



LETHBRIDGE
POLYTECHNIC



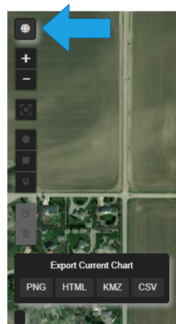
Agriculture and
Agri-Food Canada

Irrimap How To

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Control the Map

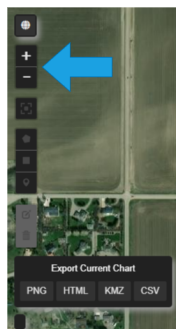
Move The Map



To move the map, click and hold on the map while dragging the cursor. If the desired location is a large distance from the default location, you may want to [zoom out](#) before moving as it will go faster.

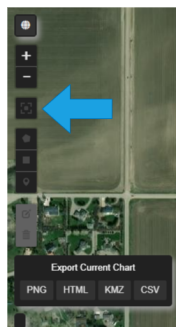
Alternatively, select the search box in the top left of the map, shown in the above image. It will open a text box that you can put an address into, which will take you the closest result. In the case of an address, this will be the location, but for names it may come up with multiple locations.

Zoom In and Out



To zoom in, place your cursor over the map and scroll up. To zoom out, scroll down. Alternatively, you can use the + and - buttons pictured above. They are located in the top left of the map, just under the [search bar](#) and above the [fullscreen](#) button.

Enter and Exit Fullscreen

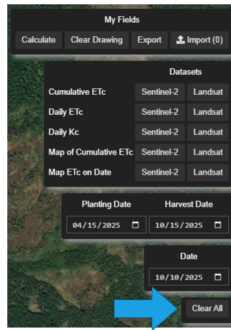


To enter fullscreen, click on the fullscreen button, just under the [zoom buttons](#) and above the [drawing tools](#). The fullscreen button is pictured above.

To exit fullscreen, either click on the fullscreen button again, or hit the escape key on your keyboard. The escape key is typically located in the top left corner of your keyboard.

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Clear Output, Graph and Map



To clear the console output, graph and map, click the reset button, pictured above. It is recommended to do this before you start an operation, as the operation will have to be redone if you hit the reset button after it completes. If selected while an operation is running, the output, graph and map will be reset immediately after the operation completes.

Pick a Dataset

Sentinel-2

The Sentinel-2 dataset is comprised of data from 2 satellites in the same orbit. It features a pixel size of 10 meters by 10 meters, compared to Landsat's 30. It also updates every 5 days, or 10 per satellite, whereas Landsat returns every 16 days. This allows its data to usually be more up to date than Landsat's, though there are occasions where Landsat will have been updated more recently than Sentinel-2.

Sentinel-2 is part of the European Union's [Copernicus program](#), designed to make earth observations available to anyone. Note that Sentinel-2 starts part of the way through 2018.

Landsat

The Landsat dataset has a slower orbit, as well as a lower resolution, allowing it to complete calculations faster. It is ideal for visualizing data over a long time period, as the individual points will be more obvious. It's also good for calculations on a larger geographical area, for the reasons mentioned above.

Landsat is a project helmed by NASA and the USGS (United States Geological Survey). There are many satellites in this program, but the one used by Irrimap is [Landsat 8](#), as it goes back to 2013, compared to Landsat 9, which started in 2021. This is to allow for the use and analysis of historical data.

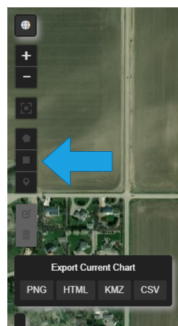
Modify Geometry

Default Shape

To use the default shape, select any operation. The default shape is automatically loaded in when the application starts. To change the default shape, either [draw new geometry](#) or [import geometry](#). You will have to press the submit button to use the new geometry.

The default shape is a field on Lethbridge Polytechnic's research farm, so various experiments may be taking place there. If the data in this location looks patchy, it's likely that an experiment is happening on it.

Draw New Shapes



To draw a new shape, select one of the 4 drawing tools, pictured above. They are, in order, polyline, polygon, rectangle, and point. **To apply any changes, you must hit the Submit button on the right side of the map.** If you don't, the

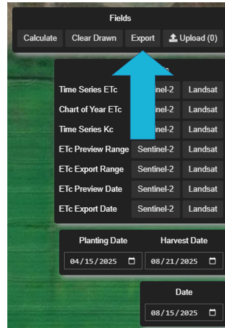
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application will use the old geometry. Note that drawn geometry will always overrule the default shape.

To edit these shapes, select the edit tool, directly below the drawing tools and above the delete tool. From there, alter the shape as you see fit and hit save on the drawing tools. Alternatively, select cancel to undo changes. To delete a shape, select the delete tool, then the shape to delete. You must hit save to apply the changes. You can also clear all, which will does not need to be saved.

The main 2 shapes that will be used are the polygon and the rectangle, as the other 2 have no surface area. The polygon tool will create a point wherever you click on the map and will close the shape when you select the first point again. The rectangle tool will start a shape where you click, but you must drag the cursor to finish the shape.

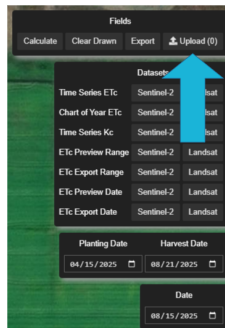
Export Geometry



To export geometry, you must first submit the geometry using the submit button in the top right corner of the map. From there, click the export button, pictured above, and it will start the exporting process. When the process has completed, you will see a link in the console output, located in the bottom right corner of the map. Click it, and it will download.

To save the file if it opens in a new tab, right click the page and select save as from the menu. Then, save it wherever you want.

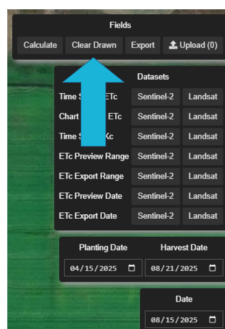
Import Geometry



To import geometry, it must be in geojson format. Click on the upload button, this will open a file selection window. Select the file you want. After importing, the geometry will have overwritten the default square and all drawn shapes. However, the backend will still be using the old geometry, so you will have to select submit to change that.

To return to the default geometry, you will have to reload the page or recreate it on your own.

Clear Drawn Shapes

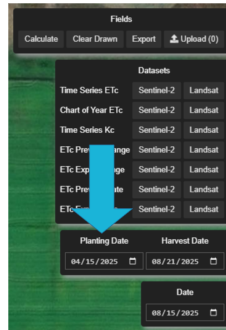


To clear the drawn shapes, click the clear drawn button, pictured above, and located in the top right corner of the map. If geometry has been [imported](#), then the map will be reset to this geometry. If not, it will be reset to the default shape. After resetting, the backend will still be using the old geometry, so you may need to click the submit button to update it.

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Change Dates

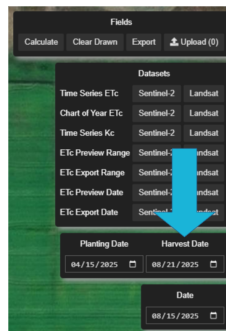
Planting Date



The date selectors are located in the top right of the map, pictured above, under the data tools. The planting date selector is the one on the left. This acts as the start limit for graphs and cumulative sums.

These selectors are not error checked, so if the planting date is after the harvest date, you will get an empty dataset. This may result in errors. Data only starts in 2018.

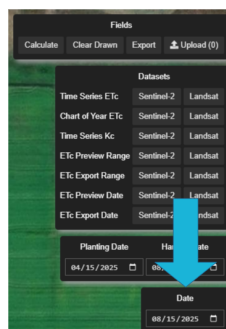
Harvest Date



The date selectors are in the top right of the map, pictured above, under the data tools. The harvest date selector is the one on the left. Before you change anything, you may notice that this selector starts past the current date. This is because Irrimap includes functionality to get 7 days of forecast data (current date inclusive). On graphs, this data will be a darker color than the historical data. Note that if set later than 6 days in the future, the data will still stop at the 6-day limit.

These selectors are not error checked, so if the planting date is after the harvest date, you will get an empty dataset. This may result in errors. Data only starts in 2018.

Date

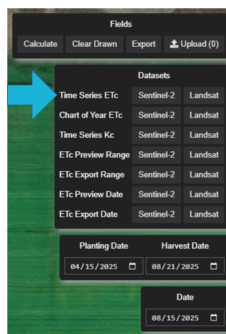


The date selector is located in the top right of the map, right under the other 2 date selectors. This one is used for any operation that uses a singular date, such as chart of year (just takes the year), contour date, preview date, and export date. For the last 3, they will take the closest day without clouds covering the selection. This helps to get more accurate data, though it can result in a date far from what was asked for.

Graph

Time Series

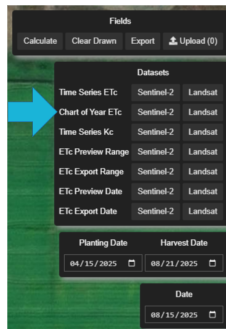
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To create a time series graph, select one of the buttons in the time series row. This will start the graph creation process. When completed, the graph will appear in the graph box, located above the reset button and below the drawing tools. This graph will contain the 5th percentile, 95th percentile, and mean cumulative ET_c from the [planting date](#) to the [harvest date](#).

These graphs are interactive, so hovering the mouse over a point will show the data it contains.

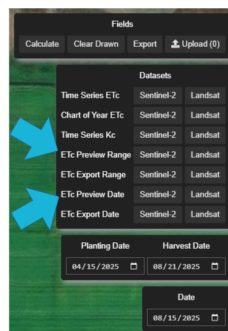
Chart of Year



To create a chart of a year, select the correct date using the [date selector](#) (only the year matters for this operation). Then, click one of the buttons in the chart of year row to start the graph creation process. When completed, the graph will appear in the graph box, located above the reset button and below the drawing tools. This graph will contain the average cumulative ET_c from April 15th to October 15 of the given year.

These graphs are interactive, so hovering the mouse over a point will show the data it contains.

Contour

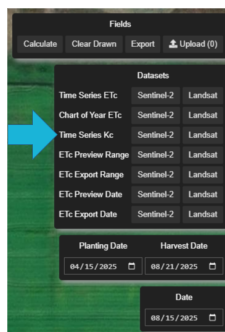


To create a contour chart, select one of the buttons in the preview range or preview date rows. Range will get a cumulative sum of the date range, while date will only get one day. All contour charts use the bounding box of the geometry, shown during the creation process, rather than the geometry itself to create the chart. This is to simplify chart creation. Please note that this type of chart may take a long time to load, depending on the size of the geometry. As an example: the whole test farm can take as long as 15 minutes, whereas the default shape can take as little as 1 second.

These graphs are interactive, so hovering the mouse over a point will show the data it contains.

Crop Coefficient

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To create a crop coefficient chart, select one of the buttons in the K_c range or K_c Date rows. This will start the graph creation process. When completed, the graph will appear in the graph box, located above the reset button and below the drawing tools. This graph will have 1 datapoint per orbit (excluding days with cloud cover), as opposed to the 1 every day from the ET_c charts. This data is good to see what data is used to calculate the ET_c data, in case something goes wrong.

These graphs are interactive, so hovering the mouse over a point will show the data it contains.

Export Graph



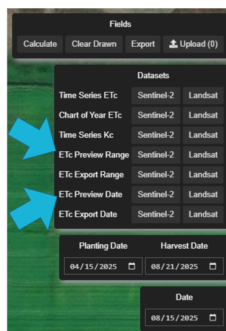
To export the graph, select one of the buttons pictured above, titled "Export Current Chart". If no graph is shown in the graph box, this will fail. When the export is done, a download link will be shown in the output box, located in the bottom right. Click it and the file will save to your downloads folder.

The file formats are PNG, HTML, KMZ, and CSV, described below:

- PNG: A static image
- HTML: An exact copy of the chart, including interactivity.
- KMZ: An image with geographical data to put on a map. Only works for contour plots, KMZ will display properly in ArcGIS.
- CSV: List of all the cumulative and daily datapoints. This will output like this whether or not you are exporting a time series plot.

Export Images

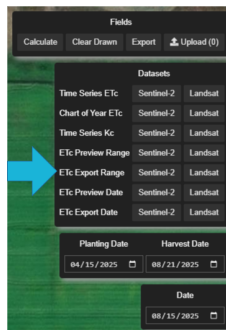
Preview



To see the underlying data to be exported, click one of the buttons in the preview range or preview date rows. This will draw the image to the map and create a contour chart of the image. Note that the bluer the color, the higher the value. The actual export will be a raster of a contour plot of the same location, rather than the pixels shown in this preview. Also note that contours use the bounding box rather than the exact geometry.

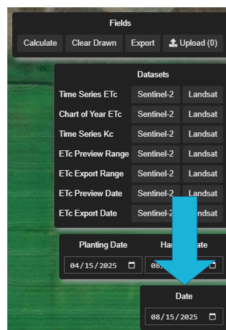
Range

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To export the cumulative ET_c data of the selected parameters, click one of the buttons in the export range row. This will create a KMZ file containing a contour plot of the given geometry of the cumulative ET_c over the given date range. When the export process is done, it will output a link to the console output. Click on it to download the file.

Date



To export the cumulative ET_c data of the selected parameters, click one of the buttons in the export date row. This will create a KMZ file containing a contour plot of the given geometry of the cumulative ET_c on the [given date](#). When the export process is done, it will output a link to the console output. Click on it to download the file.

Save Site to Desktop

Open [Irrimap](#) in your browser. You will see the URL at the top of your browser, but to the left of it will be 1 or 2 icons. Click and drag them to your desktop. This will create a shortcut to Irrimap. Double click on it to open the site.

Recover from Errors

If an error is encountered, please send the whole error message to your system administrator with a description of how it happened. Once that has been completed, you can clear the output console and continue from where you were. Note that the error is likely to occur again if you do the same thing that caused it in the first place. If the operations will no longer run, reload the page. If you need the data from the operation that caused the error, wait for your system administrator to get back to you.

ETc Calculation

Irrimap calculates ET_c by multiplying K_c data from [Google Earth Engine](#) by ET_0 data from [Open-Meteo](#). ET_0 data is given once per day, but K_c is given whenever a satellite comes by. In order to make a cumulative sum, we need a datapoint per day, so Irrimap makes some assumptions. The first K_c datapoint within the date range will be used to calculate from the first day of the date range to the next K_c datapoint. This K_c value will be used until the next reading and so on.

From the Open-Meteo Website:

ET_0 Reference Evapotranspiration of a well-watered grass field. Based on [FAO-56 Penman-Monteith equations](#) ET_0 is calculated from temperature, wind speed, humidity and solar radiation. Unlimited soil water is assumed. ET_0 is commonly used to estimate the required irrigation for plants.

The formula for K_c is $NDVI * 1.37 - 0.097$. This is the same formula as [Irrisat](#), see [technical reference](#).