

Filière Génie de l'Environnement & Géosciences (S3)

Module : Géomatique

TP N°1 : Géoréférencement & cartographie



Prof. Morad TAHER



HAPPY
GIS day

New Project

Map Catalog Global Scene Local Scene Start without a template

Recent Projects

Open another project

Recent Templates Start with another template

[Learn more about creating project templates](#)

Your recent projects will appear here

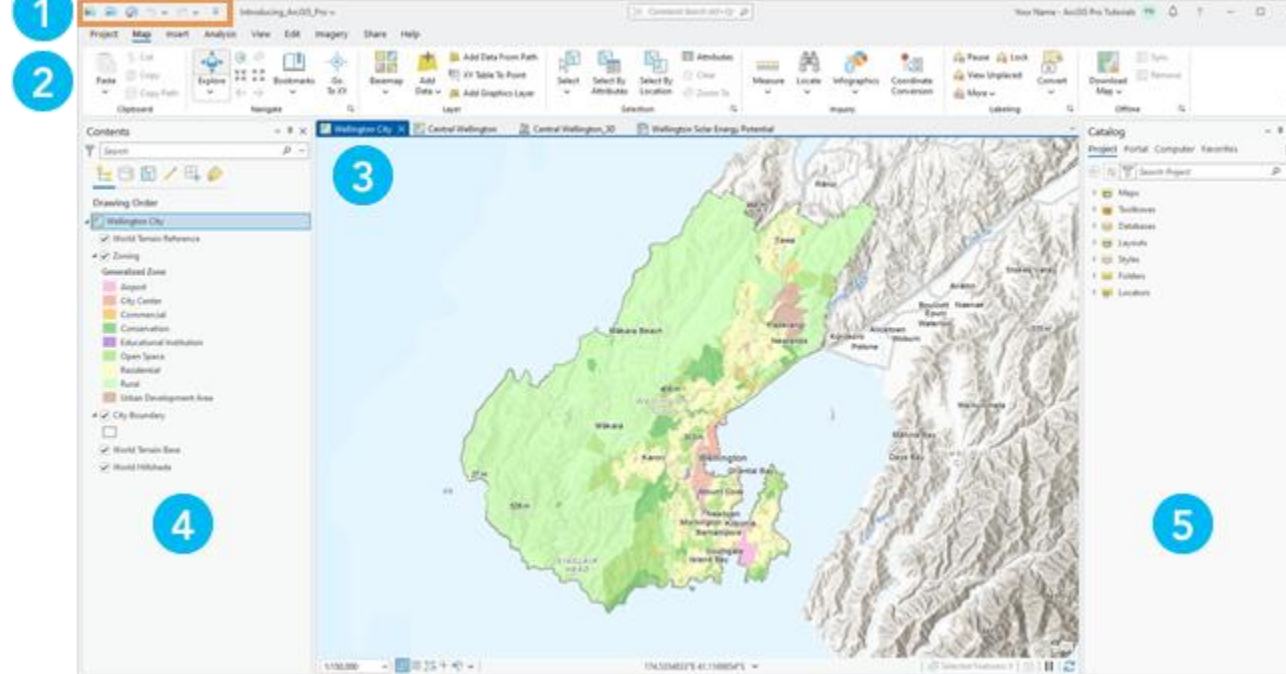
Create a New Project

Name

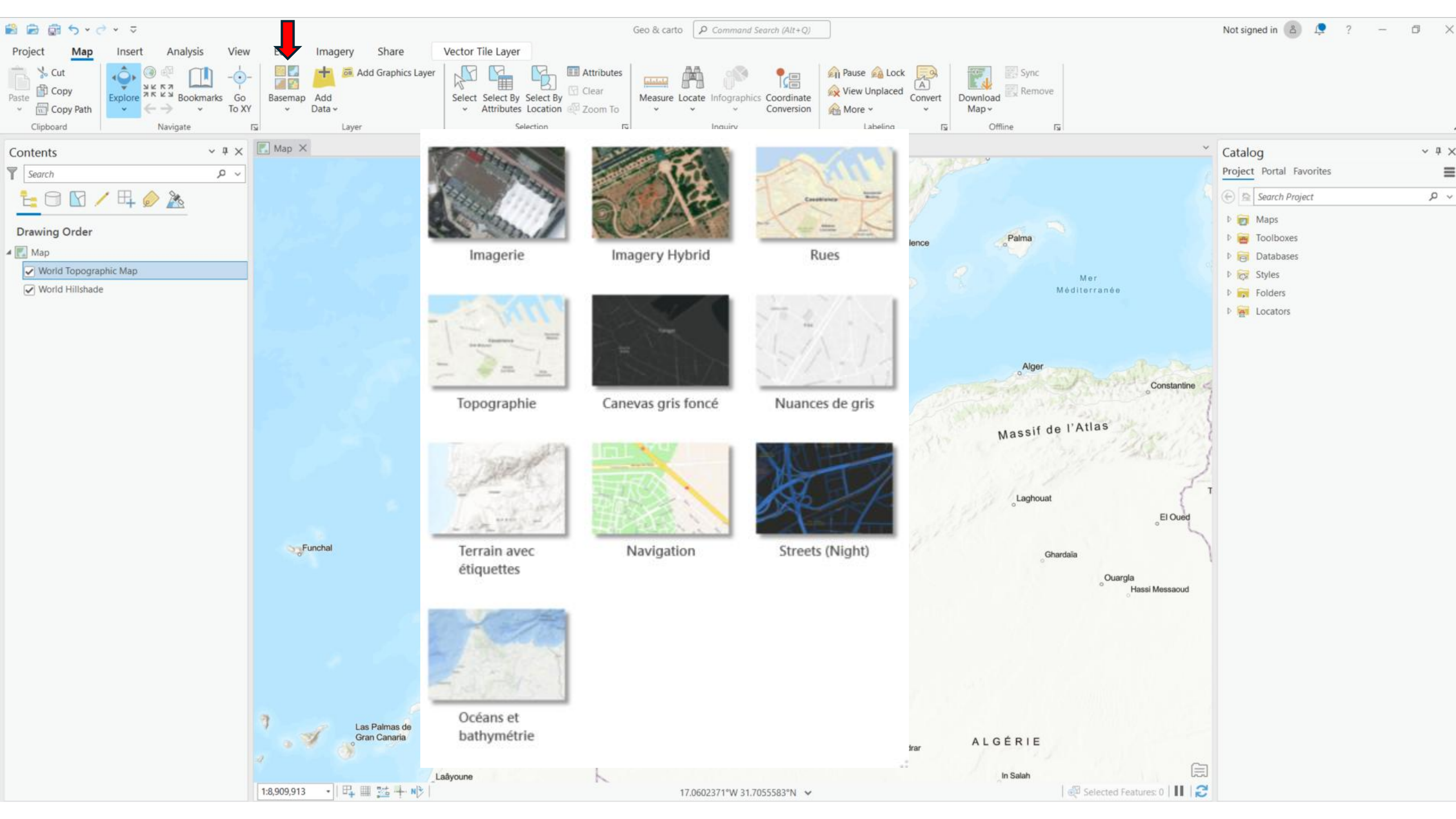
Location

☒ Create a new folder for this project

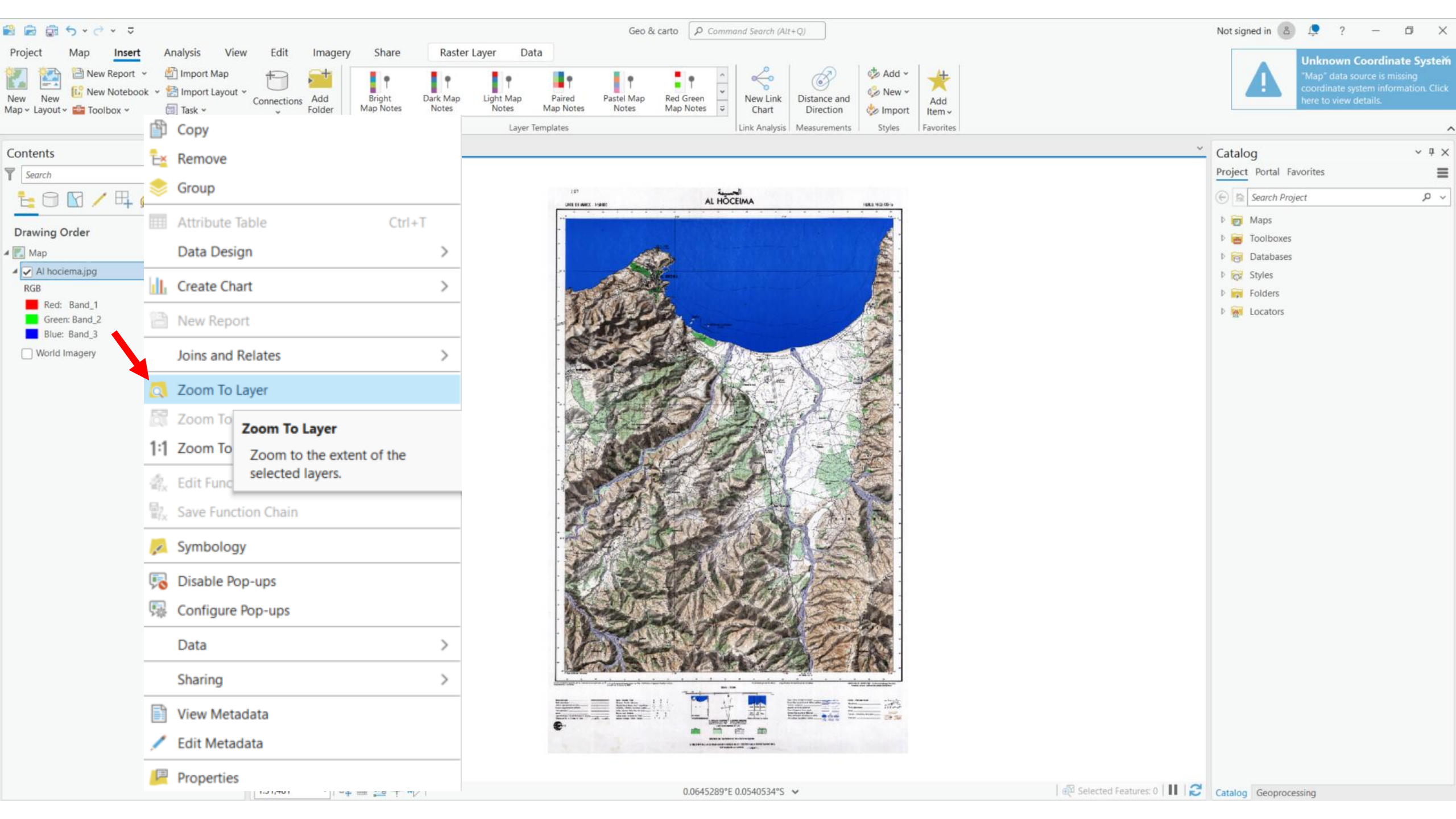
OK Cancel

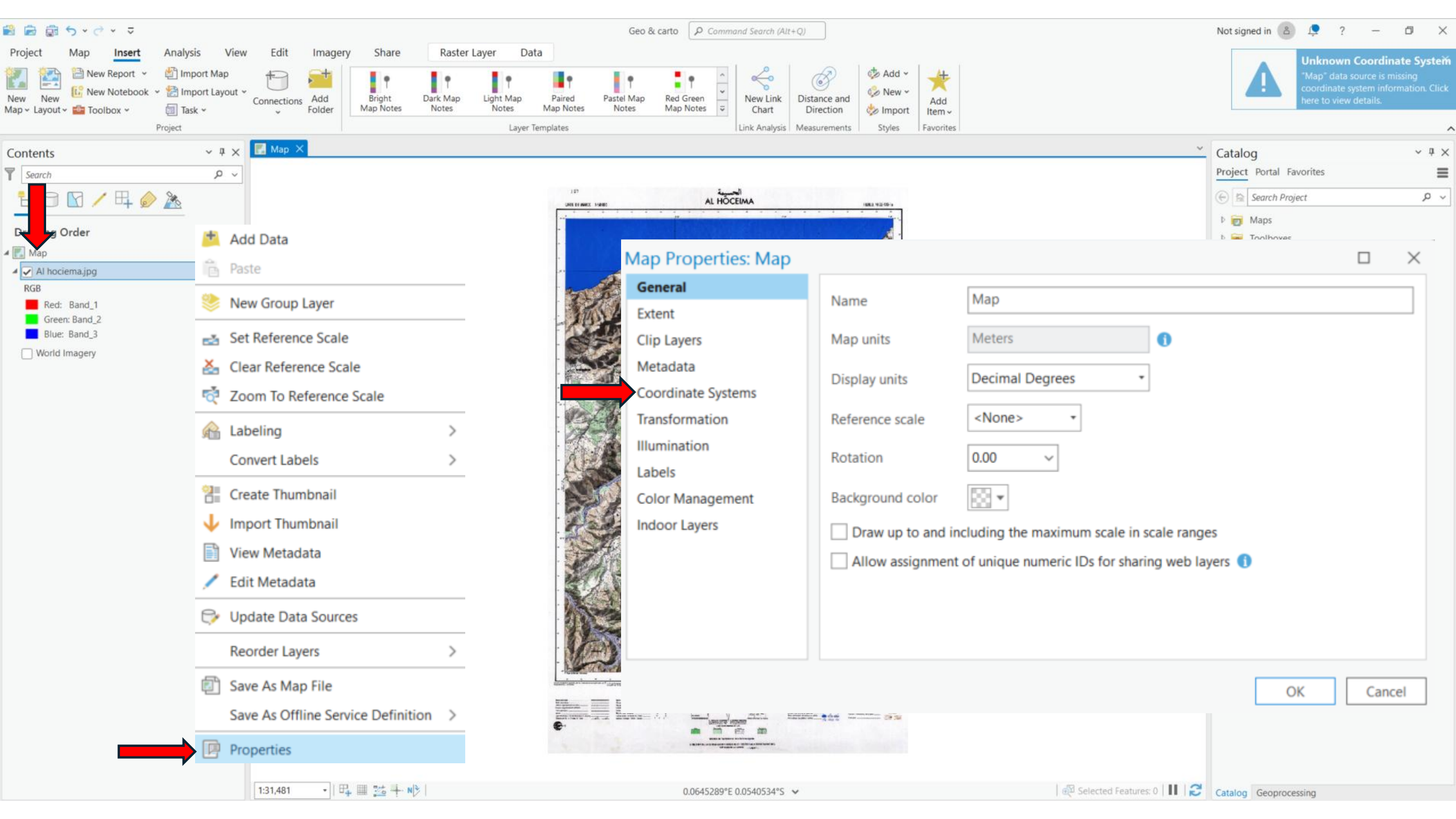


Élément	Description
1	La barre d'outils Quick Access (Accès rapide) comporte des commandes communes. Par exemple, vous pouvez enregistrer le projet ou annuler une action.
2	Le ruban se compose d'une série d'onglets. Chaque onglet, tel que l'onglet Map (Carte) , comporte son propre jeu de commandes.
3	Une vue peut afficher une carte, une mise en page, une table, un diagramme ou un autre élément.
4	La fenêtre Contents (Contenu) montre le contenu de la vue active.
5	La fenêtre Catalog (Catalogue) permet d'accéder aux données et à d'autres éléments utilisés dans le projet.



Géoréférencement d'une carte topographique en coordonnées DMS et métriques





Map Properties: Map

General

Extent

Clip Layers

Metadata

Coordinate Systems

Transformation

Illumination

Labels

Color Management

Indoor Layers

Select the Coordinate System to view the available options.

Current XY

Details

Current Z

Nord Maroc (degrees)

<None>

XY Coordinate Systems
Available

nord maroc



- Projected Coordinate System
- National Grids
- Africa



Nord Maroc

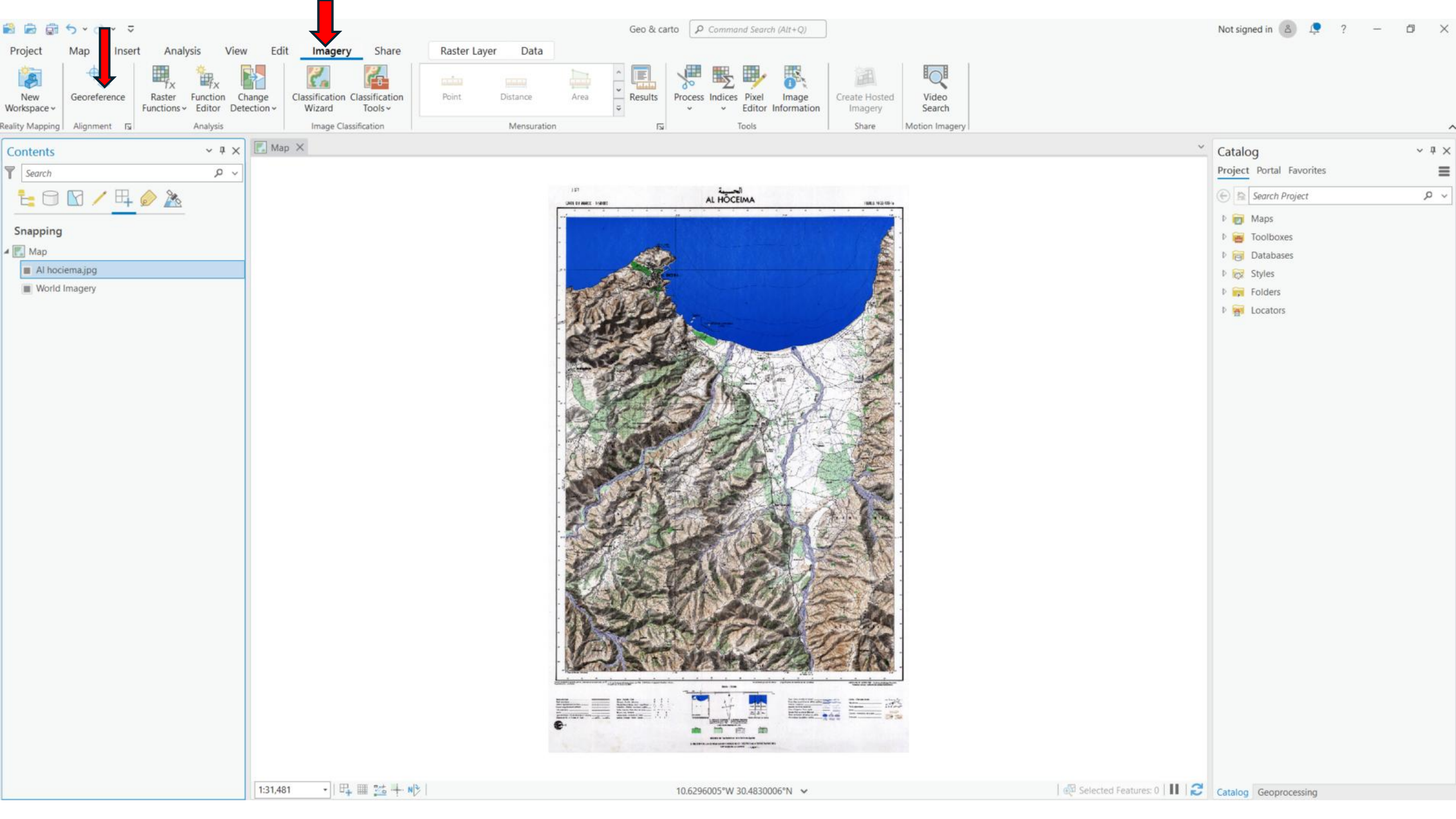


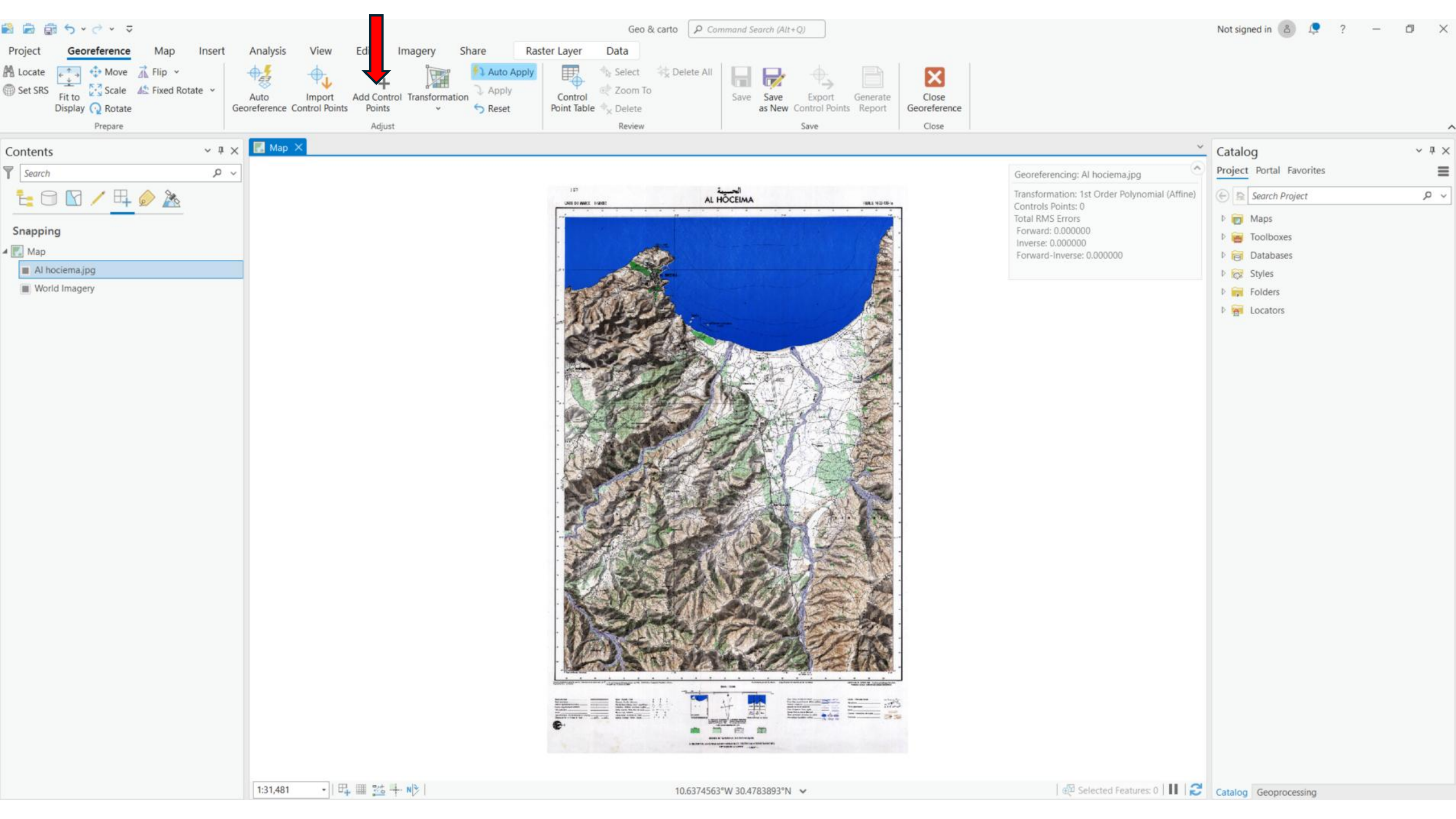
Nord Maroc (degrees)

☐ Enable wrapping around the date line

OK

Cancel





Project

Georeference

Map

Insert

Analysis

View

Edit

Imagery

Share

Raster Layer

Data

Locate

Set SRS

Fit to Display

Move

Scale

Rotate

Flip

Fixed Rotate

Auto Georeference

Import Control Points

Add Control Points

Transformation

Auto Apply

Apply

Reset

Control Point Table

Select

Zoom To

Delete

Delete All

Save

Save as New

Export Control Points

Generate Report

Close Georeference

Geo & carto

Command Search (Alt+Q)

Not signed in

Contents

Search

Map

AI hociema.jpg

World Imagery

Snapping

Map

Georeferencing: AI hociema.jpg

Transformation: 1st Order Polynomial (Affine)

Controls Points: 0

Total RMS Errors

Forward: 0.000000

Inverse: 0.000000

Forward-Inverse: 0.000000

Target Coordinates

Longitude : 10 degree 36 minute 16.91 second W

Latitude : 30 degree 28 minute 17.80 second N

Show Coordinates in DMS

OK

Cancel

Catalog

Project Portal Favorites

Search Project

Maps

Toolboxes

Databases

Styles

Folders

Locators

Contents

Search

Snapping

Map

- AI hociema.jpg
- World Imagery

Map X

Export Control Points

← → ↶ ↷ ↻ Bureau TP rcgis pro Search

Organize New Item

Name	Type	Date M
Geo & carto	Folder	8/26/20

Name point controle Text Files (TXT)

Save Cancel

1:201,431 3.8166917°W 35.1350461°N Selected Features: 0 Catalog Geoprocessing

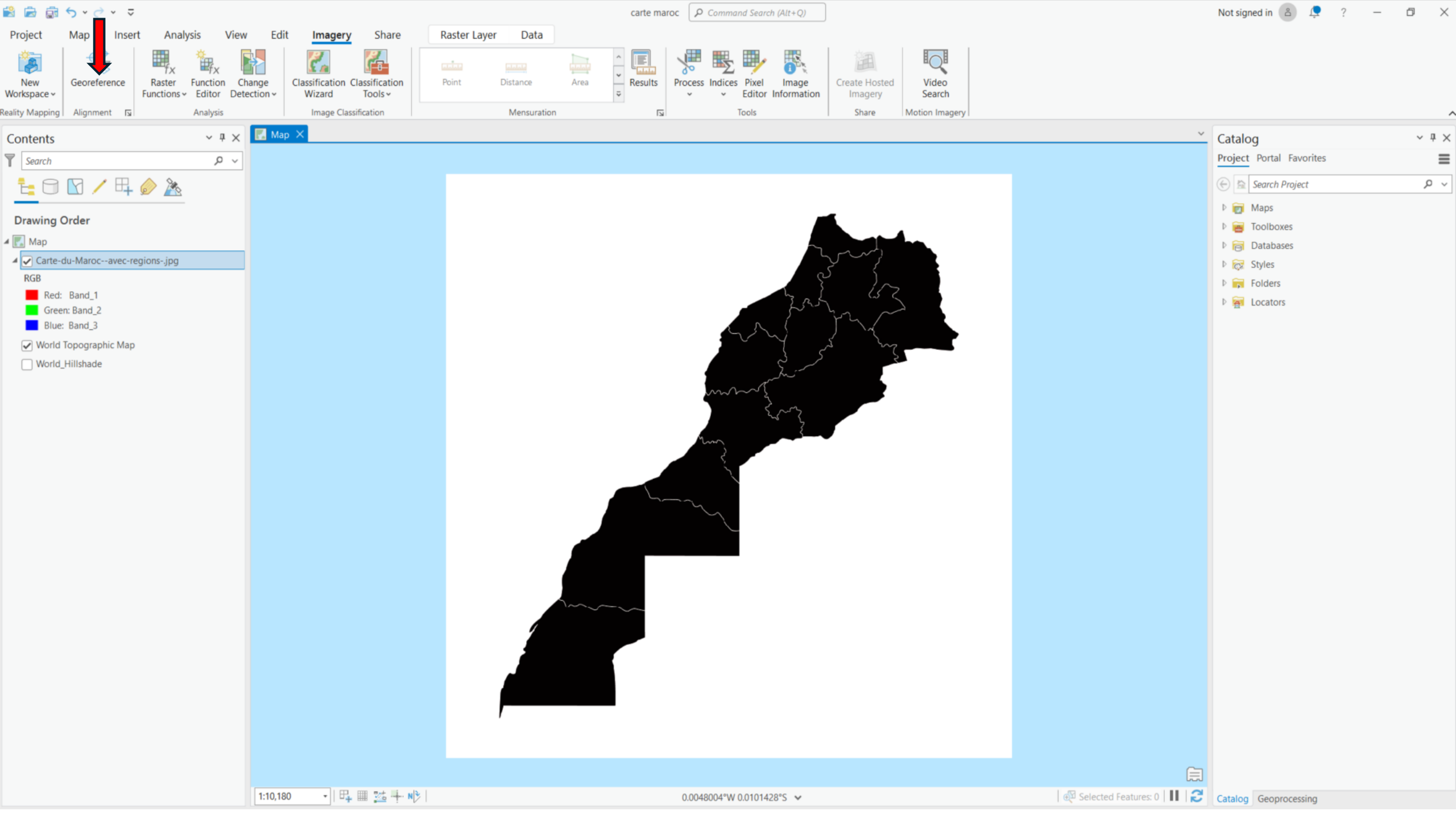
Catalog

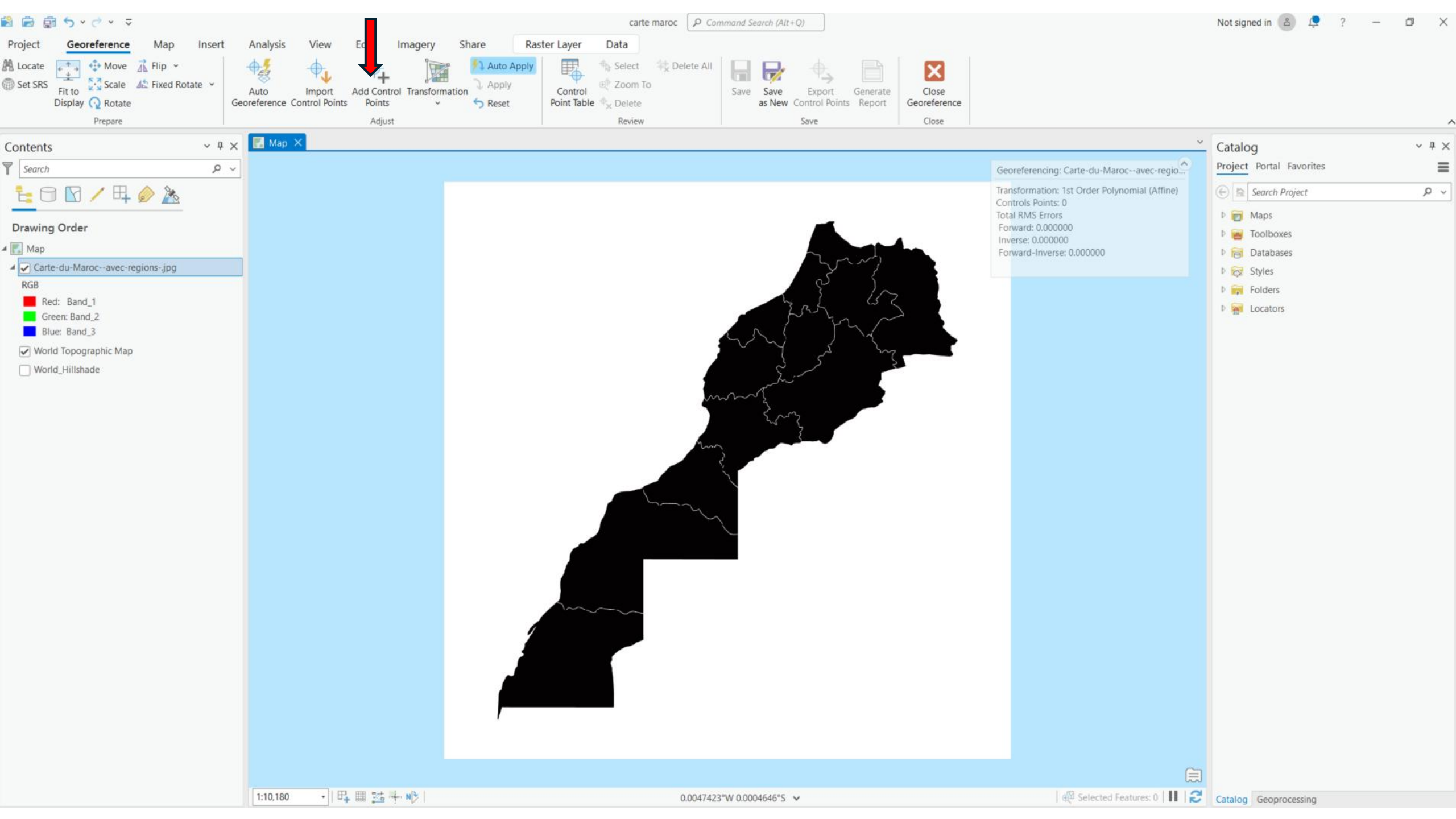
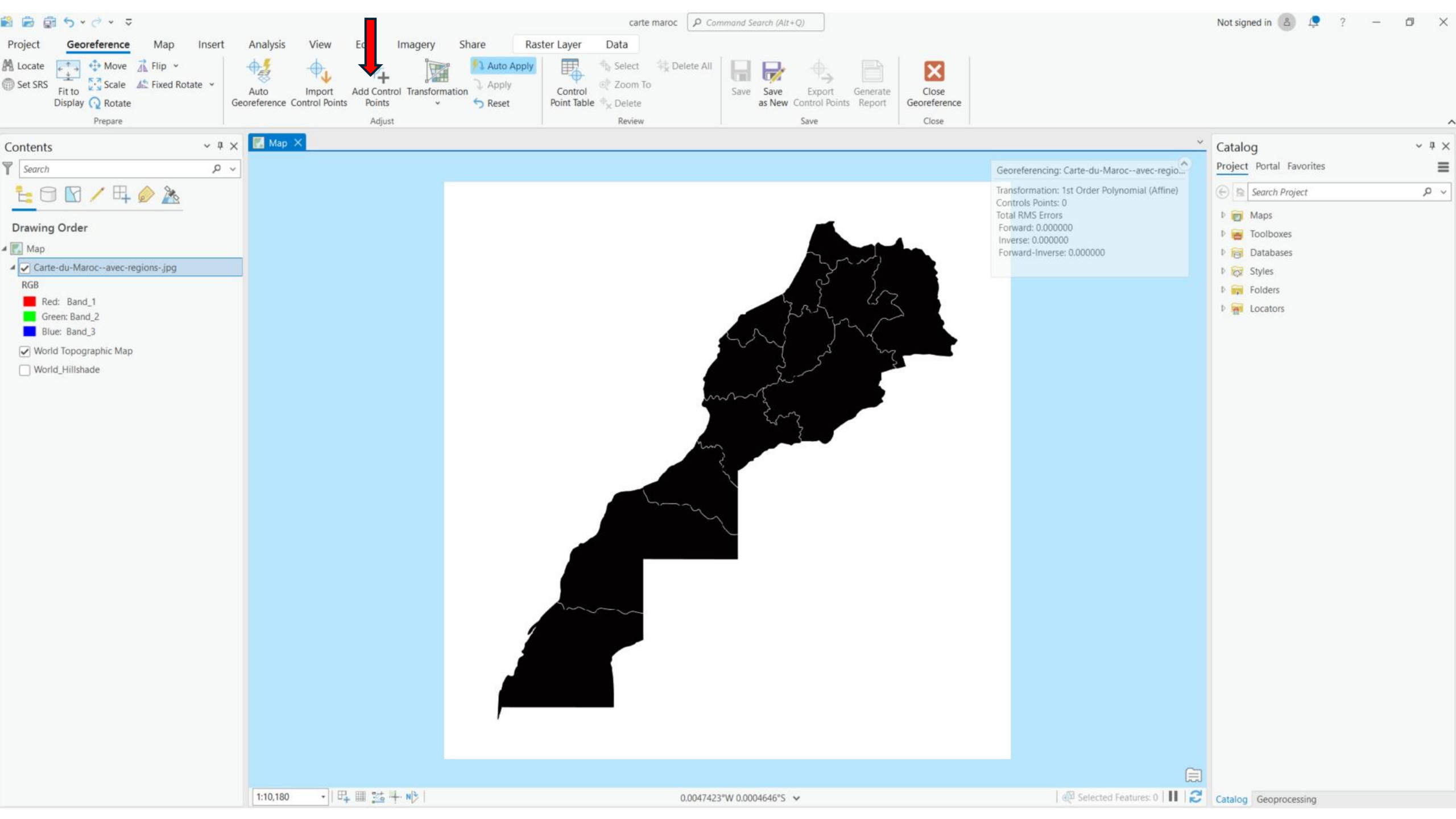
Project Portal Favorites

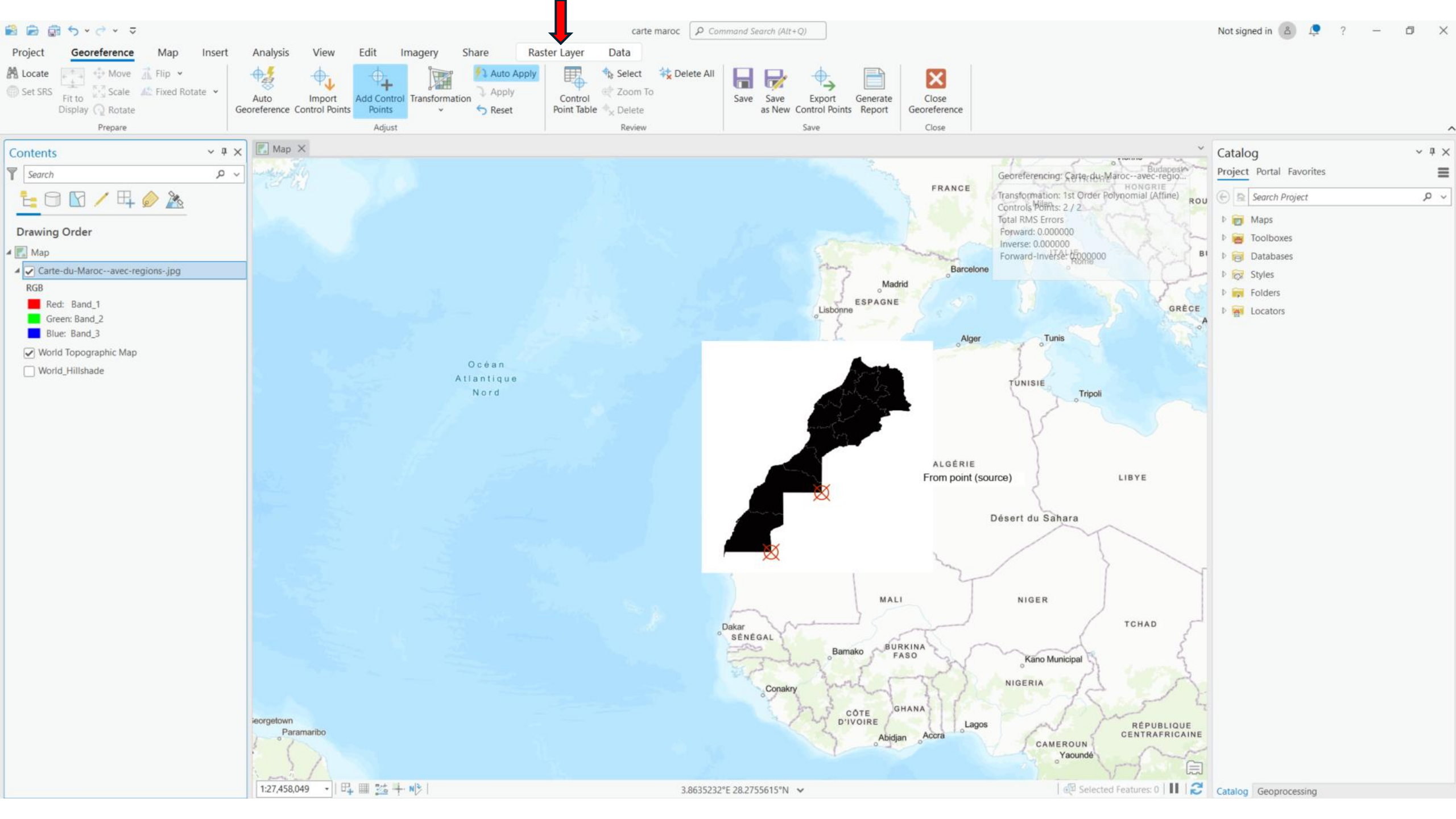
Search Project

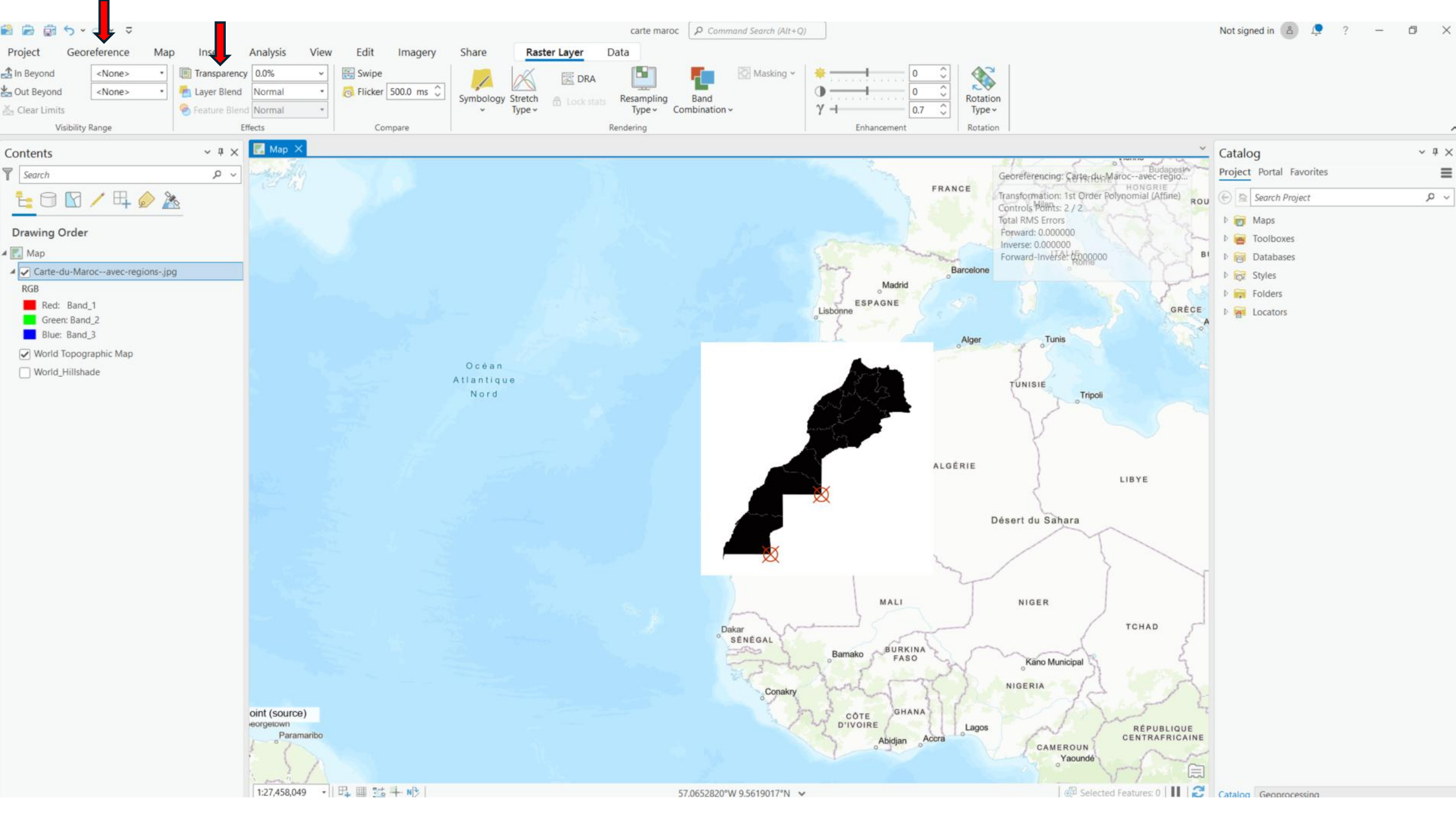
- Maps
- Toolboxes
- Databases
- Styles
- Folders
- Locators

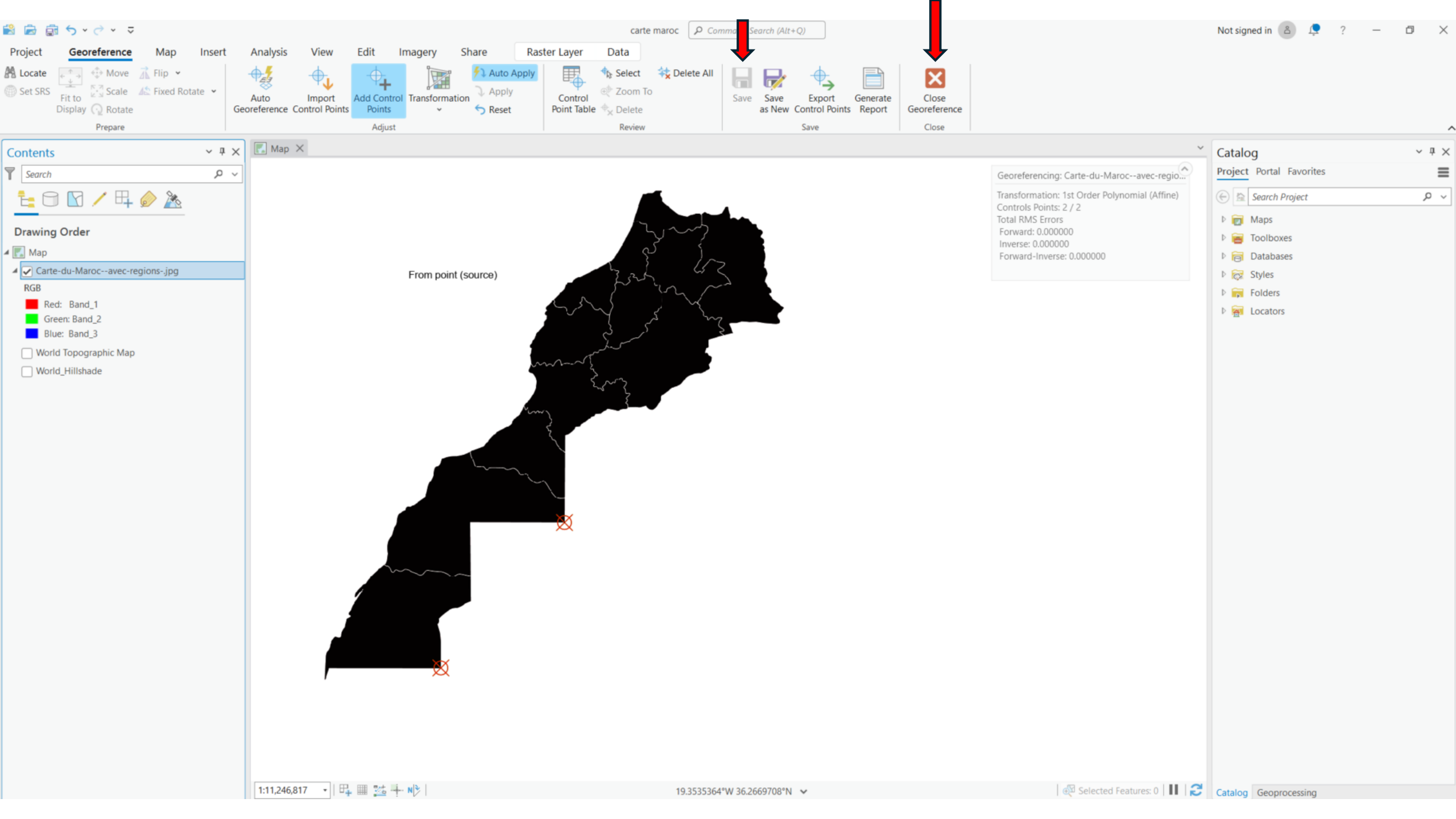
Géoréférencement d'une carte sans coordonnées

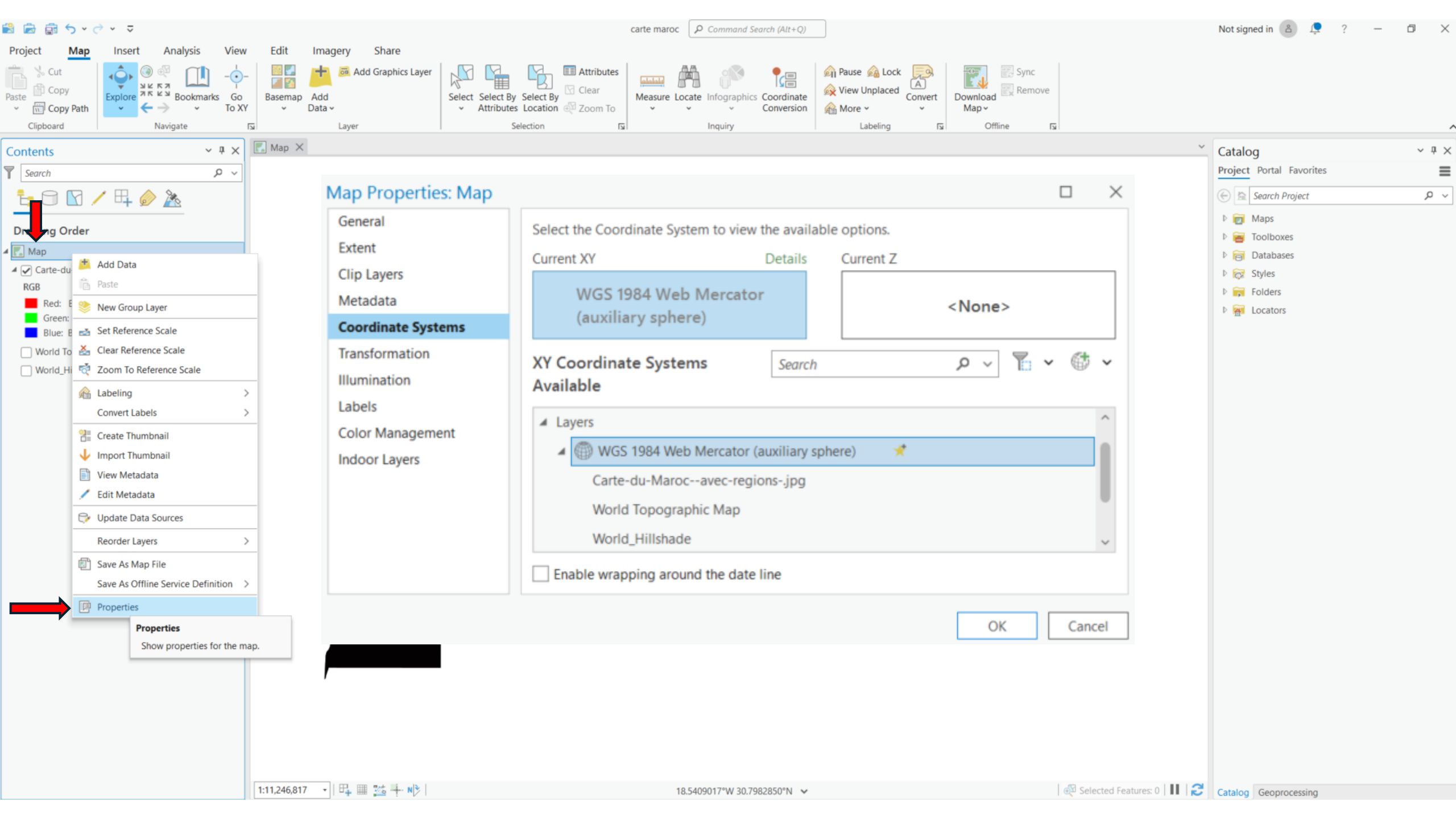


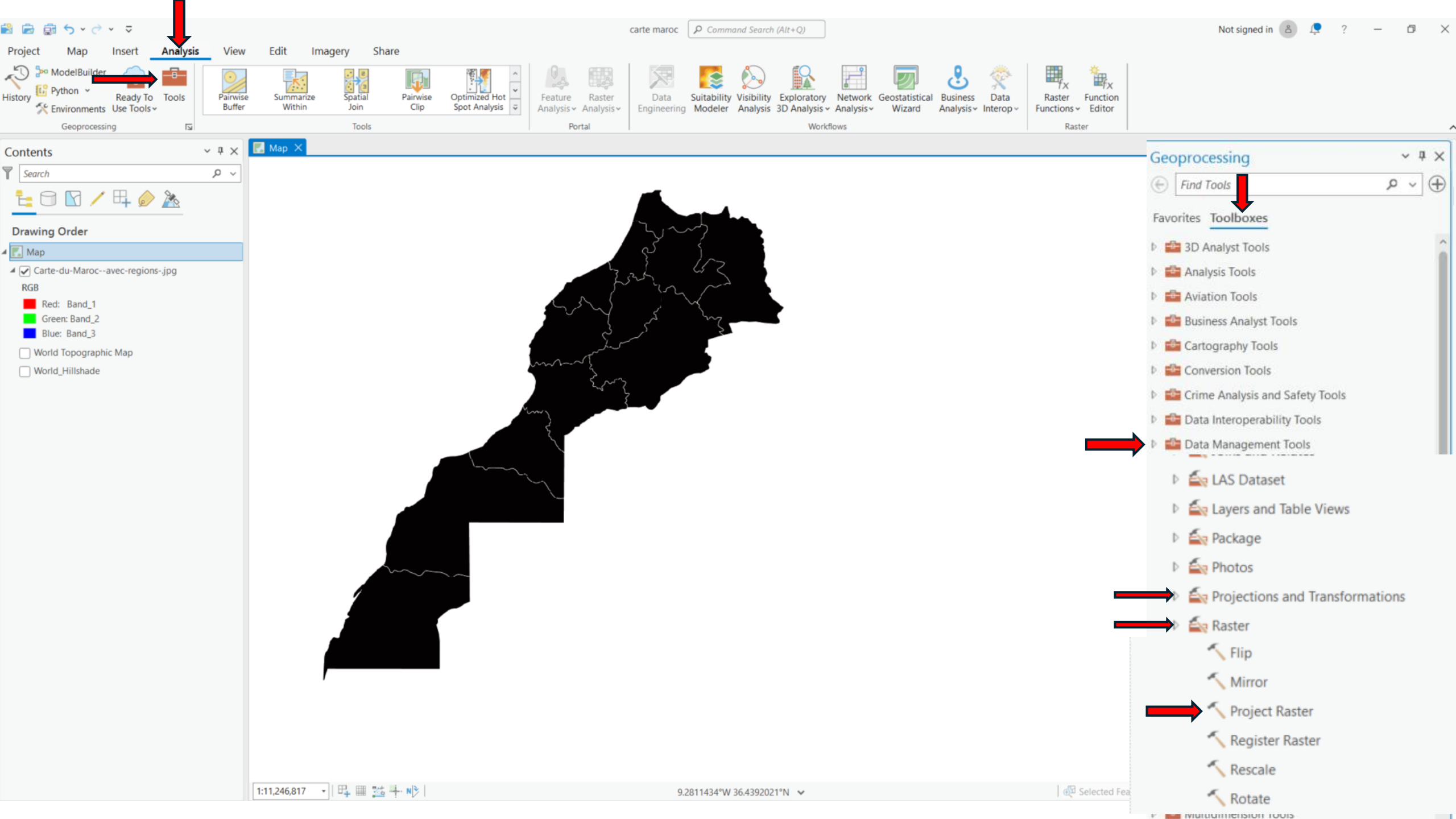


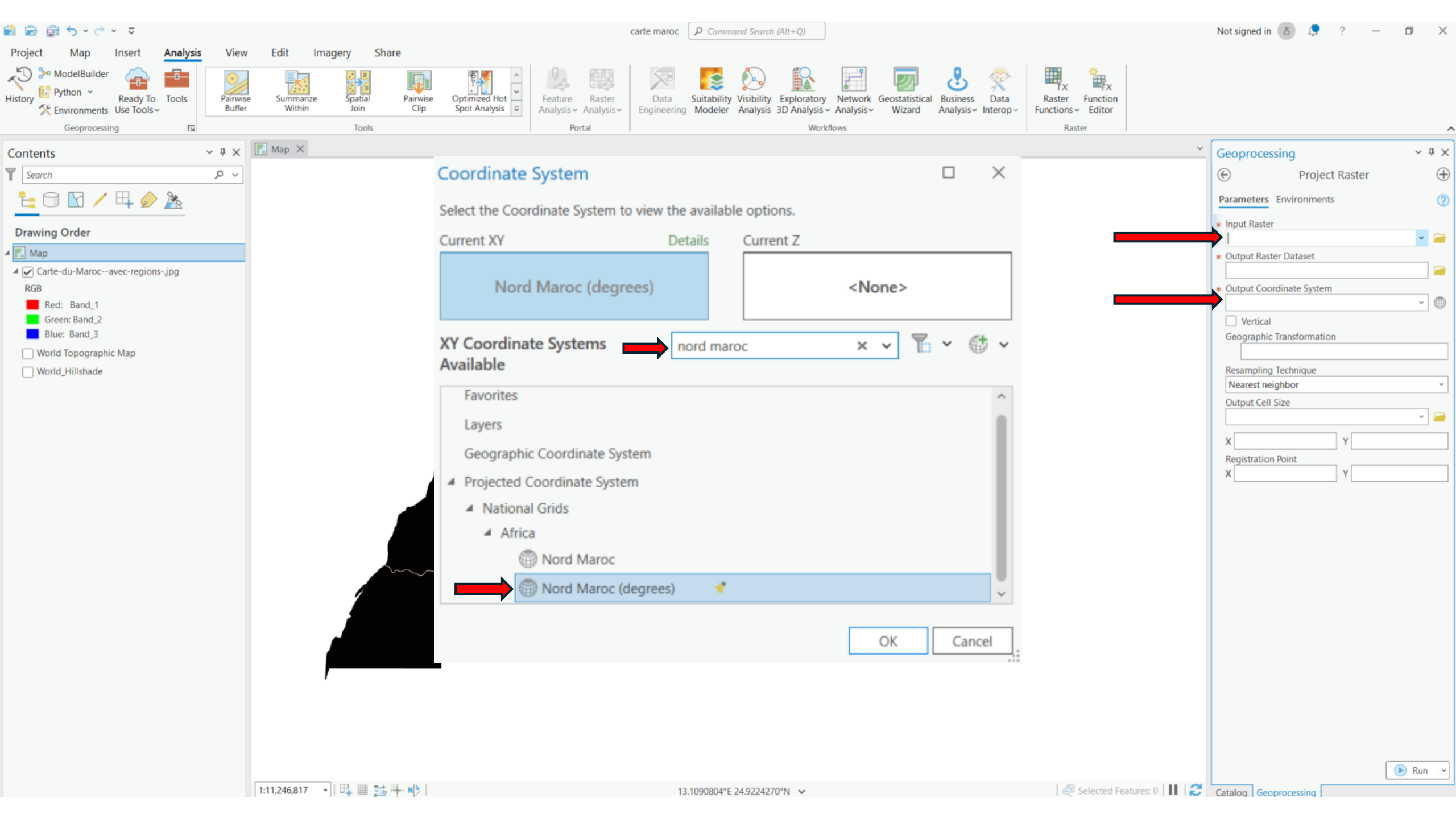


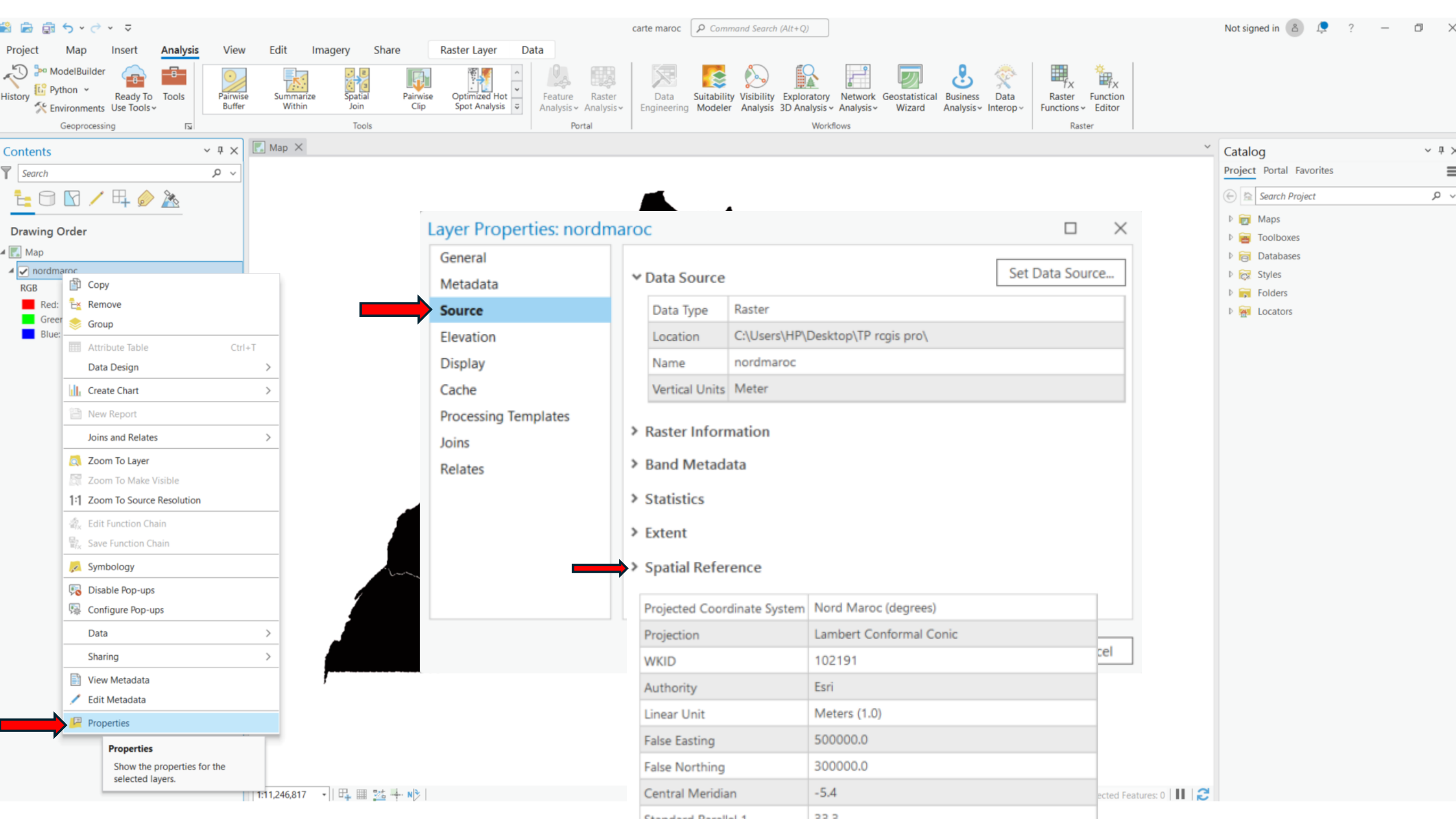




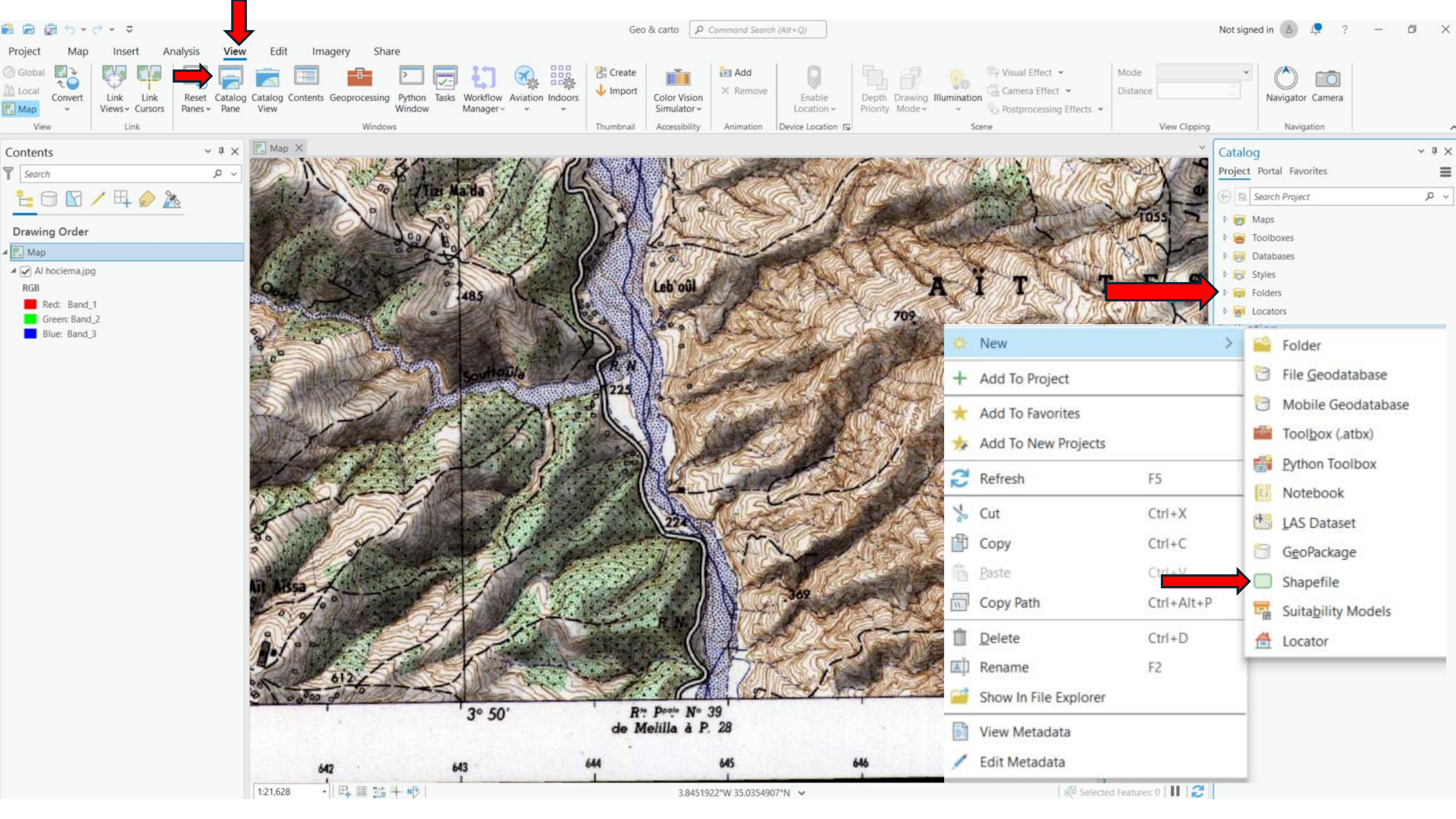








La digitalisation = La cartographie



Geoprocessing

Create Feature Class

Parameters Environments

Feature Class Location
digitalisation

Feature Class Name
Route

Geometry Type
Polyline

Template Dataset

Has M
No

Has Z
No

Coordinate System
Nord_Maroc_Degree

Feature Class Alias

Geodatabase Settings (optional)

Run

Create Feature Class completed.
View Details Open History

Project Map Insert Analysis View

Global Local Map Convert Link Views Cursors Reset Panes Catalog Pane

Contents

Search

Drawing Order

- ☒ Route
- ☒ Al hociema.jpg
 - RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3
 - ☐ World Imagery

Symbology

Format Line Symbol

Gallery Properties

Type here to search

Symbols found: 138

ArcGIS 2D

Highway	Major Road	Minor Road	Ramp
Railroad	Boundary	Water (line)	Intermittent Water (line)
Ferry	Limited Access	Highway	Major Road
Minor Road	Ramp	Toll Road	Railroad
Boundary	Water (line)	Intermittent Water (line)	Limited Access
Highway	Major Road	Minor Road	Limited Access

Route

No color

ArcGIS Colors

Eyedropper

Color Properties...

Map

☒ RGB

Copy

Remove

Group

Attribute Table Ctrl+T

Data Engineering Ctrl+Shift+D

Add Error Layers

Data Design >

Create Chart >

New Report

Joins and Relates >

Zoom To Layer

Zoom To Make Visible

Selection >

Label

Labeling Properties...

Convert Labels >

Symbology

Disable Pop-ups

Configure Pop-ups

Data >

Sharing >

View Metadata

Edit Metadata

Properties

Contents

Search

Drawing Order

Map

☒ Route

☒ Al hociema.jpg

RGB

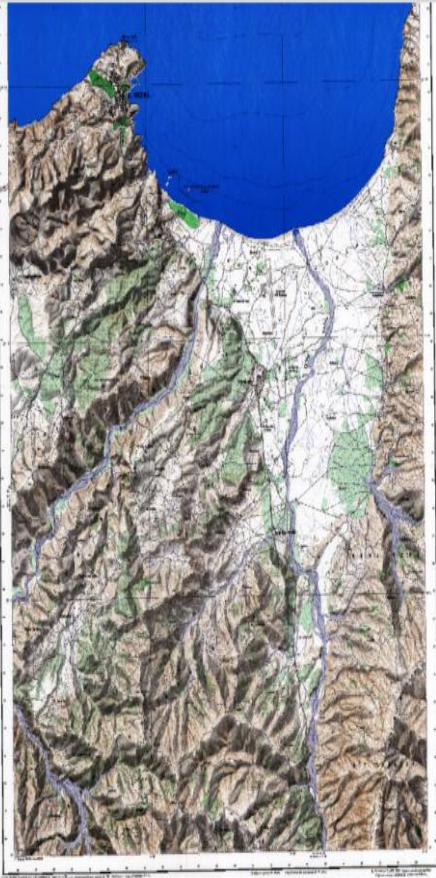
Red: Band_1

Green: Band_2

Blue: Band_3

☐ World Imagery

Map X



1:201,431

4.1797944°W 35.0948586°N

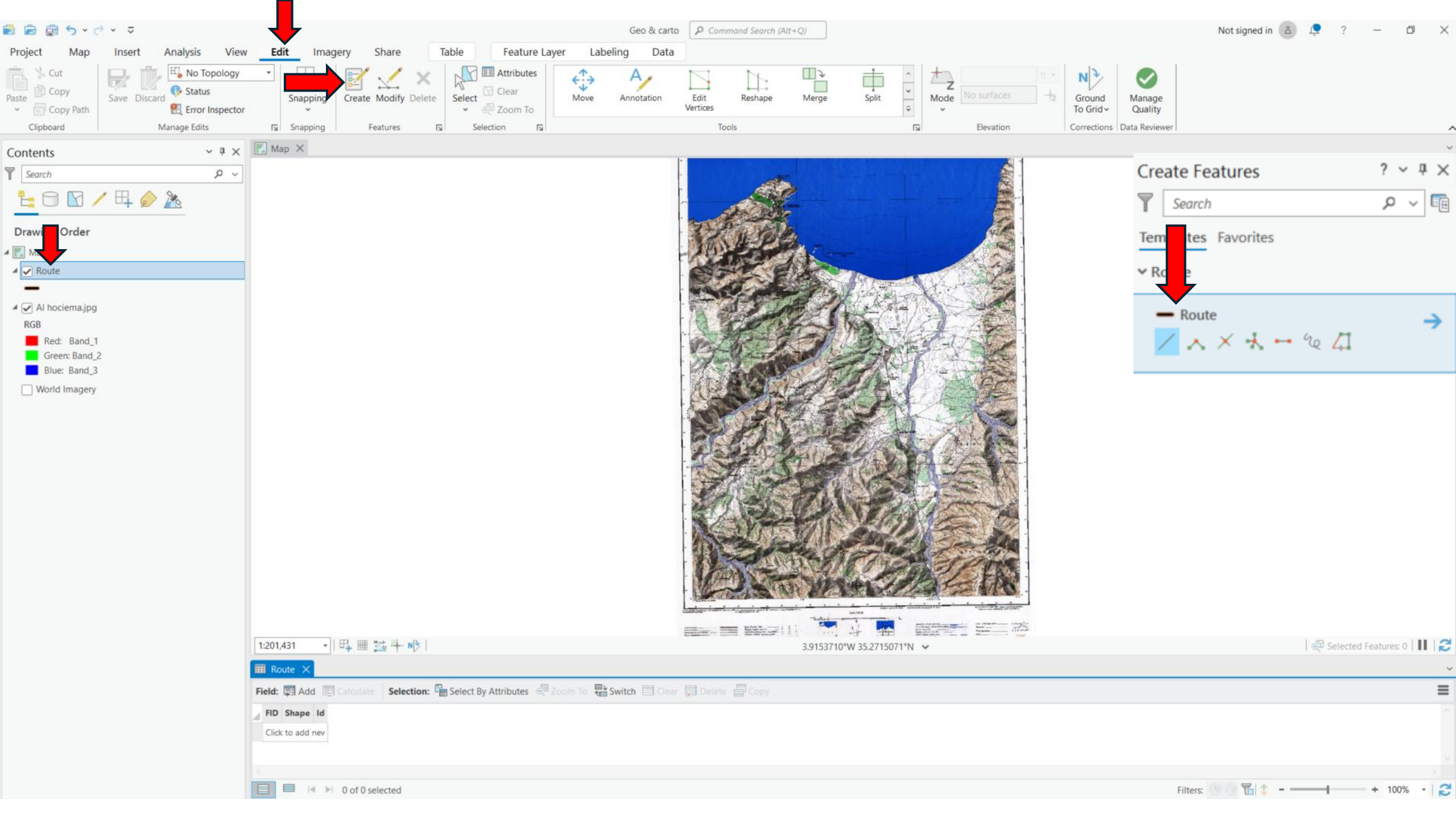
Selected Features: 0

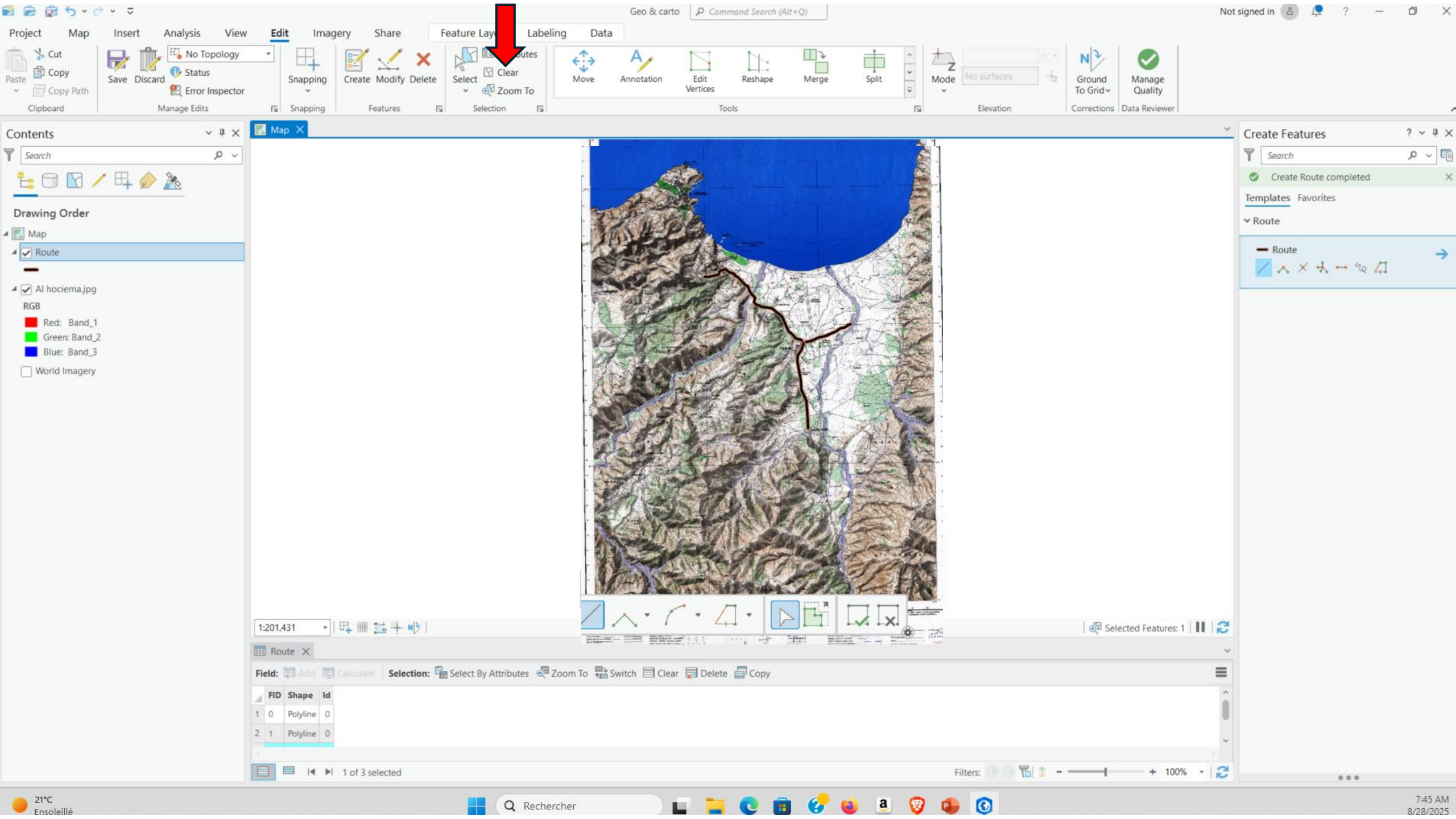
Route X

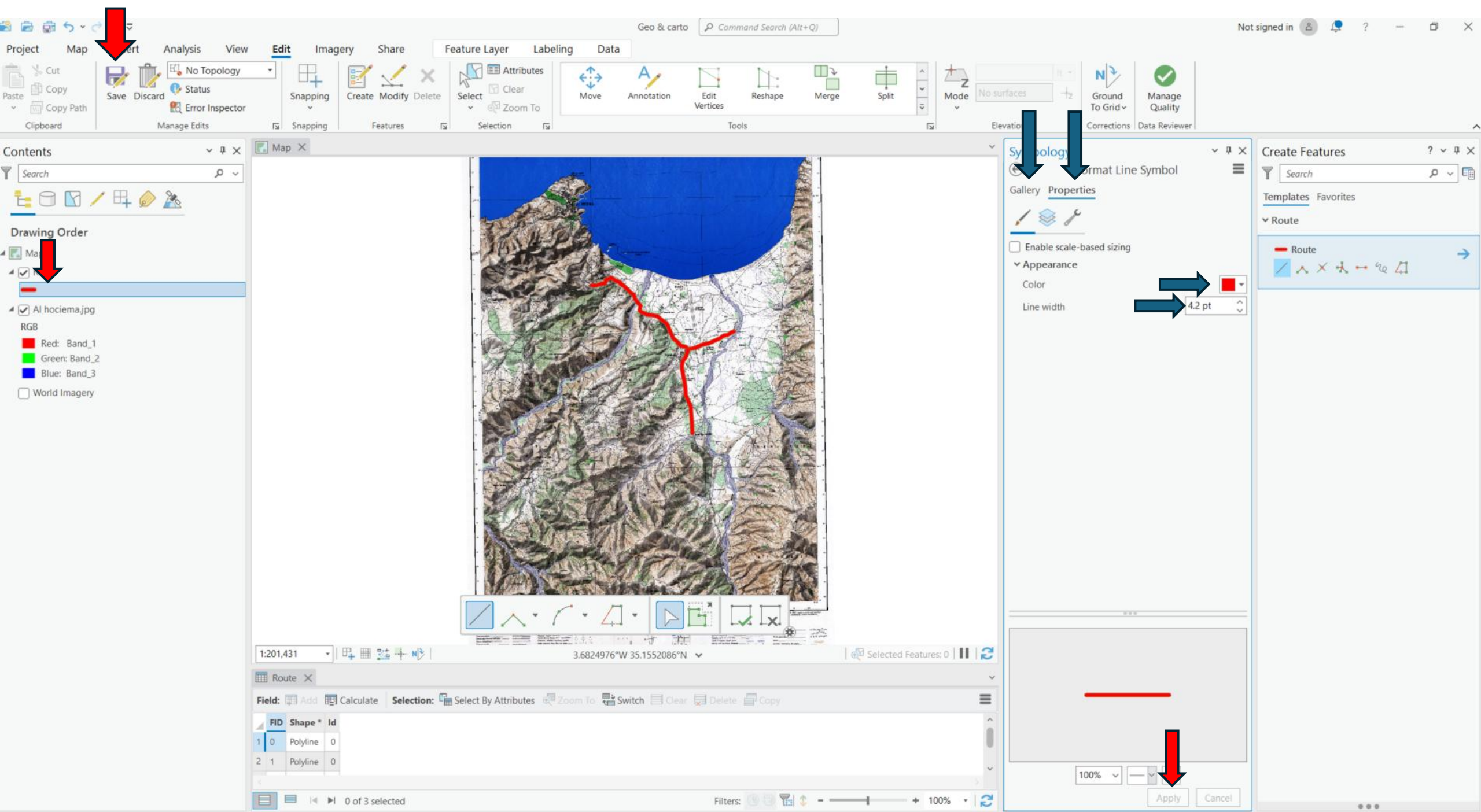
Field: Add Calculate Selection: Select By Attributes To Switch Clear Delete Copy

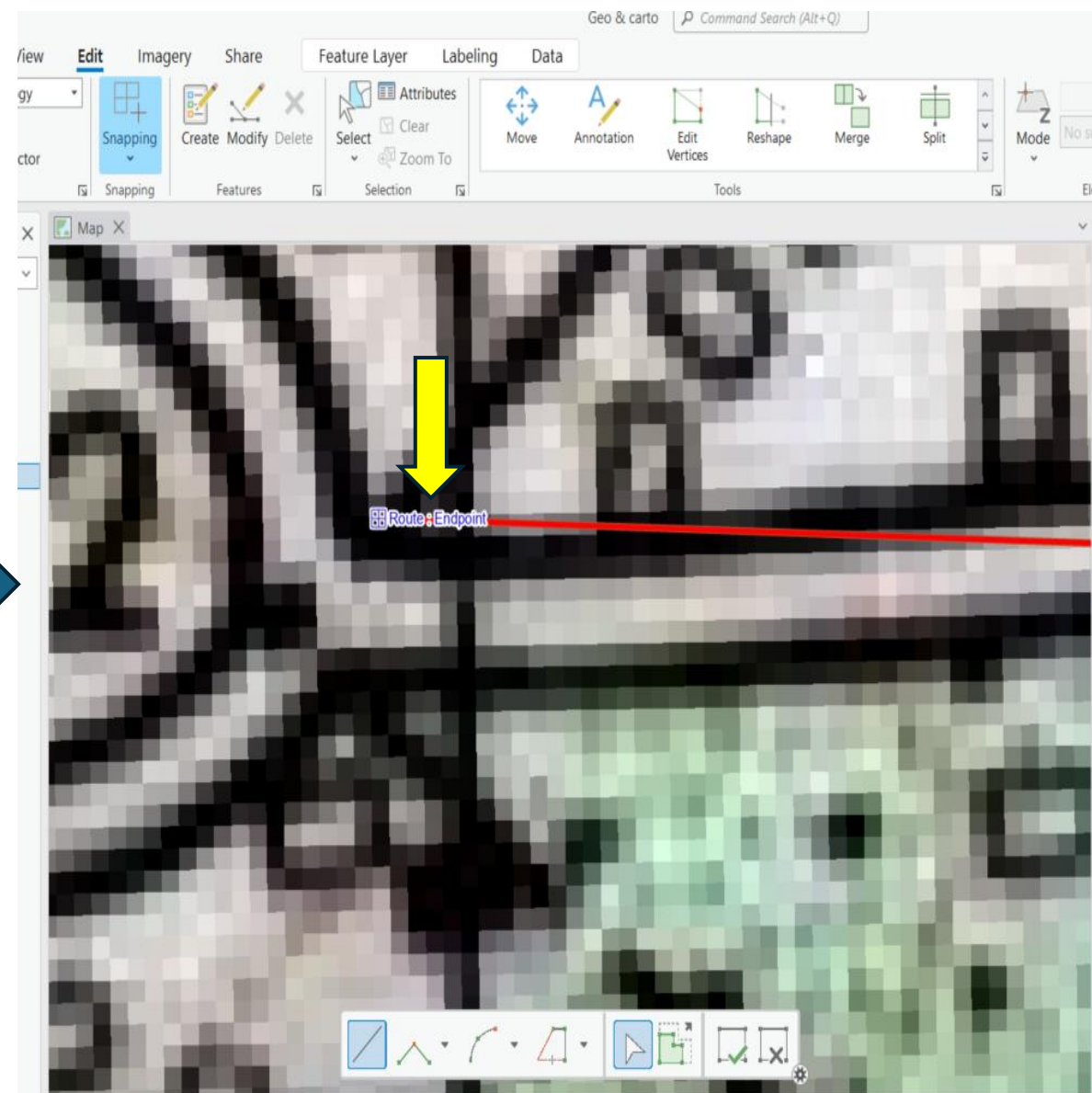
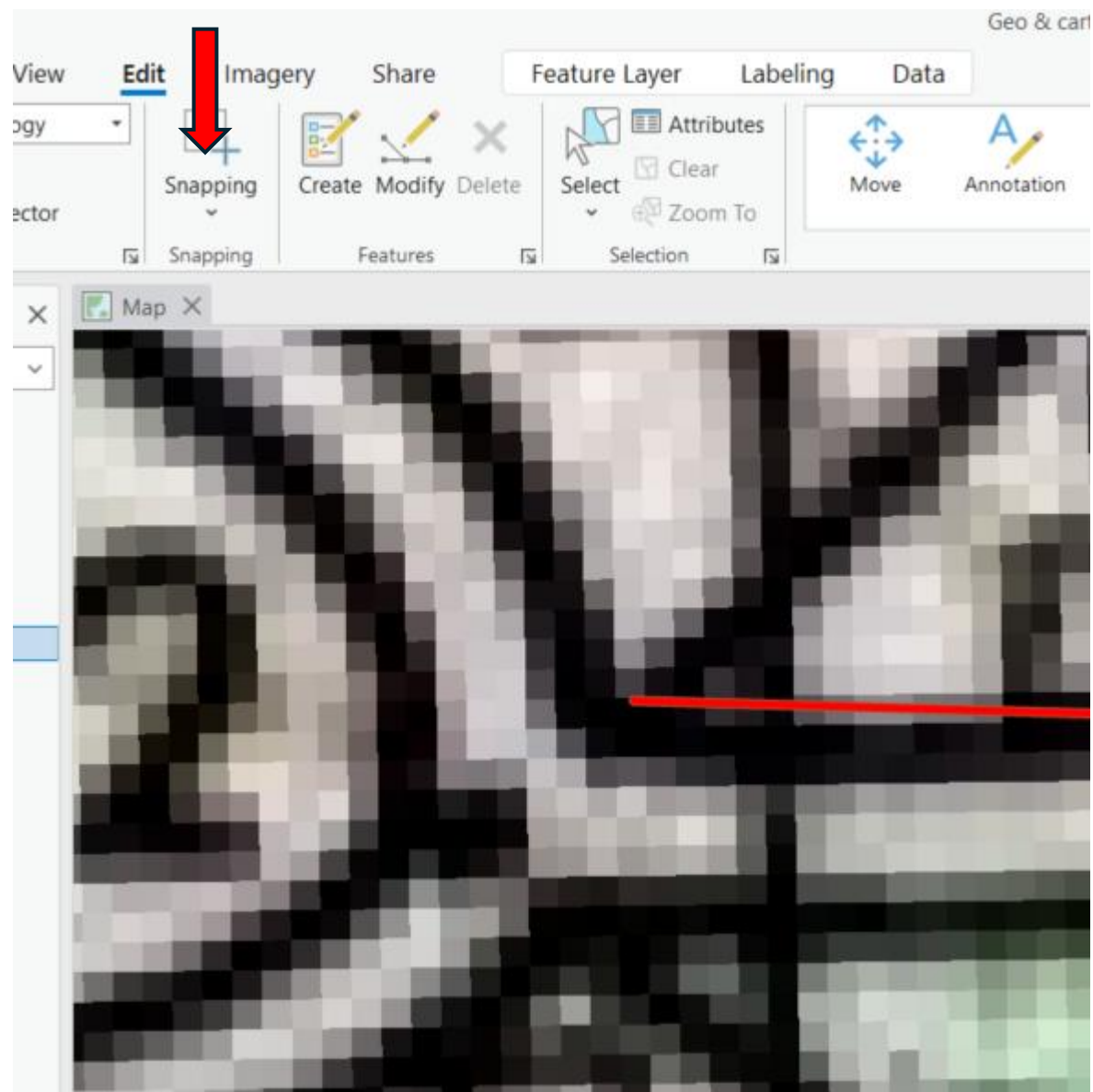
FID Shape Id

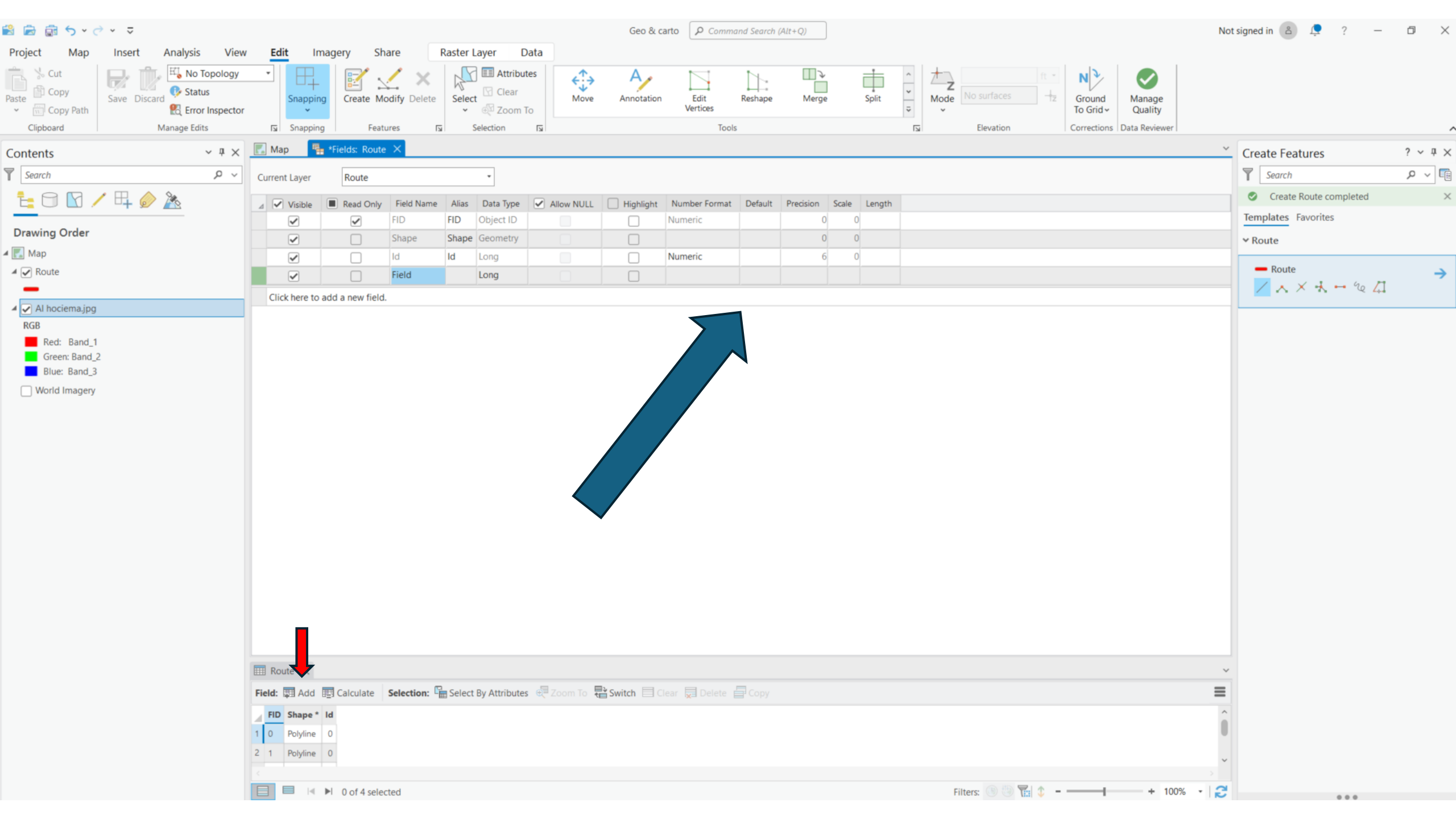
Click to add new











1:262,322 | 4.2495224°W 35.0722420°N | Selected Features: 0

Route *Fields: Route X

Current Layer: Route

Visible	Read Only	Field Name	Alias	Data Type	Allow NULL	Highlight	Number Format	Default	Precision	Scale	Length
☒	☐	Id	Id	Long	☐	☐	Numeric		6	0	
☒	☐	Nom		Text	☐	☐					255

Short

Long

Float

Double

Date

Text

Short

- C'est un type de nombre entier (integer) court.

Long

- C'est aussi un nombre entier, mais plus grand que le type Short.

Float

- Représente un nombre à virgule flottante simple précision (décimale).

Double

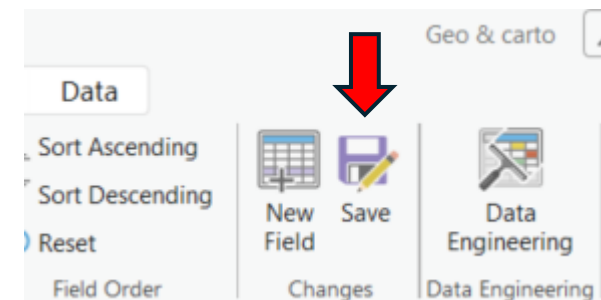
- Représente un nombre à virgule flottante double précision.

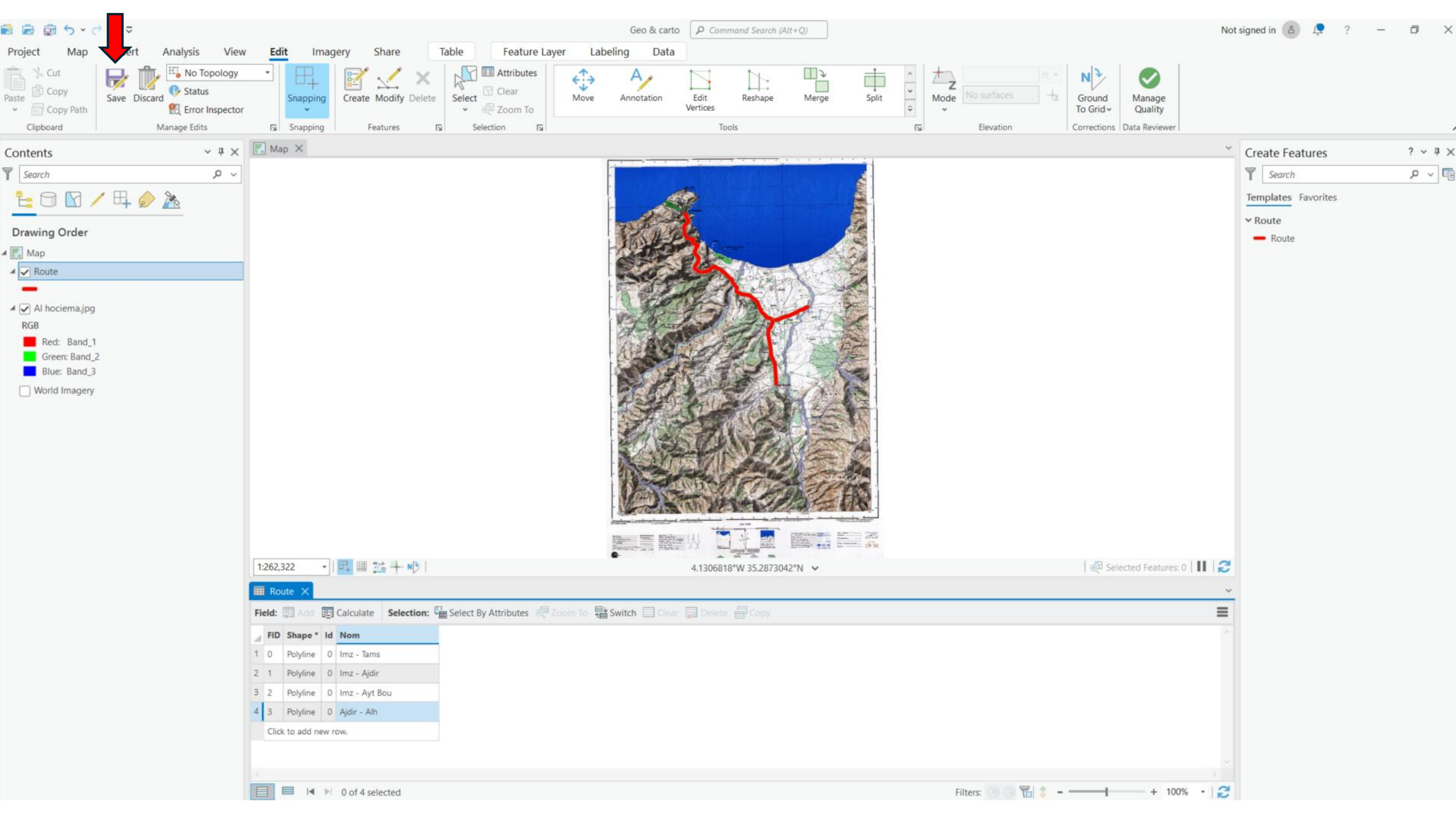
Date

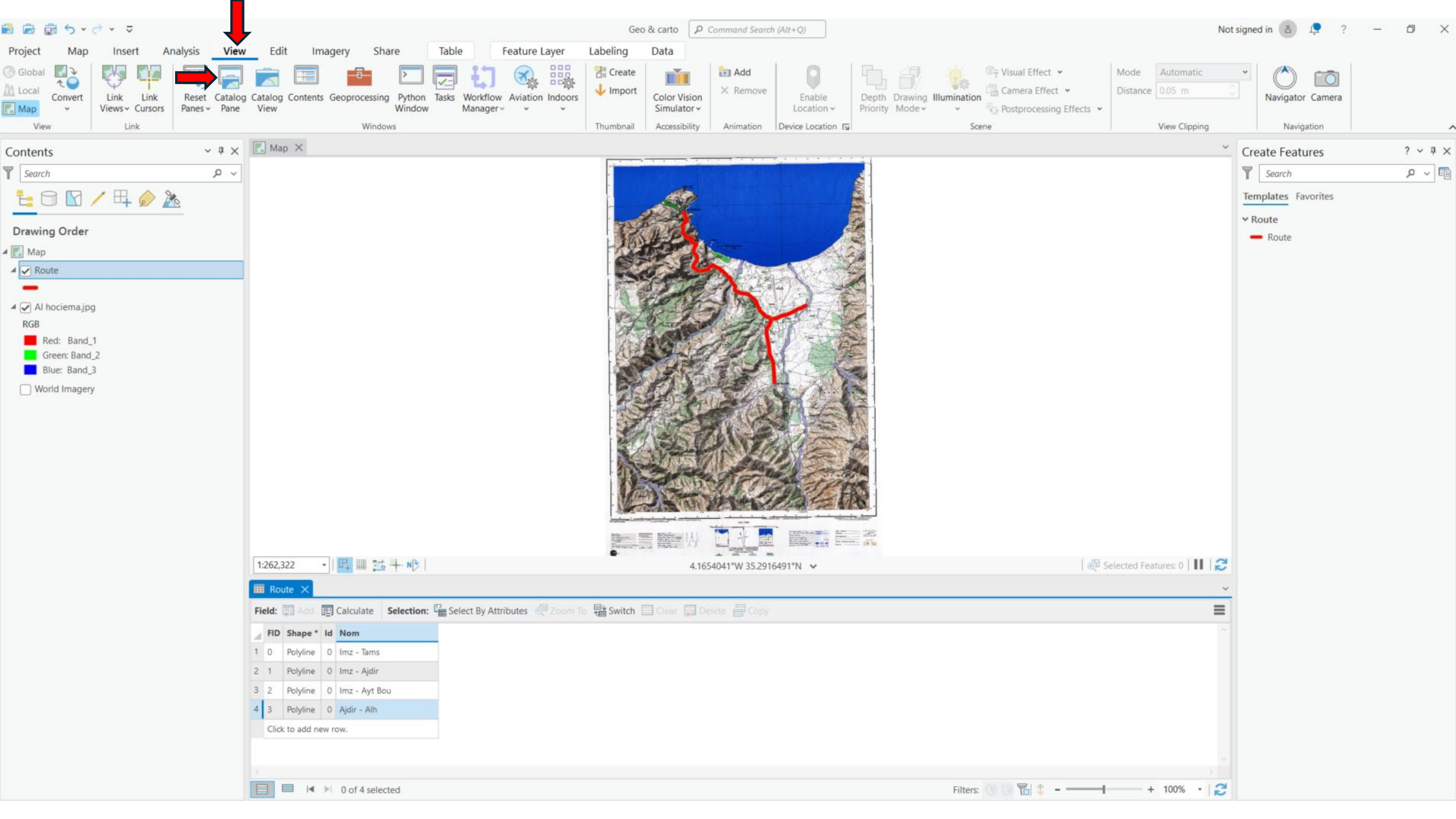
- Utilisé pour stocker une date (et parfois l'heure).

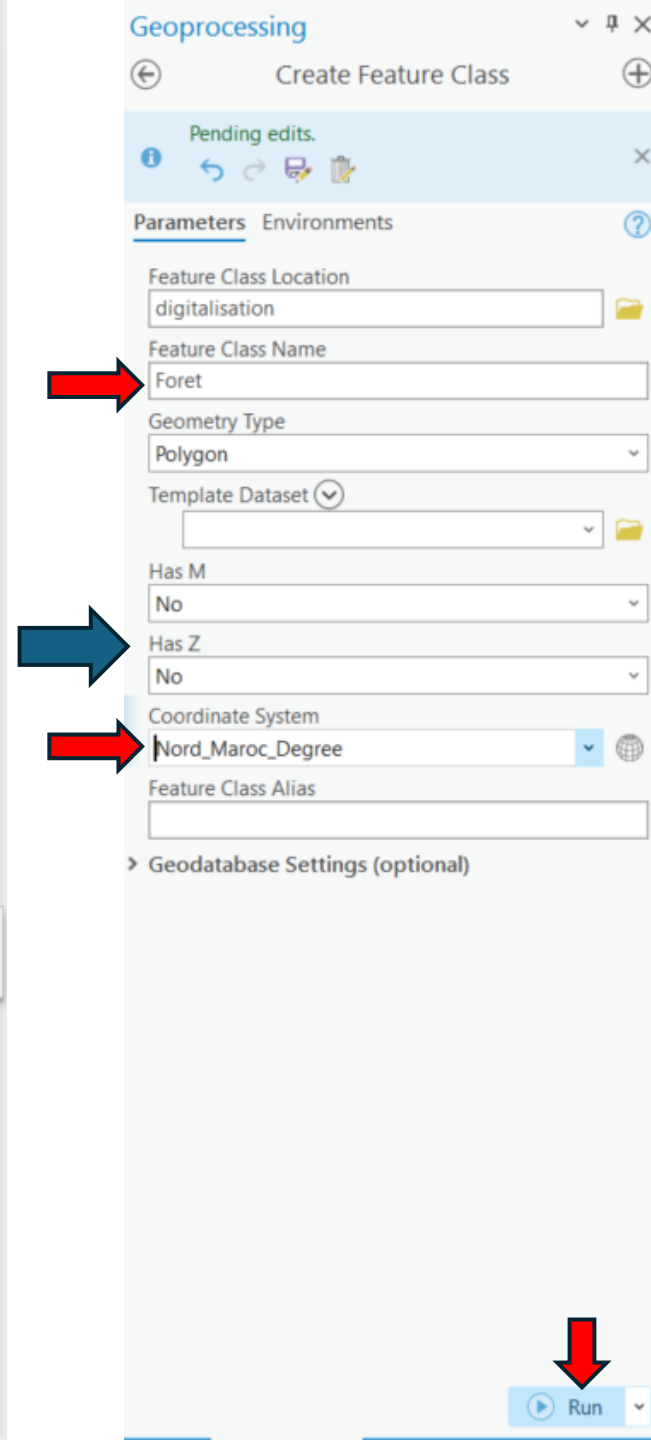
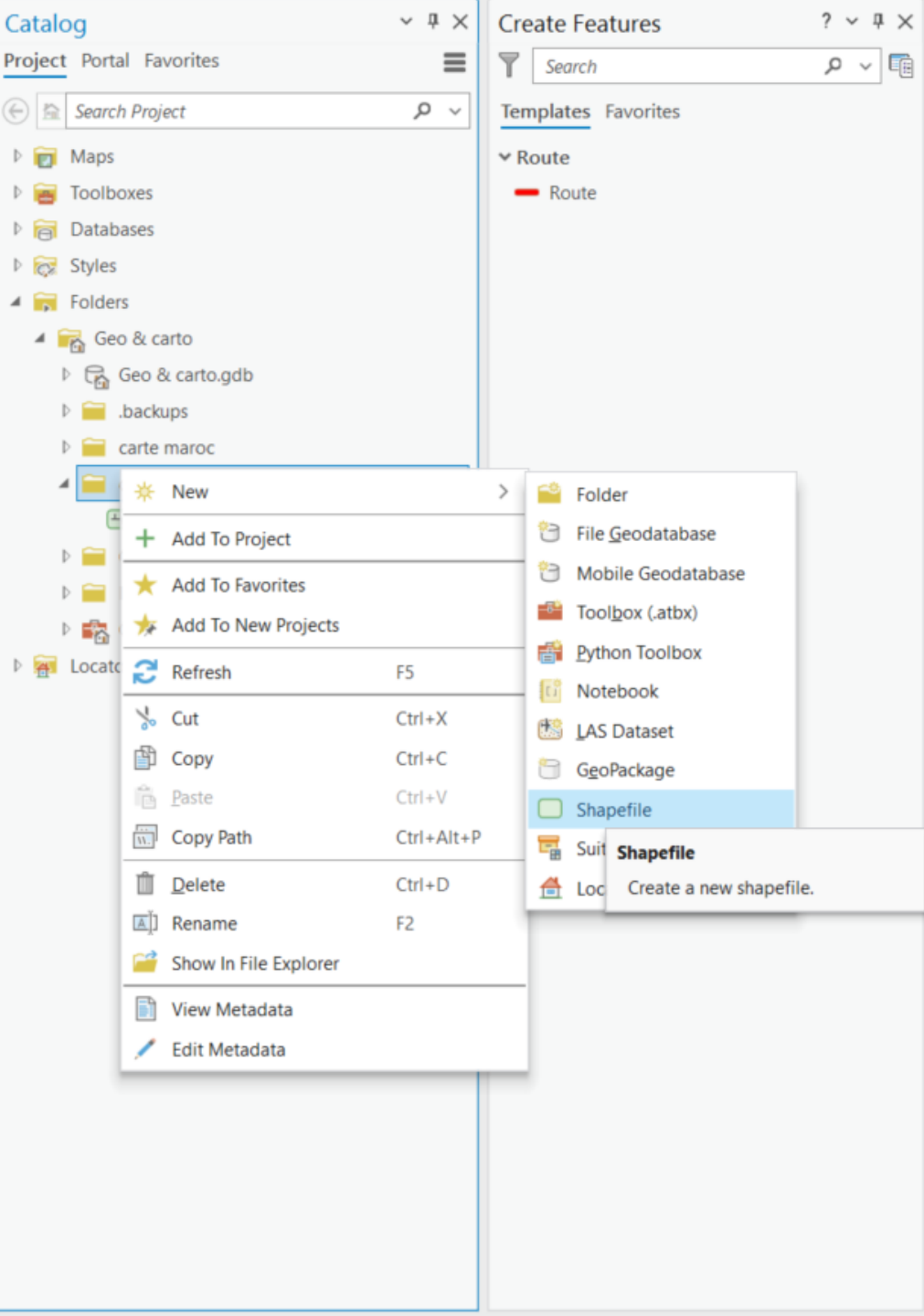
Text

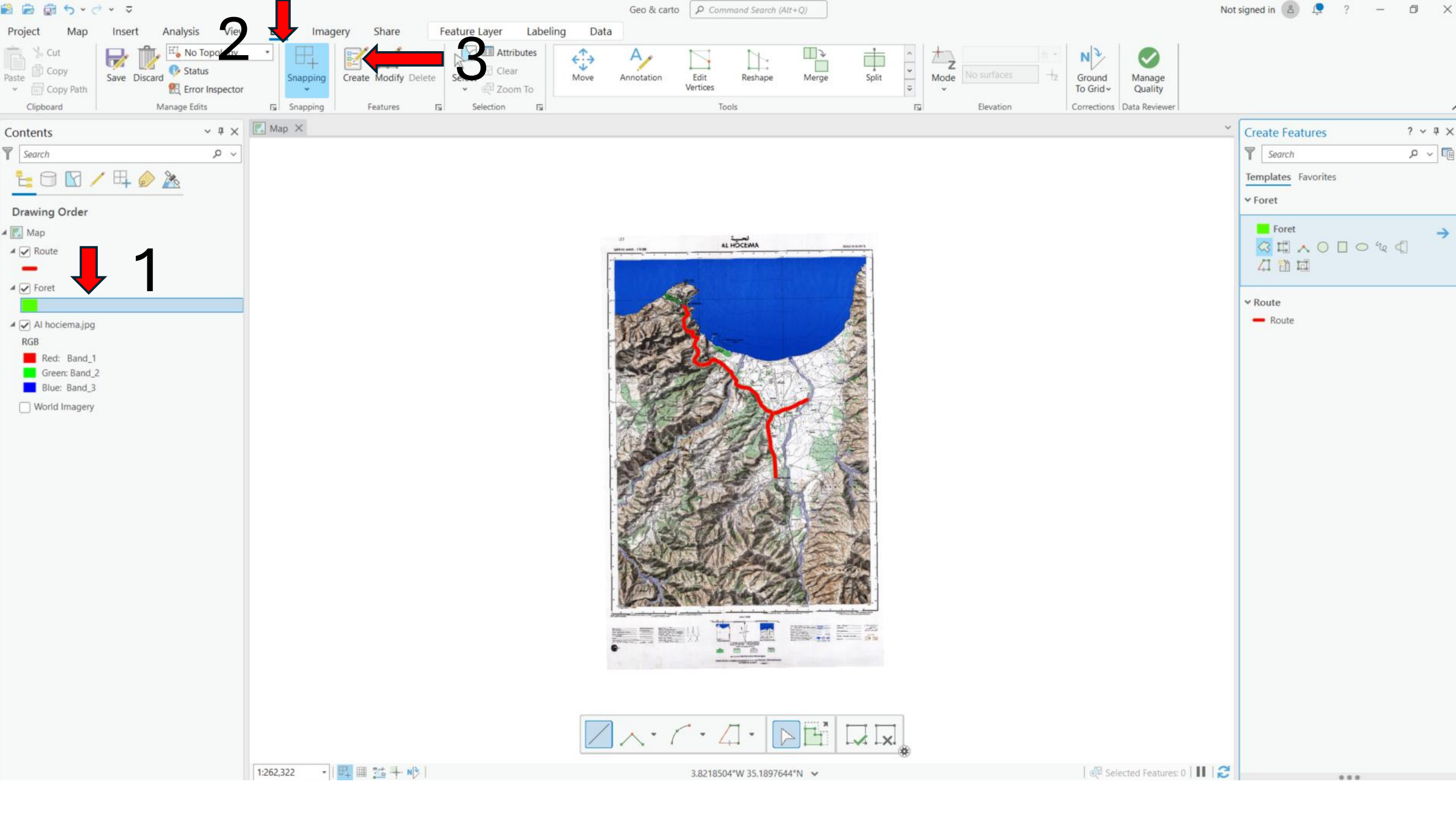
- Utilisé pour représenter du texte ou des chaînes de caractères (lettres, mots, phrases).

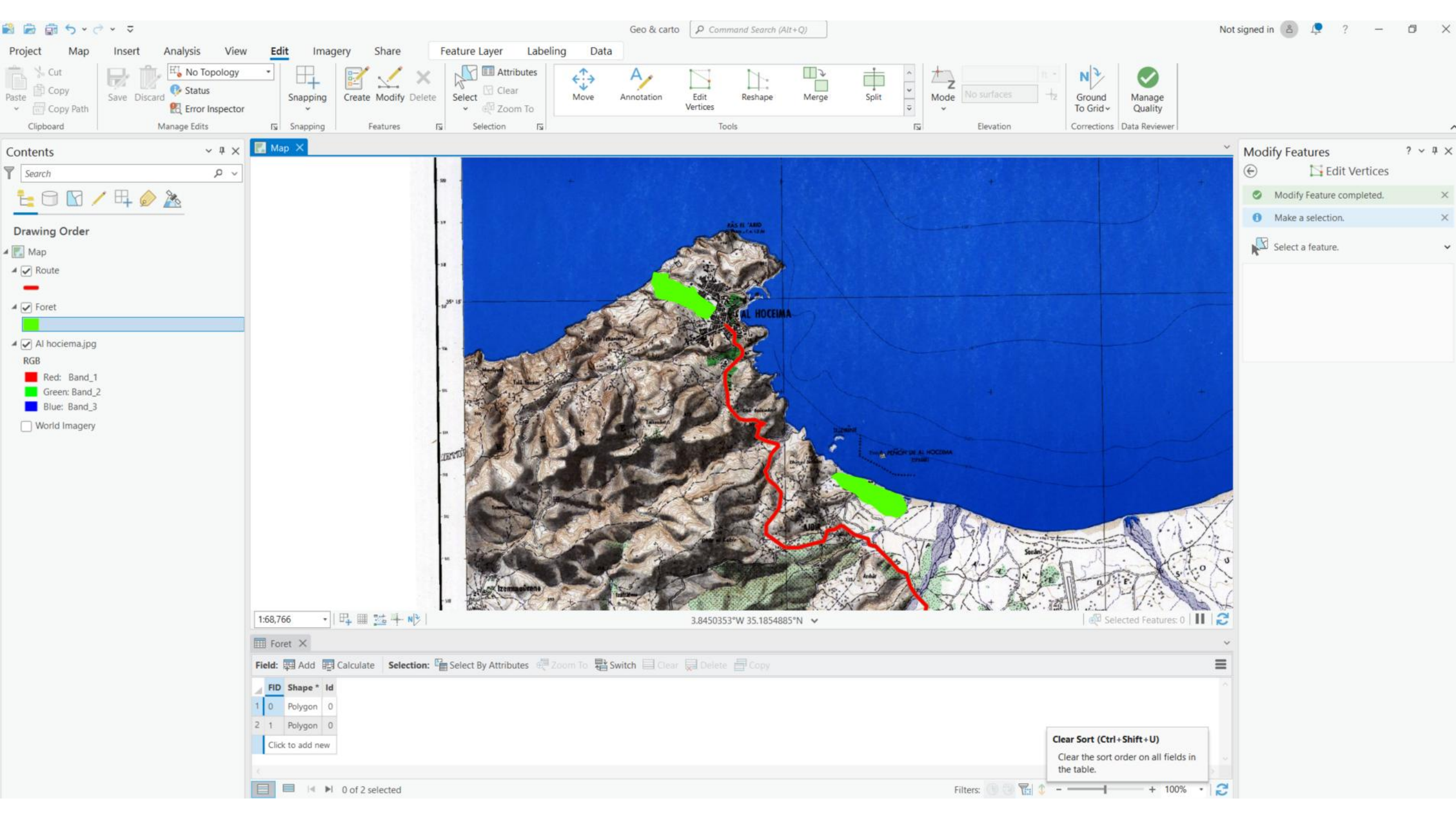


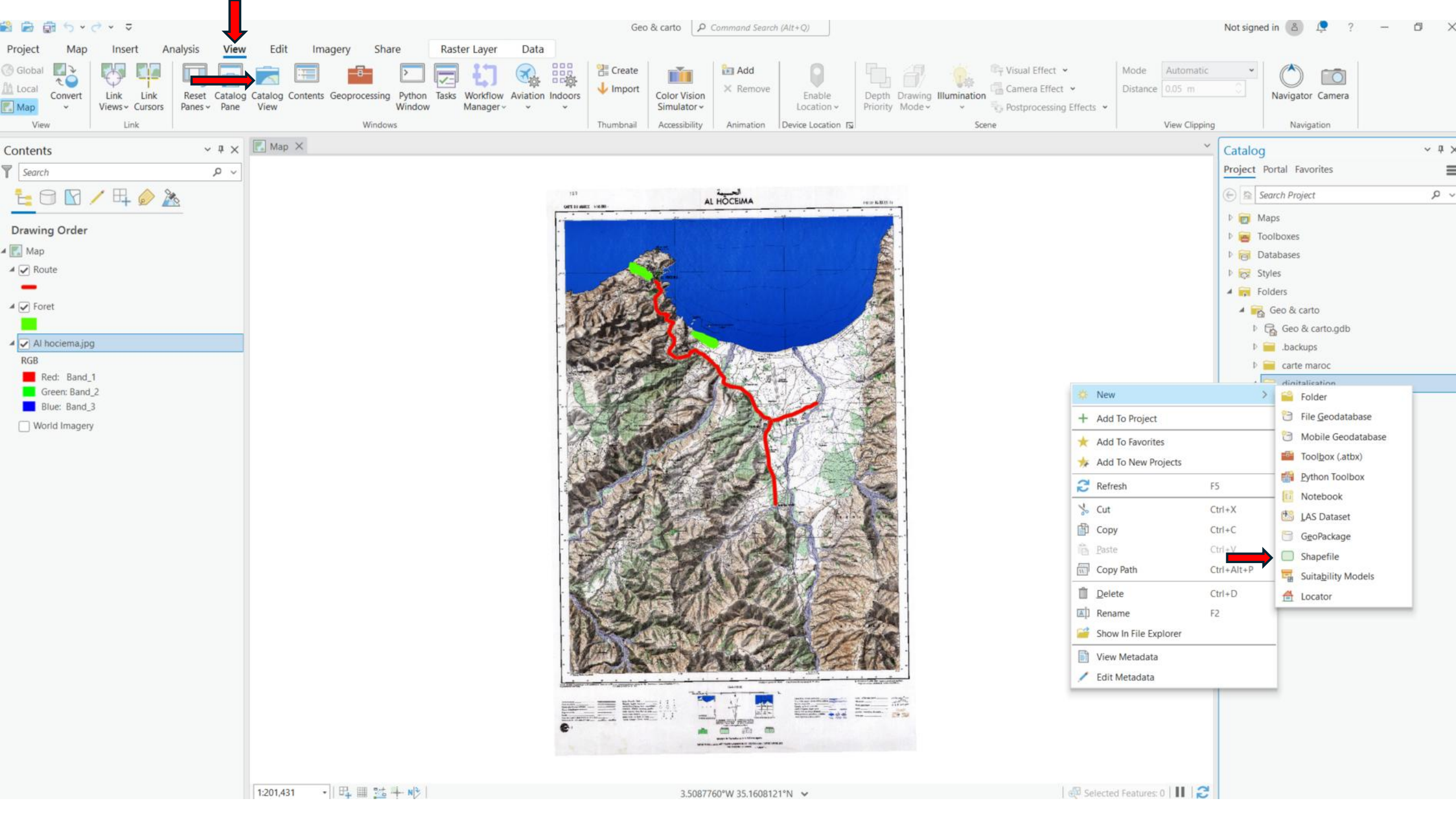


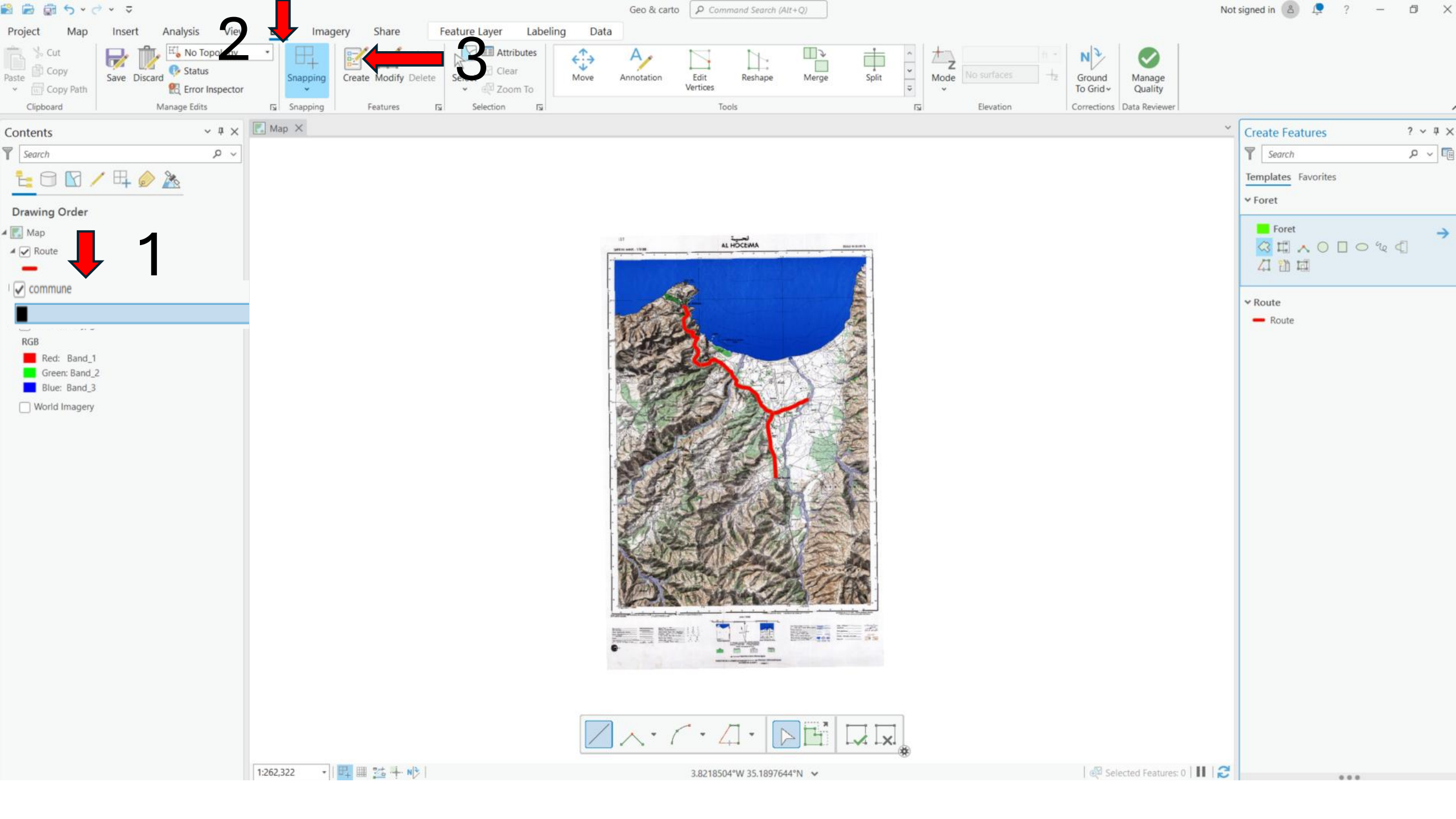


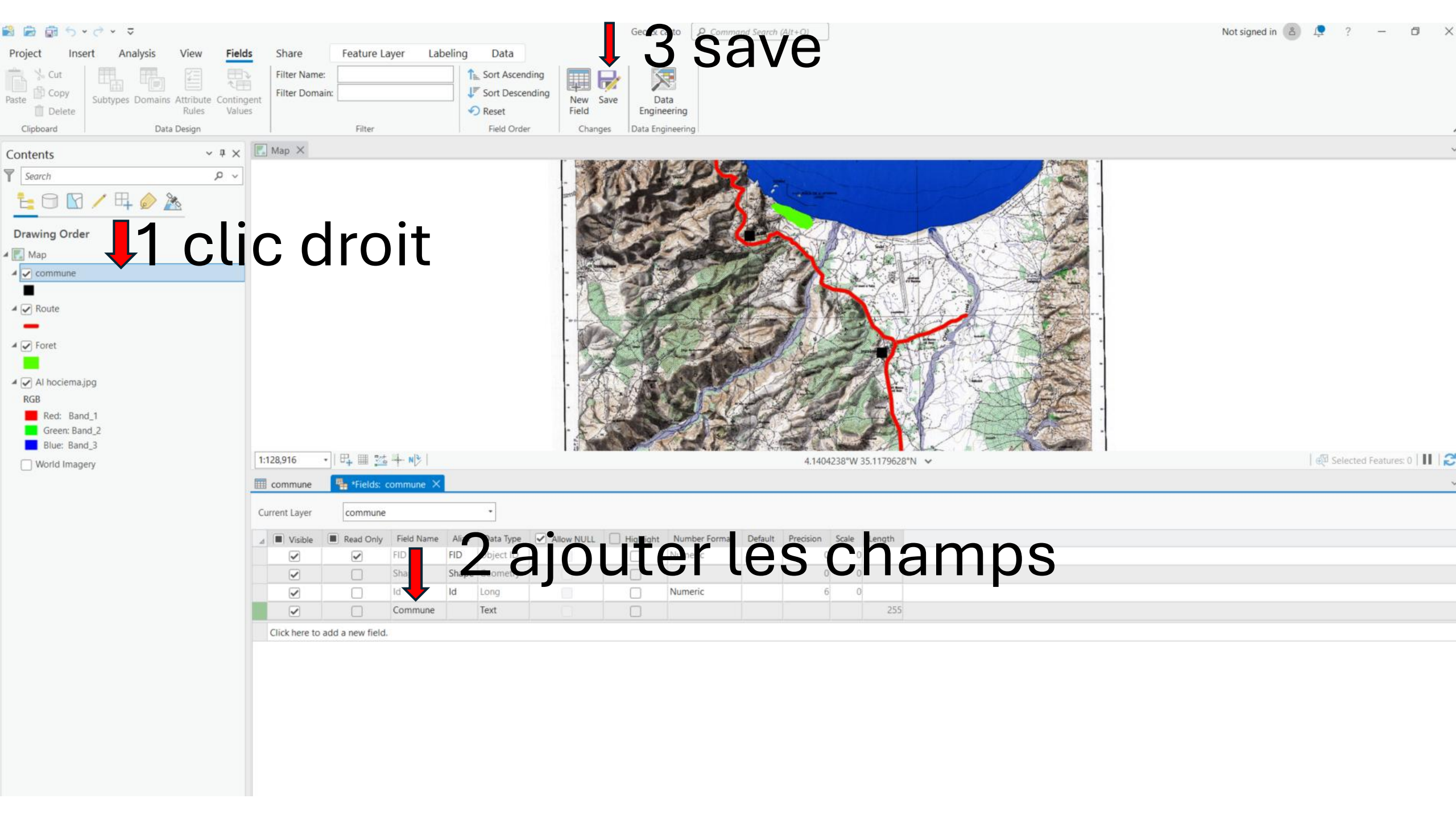


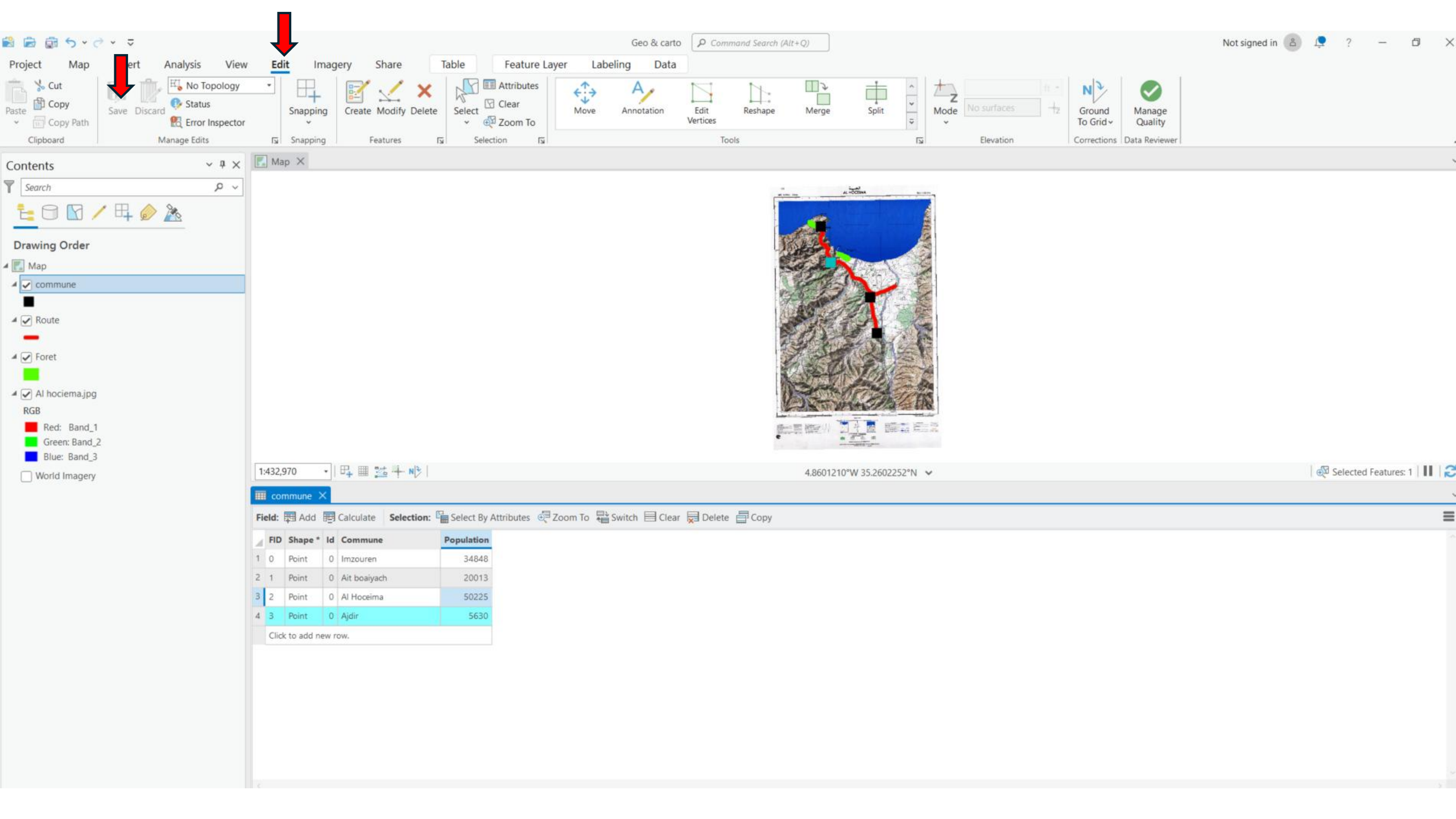












Contents

Search

Drawing Order

- Map
- commune
- Route
- Foret
- Al hocima.jpg

RGB

- Red: Band_1
- Green: Band_2
- Blue: Band_3

☐ World Imagery



commune

Field: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy

	FID	Shape *	Id	Commune	Population
1	0	Point	0	Imzouren	34848
2	1	Point	0	Ait boaiyach	20013
3	2	Point	0	Al Hoceima	50225
4	3	Point	0	Ajdir	5630

Click to add new row.

Calcul géométrique

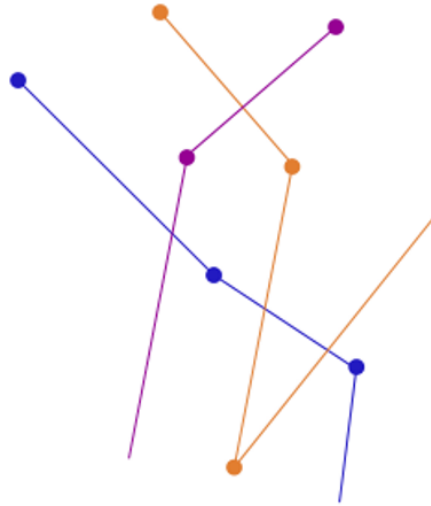
Calcul géométrique

Points



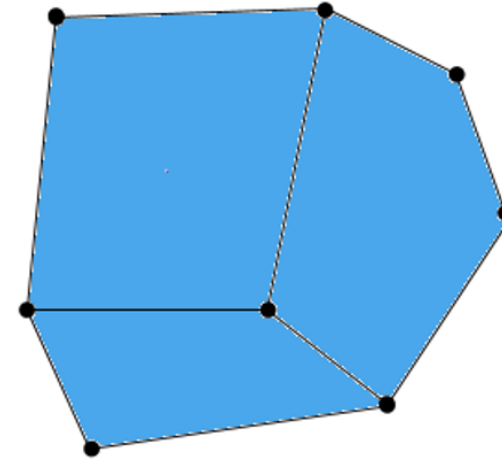
Les coordonnées

Lignes



Les longueurs

Polygones



Les surfaces
Les périmètres

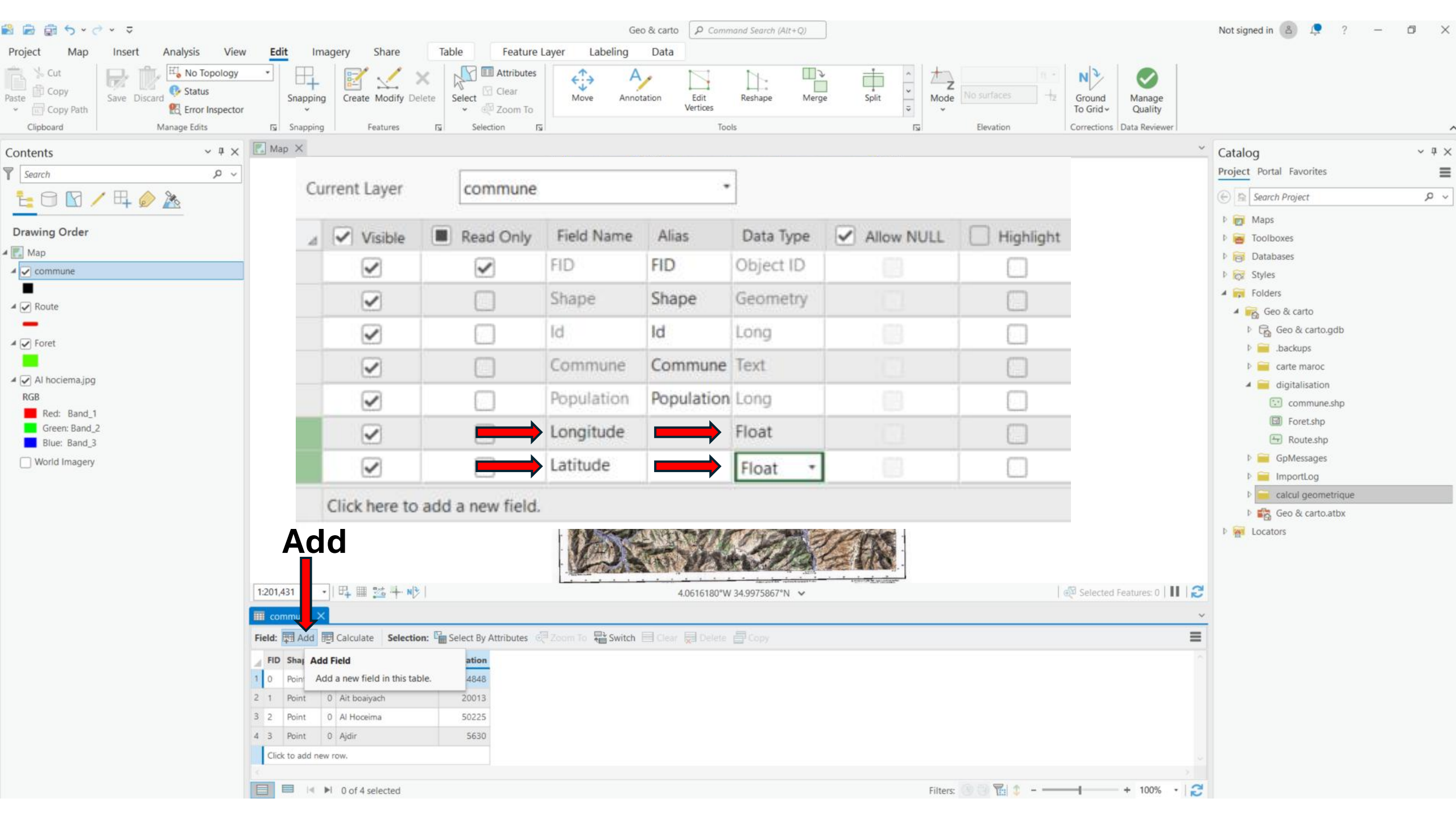
Calcul géométrique

Points



1

Les coordonnées

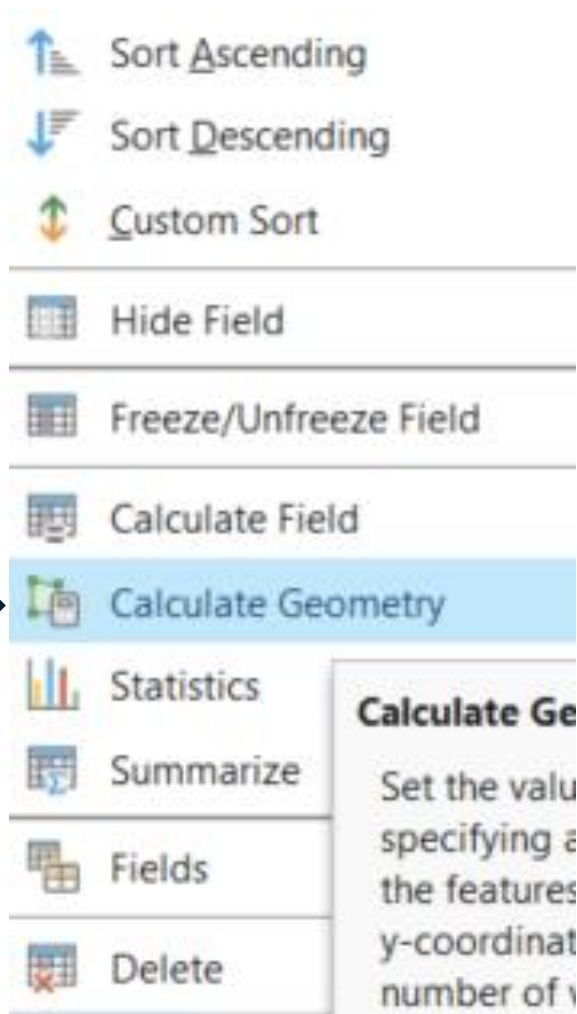


commune

Field: Add Calculate Selection: Select By Attributes Zoom

	FID	Shape *	Id	Commune	Population	Longitude	Latitude
1	0	Point	0	Imzouren	34848	0	0
2	1	Point	0	Ait boaiyach	20013	0	0
3	2	Point	0	Al Hoceima	50225	0	0
4	3	Point	0	Ajdir	5630	0	0

Click to add new row.



Calculate Geometry

This tool modifies the Input Features

Parameters Environments

Input Features
commune

Geometry Attributes
Field (Existing or New) Property
Longitude Point x-coordinate

Coordinate Format
Decimal Degrees

Coordinate System
Nord_Maroc_Degree

OK

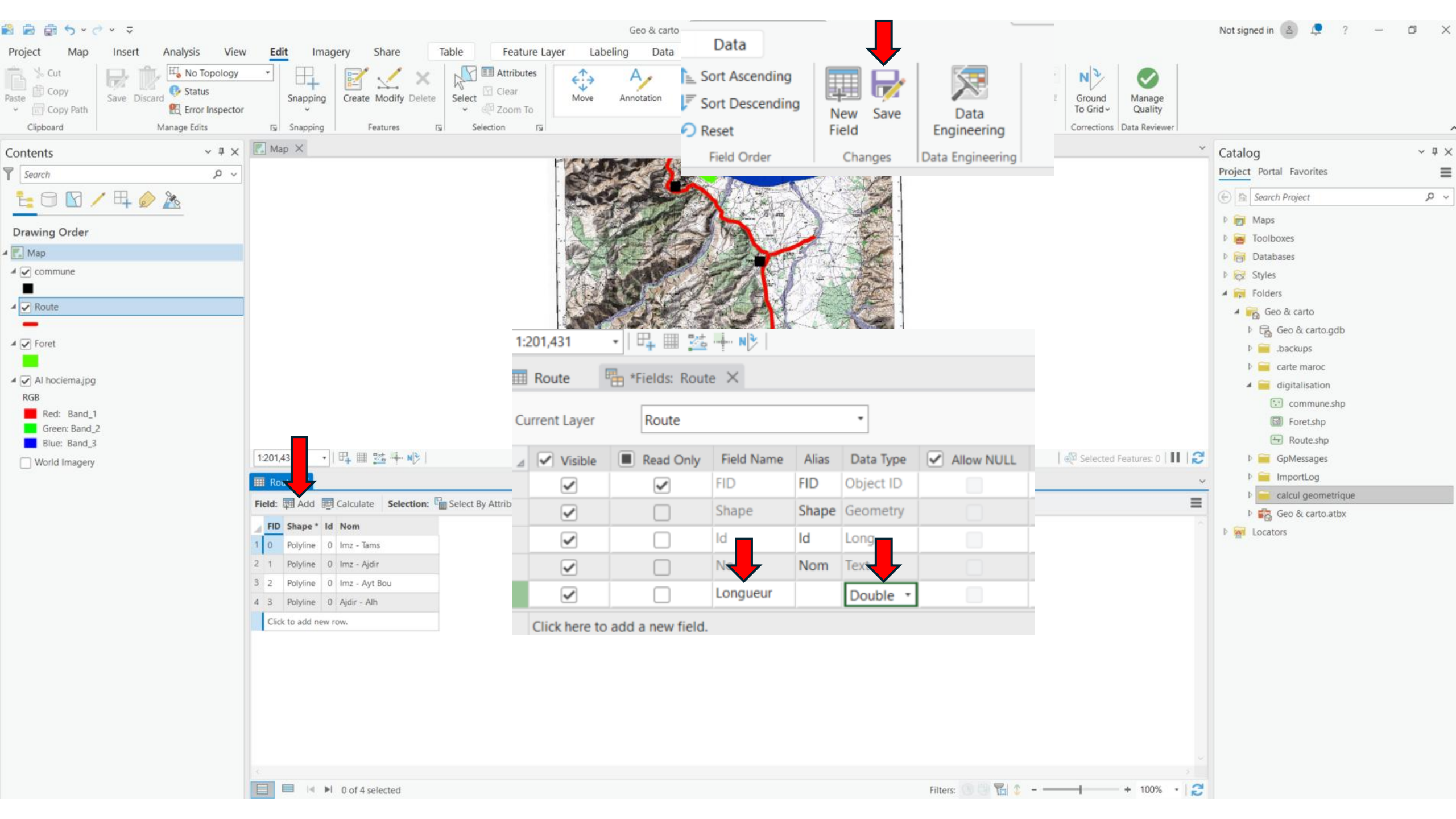
commune X							
Field:  Add  Calculate				Selection:  Select By Attributes  Zoom			
	FID	Shape *	Id	Commune	Population	Longitude	Latitude
1	0	Point	0	Imzouren	34848	-3.85176	35.1523
2	1	Point	0	Ait boaiyach	20013	-3.84147	35.1039
3	2	Point	0	Al Hoceima	50225	-3.93118	35.2486
4	3	Point	0	Ajdir	5630	-3.9156	35.1999

Calcul géométrique

Lignes



Les longueurs



Le calcul précis des longueurs, surfaces et périmètres nécessite une reprojection des données en coordonnées UTM, adaptées aux mesures métriques.

The image shows the QGIS software interface. On the left, the 'Map' menu is open, and the 'Properties' option at the bottom is highlighted with a red arrow. A second red arrow points from this menu item to the 'Map Properties: Map' dialog box. In this dialog, the 'Coordinate Systems' tab is selected in the left sidebar. The main area shows the 'Current XY' coordinate system as 'WGS 1984 Complex UTM Zone 30N'. Below, a list of 'Available' coordinate systems is shown, with 'WGS 1984 Complex UTM Zone 30N' selected and highlighted by a red arrow. Other options in the list include WGS 1984 Complex UTM Zones 26N, 27N, 28N, and 29N. The 'Current Z' field is set to '<None>'. At the bottom right of the dialog are 'OK' and 'Cancel' buttons.

Contents

Search

Drawing O

Map

commu

Route

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AI hoci

RGB

Red:

Green

Blue:

World I

Copy

Remove

Group

Attribute Table Ctrl+T

Data Engineering Ctrl+Shift+D

Add Error Layers

Data Design >

Create Chart >

New Report

Joins and Relates >

Zoom To Layer

Zoom To Make Visible

Selection >

Label

Labeling Properties...

Convert Labels >

Symbology

Disable Pop-ups

Configure Pop-ups

Data

Sharing >

View Metadata

Edit Metadata

Properties

Export Features

Export Table

Rematch Addresses

Set Data Source

Shape *	Id	Nom	Lon
Polyline	0	Imz - Tams	
Polyline	0	Imz - Ajdir	
Polyline	0	Imz - Ayt Bou	

Export Features

Parameters Environments

Input Features
Route

Output Feature Class
route_utm.shp

> Filter

> Fields

> Sort

OK

Export Features

Parameters Environments

> Output Coordinates

Output Coordinate System
WGS_1984_Complex_UTM_Zone_30N

Geographic Transformations

> Processing Extent

Extent
Default

> Geodatabase

Output CONFIG Keyword

Auto Commit
1000

☒ Maintain Attachments

> Geodatabase Advanced

☐ Preserve Global IDs

> Fields

☒ Maintain fully qualified field names

☐ Transfer field domain descriptions

> XY Values

Output XY Domain
Same As Input

OK

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Copy

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Group

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Zoom To Layer

Zoom To Make Visible

Selection

Label

Labeling Properties...

Convert Labels

Symbology

Disable Pop-ups

Configure Pop-ups

Data

Sharing

View Me

Edit Met

Properties

Properties

Show the properties for the selected layers.

Layer Properties: route_utm

General

Metadata

Source

Elevation

Selection

Display

Cache

Definition Query

Time

Floors

Range

Indexes

Joins

Relates

Data Source

Set Data Source...

Data Type	Shapefile Feature Class
Shapefile	C:\Users\HP\Desktop\TP rcgis pro\Geo & carto\route_ut
Geometry Type	Line
Coordinates have Z value	No
Coordinates have M value	No
Vertical Units	Meter

Extent

Spatial Reference

Projected Coordinate System	WGS 1984 Complex UTM Zone 30N
Projection	Transverse Mercator Complex

OK

Cancel

Contents

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- Map
- commune
- route_utm
- Route
- Foret
- Al hociema.jpg
- RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3
- World Imagery

1:201,431

route_utm

Field: Add Calculate Selection: Select By

	FID	Shape *	Id	Nom	Longueur
1	0	Polyline	0	Imz - Tams	0
2	1	Polyline	0	Imz - Ajdir	0
3	2	Polyline	0	Imz - Ayt Bou	0
4	3	Polyline	0	Ajdir - Alh	0
Click to add new row.					

- Sort Ascending
- Sort Descending
- Custom Sort
- Hide Field
- Freeze/Unfreeze Field
- Calculate Field
- Calculate Geometry
- Statistics
- Summary
- Field Calculator
- Delete

Calculate Geometry

Set the values of this specifying a geometr the features, such as y-coordinate, length, number of vertices. If

Calculate Geometry

This tool modifies the Input Features

Parameters Environments

Input Features
route_utm

Geometry Attributes
Field (Existing or New) Property
Longueur Length

Length Unit
Kilometers

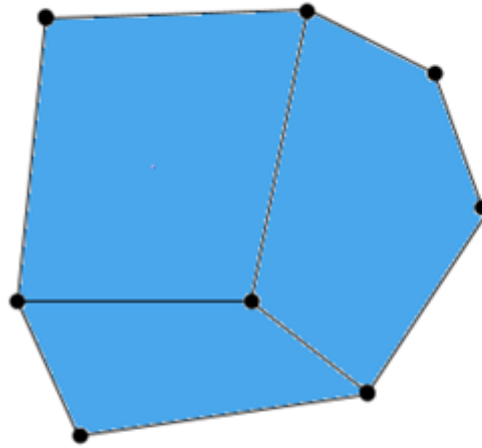
Coordinate System
WGS_1984_Complex_UTM_Zone_30N

OK

	FID	Shape *	Id	Nom	Longueur
1	0	Polyline	0	Imz - Tams	3.450146
2	1	Polyline	0	Imz - Ajdir	9.355396
3	2	Polyline	0	Imz - Ayt Bou	5.937877
4	3	Polyline	0	Ajdir - Alh	7.384295
Click to add new row.					

Calcul géométrique

Polygones



Les surfaces
Les périmètres

Le calcul précis des longueurs, surfaces et périmètres nécessite une reprojection des données en coordonnées UTM, adaptées aux mesures métriques.

The screenshot shows the QGIS interface. On the left, the 'Data' menu is open, listing options like Copy, Remove, Group, Attribute Table, Data Engineering, Add Error Layers, Data Design, Create Chart, New Report, Joins and Relates, Zoom To Layer, Zoom To Make Visible, Selection, Label, Labeling Properties..., Convert Labels, Symbology, Disable Pop-ups, Configure Pop-ups, Export Features, Export, Remove, Set D, and Properties. The 'Export Features' option is highlighted. In the center, a table displays feature data:

Shape *	Id	Nom	Longueur
Polyline	0	Imz - Tams	3.450146
Polyline	0	Imz - Ajdir	9.355396
Polyline	0	Imz - Ayt Bou	5.937877
Polyline	0	Ajdir - Alh	7.384295

A tooltip for 'Export Features' is visible, stating: 'Convert a shapefile or geodatabase feature class to a shapefile or geodatabase feature class.'

The screenshot shows the 'Export Features' dialog box in QGIS. The 'Environments' tab is selected, indicated by a red arrow. The dialog contains the following settings:

- Output Coordinates:**
 - Output Coordinate System: WGS_1984_Complex_UTM_Zone_30N
 - Geographic Transformations: (empty)
- Processing Extent:**
 - Extent: Default
- Geodatabase:**
 - Output CONFIG Keyword: (empty)
 - Auto Commit: 1000
 - ☒ Maintain Attachments
- Geodatabase Advanced:**
 - ☐ Preserve Global IDs
- Fields:**
 - ☒ Maintain fully qualified field names
 - ☐ Transfer field domain descriptions
- XY Values:**
 - Output XY Domain: Same As Input

An 'OK' button is located at the bottom right, with a red arrow pointing to it.

ids

Share

Feature Layer

Labeling

Data

Filter Name:

Filter Domain:

Filter

Sort Ascending

Sort Descending

Reset

Field Order

New Field

Save

Changes

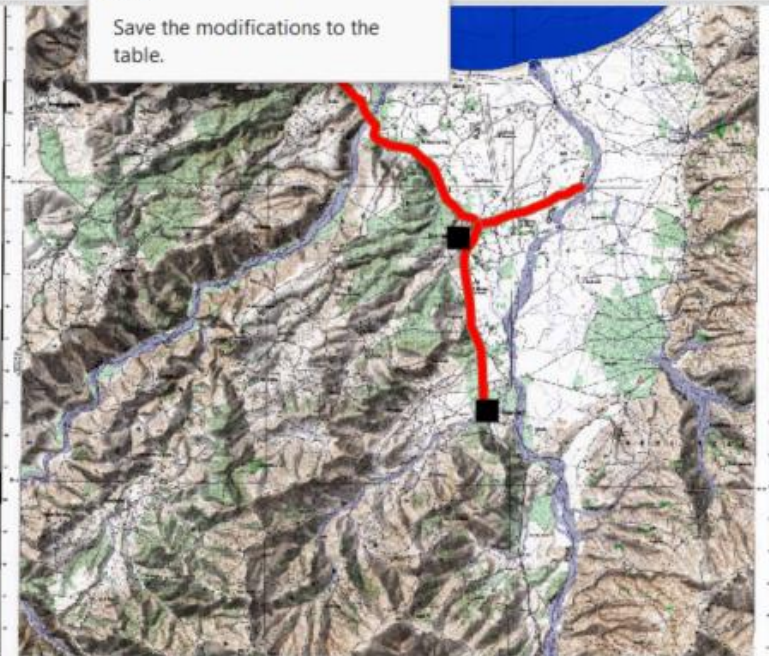
Data Engineering

Data Engineering

Map X

Save

Save the modifications to the table.



1:201,431

3.9884102°W 35.2077391°N

Selected Features: 0

foret_utm

*Fields: foret_utm X

Current Layer foret_utm

	Visible	Read Only	Field Name	Alias	Data Type	Allow NULL	Highlight	Number Format	Default	Precision	Scale	Length
☒	☒	☒	FID	FID	Object ID	☐	☐	Numeric		0	0	
☒	☐	☐	Shape	Shape	Geometry	☐	☐			0	0	
☒	☐	☐	Id	Id	Long	☐	☐	Numeric		6	0	
☒	☐	☐	Nom	Nom	Text	☐	☐			0	0	254
☒	☐	☐	Surface		Double	☐	☐					
☒	☐	☐	Périmètre		Double	☐	☐					

Click here to add a new field.

foret_utm

Field: Add Calculate Selection: Select By Attribute

	FID	Shape *	Id	Nom	Surface	Périmètre
1	0	Polygon	0	Souani - Sfiha		
2	1	Polygon	0	Al Hoceima		

Click to add new row.

Surface

Type:
Default: <↑
Read-Only: No

Sort Ascending
Sort Descending
Custom Sort
Hide Field
Freeze/Unfreeze Field
Calculate Field
Calculate Geometry

Calculate Geometry

Set the values of this field specifying a geometry property of the features, such as x-coordinate, y-coordinate, length, area, or number of vertices. If any rows in the table are currently selected, the values will be calculated for those rows only.

Calculate Geometry

This tool modifies the Input Features

Parameters Environments

Input Features
foret_utm

Geometry Attributes
Field (Existing or New) Property
Surface Area

Area Unit
Square Kilometers

Coordinate System
WGS_1984_Complex_UTM_Zone_30N

OK

foret_utm X

Field:  Add  Calculate Selection:  Select By Attribute

	FID	Shape *	Id	Nom	Surface	Périmètre
1	0	Polygon	0	Souani - Sfiha	0.672945	4.207174
2	1	Polygon	0	Al Hoceima	0.604963	4.017802

Click to add new row.

Cartographie thématique

(Exemple de la population)

