STRABOFIELD

USER GUIDE



October 7, 2026

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1 Introduction

1.1 About This Guide

This guide provides an overview of the open-source, community-driven **StraboField** application, a key component of the StraboSpot ecosystem. It is designed to help users collect geologic data digitally using mobile devices such as smartphones and tablets. Data review and modifications can be conducted on the StraboField web viewer, refer to Section 5.1 for more information on how to use StraboField on a computer.

StraboField is freely available on both the Google Play Store and Apple App Store for phones and tablets. It can also be accessed on the StraboField web viewer, see Secction 5.1 for more information. While most examples in this guide are based on the iPad interface, the core functionality is the same across platforms. Major interface differences between Android and iOS devices are noted where relevant.

This manual provides a comprehensive reference for all features, buttons, and options available in the StraboField application. While the information does not follow a strict field workflow structure, Figure 1 illustrates a typical digital geoscience workflow using StraboField to support users from project setup through data collection and post-field data management.

1.2 Overview of the StraboSpot System

StraboSpot is an open-source data system designed for the digital collection, organization, and dissemination of field and laboratory geoscience data. Developed in alignment with the FAIR data principles—Findable, Accessible, Interoperable, and Reusable—it supports a range of workflows across geoscience disciplines, including structural geology, petrology, sedimentology, volcanology, and experimental deformation.

The StraboSpot ecosystem consists of several integrated applications:

- **StraboField** – An application for collecting geologic data in the field.
- **StraboMicro** – A desktop application for documenting and analyzing microstructural and thin section observations.
- **StraboExperimental** – A platform for managing data from laboratory-based deformation experiments.
- **StraboTools** – An iOS application for real-time image analysis in the field.

At the core of the ecosystem is the **StraboSpot Database** (`https://strabospot.org`), which stores user-submitted data and enables controlled public sharing of datasets. Users can choose to make their data publicly accessible or keep it private. The system supports the generation of Digital Object Identifiers (DOIs) for projects and datasets, facilitating citation, data sharing, and long-term discovery.

StraboSpot employs a hierarchical data model centered on the concept of a **Spot**—a spatially defined unit of observation (e.g., point, line, or polygon). Spots can be nested and linked, allowing for the documentation of relationships between observations at different spatial scales,

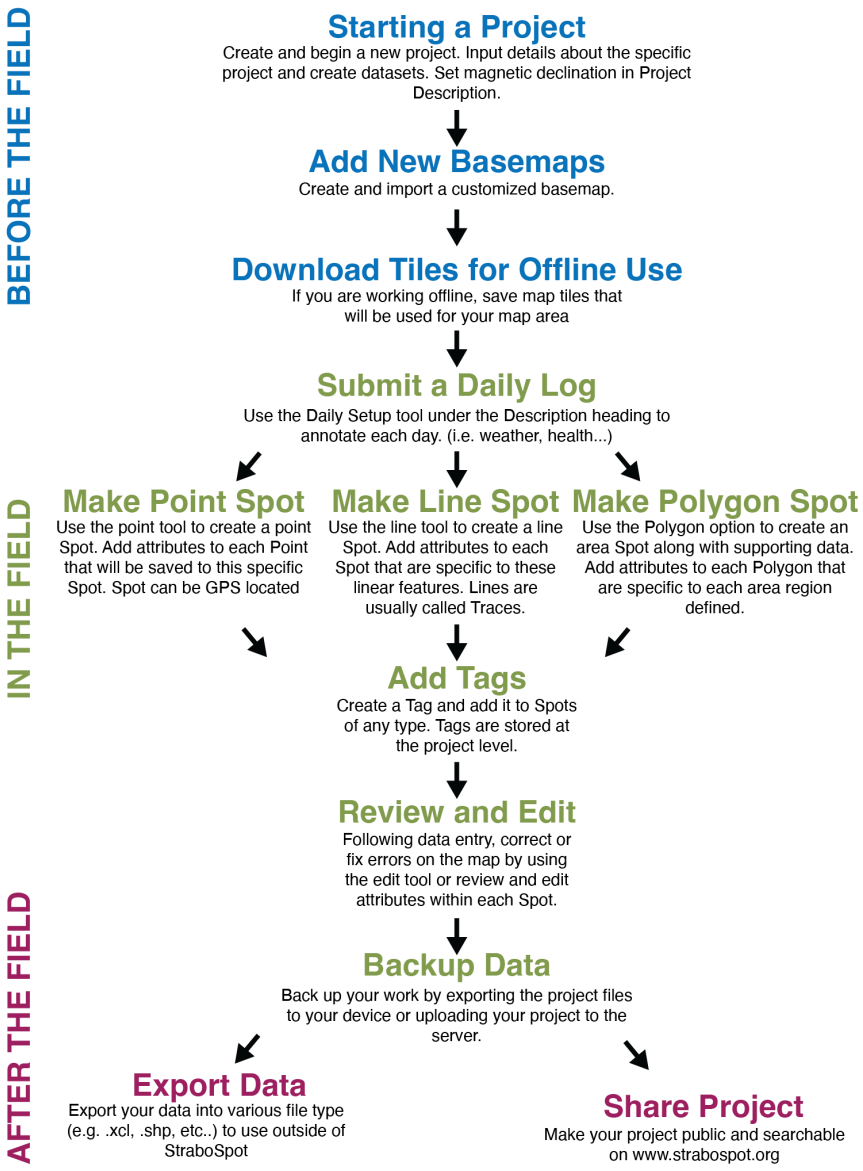

Figure 1. The StraboField digital workflow.

from regional mapping to microstructural analysis.

Versioning and Data Integrity

StraboSpot supports versioning at the project level. Each time a project is uploaded to the StraboSpot database, a new version is saved, preserving previous states of the dataset. This enables users to track changes over time and retrieve earlier versions when needed. Users can manage versions through the StraboSpot web interface.

API Access

The StraboSpot system provides a RESTful API, enabling programmatic access to public datasets and user-authorized data. Developers and researchers can use the API to:

- Query data by Spot, user, project, or tag.
- Integrate StraboSpot data into external tools or research workflows.

- Access metadata, spatial relationships, and associated media files.

API documentation is available at `https://strabospot.org/api`.

Community Development

StraboSpot is developed and maintained by a collaborative, community-driven team of geoscientists, software developers, and educators. Community input plays a central role in feature development, vocabulary standardization, and disciplinary support. The project is open-source, and contributions are welcomed through its GitHub repositories, available at `https://github.com/StraboSpot`.

Users are encouraged to report bugs, request features, and contribute to discussions that guide future development. Workshops, webinars, and training materials are regularly offered to support the growing user community.

1.3 Data Structure in StraboField

StraboField organizes data using a flexible, hierarchical structure that supports detailed and scalable field observations. This structure is centered around the concept of a **Spot**, which serves as the fundamental unit of data collection (Figure 2).

A Spot is a spatially defined observation and can take the form of a point, line, or polygon. Each Spot can store a wide range of data, including measurements, photographs, sketches, notes, analyses, and stratigraphic columns...

- **Spot:** A Spot is a spatially defined observation and can take the form of a point, line, or polygon. Each Spot can store a wide range of data, including measurements, photographs, sketches, notes, analyses, and stratigraphic columns. Spots can be endlessly nested, allowing users to represent spatial and contextual relationships at any scale. For example:
  - A polygon Spot might represent a mapped area.
  - Within that polygon, line Spots can be added to represent transects or stratigraphic sections.
  - Point Spots can be placed throughout the area to mark specific features such as sample sites, measurement locations, or geologic contacts.

  Users can also create complex structures, such as adding a point Spot at an outcrop, capturing an image of the exposure, turning that image into an image basemap, and then adding additional Spots on the image to document structural features, sketches, or sample locations. This enables the organization of data across scales—from regional mapping to microscopic observations.
- **Dataset:** A Dataset is a collection of Spots and generally corresponds to a single field area, site, or subproject. Datasets provide a convenient way to manage related observations and spatial groupings.
- **Project:** A Project encompasses all Datasets, including user-defined vocabulary, settings, and metadata. Projects serve as the primary container for organizing field campaigns or

research efforts.

- **User Account:** At the highest level, each user account manages multiple Projects and Datasets. Accounts are linked to the StraboSpot web platform (`https://strabospot.org`) and are used to synchronize, store, and share data across devices and collaborators.

The flexible data model in StraboField allows users to record as much detail as needed, whether capturing a few field notes or constructing a complex, multiscale dataset. The application supports tools for sketching on images, drawing plain sketches, taking georeferenced measurements, and building stratigraphic columns—all anchored to specific Spots. This scale-independent structure empowers users to tailor data collection to their workflow, discipline, and research goals.

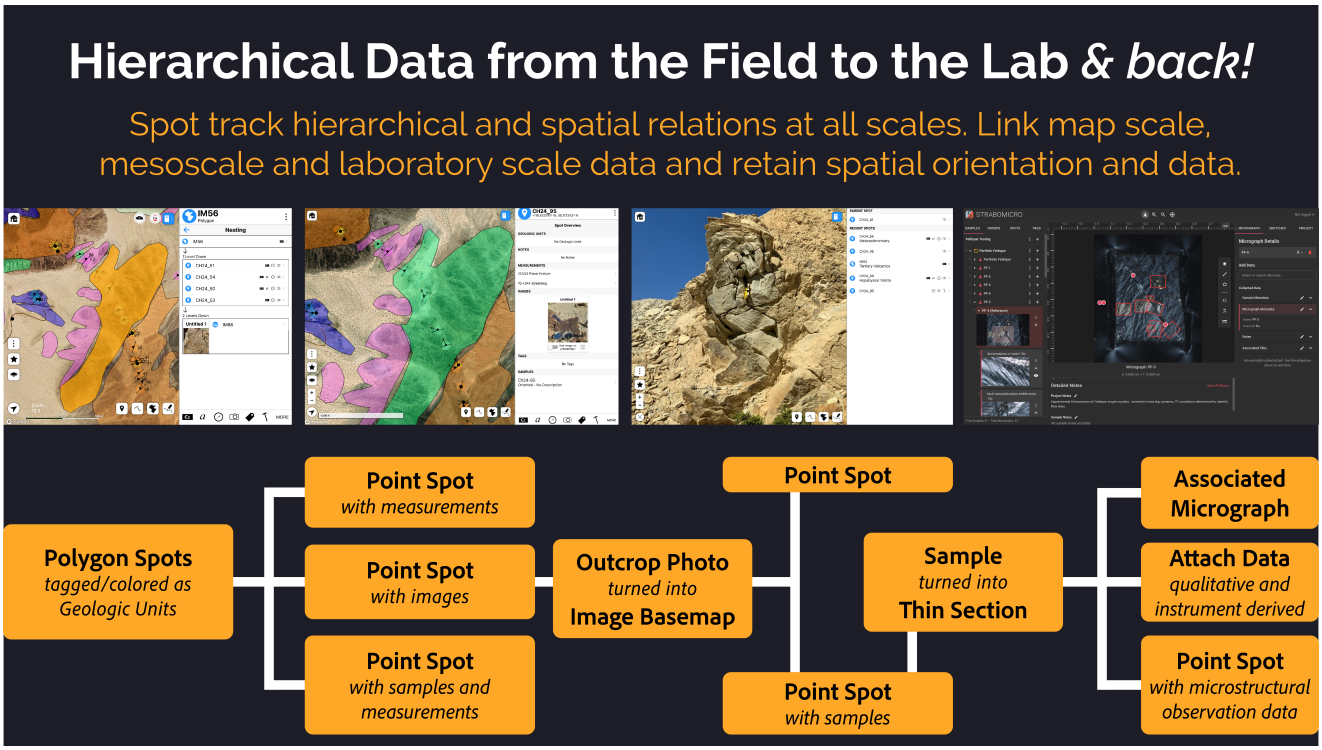

Figure 2. Hierarchical data structure in StraboField showing Projects, Datasets, and nested Spots (points, lines, and polygons) across scales.

1.4 Disclaimer

StraboField is built with React Native technologies and runs on iOS, Android, and desktop browsers. All entries in the system (Projects, Spots, etc.) are assigned unique identifiers.

StraboField relies on the device's GPS and compass for location and orientation data. Accuracy may vary by hardware. Users are advised to verify measurements using external instruments, particularly for compass readings.

Before entering the field, ensure your device is fully charged and carry a backup battery. Familiarity with field navigation, map use, and general outdoor safety is essential. While StraboField can operate offline, features like project upload/download require an internet connection.

2 Main Map in StraboField

The main view of the StraboField application is the basemap. Surrounding the basemap are various buttons that control functionality, toggle data visibility, and provide access to menus. The following section describes the purpose and features of each button.

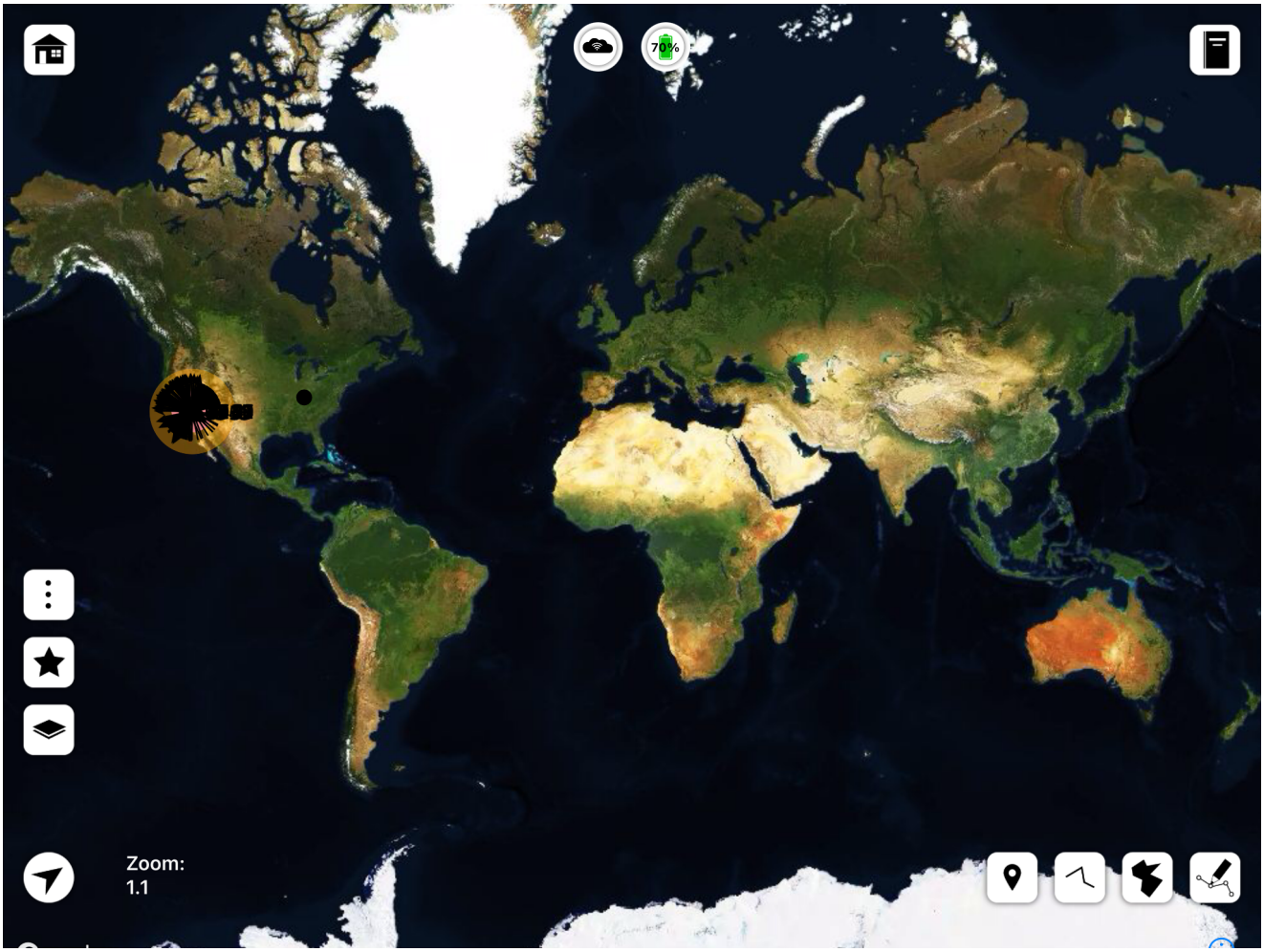

Figure 3. Default Main Map View

2.1 Main Map Buttons

This section provides an overview of all buttons available on the StraboField home screen, along with a description of their functions and uses. The icons shown below correspond to the buttons shown in the screenshot above (Figure 3).

2.1.1 Home Menu



Home Menu Button: Click the Home Menu button (shown to the left) to toggle the visibility of the Home Menu panel on the left side of the application. This panel provides access to additional settings and options. For more information, see Section 3.

2.1.2 Notebook



Notebook Button: The notebook button shown above toggles the visibility of the notebook panel on the right side of the application. Clicking it will display or hide the panel, which contains all spot metadata and data collection pages. More details on the notebook are provided in Section 4.

2.1.3 Map Actions



Map Actions Button: Tap the 3-dot button to open the Map Actions Menu. This menu provides options to:

- Zoom to Extent of Spots
- Save Map for Offline Use
- Lasso Spots for Stereonet
- Add Tag(s) to Spot(s)
- Add Spot(s) to Memo
- Measure Distance
- Switch Scale Bar to Metric (or Imperial)

2.1.4 Symbols



Symbols Button: Tap the star button to open the Map Symbols Menu. This menu provides options to show/hide map symbols and choose what is displayed on the map. Icons, feature names, and options are shown below in Table 1

Icon	Feature Name
Feature Types	
	Horizontal Bedding
	Inclined Bedding
	Overturned Bedding
	Vertical Bedding
	Fault
	Fold Axial Surface
	Fold Hinge
	Horizontal Foliation

Icon	Feature Name
	Inclined Foliation
	Inclined Shear Zone
	Vertical Shear Zone
	Vertical Foliation
	Fracture
	Lineation
	Vertical Contact
	Inclined Contact
	Joint
	Other
	Stretching
	Unspecified
	Vein
Spot Geometry Types	
	Points
	Lines
	Polygons
Labels	
	Dip/Plunge or Name | Dip/Plunge Only | Spot Name Only
Other Options	
	Only 1st Measurements (show/hide)
	Tag Colors (show/hide)
	Show Samples (show/hide)

Table 1. Feature Types, Geometry Types, and Display Options

2.1.5 Map Layers



Map Layers Button: Opens the map display settings, allowing you to choose the **basemap** and any **overlay maps**. The available sections include:

- **Default Basemaps:** Includes Mapbox Topo, Mapbox Satellite, OSM Streets, Geology from Macrostrat, and USGS Hillshade.
- **Custom Basemaps:** Load custom maps through the Home Menu under *Custom Maps*. See Section 3.5.1 for details.
- **Custom Overlays:** To use a custom map as an overlay, first add it as a custom basemap. Then, open the map details in the Home Menu and enable the overlay option. For more information, refer to Section 3.5.1.

2.1.6 Location



My Location Button: Clicking the My Location button will zoom the map to your current location. You will be shown on the map as a blue active location dot .

2.1.7 Scale Bar



Scale Bar: Automatically adjusts as you zoom in or out on the map. Displays the scale in miles, along with the current zoom level.

2.1.8 Add Spots

Note: The default behavior of the Point, Line, and Polygon buttons can also be configured in advance via `Home Menu > Adding New Spots`, where toggle switches provide an alternative to long-pressing the map buttons. See Section 3.7.1 for details.



Add Spot Button: Activates the spot creation tool. When active, the button turns blue. Click anywhere on the map to add a new point spot at that location; the button returns to white once the spot is added.
Spots are the primary structure for storing data, measurements, images, and other information in StraboField projects. For more on the concept of a spot, see Section 1.3. For details on the types of data that can be added to a spot, refer to the Notebook Section 4.



Add Spot at Current Location Button: Press and hold the Add Spot button to switch to this mode. Once selected, clicking the button will add a point spot at your current GPS location—no need to click on the map.



Add Line Button: Activates the line spot tool. When active, the button turns blue. To create a line spot, tap multiple locations on the map, each tap adds a vertex (indicated by a yellow spot), and a yellow dotted line connects the vertices.
When finished, tap **Save New Spot** in the popup at the bottom-right corner of the screen to complete and save the line. To cancel and start over, tap **Cancel** and then reselect the Add Line button.
Figure 4 below shows the save menu interface.



Add Freehand Line Button: Press and hold the Add Line button to switch to freehand mode. In this mode, you can draw a line directly on the map by dragging your finger across the screen. Vertices will be added automatically as you draw.
If you lift your finger, the current line will be ended. If you draw a new line, the previous line will be cleared. To complete the line, tap **Save New Spot** when you finish drawing.
For more on line spots, see Section 1.3. For information on the types of data that can be added to a spot, refer to the Notebook Section 4.



Figure 4. Save menu buttons displayed when adding line or freehand line spots. **Note:** *The save modal indicates the active dataset and the destination where the new spot will be saved. For more information about active datasets, see Section 3.2.1.*



Add Polygon Button: Activates the polygon spot tool. When active, the button turns blue. Tap the map to add vertices (each marked with a yellow dot). After the third vertex, a transparent yellow polygon will appear, updating dynamically as more vertices are added.
To complete and save the polygon, tap **Save New Spot** once all desired vertices have been added (See Figure 4).



Add Freehand Polygon Button: Press and hold the Add Polygon button to switch to freehand mode. Activates the freehand polygon tool. When active, the button turns blue. Draw a polygon directly on the map using your finger. If you lift your finger, the polygon is finalized; starting a new line will clear the previous one.
To save the drawn polygon, tap **Save New Spot** when finished (See Figure 4).



Edit Shape Button: Activates the shape editing tool. When active, the button turns blue. To edit the geometry of a line or polygon spot, tap the feature, select a vertex, and drag it to the desired location. You may make multiple edits to the shape as needed.
To finalize and save your changes, tap **Save Edits**.

3 Home Menu

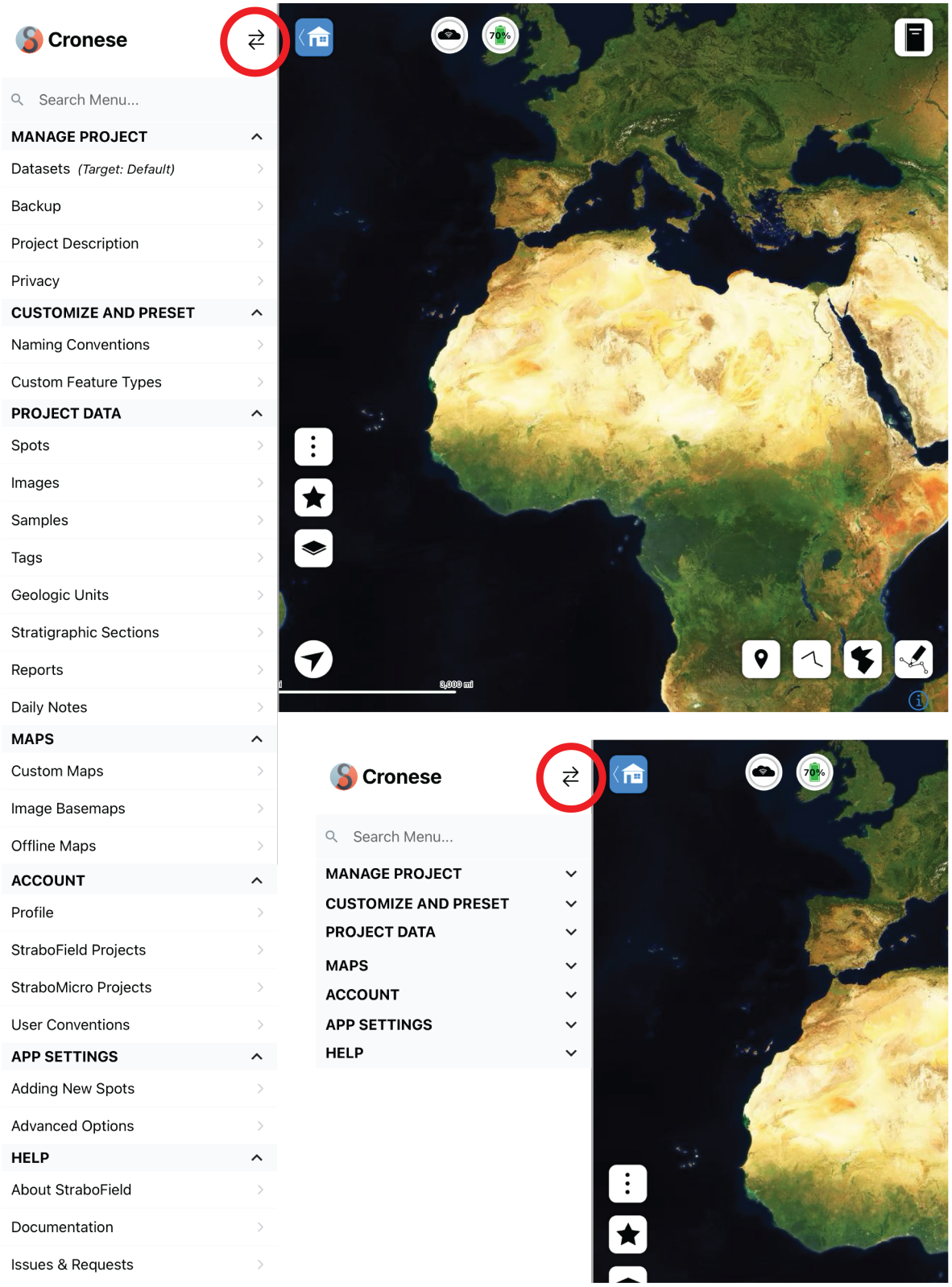

Figure 5. Home Menu Overview, showing menu sections both expanded and collapsed. The search bar allows users to search for a menu page or function. Review the following section for more information.

3.1 Home Menu Header

The header of the Home Menu includes the **StraboSpot** logo, the name of the active project, and a **Switch Project** button (circled in red in Figure 5). Tapping this button navigates the user to the **StraboField Projects** page (see Section 3.6.2), where users can create new projects, as well as save, download, or upload existing ones.

3.2 Manage Project

Manage Project is the first collapsible section of the Home Menu. It contains all available actions for the active project (the currently open project). Refer to the subsections below for details on each option and its functionality.

3.2.1 Datasets

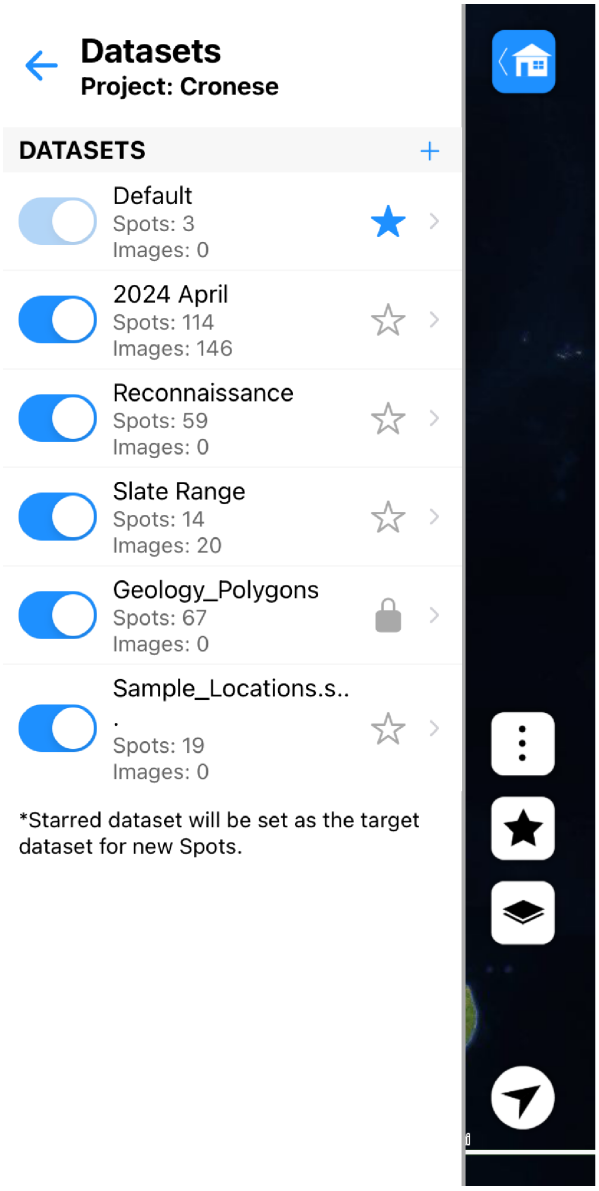

Figure 6. The Datasets Page in the Home Menu.

To create a new dataset, tap the **"+"** icon at the top of the page.

Each dataset entry includes:

- **Name** of the dataset
- **Number of Spots and Images** it contains (displayed beneath the name)
- A **Toggle** to show or hide the dataset on the map
  - If the toggle is off (left and grayed out), the dataset is hidden from the map view.
- A **Star** icon indicating the *Target Dataset*
  - The Target Dataset is where new Spots will be added.
  - This is especially useful when managing multiple datasets.
  - Always verify the correct dataset is selected as the target before adding new Spots.
- A **Lock** icon will replace the Star icon when a Dataset is Read-Only.
  - The lock icon replaces the Target Dataset star icon, as read-only datasets cannot receive new Spots and therefore cannot be set as the Target Dataset.
  - See Section 3.2.2 for more information and an example workflow.

Tapping a dataset opens the **Dataset Details** page, where additional metadata and settings can be reviewed. For more information, see Section 3.2.3.

3.2.2 Read-Only Datasets

The current version of StraboField supports a workflow of one shared project with multiple users and datasets, where each user is responsible for editing a single assigned dataset. The example below outlines the setup for three users and three datasets.

Setup Process

1. **Download the shared project.** All users download the shared project from the server to their respective devices.

2. **Configure dataset visibility and permissions.** Upon download, each user can configure which datasets are visible and whether they are read-only. These settings are also accessible via `Home Menu > Datasets`.

3. **Set read-only permissions.** Each user should set all datasets to visible (optional), then enable read-only on the datasets they are not responsible for editing:

    - **User 1** — Enable read-only on Datasets 2 and 3 (edits Dataset 1 only)
    - **User 2** — Enable read-only on Datasets 1 and 3 (edits Dataset 2 only)
    - **User 3** — Enable read-only on Datasets 1 and 2 (edits Dataset 3 only)

4. **Work simultaneously.** All users can work within their assigned datasets at the same time.

5. **Upload independently.** When uploading, each user's dataset updates independently on the server based on the most recent `modified_timestamp`. Uploads will not overwrite one another's work, provided read-only settings are correctly configured.

Important: Risk of Data Overwrite

If a user forgets to enable read-only on another user's dataset and accidentally makes edits, there is a risk of overwriting data upon upload if their `modified_timestamp` is more recent.

To mitigate this risk, observe the following best practices:

- Double-check read-only settings before beginning each session.
- Frequently save and create ZIP backups to your device.
- Periodically verify that the server is correctly accepting and preserving each dataset.

3.2.3 Dataset Detail

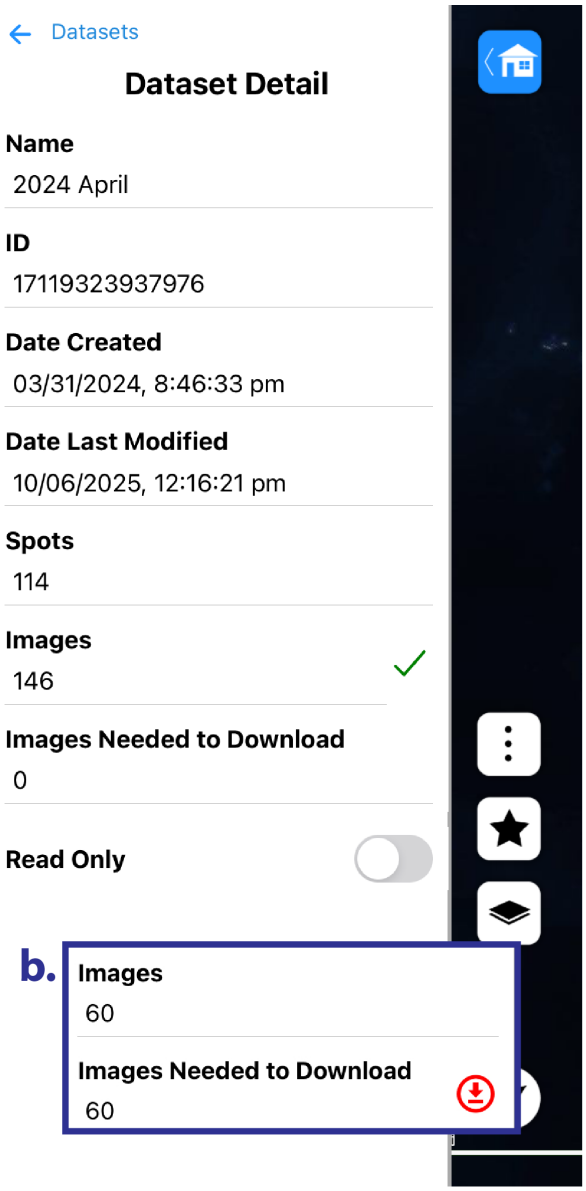

Figure 7. The Dataset Detail page containing specific Dataset metadata. Part b. shows the Image Download button (red). When images exist in a Dataset but are not downloaded, they number will appear in the 'Images Needed to Download' field.

The **Dataset Detail** page is accessed by tapping a dataset listed on the **Datasets** page of the Home Menu.

Displayed Information:

This page provides the following details about the selected dataset:

- **Name**
- **Dataset ID**
- **Date/Time Created**
- **Date/Time Last Modified**
- **Number of Spots**
- **Number of Images**
- **Images Needed to Download**
- **Read-Only**

Image Download Status:

If a project is downloaded without its associated images, the Dataset Detail page will display a red download button. It also indicates how many images still need to be downloaded from the server. See Figure 7b for an example.

Even if all data and metadata are present, images will not display until they are downloaded to the device.

Read-Only Toggle:

The **Read-Only** toggle prevents edits to the dataset, providing an added layer of protection. This is especially useful for viewing data without the risk of accidental changes. Refer to the previous Section 3.2.1 for the Lock icon that appears when a Dataset is Read-Only.

Important

Enabling Read-Only mode does **not** prevent changes made *before* toggling from being uploaded. Any modifications made prior to enabling Read-Only will still sync to the server if the project is uploaded.

3.2.4 Backup

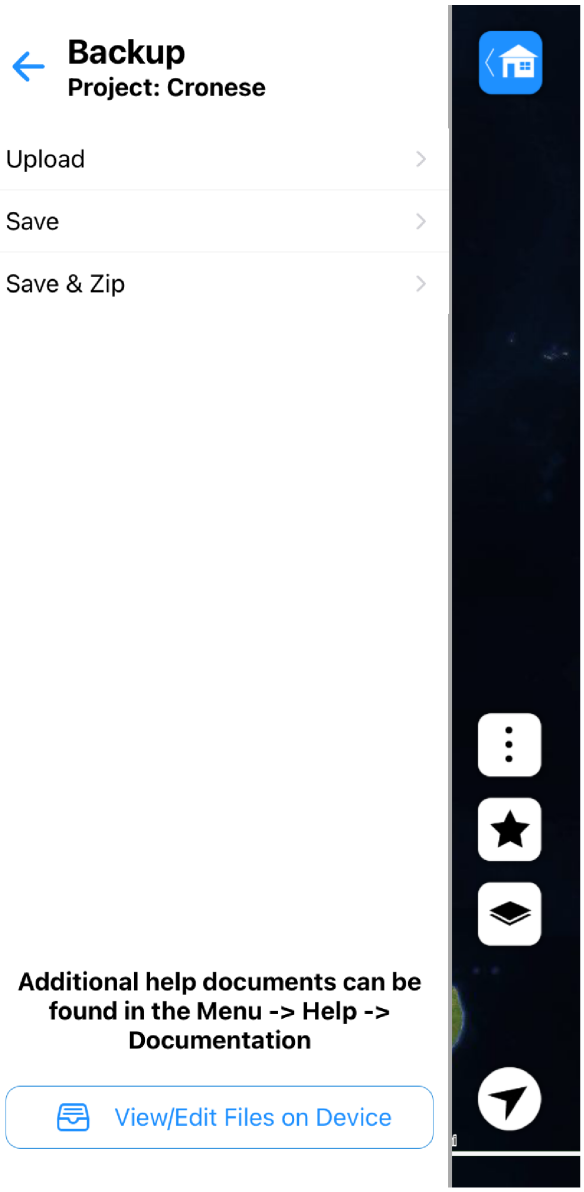

Figure 8. The Backup page on the Home Menu has options for **Uploading** the Active Project to the server, **Saving** the Active Project to the device, and **Save and Zip** the Active Project to the device for easy sharing. The **View/Edit Files on Device** button will open the device file storage application.

Backup

The **Backup** page provides tools for saving and uploading the active project. It includes three main actions:

1. Upload Uploads the current active project to the StraboSpot server.

- Requires an internet connection via Wi-Fi or cellular data.
- Recommended for syncing your most recent work with the server.

2. Save Saves a full copy of the project to the device's local storage.

- Includes all project data: Spots, images, and maps.
- Useful as a local backup or for offline work.

3. Save & Zip Creates a compressed (`.zip`) version of the project and saves it to the device.

- Easier to share (e.g., via AirDrop on Apple devices).
- Contains all project content in a single file.

View/Edit Files on Device iOS Only
At the bottom of the Backup page, the **View/Edit Files on Device** button opens the device's native file management application. This action occurs outside the StraboField app and allows users to manage saved files directly.

3.2.5 Project Description

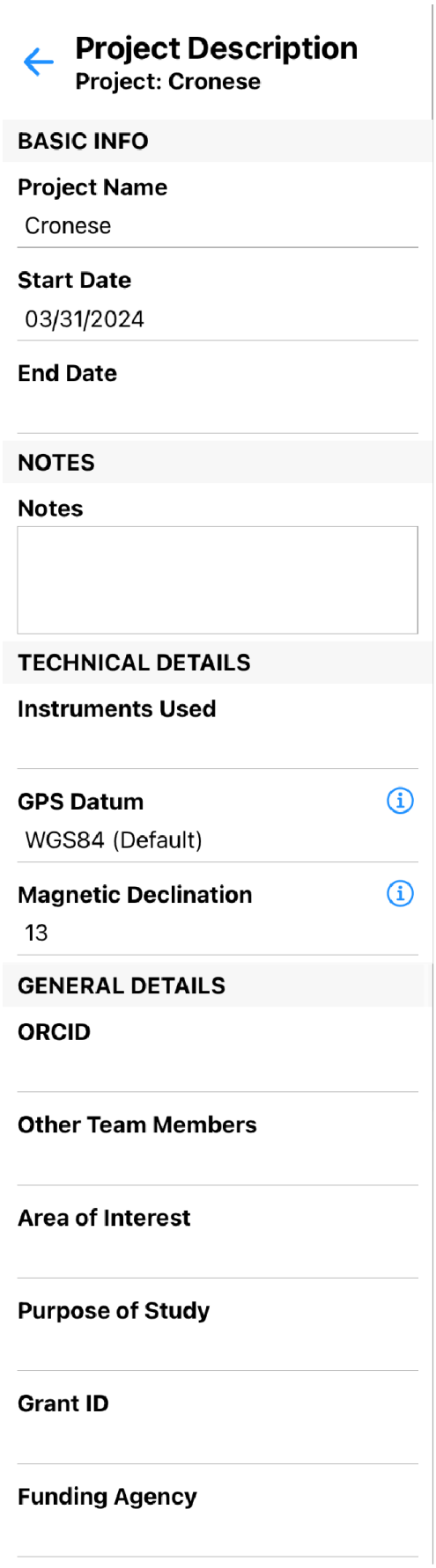

Figure 9. Project Description page.

Project Description

The **Project Description** page contains metadata fields that can be used to describe the overall project or research effort. These fields are grouped into several sections:

Basic Info

- **Project Name**
- **Start Date** (automatically populated)
- **End Date**

Notes

- A long-text field for entering general project notes or descriptions.

Technical Details

- **Instruments Used**
- **GPS Datum** (automatically populated)
- **Magnetic Declination**

General Details

- **ORCID**
- **Other Team Members**
- **Area of Interest**
- **Purpose of Study**
- **Grant ID**
- **Funding Agency**

Some fields, such as **Start Date** and **GPS Datum**, are automatically populated by the application. All other fields are optional and may be filled in at the user's discretion.

3.2.6 Privacy

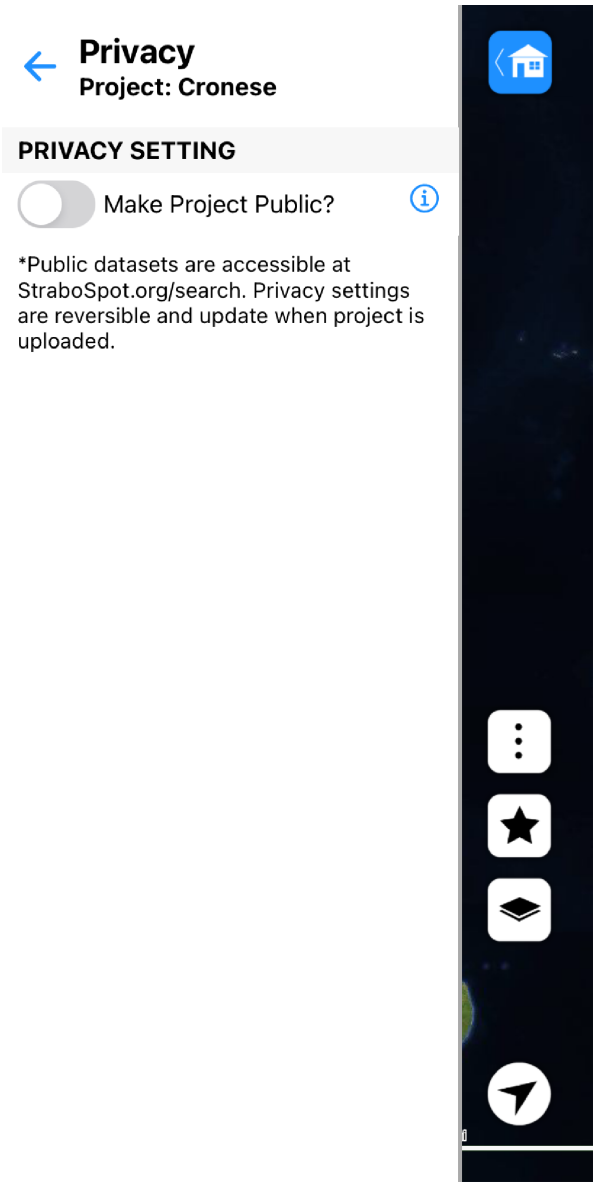

Figure 10. The Privacy page in the Home Menu.

Privacy

The **Privacy** section allows users to control the visibility of their project once it is uploaded to the StraboSpot server.

Make Project Public? Toggle

- When the toggle is **ON**, the project becomes publicly searchable on the StraboSpot website: `https://strabospot.org/search`.
- When the toggle is **OFF**, the project remains private and will not appear in public search results.

The privacy setting can be changed at any time, before or after uploading the project. **Note:** The Project must be uploaded to the StraboSpot server for any Privacy changes to take effect.

3.3 Customize and Preset

The Customize and Preset section is for pages containing user defined components, like Naming Conventions for Spots, Images Basemaps, and Samples or Custom Feature Types defined in the Active Project.

3.3.1 Naming Conventions

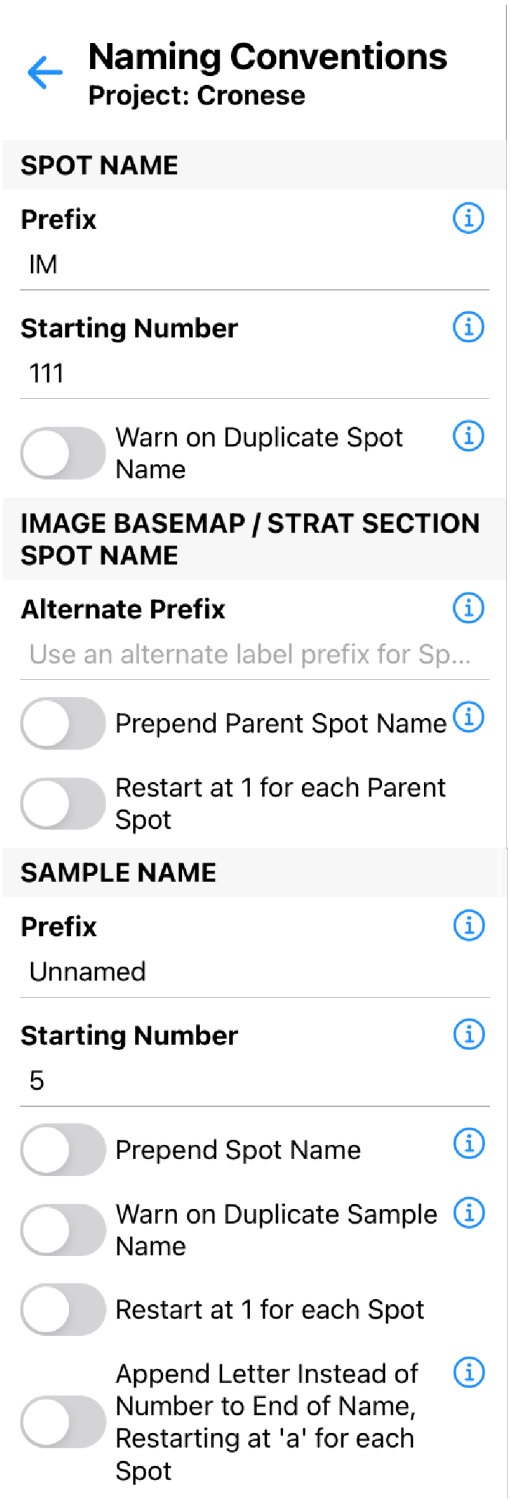

Figure 11. The Naming Conventions page.

The **Naming Conventions** page allows users to define how various elements within the project are named. This includes naming rules for:

- Spots
- Image Basemaps
- Stratigraphic Section Intervals
- Samples

Spot Naming

Users can configure the following options for Spot naming:

- **Prefix** — Custom text added to the beginning of each Spot name.
- **Starting Number** — The initial number used in the naming sequence.
- **Duplicate Name Warning** — A toggle to enable/disable alerts when a Spot name is already in use.

Image Basemaps & Stratigraphic Section Intervals

These items have their own naming configuration, separate from general Spot naming:

- **Alternate Prefix** — Custom prefix distinct from the Spot prefix.
- **Prepend Parent Spot Name** — Option to add the Parent Spot name at the beginning.
- **Restart Numbering for Each Parent Spot** — Resets numbering to 1 within each Parent Spot group.

Sample Naming

Sample naming includes flexible options for precise control:

- **Unique Prefix** — A custom prefix used only for samples.
- **Starting Number** — Starting point for the numbering sequence.
- **Optional Toggles:**
  - **Prepend Parent Spot Name**
  - **Warn on Duplicate Sample Name**
  - **Restart Numbering at 1 for Each Spot**
  - **Append Letter Instead of Number** — Adds a letter (starting at “a”) for each Spot.

3.3.2 Templates

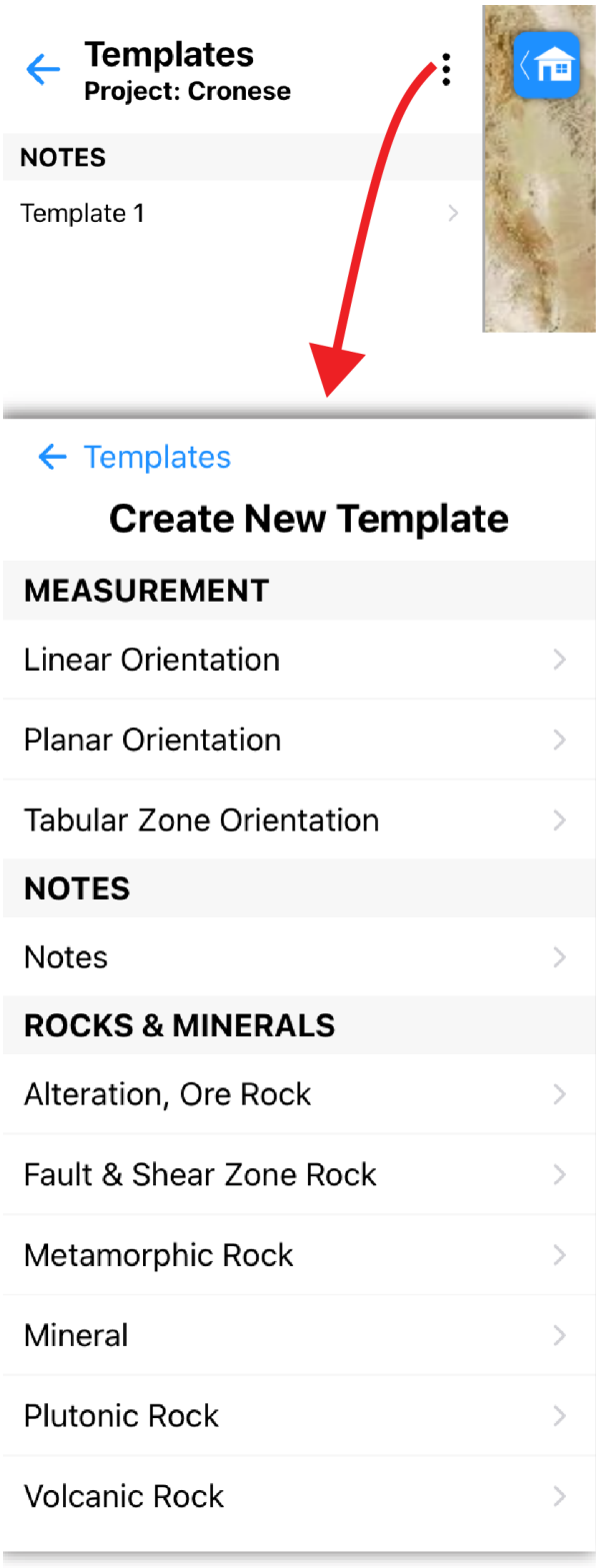

Figure 12. All Templates defined in the Active Project and the list of all Template Types.

Templates

The *Templates* page allows you to create and manage predefined data entries that can be quickly applied during field work. Templates are particularly useful for repetitive data collection workflows where consistent feature types, measurements, or descriptions are recorded across multiple Spots.

Templates are organized by data type. The following template categories are available:

Measurement

Predefined measurement configurations for structural orientation data:

- Linear Orientation
- Planar Orientation
- Tabular Zone Orientation

Notes

Predefined note entries for consistent text-based observations:

- Notes

Rocks & Minerals

Predefined rock and mineral descriptions for common lithologic classifications:

- Alteration / Ore Rock
- Fault & Shear Zone Rock
- Metamorphic Rock
- Mineral
- Plutonic Rock
- Volcanic Rock

Manage Templates

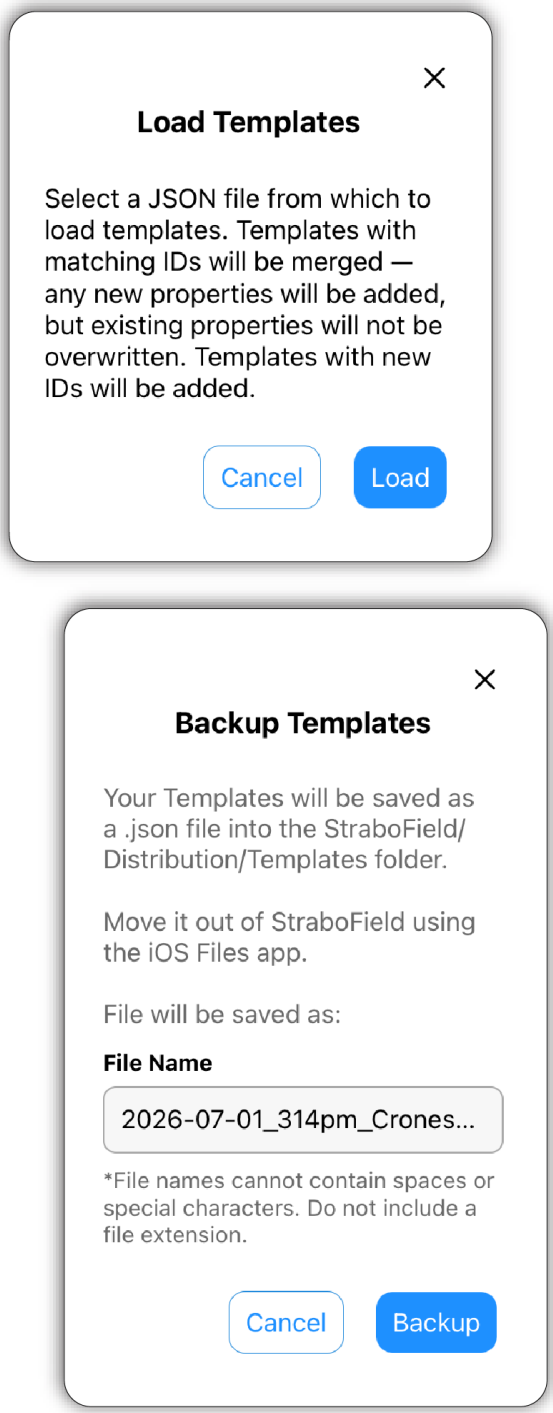

Figure 13. Load and Backup Templates.

Managing Templates

Templates can be backed up and shared between devices or users using the **Backup** and **Load** functions.

Backup Templates

The Backup function exports your templates as a `.json` file saved to the following location on your device:

`StraboField > Distribution > Templates`

To move the file off the device, open the **iOS Files app** and navigate to the folder above. From there, the file can be shared, transferred, or saved to another location such as iCloud Drive.

Use the **File Name** field to customize the export file name before saving. Note the following naming constraints:

- File names cannot contain spaces or special characters
- Do not include a file extension — this is added automatically

Load Templates

The Load function imports templates from a `.json` file on your device. Select the file to begin the import. The following rules apply during import:

- **Matching IDs** — Templates are merged; any new properties are added, but existing properties are not overwritten.
- **New IDs** — Templates are added as new entries.

3.3.3 Custom Feature Types

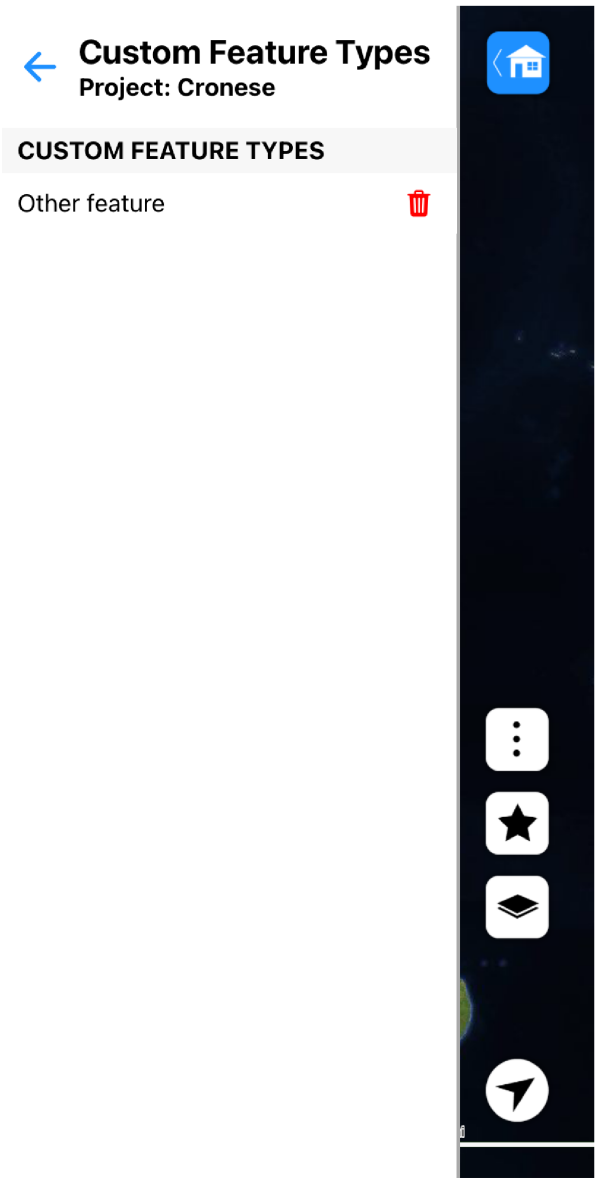

Figure 14. All Custom Features defined in the Active Project.

Custom Feature Types

The **Custom Feature Types** page displays all user-defined feature types created via the **Other Features** page.

Creating a Custom Feature Type

To create a custom feature type:

1. Navigate to the **Other Features** page.
2. Create a new feature.
3. Set the **Feature Type** to **Other**.
4. Enter a new name in the **Other Feature Type** text field.

Once created, the new feature type will appear in the list on the **Custom Feature Types** page.

3.4 Project Data

The **Project Data** section provides access to all types of data within the active project. It displays information from all datasets that have been toggled on. For guidance on enabling or disabling datasets, refer to Section 3.2.1.

This section allows users to locate previously created Spots, search for specific images, and review all image basemaps associated with the project. It offers a list-based interface where data can be viewed, organized, and sorted, providing an alternative to the map view in which data is accessed by geographic location. The Project Data pages are especially useful for reviewing large volumes of information or when searching for data without relying on spatial context.

3.4.1 Spots

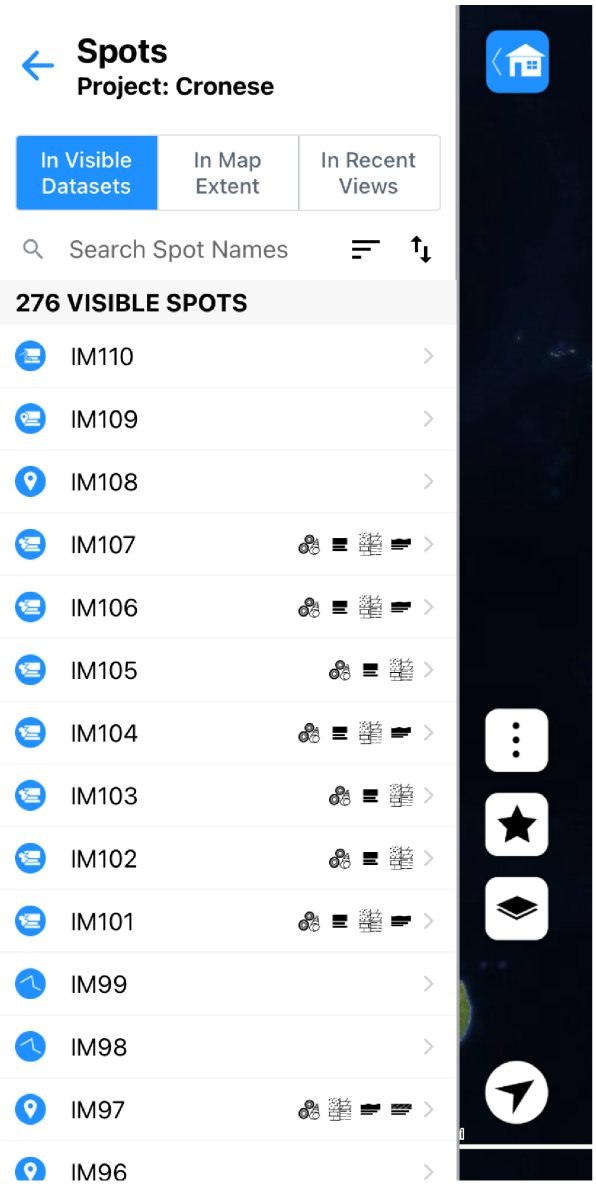

Figure 15. The **Spots** page in the Home Menu lists all Spots within the active project. Blue icons to the left of each Spot name indicate the Spot type; refer to Section 4.1.3 for a guide to Spot type icons and their meanings. Icons on the right side of each entry represent additional metadata that has been added to the Spot. For more information on these icons and their associated metadata, see Section 4.2.

The **Spots** page in the Home Menu displays a list of all Spots within the active project. This list includes only the Spots from datasets that are currently toggled on (visible). Users can sort, filter, and search the list to quickly locate specific Spots or review recent activity.

Sorting Options

The Spots list can be sorted using the following criteria:

- **In Visible Datasets**
- **In Map Extent** — Based on the map's zoom level and location
- **In Recent Views** — Displays the most recently created or modified Spots

Filter Options

Tapping the filter button allows users to sort the list by:

- **Alphabetical order**
- **Date created**
- **Date last modified**
- **Recently viewed**

A **reverse sort** button is also available. It reverses the current sort order (e.g., A–Z becomes Z–A).

Search Function

A search bar is provided at the top of the page, allowing users to search for a Spot by name.

Spot List Display

Each Spot listed includes the following:

- A **blue icon** on the left, indicating the Spot type (see Section 4.1.3 for icon definitions)
- The **Spot name**
- **Metadata icons** on the right, showing which types of metadata have been added

The metadata icons are the same as those used for Notebook Pages. They provide a quick visual summary of the data contained within each Spot. For a complete list of these icons and their meanings, refer to Section 4.2.

3.4.2 Images

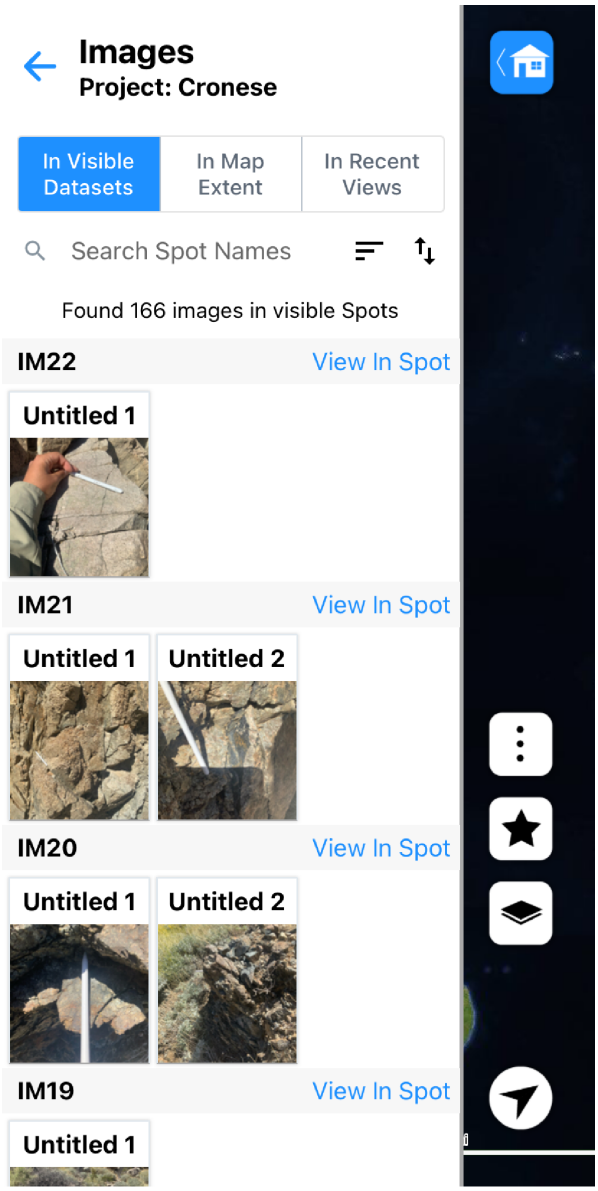

Figure 16. The Images page in the Home Menu.

The **Images** page in the Home Menu provides a list of all images contained within the active project. Only images from datasets that are currently toggled on (visible) will appear. This page allows users to browse image thumbnails, search for specific images, and quickly navigate to the Spots they are associated with.

Sorting Options

Users can sort the image list by:

- **In Visible Datasets** — Shows all images across visible datasets
- **In Map Extent** — Filters images based on the current zoom level and map location
- **In Recent Views** — Displays recently added or modified images

Filter and Search Options

The filter button allows users to sort the image list by:

- **Alphabetical order**
- **Date created**
- **Date last modified**
- **Recently viewed**

The **reverse sort** button flips the current sort order, such as reversing alphabetical order from A–Z to Z–A.

A search bar at the top of the page enables users to search for images by name.

Image List Display

Each image in the list is shown as a thumbnail with its name displayed below. To the right of each image, a **"View in Spot"** button is available. Tapping this button will open the associated Spot in the Notebook Panel, allowing users to view the image in its full context along with other metadata and observations.

3.4.3 Samples

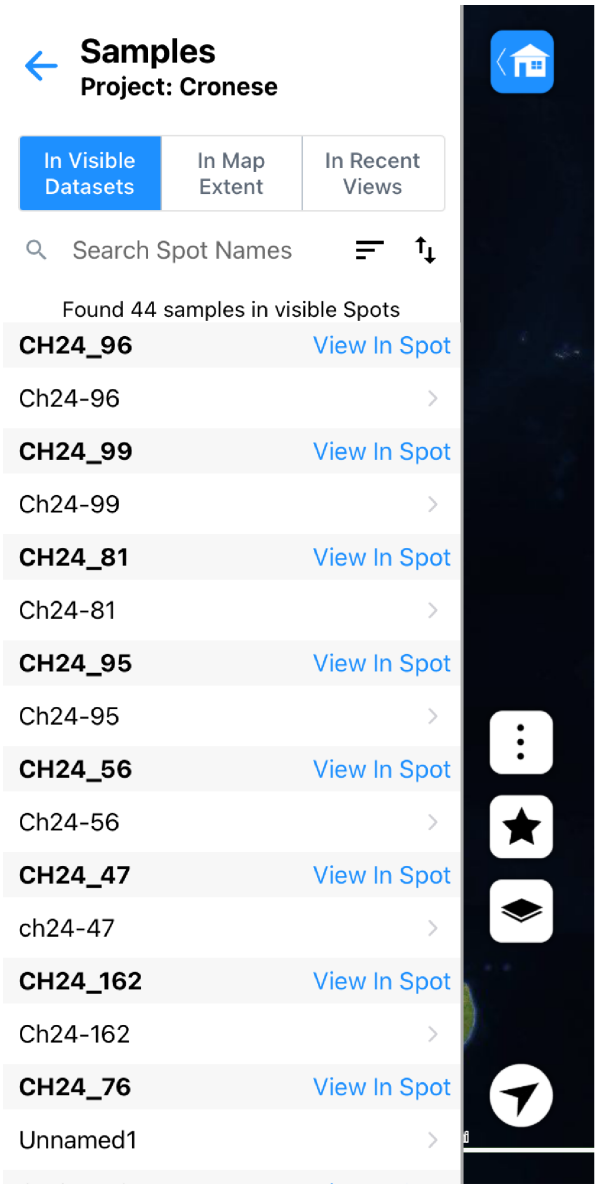

Figure 17. The Samples page in the Home Menu.

The **Samples** page in the Home Menu displays a list of all samples within the active project. Only samples from datasets that are currently toggled on (visible) will appear. This page helps users browse, locate, and manage collected samples, and provides tools for searching, sorting, and reviewing sample details.

Sorting Options

Users can view samples based on the following tabs:

- **In Visible Datasets** — Displays all samples across visible datasets
- **In Map Extent** — Filters samples based on the current zoom level and location of the map
- **In Recent Views** — Shows recently created or modified samples

Filter and Search Options

The filter button allows users to sort the sample list by:

- **Alphabetical order**
- **Date created**
- **Date last modified**
- **Recently viewed**

The **reverse sort** button reverses the selected sort order (e.g., from A–Z to Z–A).
A search bar at the top of the page allows users to search for samples by name.

Sample List Display

Each sample is listed with the following information:

- **Sample name**
- **Parent Spot name** — Indicates which Spot the sample is associated with
- A **"View in Spot"** button — Opens the associated Spot in the Notebook Panel for detailed review

This layout helps users quickly identify and access samples and understand their spatial or observational context within the project.

3.4.4 Tags

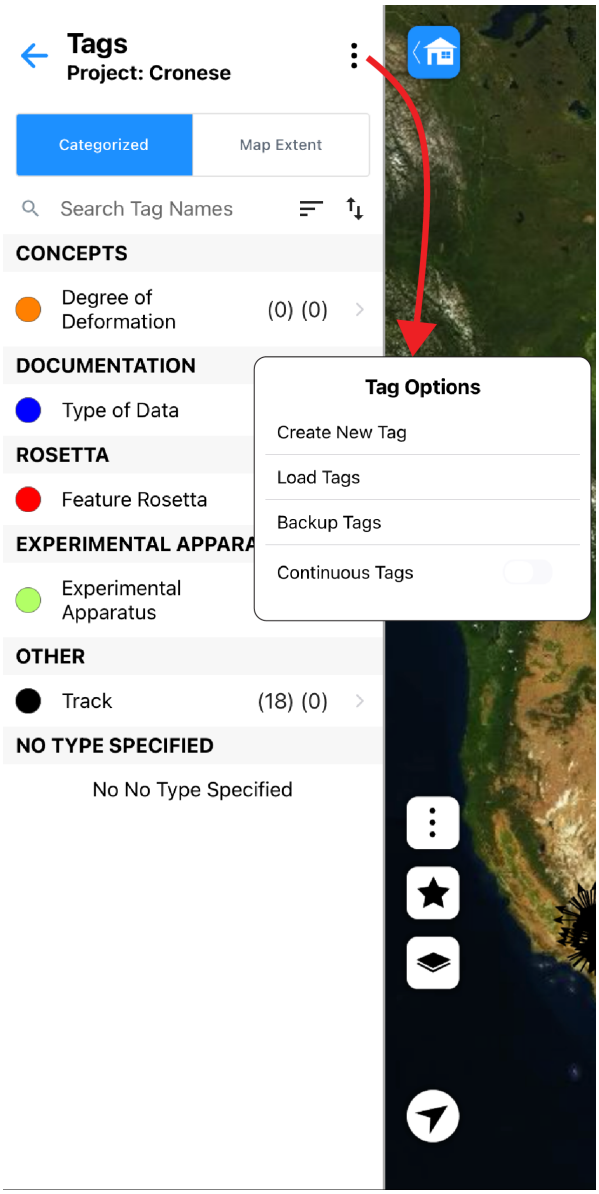

Figure 18. The Tags page in the Home Menu where all tags in the Active Project are displayed.

The **Tags** page in the Home Menu displays all tags used within the active project. At the top of the page, users can choose to display tags in two ways:

- **Categorized** — Displays tags grouped by tag type
- **Map Extent** — Filters tags to only those associated with Spots currently visible on the map

Tag Categories

Tags are organized into the following categories:

- Concepts
- Documentation
- Rosetta
- Experimental Apparatus
- Other
- No Type Specified

Tags created within each category are listed under the appropriate heading. Each tag is followed by a count in parentheses, showing:

- Number of tagged Spots
- Number of tagged Features

Continuous Tagging

Users can enable **Continuous Tagging** to apply the same tag across multiple Spots efficiently. This feature is particularly useful when recording repeated observations, such as structural measurements within a single rock unit. For example, users could apply a tag like *S1 foliation* to a series of similar structural measurements without re-selecting the tag each time.

Creating Tags

New tags can be created directly from the Tags page using the same modal used on the Notebook Page (see Section 4.2.5 for more information). All tag creation functionality, including naming and categorization, follows the same process described in that section.

Tag Color

Users can view and change the color of a tag by tapping on the tag name. This opens the Tag Detail page, which displays the current tag color as a colored square, along with the tag's metadata, a list of tagged Spots, and a list of tagged Features.

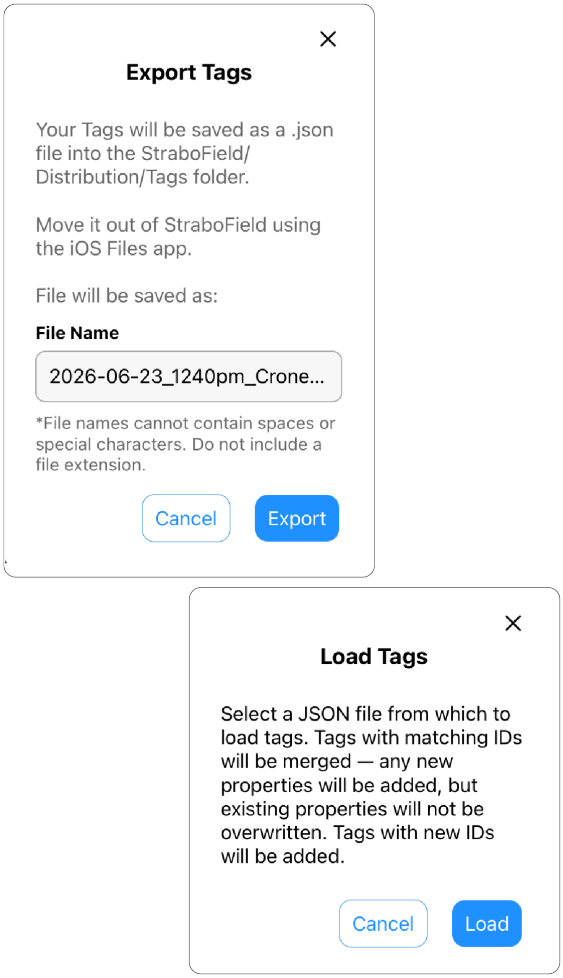

Figure 19. The Export and Load Tag modals from the Tags Page in the Home Menu where all tags in the Active Project are displayed.

Export Tags

Tags can be exported from StraboField projects, allowing users to share tags between projects or transfer them to other devices. Exported tags are saved on the device as a `.json` file at:

`Device Files > StraboField > Distribution > Tags`

From this location, the file can be sent to another device or saved elsewhere. Use the **File Name** text box to customize the file name before exporting.

Finding Exported Files on Your Device

The location of exported files differs by operating system.

Android

- Open the **Files** app (or a file manager of your choice).
- Navigate to `Internal Storage > StraboField > Distribution > Tags`.
- From here, the file can be opened, shared, or moved to another location.

Apple (iOS)

- Open the **Files** app.
- Navigate to `On My iPhone/iPad > StraboField > Distribution > Tags`.
- From here, the file can be opened, shared via AirDrop, email, or other apps, or moved to iCloud Drive or another location.

Load Tags Select a `.json` file to load tags. The following rules apply during import:

- **Matching IDs:** Tags are merged; new properties are added, but existing properties are not overwritten.
- **New IDs:** Tags are added as new entries.

3.4.5 Geologic Units

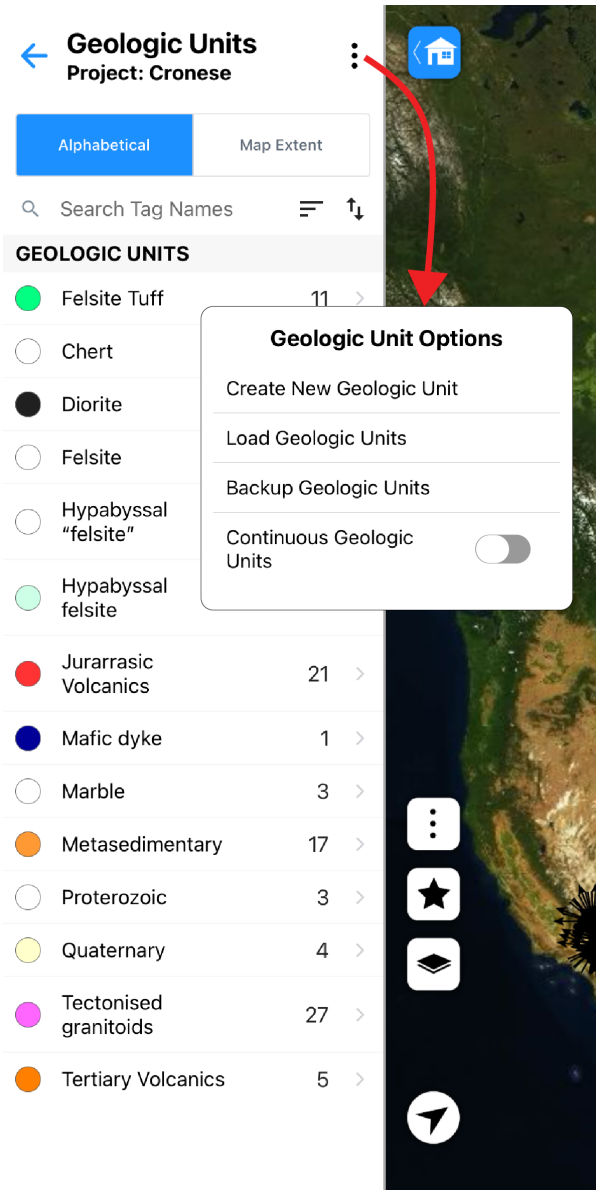

Figure 20. The Geologic Units page in the Home Menu shows all Geologic Units in the Active Project.

Geologic Units are managed through the Home Menu and function similarly to Tags. For creating new units, refer to the Geologic Units page in the Notebook (Section 4.2.1).

Sorting Options

- **Alphabetical** — Displays all units sorted alphabetically by name
- **By Map Extent** — Filters units to only those visible within the current map view
- **Date Created** — Sorts units by the date they were created, with the most recently created units displayed first
- **Date Last Modified** — Sorts units by the date they were last edited, with the most recently modified units displayed first
- **Recently Viewed** — Displays units in order of when they were last opened, with the most recently accessed units displayed first
- **Temporal** — Sorts units by their assigned geologic age, from youngest to oldest

List Display and Interaction

- Each unit is listed with a count of how many Spots or Features are tagged with it.
- Tapping a unit opens a detail panel showing:
  - Unit metadata
  - Associated Spots and Features
- Units can be assigned a display color for map visualization.

Creating and Editing Units

- Use the **Create New Geologic Unit** button to define a new unit.
- Selecting an existing unit opens its editable detail panel, where users can modify:
  - Name, Label, Type, Age
  - Description and Notes (scrollable)
- A **Delete** option is available to remove the unit.
- The color can be adjusted below the editing panel.

Continuous Tagging

Enable **Continuous Geologic Units** to automatically apply the selected unit to all new Spots until toggled off. This is useful when mapping a single rock unit across multiple locations.

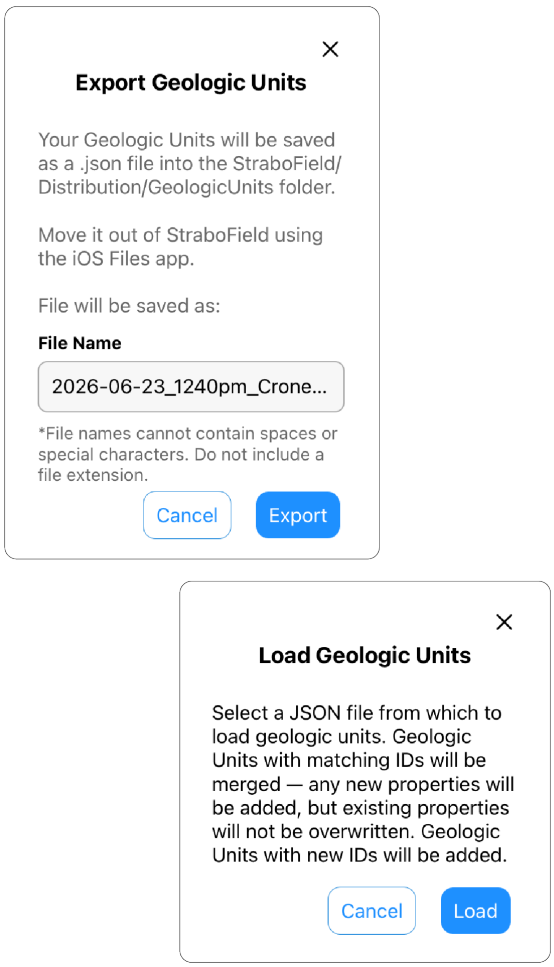

Figure 21. The Export and Load Geologic Unit modals from the Geologic Unit Page in the Home Menu where all geologic units in the Active Project are displayed.

Export Geologic Units

Geologic units can be exported from StraboField projects, allowing users to share units between projects or transfer them to other devices. Exported geologic units are saved on the device as a `.json` file at: `Device Files > StraboField > Distribution > Geologic Units` From this location, the file can be sent to another device or saved elsewhere. Use the **File Name** text box to customize the file name before exporting.

Finding Exported Files on Your Device The location of exported files differs by operating system. **Android**

- Open the **Files** app (or a file manager of your choice).
- Navigate to `Internal Storage > StraboField > Distribution > Geologic Units`.
- From here, the file can be opened, shared, or moved to another location.

Apple (iOS)

- Open the **Files** app.
- Navigate to `On My iPhone/iPad > StraboField > Distribution > Geologic Units`.
- From here, the file can be opened, shared via AirDrop, email, or other apps, or moved to iCloud Drive or another location.

Load Geologic Units Select a `.json` file to load geologic units. The following rules apply during import:

- **Matching IDs:** Geologic units are merged; new properties are added, but existing properties are not overwritten.
- **New IDs:** Geologic units are added as new entries.

3.4.6 Stratigraphic Sections

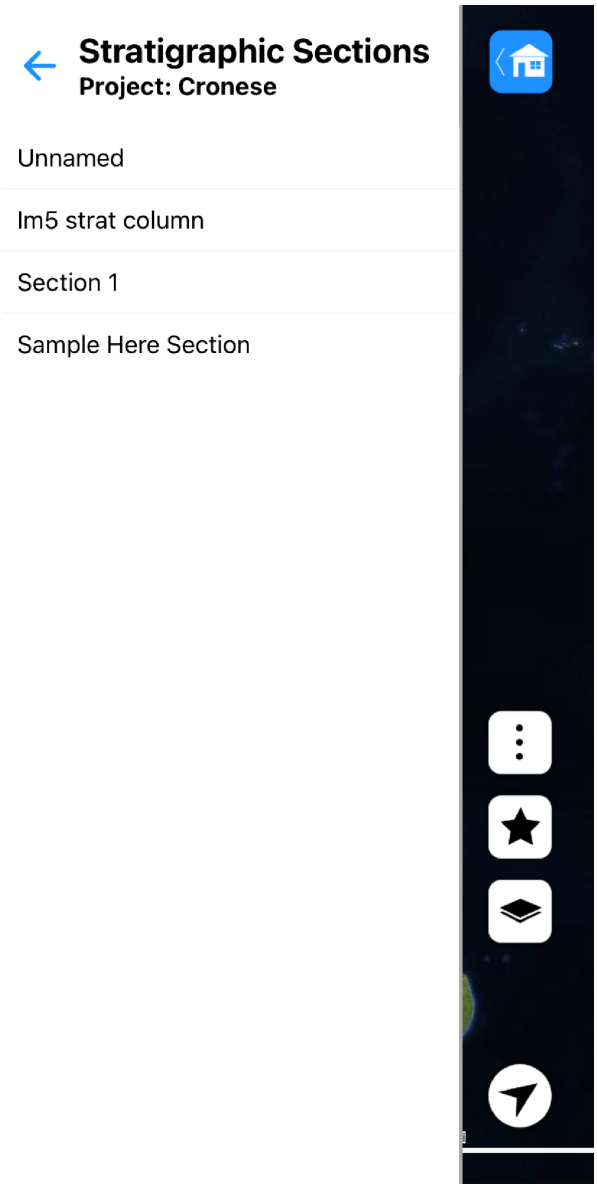

Figure 22. The Stratigraphic Sections page in the Home Menu lists all Stratigraphic Sections in the Active Project.

Stratigraphic Sections

The **Stratigraphic Sections** page in the Home Menu lists all stratigraphic sections in the active project. Selecting a section from the list will load it as the active basemap and open its corresponding page in the Notebook Panel for further viewing or editing.

Add New Stratigraphic Sections

To add new Stratigraphic Sections to exiting Spots refer to Section 4.2.22.

3.4.7 Memos

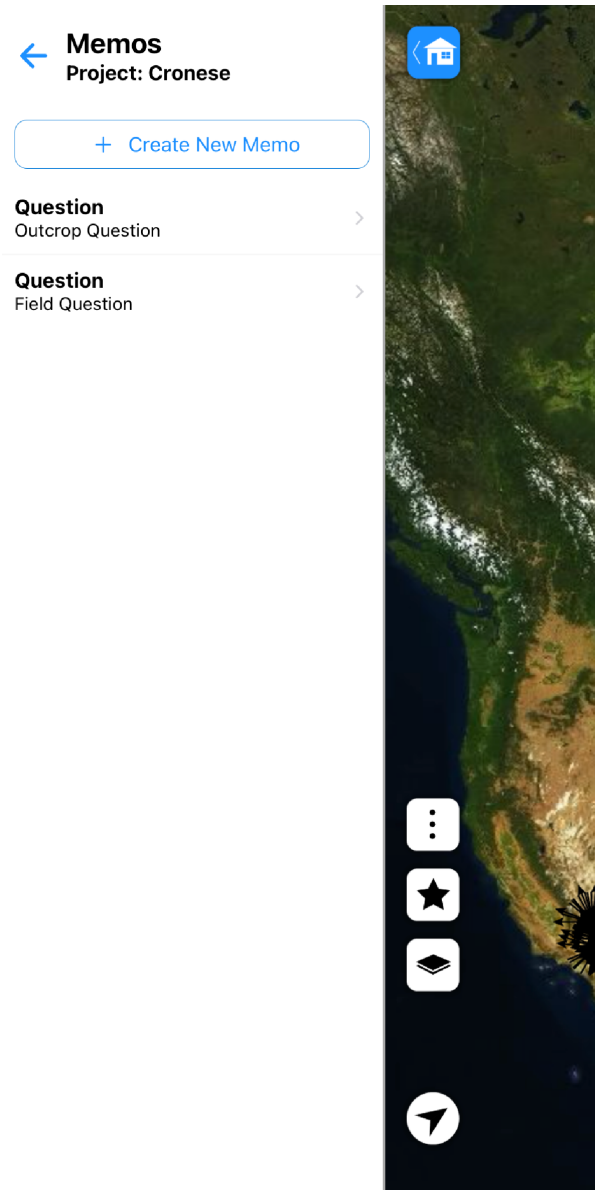

Figure 23. The Memos page in the Home Menu lists all Memos in the Active Project.

Memos

The **Memos** page in the Home Menu displays all memos associated with the active project. Memos are stored at the project level and do not need to be linked to specific Spots.
Each entry in the list shows the **Memo Type** and **Memo Name**. A **Create New Memo** button is available to add a new memo. For details and screenshots on creating memo, refer to the Notebook Page Memos Section (Section 4.2.8).

3.4.8 Daily Notes

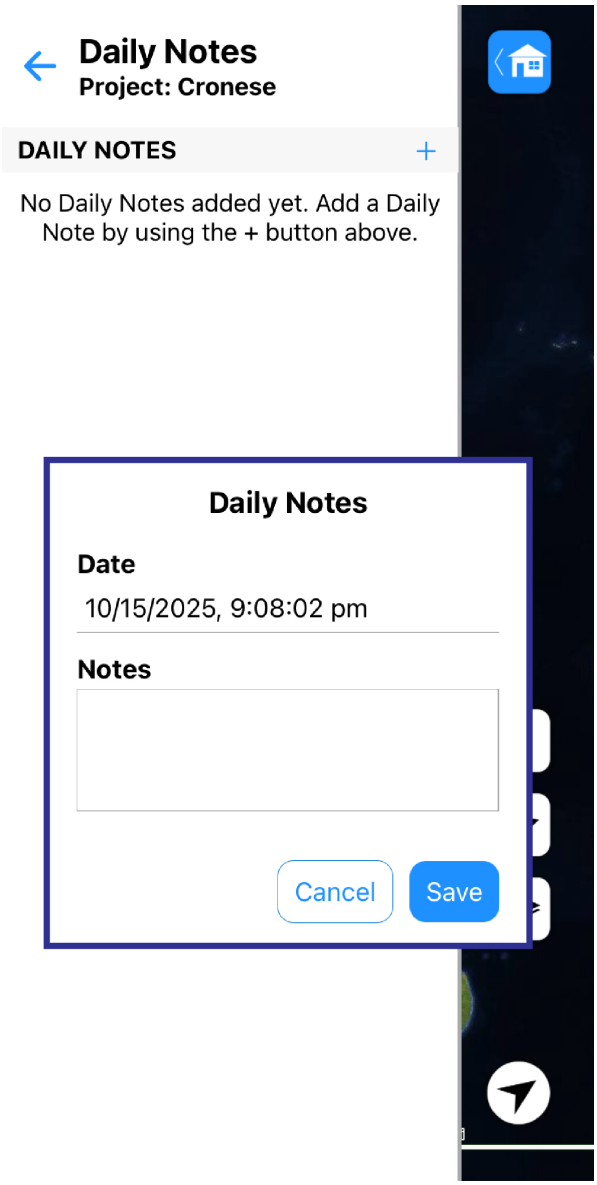

Figure 24. The Daily Notes page in the Home Menu

Daily Notes

The **Daily Notes** page in the Home Menu is the dedicated location for creating and viewing timestamped text entries. Notes are entered using a simple text input modal and are automatically time-stamped upon creation. All notes are displayed in chronological order. See the associated figure for an example of the Daily Notes input modal.

3.5 Maps

The **Maps** section of the Home Menu provides tools for managing all maps within the application. Several default basemaps are available for new users by default (see Section 2.1.5). This section also includes pages for managing custom maps, image basemaps, and offline maps.

3.5.1 Custom Maps

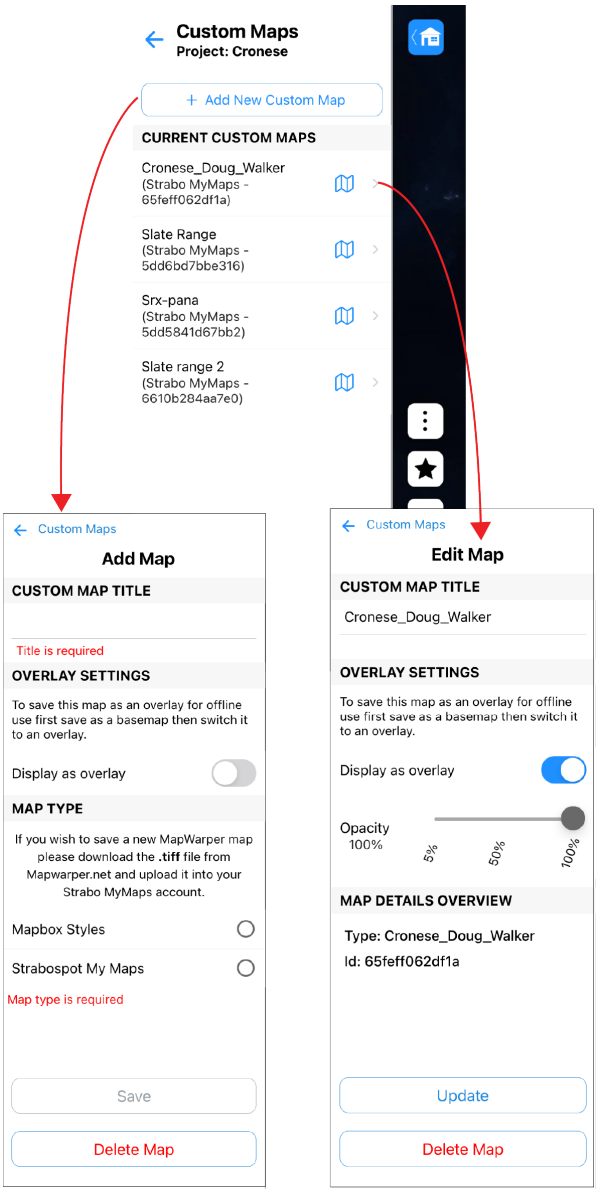

Figure 25. The Custom Maps page in the Home Menu lists all Custom Maps in the Active Project.

Custom Maps

The **Custom Maps** page in the Home Menu allows users to manage and add custom maps to the active project. All custom maps are listed by their title and ID.

Map List and Actions

- Each listed map includes:
  - **Map Title**
  - **Map ID**
- Available actions:
  - Click the **blue map icon** to zoom to and display the selected map on the main map.
  - Click the **map name** to open the **Edit Map** page.

Edit Map Page

When editing a custom map, the following fields and settings are available:

- **Custom Map Title** — editable name of the map
- **Overlay Settings**
  - Toggle **Display as Overlay** on or off
  - Adjust **Opacity** using a slider (only when overlay is enabled)
- **Map Details Overview**
  - Displays the **Map Type** and **Map ID**
- Users can update existing settings or delete the custom map entirely.

Add New Custom Map

To add a new custom map, click the **Add New Custom Map** button. This opens the Add Map page with the following required and optional fields:

- **Custom Map Title** — required
- **Overlay Settings** — optional and editable later
- **Map Type** — select from:
  - **Mapbox Styles** — requires a valid Mapbox Style URL
  - **StraboSpot My Maps** — requires a Strabo My Maps ID

3.5.2 Image Basemaps

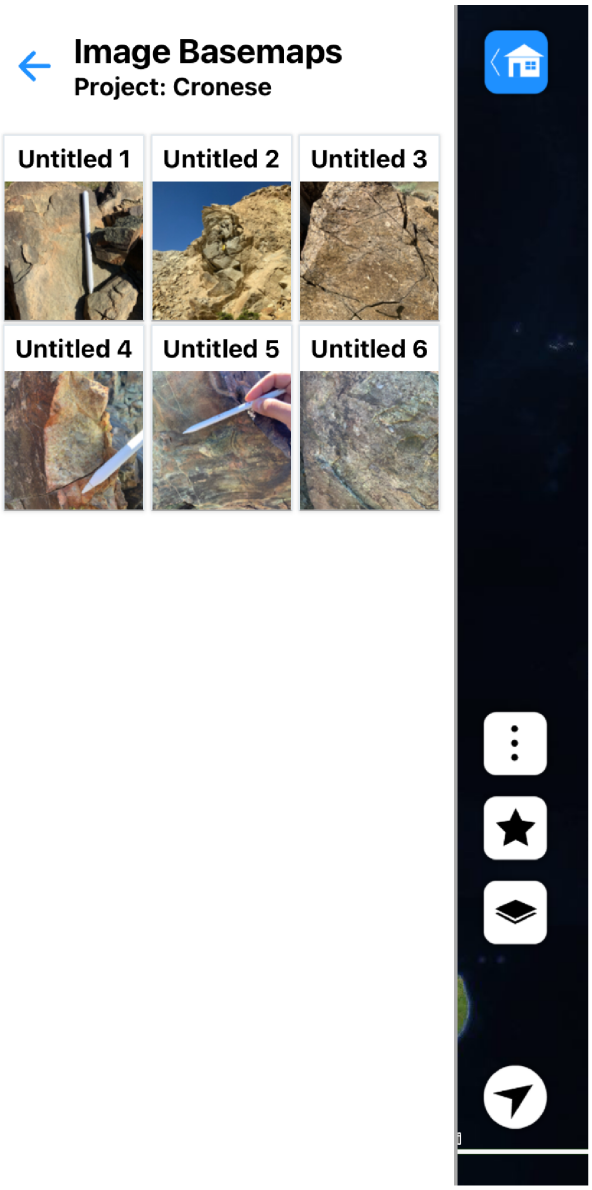

Figure 26. The Image Basemaps page in the Home Menu shows all images turned into Image Basemaps. Clicking an image will open the Image Basemap on the Main Map screen.

Image Basemaps

The **Image Basemaps** page in the Home Menu displays thumbnails of all images that have been converted into image basemaps. Each thumbnail is labeled with its corresponding image title.
Clicking a thumbnail will open the selected image basemap in the main map view.

3.5.3 Offline Maps

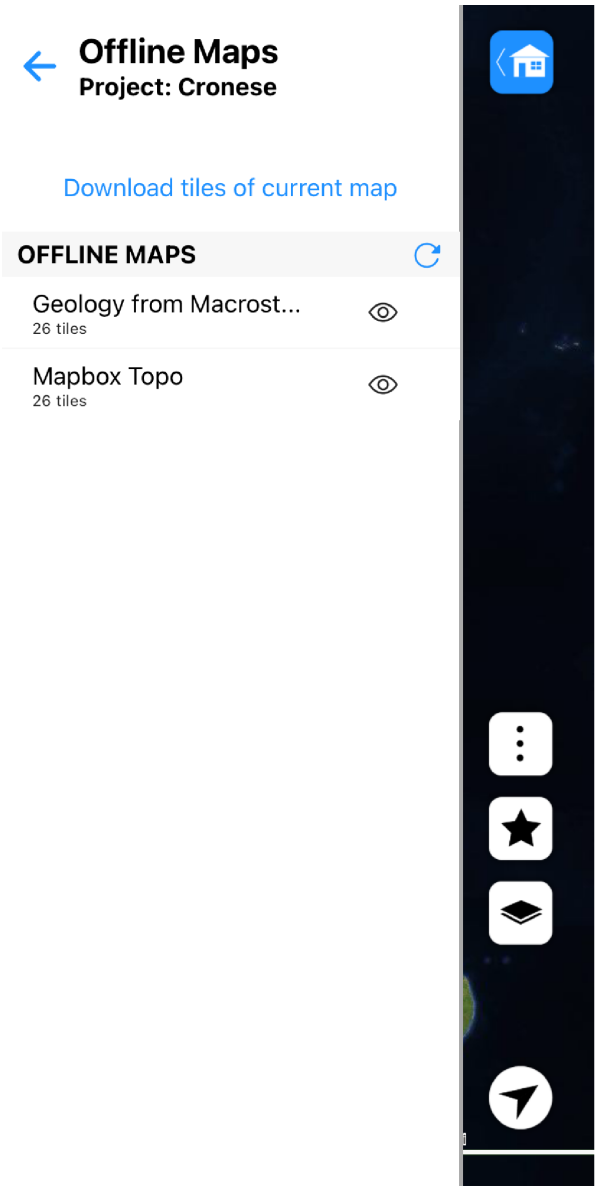

Figure 27. The Offline Maps page in the Home Menu lists all Offline Maps in the Active Project.

Offline Maps

The **Offline Maps** page in the Home Menu lists all offline map tiles downloaded for the active project. Each offline map entry includes the map name and the number of tile types associated with it.

To download offline tiles, users must navigate to the desired area on the main map screen and select the download option. A modal will appear, allowing users to choose the zoom levels for the tile download.

Each downloaded map includes a **show/hide (eye)** icon that toggles its visibility on the main map.

3.6 Account

The **Account** section of the Home Menu contains pages related to the user's StraboSpot account. These include access to the user profile, other StraboField projects associated with the account, any linked StraboMicro projects, and User Conventions — preferences that are stored at the user level and apply across all projects. Review the following subsections for more information.

3.6.1 Profile

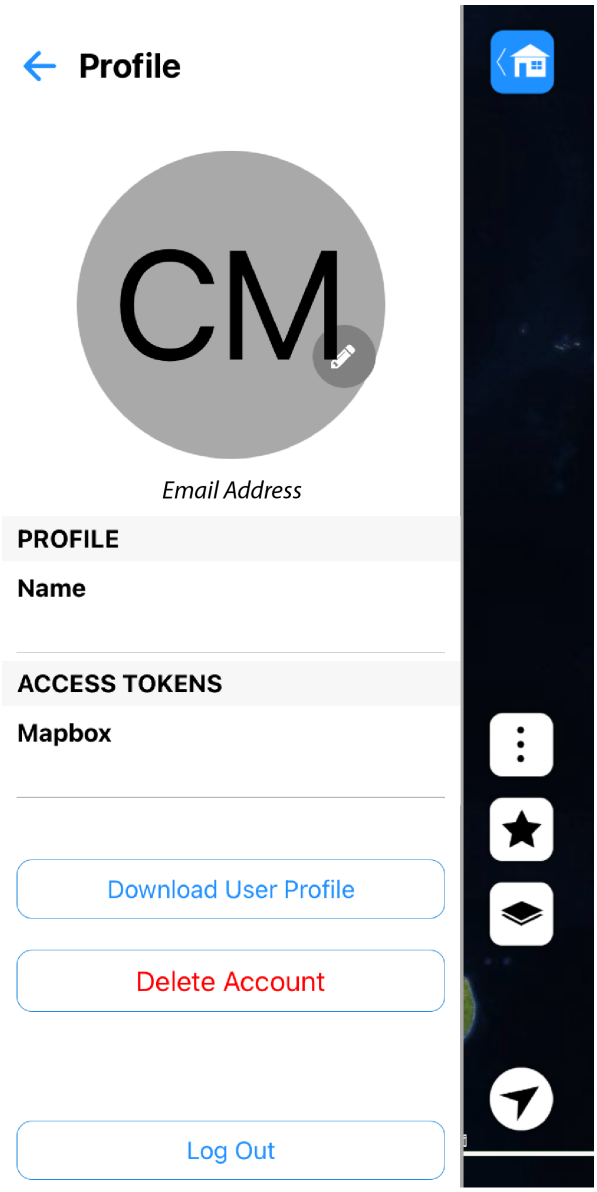

Figure 28. The Profile page in the Home Menu.

The **Profile** page in the Home Menu displays key information and account management options for the user:

- **Account Information:**
  - Email address associated with the user account
  - User's name
  - Any linked Mapbox Access Tokens
- **Available Actions:**
  - Download the user profile
  - Delete the user profile
  - Log out of the application

3.6.2 StraboField Projects

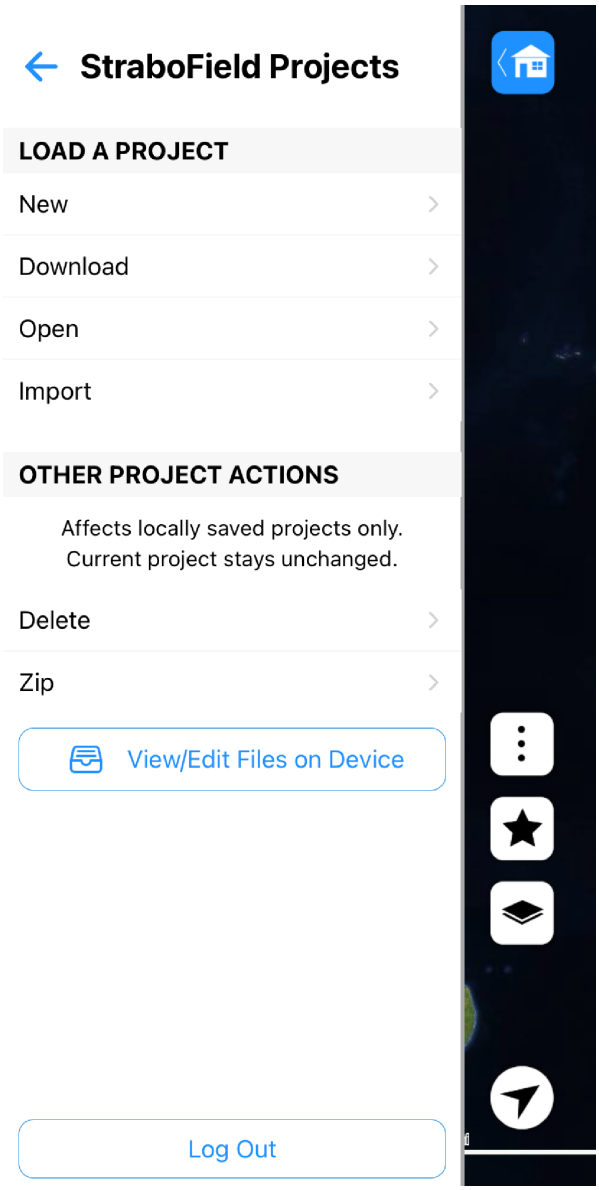

Figure 29. The StraboField Projects page in the Home Menu is where users can perform StraboField Project actions.

The **StraboField Projects** page in the Home Menu can be accessed in two ways:

- From the main list in the Home Menu
- By clicking the **Switch Projects** arrow icon next to the project name in the Home Menu header (see red circles in Figure 5)

Load a Project

The top section of the page offers several options for loading a project into the application:

- **New** – Create a new blank project.
- **Download** – Load a project from the StraboSpot server (internet connection required).
- **Open** – Load a project that is locally saved on the device in the `StraboSpot` folder.
- **Import** – Load a project file that exists on the device but is not yet saved in the `StraboSpot` folder.

Other Project Actions

This section includes actions that apply to locally saved projects:

- **Delete** – Remove a saved project from the device.
- **Zip** – Create a compressed version of a saved project for easier sharing or backup.

Note: These actions apply only to saved projects on the device, not to the currently active project.

Additional Options

- **View/Edit Files on Device** (iOS Only)– Opens the device's file management application outside of the StraboField app.
- **Log Out** – Logs the user out of the StraboField application.

3.6.3 StraboMicro Projects

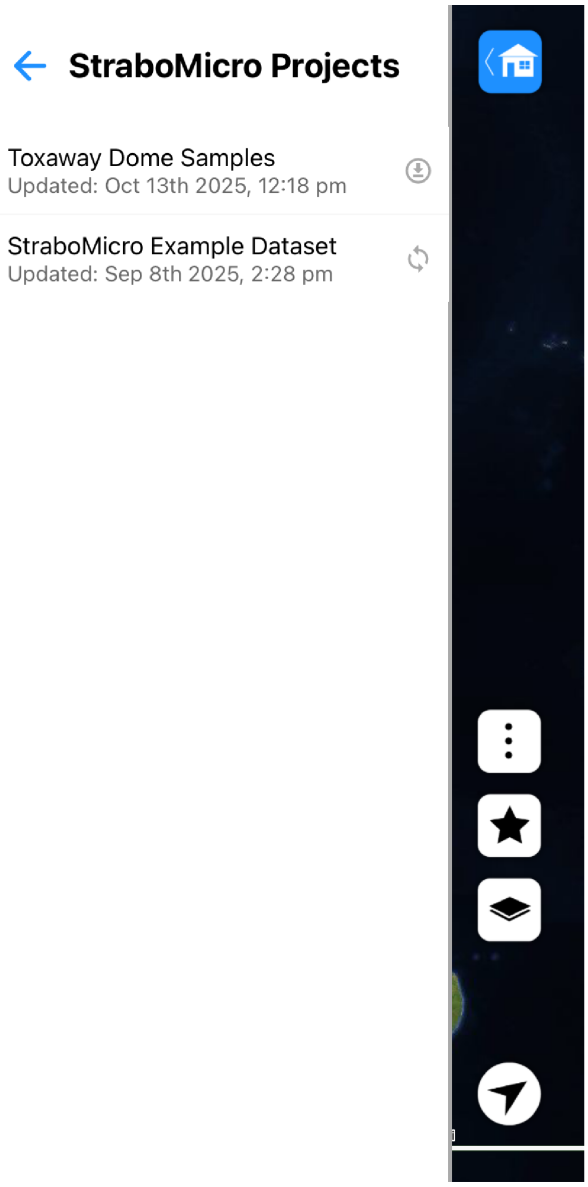

Figure 30. The StraboMicro Projects page in the Home Menu lists all StraboMicro projects associated with the user account that have been uploaded to the StraboSpot server.

The **StraboMicro Projects** page in the Home Menu displays all StraboMicro projects associated with the user's StraboSpot account. Each listing includes:

- **Project Name**
- **Last Uploaded Timestamp** – showing when the project was last synced to the StraboSpot server

Available Actions:

- **Download** – Downloads the selected StraboMicro project from the server to the device for local viewing.
- **Refresh** – Updates the project by downloading the most recent version from the server.

Clicking on a project listing opens a PDF view of the StraboMicro project. The PDF can be:

- Viewed directly within the StraboField application, or
- Downloaded to the device for viewing outside the app

3.6.4 User Conventions

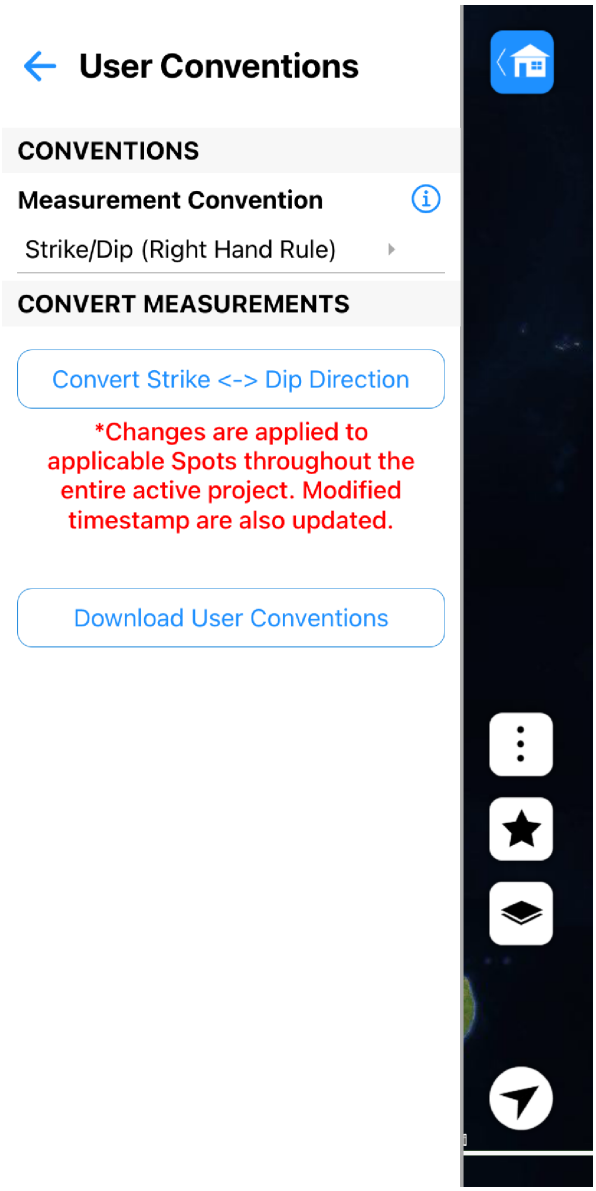

Figure 31. The User Conventions page in the Home Menu has user defined preferences that are stored at the user level, not only associated with the project.

The **User Conventions** page in the Home Menu allows users to view and modify their preferences, which are stored at the account level (associated with the user account, not limited to the active project).

Measurement Convention:

- Users can select between two measurement conventions:
  - Strike and Dip (Right Hand Rule)
  - Dip and Dip Direction
- A **Convert All Measurements** button enables a one-time calculation to update all existing measurements if the convention changes (e.g., converting from Strike/Dip to Dip/Dip Direction). This updates the strike, dip, and dip direction fields in the measurement section of the notebook panel for spots with recorded measurements.

User conventions can also be downloaded to the application from the StraboSpot server.

3.7 App Settings

The **App Settings** section in the Home Menu contains pages for configuring settings specific to the StraboField application on the device. This includes options such as adding shortcut buttons and enabling testing mode for the application.

3.7.1 Adding New Spots

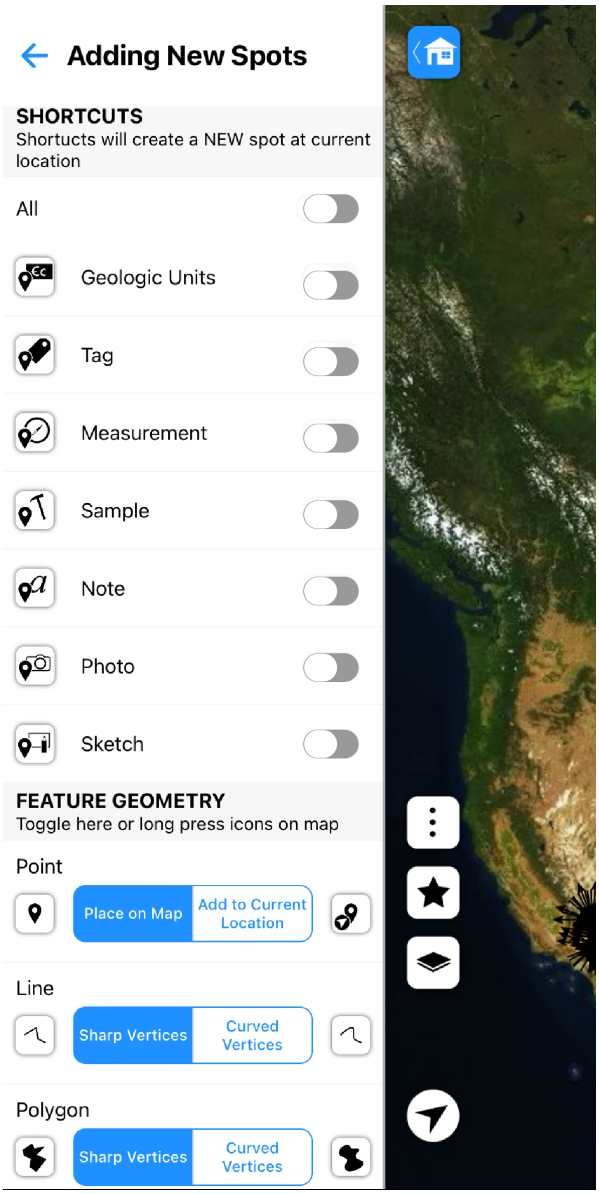

Figure 32. The Adding New Spots page in the Home Menu is how users can add shortcut buttons to the Main Map.

The **Adding New Spots** page includes toggles to add shortcut buttons to the Main Map interface. These shortcut buttons allow quick creation of new spots at the user's current location with predefined data types.

The available shortcut buttons include:

- Geologic Units
- Tag
- Measurement
- Sample
- Note
- Photo
- Sketch

For example, when collecting measurements along an outcrop, the user can simply tap the *Measurement* shortcut button to create a new spot, take a measurement, save it, and continue without interrupting their workflow. This streamlines the process by replacing the traditional sequence of adding a spot, opening the measurement page, taking a measurement, and then saving.

Feature Geometry

Feature geometry settings control how Spot shapes are placed and drawn on the map. These settings can be configured in the Home Menu, or changed on the fly by **long-pressing** (press and hold) the Point, Line, or Polygon buttons directly on the map — a quick and convenient option when working in the field without navigating away from the map view.

Each geometry type has two behavior options:

- **Point**
  - *Place on Map* — Tap the map to place the point at a chosen location
  - *Add to Current Location* — Automatically places the point at your current GPS position
- **Line**
  - *Sharp Vertices* — Draws straight-edged lines between tapped points
  - *Curved Vertices* — Draws smooth, curved lines between tapped points
- **Polygon**
  - *Sharp Vertices* — Draws straight-edged polygons between tapped points
  - *Curved Vertices* — Draws smooth, curved polygons between tapped points

3.7.2 Advanced Options

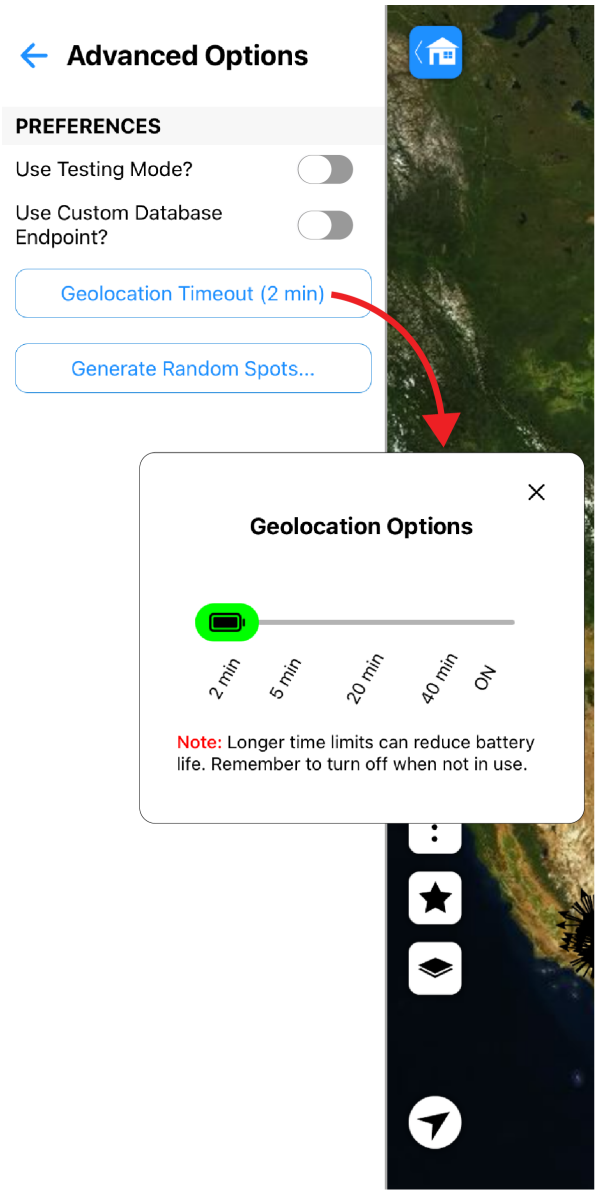

Figure 33. The Advanced Options page in the Home Menu.

Database Endpoint and Testing Mode

- **Database Endpoint:** Users can change the database endpoint if they are using a custom version of StraboSpot.
- **Testing Mode:** This mode is intended for the internal StraboSpot team to test the application.

Geolocation Timer

The Geolocation Timer controls how long the app actively tracks your device location before automatically turning off. Keeping location active makes Spot placement faster and more accurate, particularly when working offline where acquiring a GPS fix can take additional time.

The following options are available:

- **2 Minutes** — Default setting; location turns off automatically after 2 minutes
- **5 Minutes**
- **20 Minutes**
- **40 Minutes**
- **ON** — Location remains active for the duration of the session

Battery Usage Note

Active location tracking increases battery consumption. For extended field sessions, particularly in areas without power access, use longer timer settings or the **ON** option with this in mind. If working offline where GPS acquisition is slow, leaving the timer on a longer setting or selecting **ON** can reduce delays when placing Spots.

3.8 Help

The Help section of the Home Menu has application information and issue reporting pages.

3.8.1 About Strabo

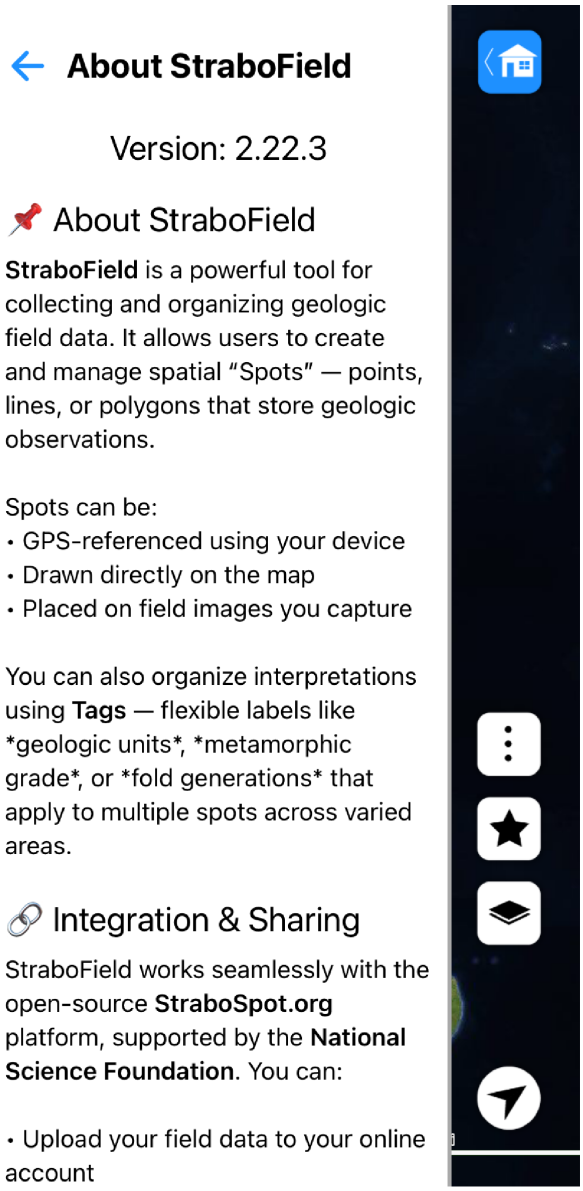

Figure 34. The About StraboField page in the Home Menu has the StraboField Application Version and an overview of the application.

The **About StraboField** page in the Home Menu displays the current version of the StraboField application, which is important for issue reporting. This page also includes a brief overview of the StraboField application.

3.8.2 Documentation

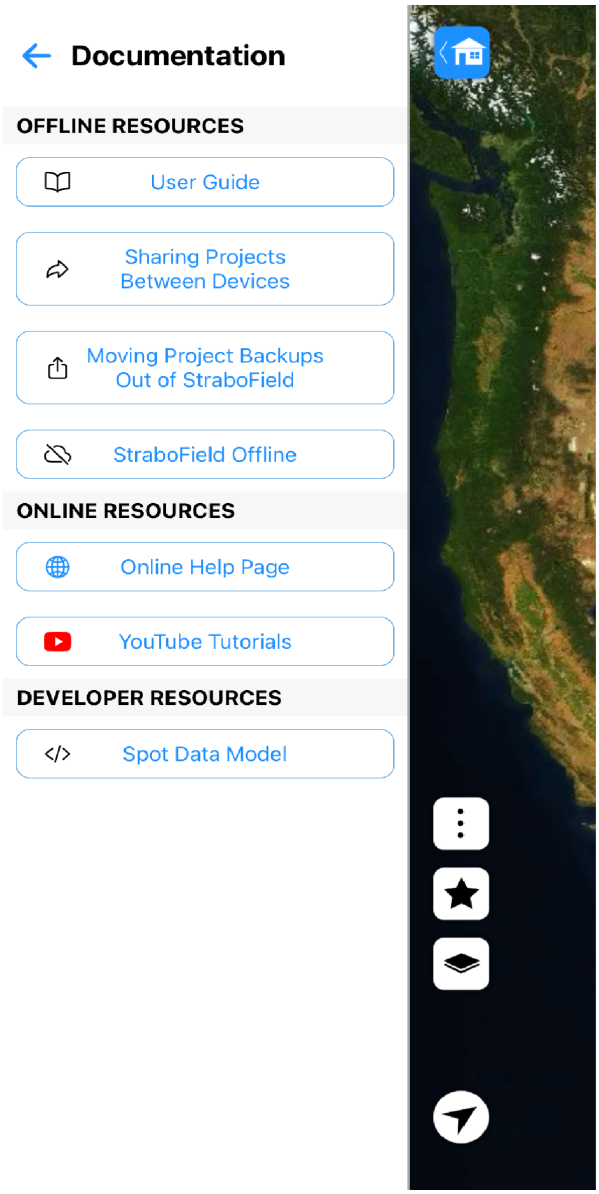

Figure 35. The Documentation page in the Home Menu has links and PDFs to helps users navigate the application.

The **Documentation** page in the Home Menu provides access to several resources that support users in using the StraboField application effectively. The available buttons include:

- **Online Help Page** – Links to the StraboSpot website help page, which includes:
  - Registration links for weekly office hours
  - YouTube video tutorials
  - The StraboField Help Guide
  - Specialized guides for specific features and workflows
- **How to Airdrop Backup Files to Other iPads** (iOS Only) – Opens a short PDF guide explaining how to share StraboField project backup files via AirDrop.
- **Moving Backups out of the StraboSpot2 Folder** (iOS Only) – A guide on preserving project files before deleting the app, which may remove associated data (relevant for certain device types).
- **Help Guide** – Opens a PDF version of the comprehensive StraboField user manual.
- **Spot Data Model** – Opens a JSON file that outlines the structure of a Spot object in StraboField.

3.8.3 Issues and Requests

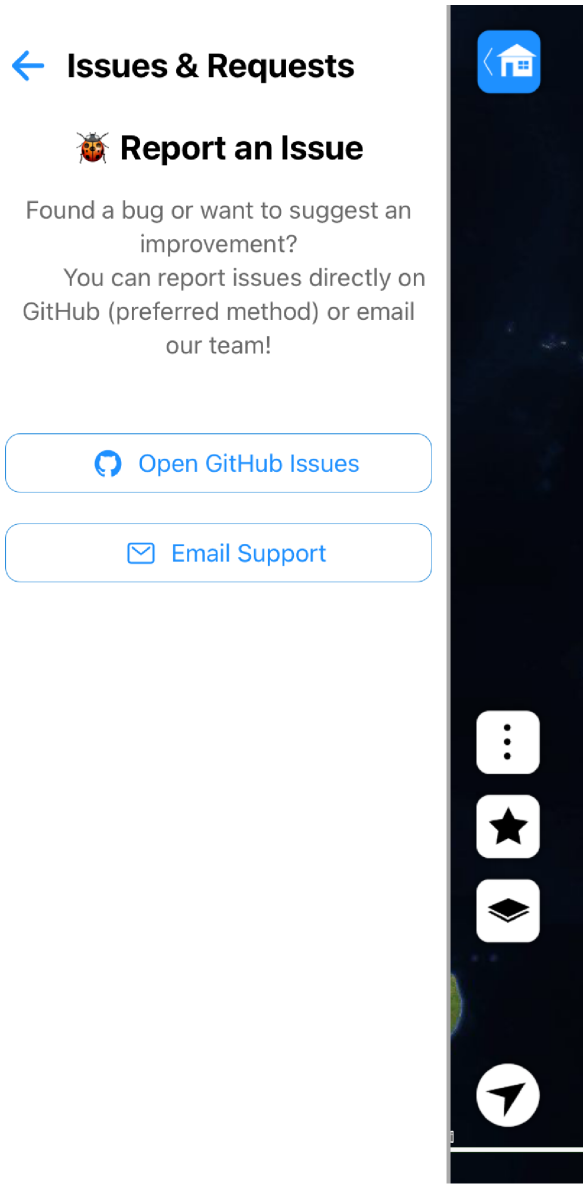

Figure 36. The Issues and Requests page on the Home Menu has two options for reporting issues or feature requests with the StraboField application.

The **Issues and Requests** page in the Home Menu provides two options for reporting bugs or submitting feature requests for the StraboField application:

- **GitHub (Preferred Method)** – Submit a new issue directly through GitHub. This is the preferred method, as it allows the StraboSpot development team to organize, prioritize, and track requests efficiently. The GitHub submission form also helps ensure all relevant details are included.
- **Email** – Users can also send questions, issues, or feature requests to the official StraboSpot email address.

4 The Notebook

The Notebook appears on the right side of the main map and provides access to all spot metadata. It is where spot metadata is added and edited. The figure below highlights the layout of the Notebook.

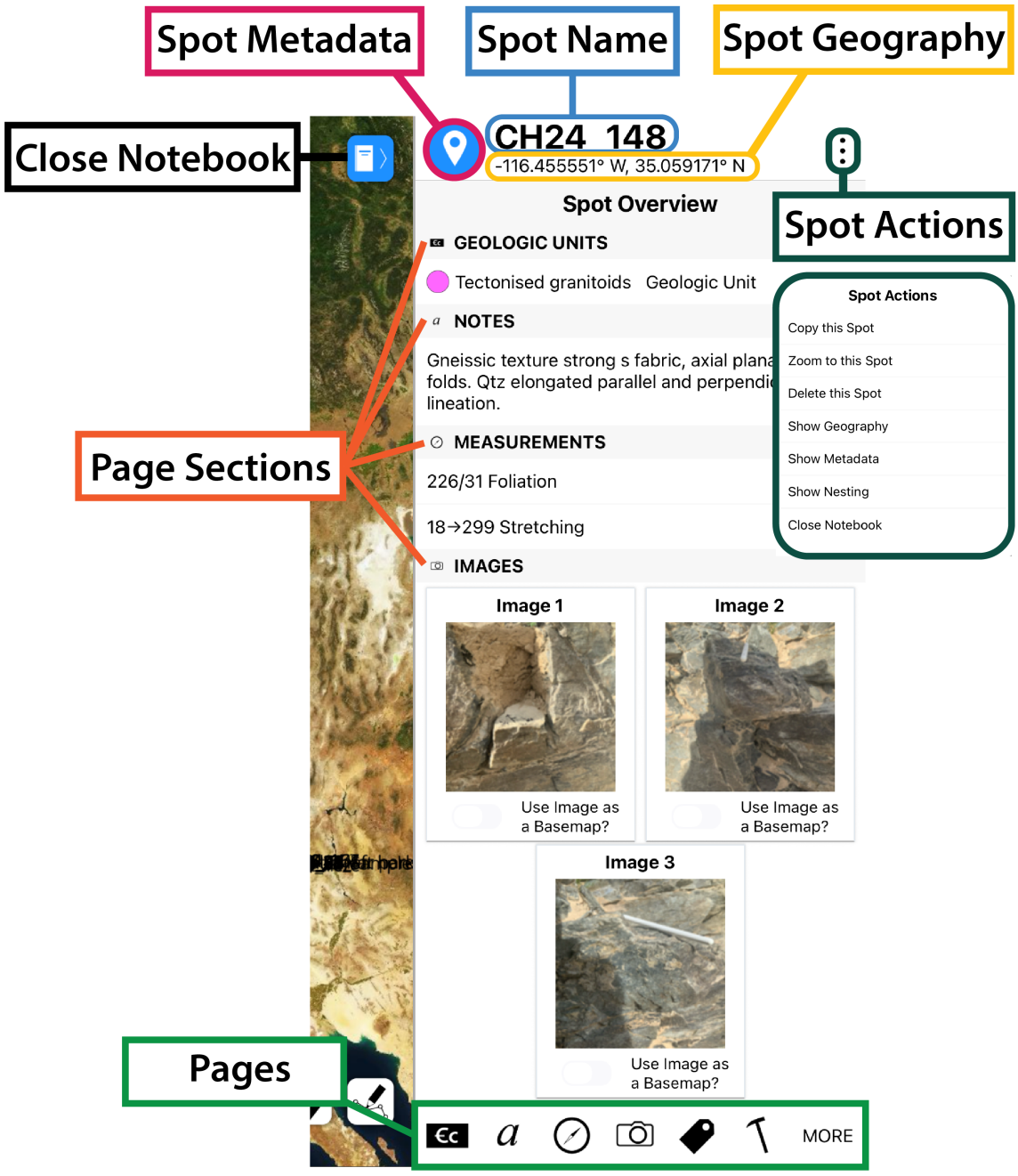

Figure 37. **The Notebook Panel:** Contains many buttons, menus, and features. Explore the following sections for more information. Spot Metadata, section 4.1.3. Spot Name, section 4.1.4. Spot Geography, section 4.1.5. Spot Actions, section 4.1.6. Close Notebook, section 4.1.1. Page Sections, section 4.1.2. Notebook Pages, section 4.2.

4.1 Notebook Panel Overview

Moving the Map and Selecting Spots: Clicking the main map does *not* close the panel. Users can move and zoom the map while the Notebook remains open. If you tap the map without selecting a specific spot, a list of recent spots will be displayed in the Notebook panel. If you tap a new spot, the notebook panel will display the associated metadata.

4.1.1 Notebook Buttons



Notebook Button: Opens the Notebook panel on the right side of the application. This panel provides access to spot metadata and associated notebook pages.



Close Notebook Button: Closes the Notebook panel.

4.1.2 Page Sections

Several **Page Sections** appear in the *Notebook Panel* by default, regardless of which pages the user has toggled on or off. These default sections are always visible to provide a consistent overview of commonly used data types.

Default Page Sections:

- Geologic Units
- Notes
- Measurements
- Images
- Tags
- Samples

Additional Sections: If information is entered through any optional Notebook Pages (see the *Notebook Page Index* in Section 4.2), additional sections will automatically appear in the Notebook Panel to display the corresponding data.

4.1.3 Spot Metadata

Clicking the **Spot Icon** (highlighted in Figure 37) opens the *Spot Metadata* page. This page displays essential information about the active Spot, including:

- **Spot ID**
- **Date Created**
- **Last Modified**

- **Dataset Name** — the Dataset in the Project to which the Spot belongs. Individual Spots can be moved to a different dataset here.

Figure 38 shows a screenshot of the Spot Metadata page.

The **Spot Icon** itself is also significant: it visually indicates the *type of Spot* currently active. Users will see this icon in both the *Notebook Panel* and the *Spots List* in the Home Menu.

Spot Type Icons:



Point Spot: is a spot added at a single location. **Example:** a sample, measurement, or outcrop location.



Line Spot: is a linear spot, recorded as many connected points. **Example:** a trail, contact, or fault trace.



Polygon Spot: a 2D area spot, recorded as an outline and the internal area. **Example:** a geologic unit, area of interest, or large outcrop area.



Undefined Spot: this spot is missing location information.



Image Point Spot: a Point Spot added to an Image Basemap, refer to Section 3.5.2 for more information. **Example:** a sample, measurement, or feature of interest on an image of a large outcrop.



Image Line Spot: a Line Spot on an Image Basemap, refer to Section 3.5.2 for more information. **Example:** a linear feature, fault, or contact on an Image Basemap.



Image Polygon Spot: a Polygon Spot on an Image Basemap, refer to Section 3.5.2 for more information. **Example:** an area of importance on an Image Basemap.



Stratigraphic Interval Point Spot: a Point Spot added to a Stratigraphic Column **Example:** a sample or measurement taken in a particular unit of the Stratigraphic Column outcrop.



Stratigraphic Interval Line Spot: a Line Spot added to a Stratigraphic Column **Example:** a linear feature, fault or contact added within or crosscutting the Stratigraphic Column outcrop units.



Stratigraphic Interval Polygon Spot: All Stratigraphic Column Intervals added are Stratigraphic Interval Polygon Spots because intervals are 2D areas on the Strat Column, x-axis is grain size, y-axis is unit height/depth. Additional Polygon Spots can be added to the Strat Column.

4.1.4 Spot Name



Spot Name: clicking the spot name will open the keyboard, the spot name can be edited as needed.

4.1.5 Spot Geography



Spot Geography: shown in Figure 39 includes the spot geography information like spot geometry (point, line, polygon), longitude and latitude, GPS accuracy (m), Altitude (m), Radius of Spot (m).

4.1.6 Spot Actions



Spot Options: as shown in Figure 37 clicking the 3-dots in the upper right corner of the notebook panel will open the Spot Actions menu including options to: Copy this Spot, Zoom to this Spot, Delete this Spot, Show Geography (opens the Geography Menu, Figure 39), Show Metadata (opens the Metadata Menu, Figure 38), Show Nesting (spot hierarchy), and Close Notebook.

Spot Metadata

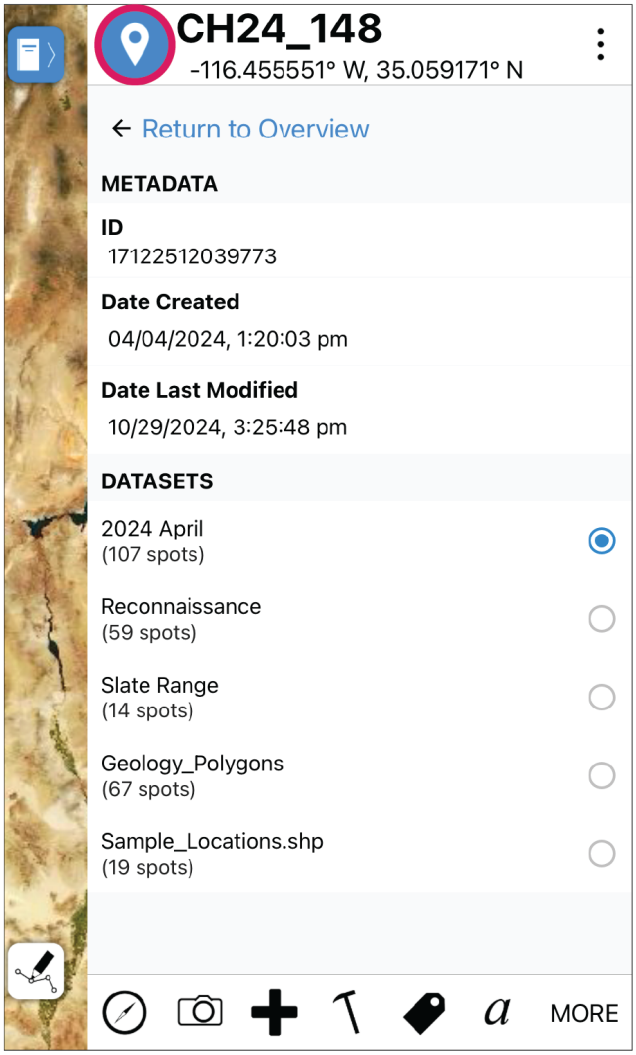

Figure 38. **Spot Metadata Menu:** Accessed by clicking the spot icon in the Notebook panel (see Figure 37). This menu allows users to view and edit metadata, and change the spot's dataset.

Spot Geography

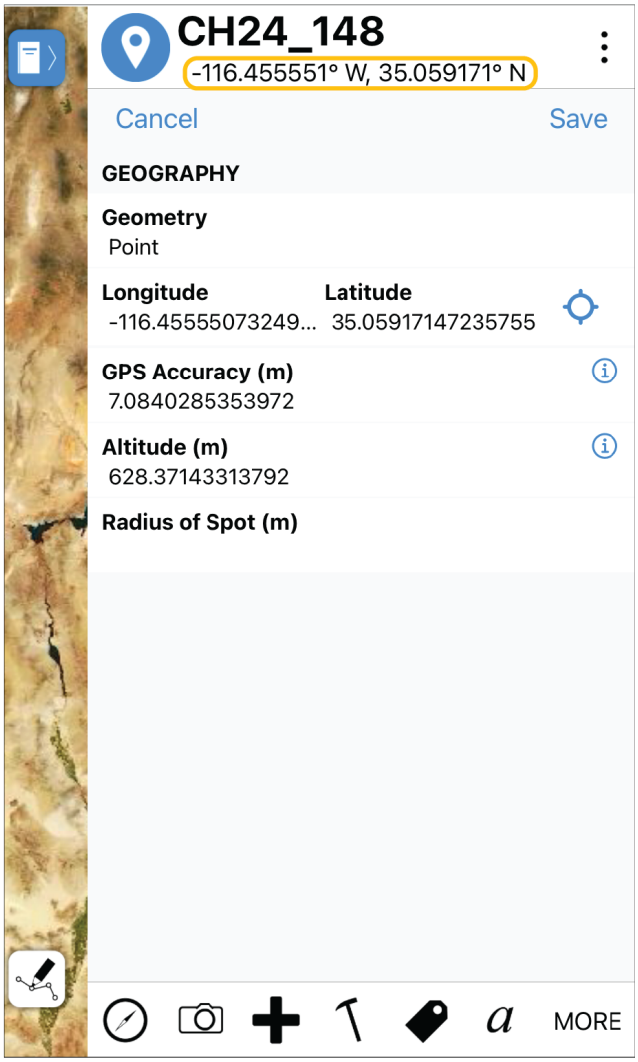

Figure 39. **Spot Geography Menu:** Accessed by clicking the coordinates in the Notebook panel (see Figure 37). Displays spatial information including location, geometry, and GPS data.

4.2 Notebook Pages

Pages are used to organize and customize the metadata sections that appear for each spot within the Notebook panel. As pages are toggled ON (see Figure 40), their corresponding sections become visible in the panel, and quick-access icons are displayed along the bottom for easy navigation (see Figure 37 for an example of Pages and Page Sections). As metadata is entered into these sections, a summary of the content will be shown directly within the Notebook panel.

The next section will review all current StraboField Notebook pages and the intended functionality of each page.

Notebook Page Index

Geologic Units Section 4.2.1

Notes Section 4.2.2

Measurements Section 4.2.3

Images Section 4.2.4

Tags Section 4.2.5

Samples Section 4.2.6

Memos Section 4.2.8

3D Structures Section 4.2.9

Fabrics Section 4.2.10

Other Features Section 4.2.11

Data Section 4.2.12

Site Safety Summary Section 4.2.13

Tephra Layers Section 4.2.14

Earthquakes Section 4.2.15

Alteration, Ore Rocks Section 4.2.16

Fault and Shear Zone Rocks Section 4.2.17

Igneous Rocks Section 4.2.18

Sedimentary Rocks Section 4.2.19

Metamorphic Rocks Section 4.2.20

Minerals Section 4.2.21

Stratigraphic Section Section 4.2.22

Interval Section 4.2.23

Lithologies Section 4.2.24

Bedding Section 4.2.28

Structures Section 4.2.29

Diagenesis Section 4.2.30

Fossils Section 4.2.31

Interpretations Section 4.2.32

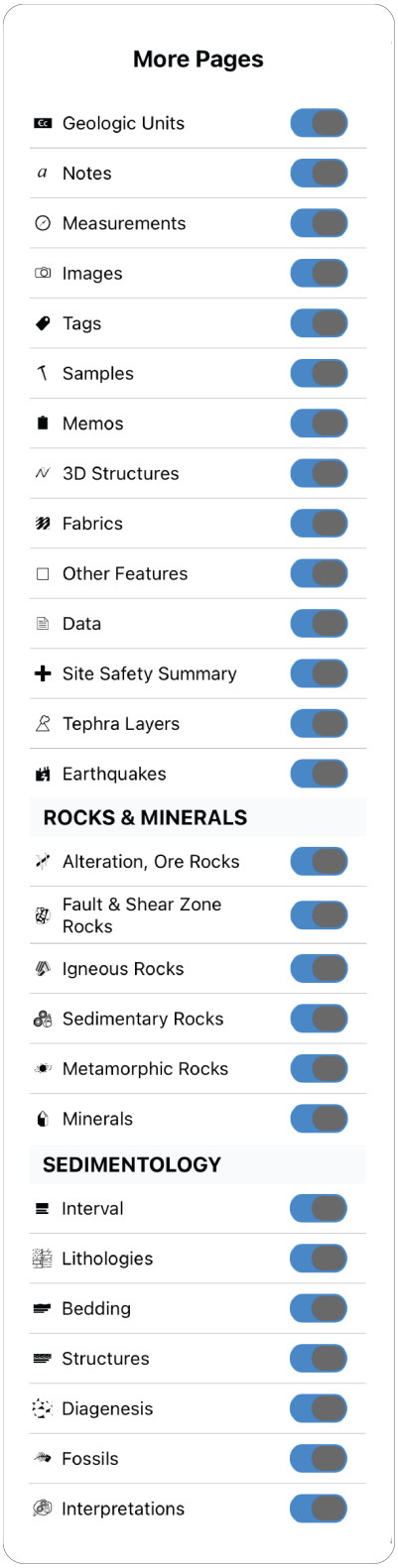

Figure 40. Notebook Pages and Page Sections: Each icon represents a page section that can be added to the Notebook panel for metadata entry.

Back to Top

Reminder

Information added in the **Notebook Panel** applies only to the **active Spot**, which is displayed in bold at the top of the panel. Refer to Figure 37 for a labeled screenshot.

4.2.1 Geologic Units

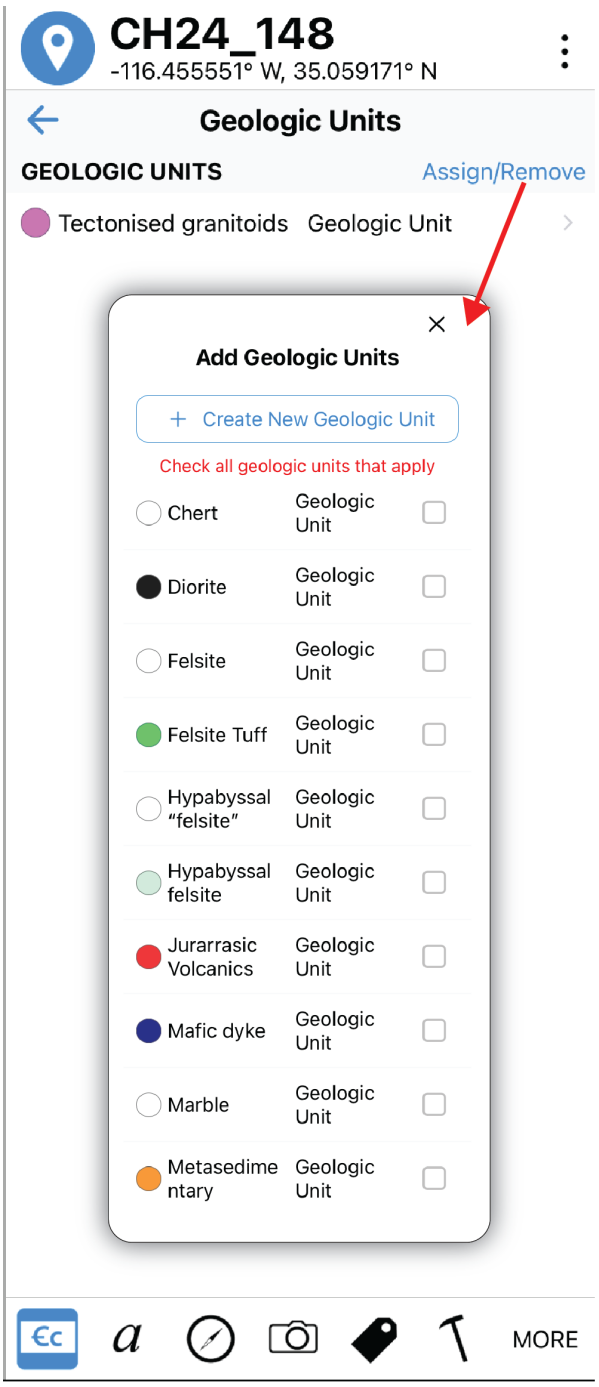

Figure 41. Geologic Units page in the Notebook Panel. For Geologic Units in the Home Menu see Section 3.4.5.

Geologic Units in StraboSpot are a specialized type of **Tag**. While they function similarly to other tags, they include additional attributes and functionality that support more detailed geologic classification. This section outlines how to view, assign, and manage Geologic Units at the Spot level.

On a Spot's Notebook page, the **Geologic Units** section summarizes all units currently assigned to that Spot. To access the full Geologic Units page:

- Click the **page icon** at the bottom of the Notebook panel, or
- Click the Geologic Units **section header** within the overview page.

The Geologic Units page lists all units associated with the selected Spot. It includes an **Assign/Remove** button (see Figure 41), which opens the Geologic Units modal.
In this modal:

- Users can assign or remove units by selecting checkboxes next to each Geologic Unit.
- New Geologic Units can be created by clicking the **Create New Geologic Unit** button located at the top of the modal.

For a detailed explanation of how to create and manage Geologic Units via the Home Menu, refer to Section 3.4.5.

4.2.2 *a* Notes

The **Notes** field is a free-text entry area where users can add any relevant textual information to a Spot.

Templates can be used to streamline data entry, especially for repeated content or structured notes. Users can toggle templates on and select from predefined options or create new ones.

- **To use an existing template:**
  - Toggle on the **Templates** option.
  - Tap **Select Note Templates** to open a list of available templates.
  - Choose one or more templates by tapping them, then tap **Done**.

- **To create a new template:**
  - Tap **Define New Note Template** at the bottom of the popup.
  - Enter a name and the text for the template using the on-screen keyboard.
  - Tap **Save** to add the template to your list.

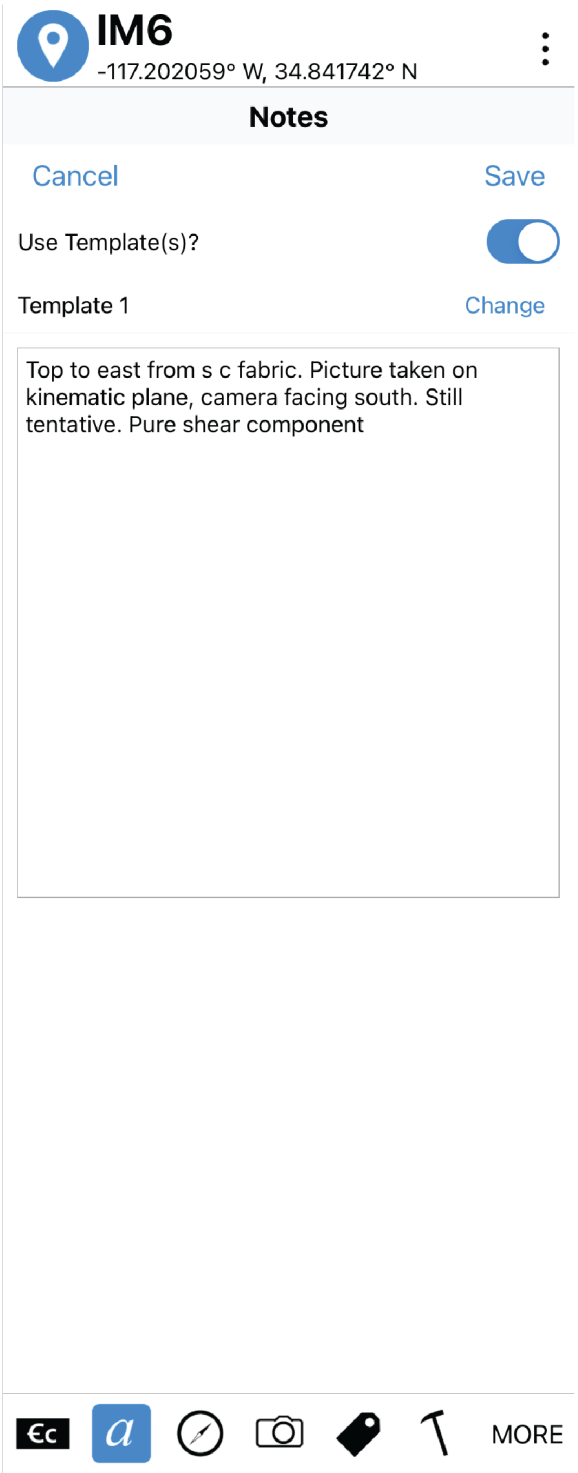

Figure 42. The Notes page in the Notebook Panel.

4.2.3 Measurements

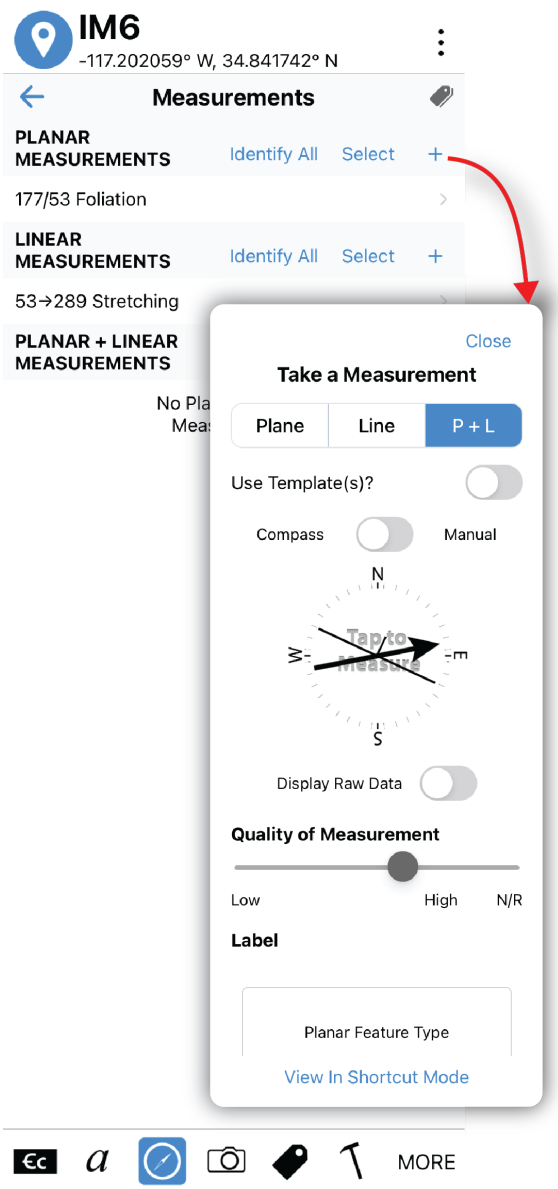

Figure 43. The Measurements page in the Notebook Panel.

Quick Steps for Measurement Collection

- Tap the **Measurements** header in the Notebook Summary.
- Choose to measure **Planar**, **Linear**, or **Combined** features.
- The measurement popup opens with the compass tool (see screenshot).
- Use the device's sensors to capture:
  - **Planar**: Lay the flat surface on the feature.
  - **Linear**: Align the long edge with the linear structure.
  - **Combined**: Use both for simultaneous measurement.
- Tap the compass graphic to record the measurement.
- Use **Manual Entry** for input from a physical compass.
- Toggle **Shortcut Mode** to automatically create a new Spot at each compass click.
- Close the compass popup to continue editing.

Templates and Shortcut Mode

- Define templates for repeated planar or linear features.
- Apply templates directly from the compass tool.
- Use **Shortcut Mode** for rapid data collection during traverses.

Measurement Collection Details

Selecting the **Measurements** page opens a modal for rapid data entry. Users may record:

- Planar features (e.g., bedding, foliation, faults),
- Linear features (e.g., mineral lineation, slickenlines), or
- Combined planar and linear measurements.

Orientation Setup and Entry

Before collecting measurement data, define the relevant **Orientation** (strike/dip, dip azimuth, trend/plunge). The Orientation page allows users to:

- Add Planes, Lines, or Tabular Zones.
- Enter multiple planes or lines for a single Spot.

- Record both a feature (e.g., a fault plane) and its associated features (e.g., slickenlines).
- Classify features using selectable types (e.g., bedding, foliation, intersection lineation).

Each dialog allows entry of orientation data and associated metadata.

Compass and Manual Entry Options

Users can:

- Use the devices's internal sensors to measure features.
- Input compass readings manually using the "Manual Entry" option.
- Review raw sensor data via the **Show Compass Data** option.
- Enable **Shortcut Mode** to automatically create a Spot at each compass reading.

After Measurement: Data Fields

Once a measurement is recorded, users can enter additional details:

- **Planar Feature Types** (14+ options, including a customizable "Other" type).
- **Subfields** based on the selected type (e.g., bedding type, fault movement).
- Optional measurements: thickness, length (in meters), and notes.

Tabular Zones

Tabular Zones represent planar bodies with thickness. Users can select from:

- Stratigraphic, intrusive body, vein, fracture zone, alteration zone, etc.
- Custom types using the "Other" option.

Add associated linear features to represent structural elements like lineated gneiss, slickensides, or flow indicators. Multiple lines can be linked to one planar feature.

Adding Linear Measurements

When adding a linear measurement:

- Save any associated planar data first.
- Use the compass tool or enter trend/plunge manually.
- Assign a **Linear Feature Type** (select from extensive list or create custom).
- Optional fields: *Lineation Defined By*, *Line Notes*.
- Delete measurements if needed using the button at the bottom of the page.

Multiple linear features may be added to a single planar measurement.

Measuring Linear Features Only

The same interface supports:

- Linear-only measurements,
- Combined measurements (planar and linear),

- Adding a linear feature and then associating a planar feature later.

Using Templates

Templates streamline repetitive data entry:

- Define a Planar or Linear template with pre-filled metadata.
- Apply templates during measurement for consistent attribute tagging.
- Create multiple templates for different structural features.

Templates are especially useful for high-density traverses of repetitive features.

Device Settings Tip

Note: Device auto-correction may interfere with note entry. To improve performance, paste a list of commonly used geological terms into StraboSpot. This helps train the device dictionary and reduces unwanted corrections.

4.2.4 Photos and Sketches

Photos and Sketches

Users can add images to a Spot using:

1. **Take** – Capture new photos using the device camera.
2. **Import** – Select images from the device's photo library.
3. **Sketch** – Create a freehand sketch on a blank canvas.

Image Options (Notebook View)

Tap an image thumbnail to:

- **Add Notes** — Use the "*a*" icon to enter metadata.
- **Sketch** — Use the pen icon to draw over the image. Tap **Save** to store the sketch as a separate copy.
- **Delete** — Tap the trash icon to remove the image.

Image as Basemap

- Toggle **Image as Basemap** to use an image for mapping.
- Tap **View as Image Basemap** to open mapping mode with the image as background.
- Spots added here are stored in image (pixel) space, not geographic space.
- Nested basemaps can be created recursively.
- Use **Show Nesting** (three-dot menu) to view nested hierarchy.

1. **Take a Photo**
   - Opens the device camera (access may be requested).
   - Tap the shutter to capture, then choose **Retake** or **Use Photo**.
   - Tap **Cancel** to return; thumbnails appear in the Notebook.
   - All photos are also saved to the device library.
2. **Import Photo**
   - Opens the photo library to select existing images.
3. **Create a Sketch**
   - Opens a blank canvas with drawing tools.
   - Save the sketch to link it with the current Spot.

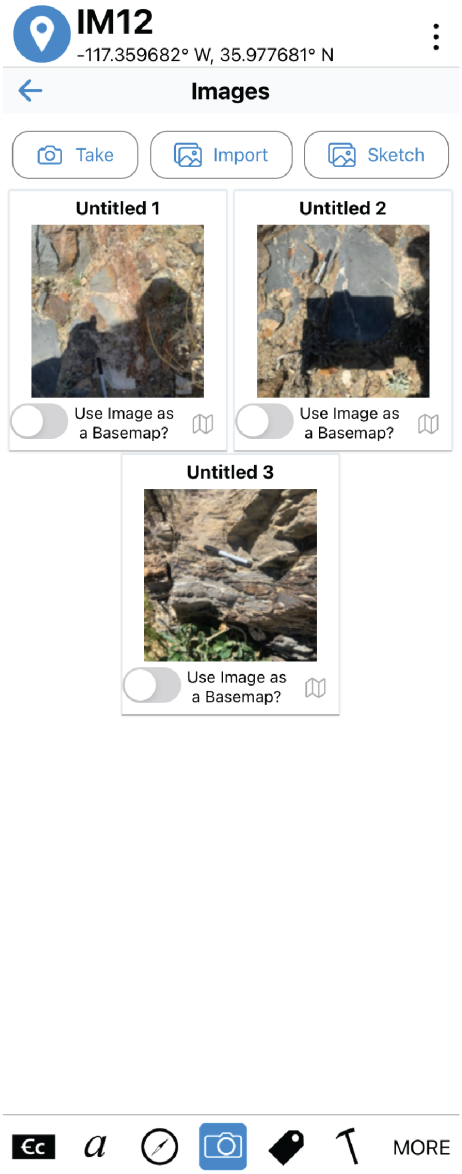

Figure 44. The Photos and Sketches page in the Notebook Panel. For Images in the Home Menu see Section 3.4.2

4.2.5 Tags

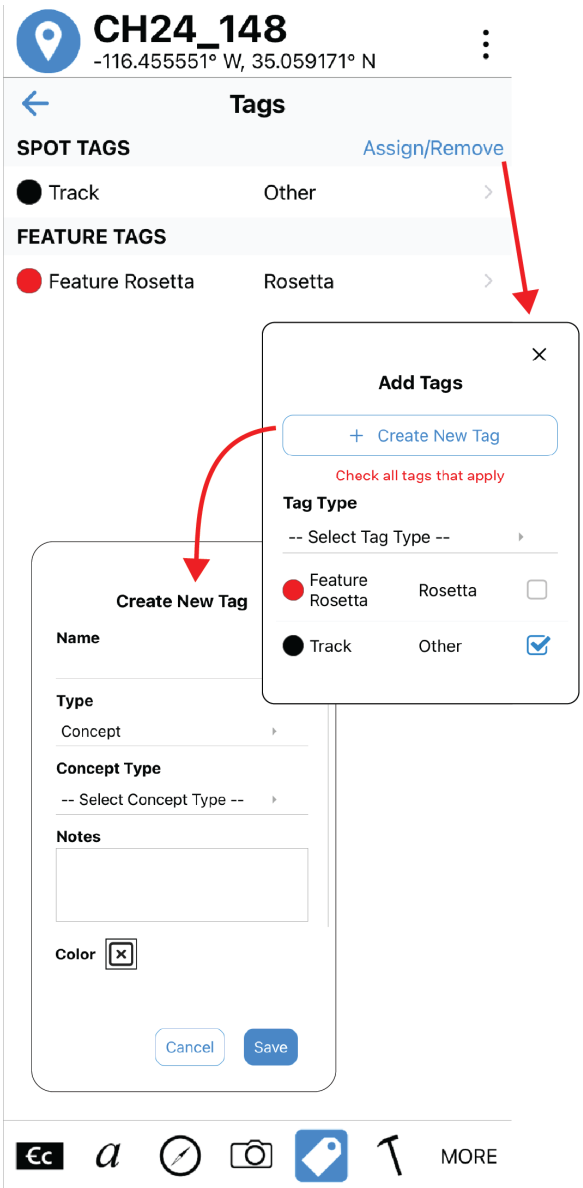

Figure 45. Home Menu (left) shows Tag info and color selection (See Section 3.4.4). Notebook Page (right) shows Tag page for a Spot. 'Assign/Remove' opens the Add Spot Tags modal; '+ Create New Tag' opens the Tag creation modal.

Tags Overview
Tags allow you to attach attributes to Spots, such as rock units, facies, or structural features. Tags act like labels or sticky notes that can be reused across the project. They are stored at the project level and available to all Datasets.

Types of Tags

- Geologic Units
- Concept
  - Geologic Structure
  - Marker Layer
  - Deformation Event
  - Degree of Deformation
  - Metamorphic Facies
- Documentation
  - Observational Timing
  - Type of Data
  - Other Documentation
- Rosetta – for key observations
- Experimental Apparatus
- Other

Creating and Using Tags Tags can be created via the Tags page under the *Attributes* menu. Tap the "+" icon to create a new Tag. Assign a name and select the type (Geologic Unit, Concept, Documentation, or Other).
Spots can have multiple Tags. Tags can also be assigned to individual features within Spots (e.g., orientations). Tags are searchable and can be filtered by type.

Continuous Tagging Use the continuous tagging button (top of screen) to automatically assign new Spots to a selected Tag. This is useful for repeated measurements in the same unit or structure (e.g., tagging all S1 foliations).

Managing Tags The Tags page displays all project-level Tags along with the number of associated Spots. Tags can be edited or deleted from this page.

Tag Color To change a Tag's color, go to the Home Menu > Project Data > Tags, Section 3.4.4. Select a Tag, then click the color box in the top right corner of the panel to choose a new color.

4.2.6 Samples

Sample Interface Overview

- **Notebook Panel (1):** Lists all Samples associated with a Spot in the “Samples” section.
- **Sample Page (2):** Accessed by selecting a Sample. Includes detailed metadata fields:
  - Sample IGSN
  - Main Sampling Purpose
  - Material Type
  - Deposit Thickness
  - Degree of Weathering
- **Sample Modal (3):** Used to add new Samples. Access it by:
  - Tapping the “Samples” header in the notebook
  - Clicking the “+” icon on the Samples page
  - Using the “Add Sample at Current Spot” shortcut (see Section 3.7.1)
  - Clicking the Sample icon at the bottom of the notebook panel

  The modal captures:
  - Sample Type
  - Material Type
  - Sample ID / Name
  - Label
  - Description
  - Inplaceness
  - Orientation
  - Sample Notes

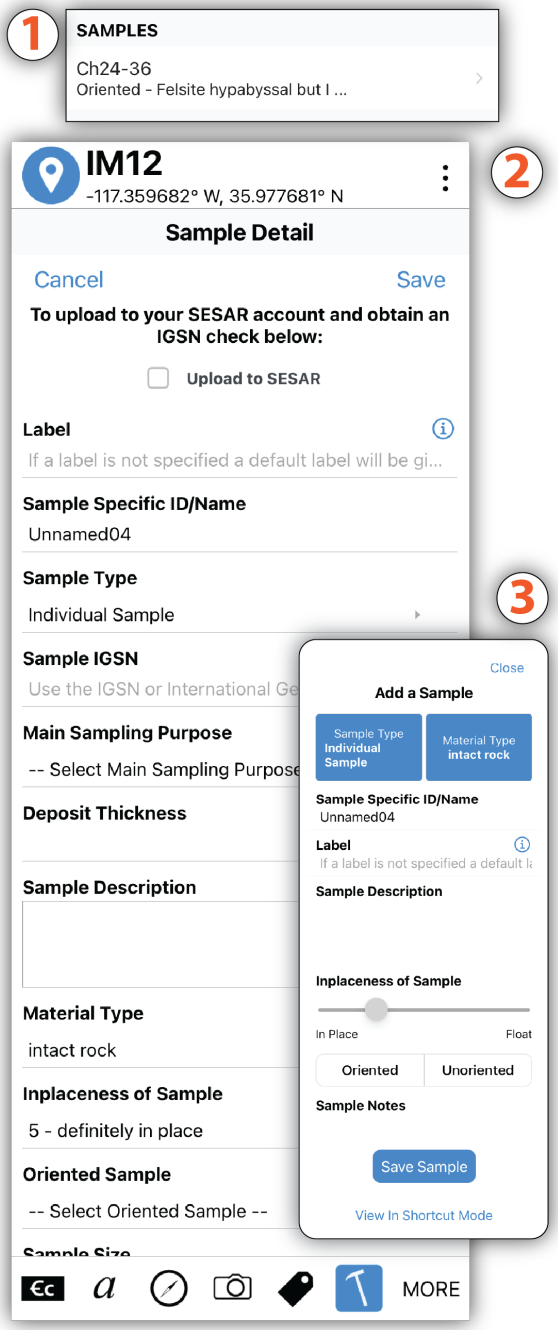

Figure 46. (1) Notebook panel showing Samples listed for a Spot. (2) Sample page displaying detailed metadata for a selected Sample. (3) Sample modal used to add a new Sample and enter key attributes.

Notes

- Samples are often treated separately due to additional lab analysis.
- You can export a list or map of sample locations.
- Custom naming conventions are supported; IGSNs can be assigned later if needed.

Samples

Samples refer to physical materials collected in the field or subsamples (e.g., mineral grains) analyzed for properties such as composition or age. Each Sample is associated with a Spot and stored in the Spot.

The *Samples* page allows you to view, add, edit, and annotate Samples linked to your Spots. Each Sample appears in a labeled box displaying the associated metadata. Tapping a Sample navigates to the parent Spot, where you can view or edit its attributes.

IGSN Integration

International Geosample Numbers (IGSNs) can be used to name and manage Samples. IGSNs are globally recognized identifiers with a user-specific prefix and sequential numbering. You can assign IGSNs manually or generate them automatically through integration with SESAR.

To enable automatic IGSN generation, check the box on the Sample page labeled:

"Upload to SESAR" This links your project to your SESAR account and uploads sample data to their database. Some fields will be automatically populated in SESAR, and you can manage the records online `https://www.geosamples.org/`.

4.2.7 StraboSamples: Your Samples on StraboSpot.org

What StraboSamples Is

StraboSamples is the part of the StraboSpot website that gives every physical sample one shared record, used by StraboField, StraboMicro and StraboExperimental. When you upload a StraboField project, each Sample on its Spots becomes a StraboSamples record. Nothing extra is needed in the app.

To see your samples, sign in at `strabospot.org` and choose `My Samples` from the account menu. Each sample has its own page showing its metadata, its parent and child samples, every project that uses it, and a full history of changes. See the *StraboSamples User Guide* for details.

Following a Sample Into the Lab

When a sample collected in StraboField is later imaged in StraboMicro or tested in StraboExperimental, those applications link to the same StraboSamples record with their **Link Sample From StraboSamples** button. The sample's page on the website then lists the StraboField Spot, the StraboMicro project and the experiments together, each with a button that opens the project.

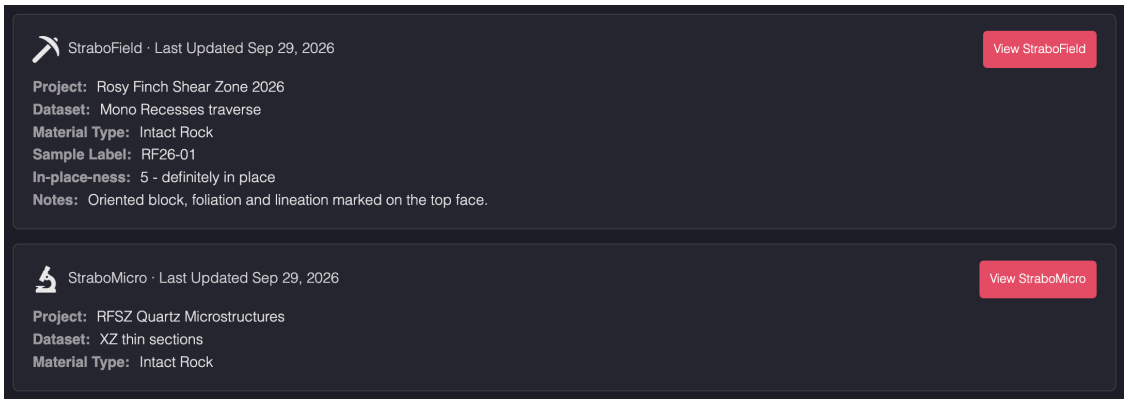

Figure 47. On a sample's page at strabospot.org, one card for each place the sample is used: here, the StraboField Spot it was collected at and the StraboMicro project with its thin sections.

StraboField Is the Main Source

- **Location:** a sample's latitude and longitude come from its Spot. They cannot be changed on the website; edit the Spot's location in StraboField and upload the project.
- **Shared fields:** when a sample is used in several applications, the StraboField values for the Sample ID, IGSN, description, notes, material type and sampling purpose take priority. Uploads from StraboMicro or StraboExperimental do not overwrite them, and StraboMicro locks those fields for StraboField samples.

Edits Made on the Website

The Sample ID, IGSN, description, notes, material type and sampling purpose can also be edited on the sample's page at strabospot.org. These edits are written back into the StraboField data on the server, so they appear in the app the next time the project is downloaded. The most recent change wins: an upload of older data does not undo an edit made on the website, but a newer edit made to the Spot in StraboField replaces it.

- Download the project into StraboField after editing its samples on the website, before you continue working on those Spots.
- Material types used only in StraboExperimental, and values typed with *Other*, cannot be written back to StraboField. The sample's history on the website notes when this happens.

Removing Samples

When you delete a Sample (or its Spot, dataset or project) and upload, its StraboField link is removed from the StraboSamples record. If no other application uses the sample, the record is deleted from StraboSamples, together with its history and any collaborators or custom fields added on the website. If StraboMicro or StraboExperimental still use it, the record stays.

Sharing and Public Samples

- When a sample is first uploaded from a project that has collaborators, they become collaborators on the sample as well. Samples can also be shared individually on the website.
- When a project is public, the pages of its samples are public too, including their notes. Review sample notes before making a project public.

4.2.8 Memos

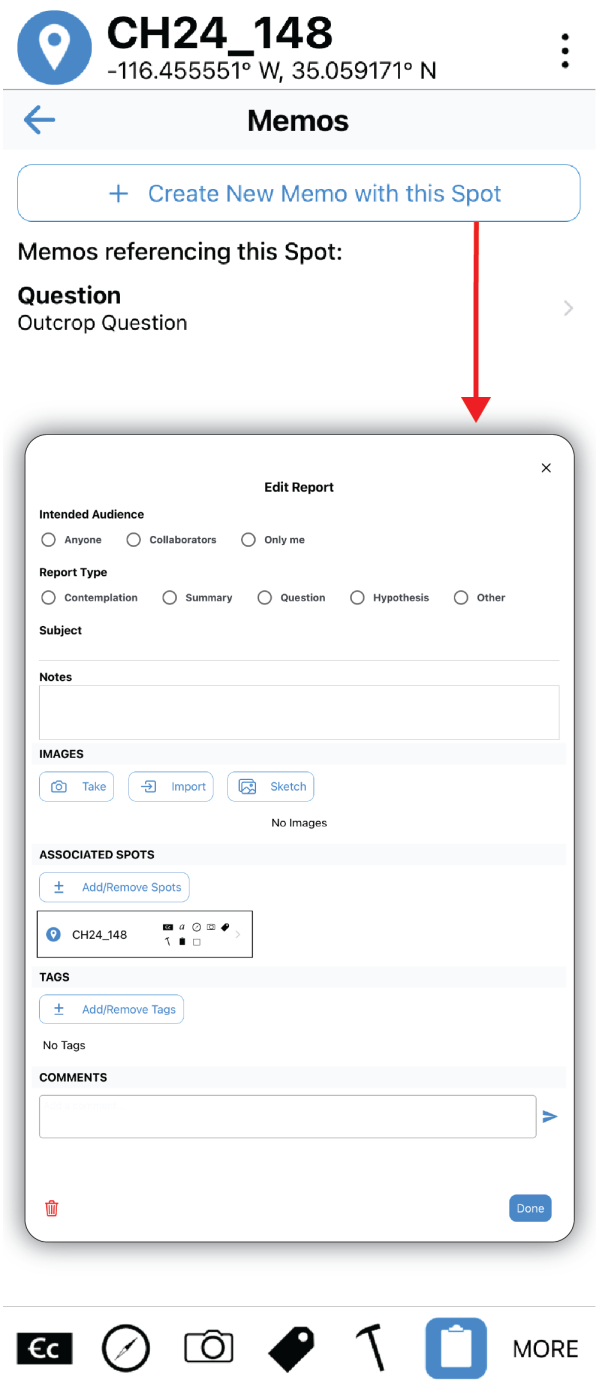

Figure 48. The Memos Notebook page displays all Memos associated with the selected Spot. New Memos can be created using the Memos modal. For more details on managing Memos in the Home Menu, see Section 3.4.7.

Memos

Memos are designed to replicate flexible note-taking in a field notebook. Each Memo includes structured metadata and content fields to support documentation and collaboration.

Memo Components

- **Intended Audience:** *Anyone*, *Collaborators*, or *Only Me*
- **Memo Type:** *Contemplation*, *Summary*, *Question*, *Hypothesis*, or *Other*
- **Subject:** Free text field
- **Notes:** Main memo content
- **Photos and Sketches:** Capture new images, import from device, or sketch on images/blank page
- **Associated Spots:** Link the memo to one or more Spots
- **Tags:** Add tags relevant to the memo content

Memos can be saved, closed, or deleted using the respective buttons in the interface.

The goal of Memos is to capture informal, field-based observations—such as notes, sketches, ideas, or working hypotheses—similar to a geologist's paper notebook. The *Intended Audience* setting anticipates future collaborative features, enabling shared note-taking among peers or students working in the same area.

4.2.9 3D Structures

3D Structures

The *3D Structures* page allows you to define complex, three-dimensional geologic features associated with a Spot. There are four structure types:

- Fold
- Fault
- Tensor
- Other

These tools help capture detailed information about macroscopic structures such as folds, tectonic fabrics, and boudinage. Each structure type opens a dedicated form with context-specific fields.

Folds

Use this option to define large-scale folds within a Spot, such as a fold captured by a polygon with multiple structural measurements.

- **Label:** Optional. If left blank, the selected Fold Type is used as the label.
- **Fold Type:** Choose from a list (e.g., anticline, syncline, antiform, Z-fold, etc.). Selecting a type reveals additional classification fields (optional, but recommended).
- **Orientation Tools:** Compass-based inputs for hinge, axial surface, and associated foliation orientations.
- **Edit Geometry:** Launches a geometry editor.
- **Tightness / Interlimb Angle:** Use the slider to determine the approximate angle range.
- **Vergence:** Use the slider to determine the vergence orientation.
- **Fold Notes:** Record any notes specific to the fold observations.

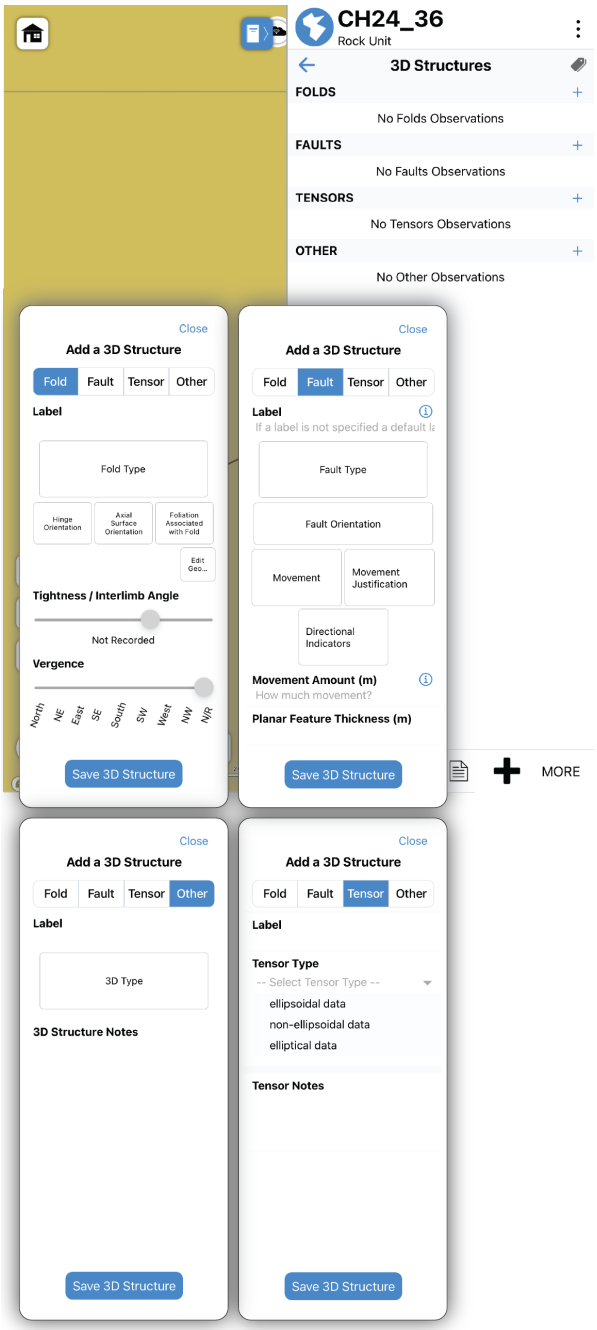

Figure 49. The figure shows each 3D Structure modal option (Fold, Fault, Tensor, Other) and the 3D Structures Notebook page with section headings. Each added structure appears listed beneath its corresponding section in the Notebook.

Faults Used to represent large-scale faults within a spot, such as a fault captured by a line spot with multiple spot locations nested within.

- **Fault Type:** Choose from a list of common fault types.
- **Fault Orientation:** Tap to take a measurement of the fault surface using the device. The

Fault Orientation modal also captures a user defined quality of measurement rating. Measurements can be manually input.

- **Movement:** Choose from a list of fault movement descriptions, including SE side up, top to W, and left-lateral for example.
- **Movement Justification:** Choose from a list of common offset feature types used to determine relative movement.
- **Directional Indicators:** Choose from a list of common directional indicators at the outcrop.
- **Movement Amount:** Describe the amount of fault movement.
- **Planar Feature Thickness and Length (m):** Record the feature dimensions.
- **Notes:** Type out any additional thoughts, observations, or interpretations specifically associated with the 3D Structure: Fault.

Tensors Used to represent orientation or shape data (e.g., ellipsoids).

- **Tensor Type:** Choose from ellipsoidal, non-ellipsoidal, elliptical, or define your own via "Other Tensor Type." Selecting a type reveals input fields for further description.
- **Ellipsoidal:** Finite strain, shape preferred orientation (SPO), anisotropy of magnetic susceptibility (AMS), stress, infinitesimal strain, aspect ratio, and other.
- **Non-Ellipsoidal:** Flow apophyses, displacements, and other.
- **Elliptical:** Finite strain, SPO, aspect ratio, and other.
- **Tensor Notes:** Add optional notes specific to the tensor.

Other 3D Structures Use this option to document structures such as boudinage, mullions, or lobate-cuspate geometries. Custom structures can also be defined.

- **Label:** Optional. Defaults to the selected 3D Type if left blank.
- **3D Type:** Select from a dropdown list (e.g., boudinage, mullion, lobate-cuspate, other).
- **3D Structure Notes:** Add notes specific to the selected structure.

Each form provides additional fields as needed for the selected structure type. These are optional but help improve classification and documentation of complex geologic features.

Accessing the 3D Structures Tool The 3D Structures tool is accessed via the button at the bottom of the Notebook window. If not visible, tap *MORE* to open the toggle list and enable the 3D Structures tool. This interface supports the addition of folds, faults, tensors, and user-defined 3D structures.

Multiple structures can be added to a Spot, and each can be tagged or untagged as needed. Added structures are listed beneath the 3D Structures section in the Notebook.

3D Structure Entry Behavior When adding a new 3D Structure, the popup window defaults to Fold mode. Each structure type opens a specialized form with relevant input options. Closing the popup returns you to the Notebook view. Use the *Save* button to store the structure.

4.2.10 Fabrics

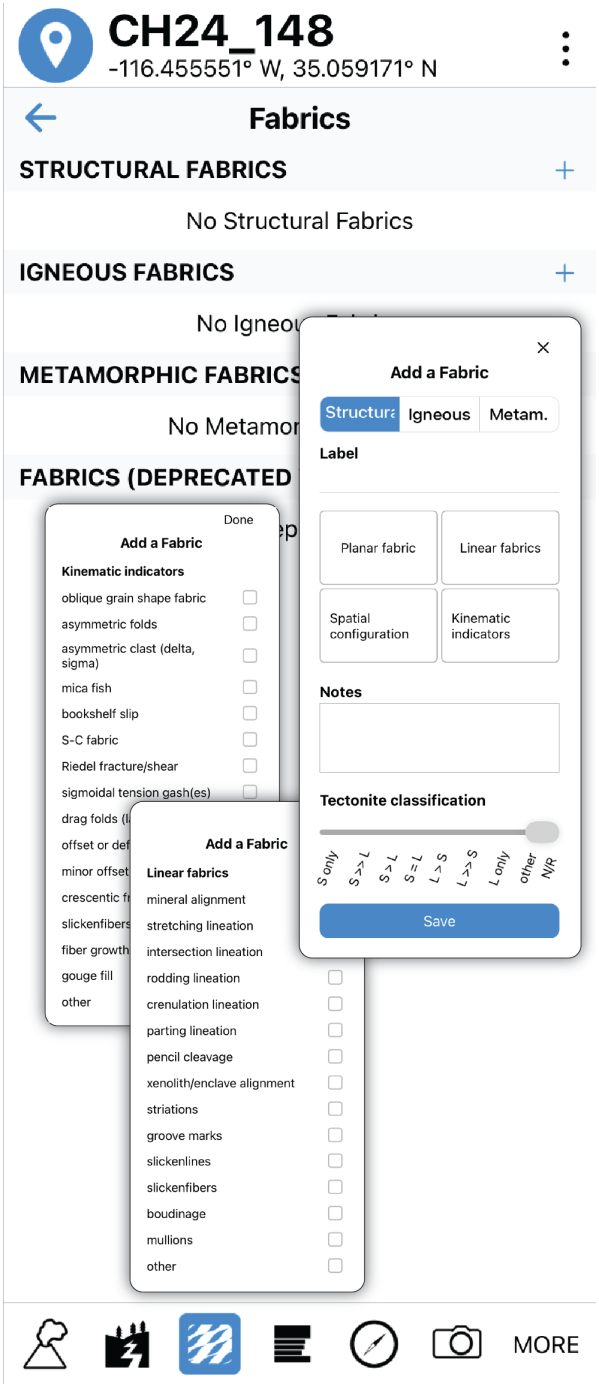

Figure 50. The other features page allows users to create and tag other features.

Fabrics

The *Fabrics* page allows you to document and classify fabrics associated with a Spot. Fabrics are organized into three types: **Structural**, **Igneous**, and **Metamorphic**. Each with context-specific fields that adjust based on the selected fabric type.

Fabric Types

Select a fabric type to begin. The available fields and vocabulary options will update to reflect the selected context:

- **Structural** — Documents tectonic and deformational fabrics. Fields include planar fabric type, linear fabric type, tectonite classification, and kinematic indicators.
- **Igneous** — Documents fabrics related to igneous processes and emplacement. Fields include planar fabric type, linear fabric type, magmatic structures, and kinematic indicators.
- **Metamorphic** — Documents fabrics produced by metamorphic processes. Fields include planar fabric type, linear fabric type, kinematic indicators, and additional metamorphic context fields.

Fabric Form Fields

Regardless of fabric type, each entry includes the following core forms. Field options within each form are tailored to the selected fabric type:

- **Planar Fabric** — Describes the orientation and type of planar structural surfaces present, such as foliation, cleavage, or banding.
- **Linear Fabric** — Describes linear elements within the rock, such as lineations, slickenlines, or mineral alignments.
- **Type-Specific Fields** — A fourth form adjusts based on fabric type: *Structural* fabrics include kinematic indicators; *Igneous* fabrics include magmatic structures; *Metamorphic* fabrics include additional metamorphic descriptors.

4.2.11 ☐ Other Features

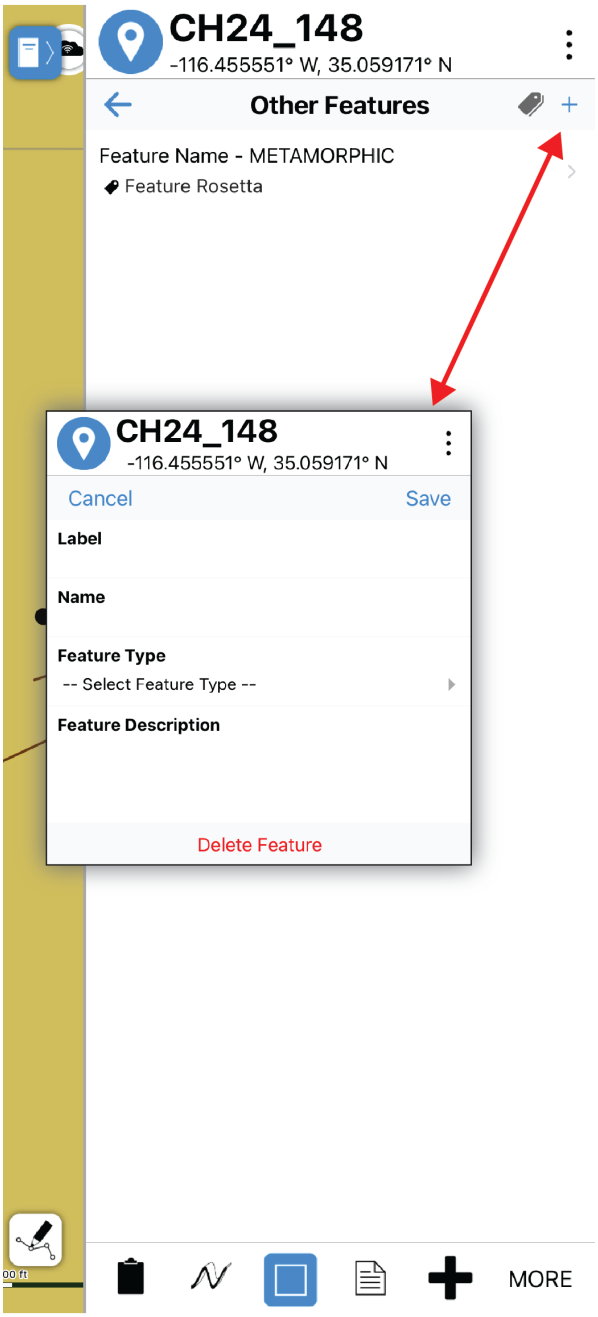

Figure 51. The other features page allows users to create and tag other features.

The **Other Features** page allows you to add geologic features to your spot that are not already covered by predefined categories in Strabo.

- **Label:** Create a label for the feature. If left blank, the *Feature Type* will be used as the label.
- **Feature Type:** Specify the type of geologic feature (e.g., *geomorphic*, *igneous*, *metamorphic*).
- **Feature Name:** Provide a meaningful name for the feature.
- **Feature Description:** Enter a description detailing the characteristics of the feature.

Use this page only when existing categories in Strabo do not adequately describe your geologic observation.

4.2.12 Data

The **Data** page consists of two main sections:

- **URL Input Section:** This section allows users to add web resource links using both `http` and `https` URL addresses. Multiple URLs can be added and saved directly to the spot for future reference.
- **CSV Upload Section:** Users can upload data tables in the `.csv` (Comma-Separated Values) format. Once a file is uploaded, its contents can be previewed within the application—there is no need to download the file to view it.

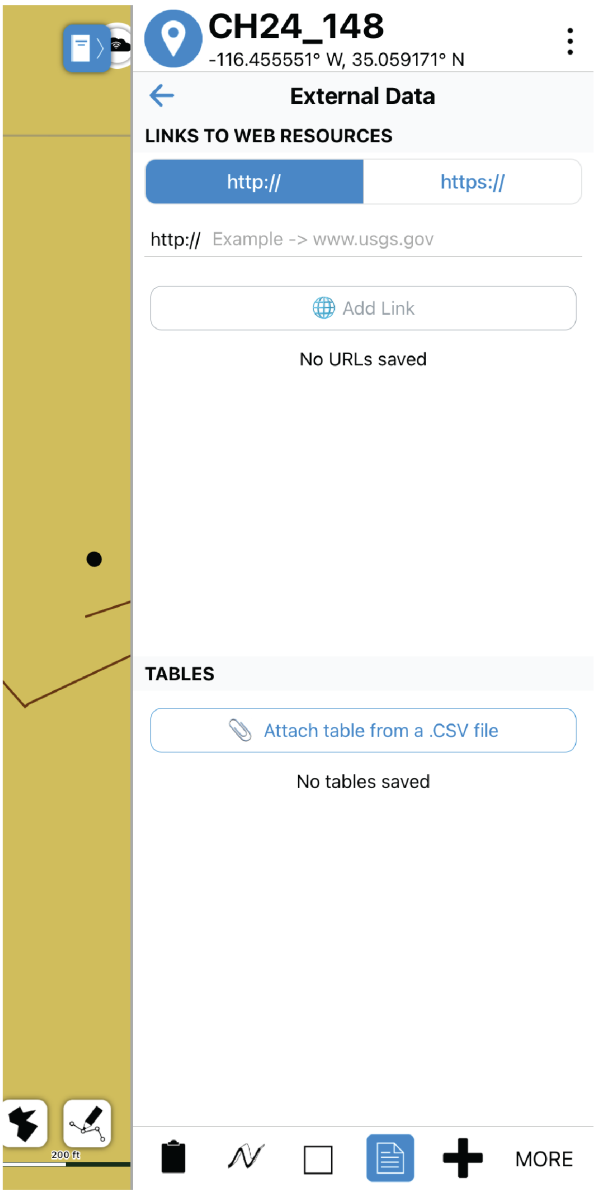

Figure 52. The Data notebook page enables users to upload `.CSV` files and add links to web resources using URLs.

4.2.13 + Site Safety Summary

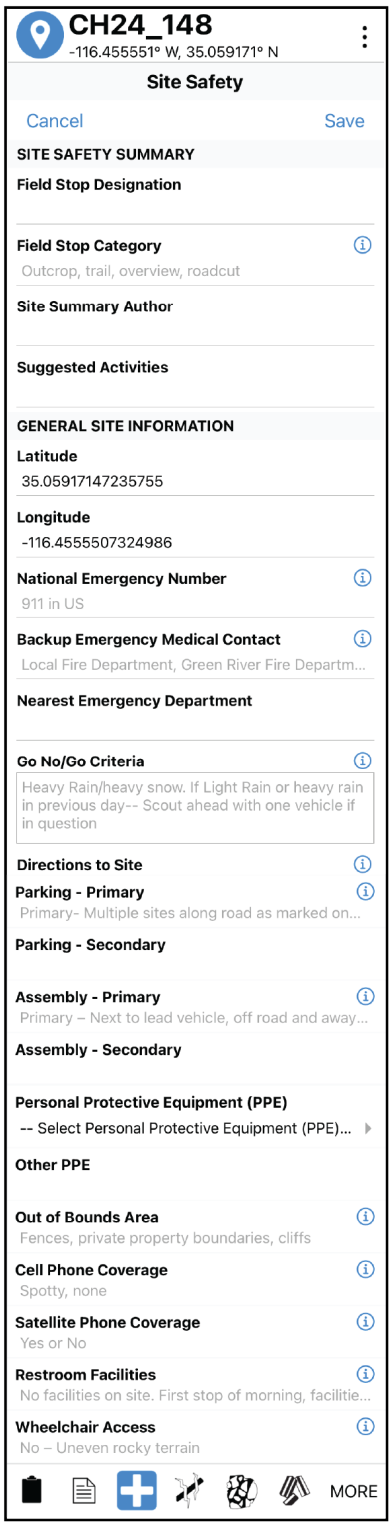

Figure 53. The Site Safety Page is designed to document essential safety information.

The **Site Safety Summary Page** is designed to document essential safety information and key characteristics of a field area. This helps inform future visitors, whether colleagues or your future self, about site conditions, hazards, and logistical considerations.

1. Site Safety Summary Section

Fields in this section include:

- Field Stop Designation
- Field Stop Category *(e.g., outcrop, trail, overview, roadcut)*
- Site Summary Author
- Suggested Activities

2. General Site Information Section

This section records geographic and emergency response details:

- Latitude, Longitude
- National Emergency Number *(e.g., 911 in the USA)*
- Backup Emergency Contact
- Nearest Emergency Department
- Go/No-Go Criteria *(e.g., avoid site during heavy rain or snow; if uncertain due to prior weather, scout ahead with one vehicle)*
- Directions to Site

3. Parking and Assembly Areas Section

Logistics and access information include:

- Primary Parking, Secondary Parking
- Primary Assembly Area, Secondary Assembly Area
- Personal Protective Equipment (PPE)
- Other PPE
- Out of Bounds Area
- Cell Phone Coverage
- Satellite Phone Coverage
- Restroom Facilities
- Wheelchair Access

4.2.14 Tephra Layers

Tephra Layers

The *Tephra Layers* page enables systematic documentation of volcanic stratigraphic sequences directly within StraboField. Layer entries capture a range of descriptive attributes including layer type, thickness, grainsize, grading, sorting, contact characteristics, and grain support. An additional free-text description field accommodates non-standard observations such as componentry, clast measurements, or mineralogy. Layers can be annotated directly on a photograph of the section using the image basemap functionality, or entered as an ordered list without an image.

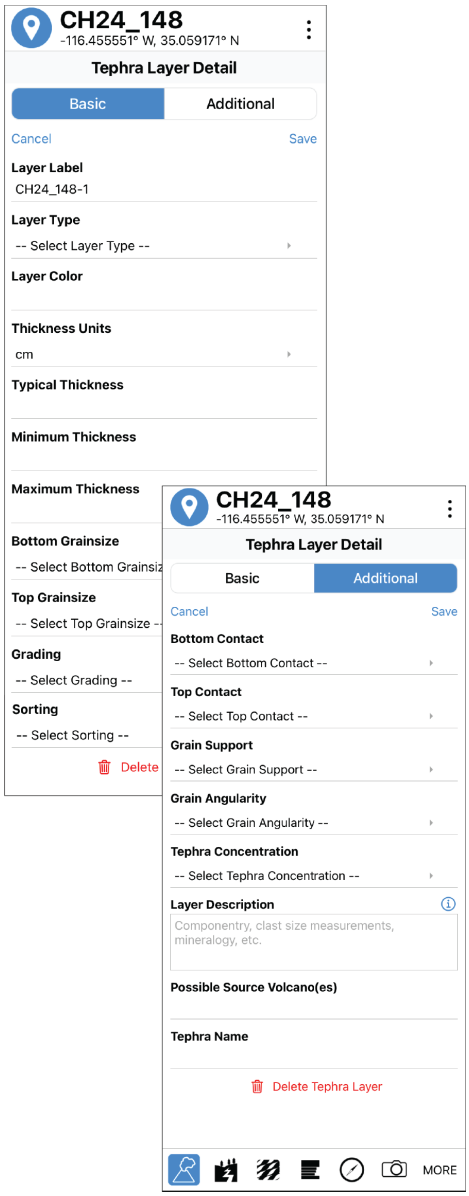

Figure 54. The Tephra Layers notebook page page enables systematic documentation of volcanic stratigraphic sequences.

The following fields are available within each layer entry:

- **Layer Type** — Select from a controlled vocabulary list (required)
- **Layer Label** — Identifier for the layer, particularly useful when not annotating an image
- **Color** — Free-text description of layer color
- **Thickness** — Typical, minimum, and/or maximum thickness; at least one value is required
- **Grainsize** — Grainsize at the bottom and top of the layer
- **Grading** — Characterization of grading (normal, reverse, ungraded, etc.)
- **Sorting** — Grainsize sorting classification
- **Contacts** — Top and bottom contact characteristics (Additional tab)
- **Grain Support** — Clast or matrix support (Additional tab)
- **Grain Angularity** — One or more angularity descriptors (Additional tab)
- **Tephra Concentration** — Concentration classification (Additional tab)
- **Possible Source Volcanoes** — List of potential source volcanoes for tephra layers
- **Tephra Name** — Formal or informal name used for correlation
- **Layer Description** — Free-text field for additional observations

Physical samples collected from a layer can be documented using the Sample tool and will be associated with the corresponding layer Spot.

See Section 7 for more information on how to use StraboField in a Tephra field work setting.

4.2.15 Earthquakes

Earthquakes

The *Earthquakes* page enables documentation of earthquake-related ground deformation and hazard features following the California Geological Survey (CGS) schema. Fields are organized to capture the type of observed feature, confidence level, mode of observation, and detailed slope movement parameters.

Feature

Select the primary earthquake-related feature observed at the Spot (required):

- Fault Rupture
- Liquefaction
- Slope Movement
- Damage
- No Deformation

Observation Details

Confidence in Feature — Rate the confidence in the feature identification on a scale of 1 (Low) to 5 (High).

Mode of Observation — Select the method by which the feature was observed:

- **Physical** — Direct observation in the field (boots on the ground)
- **Visual** — Terrestrial line-of-sight observation
- **Estimate** — Areal estimation without direct access

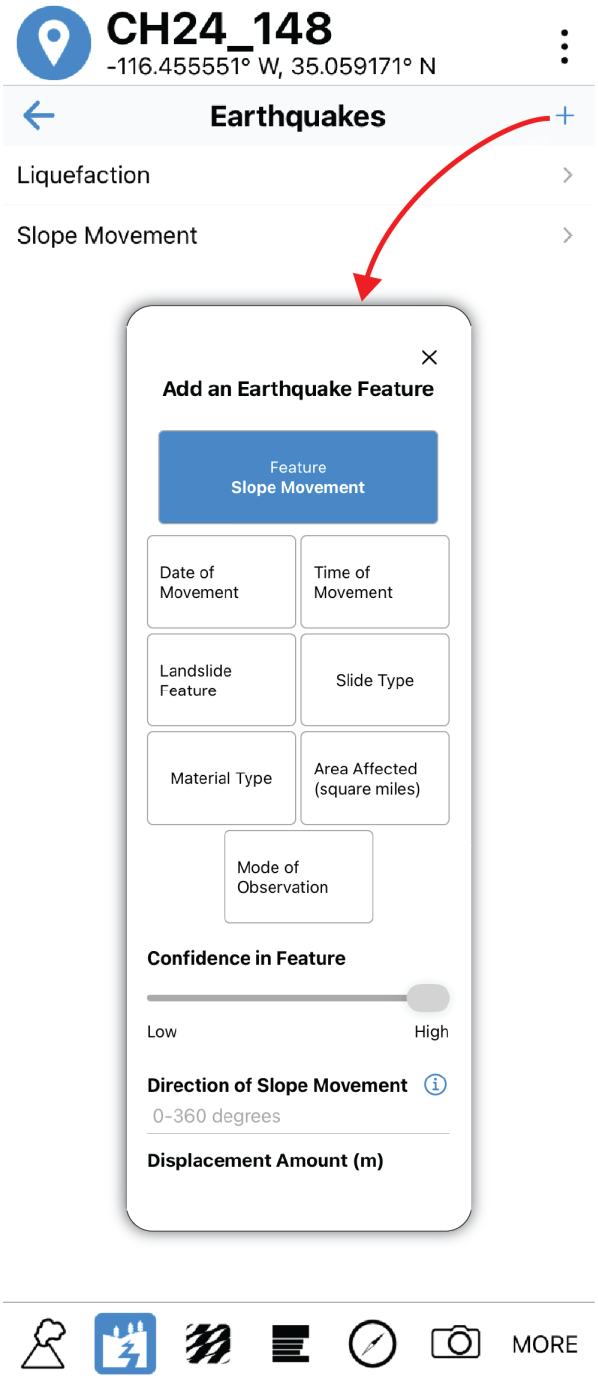

Figure 55. The Earthquakes notebook page lists all earthquake features added in the spot. The modal shows the metadata options when adding new earthquake features.

Slope Movement

The following fields are applicable when **Slope Movement** is selected as the feature type.

Slide Type — Select the type of slope movement:

- Rock Slide

- Soil Slide
- Earth Flow
- Debris Flow
- Rock Fall
- Multiple (add details to Notes)
- Other (add details to Notes)

Material Type — Select the dominant material involved:

- Fill
- Existing Landslide Material
- Soil/Alluvium
- Colluvium
- Sedimentary Rock
- Crystalline/Metamorphic Bedrock
- Multiple (add details to Notes)
- Other (add details to Notes)

Landslide Feature — Select the component of the landslide being described:

- Deposit
- Scarp/Source Area

Timing — Record the date and time of movement where known:

- Date of Movement
- Time of Movement

Area Affected — Select the estimated area affected (square miles):

- $<$ 10
- 10 – 100
- 100 – 1,000
- 1,000 – 10,000
- $>$ 10,000

Measurements — Enter numeric values where applicable:

- **Direction of Slope Movement** — Bearing in degrees (0–360)
- **Displacement Amount** — Total displacement (m)
- **Depth** — Depth of failure plane (m)
- **Max Drop in Elevation** — Maximum vertical drop (m)
- **Length Exposed Downslope** — Downslope run-out length (m)

Notes — Use the Notes field to provide additional context, describe features selected as *Multiple* or *Other*, or record any observations not captured by the structured fields.

4.2.16 Alteration, Ore Rocks

The **Alteration, Ore Rocks** popup can be accessed using the tool *circled in red below*. This interface allows you to manage entries related to hydrothermal alteration and ore mineralization at a given Spot.

- This tool can copy existing **Alteration, Ore Rocks** entries from other Spots in the project.
  - If another Spot already has relevant entries, you can import them by selecting the appropriate Spot number.
- Click Add to create a new **Alteration, Ore Rocks** entry.
  - This will open a new popup window where the entry can be edited.
- The interface includes two dropdown menus:
  - A popup menu for selecting the type of **Alteration, Ore Rocks**.
  - A second menu for selecting **Hydrothermal Alteration** types.
- The following fields are available as open text fields:
  - **Host Rock**
  - **Mineralized Elements**
  - **Notes**
- Multiple **Alteration, Ore Rocks** entries can be added to a single Spot as needed.

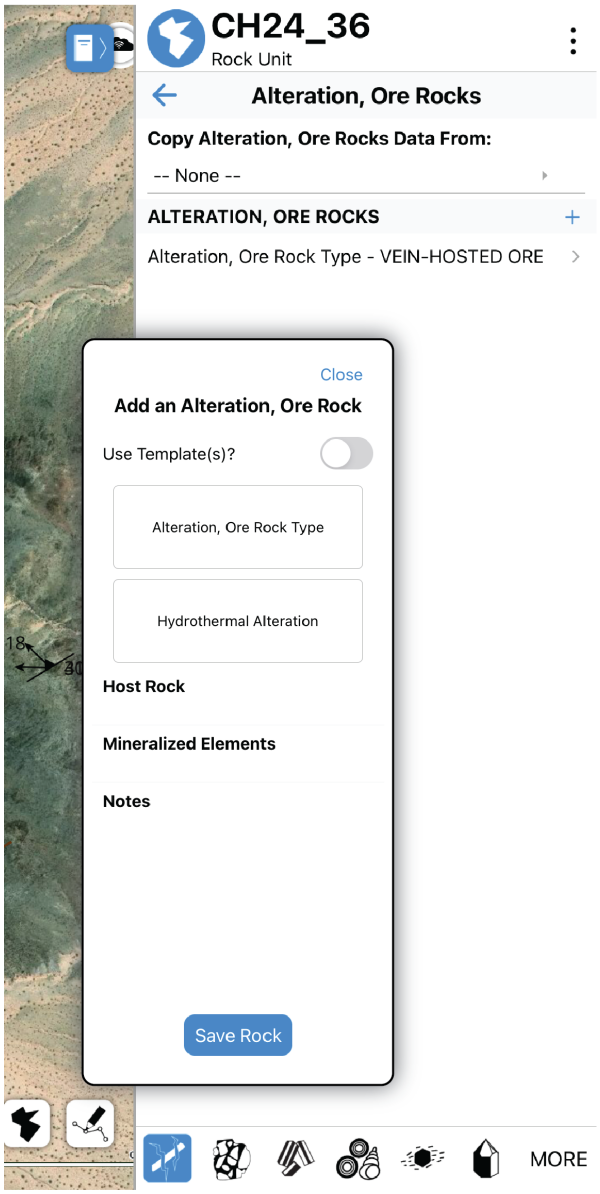

Figure 56. The Alteration, Ore Rocks notebook page lists all rocks added in the spot. The modal shows the metadata options when adding new Alteration, Ore Rocks.

4.2.17 Fault and Shear Zone Rocks

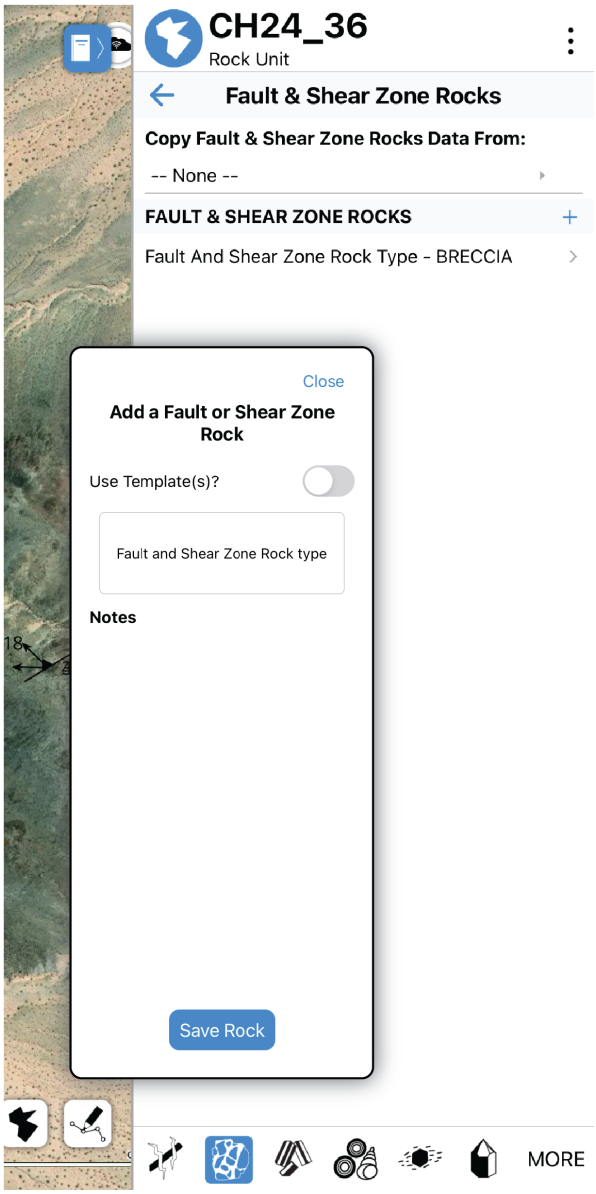

Figure 57. The Fault and Shear Zone notebook page lists all entries. The modal is how the initial Fault and Shear Zone Rocks are added to the spot.

This page adds structured metadata for **Fault & Shear Zone Rocks** to the selected Spot. It can be accessed using the icon on the bottom right corner of the Notebook page, highlighted in blue in Figure 57. Clicking the icon or the '+' symbol at the top of the Notebook page will open the Fault and Shear Zone Rocks modal, shown in the Figure.

- The tool functions similarly to the **Igneous Rocks Tool**, providing a list of rock type options and an open text field for **Notes**.
- Each selection box opens a new popup window with predefined choices.
  - Most categories include an *"Other"* option, allowing users to add a custom value.
- Templates can be used with this tool to define and later recall a user-defined **Sedimentary Rock** entry.

4.2.18 Igneous Rocks

The **Igneous Rocks Tool** is used to add detailed information about igneous rocks at a Spot.

- Descriptions and attributes entered can be saved and applied to other Spots.
- To add a new igneous rock entry, click the corresponding Add button for either **Plutonic Rocks** or **Volcanic Rocks**. This opens a dedicated popup window.
- The tool supports the use of templates, allowing users to define and later recall custom igneous rock descriptions. These templates function similarly to those described on page 14.

Plutonic Rocks

- **Plutonic Rock Types** opens a popup with a list of options, including an *"Other"* field to input a custom rock name.
- **Occurrence** provides a list of options such as pluton, dike, stock, etc.
- **Texture** includes choices for grain size, porphyritic texture, and more.
- **Color Index** opens a popup. Click below the label to enter the percentage of dark-colored minerals. After inputting a value, you can select the data source:
  - **StraboTools** (a separate application)
  - **Visual Estimation**
- **Modification** includes choices such as altered, shattered, veined, etc.
- Use the keyboard to fill in fields for **Characteristic Crystal Size** and **Notes**.

Volcanic Rocks

- Similar structure and input fields as the Plutonic Rocks popup, but with choice lists tailored to volcanic rock types and occurrences.

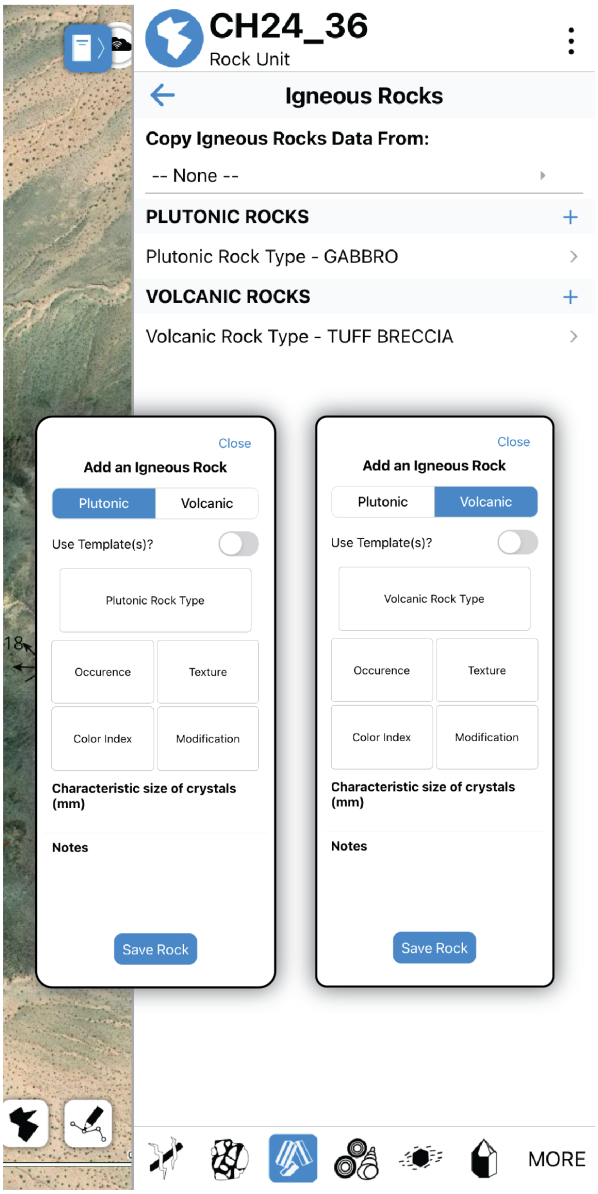

Figure 58. The Igneous Rocks notebook page records igneous rocks added to the spot. The modal input options vary depending on the type of igneous rock, plutonic vs volcanic.

4.2.19 Sedimentary Rocks

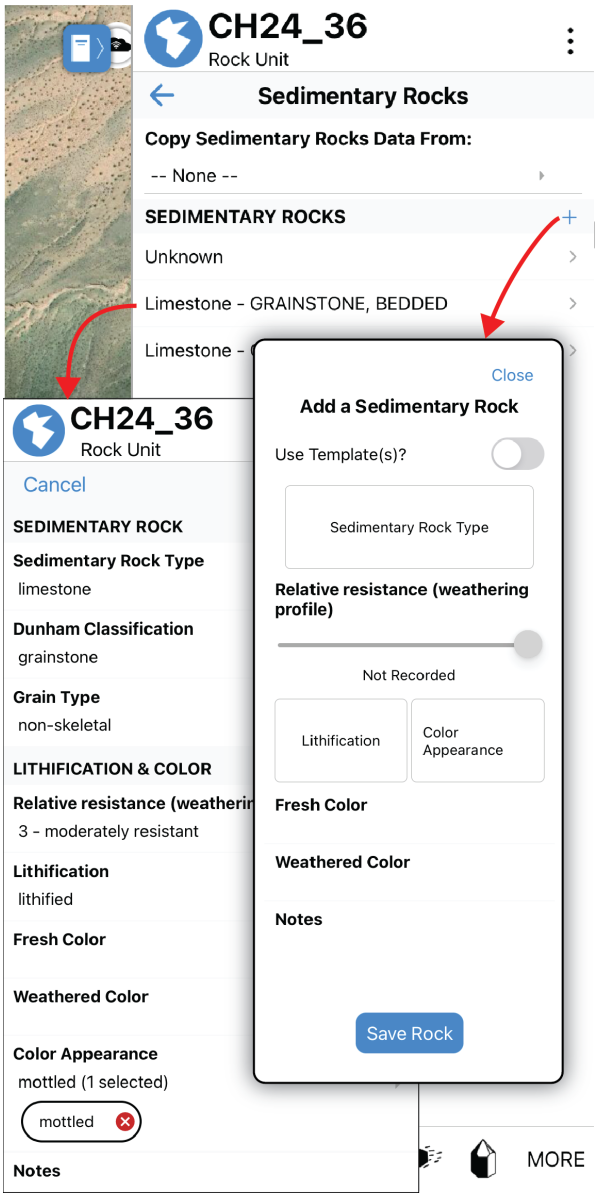

Figure 59. The Sedimentary Rocks notebook page displays all sedimentary rock entries added to the Spot. The modal is used to input new rock descriptions. The bottom-left screenshot shows the metadata recorded for each entry.

The **Sedimentary Rocks Page** allows users to add a structured dataset describing sedimentary rocks at a given Spot. The tool can be accessed using the page icon, which opens the Sedimentary Rocks modal as shown in Figure 59.

- This tool functions similarly to the **Igneous Rocks Tool**, providing:
  - Lists of selectable attributes
  - A slider for **Relative Resistance**
  - Open text fields for **Fresh Color**, **Weathered Color**, and **Notes**
- Each field opens a popup containing a set of predefined choices.
  - Most fields also include an *"Other"* option, allowing for user-defined entries.
- Templates can be used with this tool to define and save custom sedimentary rock profiles, which can be recalled and applied to other Spots.

4.2.20 Metamorphic Rocks

The **Metamorphic Rocks Page** allows users to add a structured metadata describing metamorphic rocks at a Spot. The tool can be accessed using the icon *circled in red below*, which opens a popup window.

- This tool functions similarly to the **Igneous Rocks Page**, offering:
  - Lists of selectable attributes
  - An open text field for **Notes**
- Each input field opens a popup with predefined choices.
  - Most fields include an *"Other"* option for user-defined entries.
- Templates can be used to define, save, and reuse customized metamorphic rock descriptions across multiple Spots.

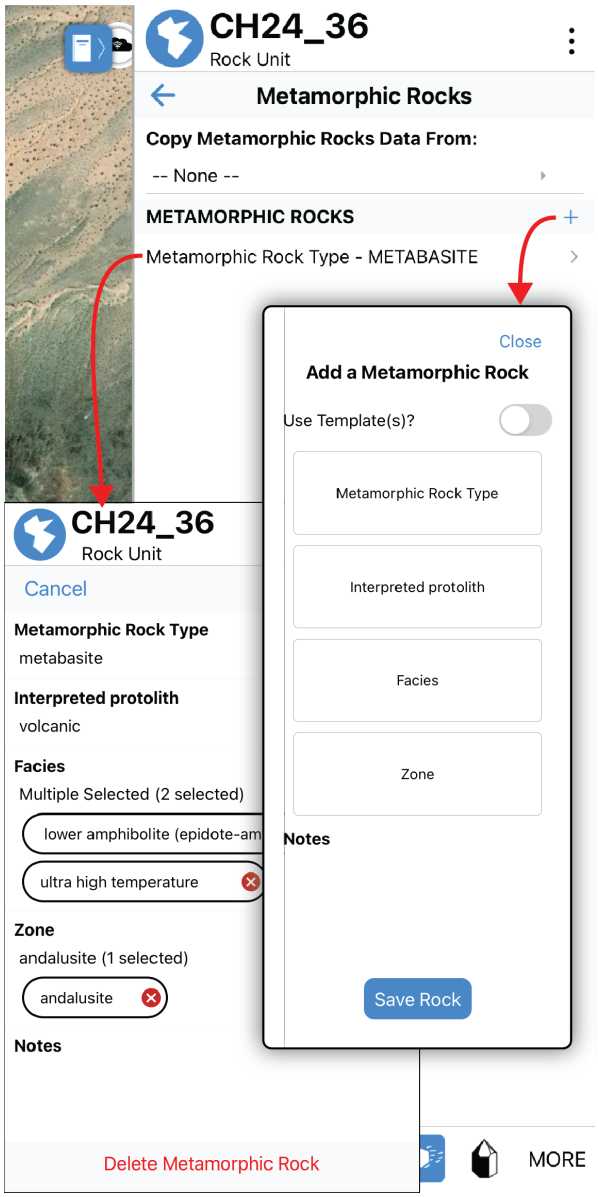

Figure 60. Metamorphic rocks added to the Spot are listed in the Notebook Panel (top center). New entries are added using the popup modal (center right). Selecting an existing entry allows users to view and edit its associated metadata.

4.2.21 Minerals

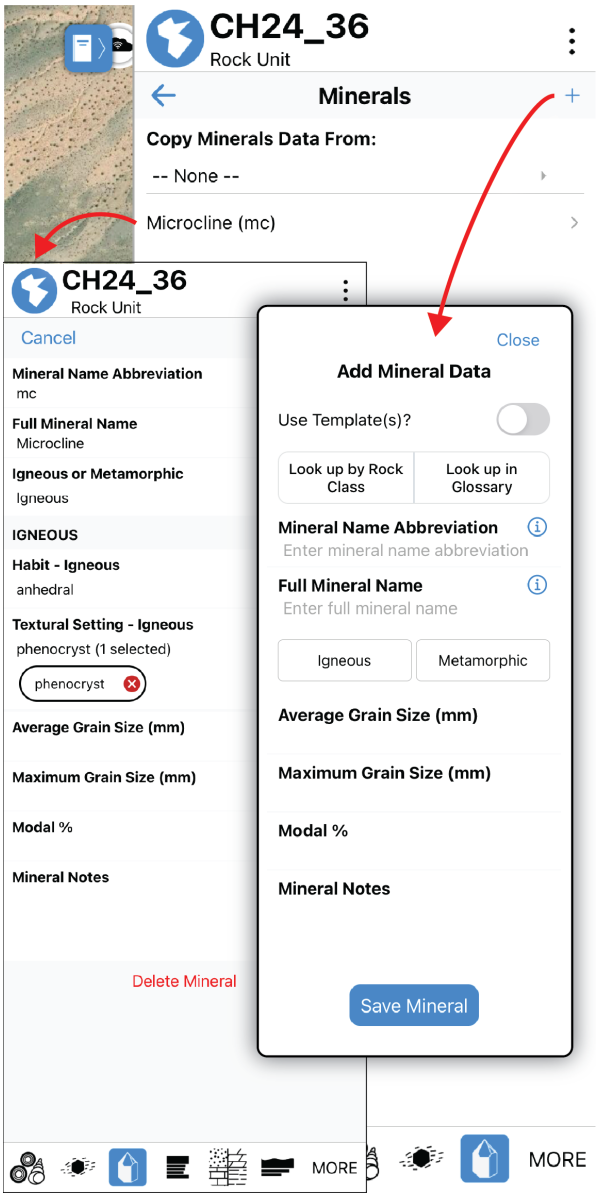

Figure 61. The Mineral Page (top) shows all minerals added to the active Spot. When a user selects a previously added mineral, the mineral metadata page appears (bottom left), when a user clicks the '+' button to add a new mineral the modal appears (bottom right).

The *Minerals Notebook Page* allows users to add structured mineralogical data to individual Spots using the accompanying *Minerals Modal*. This modal provides multiple methods for entering mineral information and supports the addition of multiple minerals while open.

Methods for Adding Mineral Data:

- **Look Up by Rock Class:** Displays lists of commonly associated minerals categorized by rock type: *plutonic*, *volcanic*, *metamorphic*, and *alteration/ore*.
- **Look Up in Glossary:** Provides an alphabetized glossary of minerals. Selecting a mineral opens its `mandate.org` entry, showing label, abbreviation, rock class, formula, crystal system, hardness, distinguishing features, occurrence, associated minerals, and a direct link to the full online record.
- **Manual Entry:** Users may enter custom mineral data using the following fields:
  - **Mineral Name Abbreviation**
  - **Full Mineral Name**
  - **Rock Type:** *Igneous* or *Metamorphic*
  - **Habit (conditional):** Filtered options based on rock type
  - **Textural Setting (conditional):** Filtered options based on rock type
  - **Average Grain Size (mm)**
  - **Maximum Grain Size (mm)**
  - **Modal %** (estimated abundance)
  - **Mineral Notes** (optional)

Viewing Entered Mineral Data:

- Complete mineral metadata can be reviewed on the *Minerals Notebook Page*.
- A summarized string of entered data appears in the *Notebook Spot Overview*.

4.2.22 Stratigraphic Section

The Stratigraphic Section Overview page allows users to associate a stratigraphic section with the active spot.

How to Add a Stratigraphic Section:

1. Toggle **Add a Stratigraphic Section at this Spot?** to **ON**.
2. This action displays the *Stratigraphic Section Metadata Page*.

Metadata Configuration:

- In the **Image Overlays** section, users can link existing images from the spot as overlays. Each image can be configured with:
  - Image Origin (X, Y)
  - Adjusted Width and Height
  - Opacity
  - Z-Index
- In the **Section Settings** area, users enter general information about the stratigraphic column:
  - Section / Well Name
  - Column Profile
  - Display Lithology Patterns (toggle)
  - Column Y-axis Units
  - Section Type
  - Location / Locality
  - Basin
  - Age
  - Purpose
  - Project Description
  - Scale of Interest
  - Observation Interval
  - Georeferencing Method
  - Notes

After metadata is added, users proceed to define stratigraphic intervals by viewing and editing the stratigraphic section (see next section).

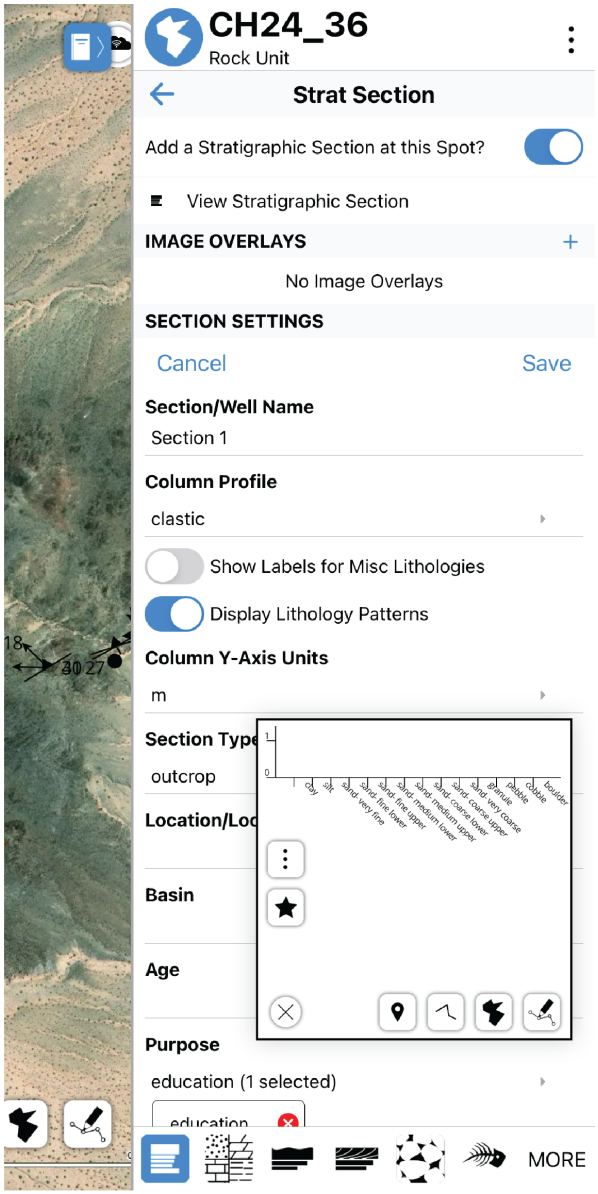

Figure 62. The Stratigraphic Section Notebook Page contains all general information about the Stratigraphic Section, users can add images from the Spot to the Section and click to view the Section.

4.2.23 Interval

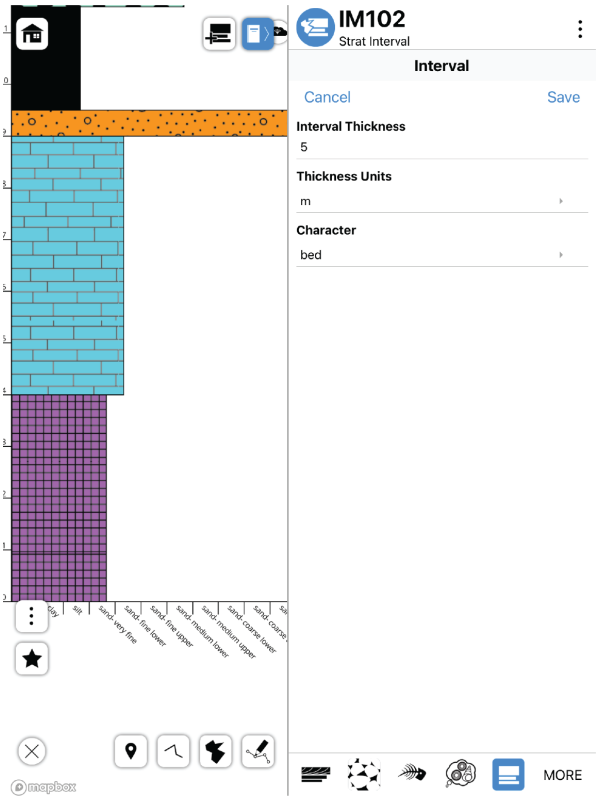

Figure 63. The Stratigraphic Column (left) is displayed and updated as Intervals are added. The Interval page and associated metadata is shown in the Notebook Panel (right).

Stratigraphic Interval Page

Once the strat section is created, intervals can be defined through the **Stratigraphic Interval Page**.

Creating Intervals:

1. Click **View Stratigraphic Section** at the top of the metadata page. This replaces the map view with a blank strat section plot.
2. Click the **+ Interval** button to add a new interval.

Add Interval Modal Fields:

- Insert New Interval After: (dropdown list of current intervals)
- Copy Interval Data From: (optional; speeds up data entry for repeating intervals)
- Interval Name
- Interval Thickness and Units
- **Type of Interval:**
  - Bed
  - Bed, Mixed Lithologies
  - Interbedded
  - Package (Succession of Beds)
  - Unexposed / Covered
  - Not Measured
- Notes

Conditional Fields by Interval Type: Depending on the Interval Type chosen (above, orange), additional fields will appear. These 'conditional' fields are only relevant for particular Interval Types and will only appear when various options are chosen, see below for the options and related conditional fields.

[S1] Bed Intervals

- Displays **Lithology 1** section:
  - Primary Lithology
  - Lithification
  - Fresh Color
  - Weathered Color

    - Relative Resistance
    - Notes

[S2] Bed, Mixed Lithologies / Interbedded

- Displays both **Lithology 1** and **Lithology 2** sections (same fields as [S1]).
- Adds **Bedding Section** with:
    - Interbed Proportion Change (Up Section): Increase, Decrease, No Change
- *If Increase or Decrease selected:*
    - Lithology 1: Max / Min Thickness
    - Lithology 2: Relative Proportion (%)
    - Lithology 2: Max / Min Thickness
    - Interbed Thickness Units
    - Lithology at Bottom Contact
    - Lithology at Top Contact
- *If No Change selected:*
    - Lithology 1 and 2: Average Thickness
    - Other fields remain visible

[S3] Package (Succession of Beds)

- Displays **Lithology 1** section (see [S1])
- Adds **Bedding Section** with:
    - Thickness of Individual Beds
    - Package Beds Thickness Units
    - Notes

[S4] Unexposed / Covered or Not Measured

- No additional fields are displayed.

4.2.24 Lithologies: Lithology

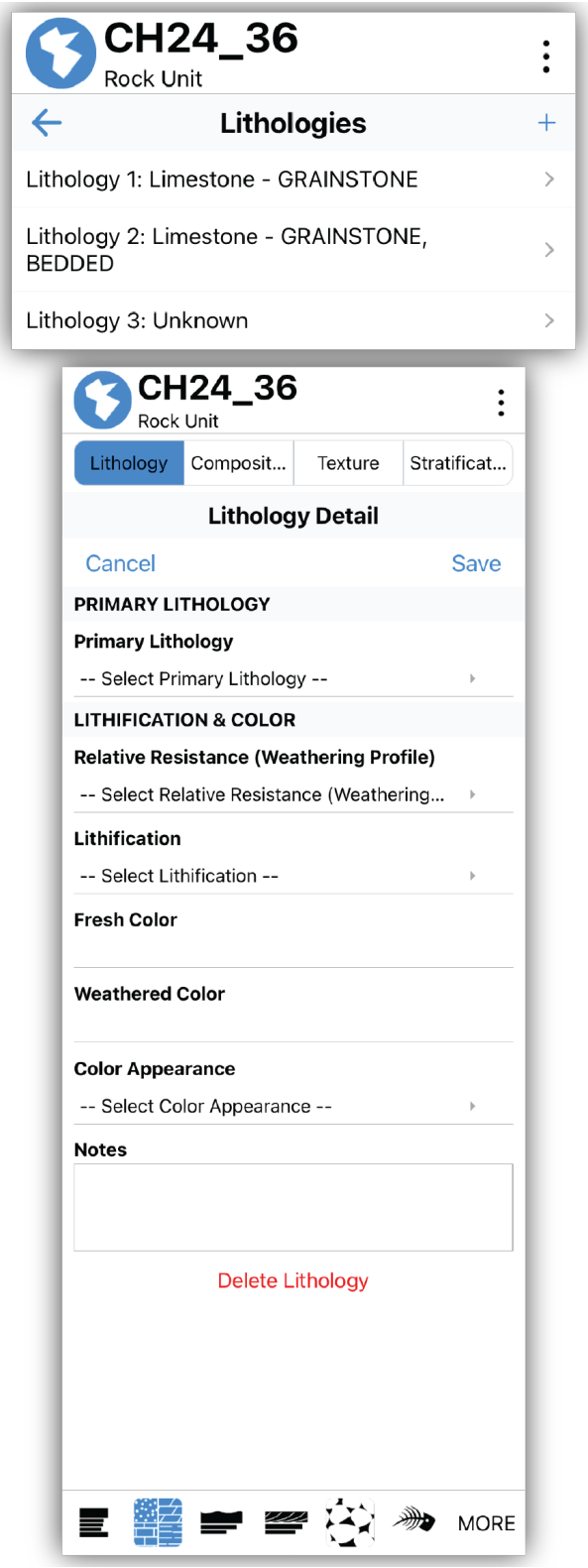

Figure 64. A lithology listing is shown up top in the Notebook Panel. The full panel shows the Lithology metadata page.

The **Lithologies** page contains four tabs: *Lithology*, *Composition*, *Texture*, and *Stratification*. Like all pages in the system, this page allows users to add detailed lithologic metadata to any spot (point, line, polygon, or stratigraphic interval).
Each tab provides structured metadata fields populated via predefined dropdown lists.
There are no required fields—any amount of metadata can be saved per spot.
Figure 64 shows how lithologic metadata appears in the spot overview page of the notebook.

Lithologies Page - Lithology Tab

The *Lithology* tab includes two main sections: **Primary Lithology** and **Lithification and Color**.

Primary Lithology Fields:

- **Primary Lithology**: Options include:
  - Siliciclastic
  - Limestone
  - Dolostone
  - Organic/Coal
  - Evaporite
  - Chert
  - Ironstone
  - Phosphatic
  - Volcaniclastic
- **Conditional Fields (based on selection)**:
  - **Siliciclastic**: Prompts *Siliciclastic Type* (claystone, mudstone, shale, siltstone, sandstone, conglomerate, breccia)
  - **Limestone / Dolostone**: Prompts *Dunham Classification* (mudstone, wackestone, jackstone, grindstone, boundstone, cementstone, recrystallized, floatstone, rudstone, framestone, bafflestone, bindstone)
- **Organic/Coal**: Prompts *Organic/Coal Lithologies* (amber, peat, lignite, sub-bituminous, bituminous, coal ball, tar, other)

- **Evaporite**: Prompts *Evaporite Type* (gypsum - anhydrite primary, gypsum - anhydrite diagenetic, halite - primary, halite - diagenetic, other)
- **Phosphatic**: Prompts *Phosphorite Type* (nodular, bedded, massive, other)
- **Volcaniclastic**: Prompts multiple fields:
  - *Volcaniclastic Type* (volcanic mudstone, volcanic sandstone, lapillistone, agglomerate, volcanic breccia, bentonite, tuff, welded tuff, ignimbrite, other)
  - *Report presence of particle aggregates*
  - *Componentry* (pumice, accidental lithic, accessory lithic, glass/obsidian, crystals, accretionary lapilli)
  - *Approximate relative abundance of clasts*
- **Chert and Ironstone**: No additional fields.

Lithification and Color Fields:

- **Relative Resistance (weathering profile)**: scale from 1 to 5
- **Lithification**: lithified, poorly lithified, unlithified/unconsolidated, metamorphosed
- **Evidence of deposit alteration**
- **Evidence of clast alteration**
- **Fresh Color**
- **Weathered Color**
- **Color Appearance**: uniform, patchy, striped, mottled, spotted, gradational, other
- **Notes**

4.2.25 Lithologies: Composition

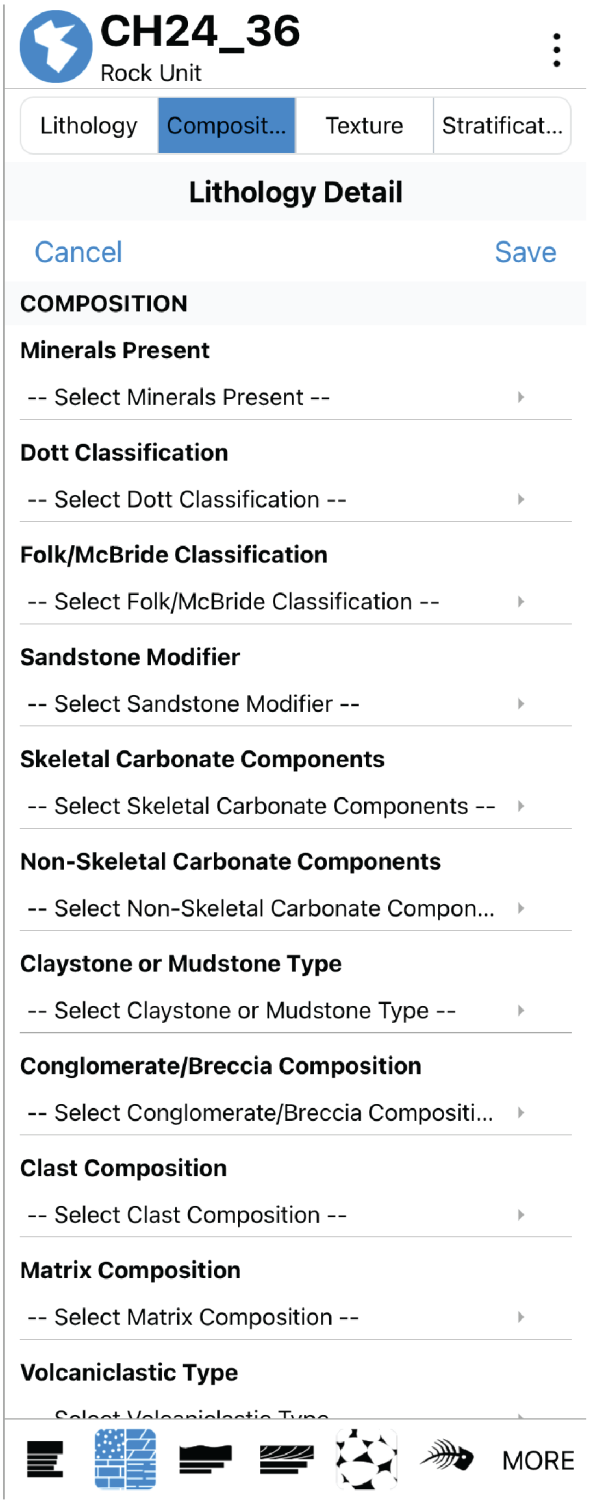

Figure 65. The Lithologies Composition tab with special controlled metadata.

Lithologies Page - Composition Tab

The **Composition** tab of the Lithologies page provides a wide range of structured metadata fields based on recognized geologic classifications. This allows users to record both observational and interpretive lithologic details.

- **Minerals Present**
- **Dott Classification**:
  - quartz arenite, feldspathic arenite, subarkose arenite, lithic arenite, sublithic arenite, quartz wacke, lithic wacke, feldspathic wacke
- **Folk/McBride Classification**:
  - quartzarenite, aubarkose, sublithic arenite, arkose, lithic arkose, arkosic litharenite, litharenite
- **Sandstone Modifier**:
  - rip-up clasts, wood, fossils, other
- **Skeletal Carbonate Components**:
  - skeletal (general), mollusk, brachiopod, coral, echinoderm, bryozoan, calcareous algae, foraminifera, stromatolite, thrombolite, dendrolite, leiolite, other
- **Non-Skeletal Carbonate Components**:
  - mud, cement, intraclast, peloid, ooid, oncoid, pisoid, coated grain, grapestone, giant ooid, seafloor precipitate, molar tooth, other
- **Claystone or Mudstone Type**:
  - siliceous mudstone, siliceous calcareous mudstone, siliceous volcaniclastic mudstone, calcareous mudstone, black shale, red clay, red mudstone, green mudstone, variegated mudstone, marl, sarl, argillaceous mudstone, other
- **Conglomerate/Breccia Composition**:
  - intraformational, extraformational, monomictic, oligomictic, polymictic

- **Clast Composition**:
  - List of common rock and mineral clast types
- **Matrix Composition**:
  - intrusive igneous, volcanic, metamorphic, mudstone, siltstone, sandstone, conglomerate, carbonate, other
- **Volcaniclastic Type**:
  - glass, crystals, lithic fragments, volcanic mudstone, volcanic sandstone, lapillistone, agglomerate, volcanic breccia, bentonite, tuff, welded tuff, ignimbrite, discrete, disseminated, cryptotephra, other
- **Evaporite Type**:
  - gypsum – anhydrite primary, gypsum – anhydrite diagenetic, halite – primary, halite – diagenetic
- **Phosphorite Type**:
  - nodular, bedded, massive
- **Organic/Coal Lithologies**
  - amber, peat, lignite, subbituminous, bituminous, coal ball, tar
- **Notes**

4.2.26 Lithologies: Texture

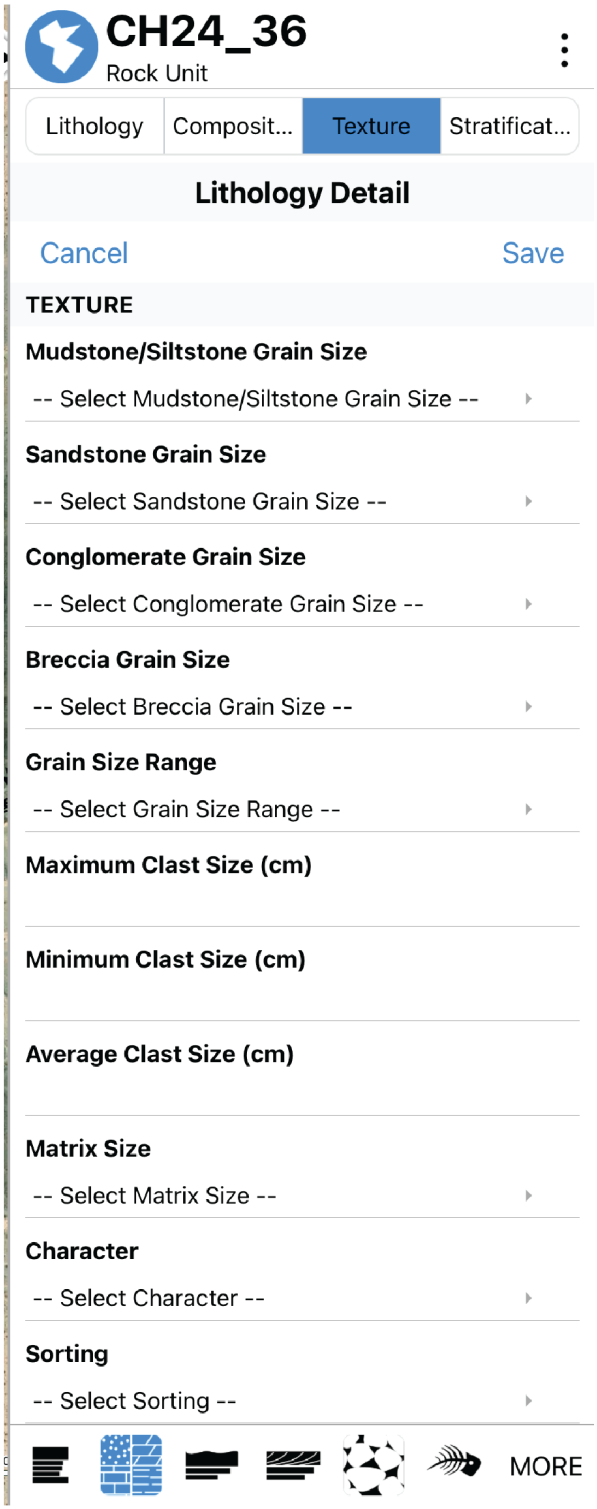

Figure 66. The Lithologies Texture tab with controlled metadata.

Lithologies Page – Texture Tab

The **Texture** tab provides predefined options to assist users in describing lithologic textures accurately and consistently. Fields include both quantitative and qualitative descriptors related to grain size, support structure, and particle morphology.

- **Mudstone/Siltstone Grain Size**:
  - clay, silt
- **Sandstone Grain Size**:
  - Options range from very fine to very coarse
- **Conglomerate and Breccia Grain Size**:
  - granule, pebble, cobble, boulder
- **Grain Size Range**:
  - Options span from clay to boulder
- **Maximum Clast Size (cm)**
- **Minimum Clast Size (cm)**
- **Average Clast Size (cm)**
- **Matrix Size**:
  - clay, silt, sand, granule, pebble, cement, other
- **Character**:
  - grain-supported, matrix-supported, imbrication, alignment
- **Sorting**:
  - Options range from very well sorted to very poorly sorted
- **Rounding**:
  - Options range from well-rounded to very angular
- **Shape**:
  - spherical, equant, tabular, disk/chip-like, prolate, bladed, rod-like, skeletal, non-skeletal, other
- **Notes**

4.2.27 Lithologies: Stratification

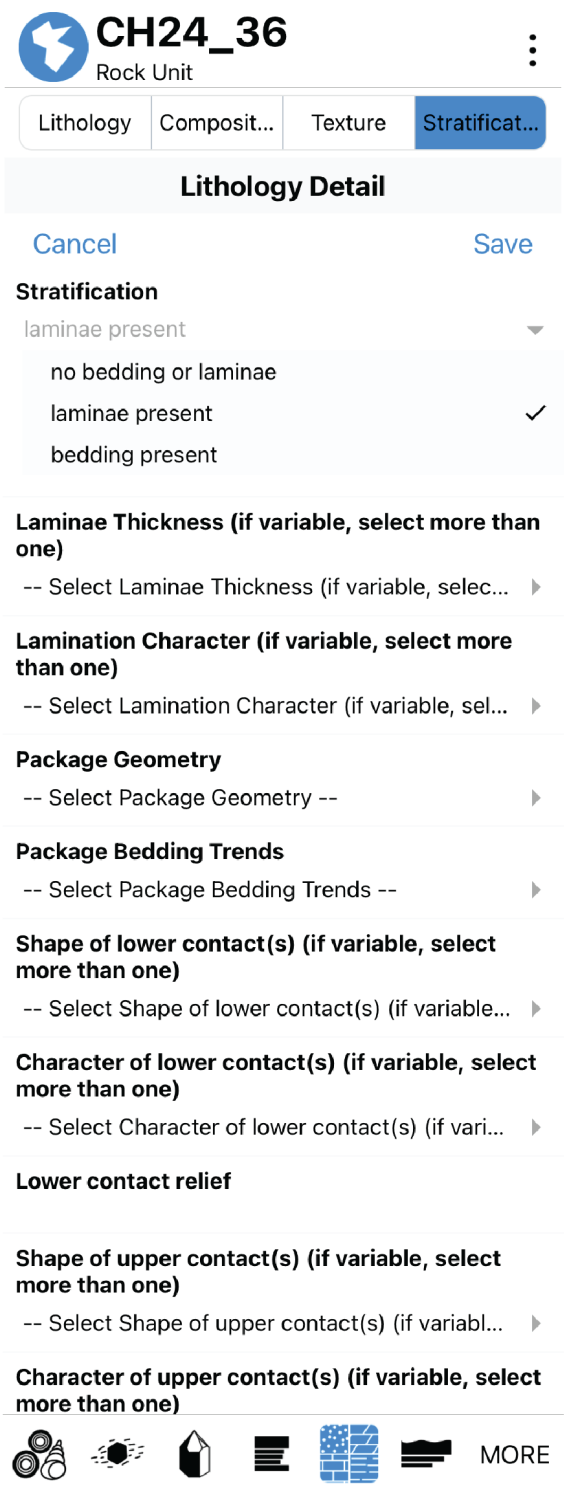

Figure 67. The Lithologies Stratification tab with controlled metadata fields.

Lithologies Page – Stratification Tab

The **Stratification** tab contains numerous conditional fields designed to help users capture detailed metadata about sedimentary structures, specifically bedding and lamination. The fields that appear depend on the user's selection in the initial *Stratification* field.

- **Stratification**:
  - no bedding or laminae
  - laminae present
  - bedding present
- **Laminae Thickness**:
  - Options range from very thin to thick
  - variable
  - thin upwards
  - thicken upwards
- **Lamination Character**:
  - weak, strong, discontinuous, planar, wavy, irregular, tufted, crinkly, pustular, wedge, sand stringers
- **Bedding Thickness**:
  - Same options as Laminae Thickness
- **Bedding Character**:
  - weak, strong, tabular/parallel, discontinuous, lenticular, channel-like, wedge, wavy, chaotic, nodular
- **Package Geometry**:
  - discontinuous, tabular/parallel, lenticular, channel-like, wedge
- **Package Lateral Extent**:
  - meter-scale, tens of meters, hundreds of meters, kilometer-scale
- **Package Bedding Trends**:
  - upward thinning, upward thickening, uniform (no trend), can't be determined, other
- **Shape of Lower Contact(s)**:
  - flat, undulatory, curved, concave up, concave down, irregular, covered, n/a
- **Character of Lower Contact(s)**:
  - sharp, gradational, well-defined, amalgamated, erosional, depositional, reworked, lag

deposits/rip-up clasts, can't be determined

- **Lower Contact Relief**
- **Shape of Upper Contact(s)**:
  - Same list as *Shape of Lower Contact(s)*
- **Character of Upper Contact(s)**:
  - Same list as *Character of Lower Contact(s)*
- **Upper Contact Relief**
- **Interbed Relative Proportion (%)**
- **Interbed Thickness**:
  - $\sim$2 cm, 2–5 cm, 5–10 cm, 10–30 cm, $>$30 cm
- **Interbed Proportion Change (Up Section)**:
  - increase, decrease, no change
- **Interbed Thickness Change (Up Section)**:
  - increase, decrease, no change
- **Notes**

4.2.28 Bedding

Bedding Page Overview
The **Bedding** page can be added to the Notebook to document detailed bedding metadata. It uses dropdown menus to standardize descriptions across four main sections.

Bedding Geometry

- Bed Geometry:
  - discontinuous
  - tabular/parallel
  - lenticular
  - wedge
  - channel-like

Lower Contact

- Shape of Lower Contact:
  - flat
  - undulatory
  - curved
  - concave up
  - concave down
  - irregular
  - covered
- Character of Lower Contact:
  - sharp
  - gradational
  - well-defined
  - poorly-defined
- Lower Contact Relief

Upper Contact

- Shape of Upper Contact:
  - Same options as Shape of Lower Contact
- Character of Upper Contact:
  - Same options as Character of Lower Contact
- Upper Contact Relief

Interbed Thickness

- Average Thickness
- Maximum Thickness
- Minimum Thickness
- Notes

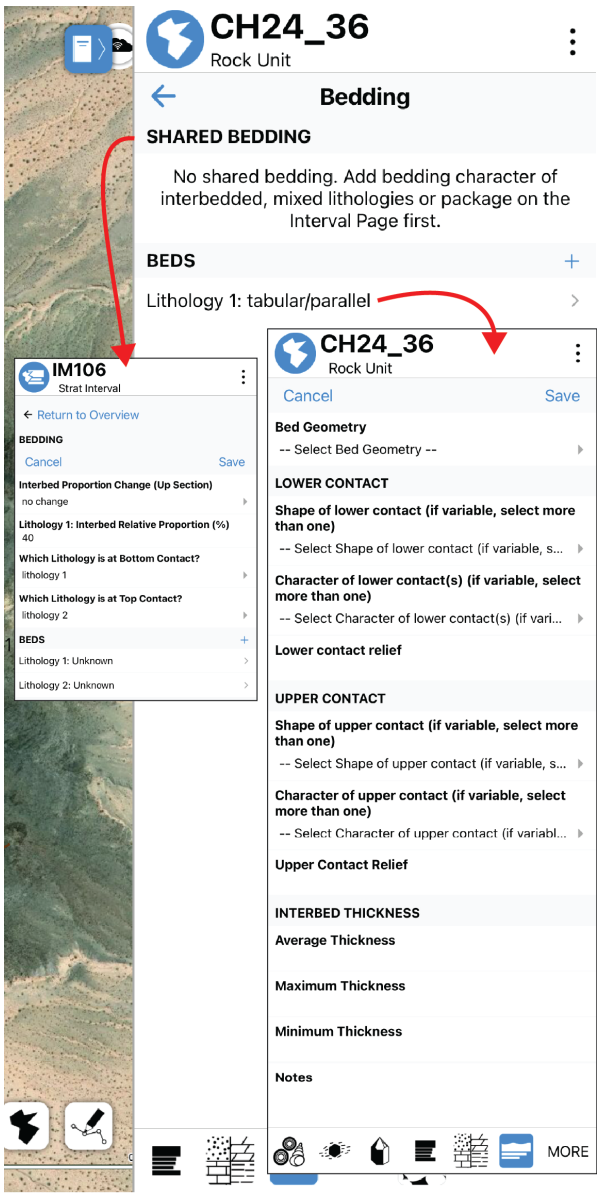

Figure 68. Bedding metadata added will appear in the spot overview page (top). When shared bedding relations are added to Stratigraphic Intervals specialized metadata is available (bottom left). Beds are added (bottom right) using the controlled metadata page.

4.2.29 Structures

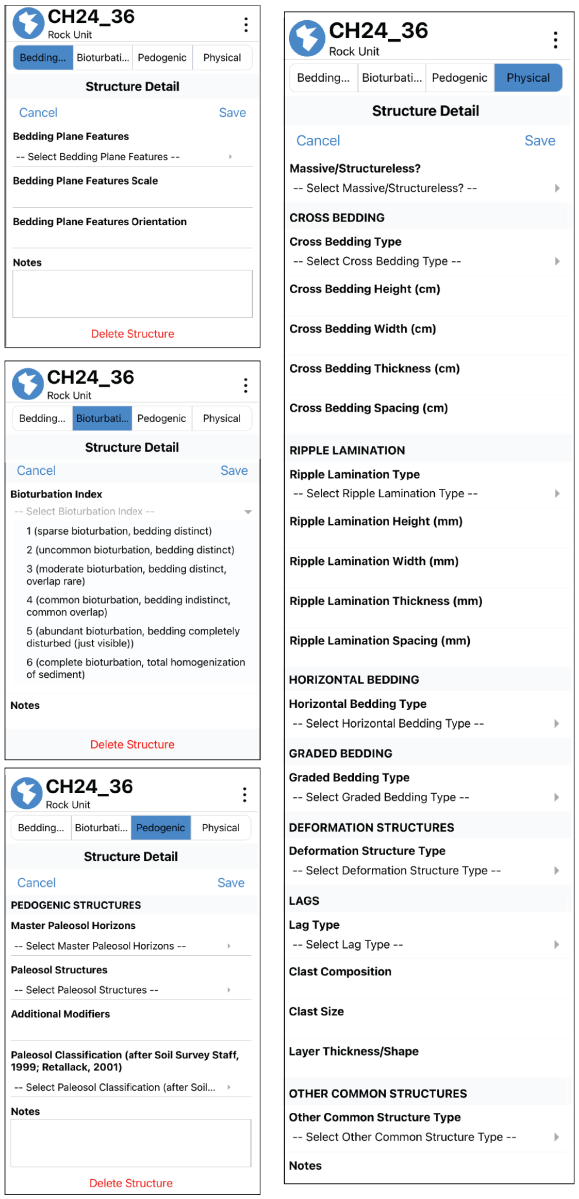

Figure 69. The Structures Notebook page with the 4 specialized structure tabs: Bedding Plane, Bioturbation, Pedogenic, Physical. Each tab has controlled metadata for the related structure observations and interpretations.

The **Structures** page consists of four tabs: *Bedding Plane*, *Bioturbation*, *Pedogenic*, and *Physical*. Each tab provides distinct metadata fields for describing specific types of sedimentary structures.

Bedding Plane Structure Tab

- Bedding Plane Features:
  - bedforms, sole marks, flute casts, groove casts, tool marks, gutter casts, load casts, parting lineation, mudcracks, syneresis cracks, evaporite molds, raindrop impressions, glacial striations, hardground/firmground, other
- Bedding Plane Features Scale
- Bedding Plane Orientation
- Notes

Bioturbation Structure Tab

- Bioturbation Index:
  - 1 – sparse bioturbation, bedding distinct
  - 2 – uncommon bioturbation, bedding distinct
  - 3 – moderate bioturbation, bedding distinct, overlap rare
  - 4 – common bioturbation, bedding indistinct, common overlap
  - 5 – abundant bioturbation, bedding disturbed (just visible)
  - 6 – complete bioturbation, sediment homogenized
- Notes

Pedogenic Structure Tab

- Master Paleosol Horizons:
  - O, A, E, B, K, C, R, compound, composite, other
- Paleosol Structures:
  - peds, slickensides, rooting, mottling, carbonate nodules, leaching horizons, other
- Additional Modifiers

- Paleosol Classification:
  - gelisol, histosol, spodosol, andisol, oxisol, vertisol, aridisol, ultisol, mollisol, alfisol, inceptisol, entisol
- Notes

Physical Structure Tab

- Massive / Structureless?
  - yes, no

Cross Bedding Section

- Cross Bedding Type:
  - general, trough, hummocky, swaley, planar tabular, festoon, wedge, low angle, high angle, symmetric, asymmetric, herringbone, bi-directional, sigmoidal, pinstripe, avalanche tongues, large-scale, carbonaceous drapes, mud drape, other
- Cross Bedding Height (cm)
- Cross Bedding Width (cm)
- Cross Bedding Thickness (cm)
- Cross Bedding Spacing (cm)

Ripple Lamination Section

- Ripple Lamination Type:
  - general, trough, climbing, flaser, wavy, lenticular, translatent, starved, herringbone, symmetric, asymmetric, bi-directional, pinstripe, wind, interference, carbonaceous drape, mud drape, other
- Ripple Lamination Height (mm)
- Ripple Lamination Width (mm)
- Ripple Lamination Thickness (mm)
- Ripple Lamination Spacing (mm)

Horizontal Bedding Section

- Horizontal Bedding Type:
  - horizontal, planar, rhythmic, wavy, lenticular, carbonaceous drape, mud drape, sandy stringers, other

Graded Bedding Section

- Graded Bedding Type:
  - normally graded, inverse graded

Deformation Structures Section

- Deformation Structure Type:

    - contorted bedding, convolute bedding, rip-up clasts, nodular bedding, pipes, dikes, sills, dish structures, flame structures, sand/mud volcanoes, load structures, ball and pillow, boudinage, intrastratal cracks, liquefaction features, syn-sedimentary faults, neptunian dikes, post-lithification deformation, other

Lags Section

- Lag Type:
    - lag deposit, rip-up clasts, intraclasts, other
- Clast Composition
- Clast Size
- Layer Thickness/Shape

Other Common Structures Section

- Other Common Structure Type
- Bouma Sequence
- Bouma Sequence Part:
    - a, b, c, d, e
- Tidal Bundles
- Notes

4.2.30 Diagenesis

The **Diagenesis** page in the Notebook allows users to document detailed observations related to the post-depositional alteration of rocks. This includes information on cement, veins, fractures, nodules, concretions, replacement, recrystallization, porosity, and carbonate desiccation/dissolution features—key data that support interpretations of sediment-to-rock transformation processes.

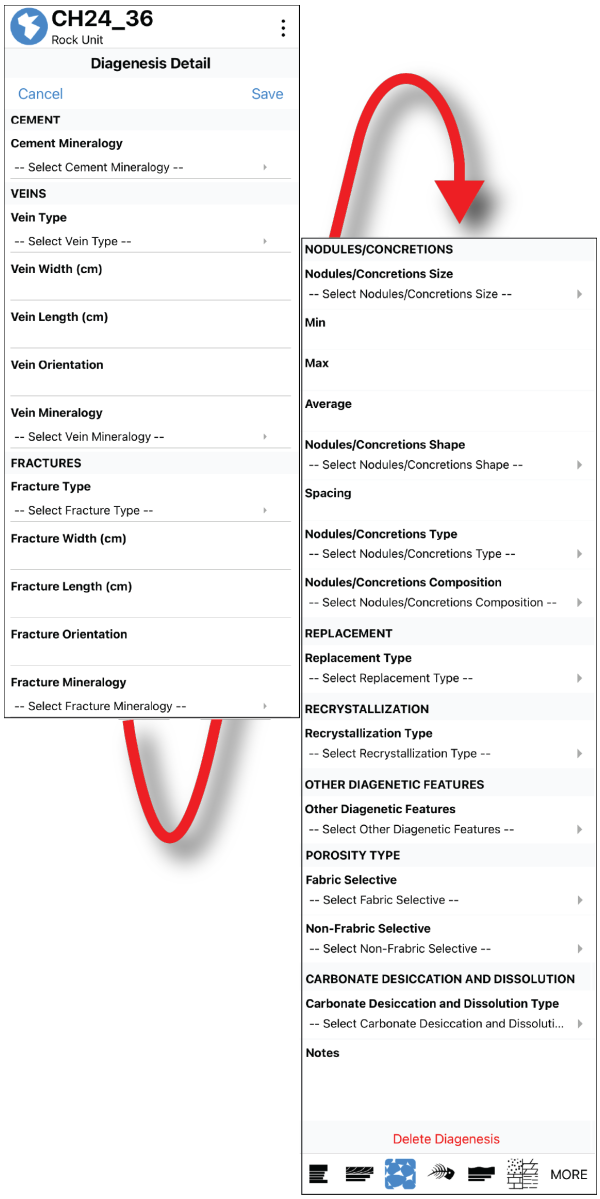

Figure 70. The Diagenesis Notebook page with controlled metadata fields.

Cement

- Cement Mineralogy:
  - calcite, dolomite, silica, iron oxides, evaporite minerals, clay, other

Veins

- Vein Type:
  - parallel, oblique, perpendicular, en echelon
- Vein Width (cm)
- Vein Length (cm)
- Vein Orientation
- Vein Mineralogy:
  - calcite, quartz, iron oxides, evaporite minerals, other

Fractures

- Fracture Type:
  - parallel, oblique, perpendicular, en echelon
- Fracture Width (cm)
- Fracture Length (cm)
- Fracture Orientation
- Fracture Mineralogy:
  - calcite, quartz, iron oxides, evaporite minerals, other

Nodules / Concretions

- Size Units:
  - mm, cm, dm, m
- Size Measurements:
  - Minimum, Maximum, Average
- Shape:
  - spherical, pod, elongate, masses, pipes, irregular, other

- Spacing
- Type:
  - septarian, solid, rinded, layered, other
- Composition:
  - calcite, dolomite, pyrite, iron oxide, silica, gypsum/anhydrite, apatite, siderite, kaolinite, copper carbonate, other

Replacement

- Replacement Type:
  - fossil selective, local, extensive, petrified wood, other

Recrystallization

- Recrystallization Type:
  - selective, local, extensive, recrystallized foam, other

Other Diagenetic Features

- Feature Type:
  - stylolites, Liesegang banding / chemical reaction front, dendrites, intergranular, weathering horizon, hardground, oil staining, random cumulates, bottom growth textures, other

Porosity Type

- Fabric Selective:
  - interparticle, intraparticle, intercrystal, moldic, fenestral, shelter, growth-framework, boring, burrow, shrinkage, breccia, other
- Non-Fabric Selective:
  - fracture, channel, vug, cavern/cavities, other

Carbonate Desiccation and Dissolution

- Feature Type:
  - karst, gyres, fissures, pavement, caliche, geopetal, sheet cracks, collapse structures, caves, stylolites, other
- Notes

4.2.31 Fossils

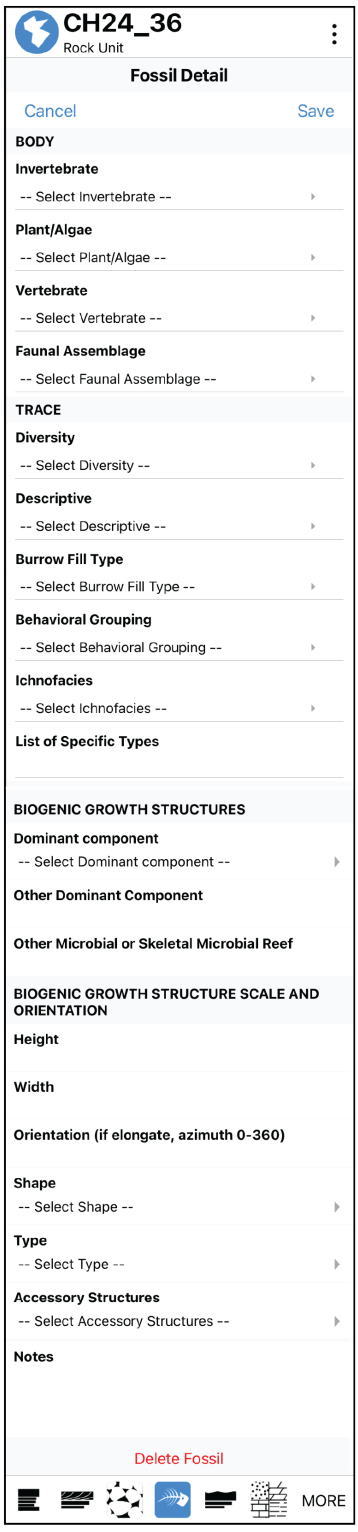

Figure 71. The Fossils Notebook page with controlled metadata fields for capturing observations and interpretations at the Spot.

Fossil Page Overview

The **Fossil** page in the Notebook Panel enables users to record structured metadata about fossils and fossil-related structures observed at a given spot.

Body Fossils

- **Invertebrate:** porifera/sponge, mollusc, brachiopod, arthropod, echinoderm, cnidarian, chordate, bryozoan, protist, calcmicrobe, other
- **Plant/Algae:** green algae, red algae, cyanobacteria, coralline, udoteaceans, phylloid, charophytes, bryophyta, pteridophytae, angiosperm, gymnosperm, other
- **Vertebrate:** antinopterygii, chondrichthyes, aves, amphibia, reptilia, mammalia, dinosauria, other
- **Faunal Assemblage:** heterozoan, photozoan, other

Trace Fossils

- **Diversity:** low, medium, high
- **Descriptive Terms:** burrowed, track, trail, footprint, underprint, horizontal, sub-vertical, vertical, oblique, branching, u-shaped, y-shaped, lined, unlined, other
- **Burrow Fill Type:** passive, active, siliciclastic sand, siliciclastic silt, siliciclastic mud, siliciclastic grains, carbonate grains, mudstone, wackestone, packstone, grainstone, cementstone, other
- **Behavioral Grouping:** resting, locomotion, grazing, feeding, dwelling structure, escape, farming, predation, brooding, multipurpose, equilibrium, other
- **Ichnofacies:** psolonichnus, skolithos, cruziana, zoophycos, nereites, trypanites, glossifungites, teredolites, other
- **List of Specific Types**

Biogenic Growth Structures

- **Dominant Component:** skeletal reef, skeletal-microbial reef, microbial reef, mud mound, other

- **Other Dominant Component**
- **Other Microbial or Skeletal-Microbial Reef**

Biogenic Growth Structure Scale and Orientation

- **Height**
- **Width**
- **Orientation**
- **Shape:** bioherm (lens-shaped), biostrom (tabular), dome, mound
- **Type:** fringing, patch reef, atoll, other
- **Accessory Structures:** fenestrae, geopetal, framework cavities, cement-fill, other
- **Notes**

4.2.32 Interpretations: Architecture

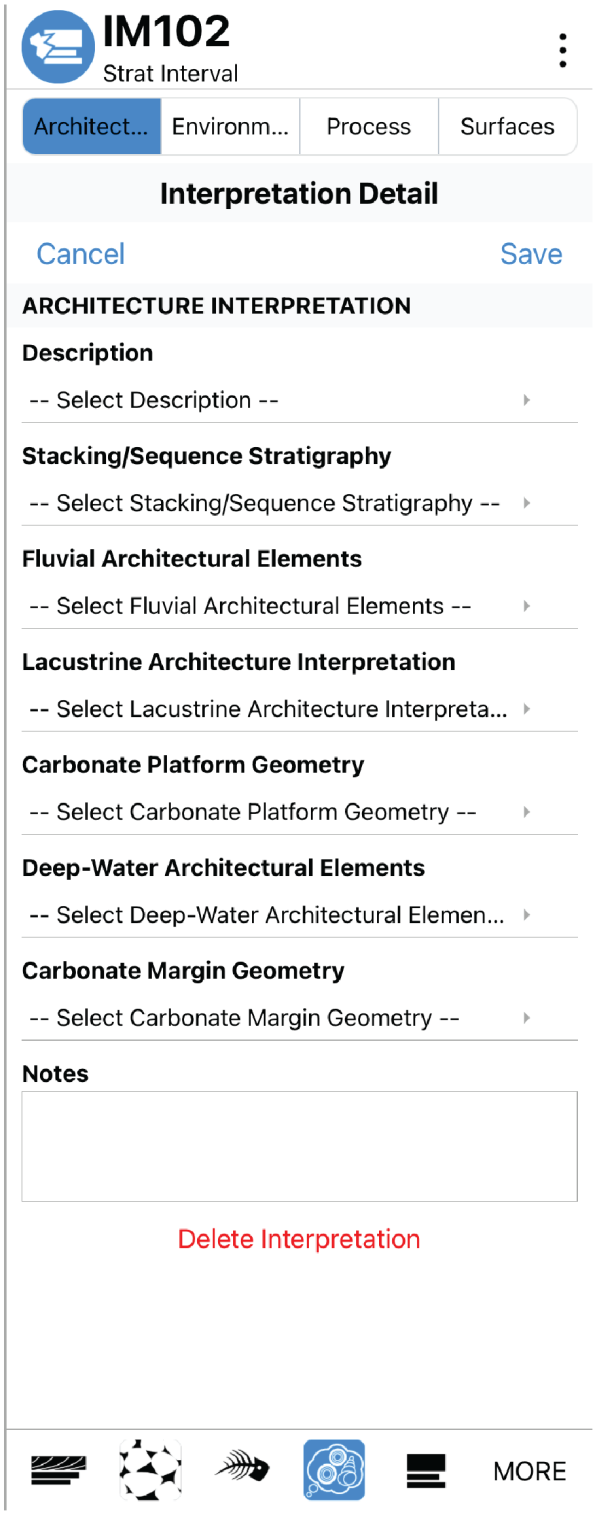

Figure 72. The Interpretations Notebook page, Architecture tab with controlled metadata for architectural interpretations within a Stratigraphic column.

The **Interpretation Notebook Page** becomes available only when a **Stratigraphic Interval Spot** (referred to in the application as a "Strat Interval") is both created and active.
To access the Interpretation Page:

- First, add a stratigraphic column to a spot (see Section 4.2.22).
- Then, add an interval to the column (see Section 4.2.23).
- This creates a Strat Interval Spot.

Once the Strat Interval Spot is active, the Interpretation page can be added to the Notebook Panel (refer to Section 4.2 for instructions on adding pages).
Tip: The blue icon at the top of the Notebook Panel indicates the active spot type. Refer to Section 4.1.3 for icon meanings. To access the Interpretations page, the spot type must be **Strat Interval**.

Interpretation Tabs

The Interpretation Page consists of four tabs, each supporting different interpretation types. This section covers the first tab: **Architecture Interpretations**.

Architecture Interpretations Fields

- **Description:** fining upward, coarsening upward, cyclic, random, stacked, isolated

- **Stacking / Sequence Stratigraphy:** progradational, aggradational, retrogradational, degradational, transgressive hemicycle, regressive hemicycle, Highstand Systems Tract, Lowstand Systems Tract, Transgressive Systems Tract, Falling Stage Systems Tract, incised valley fill, other
- **Fluvial Architectural Elements:** channel (CH), gravely bar or bedform (GB), sandy bedform (SB), forest macroforms (FM), lateral accretion macroform (LA), sediment gravity flow (SG), laminated sand sheet (LS), overbank fines (OF), other
- **Lacustrine Architecture Interpretation:** underfilled, overfilled, balanced, other
- **Carbonate Platform Geometry:** rimmed platform, ramp, attached, isolated, homocline ramp, distally steepened ramp, unrimmed platform, other
- **Deep-Water Architectural Elements:** channel, levee, sheet, splay, overbank deposits, mound, other
- **Carbonate Margin Geometry:** escarpment margin, accretionary margin, other
- **Notes**

4.2.33 Interpretations: Environmental

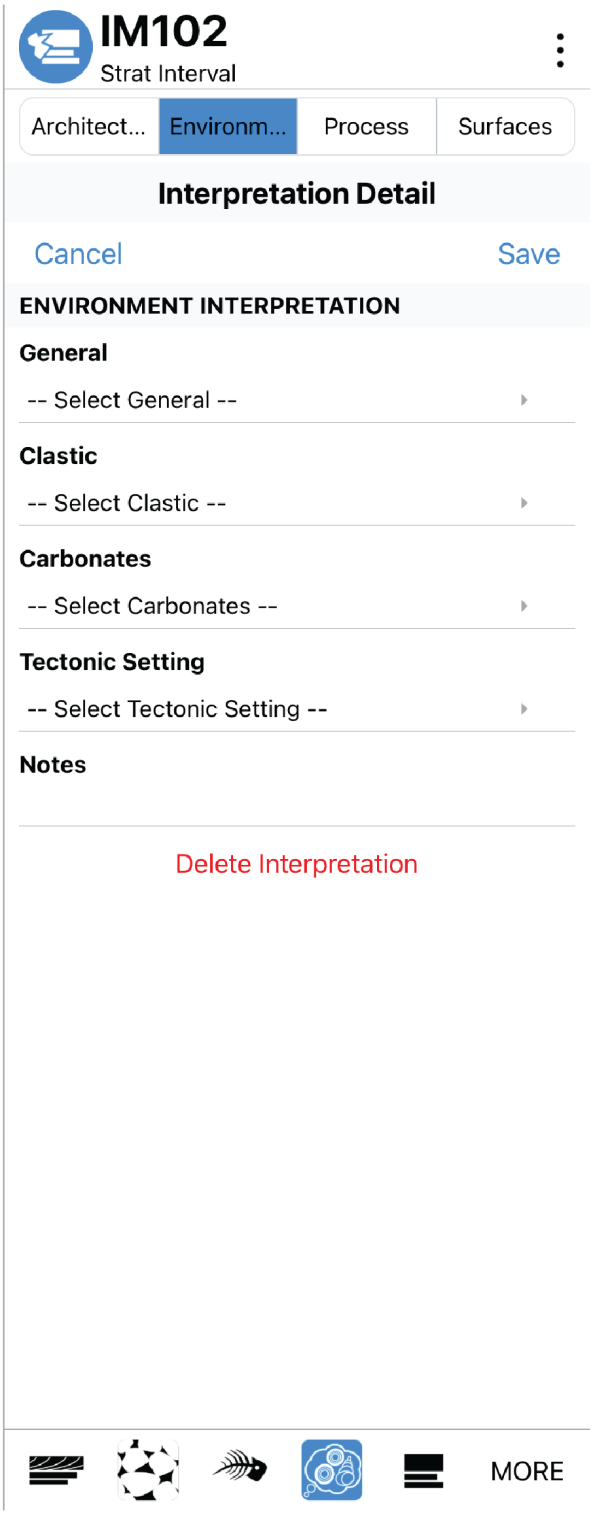

Figure 73. The Interpretations Notebook page, Environmental tab with controlled metadata for environmental interpretations within a Stratigraphic column interval.

The second tab of the **Interpretations** Notebook Page is used to capture Environmental Interpretations. This tab is only available when a Stratigraphic Interval Spot is active (see Section 4.2.23). It provides structured metadata fields for interpreting depositional environments and tectonic settings.

Environment Interpretation

- General: continental, transitional, shallow marine, deep marine
- Clastic: alluvial fan, glacial and proglacial, fluvial, floodplain, mire/swamp, lake, playa, eolian, sabkha, tidal flat, lagoon, delta, beach, shoreface, shelf, offshore transition zone, open marine, deepwater channel, deepwater fan, other
- Carbonates: factory, environmental
- Tectonic Setting: intracratonic basin, rift, passive margin, offshore bank, foreland basin, forearc basin, backarc basin, volcanic pedestal, caldera, other
- Notes

4.2.34 Interpretations: Process

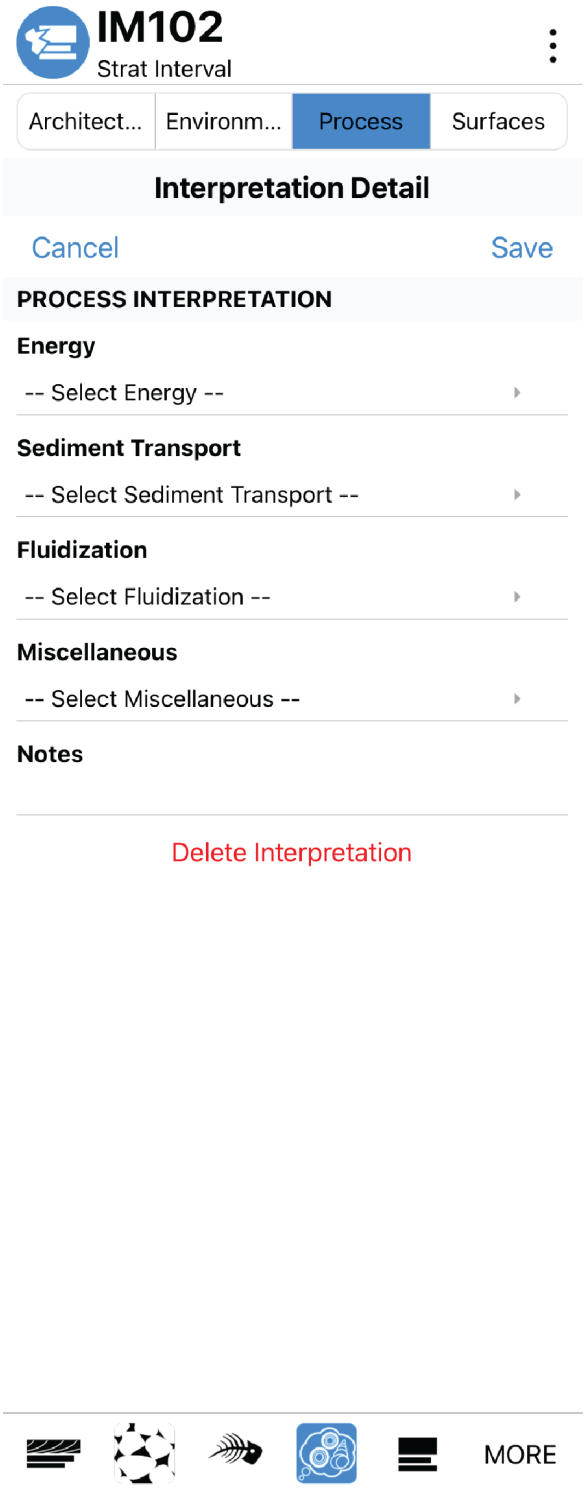

Figure 74. The Interpretations Notebook page, Process tab with controlled metadata for process interpretations within a Stratigraphic column interval.

Process Interpretations

The third tab of the **Interpretations** Notebook Page is used to capture **Process Interpretations**. These structured metadata fields allow users to describe physical processes influencing deposition within the stratigraphic interval.

Energy

- Energy: high energy, low energy, variable energy, other

Sediment Transport

- Sediment Transport: waves, current, combined flow, bed load, suspended load, turbidity current, debris flow, density flow, mud slurry, hypopycnal flow, hyperpycnal flow, mass transport, tides, tidal rhytmite, tidal bundle, wind, ice, pyroclastic flow, ground surge, base surge, other

Fluidization

- Fluidization: liquefaction, granular, mass flow, other

Miscellaneous

- Miscellaneous: ice rafting, till, moraine, storm, hemipelagic, desiccation, river, earthquake, flood, impact, evaporation, bio-precipitation, oxidation/reduction, pedogenic, biomediated, microbial, bedform migration, other
- Notes

4.2.35 Interpretations: Surfaces

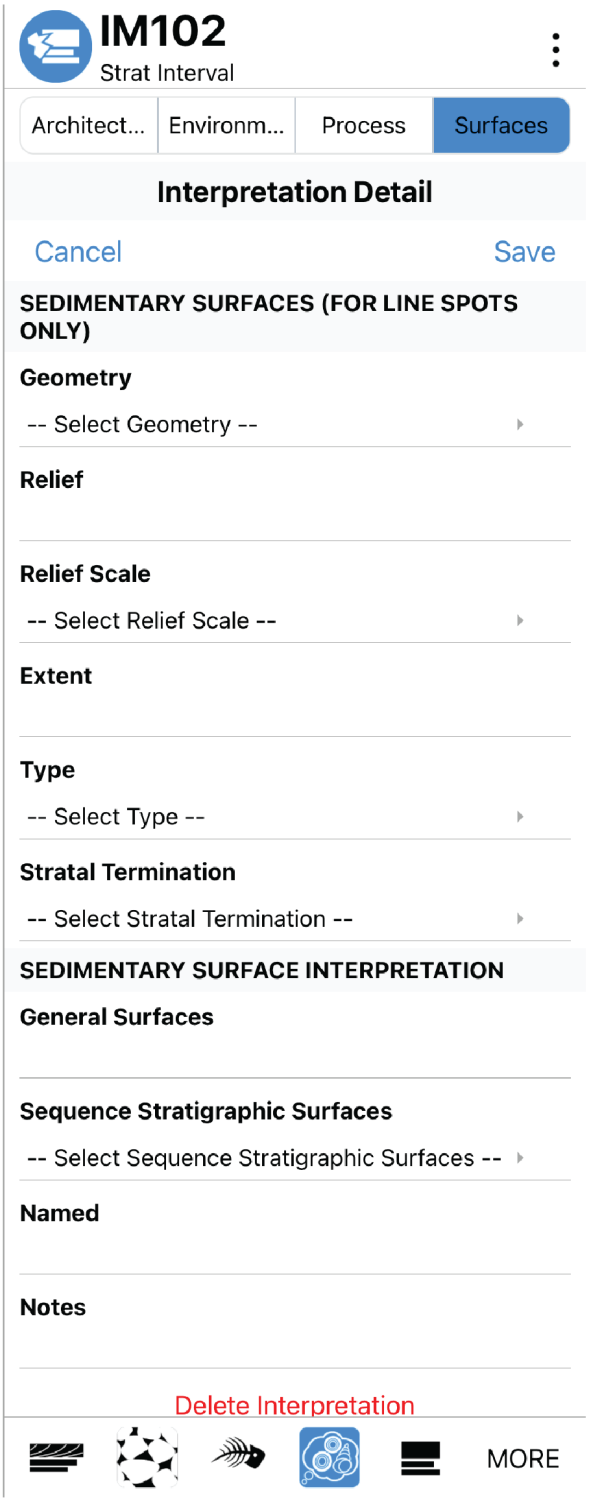

Figure 75. The Interpretations Notebook page, Surfaces tab with controlled metadata for surface interpretations within a Stratigraphic column interval.

The fourth and final tab of the **Interpretations** Notebook Page captures interpretations related to **sedimentary surfaces**. These metadata fields help characterize and classify bounding or discontinuity surfaces within stratigraphic intervals.

Sedimentary Surfaces

- Geometry: flat, undulatory, concave up, concave down, irregular
- Relief
- Relief Scale: cm, m
- Extent
- Type: mineralization, karst, hardground, firmground, burrowed, pedogenic, weathering, lag, condensed, erosional, conformable, unconformable, ash/tuff, fault exposure, flooding, ravinement, hiatus (hiatal), reactivation, supersurface, interdune, deflation, other
- Stratal Termination: onlap, downlap, toplap, offlap

Sedimentary Surface Interpretation

- General Surfaces
- Sequence Stratigraphic Surfaces: Type 1 sequence boundary, Type 2 sequence boundary, Type 3 sequence boundary (drowning unconformity), interfluve expression, erosional expression, correlative conformity, parasequence boundary, maximum flooding surface, transgressive surface of erosion, subaerial unconformity, other
- Named
- Notes

5 StraboSpot Website

The StraboSpot website (`https://www.strabospot.org`) serves as the central hub for accessing resources, tools, and data within the StraboSpot Ecosystem. It provides a unified platform for users of all Strabo applications, including StraboField, StraboMicro, and StraboExperimental.

Key Features of the StraboSpot Website:

- **Access to All Strabo Applications:**
  - Launch the **StraboExperimental** browser-based structural analysis tool.
  - Access the **StraboField web viewer** for viewing and exploring collected data online.
  - Download the **StraboMicro** desktop application for microstructural data collection.
- **Public Data Access and Search:**
  - Search public datasets from all three Strabo applications.
  - View publicly shared **interactive maps**.
  - Download publicly available projects in multiple file formats (e.g., JSON, CSV, GeoPackage).
- **Project Management and Data Sharing:**
  - Create and manage DOIs (Digital Object Identifiers) for projects.
  - Upload custom basemaps to **StraboSpot My Maps**, which can then be downloaded and used in StraboField.
  - See Section 3.5.1 for instructions on how to use custom maps in StraboField.
- **Spreadsheets and Samples:**
  - Export datasets to Excel or CSV, edit them, and import them back with the **Field Template Wizard** (Section 5.2).
  - See and manage your samples in **StraboSamples** (Section 4.2.7).

The StraboSpot website is an essential tool for managing your geologic data, collaborating across platforms, and contributing to the open-access geoscience community.

5.1 StraboField Web Viewer

The StraboField Web Viewer is a browser-based version of the StraboField application that includes most of the core features and functionality available in the mobile version. It allows users to view, edit, and add data to their existing projects directly from a web browser without requiring installation of the app.

Accessing the StraboField Web Viewer:

1. Navigate to the website: `https://www.strabospot.org`
2. Log in using your StraboSpot user credentials.
3. Click on the **Account** tab.
4. Select **My StraboField Data**.
5. Find your project in the list and click the **Options** button next to the timestamp.
6. Choose **View/Edit/Add Data** from the dropdown menu.

Important Note: The Web Viewer opens in a new browser tab. Ensure that pop-ups are enabled in your browser. If pop-ups are currently blocked, you may need to temporarily allow them to launch the Web Viewer.

Once opened, your project will load in an interface that mirrors much of the StraboField mobile app experience, allowing seamless interaction with your geologic data from any internet-connected device.

5.2 Field Template Wizard

The **Field Template Wizard** on the StraboSpot website moves StraboField data in and out of spreadsheets. You can export a dataset to Excel (`.xlsx`) or CSV, edit it on your computer, and import it back to update existing Spots or add new ones. You can also fill in a blank spreadsheet by hand, for example to bring legacy station data into StraboField.

Note: The Template Wizard's *templates* are spreadsheet layouts: they decide which columns a spreadsheet carries. They are different from the data entry **Templates** in the StraboField app (Section 3.3.2), which pre-fill values while you collect data.

5.2.1 Opening the Template Wizard

Sign in at `https://www.strabospot.org`, then use any of these:

- **Account** menu, **Field Template Wizard**.
- **My StraboField Data**: the **Template Wizard** button at the top of the page, or **Import Tabular Data** to go straight to importing.
- **My StraboField Data**: a dataset's **Download** menu, **Template Wizard** (opens the export page with that dataset selected).
- **My StraboField Data**: a project's **Options...** menu, **Add Data with Template Wizard** (opens the import page with that project selected). The same button appears after you create a new project on the website.

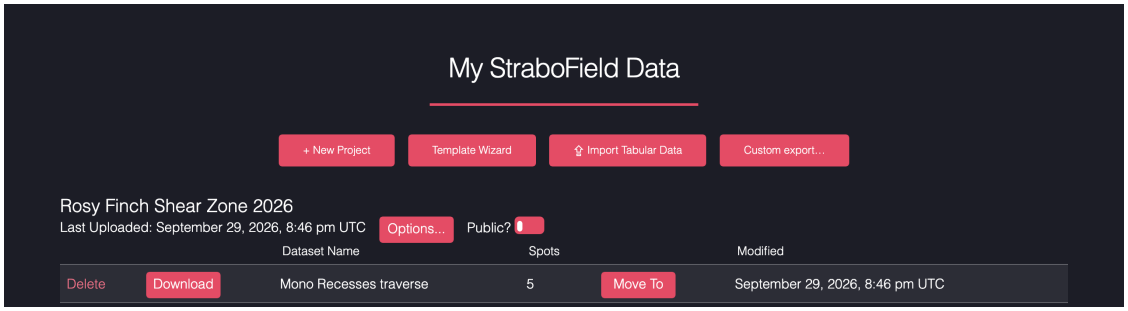

Figure 76. My StraboField Data, with the **Template Wizard** and **Import Tabular Data** buttons.

The Template Wizard works with **projects you own**. Projects shared with you as a collaborator are not listed.

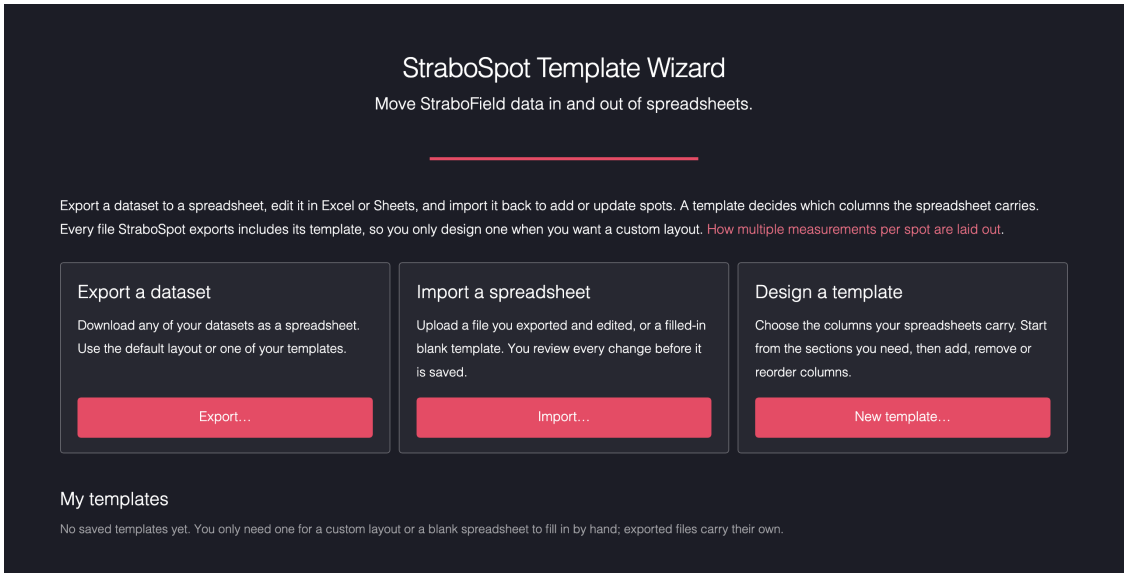

Figure 77. The Template Wizard home page: export a dataset, import a spreadsheet, or design a template.

The home page has three cards (**Export a dataset**, **Import a spreadsheet**, **Design a template**) and a **My templates** list. The link *How multiple measurements per spot are laid out* opens a how-to page with a filled example spreadsheet you can download and try.

5.2.2 How the Spreadsheet Is Laid Out

- **One row per measurement.** A Spot with three orientations takes three rows; samples and other features also take a row each. The Spot's `strabo_internal_id`, `name`, `latitude` and `longitude` repeat on every row of that Spot; other Spot-level values (date, notes and so on) are on its first row.
- **`strabo_internal_id`** is the Spot's identifier on StraboSpot. It is how an import finds the Spot to update. Do not edit it. Leave it blank on new Spots.
- In `.xlsx` files, the first row is a colored band naming each section (Spot, Orientation, Samples, and so on), the second row holds the column headers, and the header rows and id column are locked against accidental edits. Columns with a fixed list of values have drop-down menus; you can still type another value, and the import asks how to handle it.

- The workbook also has a **Vocabulary** sheet (the drop-down lists) and an **Instructions** sheet. The template itself is stored inside the file, so the file can be imported again without choosing a template.
- If the dataset contains line or polygon Spots, `geometry_type` and `geometry_wkt` columns are added, and the latitude and longitude are the shape's centroid.

5.2.3 Exporting a Dataset

1. Click **Export...** on the Template Wizard home page.
2. Choose the **Project** and **Dataset**.
3. Choose a template: **Basic layout (built-in)** or one of your own templates. The Basic layout covers the Spot basics (name, location, altitude, date, notes) and orientations (feature type, strike, dip, dip direction, trend, plunge, quality).
4. Choose a format: **Excel (.xlsx)** (recommended) or **CSV (.csv)**.
5. Click **Download Export**.

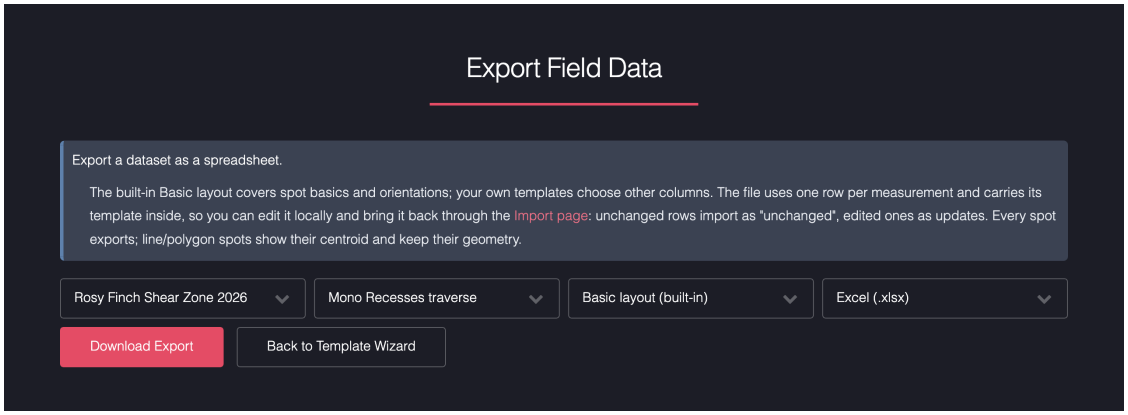

Figure 78. Exporting a dataset with the Basic layout.

Exports are one dataset at a time. CSV files have no section band, locking, drop-downs or embedded template, so use `.xlsx` when you plan to import the file again.

5.2.4 Importing a Spreadsheet

1. Click **Import...** on the home page (or **Import Tabular Data** on My StraboField Data).
2. Click **Choose File...** and select an `.xlsx` or `.csv` file (up to 15 MB and 10,000 rows). Leave **Template** on **auto-detect**: files exported by StraboSpot carry their template, and other files are matched by their column headers. Click **Upload & Review**.
3. Under **Where should this data go?**, choose the **Project**, then an **Existing dataset** or **New dataset named:** with a name.
4. Click **Analyze** and review the changes (see below).
5. Click **Confirm & Import**, or **Cancel** to stop without changing anything.

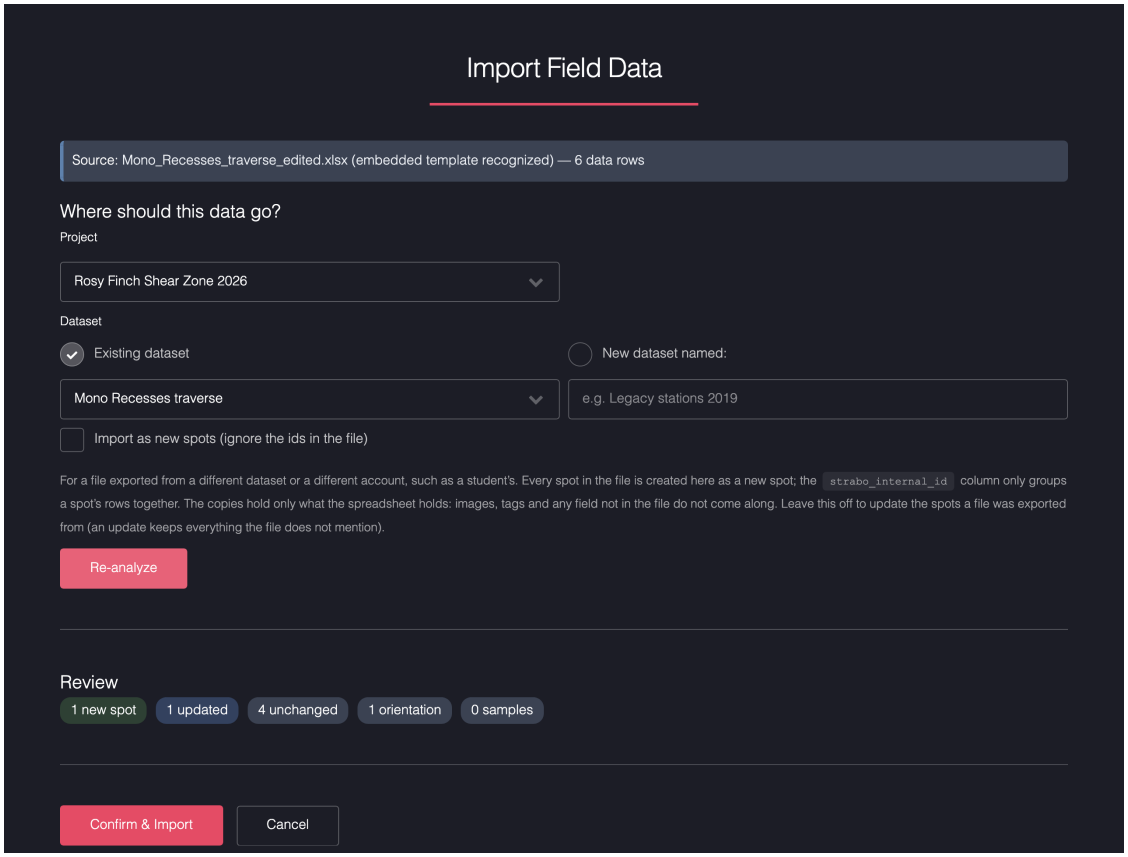

Figure 79. Reviewing an import: one new Spot, one updated Spot, four unchanged, and one orientation.

The review screen shows, before anything is saved:

- **Counts** of new, updated and unchanged Spots, orientations and samples.
- **Errors**, with the row, column and problem. An import is all or nothing: fix every error in the file and upload it again.
- **Unrecognized vocabulary**: for each value that is not in a drop-down list, choose **Map to** a suggested value, keep it as **Other**, or keep it exactly as typed.
- **Unknown columns**: import them as custom fields on the Spot, or ignore them.
- **Heads up** warnings that do not block the import, for example new Spots whose names match Spots already in the dataset.

How an import changes your data:

- A row with a `strabo_internal_id` **updates** that Spot, which must be in the chosen dataset. Only the columns in the file change; everything else on the Spot (images, tags, other fields) is kept.
- A row with a blank id **creates** a new Spot. New Spots need a name, latitude and longitude.
- A column left out of the file leaves that field untouched. A blank cell in a column that is in the file clears that field.
- If a Spot's rows carry orientation (or sample) values, they replace that Spot's orientations (or samples).

- Spots are never matched by name, and an import never deletes Spots.
- The location of a line or polygon Spot cannot be changed from a spreadsheet. To move a point Spot, change its latitude and longitude on every one of its rows.
- Samples imported this way are added to StraboSamples like any other StraboField samples (Section 4.2.7).

Import as new spots. Tick **Import as new spots (ignore the ids in the file)** to copy a file into a dataset as brand-new Spots, for example a student's export or an export from another dataset or account. The ids in the file then only group each Spot's rows. The copies contain only what the spreadsheet holds: images, tags and fields not in the file are not copied.

After the import. When an import creates Spots, your file no longer matches the server, because the new Spots now have ids your file does not carry. Click **Download this dataset with ids** on the **Import complete** page and keep working from that copy; uploading the original file again would create the new Spots a second time.

5.2.5 Designing a Template

A template is an ordered list of columns. You only need one for a custom layout, or for a blank spreadsheet to fill in by hand; files you export already carry their template.

1. Click **New template...** on the home page, tick the sections to start with (**Orientations**, **Rock units**, **Traces**, **Other features**, **Samples**; Spot data is always included), and click **Open the designer**.
2. Enter a **Template name**.
3. Adjust the columns:
    - Under **Add columns**, open a group (Spot, Orientation, Geologic Unit, Trace, Other Features, Samples, StraboSpot columns) or use **Filter fields...**, and click **+** next to a field.
    - Reorder columns by dragging them or with the arrows; remove one with **×**. The StraboSpot id column always stays first, and the orientation type column is placed automatically.
    - To add your own column, type a header under **Custom column** and click **Add**. Custom columns are stored as custom fields on the Spot.
4. Check the **Spreadsheet preview** at the bottom of the page.
5. Click **Save template**, or **Download blank** to save it and download an empty spreadsheet to fill in.

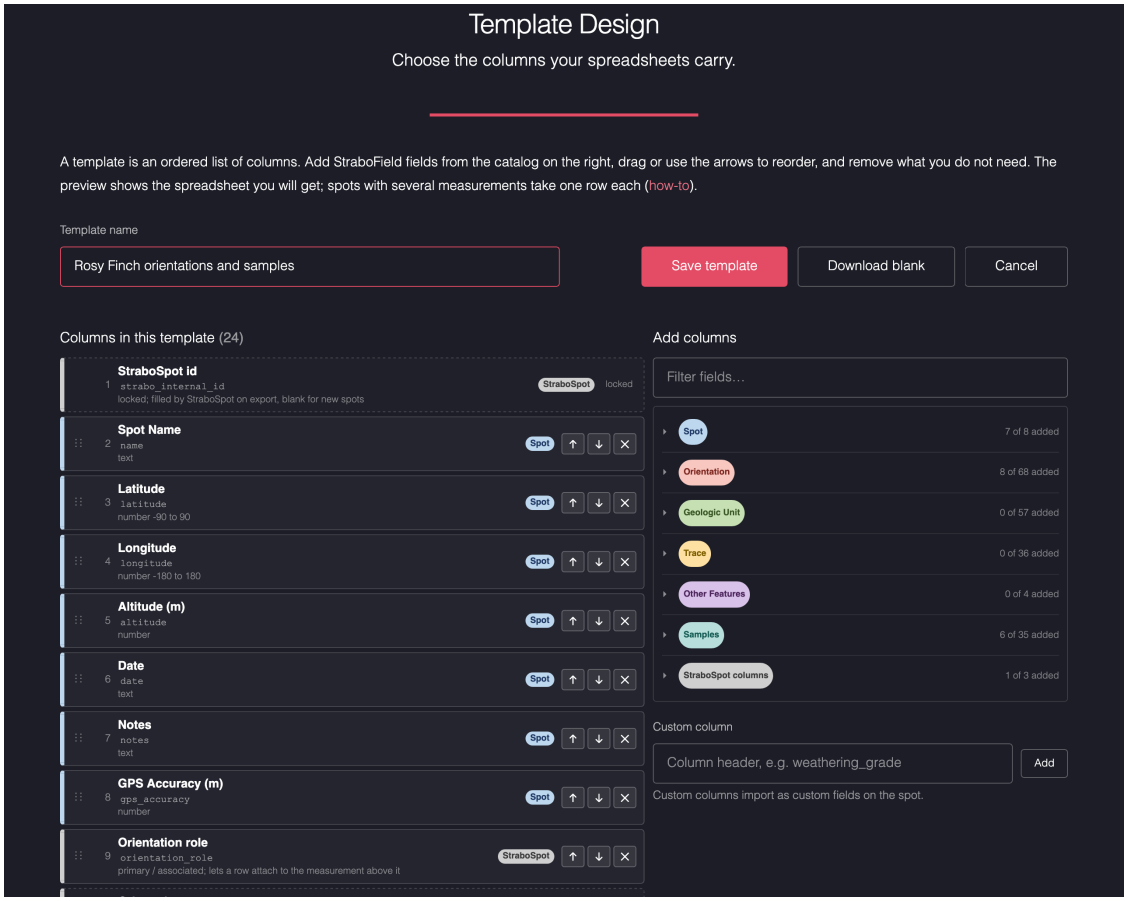

Figure 80. The template designer: the template's columns on the left, fields to add on the right.

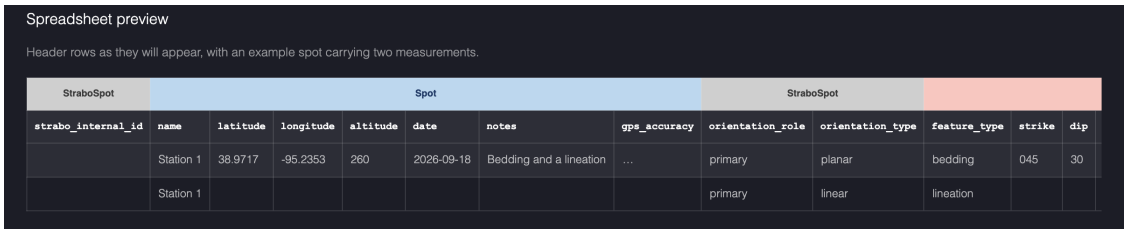

Figure 81. The spreadsheet preview shows the header rows and an example Spot with two measurements.

Saved templates are listed under **My templates** on the home page, with **Download blank**, **Edit** and **Delete** buttons. A template can be used for both export and import. To share a template, share a spreadsheet made with it; the template travels inside the file. Deleting a template does not affect files already made with it.

5.2.6 Tips and Limits

- Use `.xlsx` rather than CSV when you will import the file again.
- To sort the sheet in Excel, choose **Review > Unprotect Sheet** (there is no password). Sorting is safe, except that an *associated* orientation row must stay directly below its primary orientation.
- Some spreadsheet programs, such as Apple Numbers, ignore the locked columns. Take care not to change the `strabo_internal_id` column.

- Not yet supported: 3D Structures, Petrology, Sedimentology, Tephra, Fabrics, Tags and images; whole-project files; and projects shared with you as a collaborator.

6 StraboField Offline

6.1 What is StraboField Offline?

StraboField Offline enables members of the StraboSpot community to host their own StraboField backend as a self-contained, locally-run server. This is particularly useful in field camp scenarios where reliable internet access is unavailable. StraboField Offline allows users to:

- Back up application data
- Upload shapefiles
- Create custom downloadable maps
- Maintain versioned copies of projects and datasets

All of the above functionality is available without an internet connection.

6.2 How Does StraboField Offline Work?

StraboField Offline is a web application packaged as a **Docker container** — a lightweight, standalone, executable software package that includes everything needed to run the application: code, runtime, system tools, system libraries, and settings. Containerization ensures that StraboField Offline runs quickly and consistently across different computing environments, regardless of the host system's configuration.

6.3 System Requirements

StraboField Offline is compatible with nearly any modern computer running macOS, Windows, or Linux. In a field camp setting, a laptop is the most practical host machine, though any desktop or server is equally supported.

In addition to a host computer, a **local network device** is required to allow multiple users to connect simultaneously. Compact travel Wi-Fi routers are well-suited for field use, and many models can be powered via USB battery banks, making them practical for remote deployments.

6.4 Installing Docker

Visit `https://www.docker.com/products/docker-desktop` to download Docker Desktop for your operating system. A free Docker account is required to download the software — if you do not already have one, you will be prompted to create an account during the download process.

Once the download is complete, run the installer and follow the on-screen instructions to complete the installation.

Docker Desktop is a background application that manages all containers running on your host machine. It also provides command-line tools for installing, configuring, and controlling Docker containers.

6.5 Building the StraboField Offline Containers

Before StraboField Offline can run, the necessary Docker containers must be built and orchestrated. This is done via a single command from your system's terminal or command prompt.

Open a terminal and navigate to your `StraboFieldOffline` directory, then run the following command:

```
docker-compose up -d
```

The full sequence of commands for each operating system is shown below.

macOS:

```
cd ~/Desktop/StraboFieldOffline
docker-compose up -d
```

Windows:

```
cd Desktop\StraboFieldOffline
docker-compose up -d
```

Once issued, Docker will begin building all containers required to run the application. This process may take several minutes — please allow it to complete before proceeding.

6.6 Accessing StraboField Offline

Once Docker has finished building and starting the containers, StraboField Offline will be accessible in any web browser at the following address:

```
http://localhost
```

The interface closely resembles the standard StraboField web application, with certain features removed or restricted for offline use.

6.6.1 Default Administrator Account

Upon first installation, StraboField Offline includes a single default administrator account with the following credentials:

Username	`admin`
Password	`StraboR0cks`

It is strongly recommended to change the default password after first login.

6.6.2 Creating User Accounts

When logged in as `admin`, StraboField Offline provides options to create either a single new user or multiple new users simultaneously. Use these options to provision accounts for all team members who will require access to StraboField Offline during the field campaign.

6.7 Enabling Network Access

For mobile devices to communicate with the Docker host machine, all devices must be connected to a shared local network. The recommended approach is to use a portable Wi-Fi access point placed within range of all devices.

6.7.1 Choosing a Wi-Fi Access Point

Any consumer-grade Wi-Fi router is compatible with StraboField Offline. However, for field camp deployments where AC power is unavailable, a **portable travel router** is strongly recommended. When selecting a travel router for field use, look for the following specifications:

- **USB bus power** — the router should be powerable via a standard USB port, allowing it to run off a portable battery bank
- **Compact form factor** — travel routers are significantly smaller and lighter than standard home routers
- **802.11ac (Wi-Fi 5) or newer** — provides sufficient throughput for multiple simultaneous users
- **Multiple LAN ports** (optional) — useful if a wired connection to the host laptop is preferred for reliability

Compact travel routers meeting these specifications are widely available from electronics retailers and online marketplaces at modest cost. A USB battery bank with a capacity of 10,000 mAh or greater is sufficient to power most travel routers for a full field day.

6.7.2 Connecting Devices

All devices — including the laptop running Docker — must be connected to the same Wi-Fi access point in order to access StraboField Offline. Once connected, users can reach the application in any mobile browser at:

`http://<host-laptop-ip-address>`

Note: The host laptop's local IP address can be found by running `ipconfig` (Windows) or `ifconfig` (macOS/Linux) from a terminal.

6.8 Obtaining the Server IP Address

Before mobile devices can connect to StraboField Offline, the local IP address of the Docker host machine must be identified. This address is assigned by the Wi-Fi access point when the laptop joins the network, and is used by all client devices to reach the server.

Ensure the Docker host laptop is connected to the shared Wi-Fi access point before proceeding.

6.8.1 macOS

1. Open **Terminal** (Applications → Utilities → Terminal, or search `Terminal` in Spotlight).

2. Run the following command:

   ```
   ifconfig
   ```

3. The output will contain multiple network interfaces. Look for the entry corresponding to your Wi-Fi adapter — typically labelled `en0` — and locate the line beginning with `inet`:

   ```
   en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
       inet 192.168.0.105 netmask 0xffffff00 broadcast 192.168.0.255
   ```

4. The value following `inet` (e.g. `192.168.0.105`) is your server IP address. Make a note of this — it will be needed when configuring client devices.

6.8.2 Windows

1. Open **Command Prompt** by pressing `Windows + R`, typing `cmd`, and pressing `Enter`.
2. Run the following command:

   ```
   ipconfig
   ```

3. The output will list multiple network adapters. Locate the section labelled **Wireless LAN adapter Wi-Fi** and find the line beginning with `IPv4 Address`:

   ```
   Wireless LAN adapter Wi-Fi:
      Connection-specific DNS Suffix  . :
      IPv4 Address. . . . . . . . . . . : 192.168.0.105
      Subnet Mask . . . . . . . . . . . : 255.255.255.0
      Default Gateway . . . . . . . . . : 192.168.0.1
   ```

4. The value to the right of `IPv4 Address` (e.g. `192.168.0.105`) is your server IP address. Make a note of this — it will be needed when configuring client devices.

Note: The IP address assigned to the laptop may change each time it reconnects to the Wi-Fi network. If client devices lose connection to StraboField Offline, repeat the steps above to verify the current IP address and update client settings accordingly.

6.9 Configuring the StraboField Mobile App

The following steps must be completed on **each mobile device** that will connect to StraboField Offline. Ensure each device is connected to the shared Wi-Fi access point before proceeding.

1. Open the **StraboField** mobile app.
2. Tap the **Home Menu** icon in the upper-left corner of the screen to open the side navigation panel.
3. Navigate to `App Settings` Section → `Advanced Options`.
4. In the **Advanced Options** settings, locate the **Use Custom Database Endpoint** toggle.
5. Toggle **ON** and replace the existing value with the following:

   ```
   http://xxx.xxx.xxx.xxx/db
   ```

where `xxx.xxx.xxx.xxx` is the server IP address obtained in the previous section (e.g. `http://192.168.0.105/db`).

6. Save the setting and return to the main screen.

Important

When entering the database endpoint URL, the following requirements must all be met:

- The URL must begin with `http://` — **not** `https://`. Using `https://` will prevent the app from connecting to the local server.
- The URL must end with `/db` — the trailing `/db` is required and must not be omitted.
- The IP address must exactly match the server IP address identified in the previous section.

A correctly formatted URL will look like: `http://192.168.0.105/db`

6.10 Verifying the Installation

If all previous steps have been completed successfully, mobile devices connected to the shared Wi-Fi network should now be able to access StraboField Offline. To confirm, open the StraboField app on a client device and attempt to log in using the credentials created in Section 6.6.2.

Once connected, the following functionality is available to field users:

- Back up device data to the offline server
- Create maps suitable for downloading to a device using GeoTIF files
- Upload shapefiles for use on connected devices
- Maintain versioned copies of all projects and datasets

7 Tephra Stratigraphic Workflow

This appendix provides a complete guide to documenting tephra stratigraphic sections in StraboField, including project setup, naming conventions, data collection procedures, and export. This workflow was developed in collaboration with the tephra volcanology community and reflects best practices for field data collection.

7.1 Overview

Tephra sections are organized hierarchically within StraboField. Each field locality is recorded as a **station** Spot placed on the basemap with a latitude-longitude coordinate, location description, and unique name. Individual stratigraphic layers within a section are recorded as **nested Spots** beneath the station Spot. This structure preserves the spatial and stratigraphic relationships between localities and individual units throughout the project.

StraboField supports two methods for documenting layers within a section:

- **Option 1 (Recommended)** — Annotate layers directly on a photograph of the section using the image basemap tool. This approach clearly associates described layers with their visible position in the section.
- **Option 2** — Enter layers as an ordered list without an image. This approach is useful when photography is not practical or when a simplified record is sufficient.

7.2 Project Setup

Before beginning data collection, configure the following project settings:

7.2.1 Naming Conventions

Consistent naming conventions are essential for organizing station and layer data, particularly when multiple users are working on the same project. The following setup is recommended:

- Use a standardized prefix for station names. The Alaska Volcano Observatory (AVO) convention is `YY-VolcanoInitials-GeologistInitials`, for example: `26VOML01`, `26VOKW02`.
- Configure naming conventions to **prepend** the parent station name to each layer, with layers numbered sequentially (e.g., `26VOML01-01`, `26VOML01-02`).
- Include a `-` in the alternate prefix field for consistent layer naming.
- If collecting samples, configure the naming convention to prepend the station name and append a **letter** for samples (e.g., `26VOML01-A`), distinguishing them from numbered layers.

- Enable the duplicate name warning to prevent accidental duplication of Spot or sample names.

7.2.2 Notebook Pages

For the tephra workflow, enable the following pages in the notebook via `MORE` on the bottom right of the Spot notebook:

- Notes
- Images
- Samples
- Tephra Layers

7.2.3 Data Collection: Stations

1. **Place the station Spot.** Use the Spot tool to place a station on the basemap, or hold the Spot tool to set the station to your current GPS location. If a station is placed manually and you wish to update it to your current location, tap the latitude-longitude field and use the location icon. GPS accuracy is displayed at this step — if accuracy is poor, wait and try again before proceeding.

2. **Add station notes.** Use the **Notes** page to record a description of the locality and any general field observations. Stations can also be used without tephra layers to document general observations during a field project. For edifice or lava samples, a sample can be added directly to the station without entering the Tephra Layers module.

3. **Add photographs or sketches.** Use the camera icon to add one or more images of the section. Images can be captured with the device camera, imported from the device gallery, or created as sketches within the app. To annotate layers on the image, toggle **Use Image as a Basemap**.

7.2.4 Data Collection: Layers

Option 1 — Image Annotation

1. **Open the image basemap.** Tap the map icon to open the image and begin annotating layers.

2. **Annotate each layer.** Use the polygon tool to outline the extent of a layer. Working systematically from top to bottom or bottom to top is recommended. Zoom in on the image as needed before annotating. Save each polygon as a new nested Spot. Lines or points may also be used, though polygons best represent layer geometry.

3. **Enter layer metadata.** Use the volcano icon and + to open the layer form. Complete the following fields:
    - **Layer Type** — Select from the controlled vocabulary list (required).
    - **Color** — Free-text description of layer color (optional).
    - **Thickness Units** — Select units; centimeters is the default.
    - **Thickness** — Enter at least one of the following (one value required):
        - *Typical* — Use for uniform layers.
        - *Minimum* and *Maximum* — Use for variable layers. A minimum of 0 indicates a discontinuous layer.
        - *Typical* in addition to minimum/maximum — Use when a most common thickness exists that is not the average.
        - *Minimum only* — Use when the base of the layer is not exposed.
    - **Grainsize (Bottom and Top)** — Select grainsize for the base and top of the layer. For poorly sorted deposits, describe the maximum mode (strongly encouraged).
    - **Grading** — Select a grading descriptor. Ensure consistency with the grainsize selections above (optional).
    - **Sorting** — Select a sorting descriptor (optional).
    - Navigate to the **Additional** tab to complete:
        - Top and bottom contact characteristics
        - Grain support
        - Grain angularity (one or more values)
        - Tephra concentration
    - **Layer Description** — Use the free-text field for observations not captured by the structured fields, such as componentry, clast size measurements, or mineralogy (optional).
    - **Possible Source Volcanoes** — List potential source volcanoes (optional; applicable to tephra layers only).
    - **Tephra Name** — Enter a formal geologic name (e.g., *1912 Katmai*) or an informal field name used for correlation between sections (e.g., *Tephra A*).
4. **Save the layer** and proceed to the next. If naming conventions are configured correctly, each subsequent layer Spot will be numbered sequentially.
5. **Add samples.** Use the Sample tool (rock hammer icon) to document any physical samples collected from a layer. Sample information can also be entered in the layer description field if preferred.

Option 2 — List Without Image

1. Use the volcano icon on the station Spot to open the Tephra Layers module.
2. Tap + to add the first layer and complete the fields as described above.
3. After saving, tap + to add subsequent layers in order.
4. Layers are added top to bottom by default. The order can be adjusted manually by drag and drop.

7.2.5 Best Practices

- **Layer granularity** — Individual tephra deposits can be split into separate layers to describe complex sequences such as mixed normal and reverse grading. It is often preferable to describe a tephra and the soil developed on top of it as separate layers rather than a single tephra-soil complex. Where time constraints prevent detailed description, complex sequences can be recorded as a single undifferentiated package with a note in the layer description.
- **Backup frequently** — At the end of each day, or after completing a section, use the backup option to save the project to your device. A local snapshot protects against data loss in the event of an application error.
- **Sync regularly** — With an internet connection, use the backup option to sync the project with the online server. If only your assigned dataset has been edited, syncing should not cause conflicts with other users' data.
- **GPS accuracy** — Always verify GPS accuracy when setting a station location. If accuracy is poor, wait for the device to improve its fix before recording the position.

7.2.6 Data Export

Once the project has been synced to the server, log in to StraboSpot.org and navigate to `My StraboSpot Field Data`. Spots recorded under your dataset will be available for download. Select the **XLS** download option to export all layer and station data. A tephra-specific export format is in development and will be available in a future release.

8 Help and Support

Refer to Section 3.8 for detailed information about the Help Resources within the StraboField application.

8.1 Help and Support within the StraboSpot Ecosystem

Need Help? Here's Where to Start!

StraboSpot offers multiple resources to help users get started, troubleshoot issues, and stay up to date:

- **Website Help Page:** Visit `strabospot.org/help` for:
  - Application manuals
  - Video tutorials
  - Weekly office hours registration
- **StraboSpot YouTube Channel:** Access video tutorials, recorded workshops, and playlists at `youtube.com/@strabospot8893`
- **GitHub (Issues + Requests):** Join the development conversation!
  - Submit bugs or feature requests
  - Track updates and version history
  - Visit: `github.com/StraboSpot`
- **In-Person Support:** Find us at major annual conferences—stop by our exhibit booth, attend posters or talks, and connect with the team!

8.2 Glossary

This glossary defines key terms used in the StraboField and StraboSpot ecosystem. Understanding these concepts will help users navigate the application and manage data effectively.

Attribute A specific quality or value associated with a measurement, such as dip angle, fold shape, or lithology.

Field Synonymous with an attribute. It represents a value or observation entered into the system.

Image Any raster data associated with a Spot, including photos and sketches. Images may be captured in the field or imported into the system.

Image Basemap
A georeferenced raster image used for mapping. It is a type of Image associated with a Spot and serves as a base layer for placing additional data.

Nest A spatial relationship in which one Spot is located within the bounds of another. Nesting is automatic and used to maintain spatial hierarchy—for example, point observations nested within a polygonal outcrop boundary.

Offline Basemap
A downloaded map stored on the device for offline use in the field. It allows GPS

positioning without a data connection.

Other Basemap
: A custom, user-provided map image used as a base layer in the application.

Overlay
: An image or map layer displayed above another map. Overlays support adjustable transparency to compare or trace over other spatial data.

Private/Public
: **Private** data are stored in StraboSpot but not visible to other users. **Public** data are shared and searchable by other users through the StraboSpot platform.

Purpose
: The intent or focus of a data collection effort. It provides contextual metadata explaining why certain observations were made or omitted. For example, a user documenting ductile structures may intentionally exclude brittle features. The purpose of recording improves the interpretability of the data.

Spot
: The fundamental unit of observation in StraboField. It represents a spatially defined location or area and may contain measurements, images, notes, and other data. Spots can represent a single point measurement or a nested set of observations, allowing hierarchical organization across multiple spatial scales.

Tag
: A user-defined keyword used to categorize and organize Spots. Tags help group related data, such as geologic units or facies, and can be applied to Spots and sub-elements like individual measurements. Tags are searchable and facilitate data filtering and classification.

8.3 Frequently Asked Questions (FAQs)

Account & Setup

Do I need an account before mapping?

- You can map without signing in, but data will not save to the StraboSpot database until you create an account. Accounts can be created directly in the StraboField application.

What is my profile information used for?

- Your profile is used for communication, attribution, and account access. When data are made public, your username is displayed with your data. No user data is sold or shared with third parties.

Can I edit my project details after creation?

- Yes. Project details can be reviewed and edited under `Project Management` on StraboSpot.org.

Should I make my project public?

- Keep your project private while collecting and interpreting data. Once ready, making it public makes your work available to the broader Earth Science community.

Projects & Datasets

Why can I only have one active project at a time?

- StraboField supports one active project at a time. Switching projects will delete the current local project — always upload to StraboSpot.org before switching. This also ensures data security when sharing a device.

Why use multiple datasets?

- Separating data by map area or outcrop improves app performance. Datasets with a large number of Spots can be slow to respond on mobile devices. Datasets can be toggled on and off to improve responsiveness.

Can I view multiple datasets simultaneously?

- Yes. Any dataset active in a project is displayed on the main map. Datasets are managed via `Manage Project` and the `Layer Manager`.

Can I switch projects while offline?

- This is strongly discouraged. Switching projects offline will cause the current project to be lost. Multiple warnings are provided to help prevent accidental data loss.

Spots

What is a Spot?

- A Spot is the fundamental data element in StraboSpot — the core node of the graph database structure used across the StraboSpot ecosystem.

Can I edit any Spot regardless of type?

- Yes. Points can be moved; lines and polygons support moving, adding, or deleting vertices. Changes must be saved to be preserved.

I have many Spots with the same metadata. Do I need to re-enter data each time?

- No. Select a Spot with the desired metadata, copy it from the three-dot menu in the Notebook, and use **Set to My Location** or **Set From Map** to place it. This is the fastest way to add Spots with identical attributes.

I cannot find my map area because I have no Spots.

- Place a Spot in the center of your area of interest when starting a new project or dataset. This provides a reliable reference point to return to. You can also zoom to offline maps under the offline maps menu.

Why would I use a Spot radius for a line?

- Lines are Spots and can have an associated area. Assigning a radius allows nearby measurements within that distance to be associated with the line feature — similar to a buffer in a GIS.

Are all polygons nests?

- Yes. Any polygon can display Spots nested within it via the Nesting page.

Can I snap polygons to lines as in a GIS?

- No. StraboField does not support snapping or topology. Data can be exported to Shapefile or used with the StraboSpot plugin for ArcGIS or QGIS for advanced operations.

Tags & Geologic Units

Why are tags stored at the project level?

- Tags are stored at the project level so they can be reused across multiple datasets within the same project — useful for projects with consistent geologic units across separate mapping areas.

What are some uses of tags?

- Tags can represent rock facies, formations, structure types, or any feature shared across multiple Spots — functioning similarly to labels in a GIS. Use **Continuous Tagging** to automatically apply the same tag to all new Spots until toggled off, which is particularly efficient when recording measurements within the same rock unit or structure type.

What if I want to add multiple rock units or tags?

- Multiple geologic units or tags can be added from the **Geologic Unit** page and the **Tag** page in the Home Menu.

Images & Image Basemaps

What can be used as an image?

- Any picture, sketch, annotated photo, or raster viewable in the device photo library. Images can also be imported from cloud storage such as Dropbox.

Why use an image basemap?

- An image basemap allows you to place and document Spots on a photograph or sketch taken at a field locality — useful for mapping outcrop-scale features, tephra sections, or any image requiring spatial annotation.

How does an image become an image basemap?

- Toggle **Use Image as a Basemap** when adding the image, or navigate to `Images` under Attributes and check the basemap option directly.

What coordinate system does an image basemap use?

- Image basemaps use pixel coordinates relative to the image. The image basemap is referenced to the real-world coordinates of the parent Spot where it was created.

What is the difference between an image basemap and another basemap?

- Other basemaps must be georeferenced with real-world coordinates. Image basemaps use pixel coordinates but are referenced to a parent Spot with a latitude and longitude.

Offline Maps & Baselayers

How do I view baselayers offline?

- Verify that: (1) the correct offline baselayer is selected — your map must be set to the layer you downloaded, not the default street map; and (2) you are at a zoom level that was downloaded. Enable airplane mode to ensure you are truly offline. Restart the app if the issue persists.

What baselayers are available natively?

- OSM Streets, Mapbox Satellite, Mapbox Topo, and No Basemap are built into StraboField. Additional custom baselayers can be added via Mapbox or StraboSpot My Maps. See the appendices for instructions.

What happens if I zoom in beyond my downloaded tile levels?

- The app will display the highest resolution tiles available for that area. The image may appear pixelated if high-resolution tiles were not downloaded.

What happens to baselayers when I change projects?

- Baselayers are saved independently of projects and remain available regardless of which project is active.

Samples

Why are samples a separate attribute?

- Samples often require additional documentation and analysis beyond field observation. Storing them separately allows users to generate sample lists and location outputs independent of other Spot data.

What is an IGSN?

- An IGSN (International Geo Sample Number) is a unique, persistent sample identifier maintained through the SESAR system (igsn.org). IGSNs allow sample data — including age, chemistry, and structural data — to be linked across different data systems. You may assign an IGSN to a sample at any time; any internal naming convention can be used in the field.

Measurements

Can I manually enter strike and dip measurements?

- Yes. Strike, dip, and dip azimuth can always be entered manually. The device compass may not always be reliable — cross-checking with a hand compass is recommended.

What if the magnetic declination changes across my map area?

- Update the declination value in `Project Preferences`. Declination is applied at the time of measurement; previously recorded orientations are not retroactively changed.

Backup & Data Management

Should I update the app while in the field?

- Do not update StraboField during active field work unless a critical bug fix is required. Always back up all active projects to the device and upload to StraboSpot.org before updating.

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

- Upload your project. Uploading saves the current project to the server and creates a versioned backup. Previous versions remain recoverable. This is the recommended method for ensuring data integrity.

I am offline in a remote location. What should I do?

- Use **Export Project to Device** to save a local copy of your project data and images. On Android, this folder can be copied to an external memory card. On iOS, use the Files app to transfer or access the exported files. Do not update the app until your data has been uploaded to StraboSpot.org.

How are exported files stored?

- Spot data is exported as GeoJSON — a widely readable ASCII format compatible with QGIS, GitHub, and other platforms. Images are stored in their original format.

What is the minimum backup I should do?

- At minimum, export your project to the device. Solid-state device storage is reliable and recoverable. Uploading to StraboSpot.org provides the most complete backup and version history.

Notebook Pages & Preferences

Do I need to keep all notebook pages active while working?

- No. Enable only the pages relevant to your current workflow. Additional pages can be toggled on at any time via **More** at the end of the page list in the Spot notebook.

What is the data model?

- The data model defines all terms and data structures used in StraboSpot — functioning as a lexicon for the system. It can be viewed within the application settings.