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Fieldmove Clino
Android User Guide

TOC

Introduction

This is a guide to using FieldMove Clino (hereafter referred to as Clino) and its features.

Clino is a digital compass-clinometer for data capture on smartphones. The app allows an iPhone or Android phone (see the Android user guide) to be used as a traditional hand-held bearing compass and clinometer for measuring and capturing the orientation of planar and linear features in the field. The field notebook and camera are an integral part of this new technology allowing the capture and storage of geo-referenced photographs and text notes. Functionality is also available to plot stereonets, draw lines and polygons onto maps and to change map symbols.

Clino supports online Google Maps as well as offline maps as geo-referenced MBTile basemaps. Projects can be exported to FieldMove (.fm.zip), ASCII CSV (.csv), MOVE™ (.mve), and Google Earth (.kmz).

This document outlines functionality and recommends workflows to use within Clino.

Happy Mapping rock lovers!

Young and old take Clino to the rocks at Siccar Point.

Disclaimer

The use of GPS devices and smartphones as navigation aids

The internal GPS in your device can be used to automatically set location information in the app, which is recorded as latitude and longitude.

Global Positioning System (GPS) devices are commonly used to aid navigation, having grown in popularity over the past decade. Over the last few years, this has extended to smartphones and digital compasses, which are often equipped with GPS functionality.

GPS is a valuable aid to navigation during fieldwork, however it is important to keep safety at the forefront, and we draw your attention to the advice given by a number of mountaineering councils:

"Everyone heading into the hills needs to learn how to read a map, and be able to navigate effectively with a paper map and traditional magnetic compass, especially in poor visibility."

The Clino App requires online data transfers for some features (Google Maps, sharing exported files, etc.). Using such functionality over mobile network services (such as 3G) may incur costs from your provider. If you use the app and services on your mobile phone, you are responsible for any fees that your phone service provider charges for data services, etc. Your phone service provider is not the provider of the Clino App.

Petroleum Experts accepts no liability or loss, resulting from the use or misuse of this product.

Definitions

Project
A project is a set of localities, structural data, notes and images related to a specific mapping area. When exporting data it is the whole project that is exported.

Localities
Localities are a way of grouping data and are user definable. For example, localities can be applied to an outcrop or for a new day in the field.

Stratigraphy
User defined list that is used to assign a colour to structural measurements or line objects i.e. to define a rock type or a fault. This information is recorded as an attribute on the object.

Data Type
Defined as planar and linear data. Location can be set automatically using the device GPS.

Comments
These are linked to specific measurements, for example describing in detail the surface where a dip measurement has been taken from.

Notes
Notes are geo-referenced descriptions, such as a sample location or notable change in vegetation. This is akin to the notes taken in a field notebook while mapping. Photos may be added to notes.

Maps
Images can be shown over the online map on the **Map** page. Map overlays can be loaded in as MBTile files.

Side Panel

The **Side Panel** can be opened from any page using the ≡ icon or by swiping from the left edge of the page. It allows navigation between the following pages:

⊕ **Compass / Clino**
Take a bearing or record structural planes and lineations with a range of attributes, and create new localities.

📖 **Notes and Images**
Keeps a chronological record of data captured and allows geo-referenced notes and photos to be taken, which can be edited and deleted.

📖 **Map**
Displays structural data on online and offline maps.

⊕ **Stereonet**
The stereonet displays data as poles and planes on an equal area or equal angle stereonet plot.

▭ **Project**
Details of the active project.

▢ **Switch Projects**
The **Project List** page displays all the projects stored on the phone, allows creation of new projects, and gives access to additional settings and access to import.

⬆ **Export**
Data can be exported as a FieldMove (.fmz), ASCII (.csv), Move (.mve), and Google Earth (.kmz).

⑦ **Help**
Access to **Quick Help** or **Extended Help** (this guide).
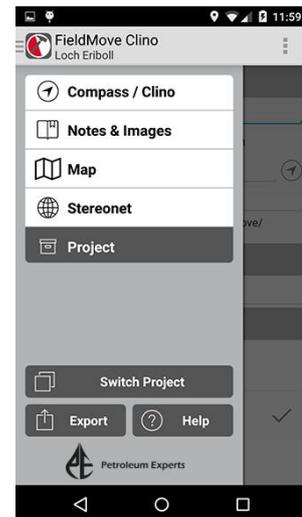
Compass / Clino

Navigate to the **Compass / Clino** page from the ≡ **Side Panel**.

A hand bearing compass or clinometer face will be activated. The active face can be switched between by tapping on the small face.

 Note: always give the compass and clinometer a few seconds to stabilise before tapping the clinometer to lock the reading. This will help to ensure the data is consistent.

Compass face. Tap to set a bearing.

Compass

To take a bearing with the compass rotate the phone in the desired heading and tap on the compass face. When the phone is rotated a red bar shows the deviation from the set bearing to the current orientation. Tap the compass face again to stop tracking the bearing.

The red arrow on the compass face displays true north and the red outline arrow displays magnetic north. Declination can be user defined or calculated by the device on the project **Settings** page.

 Note: the compass works best when the phone is held level. See our guide on **Digital Compass Calibration**.

Compass face. The set bearing is shown by the red bar.

Clinometer

The display on the clinometer shows a dip symbol if planes are being recorded or an arrow symbol if lineations are being recorded.

To lock the reading, tap the clinometer face. The icon will change from **red (active)** to **black (locked)**. The reading can be manually overwritten by tapping on the dip and azimuth, or dip and strike numbers for a plane; or plunge and plunge azimuth numbers for a lineation.


Clinometer face

To measure the orientation of a **planar feature** the **back** of the phone should be placed flat on the **plane** to be recorded.

To take a **lineation reading** the long **edge** of the phone should be placed **parallel** to the **lineation**, ideally with the back of the phone on the **plane**.

 Note: the dip icon orientation corresponds to the phones orientation, not north.

Location

Location is displayed as a latitude and longitude at the top of the page ① . Below this, the time of the last location update is displayed. The text gives an indication of how the location was set; **Updated** indicates that the location was received from the GPS, whilst **Edited** indicates it was manually set.

 Note: UTM co-ordinates are only displayed in the exported data tables.

② ◉ **Active or** ○ **Idle GPS**
When taking a reading from the **Compass / Clino** or **Map** page a location icon is displayed in the top right corner of the screen (below the time). There are two modes, **active** and **idle**, which can be toggled by tapping on the location icon.

◉ **Active**
The **location icon with dot** indicates that the phone's GPS is in use, and the current location is being updated. The time stamp under the coordinates shows the last time a new position was found.

○ **Idle**
The **location icon without a dot** indicates that the phone's GPS is idle. Any new data point or note will be assigned to the last location update the app received, either from

Location
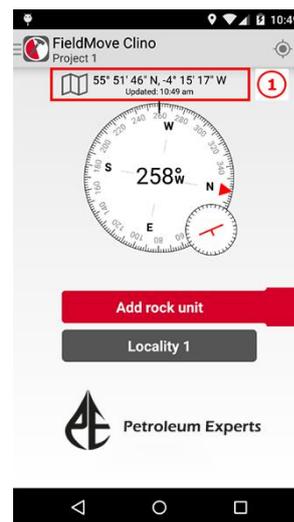
Tap coordinates ① to open the **Location** page. Long press on the map to set the location manually, the GPS will be set to **idle**
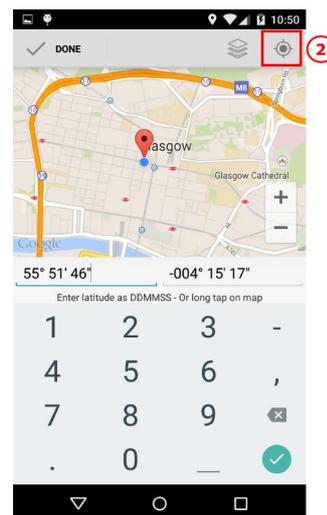
Active GPS ② , last updated GPS position is shown by blue dot and the current location by the red pin

the GPS or set by the user.

Automatic positioning using the GPS and updates

Clino uses the phone's inbuilt GPS unit for two tasks:

- Finding your location when taking a reading.
- Showing where you are on the map.

In the **Location** page, the last GPS location is shown as a glowing blue dot. The red pin represents a manually set location.

Note: the GPS is constantly trying to update when the location icon is **active**. This is battery intensive and the **idle** mode can be used to preserve battery when GPS is not required.

Setting Location Manually

Locations can be set manually without using the GPS functionality, in Degrees / Minutes / Seconds, from the **Compass / Clino** page. On the **Compass / Clino** page, tap on the latitude / longitude (lat / long) value in the **Top Bar**. This will open the lat / long **Edit Location** page. The current data location is shown by the red pin.

The GPS or current location can be manually overwritten by using a long press on the map to set a new position. This will automatically set the GPS to ○ **idle**. Alternatively, lat / long values can be entered in Degrees / Minutes / Seconds using the number key pad.

If you tap the location icon the GPS will turn on ◉ (**active**) and the red pin jumps to the received location on the map, shown as a blue dot.

Location
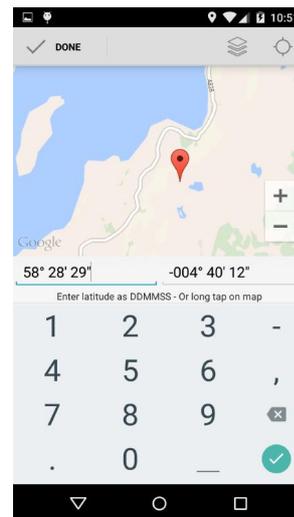
Idle GPS ②, last updated GPS position is shown by blue dot and the current location by the red pin

Declination convention

Measurements in and exported by the app are given relative to true north. All data is automatically adjusted to true north. True north is calculated using the declination value set in the **Project Details** page.

Stratigraphy

All clinometer readings must be assigned to a unit in the Stratigraphy Column i.e. rock type or object colour, such as a fault or joint. When using the app for the first time, the **Stratigraphy Column** is blank.

① Tap **Add rock unit** to open the **Stratigraphy / Rock Types** page. This button is also used to edit an existing stratigraphy column. In the **Stratigraphy / Rock Types** page tap the plus ⊕ to add new rock units.

② To change the name or colour of a unit, tap the pencil ✎ on the right hand side of the page.

③ To change the name of a unit tap the unit name. Select a new colour using the colour wheel and tap the tick ⊘ in the top left corner to apply.

④ Units can be reordered by dragging them to the correct position in the list. To do this, drag the three vertical bars on the left hand side of the unit up/down. Move it to the desired location and lift your finger from the screen to drop it.

⑤ Stratigraphy can be imported from pre-existing Clino projects or from Move as .csv files. tap on import ⬓ to open the **Import** page. Tap cancel to stop the import.
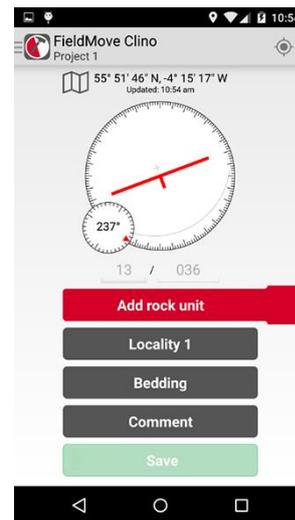
Clinometer face
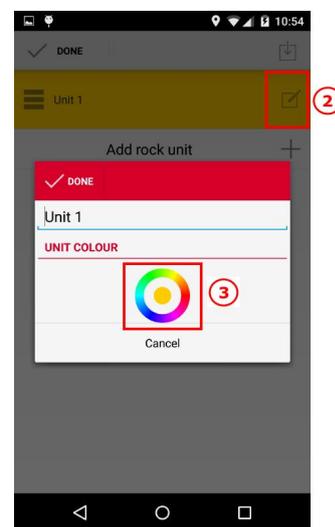
Rock Type page
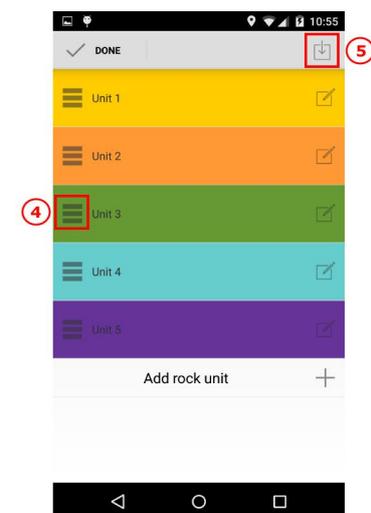
Units added to **Rock Type list**

Tap the tick ⊘ when complete.

Note: to change the active unit on the Compass / Clino page, tap on the desired unit in the Stratigraphy Column on the right hand side of the page.

Deleting a unit from the stratigraphic column

A rock unit can be deleted from the **Stratigraphy / Rock Type** page by long pressing on the unit. This will display a confirmation dialog. Tap **OK** to delete.

Locality
To change which locality new data will be created in, tap this button and select the desired locality from the list. Tap the plus ⊕ to create a new locality.

Refer to the **Project** section to find out more about the automatic naming of localities, and **Editing Data** for more information on editing locality details.

Note: **Measurements not saving?** To take and store measurements a stratigraphy needs to be set up. To do this, skip back to the Compass/Clino section and follow the workflow.

Data type

① Tap this option to choose between a range of planar and linear data types. Open the **Select Data Type** page by tapping on the current plane or lineation type. Tap any symbol to assign it to the current data or tap above to dismiss.

This list can be customised:

Select **Settings** ⚙ . This opens the list of currently collectable planar and linear data types.

Data Type

Clinometer face
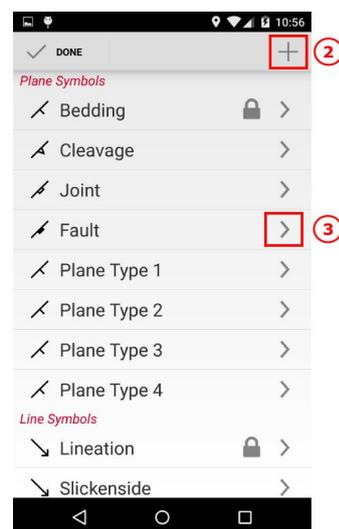
Data Type page

(2) Selecting an existing data type allows the icon and name to be edited or the symbol deleted. Any data assigned to a symbol that is deleted will be set to the default symbol of its type. For this reason, the default bedding and lineation symbols cannot be deleted.

(3) New icons (icon and name) can be added to the current list by tapping the plus ⊕ at the top right hand corner of the **Edit Symbol** page. Tap the tick ⊘ to apply.

Edit Symbol page

Comments

Add a comment which will be saved with the reading. When adding a comment for the next data point on the Clino page, you have the option to take a picture using the phone's camera.

Save

Click **Save** to store the reading which is displayed in the note book and on the map. Make sure the confirmation pop-up **Saved!** is displayed or the reading will not have been stored.

The **Save** button will be disabled if the clinometer is active or if the stratigraphy table is empty.
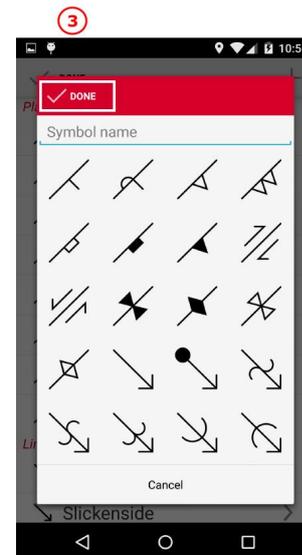
Notes & Images

Navigate to the ✎ **Notes & Images** page from the **Side Panel**. The **Notes & Images** page provides a chronological record of all the data in your project, much like a field notebook.

Data list

Data is captured from the **Compass / Clino**, **Map** and **Stereonet** pages, and is recorded here under the associated locality in reverse chronological order. Localities are listed in chronological order. However, the active locality will always be at the top of the list.

A summary of each piece of data is shown in this list. Tapping on each item allows the details to be viewed and editing of the fields detailed below. Notes and images can be added to the data list from this page.

Editing structural data

Clino does not allow the user to modify existing structural readings; however the rock unit, data type, comment and location can be edited. The rock unit and comments can be edited in the same way as on the **Compass / Clino** page.

When editing the data type, the data cannot be converted from a line type to a plane type or vice versa. Data can only be changed to a different symbol of the same data type. Structural data can be moved by selecting the **Move Data** option. See the **Setting location manually** section for more details on setting locations.

Editing notes and images

Clino allows the user to update the text and location in **Notes & Images**. The text can be edited by tapping on it. The location can be changed by selecting the **Move Data** option. See the **Setting location manually** section for more details on setting locations. Images can be viewed full screen
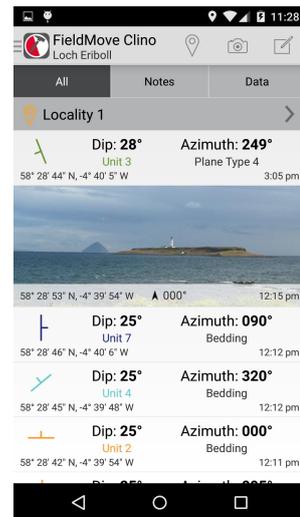
Notes & Images page
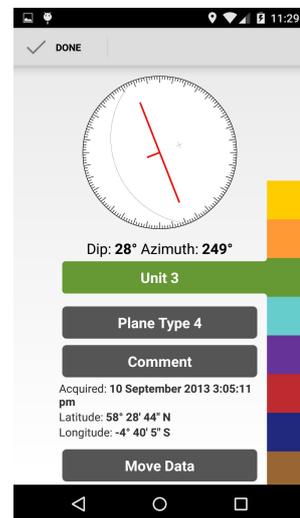
Example of **Edit** page
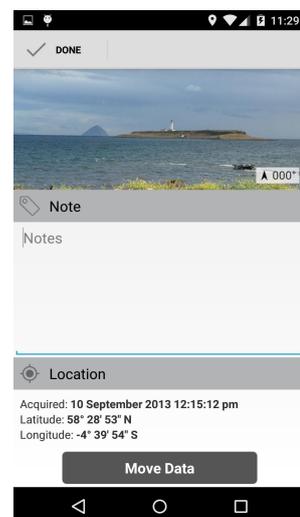
Note page

by tapping the image preview. To return from the full screen view, use the **back** button.

Note: it is not possible to edit an image, or add a new one, after the note has been created.

Editing Localities

When editing a locality, the user can change the name, description, colour and location. The colour of localities defaults to grey, and has no association to rock units. The colour can by selected by tapping the colour square ① next to the locality name.

The location of a locality can be changed by long pressing at the new location on the map, or by entering the latitude and longitude manually. Refer to the **Setting location manually** section for more information.

Deleting note book entries

In the **Notes & Images** page, orientation data, notes and photographs can be deleted by long pressing on the row. This will display a confirmation dialog. Tap **OK** to delete.

Filters allow the **Notes & Images** page to be filtered to display **All** data, or just **Notes**, **Datum** or **Lines**. They can be accessed by scrolling to the top of the list. The active filter will be dark grey. Tap on the filter to apply it to the list.

Screen Options

☰ Side Panel

Refer to Side Panel section.

⦿ Localities

This displays a list of localities that have been created, and allows the user to create a new one. The currently selected locality is displayed with a tick.

◉ Camera

Edit and Delete
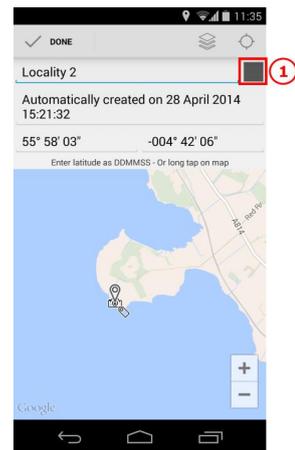
Edit Locality page
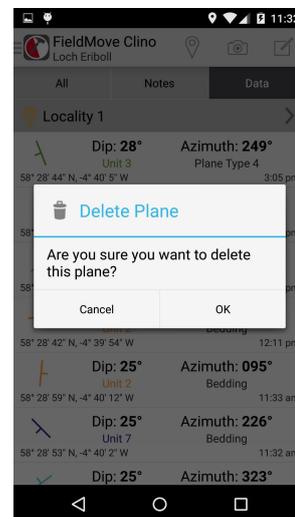
Example of **Delete**

This option will open up the camera, allowing the user to take a geo-referenced photo. Take the photograph by tapping the capture button in your camera app. Once you have taken the photo, a page displaying the current location and an option to type a note or description of the photograph will become active. A small compass will become visible. Point the phone in the direction you took the photo and tap the compass to set the bearing. Tap again if you wish to re-activate the compass. Tap the tick icon when complete. Tap **back** to cancel saving the photo.

✎ Note

Creating notes allows the user to write longer descriptions which would normally feature in a field notebook. An image can be attached to the note by tapping the camera 📷 .

The image can be selected from the gallery, or a new photo can be taken. Tap the tick ✓ when complete. Tap **back** to cancel saving the note.

Maps

Note that there are changes to the storage and location of Base Maps in Clino v3 - see Import MBTiles below:

Navigate to the **Map** page from the **Side Panel**. The **Map** can display the location of all the data that has been collected, as well as **Base Maps** that have been imported into the project.

Navigate around the map by dragging it with a finger. To zoom in, use two fingers pinched together, move them apart to zoom out.

Icons on the online map can be selected to display more details, and tapping the ⓘ opens the **Edit Data** page.

Screen Options

☰ Side Panel
Refer to **Project Set up and Settings** section.

⚲ Locality
Toggle the localities which are displayed on the map from the drop down **Locality Menu**.

⊜ Base Maps
Choose which map is used as the base map from the drop down menu. Refer to **Importing Map** section for more information.

◉ Active or ◇ Idle GPS
When the **active** location icon is displayed, the map will centre on the current location and will keep your position centred in the map as you move around your mapping area.

When the GPS mode is active, any new data point or note will be assigned to the last updated location provided by the sensors.
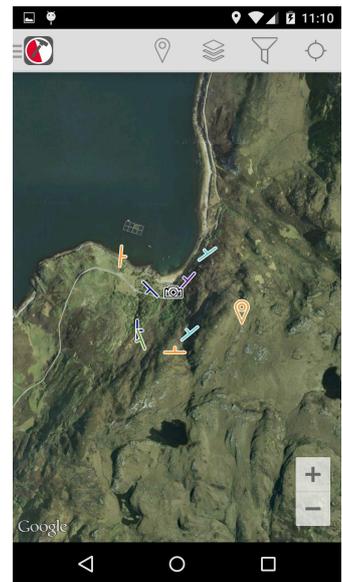
Map page, with satellite overlay displayed. Blue dot shows current GPS position.

Changing Maps

Maps will show either the satellite or the road map of the current area. To change the map display, touch the **Base Maps** ⬗ icon and select the map so that it has been ticked. This chosen map will now display instead of the online maps.

You can also import your own overlay map using MBTiles files (see below). The imported maps will show in this list and you can tap a filename to select it. Only one map can be displayed at a time.To view the image in a project, navigate to the Map page:

① Tap on the **Base Maps** ⬗ icon.

② Select **Manage maps**. All the maps that have been added to the project will be listed here. Tap on the ⊕ to select a new map.

③ Browse to the map on your device and tap to add it to the project.

If you tap on the currently active overlay map, the map view will zoom to fit the extents of that overlay.

Loading Base Maps

Maps (which may contain geological, topographic and geophysical information) can be imported into Clino as MBTiles which are created from geo-referenced images (GeoTIFF, JPEG 2000, KMZ etc.). See the Importing MBTiles section below for instuctions.

There are a variety of programs that can perform the conversion of geo-referenced images into MBTiles, including:

- MOVE 2024 (**www.petex.com**)
- Global Mapper
- Map Tiler
- Arc2Earth plugin for ArcGIS

Note: Make sure the image you use has a high enough resolution for the scale of mapping being
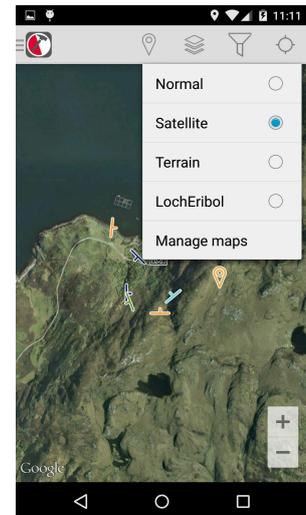
Satellite display
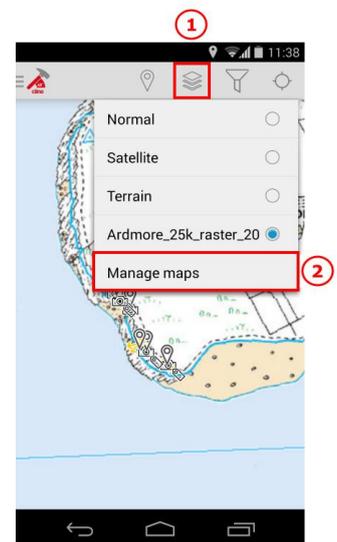
MBTile overlay
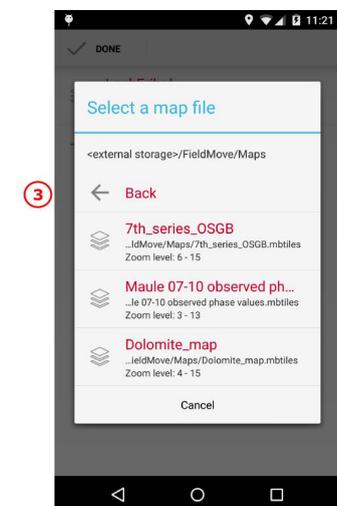
MBTile loading

performed. In low resolution files the higher you zoom in, the more distortion will be seen in the image.

Note: MBTiles files are locked at a minimum and maximum zoom level. Each zoom level increases the magnification by a factor of two, and as a result the size of the MBTiles file approximately increases by a factor of two as well. This means that low zoom level files take up less space on the phone, but not as useful for mapping as higher zoom levels. Be wary of the file size when increasing the zoom level beyond 16, as the file size grows exponentially.

Exporting MBTiles from MOVE

To export an MBTiles file from MOVE first make sure you have an image present in a geo-referenced .move file. Select the image and click the right mouse button. Select the **Export As** option then **Export MBTiles**.

The **Set MBTiles Properties** dialog box will appear. Select the **M inimum Zoom Level** and **Maximum Zoom Level**. An **Estimated Output** number of tiles and the size of the file will be displayed. An MBTiles file will be exported to the chosen location.

For topographical maps, a scale of 1m/pixel will produce a very large file with a scale that will show paths, streams etc. For satellite images, a scale that fits the resolution of the satellite is suitable. For geological maps, finer resolution than the map itself may be more suitable as this will allow high levels of zoom. It is also worth making all the small zoom levels available (typically a zoom of above 1:2,000,000). This will ensure that the image can be seen in relation to the global map, and will only take up a small amount of the phone's memory. It is worth taking some time to experiment with the scale of the map before going into the field.

Base Maps Changes in Clino v3

Note that as of Clino v3, and in line with enforced Google policy, all Project files are now stored in the App specific device folder. In the case of FieldMove Clino this for example:

Level	Metre / Pixel
1	78272
2	39136
3	19568
4	9784
5	4892
6	2446
7	1223
8	611
9	306
10	153
11	76
12	38
13	19
14	9.6
15	4.8
16	2.4
17	1.19
18	0.6
19	0.3
20	0.15

Guide to **zoom levels**

```
<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
1.fm
```

Previously FieldMove Clino files for older versions were stored on the root of the device, for example:

```
<device>/FieldMove/Projects/Project_1.fm
```

Previously it was possible for for older versions to store Base Maps in a shared **Maps** folder for example:

```
<device>/FieldMove/Projects/Maps/[.mbtiles files]
```

Note that Base Maps for each Project must now be stored in the individual Project folder. **There is no sharing of Base Maps between Projects**. Any Base Map must be imported into a Project which utilises it. This is an example of the new layout, where in this case **Map2** is in **Project_1** and **Project_2**, and located in both folders:

```
<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
1.fm/Map1.mbtiles
<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
1.fm/Map2.mbtiles

<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
2.fm/Map2.mbtiles
<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
2.fm/Map3.mbtiles
```

The is the same behaviour as Clino on iPhone, and allows the Export and Sharing of .fm.zip project archive files, which hold ALL project and map information inside a single archive file. This archive file can now easily be copied to elsewhere on the device for backup, or shared via Android Share (e.g. Drive, Gmail, OneDrive, WhatsApp). This allows better Project management, backup, and sharing, especially between groups of people on the move or in the field.

Import MBTiles files into Clino

Once images are saved in the MBTiles format, they can be copied to you device from your computer. Below are the steps to following to import a new map into your
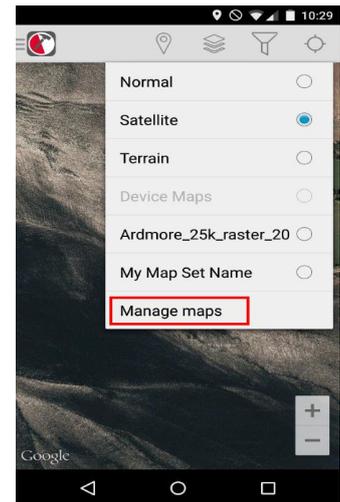
② Tap on **Manage maps**.
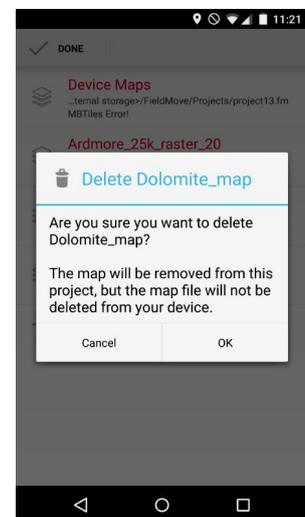
③ The **Manage Maps** list
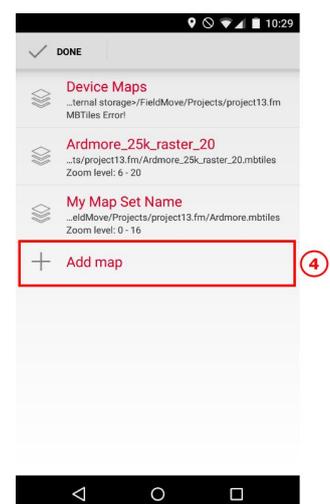
④ List of **loaded MBTiles**

Clino project.

① To import a basemap into Clino, the map needs to be saved into any writeable folder on the Phone.
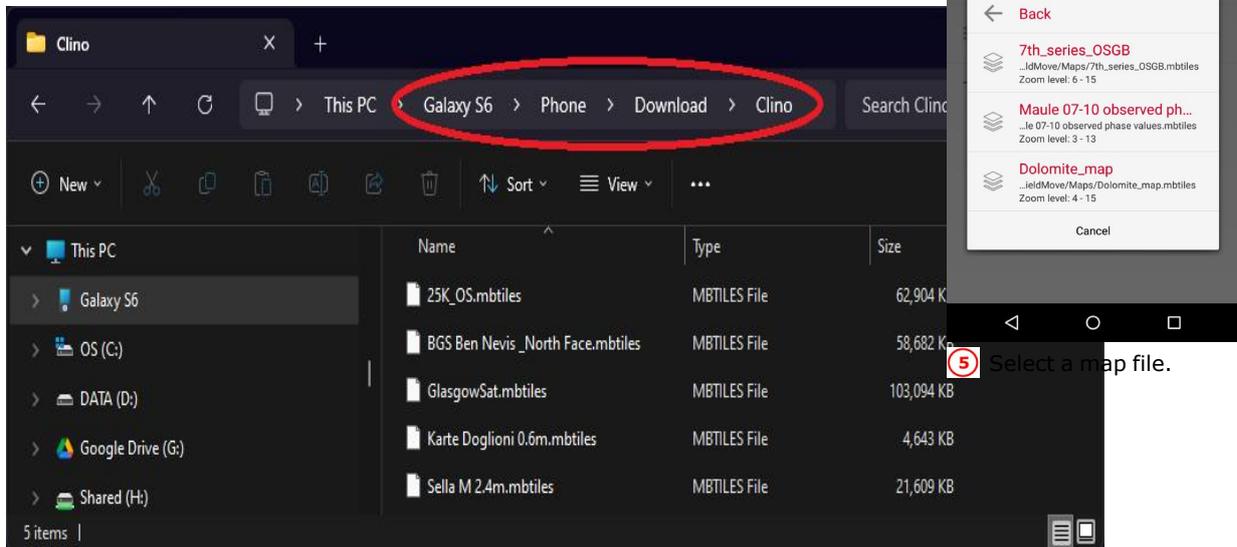
Figure: ① Downloads sub-folder. You can import new Base Maps from here.

You might also have existing Base Maps in the previous FieldMove folder on the root of your device:
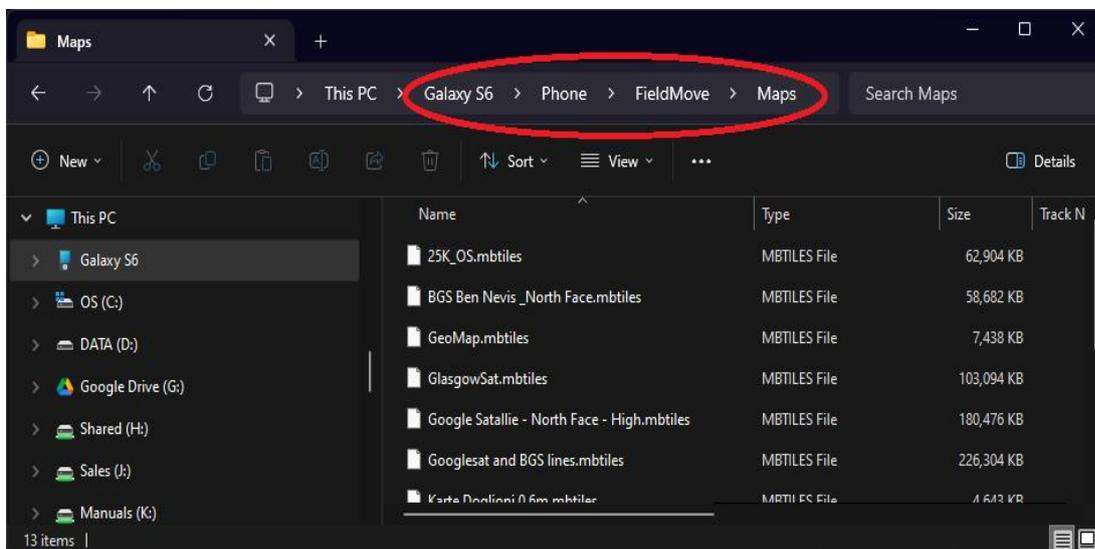

Figure: ① Maps folder from previous Clino version. You can re-import Base Maps from here.

② To open the basemap in the Clino project, open the **Map** page from the **Side Panel**. Select the **Base Map** ≋ icon, and tap on **Manage maps**.

③ The **Manage Map** screen shows all the maps that have previously been imported into the device. Long selecting on a map will bring up the option to **Delete**.

④ To add the MBTile basemap to the list of active maps, select **Add map**, this will navigate to folders on the phones memory where you can select Base Maps (.mbtiles) files.

⑤ Select the desired basemap from the list. This will automatically add it to the map selection.

When back in the main map screen, tap the **Base Map** ⩘ icon. Within this list will be the imported MBTile base map. Tap on the required map name to open it in the map view.

Stereonet

The **Stereonet** page allows the user to view structural data on an equal area or equal angle stereonet. The user can use filters to display a subset of the collected data.

Mean Dip / Azimuth

This option displays the **mean resultant plane** of all the planar data visible on the stereonet. The switch toggles whether the plane and pole are visible on the stereonet. The mean resultant plane is displayed as the thicker black pole and great circle.

① Display settings

There are two settings to toggle the visibility of **poles** and **planes** on the stereonet.

② Stereonet plot

There are two settings to choose from, **Equal Area** (Schmidt Net) and **Equal Angle** (Wulff Net).

③ ▽ Filter

Choose the data to be displayed. Individual data points can also be toggled on or off. A ticked checkbox indicates the data is being displayed.

Data can be filtered by locality, unit or type by selecting the relevant data type. **Localities** allow the user to toggle visible localities; **Units** allows the user to filter data by specific rock units; and **Types** allows the user to filter data by planar or linear data types.

≡ Side Panel

Refer to Side Panel section.

✎ Notes

Save an image of the stereonet to the **Notes & Images** page.
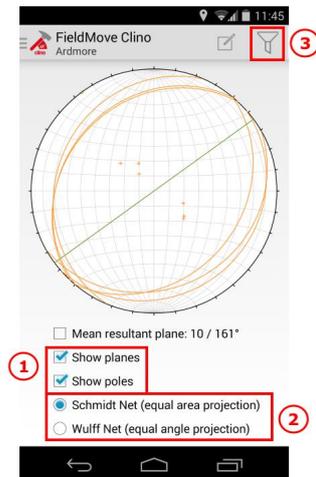
Stereonet Page
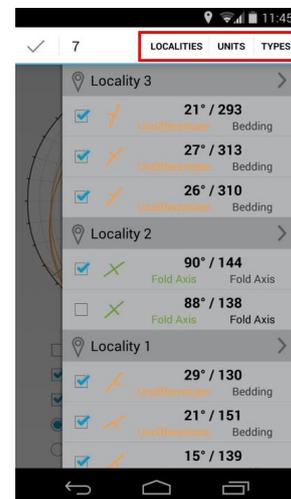
Data Display Page
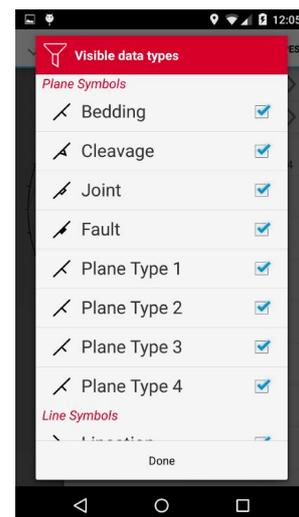
Data Type Filter Menu

Project

Locality Prefix

By default this is **Locality** #. Changing the locality prefix changes the default names given to localities when they are created. The hash (#) indicates the position of the number in the name. If it is excluded the locality number will just be appended to the prefix given.

Folder

Where to find the folder your project is stored in when you connect your device to a computer.

Note that as of Clino v3, and in line with enforced Google policy, all Project files are now stored in the App specific device folder. In the case of FieldMove Clino this is for example:

```
<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
1.fm
```

Previously FieldMove Clino files for older versions were stored on the root of the device, for example:

```
<device>/FieldMove/Projects/Project_1.fm
```

You can copy or move existing Projects to the App specific storage using a PC, or preferably use the new Project Import to locate and load existing Projects into the App specific folder.

Project page opened from the **Side Menu**

Description

Add a description of the project. By default it will give the creation date and the name of the device it was created on.

Localities

A list of the localities defined in the project, with creation date and time.
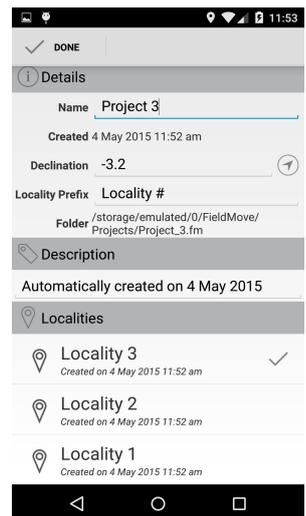
Merging Projects

The ability to insert another existing project is enabled in the project details page. After tapping the insert button, you will be presented with the list of other projects on the device. Selecting one project will show more details. You can then insert the selected project.

You have the option to ignore base maps (mbtiles) and/or images. Keep in mind that importing these will create copies of all the data and require extra storage space.

When inserting, the rock unit and symbol tables will be merged. If the inserted rock unit list or symbol list contain entries that have the same name as those in the current project, the inserted data will be assigned to the existing unit or symbol.

Deleting a locality

Localities can be deleted from the notebook, or the **Project Details** page. Delete a locality by long pressing on it. Note that the active locality cannot be deleted. Change the active locality from the **Compass / Clino** or **Notes & Images** pages.

Delete Project

This will permanently remove the Project from the device. See **Switch Project** section for more details.

 Note: this option is only available when opened from the **Switch Projects** page.

Switch Project

The **Projects List** page lists all the current projects stored in the phone.

There are five button options at the bottom of this page. **Note that there are two new options in Clino v3**:

⚙ **App Setting**

Set the **Angle Convention**. The **Version** is available from this page. See the **Settings** section for more information.

💬 **E-mail Feedback**

We are always keen improve our products so please let us know what you think and if you have any wishes for future development.

⊕ **New Project**

Create a new project, this opens the Project Details page.

⤓ **Import Project Archive (NEW)**

Import a Clino Project Archive file (.fm.zip) located anywhere on the device (see below)

📁 **Import Project Folder (NEW)**

Import a Clino Project Folder (.fm) located anywhere on the device (see below)

Importing a Clino Project Archive, or a Clino Project Folder

Note that as Clino v3, and in line with enforced Google policy, all Project files are now stored in the App specific device folder. In the case of FieldMove Clino this is for example:

```
<device>/Android-
/data/com.mve.fieldmove.clino/files/Projects/Project_
1.fm
```

Previously FieldMove Clino files for older versions were
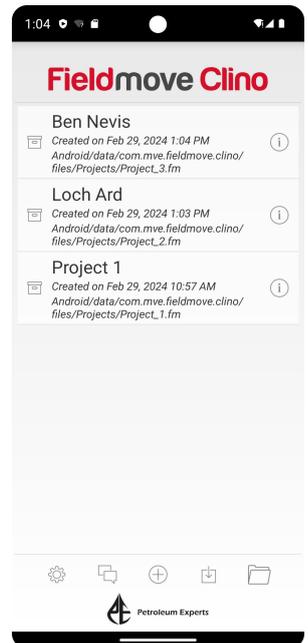
Project List page
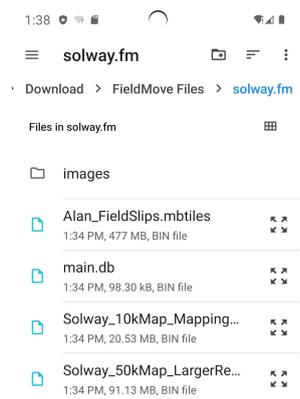
Import Project from Folder

stored on the root of the device, for example:

`<device>/FieldMove/Projects/Project_1.fm`

You can copy or move existing Projects to the App specific storage using a PC, or preferably use the new Import functionality to load existing Projects into the App specific folder. To import a Project from a PC, or import a Project from a different folder on your phone, then follow the steps below.

If PC then find the .fm.zip file or .fm folder saved onto your computer. Copy the folder or the zip file to the phone. See the Accessing Projects section on how to copy data to your phone.

Navigate to the **Switch Projects** page.

If importing a *Project folder* (.fm) press the folder button at the bottom of the page. A File Browser will appear. Navigate to the inside of a Clino Project folder (.fm) on your device (e.g. *<device>/Download/FieldMoveFiles/Solway.fm*), then press "USE THIS FOLDER". See the screen-shot to the right. This will copy the entire folder into the new app specific device folder, and then switch Clino to this Project.

If importing a *Project Archive file* (.fm.zip) press the down-arrow button at the bottom of the page. A File Browser will appear. Navigate to a folder containing a Clino Project Archive file (.fm.zip) folder on your device (e.g. *<device>/Download/FieldMoveFiles*). Then select the archive file you would like to import (e.g. *Ben-Nevis.fm.zip*). See the screen-shot to the right. This will copy unzip the archive to the new app specific device folder, and then switch Clino to this Project.

Please note that while the import will not overwrite an existing project, it does not ensure the project name not already in use. This may lead to several projects having the same Project name, however using a unique file name on the device. Clino will append "_i" to the filename of any project that currently exists.

Note that due to the new App specific storage changes all Base Maps will now reside in the Project folder. When Importing projects or archives, any Base Map that
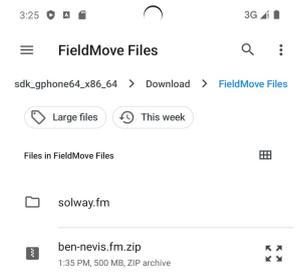
Import Project ZIP Archive

existed previously outside of the Project folder will NOT
be copied to the new Project folder. In this case then the
User will be notified, and these Base Maps (.mbtiles) will
need to the re-imported manually - see the Maps page
for import details.

Deleting a Project

To delete a project, navigate to the **Switch Project** page
and long press on the project you wish to delete. This will
bring up a confirmation dialog. Tap **OK** to remove the
project from the device.

Note: You cannot delete an active project. To delete the
active project, you will have to switch to another
project, and then return to the project details from the
Switch Project page.

Settings

The **App Settings** ⚙ gives options for:

Settings page

Angle Convention
Choose between **Dip / Azimuth** (default) or **Dip / Strike** for the right hand rule (RHR). Both conventions are used when the project is exported.

Calibrate Accelerometer
Allows the app to calibrate the accelerometer in the event that it does not report inclination correctly.

Magnetic Sample Size
Set the level of averaging used when processing magnetic data. Some devices provide more stable results with higher average, whilst others work fine with little to none. Experiment with this setting to see what works best on the device.

Version
The version of the app currently installed on your Android device. Please provide this information along with your operating system when reporting bugs.

Tap the app icon, or **back**, when complete.

Export

Projects can be exported by selecting the export option from the **Side Panel** or **Project Details** page. Data can be exported as:

- FieldMove (.fm.zip)
- MOVE (.mve)
- Google Earth (.kmz)
- ASCII (.csv)

Tap the selected file type to export the data. The operation can be cancelled by tapping **Cancel** on the progress pop-up.

 Note: Exporting a project with a large number of pictures, data, and base maps can take some time.

Once the export is complete, an option to Copy data or **Share** data is available on pop-up box.

Data can be shared using any app which is registered to deal with the export file type e.g. GoogleDrive, Gmail, OneDrive, WhatsApp.

Exported ASCII (.scv) files will be stored in the current project folder, whilst FieldMove, Google Earth or Move exports will be located in the Clino Exports folder.

    <device>/Android–
    /data/com.mve.fieldmove.clino/files/Exports

To access this data connect the phone to a laptop or desktop PC. Select the device from **My Computer** and browse to the folder that you copied to, or directly to the Exports folder location. Copy the exported files to the laptop or desktop computer.

Opening exported projects

FieldMove (.fm.zip) files are a new export format. This is the Clino and FieldMove native file format. This is simply a zipped archive of the (.fm) folder which hold the project database, photos, and base maps.

A future version of MOVE is planned to import and

Exporting Data
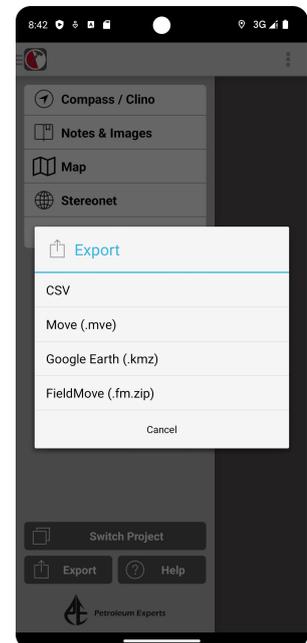
Export menu
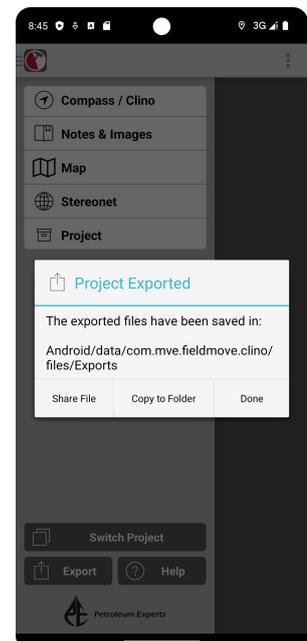
Copy To and Share pop-up options

export this format directly. This will ultimately replace the Move (.mve) export from Clino.

Note: The FieldMove (.fm.zip) format is ideal for sharing Projects amongst users, as well as a compact format to backup or archive your Clino Projects elsewhere.

Note: An existing (.fm) Project folder can be packed to (.fm.zip) by utilising numerous Zip application or utility, and any (.fm.zip) file can be unpacked to the (.fm) Project folder again.

CSV files are comma delimited and store geo-referenced point data and photo locations. The first line of each file gives the column titles. Each .csv file contains a single data type, and is named as such. For example, all localities are saved localities.csv and plane data is stored in planes.csv. Whilst localities and their data are stored in separate files, they can be easily cross referenced using the **localityId** which is assigned to each locality and data point. CSV files can be imported directly into many GIS software packages as CSV/ASCII data. Files can be viewed quickly by opening them in simple text editors such as Notepad, or spreadsheet software such as Excel. Note that images are not exported in the CSV export. Instead the geographic location of each photo is found in the image CSV file, along with the name of the image file. All images can be found in the **images** folder, which is stored in the **Project** folder on the phone.

Note: CSV files do not contain lines or polygon information.

MOVE files (.mve) can be opened directly in MOVE. MOVE is designed for 2D and 3D model building, interpretation and validation in 4D. You can also load .mve files into Clino for digital mapping on a tablet PC.

Note: When importing the data into MOVE it is advisable to set up the projection in a new document and insert the .mve file into this new document. Doing so avoids UTM calculation issues and misplaced data for larger spanning projects. This process will also flag up any UTM calculation issues on the import
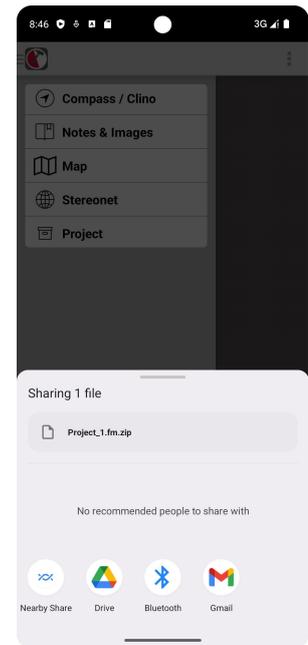
Share menu

summary and is a good check of data location / projection validity.

KMZ files can be opened in Google Earth.

Note: KMZ files do not preserve line style.

Note: **When I open my exported .kmz project into Google Earth I can only see some of my data.** In the top left of the Google Earth screen a time stamp bar shows the range of information displayed that is set between specific dates. The user may need to alter this so that the extent range covers the time period that the data was taken.

Export Accessing Projects

Accessing Projects (Android)

Projects can be re-imported to the phone after they have been copied onto a computer. This includes projects created on the iPhone version of Clino. To import a project from a computer to the phone, follow the steps below.

Note that beginning with Clino v3, and in line with enforced Google policy, all Project files are now stored in the App specific device folder.

In the case of FieldMove Clino this is for example:

`<device>/Android-/data/com.mve.fieldmove.clino/files/Projects/Project_1.fm`
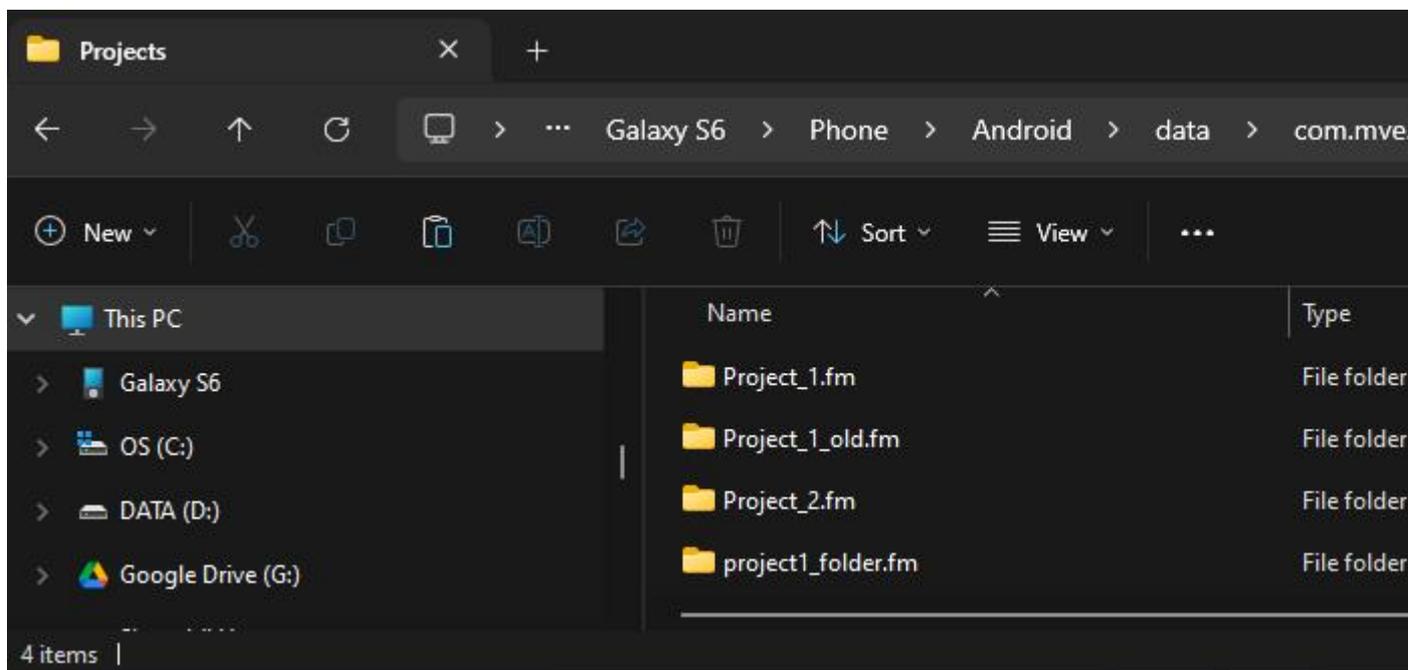
Previously FieldMove Clino files for older versions were stored on the root of the device, for example:

`<device>/FieldMove/Projects/Project_1.fm`
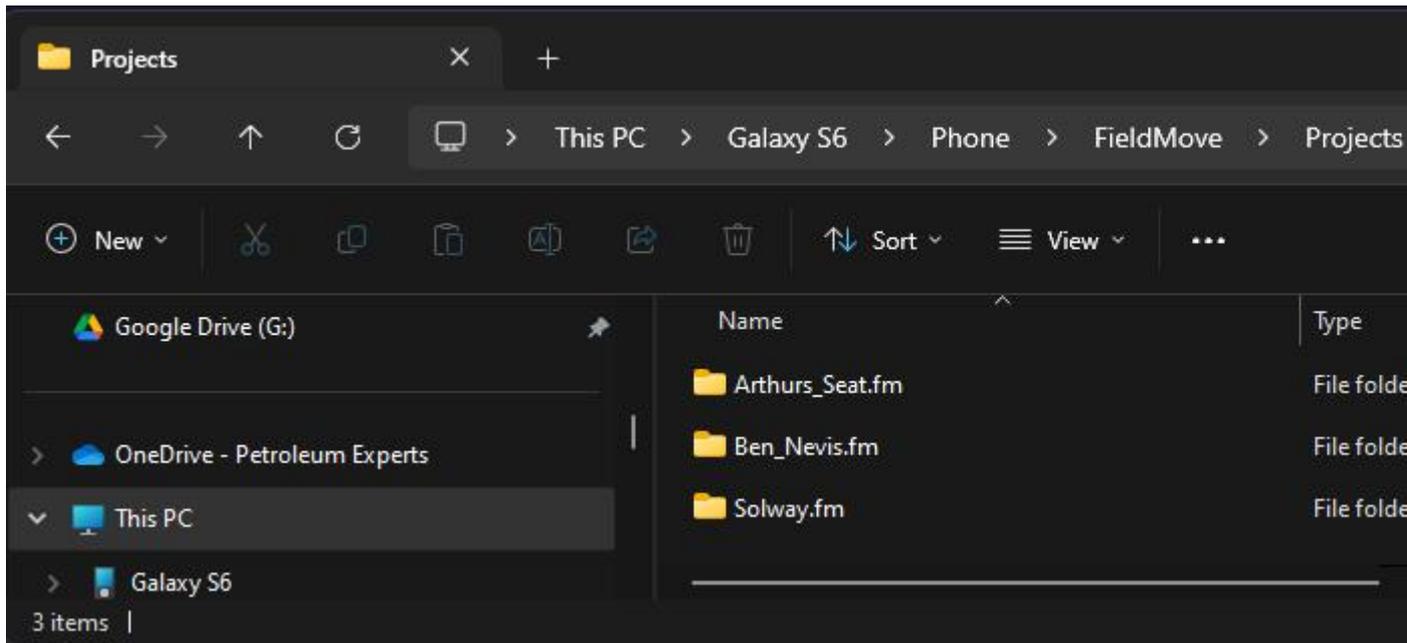
You can copy or move existing Projects to the App specific storage using Windows Explorer on a PC, or preferably use the new Import functional-ity to load existing Projects into the App specific folder. To import a Project from a PC, or import a Project from a different folder on your phone, then follow the steps below.

If PC then find the .fm.zip file or .fm folder saved onto your computer.
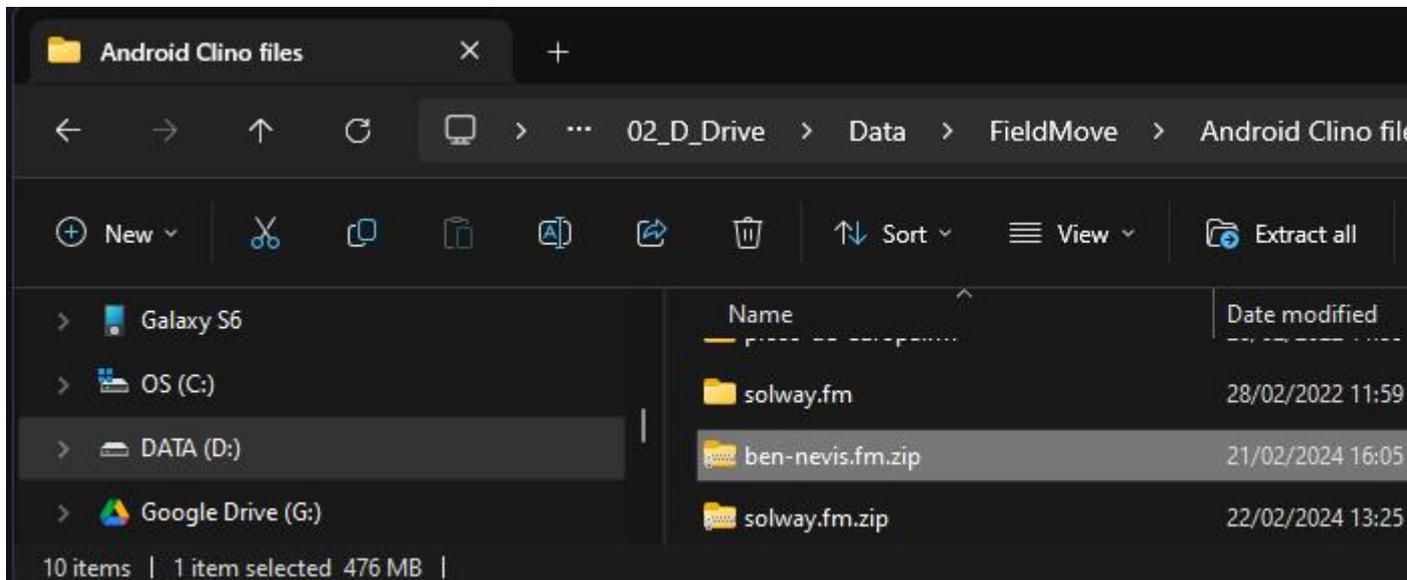
Copy the Project folder (.fm) or the Project archive (.fm.zip) file to the phone. For example create a Clino folder inside the device Download folder.
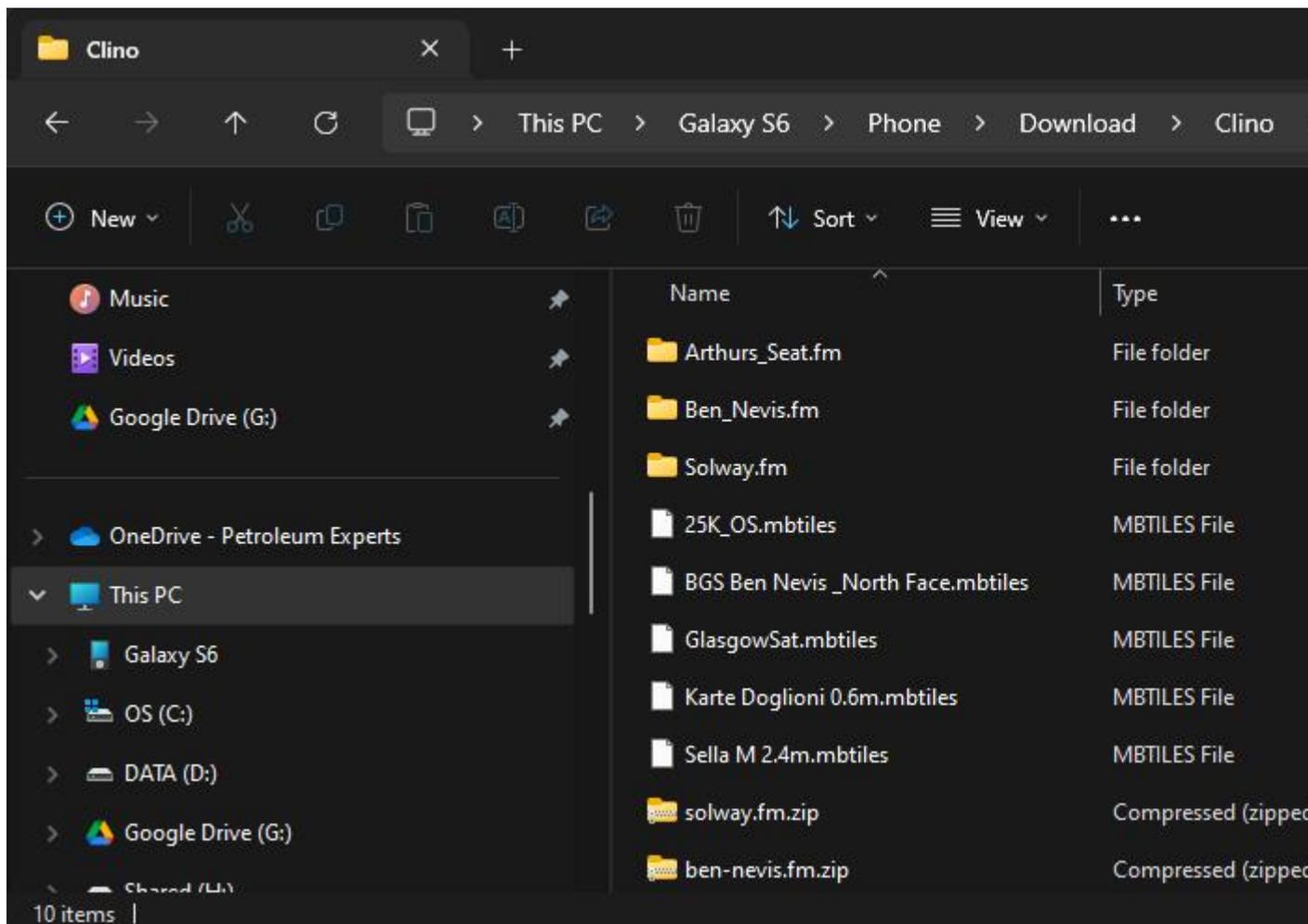
At this point we assume that you have existing Project folders or archives on your device.

There are two options to add these Projects into the Clino storage folder:

1. Use the new Import Project or Project Archive Functionality

Navigate to the **Switch Projects** page.

Use the Import Project, or Project Archive to bring existing Folders or Archives into Clino.

If using this method there is no need to restart Clino.

2. Use Windows Explorer directly.

Close Clino

On some devices you can copy existing Clino Project folders

`(.fm) directly using Windows Explorer (above):`

`If you do this then simply using copy and paste the existing Project folder from for example:`

<device>/FieldMove/Projects/Solway.fm or

<device>/Download/Clino/BenNevis.fm

To the new Clino internal storage folder:

<device>/Android/data/com.mve.fieldmove.clino/files/Projects/

Restart Clino and it will pick-up the new Projects when you open the Switch Projects page.

Open Clino and navigate to the **Switch Projects** page. The imported project should be visible.

Digital Compass Calibration

Most new smartphones contain electronic magnetometer, gyroscope, and accelerometer chips that, either individually or when combined, provide orientation information about the device. These electronic components vary in quality and are subject to a number of limitations. For example, magnetometers can be strongly influenced by the magnetized iron, steel or other permanent magnets in the device (the hard iron effect), as well as being influenced by external magnetic material in the natural and built environment. Gyroscopes often suffer from gyro-drift – an error caused by the accumulation of the unique bias present in each gyroscope. We can counteract these limitations by attempting to calibrate the sensors, or using a combination of their output data to provide an improved result.

However, some smartphones perform more consistently than others. This variation between devices can be caused by:

- differences in phone hardware and firmware
- differences in the built-in noise filtering and sampling frequency
- the different sensor combinations (sensor fusion) or compensation algorithms

There are also differences between the mobile operating systems and how they allow developers to access and manipulate the sensors available on each device.

We are reluctant to recommend specific devices to run Clino, however there are significant variations in the quality of the components that are currently being used by the various manufacturers, and we feel strongly that we should make users aware of some of our recent findings.

Calibration for Android™ Devices

We have observed much larger variations in the measured data recorded using Android devices which we suspect is largely down to the quality of the hardware components inside the device. If you are running Clino on an Android device then we would strongly recommend that you follow the advice below.

It is essential to calibrate the magnetometer/gyroscope/accelerometer combination in your phone before starting to measure data. Apple phones display a black screen with a small red ball that must be rotated within the confines of a graduated circle. The compass clinometer within Clino will not become active until this operation has been performed. Unfortunately, many Android phones do not display a similar visual feature for calibrating the internal components. We recommend that you follow the instructions

set out in the manufacturer's guide, which might include rotating the phone several times in the x-y-z planes. There are also some helpful videos on YouTube relating to compass calibration for certain models of Android phone.

We have found that some devices do not correctly report inclination. This is obvious when a device is on a flat horizontal surface, yet Clino still reports a dip. We believe this is due to components in the device not being seated properly, as we have tested other devices of the same make and model and not observed any problems. To counteract this, we have added an accelerometer calibration option in the app settings. In all cases, calibration resulted in devices correctly reporting inclination.

To get the most out of your smartphone we recommend that you collect data with the device in a variety of orientations and compare this against a traditional hand-held compass clinometer to work out the best orientation to collect data in. Many Android devices work better when held against the rock in landscape mode (long-axis horizontal) rather than in portrait mode (long-axis vertical). When measuring lineations, some Android phones will only record sensible measurements of plunge azimuth in one orientation - when the device is held with the top of the screen pointing down- or up-plunge depending on the manufacturer. This does not seem to apply to the iPhone (all models) with good data being recorded irrespective of the orientation of the phone.

These questions may help you

- Does the phone have reasonable consistency with itself in all orientations and situations?
- Does the phone have reasonable consistency with a control analogue compass-clinometer in all orientations and situations?
- Are there any orientations (e.g. device long-axis vertical or horizontal) that provide more consistent and accurate results? If so, make sure to collect data only in these orientations.

As with an analogue compass, be aware of sources of interference. This can come from magnets, ferrous metals, electronic devices, another analogue compass or electronic device, watch or phone case (beware of magnetic clasps) to name a few.

..and finally

Clino is designed to make data collection quick and easy, facilitating the collection of large, statistically valid data sets. We have found that there are tremendous advantages to using Clino on a well-calibrated smartphone.

Most users will have experience with traditional analogue devices, where often a single reading at each station is taken with the assumption that each of these readings will have a high level of both precision and accuracy. This assumption is normally wrong. We always recommend taking several readings at each location, which can then be treated statistically to provide both improved accuracy and an understanding of measurement error.

Note: **All my projects are in the same position, even though I entered different localities in different regions.** ALWAYS check that your GPS is on and has been updated recently. Any measurements will be recorded to your last known position. Therefore if the GPS has accidentally been turned off, or has lost signal the most recent measurement will be positioned at the last GPS reading. These can only be edited manually in Move, and only by using human knowledge not satellite accuracy. Additionally, you may wish to collect a track with an external GPS device or another GPS tracking app on your device. This will allow you to use time stamp information from the track to reposition any mislocated field readings.

Frequently Asked Questions

I've updated to Clino v3 - What's New?

- Clino Project Files device default location changed - please review the PDF Help Pages

- Base Maps on Android are now located by default in the Clino Project (.fm) folder.

- Support for Android 14 devices (API 34). Works on Android 6.0 upwards.

- Export of native Clino Project archive (.fm.zip)

- Support Android Sharing of exports (Drive, Gmail, OneDrive, WhatsApp etc.)

- Import of native Clino Project archive (.fm.zip), and Clino Project folders (.fm)

- Bug fixes

Clino v3 - where are my Projects !?!

No previous Projects files or Base Maps have been deleted.

In line with the enforced Google policy, all Clino Project files must now stored in the App specific device folder.

In the case of FieldMove Clino this is for example:

<device>/Android/data/com.mve.fieldmove.clino/files/Projects/Project_1.fm

Previously FieldMove Clino files for older versions were stored on the root of the device, for example:

<device>/FieldMove/Projects/Project_1.fm

Previous files will still exist on your device. You can copy or move existing Projects to the new App specific storage using Windows Explorer on a PC, however this is not guaranteed on all device models. Preferably you should use the new Project Import functionality in the Switch Projects page to locate, copy, and load existing Projects into the new App specific folder.

Clino v3 - some of my Base Maps are missing !?!

Previously it was possible for for older versions to store Base Maps in a shared **Maps** folder for example:

<device>/FieldMove/Projects/Maps/[.mbtiles files]

Note that Base Maps for each Project must now be stored in the individual Project folder. **There is no sharing of Base Maps between Projects**. A Base Map must be imported into a Project which utilises it.

This is an example of the new layout, where in this case **Map2** is used in **Project_1** and **Project_2**, and therefore is located in both Project folders.

<device>/Android/data/com.mve.fieldmove.clino/files/Projects/Project_1.fm/Map1.mbtiles
<device>/Android/data/com.mve.fieldmove.clino/files/Projects/Project_1.fm/Map2.mbtiles

<device>/Android/data/com.mve.fieldmove.clino/files/Projects/Project_2.fm/Map2.mbtiles
<device>/Android/data/com.mve.fieldmove.clino/files/Projects/Project_2.fm/Map3.mbtiles

When Importing or Opening projects, any Base Map that existed previously outside of the Project folder will **NOT** be copied to the new Project folder automatically. In this case the User will be notified, and these missing Base Maps (.mbtiles files) will need to be re-imported manually.

Refer to the **Maps** section for more detailed information on re-importing Base Maps into Projects. You will only need to do this once.

Clino v3 - why have you done all this and is it actually useful to me?

Most of these changes are to facilitate App security enforced by Google. Project files including Base Maps cannot exist outside of the new App specific storage area.

The is now the same project layout, format, and behaviour as Clino on iPhone and will allow Project sharing between iPhone and Android easier than previously.

Finally this change allows the new Export and Sharing of *.fm.zip* project archive files, which hold the entire project and map information inside a single archive file. This archive file can now easily be copied to elsewhere on the device for backup, or shared via Android Share (e.g. Drive, Gmail, OneDrive, WhatsApp). This allows better management, backup, and sharing or Projects, especially between groups of people on the *move* - or in the field.

In a future update, and as part of a longer term plan we also plan for the Move desktop product to import and export the Clino archive (.fm.zip) natively, allowing Move enhanced functionality to create, import, edit, and export Clino Projects. The move to a single Project archive also makes this possible.

Clino v3 - this sounds good - there must be a catch?

The Google App policy dictates that when you **delete** an App from your device, all the data (Projects) is also **deleted**. This is the same for Clino!

Please view the new App specific storage area as temporary working area storage only.

Please use the new Clino native (.fm.zip) Export and Share functionality:

- Export your Project, then Copy to another folder on your device e.g. **<device>/Download/Clino/**. Copy these files to your PC using Windows Explorer for safe keeping.

- Export your Project, then Share directly to Google Drive or OneDrive cloud storage for safe keeping.

Clino v3 - I've manually copied my old Project to the new App specific storage but I can't switch to it?

The Switch Projects page will not visualise or pick-up manually copied projects until Clino is re-started.

<device>/Android/data/com.mve.fieldmove.clino/files/Projects/ [all .fm folders should be here]

When you restart Clino it will automatically pick-up all Projects from the App specific storage folder above.

Alternatively use the new Project Import functionality in the Switch Projects page to locate, copy, and load existing Projects from anywhere on your device into the new App specific folder

How do I load a Base Map?

Along with the online maps already installed on the app, users can import their own basemaps. As long as the basemap is geo-referenced it can be brought into Clino. However, we recommend importing as an **MBTile** via a computer as the user can set the **zoom level** making faster to use in the field. Converting to MBTile can be done in a couple of steps in **MOVE**, please

see the **Map** section of the respective guides for more information on how to do this.

Base maps are added to a project from the **Manage Maps** option in the **Map** page. The active base map can be selected from the basemap list and is indicated with a tick.

Refer to the **Maps** section for more detailed information.

How do I change the Project name?

The project name can be changed on the **Project Details** page, which is accessed from the **Project** option in the **Side Panel**, or by tapping the information icon in the **Switch Project** page.

Refer to the **Project** or **Switch Project** sections for more detailed information.

How do I set a bearing?

Navigate to the **Compass / Clino** page. If required activate the compass by tapping on the small compass. Tap the compass face to set the bearing, deviations from this set bearing will be displayed by a red bar. To stop tracking the bearing, tap the compass face again.

Refer to the **Compass / Clino** section for more detailed information.

What does a phone need to be able to take Clino measurements?

There are 3 important items that each phone must contain to be able to take accurate readings. They are an **accelerometer**, **gyroscope** and **magnetometer** (sometimes called a geomagnetic sensor). When looking to purchase a phone, the technical specification page will normally list what sensors it is equipped with.

Can an external Bluetooth GPS be used with FieldMove Clino?

Yes an external Bluetooth GPS can be used with FieldMove Clino. To do this connect the Bluetooth GPS to your device and then restart FieldMove.

FieldMove uses the devices location service. This means if the Bluetooth GPS is compatible with your device, FieldMove will automatically use the updated information from the location service.

How do I take a reading using the Compass / Clino?

Planar or linear readings are taken from the **Compass / Clino** page. If required, activate the clinometer by tapping on the small clinometer to the right of the compass face. At least one rock unit is required before taking a reading, so select the **Add rock unit** option first or select the rock unit you wish to assign to the data you are about to collect. Set the **Data Type** to be collected from the list of planar or linear types. The clinometer page will update to reflect the **Data Type**.

To measure the orientation of a **plane**, the **back of the phone** should be placed on the surface to be measured. To take a **lineation reading**, the **edge of the phone** should be placed along the lineation, preferably with the back of the phone on the surface – but this is not essential.

To lock the reading, tap the clinometer face. The display will change from **red (active)** to **locked (black)**. Check the location reading and associated properties, unit type, locality and add an optional comment before tapping **Save**.

Refer to the **Compass / Clino** section for more detailed information.

Does Clino support other coordinate systems?

At present, Clino only operates using a **Lat/Long** and **WGS84 projection** system. When the project is imported in to **MOVE**, the coordinate system can be changed. However, we recommend that before the Clino project is imported, a blank document is set up with the correct coordinate system so that it avoids UTM calculation issues.

How do I create a geo-referenced note?

In the **Notes & Image** page select the **Note** icon to take a geo-referenced note.

Refer to the **Notes & Images** section for more detailed information.

How do I take a geo-referenced photo?

In the **Notes & Images** page select the **Camera** icon to take a geo-referenced photo. If you want to insert an image as a geo-referenced image, use the camera option within the **Note** page.

Refer to the **Notes & Images** section for more detailed information.

How do I view and edit recorded data?

All data can be viewed in the **Notes & Images** page, which can be opened from the **Side Panel**.Data can be filtered and displayed on a stereonet. Data can also be viewed on the **Map**.

Refer to the **Notes & Images** section for more detailed information.

How do I change a locality name?

Locality names and positions can be changed on the **Edit Locality** page, which is accessed from the **Notes & Images** or **Project** pages. Tap on the locality in the list to open the **Edit Locality** page.

The name of future localities can be set by changing the **Locality Prefix** in the **Project Details** page, accessed from the **Side Panel**.

Refer to the **Notes & Images** or **Project** sections for more detailed information.

How do I delete data?

The **Project** can be deleted from the **Switch Project** page. Active projects cannot be deleted. Switch projects to delete an active project. **Rock Units** can be deleted from the **Rock Types** page. **Localities** can be deleted from the **Notes & Images** page or the **Project Details** page. Notebook entries can be deleted from the **Notes & Images** page.

Long press on an item to display the **Delete** dialog.

Refer to the **Compass / Clino**, **Notes & Images** or, **Project** sections for more detailed information.

How do I export the data?

Data can be exported in FieldMove, ASCII CSV, Move, and Google Earth file formats. The export option is accessed from the **Side Panel** and **Project Details** page.

Refer to the **Export** section for more detailed information.

How do I use Clino offline?

Clino requires online connectivity for the basic maps (satellite or street views) and for Sharing projects externally. If you disable online connectivity, GPS and the map view will still work but the map view will only show a basic grid in places where there is no cached data. Please note that activating airplane mode on some devices will turn off the GPS. If the GPS does not work in airplane mode, to disable online services but preserve the GPS, please navigate to the **Settings** page and disable **Cellular Data/Mobile Data**.

Refer to the **Settings** section for more detailed information.

Our Experience

Collecting data on folded Devonian sediment at Ardmore Point

The following comments are based on our experience of testing Clino with an iPhone 5s, iPhone 7, and iPhone SE.

Hardware

Battery can last for a full field day (~8 hours, with the GPS on but when other apps and data streaming are turned off). This is highly dependent on the phone and we recommend experimenting with your phone to get the best out of usage time.

When your phone is locked, the GPS will become inactive and will not drain the battery.

There are plenty of tough cases and water proof pockets on the market that project the phone and make it waterproof and robust, such as LifeProof, Idry, Aquapac etc.

Preparation

A common hindrance to successful digital geologic mapping is a lack of advance preparation before leaving for the field. In addition to collation of digital base maps, elevation models, and existing geologic maps, the most important aspect of preparation is practice using the software and hardware tools. As with any compass, orienteering, and basic mapping skill, advance practice ensures that the mapping device is not the focus of the user's attention, leaving the field mapper to focus on 3D spatial analysis of rock

units. We find that these issues are relatively easily overcome with advance planning and training, as well as an appreciation for the potential benefits of digital field mapping.

We recommend testing and calibrating the phone against a compass before going to the field. See our guide on **Digital Compass Calibration**.

Things to watch out for when mapping with a smart-phone

1. Make sure that you **lock** your phone **when it is in your pocket**. This will ensure that you don't end up with 'ghost' readings while you're en route to the next outcrop.

2. Check that the **GPS location has updated** to your current location, **before saving** a reading. Look at the time stamp (underneath the lat / long values) and check that this has the lat / long values for your current location. If you are still unsure if the GPS has placed you correctly, tap the lat / long reading (this will bring up the Map page) where you can check that your current location is correct on the map. Additionally, you may wish to collect a track with an external GPS device or another GPS tracking app on your device. This will allow you to use time stamp information from the track to reposition any mislocated field readings.

3. Make sure that your phone has **enough storage space** for a day's data collection. We recommend that, at the end of each day, you copy your files from your phone to your PC and back these up. You can then delete the project from your phone and start a new project, to free up memory. To put a project back onto your phone, simply paste it from its saved location on your PC into the **Projects** folder on your device.

4. At the start of the day, **check** your phone's **calibration** before taking a reading. Make sure that you are away from buildings, cables, vehicles and jewellery and compare the readings from your phone with a traditional compass-clinometer.

5. Take care to check that you have made the **right lithology and structure type** choices before hitting the Save button. It is very easy to collect incorrectly classified data, which cannot be used later (e.g. you have recorded a cleavage measurement as bedding or vice-versa).

Note on the geology of Ardmore Point

All the screen shots and photos in this guide are taken from Ardmore Point which is approximately 30km north-west of Glasgow. The strata exposed on the shore are Devonian in age, with excellent antiform and synform

structures, faults and fractures with exposures of the Lower and Upper Old Red Sandstone. We frequently run training course at this location and other sites. Please get in touch if you would like to join us to learn more about digital field mapping from the experts.

Closing remarks

We find that digital mapping tools improve the 3D spatial interpretation process by facilitating more analysis and less data management than traditional techniques, especially in the "field office" during the evenings. With a digital mapping workflow, data organisation largely occurs in the field upon data collection, transcription from paper to digital format is unnecessary, and data backup can be as simple as copying digital files to external hard drives. Digital mapping allows more time in the evenings for problem solving, targeting areas of uncertainty, and formulating effective field plans.

Petroleum Experts

System Requirements

Android smart-phone version

The Android version of Clino is available to download from the Google Play Store™.

Minimum Android model requirements

- Any smart-phone containing an accelerometer, gyroscope and magnetometer (sometimes called a geomagnetic sensor). When looking to purchase a phone, the technical specification page will normally list what sensors it is equipped with.

- In general terms the more expensive the phone, the better the CPU & GPU power, and larger the internal storage.

Minimum Android OS requirements

- Requires device running Android 6.0 (Marshmallow) OS and above.

- Supports ARM devices - both 64-bit *arm64-v8a* and 32-bit *armeabi-v7a*.

- Support for devices running Android 14 (API 34 Upside Down Cake) OS and below.

About Petroleum Experts

Petroleum Experts (Petex) are the global standard in petroleum engineering and structural geology software tools. We are a team of highly skilled professionals with extensive experience in petroleum engineering, structural geology, and engineering software.

Petroleum Experts pioneered integrated field modelling, with the objectives of improving field management, production and recovery, with our petroleum engineering IPM suite – fully integrated reservoir, well, surface network modelling system, and the Digital Oil Field platform (DOF).

Midland Valley, the world leader in the field of structural geology, providing expert consultancy and the MOVE suite of geologcial software, joined forces with Petroleum Experts in October 2017.

For more than thirty years, geoscientists at Midland Valley utilised restoration and balancing techniques to unravel geological evolution and extract unseen information from available data. The ground-breaking approach minimises technical uncertainty, and enables companies to reduce risk in a methodical and cost-effective way.

The next evolutionary step of company integration will incorporate geology and geophysics through MOVE, to deliver a seamless set of workflows from field geology to production and oil and gas field management – field discovery to late production life.

About MOVE™

The MOVEtm suite is the most complete structural modelling and analysis toolkit available. It provides a full digital environment for best-practice structural modelling to reduce risk and uncertainty in geological models. The MOVE suite provides a platform for integrating and interpreting data, cross-section construction, 3D model building, kinematic restoration and validation, geomechanical modelling, fracture modelling, fault response modelling, fault analysis and stress analysis.

MOVE is the only software package that offers users the full range of tools for geometrically constrained model building and kinematic analysis in 2D and 3D space.

While other companies market software for model building, our kinematic modelling tools help clients challenge their assumptions, to discriminate between alternative interpretations, and to produce more accurate models.

MOVE is backed up by a team of specialists dedicated to the continuous improvement and evolution of the software, and the underlying science.

Further information on the principles behind our approach to model building and structural modelling using MOVE, as well as the latest software news can be found on [our website](#).