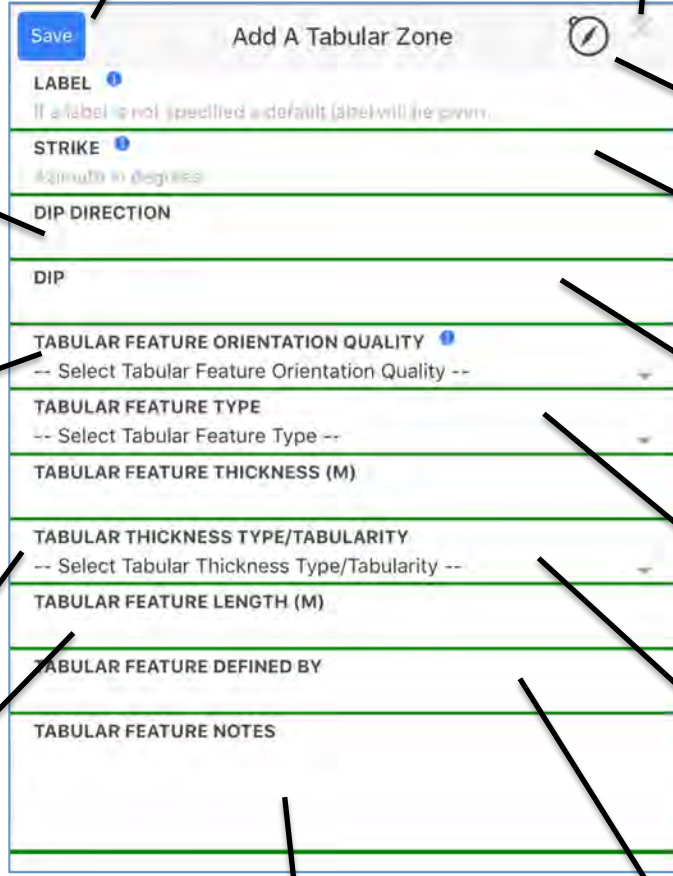
-You can always type in measurements for strike, dip, and dip azimuth. The compass is not always reliable on mobile devices, so you should probably check with another compass.

FAQ)- I WANT TO ENTER THAT THE MEASUREMENT IS ON A MINOR S-FOLD. WHAT DO I DO?

-Once you hit Linear Feature Type you will get a lot of options for more detailed information.

ORIENTATIONS (Cont.)

Add a Tabular Zone



SAVE:
Save the measurement and move on to the orientations page.

X
Do not save and go back to last screen.

COMPASS:
Pressing the Compass button and keeping the device with home button down dip, Strabo will enter in Strike, Dip Direction, and Dip automatically.

DIP DIRECTION:
The direction the tabular feature is dipping. (90 degrees from strike when using right hand rule).

MEASUREMENT QUALITY:
Determine the quality of the measurement, from 1 being poor/irregular/uncertain, to 5 being best/accurate.

TABULAR FEATURE THICKNESS:
How thick the plane of measurement is. (In meters)

TABULAR FEATURE LENGTH:
Estimated length of the tabular feature. (In meters)

TABULAR FEATURE Notes

STRIKE:
The strike in azimuth either with the compass tool or manually input the strike.

DIP:
The degree the planar feature is dipping from horizontal.

TABULAR FEATURE TYPE:
Select the type of tabular feature (e.g. vein, shear zone, alteration zone...). *More options appear once feature type is assigned.

TABULAR THICKNESS TYPE/TABULARITY:
How thick the tabular zone measurement is. (In meters)

TABULAR FEATURE DEFINED BY:
What information led to the determination of the feature?

Form Fields:
 Save
 Add A Tabular Zone
 LABEL (info icon)
 If a label is not specified a default label will be given.
 STRIKE (info icon)
 Azimuth in degrees
 DIP DIRECTION
 DIP
 TABULAR FEATURE ORIENTATION QUALITY (info icon)
 -- Select Tabular Feature Orientation Quality --
 TABULAR FEATURE TYPE
 -- Select Tabular Feature Type --
 TABULAR FEATURE THICKNESS (M)
 TABULAR THICKNESS TYPE/TABULARITY
 -- Select Tabular Thickness Type/Tabularity --
 TABULAR FEATURE LENGTH (M)
 TABULAR FEATURE DEFINED BY
 TABULAR FEATURE NOTES

FAQ)- WHAT IF I GET TO THIS SCREEN AND DECIDE NOT TO TAKE A MEASUREMENT?

-Just hit the X on the upper right.

FAQ)- I GOT IT. WHAT DO I DO TO GET BACK TO THE ORIENTATIONS?

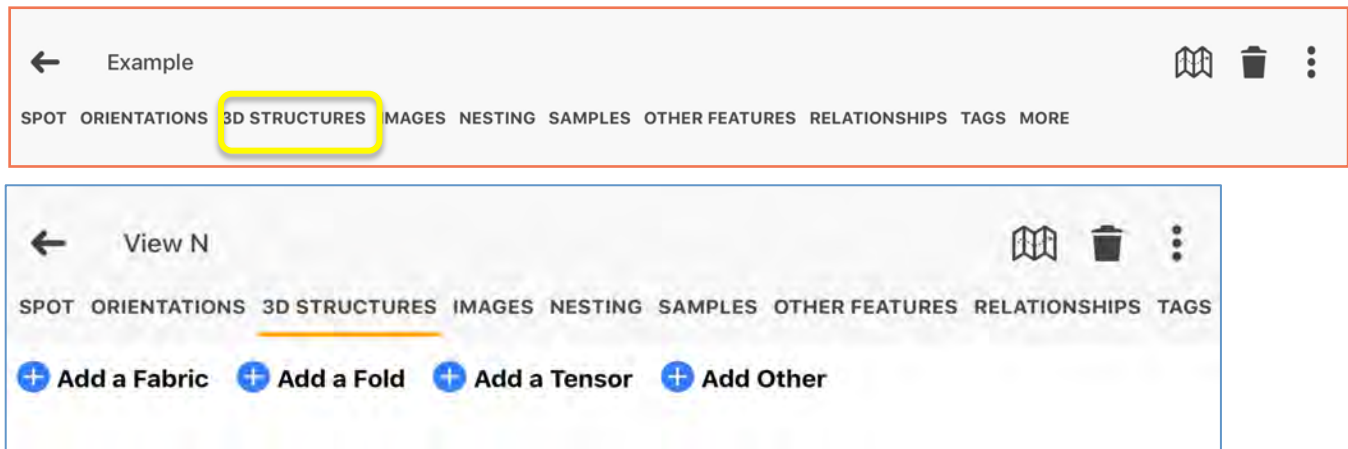
-Hit Save.

FAQ)- THE COMPASS READING SEEMS WRONG. DO I HAVE TO KEEP THIS MEASUREMENT?

-You can always type in measurements for strike, dip, and dip azimuth. The compass is not always reliable on mobile devices, so you should probably check with another compass.

3D STRUCTURES

Add 3D Structures

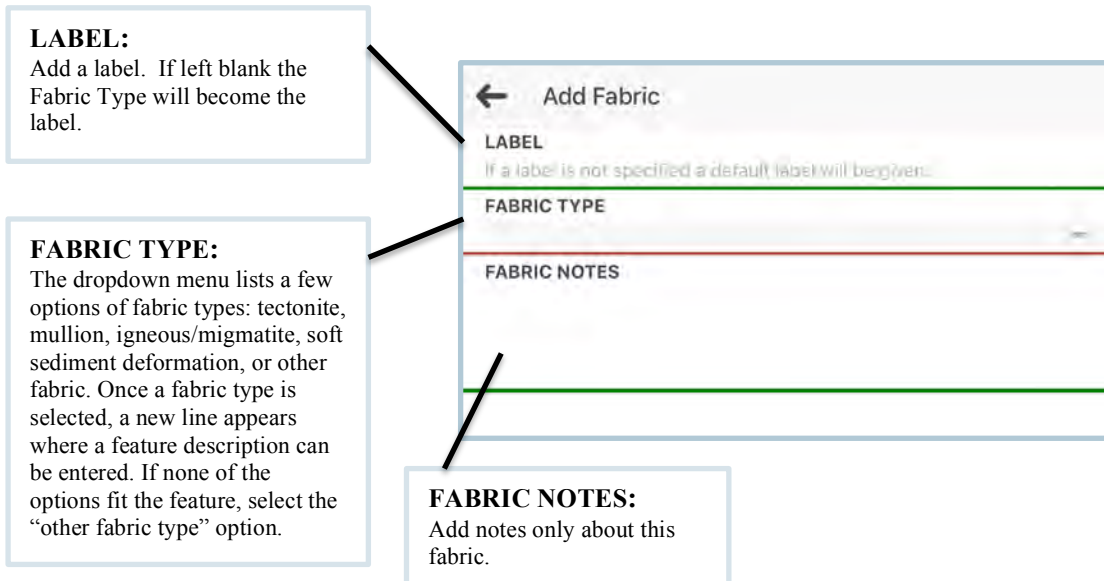


The “**3D Structures**” tab includes four different 3D structure types: Add a **Fabric**, Add a **Fold**, Add a **Tensor**, and Add **Other**.

These are used to add more detailed information for 3-Dimensional structures associated with a Spot. For example, a Fold could be a Spot that includes a larger-scale fold. This may be a polygon Spot with many measurements within it. You can then add a large amount of information about the macroscopic structure.

Similarly, adding a fabric will give you several options for solid state, igneous, and sedimentary fabrics. Again, these can be associated with any type of Spot.

Add Fabric



The diagram shows the 'Add Fabric' form with three callout boxes explaining its fields:

- LABEL:** Add a label. If left blank the Fabric Type will become the label.
- FABRIC TYPE:** The dropdown menu lists a few options of fabric types: tectonite, mullion, igneous/migmatite, soft sediment deformation, or other fabric. Once a fabric type is selected, a new line appears where a feature description can be entered. If none of the options fit the feature, select the “other fabric type” option.
- FABRIC NOTES:** Add notes only about this fabric.

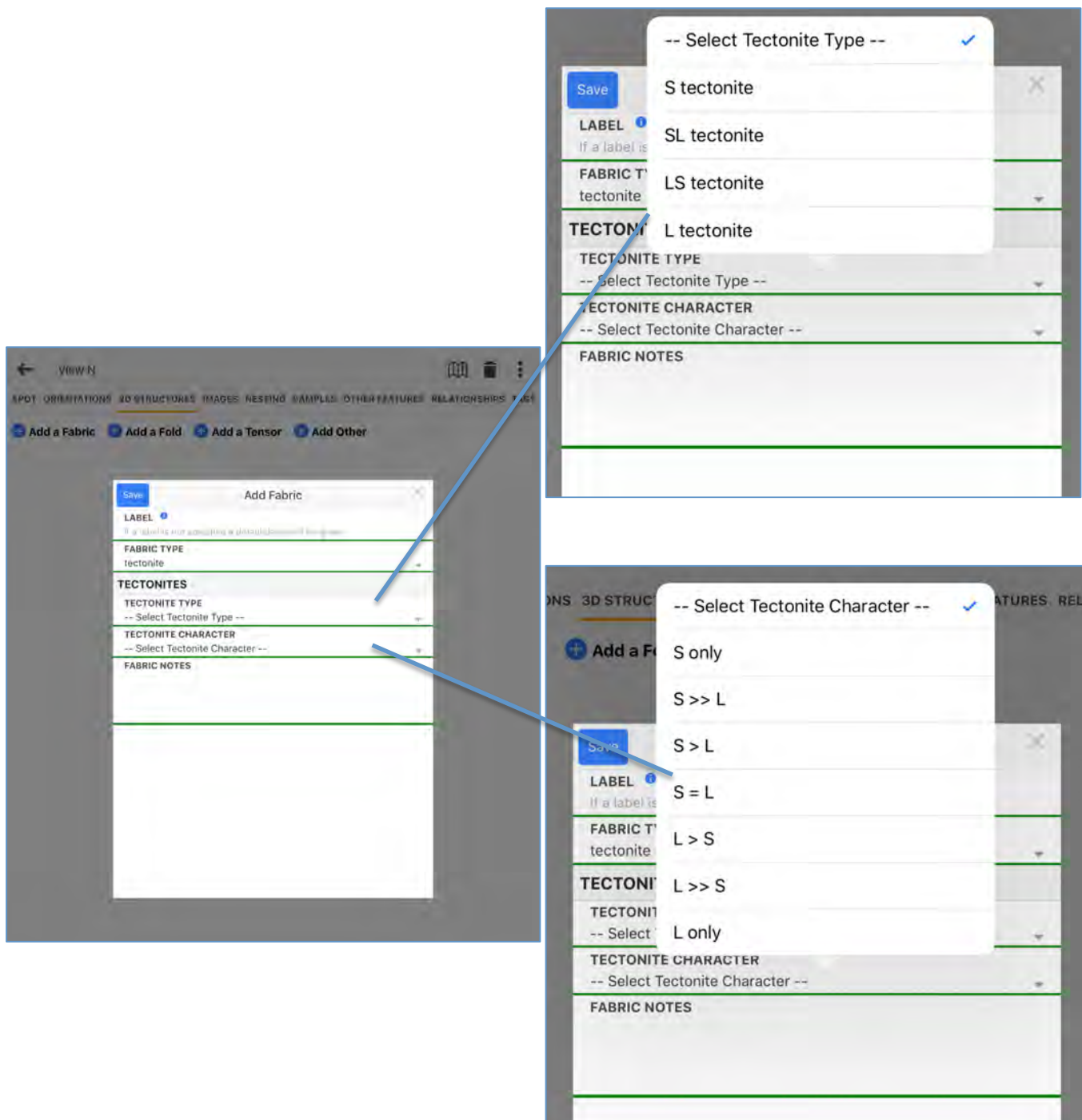
The form itself has a title bar 'Add Fabric' with a back arrow. Below it are three sections: 'LABEL' (with a note 'If a label is not specified a default label will be given'), 'FABRIC TYPE' (a dropdown menu), and 'FABRIC NOTES' (a text area).

FAQ)- CAN I ENTER MORE INFORMATION?

-Yes. You get additional dialogs when you hit a particular type of fabric.

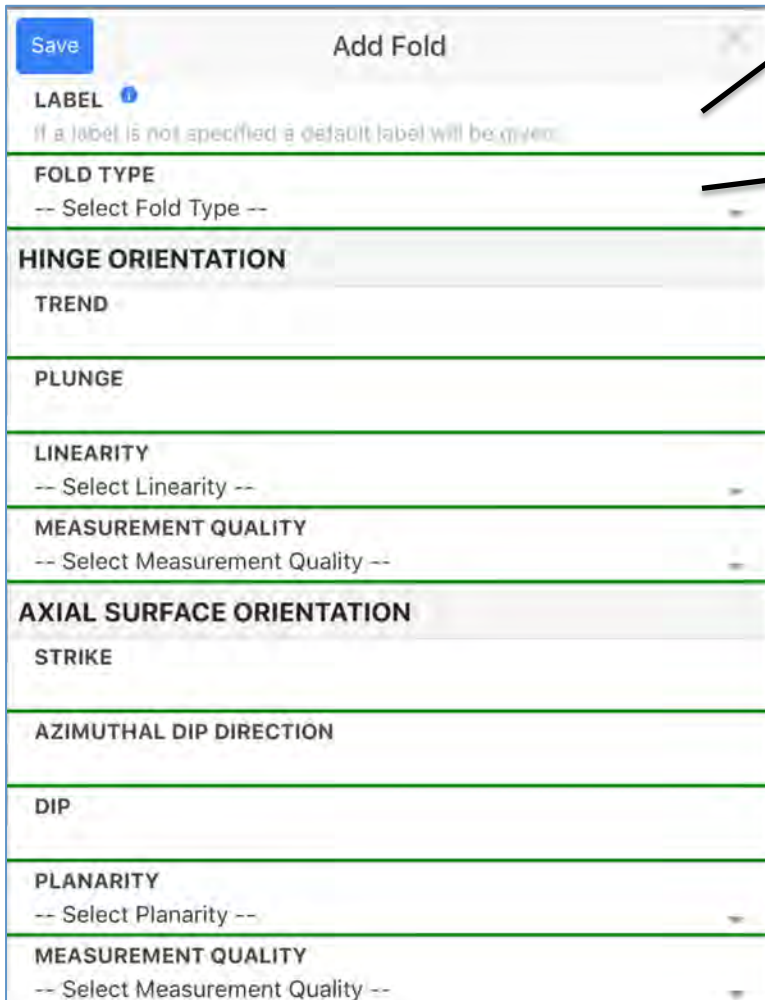
3D STRUCTURES (Cont.)

For all the entries in 3D Structures there are a lot of options that appear. This page is for Tectonite, but a similarly rich dialog appears for the other options



3D STRUCTURES (Cont.)

Add Fold



Save Add Fold

LABEL ⓘ
If a label is not specified a default label will be given

FOLD TYPE
-- Select Fold Type --

HINGE ORIENTATION

TREND

PLUNGE

LINEARITY
-- Select Linearity --

MEASUREMENT QUALITY
-- Select Measurement Quality --

AXIAL SURFACE ORIENTATION

STRIKE

AZIMUTHAL DIP DIRECTION

DIP

PLANARITY
-- Select Planarity --

MEASUREMENT QUALITY
-- Select Measurement Quality --

LABEL:

Add a label. If left blank the Fold Type will become the label.

FOLD TYPE:

The dropdown menu lists a few types of folds: anticline, syncline, antiform, z-fold, and a number of others. Once classified, options to further classify the fold appear. The new information lines that appear are not required to be filled in, however it is recommended to better classify the fold.



-- Select Fold Type --

- anticline
- syncline
- monocline
- antiform
- synform
- s-fold
- z-fold
- m-fold
- sheath
- single-layer buckle
- ptygmatic
- crenulation
- interfolial
- unspecified

3D STRUCTURES (Cont.)

Add Tensor

LABEL:

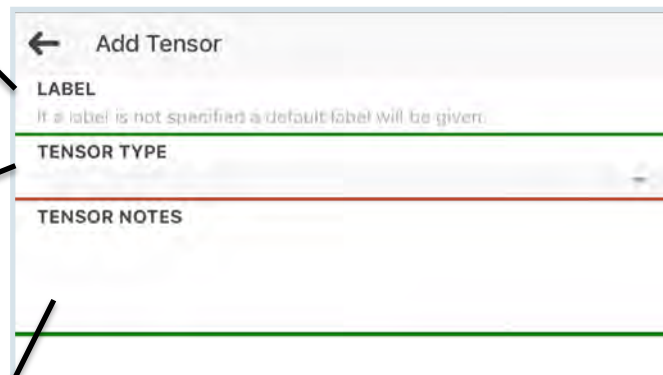
Add a label. If left blank the Fabric Type will become the label.

TENSOR TYPE:

The dropdown menu lists a few options of fabric types: ellipsoidal data, non-ellipsoidal data, or elliptical data. Once a tensor type is selected, new data input lines appear where a feature description can be entered. If none of the options fit the feature, select the “other tensor type” option.

TENSOR NOTES:

Add notes only about this tensor.

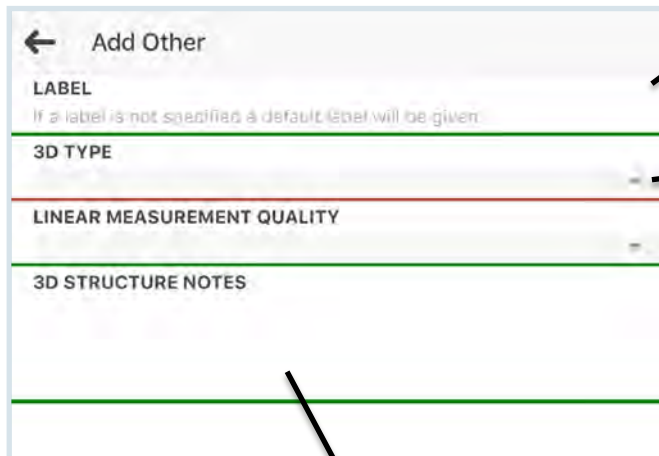


The screenshot shows a mobile application interface for adding a tensor. At the top is a title bar with a back arrow and the text 'Add Tensor'. Below this are three main input sections: 'LABEL' with a text field and a note 'If a label is not specified a default label will be given'; 'TENSOR TYPE' with a dropdown menu; and 'TENSOR NOTES' with a large text area. Three callout boxes with arrows point to these sections: the first points to the LABEL field, the second points to the TENSOR TYPE dropdown, and the third points to the TENSOR NOTES text area.

3D STRUCTURES (Cont.)

Add Other

Adding other 3D structures will give you a dialog for boudinage, mullions, lobate-cusate, and the ability to define your own 3D structure. Options appear under all choices, a few shown here for Boudinage.



← Add Other

LABEL
If a label is not specified a default label will be given.

3D TYPE

LINEAR MEASUREMENT QUALITY

3D STRUCTURE NOTES

LABEL:

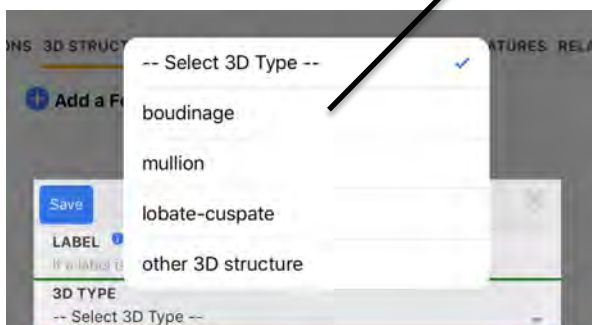
Add a label. If left blank the 3D Type will become the label.

3D TYPE:

The dropdown menu has a list to choose your 3D structure from: boudinage, mullion, lobate-cusate, other 3D structure.

3D STRUCTURE NOTES:

Add notes only about this fabric.



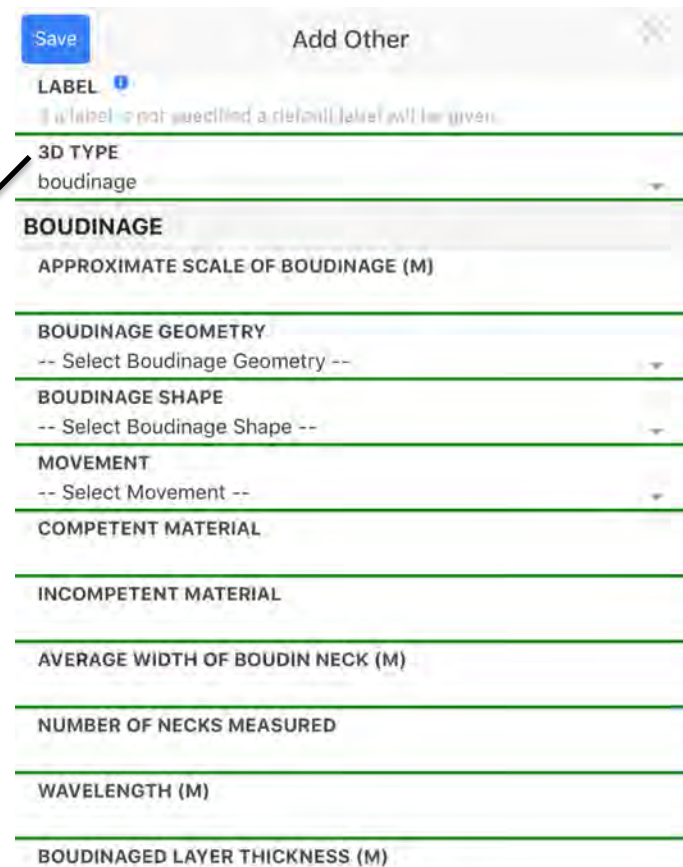
-- Select 3D Type --

- boudinage
- mullion
- lobate-cusate
- other 3D structure

Save

LABEL
If a label is not specified a default label will be given.

3D TYPE
-- Select 3D Type --



Save Add Other

LABEL
If a label is not specified a default label will be given.

3D TYPE
boudinage

BOUDINAGE

APPROXIMATE SCALE OF BOUDINAGE (M)

BOUDINAGE GEOMETRY
-- Select Boudinage Geometry --

BOUDINAGE SHAPE
-- Select Boudinage Shape --

MOVEMENT
-- Select Movement --

COMPETENT MATERIAL

INCOMPETENT MATERIAL

AVERAGE WIDTH OF BOUDIN NECK (M)

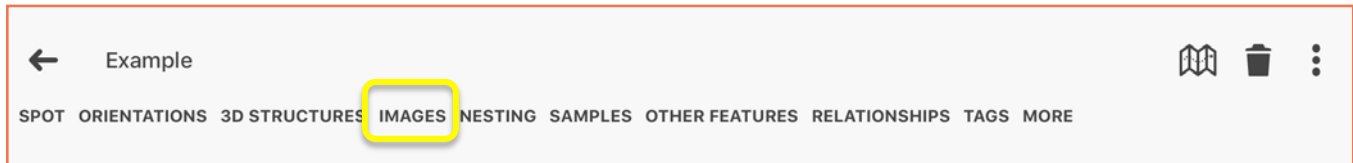
NUMBER OF NECKS MEASURED

WAVELENGTH (M)

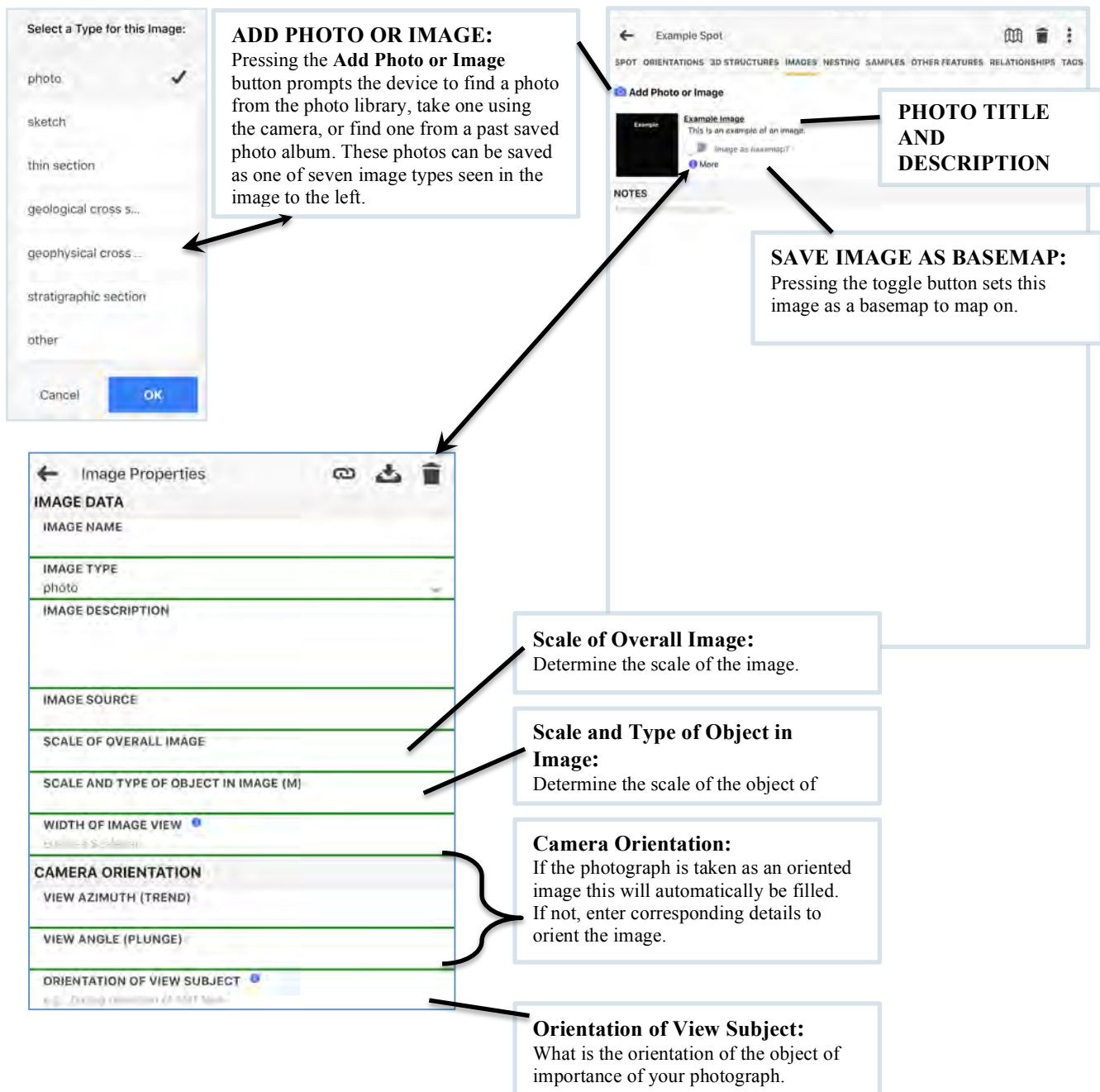
BOUDINAGED LAYER THICKNESS (M)

IMAGES

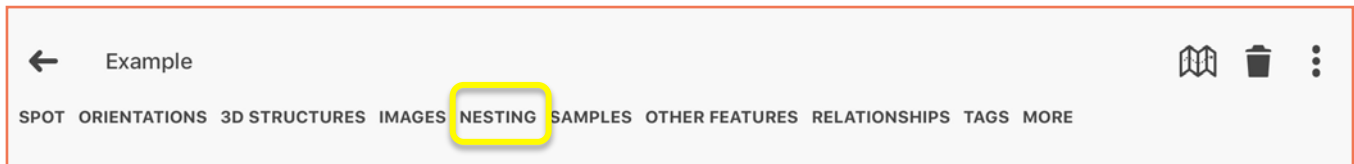
Images



The **Images** tab is where photos can be assigned to Spots. The images added to each Spot can also be found in the main menu under the **Images** heading.



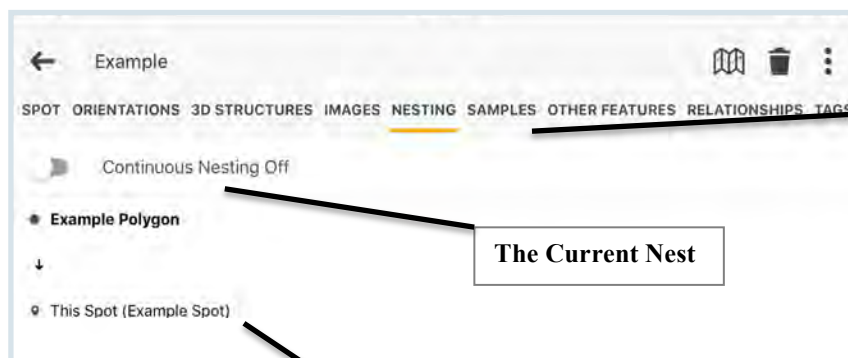
NESTING



The **Nesting** tab displays which Nest your current Spot is in.

Nesting allows for the spatial grouping of Spots by creating a polygon Spot, which contains all new Spots created while Nesting is turned on. Nesting will also add an existing Spot to this Nest Spot if the page for that Spot is accessed while Nesting is turned on. Alternatively, once Nesting is turned off Spots can be added to (or removed from) a Nest Spot by editing the shape of the Nest Spot to include (or exclude) any other Spots.

Tip: The first Spot added to a new Nest Spot determines the map that will be applicable to the Nest Spot. That is if Nesting begins on a particular Image Basemap, only Spots mapped on the exact same Image Basemap will be considered as part of the Nest.



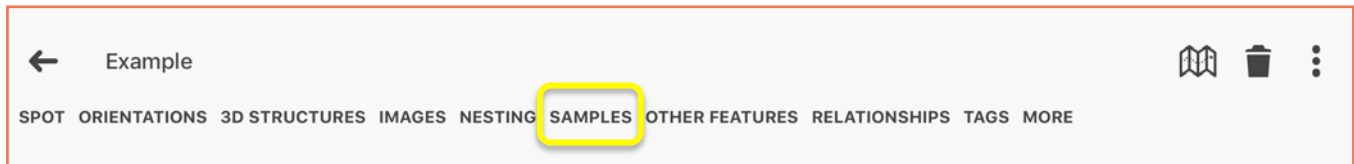
Continuous Nesting:

When this toggle button is activated, each following Spot is nesting within the same "Nest".

The Current Nest

Your Current Spot

SAMPLES



When you add a sample to the **Samples** tab, select **Add a Sample**. The following input menu opens. A catalogue of all of the samples can be seen in the main menu, under the **Samples** heading.



The 'Add A Sample' form is a vertical stack of input fields. Each field is annotated with a text box explaining its purpose. The fields and their annotations are as follows:

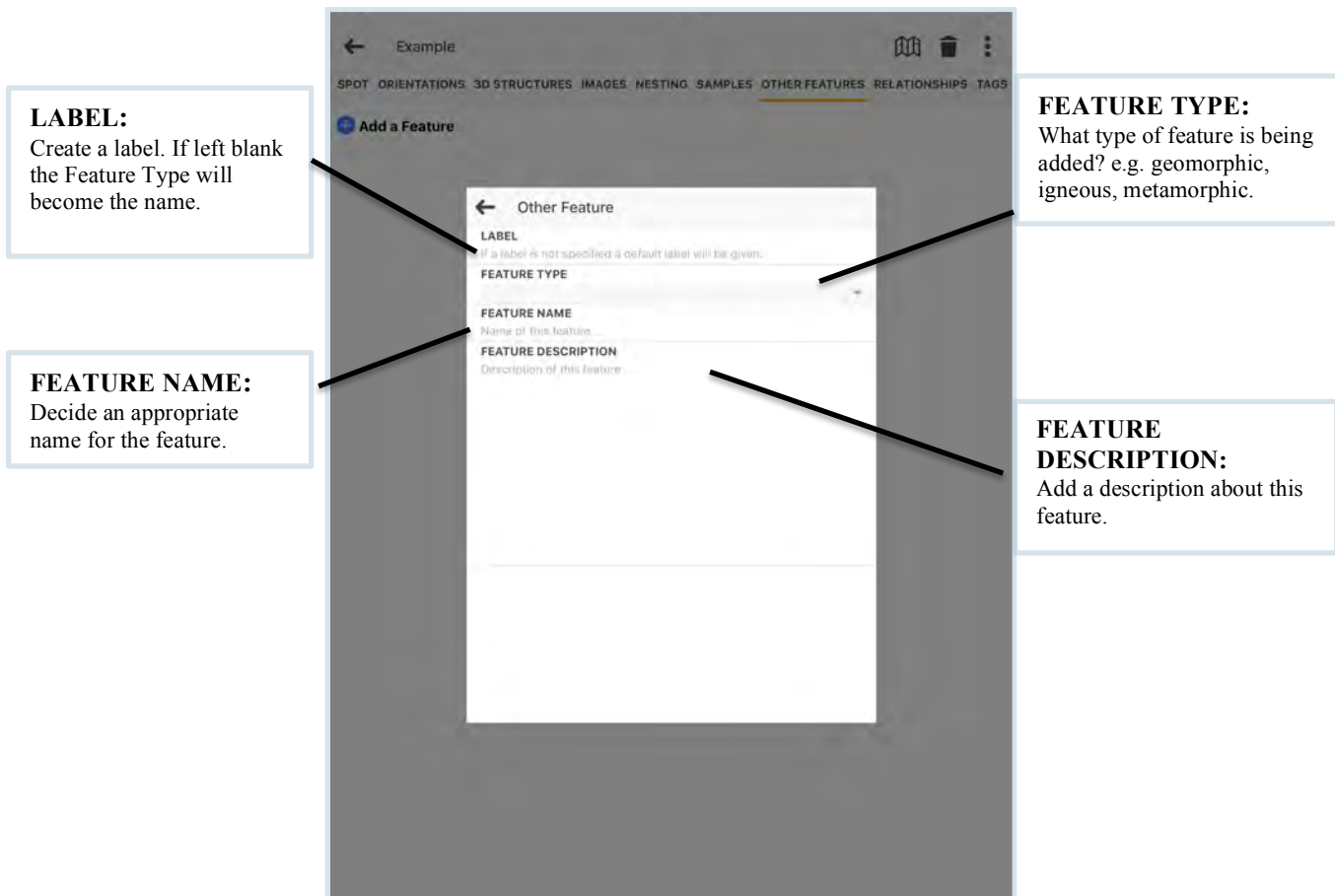
- LABEL:** Add a label. If left blank the title will appear as "sample".
- SAMPLE SPECIFIC ID/NAME:** Add your own specific ID to this sample for later sample registry.
- MAIN SAMPLING PURPOSE:** Why was this sample taken?
- SAMPLE DESCRIPTION:** Add a description about your sample.
- MATERIAL TYPE:** Select if the rock is intact, fragmented, or sediment.
- IMPLACENESS OF SAMPLE:** Add the implaceness of the sample.
- ORIENTED SAMPLE:** Select whether this sample is oriented or not. The program will ask the orientation.
- SAMPLE SIZE:** Add the size of the sample.
- DEGREE OF WEATHERING:** Add the size of the sample.
- SAMPLE NOTES:** Only write notes about this sample.

The form itself has a 'Save' button at the top left and a close 'X' button at the top right. The fields are labeled with green text and have a green border. The 'LABEL' field has a blue information icon. The 'SAMPLE SPECIFIC ID/NAME' field has a placeholder text: "If a label is not specified a default name will be given". The 'MAIN SAMPLING PURPOSE' field has a placeholder text: "-- Select Main Sampling Purpose --". The 'SAMPLE DESCRIPTION' field has a placeholder text: "-- Select Sample Description --". The 'MATERIAL TYPE' field has a placeholder text: "-- Select Material Type --". The 'IMPLACENESS OF SAMPLE' field has a placeholder text: "-- Select Implaceness of Sample --". The 'ORIENTED SAMPLE' field has a placeholder text: "-- Select Oriented Sample --". The 'SAMPLE SIZE' field has a placeholder text: "-- Select Sample Size --". The 'DEGREE OF WEATHERING' field has a placeholder text: "-- Select Degree of Weathering --". The 'SAMPLE NOTES' field has a placeholder text: "-- Select Sample Notes --".

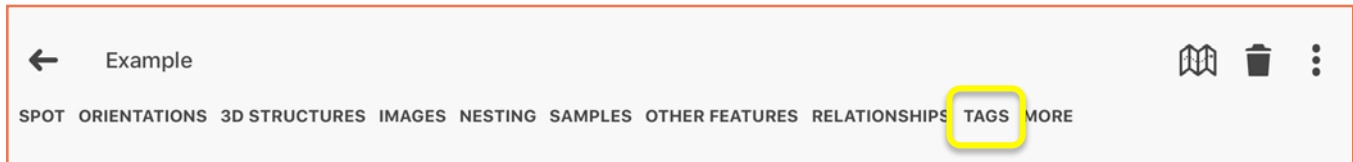
OTHER FEATURES



The **Other Features** tab allows you to add geologic features to your spot that have not already been covered.

A screenshot of the 'Add a Feature' form in the Strabospot app. The form is titled 'Other Feature' and has a back arrow. It contains four input fields: 'LABEL', 'FEATURE TYPE', 'FEATURE NAME', and 'FEATURE DESCRIPTION'. Each field has a callout box with an arrow pointing to it, explaining its purpose. The 'LABEL' callout says 'Create a label. If left blank the Feature Type will become the name.' The 'FEATURE TYPE' callout says 'What type of feature is being added? e.g. geomorphic, igneous, metamorphic.' The 'FEATURE NAME' callout says 'Decide an appropriate name for the feature.' The 'FEATURE DESCRIPTION' callout says 'Add a description about this feature.'

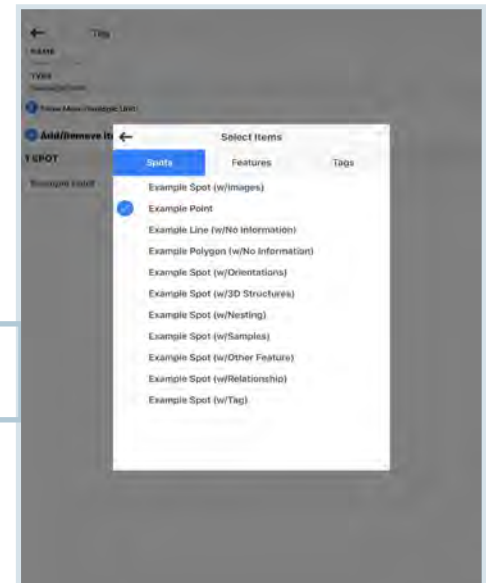
TAGS



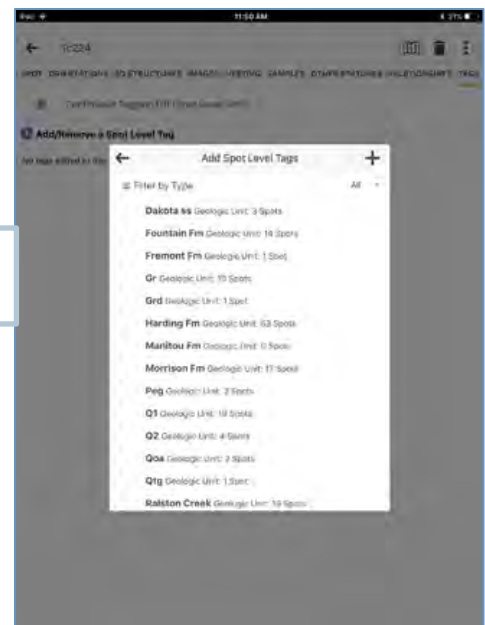
The Tags tab allows you to add more details about your Spot.

Using Tags is explained in the Attributes section of this Help Guide.

This screen shows all of your current tags, or to create a tag.



Is the screen to add spots to a Tag.

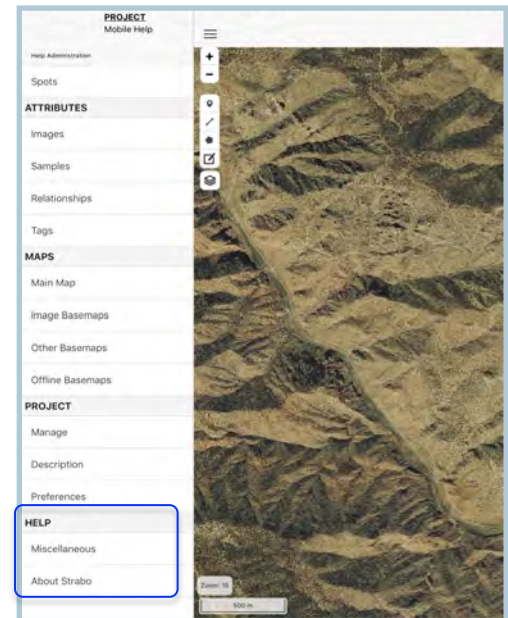


HELP

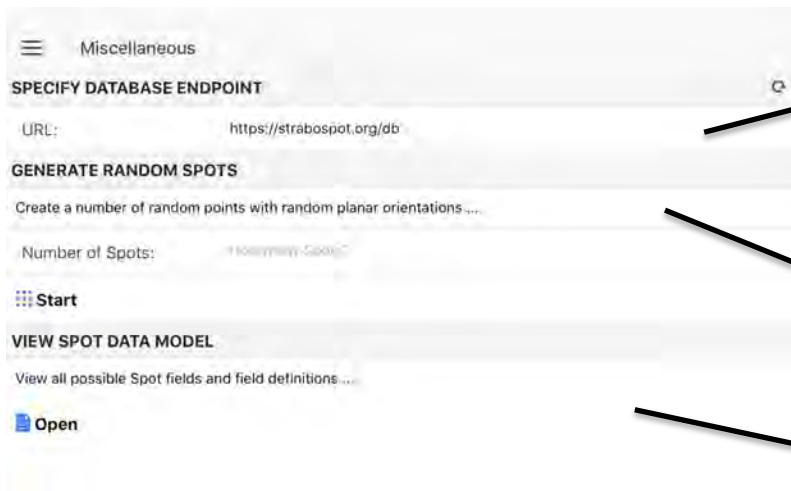
The **Help** heading on the Main Menu is for changing the database endpoint, updating StraboSpot, and submitting bug reports and suggestions.

Miscellaneous

The **Miscellaneous** bar under Help gives you several options for the database. You can change the Database Endpoint if you have a custom version of StraboSpot. You can also generate some random Spots for testing. Lastly, you can see the StraboSpot data model if that is important.



Circled is the list of headings referenced under the **Help** title.



DATABASE ENDPOINT:

If you have a custom version of the StraboSpot database you can use this as an endpoint. This currently used for testing only.

RANDOM SPOTS:

Generate random points with planar orientation for testing of the app.

DATA MODEL:

Push this to see the detailed StraboSpot data model with terms and features.

FAQ)- WHY WOULD I WANT A DIFFERENT ENDPOINT?

-You don't. This is an important testing function for StraboSpot. In the future, we may make VM versions available for custom use, but that is not in the works yet.

FAQ)- WHAT GOOD IS GENERATING RANDOM SPOTS?

-Mostly for testing the application. You can generate a bunch of points and test connections to other programs, or output for other programs. This is used mostly by the developers to evaluate the application.

FAQ)- WHAT IS THE DATA MODEL?

-This is the data model used in StraboSpot. You can see all terms in the data system – it is like a lexicon.

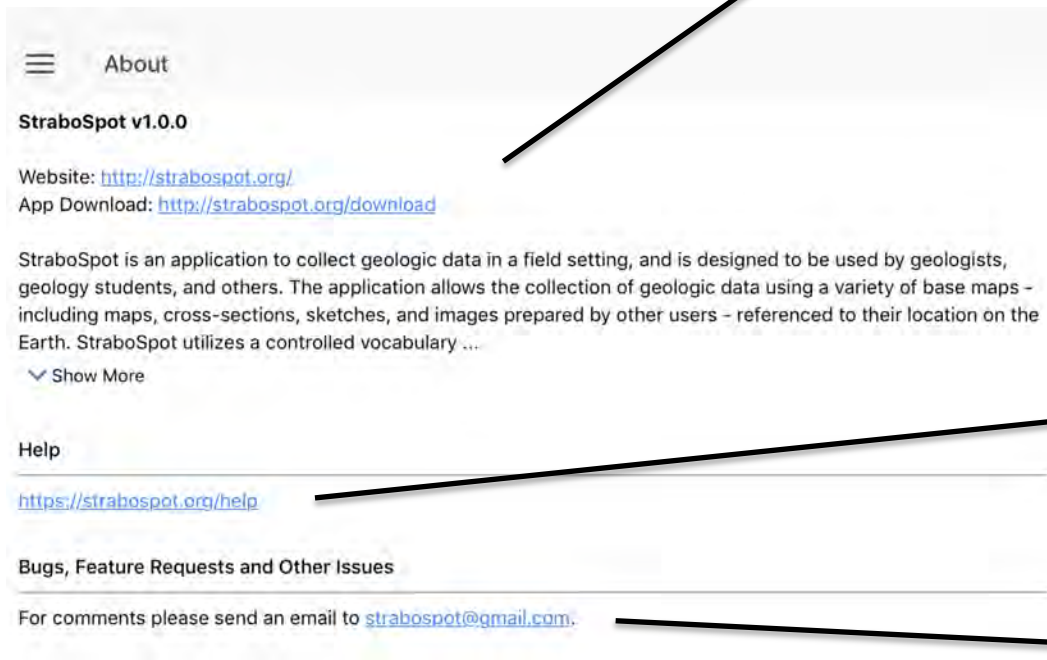
HELP (Cont.)

About

The **About** bar under Help provides locations for the main StraboSpot website as well as a link to download. It also provides a link to the help guide. Lastly, it gives you the address to contact for Bugs, Feature Requests, and Other Issues.

WEBSITE LOCATIONS:

Go directly to the StraboSpot resources on the web.



HELP:

Link to Help Guide for the application.

CONTACT:

Send comments, bugs, requests, or suggestions to the StraboSpot Team.

PLEASE!

FAQ)- DO YOU RESPOND TO EMAILS?

-StraboSpot is being and was developed using outreach and interaction with the field geology community. Yes, we try to get back to you as soon as possible and take suggestions seriously.

OUR EXPERIENCES

Before The Field

We recommend that after downloading files for offline use you should turn wifi and data off on your device and confirm the tiles are saved.

In The Field

It is recommended that you bring external batteries or solar pannels. Using GPS and mapping requires a lot of battery...

After The Field

Once you complete your fieldwork, export your project to device and upload to your account. This way your project is saved on your device, your app, and your account.

FREQUENTLY ASKED QUESTIONS

FAQ)- I GOT A NOTICE FOR AN UPDATE TO STRABOSPOT, OR I FOUND IT ONLINE. WHAT SHOULD I DO BEFORE I UPDATE, OR SHOULD I JUST GO FOR IT?

-DO NOT UPDATE until you have backed up the project either to the device or online. It is really **BETTER** to never update until you have uploaded your project. **DO NOT** update while you are in the field unless there is a serious bug fix that you have to use and you have contacted us about.

FAQ)- WHY SHOULD I MAKE MULTIPLE DATASETS?

-In projects it is useful to separate map areas or outcrops. A large number of Spots may make a single Dataset less responsive on mobile devices. A Dataset with 1000s of Spot may be slow to respond. Datasets can be turned on or off in several ways.

FAQ)- CAN I SEE MULTIPLE DATASETS AT THE SAME TIME?

-Yes. Any Dataset active in a project will be displayed on the main map. You make Datasets active in the Manage Project and Layer Manager parts of the interface. You can see multiple Datasets within a Project.

FAQ)- WHY ARE TAGS AND RELATIONSHIPS STORED AT THE PROJECT LEVEL?

-This is so the same Tags and Relationships can be reused in separate Datasets throughout the project- a helpful feature for projects where the same geologic units are encountered in separate mapping areas.

FAQ)- WHERE DO I ENTER INFORMATION FOR TAGS AND RELATIONSHIPS?

-Create new Tags and Relationships under their respective tabs for a Spot. Once a new tag or relationship is added, it will appear in a dropdown menu in its tab across all Datasets in the project.

FAQ)- WHAT ARE SOME USES OF TAGS?

-You can set up Tags for rock units. In this way, every rock of the same formation or member gets the same information associated with it. Tags can also be rock facies or any other feature shared by Spots.

FAQ)- WHY WOULD I WANT TO CONTINUOUSLY TAG?

-Continuous Tagging is very useful if you are making measurements in the same rock unit or of the same type of structure. You could continuously apply the same Tag, such as S1 foliation, to a large set of measurements you are making at the same time.

FAQ)- DO I NEED TO CREATE A PROFILE BEFORE I START MAPPING?

-No, you can map without being signed in, but consequentially your data will not be saved to the database until you get an account.

FAQ)- WHAT IS THE USER PROFILE INFORMATION USED FOR?

-Communication and attribution. You may get messages from StraboSpot about your account and changes. When data are made public, your username is exposed with your data. Of course, you need to have an account to store data.

FAQ)- WILL I BE ABLE TO EDIT MY PROJECT DETAILS AFTER I CREATE IT?

-Yes! You can review and edit your data under the “project manage” tab.

FAQ)- WHY DOES THE EXISTING PROJECT GET DELETED?

-You can only have one active project at a time. Also, if you are sharing your device and change projects you retain security on your data. You have to save to strabospot.org to ensure that your data are backed up.

FAQ)- WHY SPOT?

-A Spot is the basic data element in Strabo. It is the node in a graph database, and that is the approach for Strabo.

FAQ)- WHAT CAN BE AN IMAGE?

-Any picture, drawing, annotated photo, or raster of any type. If it can be seen on a mobile device in the pictures folder it is an image. If you use a program to draw lines on a picture it is still an image. You can pull images out of DropBox if you want.

FAQ)- WHY WOULD SAMPLES BE A SEPARATE ATTRIBUTE?

-For most workers, samples are special in that more is done with them away from the field. Users may want to create a sample list or get an output of sample locations.

FAQ)- WHY USE IGSN?

-IGSN are an internationally maintained list of samples. The IGSN starts with a prefix for an individual user, and then uses sequential numbering.

FAQ)- IF I USE AN IGSN CAN I HAVE MY OWN SAMPLE NUMBER?

-Absolutely. You can enter the sample information for the sample with any naming convention you want. You can assign these to IGSNs later.

FAQ)- WHY WOULD I WANT TO ADD A RELATIONSHIP?

-Relationships allow you to enter crosscutting relationships (space for time). The dike documented at Spot A cross cuts fabric at Spot B.

FAQ)- WHAT ARE EXAMPLES OF RELATIONSHIPS?

-Axial planar foliation cutting bedding, included fragments of underlying rock in overlying one, xenoliths of recognizable rocks in a pluton, nonconformity.

FAQ)- WHAT ARE SOME USES OF TAGS?

-You can set up Tags for rock units. In this way, every rock of the same formation or member gets the same information associated with it.

FAQ)- WHY WOULD I WANT TO CONTINUOUSLY TAG?

-Continuous Tagging is very useful if you are making measurements in the same rock unit or of the same type of structure. You could continuously apply the same Tag, such as S1 foliation, to a large set of measurements you are making at the same time. Tags can work a lot like labels in a normal GIS system.

FAQ)- WHAT CAN I NOT DO AT THE MAIN MENU?

-You cannot manage your account. That is done from the StraboSpot.org webpage.

FAQ)- DO I HAVE TO USE A PICTURE OF A PET?

-Yes. If not, you need permission from the StraboSpot Team to use an alternate picture ☺. Cats and dogs are cute. Baby pictures are usually approved without review.

FAQ)- I CANNOT FIND MY DATA OR MY MAP AREA BECAUSE I HAVE NO SPOTS

-A good idea is to place a Spot in the middle of the area of interest once you start making a project or dataset. That way you can always zoom back to the location. You can also zoom to offline maps under that menu.

FAQ)- CAN I EDIT ANY SPOT REGARDLESS OF TYPE

-Yes. Editing points will move them. By editing lines or polygons you can move vertices, add more vertices, or delete vertices. You have to save your edits if you want them to stick.

FAQ)- HOW DO I TURN OFF ALL OF THE LAYERS OF ONE TYPE?

-Use the uncheck the heading box above the layer list.

FAQ)- CAN I SELECT SPOTS THAT ARE NOT DISPLAYED?

-No, This is a handy way to limit your possible selections or hide spots such as polygons in the layer list.

FAQ)- I AM OFFLINE BUT MY BASELAYERS DO NOT SHOW.

-This can be complicated. The most common causes are 1) you do not have the offline Baselayer selected (your map is on street map and you need satellite to be selected), or 2) you are at a zoom level that you did not download. Another cause is that you need to be in airplane mode to ensure you are really offline. Turning off Wifi alone may not be enough. Restart if the problem persists.

FAQ)- ARE THESE THE ONLY CHOICES FOR BASELAYERS?

-OSM streets, Mapbox satellite, Mapbox Topo, and No basemap are the only options built into Strabo natively. You can add any other and as many Baselayers as you want using the websites for Mapbox or MapWarper. There are instructions for doing this in the appendices.

FAQ)- CAN I ADD OTHER BASELAYERS?

-Yes, using Mapbox and MapWarper.

FAQ)- WHY WOULD I WANT TO HAVE AN IMAGE BASEMAP?

-You can locate a Spot using GPS and then take a picture on your phone or tablet at that Spot. You can then map or document the Image Basemap with Spots that are same sort of data as if they are on a Satellite image.

FAQ)- WHAT COORDINATE SYSTEM DOES AN IMAGE BASEMAP USE?

-Data entered are in pixel coordinates relative to the Image Basemap. The Image Basemap is referenced to the Spot where it was taken or entered. That can be pixel coordinates if the Image is a Spot on another Image. Ultimately, the Image Basemap is related to the real-world coordinates of a parent Spot with such coordinates.

FAQ)- WHAT SORT OF IMAGE CAN BE AN IMAGE BASEMAP?

-Any image can be used as an Image Basemap. If you add an image to a spot you can place Spots on it.

FAQ)- HOW DOES AN IMAGE BECOME AN IMAGE BASEMAP?

-You can set this up when you add the image. You can also go to Images under Attributes and go it directly to set it as a basemap by checking a box.

FAQ)- WHAT IS THE DIFFERENCE BETWEEN AN OTHER BASEMAP AND AN IMAGE BASEMAP?

-Other Basemaps must have real-world coordinate – they are georeferenced. Image Basemaps have pixel coordinates but are referenced to some spot with a latitude and longitude.

FAQ)- WHY MAPBOX AND MAPWARPER?

-These are free services that allow users to download tile.

FAQ)- HOW DO I USE THESE SERVICES?

-Each group has instructions and help. We include some simple paths in the Appendices of this document.

FAQ)- I HAVE A LOT OF GEOREFERENCED MAPS. HOW DO I USE THEM?

-The easiest way is to bring these into MapBox, create a map, and download tiles.

FAQ)- WHY TILES?

-Strabo programming requires that back images are tiled – organized as smaller individual files. This is common on mobile applications.

FAQ)- HOW DO I GET TO THE OVERLAY FEATURE?

-It is an available option once you enter a map type.

FAQ)- HOW MANY OVERLAYS CAN I HAVE

-You can have as many as you want, but they will get confusing if you have a lot of them. You can have many, but then switch them on and off, several at a time.

FAQ)- HOW DO I CHANGE THE OPACITY OF AN OVERLAY?

-Go to Other Basemaps on the main menu, select the map, and you will have the option to change opacity.

FAQ)- WHAT IF I AM OFFLINE AND DO NOT HAVE TILES?

-You will get a blank background screen.

FAQ)- I AM OFFLINE AND THE MAP DOES NOT SHOW. I KNOW I DOWNLOADED THE TILES?

-Make sure you have the right Baselayer selected.

FAQ)- WHAT HAPPENS IF I ZOOM IN AND HAVE NOT DOWNLOADED THAT LEVEL?

-You will still get an image, but it will be at the highest resolution available. You may just see some pixels if you do not have high-resolution tiles. Also, see section for tiles in the definitions page.

FAQ)- WHAT HAPPENS TO BASELAYERS WHEN I CHANGE AREAS OR PROJECTS?

-All baselayers are saved. Changing projects does not matter.

FAQ)- ARE BASELAYER TILES UNIQUE?

-Yes, every Baselayer has a type (satellite, streetmap), zoom level, and identifier.

FAQ)- I AM OFFLINE AND HAVED SAVED OFFLINE MAPS BUT NOTHING APPREARS?

-You may not have the right layer selected or you are not at a tiled zoom level.

FAQ)- IN MY GIS I DO NOT HAVE TO WORRY ABOUT TILES. WHAT IS UP WITH STRABO?

-Strabo is not a GIS and does not have all of the image processing built into those applications.

FAQ)- DO I REALLY NEED TO WORRY ABOUT MANAGING MY PROJECT?

-YES! Management can keep your data safe.

FAQ)- IF I AM OFFLINE CAN I SWITCH PROJECTS EASILY?

-NO! You can, but it is tricky and will be explained. If you switch projects the current project will be lost. There are lots of warnings to help you avoid this.

FAQ)- DO I ALWAYS HAVE TO USE PREFERENCE TO CHANGE TABS?

-No. You can use the “More” at the end of the tab screen to turn on or off additional Tabs.

FAQ)- WHAT IS AN IGSN?

-IGSN is a unique sample identifier that is supplied by IEDAdata.org through the SESAR.org system (Solid Earth Sample Registry). This is a unique and persistent sample identifier. These will follow your samples forever and give the ability to link data – age, chemistry, structural – for a sample even if in different data systems.

FAQ)- WHY SHOULD I MAKE MY PROJECT PUBLIC?

-Keep your project private if you are in the process of getting or interpreting data. Once you are ready, make it public and everyone can see it! Your hard work will be available to the Earth Science Community.

FAQ)- WHAT IF I WANT TO ADD MULTIPLE ROCK UNITS OR TAGS?

-You can do this from both the rock unit menu on this page and the Tag Tab.

FAQ)- I HAVE A LOT OF POINTS WITH THE SAME METADATA. DO I HAVE TO KEEP RE-ENTERING THE SAME STUFF AGAIN AND AGAIN?

-No. Select a Spot that has the same information you are going to use and then “Set to My Location.”

FAQ)- WHY WOULD I USE A SPOT RADIUS FOR A LINE?

-Lines are Spots too, and Spots have an area to which they apply. You could map a fault, for example, and want measurements with 5m to be associated with that fault. This is like buffering in a GIS.

FAQ)- I HAVE DRAWN A LOT OF FAULTS AND KEEP CLASSIFYING THEM THE SAME WAY. DO I HAVE TO SPEND THE TIME TO CLASSIFY EVERY STRUCTURE THE SAME WAY?

-No, you can just copy the Spot, in this case a line, and then use the option to Set From Map. In this way you can simply draw a new line that will have the same basic attributes and metadata. This is the fastest way to add new Spots with the same metadata.

FAQ)- ARE ALL POLYGONS NESTS?

-Yes. Anytime you add a polygon you can go to the Nesting Tab and see Spots within it.

FAQ)- CAN I MAKE POLYGONS BY SNAPPING TO LINES LIKE IN A GIS?

-No. StraboSpot is not a GIS and does not support snapping or topology. You can export your data to a ShapeFile or use a Strabo Plugin for ArcGIS or QGIS to do more advanced operations.

FAQ)- THE POLYGON COVERS OTHER SPOTS AND THE MAP. CAN I TURN IT OFF?

-Use the layer options on the map to turn polygon layers off or on.

FAQ)- DO I HAVE TO HAVE THE TABS TURNED ON THE WHOLE TIME I AM WORKING?

-No. Just turn on the ones you are using most. If you need to have one of the others active you can just select the MORE tab and turn them on.

FAQ)- WHAT IF I GET TO THIS SCREEN AND DECIDE NOT TO TAKE A MEASUREMENT?

-Just hit the X on the upper right.

FAQ)- THE COMPASS READING SEEMS WRONG. DO I HAVE TO KEEP THIS MEASUREMENT?

-You can always type in measurements for strike, dip, and dip azimuth. The compass is not always reliable on mobile devices, so you should probably check with another compass.

FAQ)- I WANT TO ENTER THAT THE MEASUREMENT IS ON BEDDING. WHAT DO I DO?

-Once you hit Planar Feature Type you will get a lot of options for more detailed information.

FAQ)- WHY WOULD I WANT A DIFFERENT ENDPOINT?

-You don't. This is an important testing function for StraboSpot. In the future, we may make VM versions available for custom use, but that is not in the works yet.

FAQ)- WHAT GOOD IS GENERATING RANDOM SPOTS?

-Mostly for testing the application. You can generate a bunch of points and test connections to other programs, or output for other programs. This is mostly used by the developers to evaluate the application.

FAQ)- WHAT IS THE DATA MODEL?

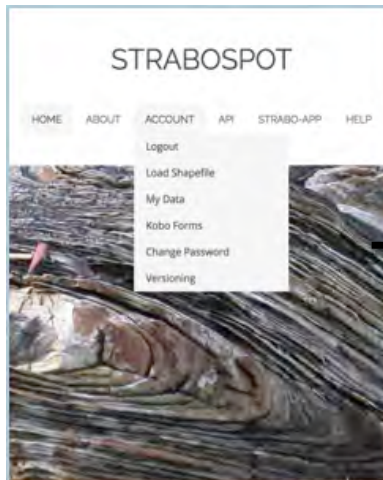
-This is the data model used in StraboSpot. You can see all terms in the data system – it is like a lexicon.

FAQ)- DO YOU RESPOND TO EMAILS?

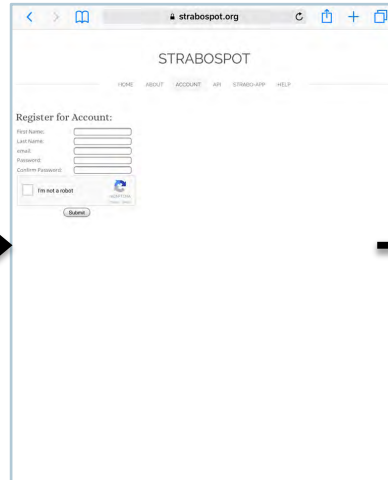
-StraboSpot is being and was developed using outreach and interaction with the field geology community. Yes, we try to get back to you as soon as possible and take suggestions seriously.

APPENDIX A - SCENARIO TUTORIALS

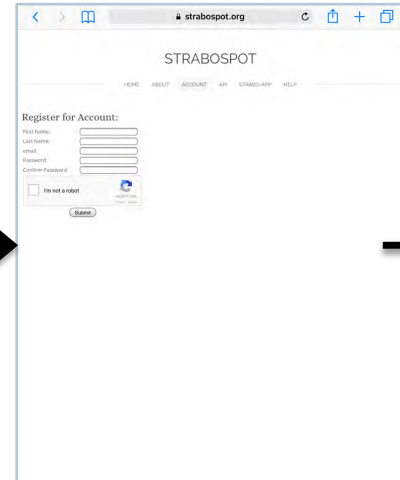
Account Creation And Project Setup



Go to strabospot.com and press the “Register for Account” button.



Register for an account.



Verify your email and confirm your registration.



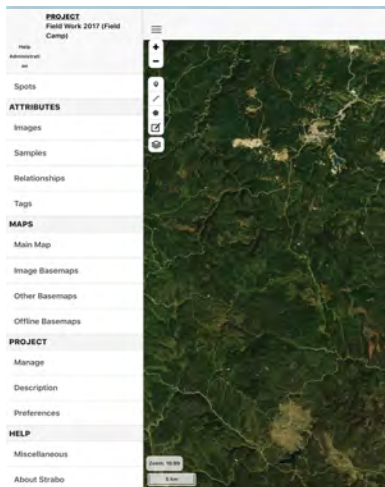
Sign in to your Strabo account on your device

You are prompted to create a project. Add information about your project.

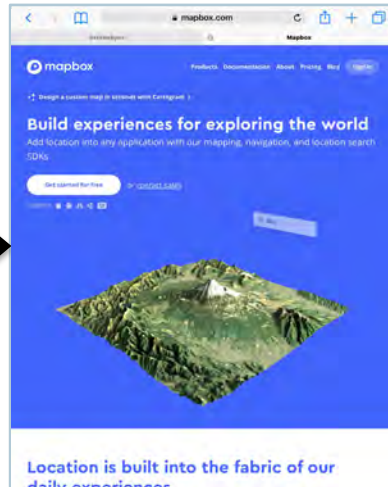


Begin mapping! Remember you can always edit your project information.

Downloading Other Basemap With Failures



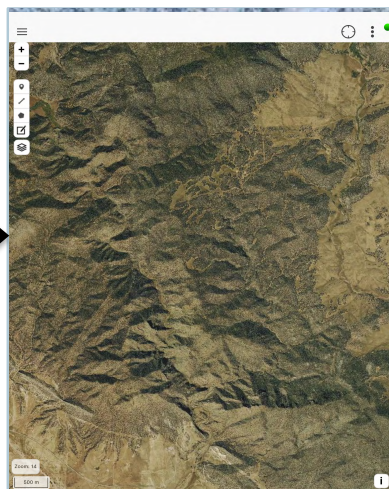
From the main menu, select the other basemaps option.



Go to Mapbox, Open Layers, or MapWarper and create a map.



Press the plus button to add a map key and fill out form.



Return to the Main Map and zoom to the extent of your map area.

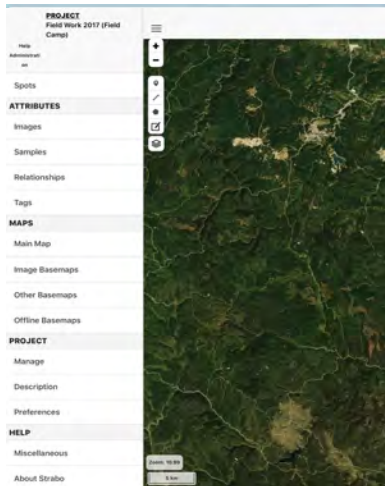


Press the 3 Dot Menu and select save map for offline use.

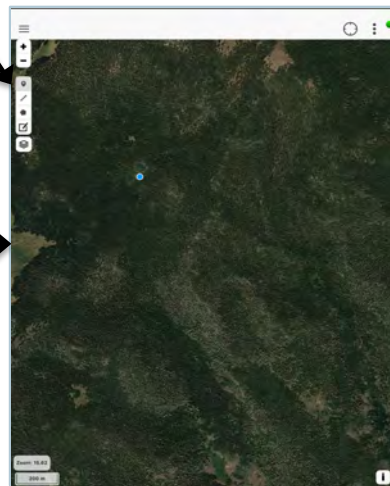


Press the Download Tiles button. If failures, re-download the tiles.

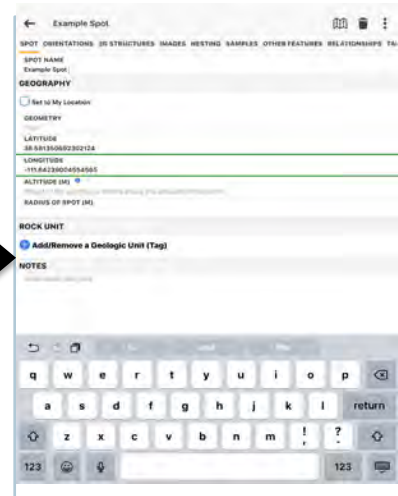
Fast Mapping (Many Spots, Little Time)



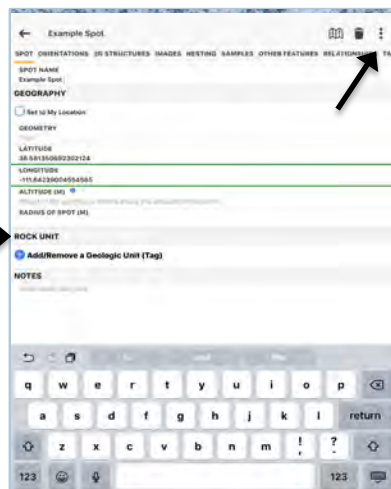
Start on the main map screen.



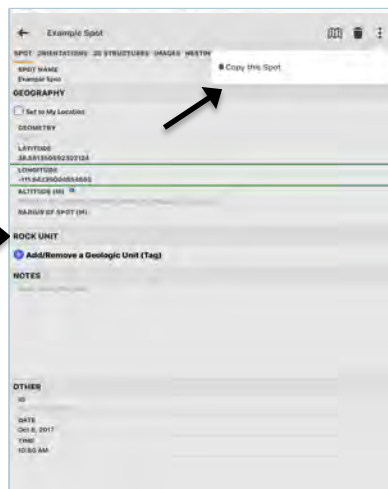
When you have a Spot to Create, press the Spot too and add to your map.



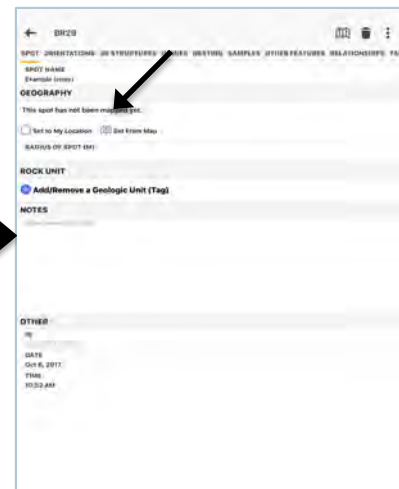
Add data and additional relevant attributes if appropriate.



Press the three dot menu in your Spot you wish to copy.

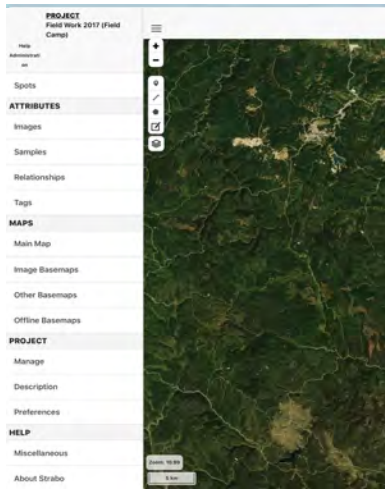


Press the Copy this Spot option.

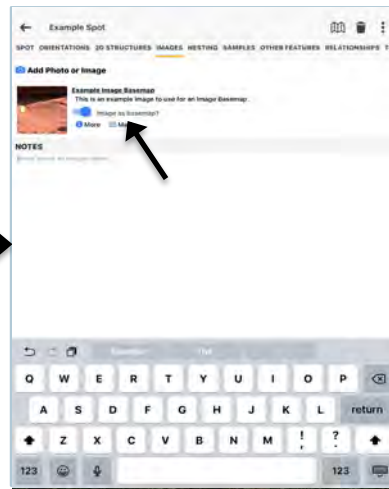


In the newly created Spot, press either Set to My Location or Set From Map.

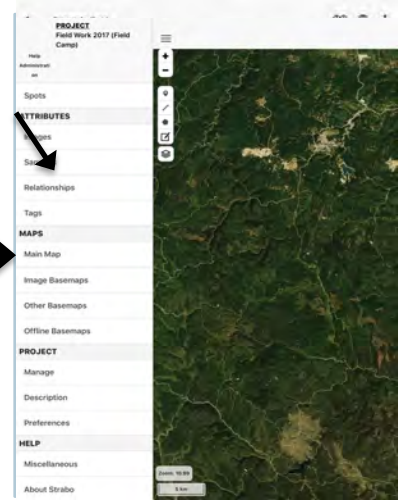
Orientations Mapped Using Image Basemaps



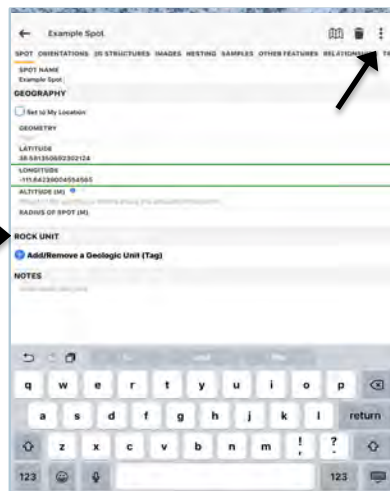
Start on the main map screen.



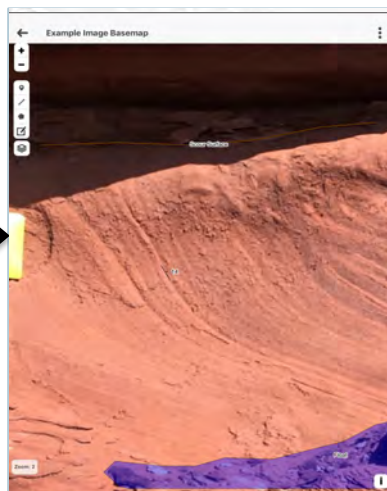
When creating a Spot, add an image, and toggle to create an image basemap.



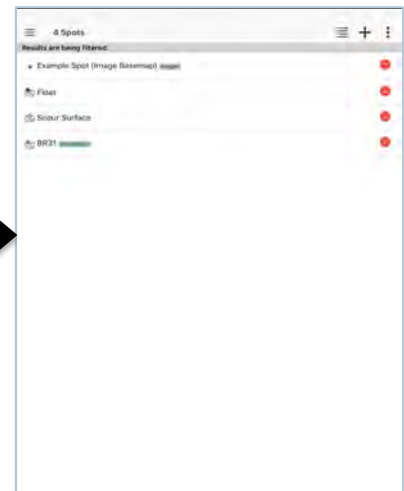
Navigate back to the main menu and press Image Basemaps.



Select the image you want to use as a basemap.

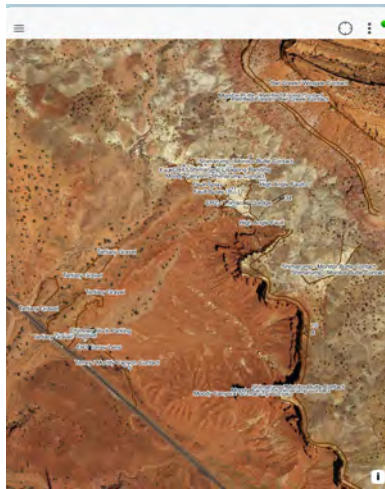


While the image is displayed where your map is normally displayed, create Spots.

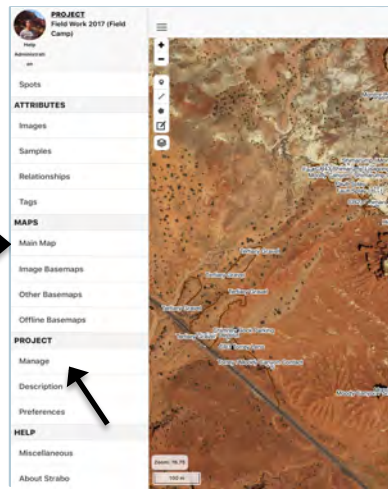


Your Image Basemap is saved as a Spot. Spots on the Image Basemaps also appear.

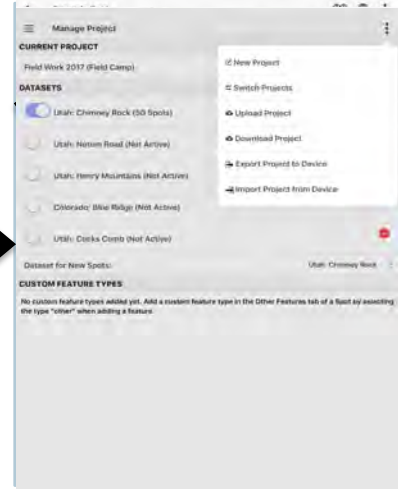
Save, Upload, and Share Projects



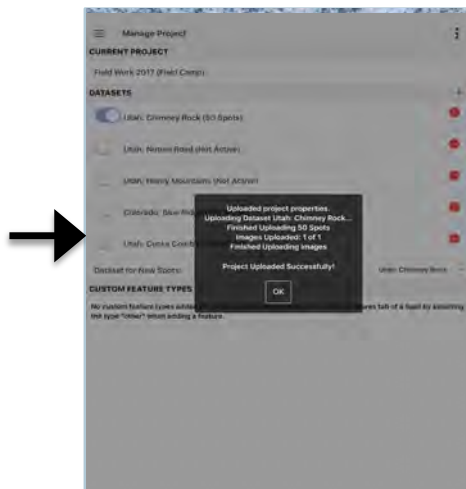
When finished, confirm you have Internet access. If not you can still save to device.



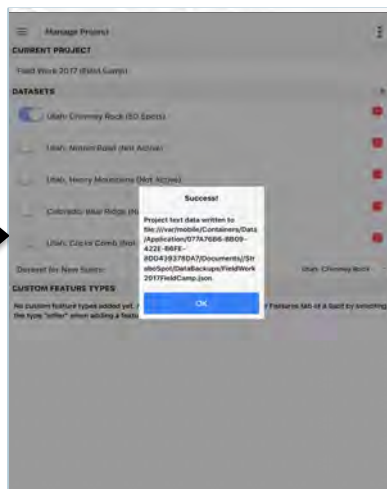
In the Main Menu screen press the Manage option.



Turn on all datasets you want saved and uploaded. Then press the three dot menu.



If you have Internet access, press Upload Project. Your upload will be confirmed.



You can also save by pressing Export Project to Device if no Internet connection.



Share projects by logging into another account as saving to device and importing.

APPENDIX B – USING MAPBOX WITH STRABO



Using MapBox

While StraboSpot offers three base layers- OSM (Open Street Map) Streets, Mapbox Satellite, and Mapbox Topo, more base layers can be added through Mapbox.

Mapbox (<https://www.mapbox.com>) is a platform which easily allows mobile apps and web applications to incorporate location services into their workflow. Examples of such apps include: Weather.com, Pinterest, and Lyft among many others.

Sign up for a free Mapbox account at

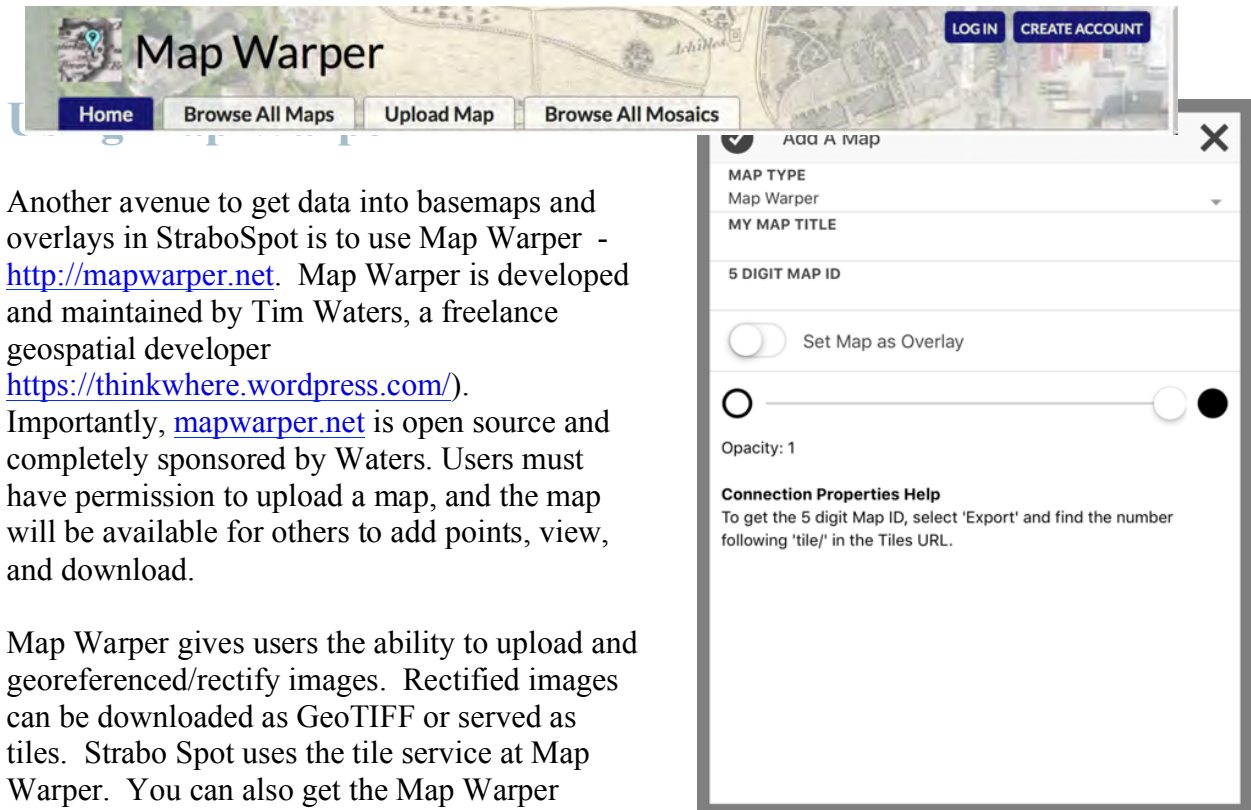
<https://www.mapbox.com/signup/> then on the Studio page

<https://www.mapbox.com/studio/> a Style can be created for use in StraboSpot. First, navigate to your access token and copy/paste to the “Mapbox Access Token” in the StraboSpot “User” info on either the StraboSpot Online app or mobile app.

To add your own data to Mapbox, add a new Tileset; the following formats are accepted: MBTiles, KML, GPX, GeoJSON, Shapefile (zipped), or CSV to create vector tiles or GeoTiff for creating raster tiles. For more information, especially if you encounter difficulties with successfully uploading data, refer to: <https://www.mapbox.com/help/uploads/>. Next, create a ‘New Style,’ and choose one of the ten pre-made Mapbox Styles as the background. In the Style Editor window, the pre-made Style is broken into layers which can be customized and any personal Tileset can be added through “New Layer” → “No tileset, click to select” → click the desired tileset → “Create Layer” button.

Once the Style is complete click “Publish”; this saves for use in StraboSpot. Open StraboSpot’s online app in browser and navigate to Maps → Other Basemaps and click the “+.” In the dialog, choose “Mapbox Styles,” (verify your account access token), type a title, then copy/paste the Style URL from the three-line menu next to the desired Style on <https://www.mapbox.com/studio/styles/>. Click the checkmark in the upper left to complete. If StraboSpot encounters a connection error, verify your access tokens copied correctly- to avoid this, using the StraboSpot Online app over the mobile app is highly recommended.

APPENDIX C – USING MAP WARPER WITH STRABO



Another avenue to get data into basemaps and overlays in StraboSpot is to use Map Warper - <http://mapwarper.net>. Map Warper is developed and maintained by Tim Waters, a freelance geospatial developer (<https://thinkwhere.wordpress.com/>). Importantly, mapwarper.net is open source and completely sponsored by Waters. Users must have permission to upload a map, and the map will be available for others to add points, view, and download.

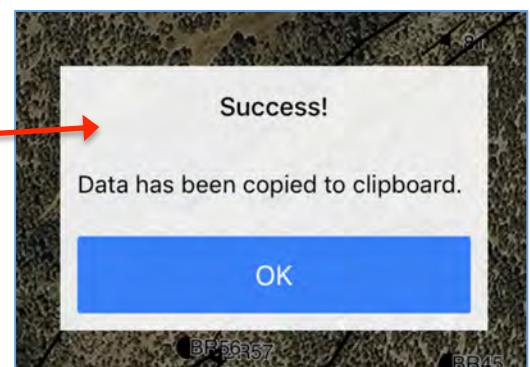
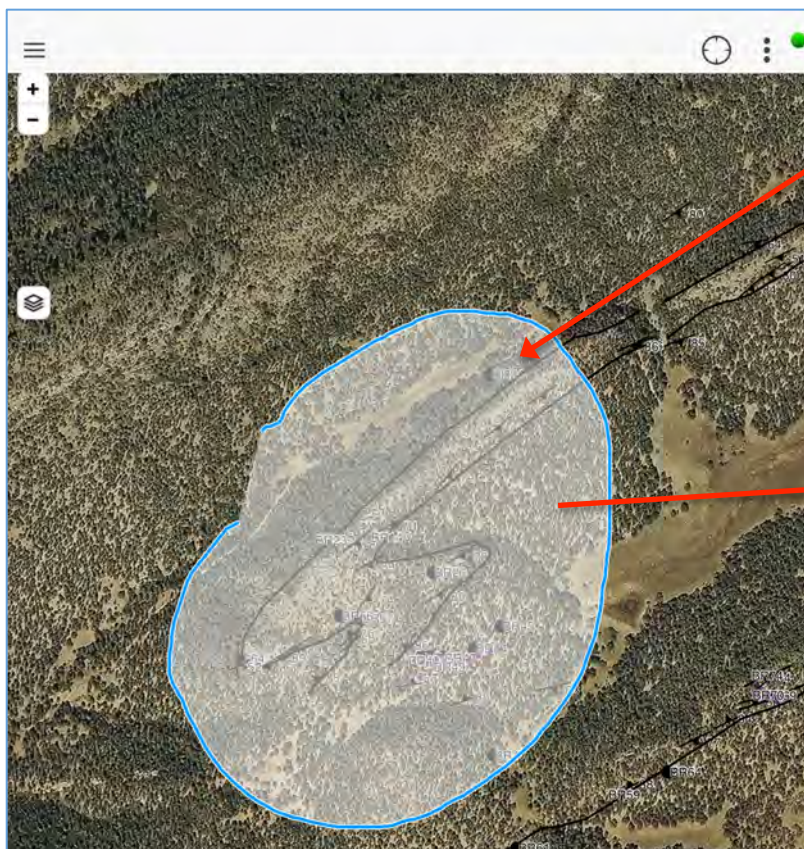
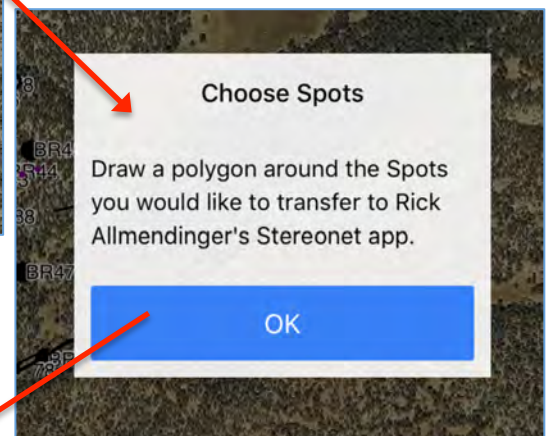
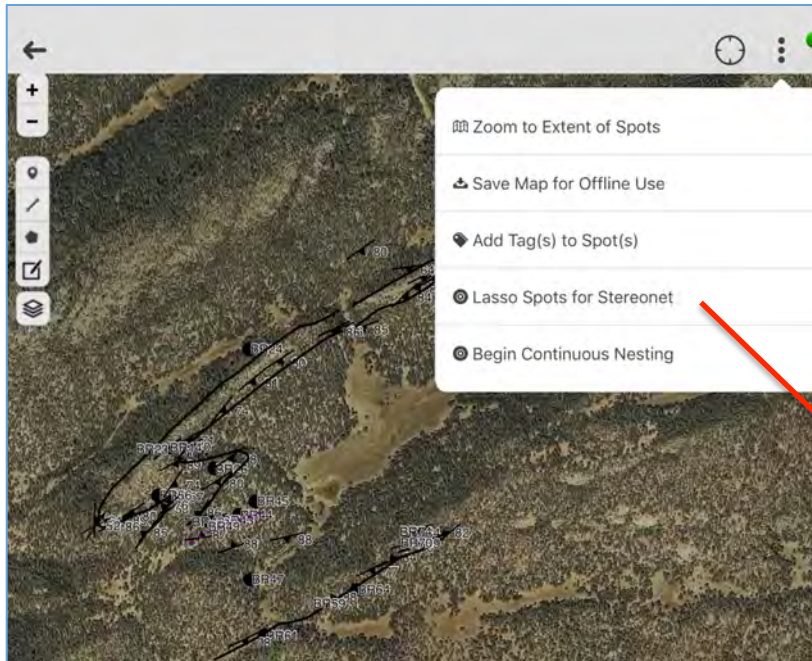
Map Warper gives users the ability to upload and georeferenced/rectify images. Rectified images can be downloaded as GeoTIFF or served as tiles. Strabo Spot uses the tile service at Map Warper. You can also get the Map Warper image into Map Box and use it from there. This is useful if you want to add more layers to the images.

You can get to Map Warper by using the Other Basemaps option. When you do this you get the dialog in the figure on the right, and select Map Type of Map Warper. You will then enter a title of your choice, and a Map ID that is in Map Warper.

The Overlay option is as described in the rest of the Help Guide.

APPENDIX D –STRABO WITH STEREONET MOBILE (FROM R. ALLMENDINGER)

You can download orientation data from StraboSpot to use directly in the StereonetMobile application developed by Rick Allmendinger. This is done from the 3-dot menu on the map. You choose **Lasso Spot for Stereonet**, select the spots, and they will be pasted to the Clipboard.



Once the data are on the Clipboard, you can go to StereonetMobile. In StereonetMobile you go to the Open selection, and then get a dialog to bring in from a file or Clipboard. Bring in from the Clipboard (you will get a warning if you have data entered already, you can replace if you want or append to existing data). You can then use the normal plotting functions of StereonetMobile.

