UNIVERSITY OF HOHENHEIM

1818 2018 200 YEARS

Public Participation GIS for Ecosystem Services

PPGIS. Data visualisation and analysis

Overview of today‘s session

- Experiences from Getik Valley
- Groups experiences
- Preparing and visualizing the data in Excel and ArcGIS
- Introduction to non-spatial analysis
- Preliminary steps for the spatial analysis in ArcGIS

GROUP EXPERIENCES

Each group explains to the rest of the participants:

- The content of your PPGIS survey
- The challenges you have encountered

PRACTICE. Preparing and visualizing the data

PRACTICE. Getting familiar with the data

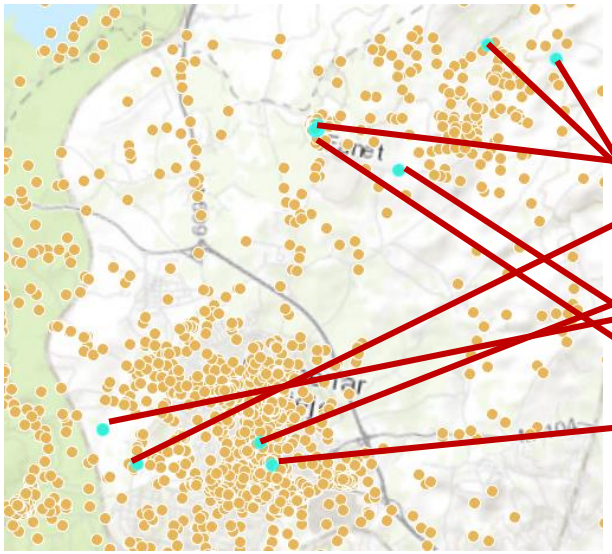
Steps:

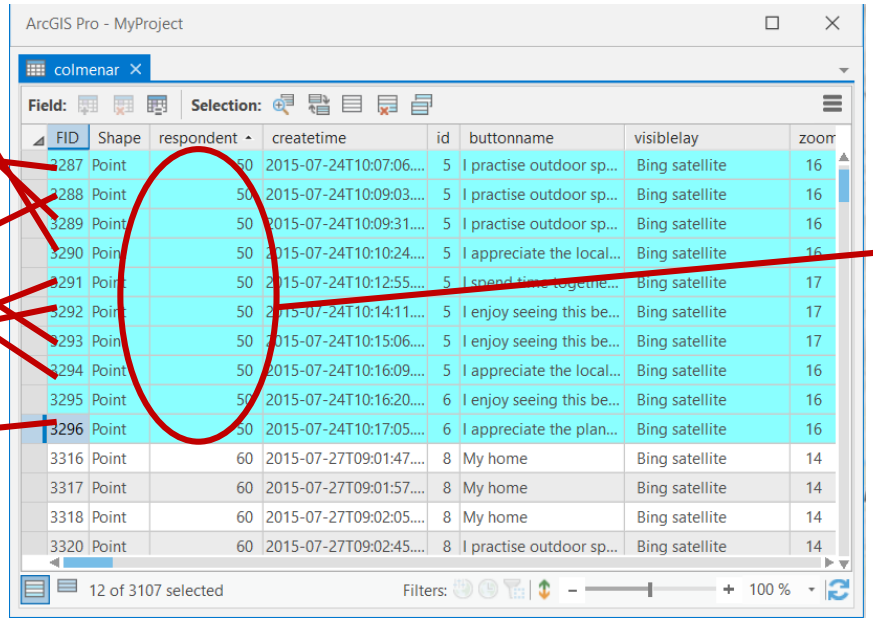
1. Downloading and organising the files
2. Visualising the data
3. Filtering the data

PRACTICE. Getting familiar with the data

PPGIS database

Spatial data of attributes (shapefile)





Backgound info (non-spat.)

	A	F	CS	CT
1	respondent	Gende	Year of bi	We ne
227	8	Female	1987	0
228	13	Male	1962	0
229	23	Female	1971	
230	34	Female	1952	
231	36	Male	1962	
232	50	Male	1946	0
233	60	Female	1957	0
234	68	Female	1966	0
235	70	Female	1952	0
236	84	Female	1982	0
237	87		1948	0
238	88	Male	1988	0
239	94	Male	1954	0
240	95	Male	1957	0
241	101	Female	1971	

Nora Fagerholm, 2014

PRACTICE. Getting familiar with the data

Downloading and organising the data: GROUP 1

maptionnaire

Analyze | Data | Files | Comments | Manage

Coordinate reference system: WGS 84 (EPSG:4326)

Download all of the data or only for a selected date range: ◉ All data ○ Date range

Downloading may take a while if there's a lot of response data!

- XLSX / Excel
- XLSX / Excel one sheet per drawbutton

Use these formats only if your GIS program cannot read CSV. They do not support long text answers or naming attribute columns with questions!
They are only provided for the sake of compatibility with old programs.
We strongly recommend that you export the Excel files as CSV and then import the CSV into your GIS program: it will make analysis a lot easier.

- MapInfo
- Esri Shape
- Esri Shape (one file per drawbutton)

Extra features

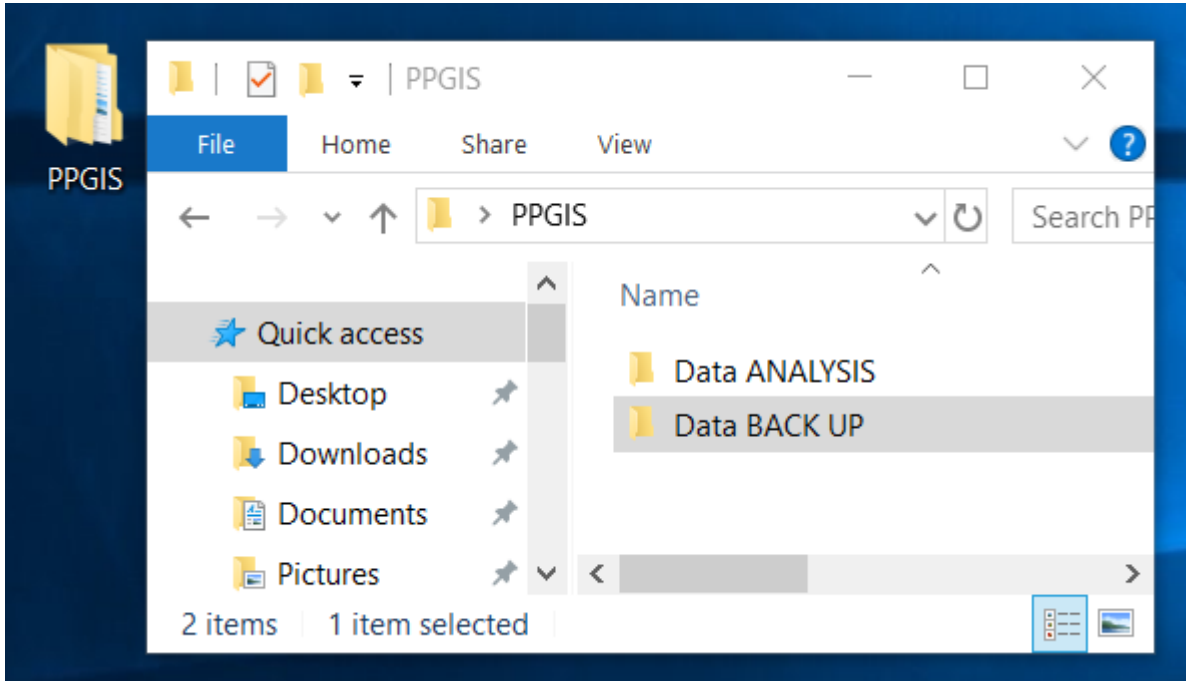
Answers disconnected from the main response data
Use this feature to for example collect e-mail addresses such that they cannot be connected to the actual questionnaire response data.

PRACTICE. Getting familiar with the data

Downloading and organising the data

Create a folder in the Desktop with:

- A back up of the data set
- The data set that will be used in the analysis



PRACTICE. Getting familiar with the data

Visualisation of the non-spatial data

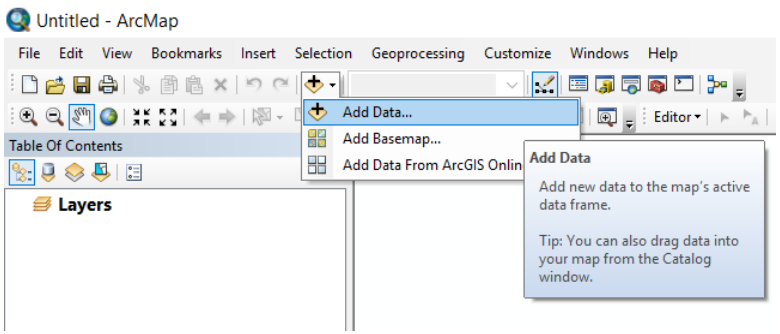
Open the Excel file with the non-spatial data and explore:

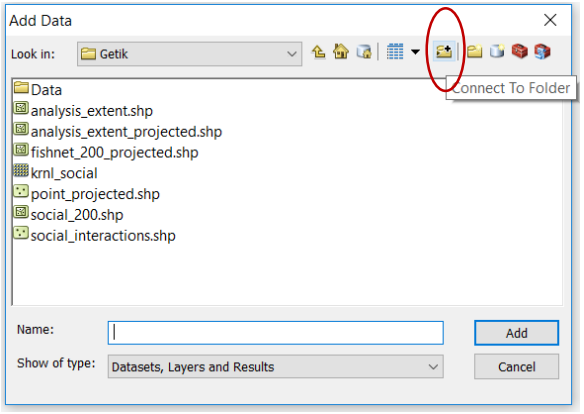
- What information does each tab contains (spatial / non spatial)
- How is the data organised?
- What information does it contain? (e.g. time, zoom, base map)
- What is the number of respondents?
- What is the number of points/lines/polygons?
- What do the descriptive statistics show?

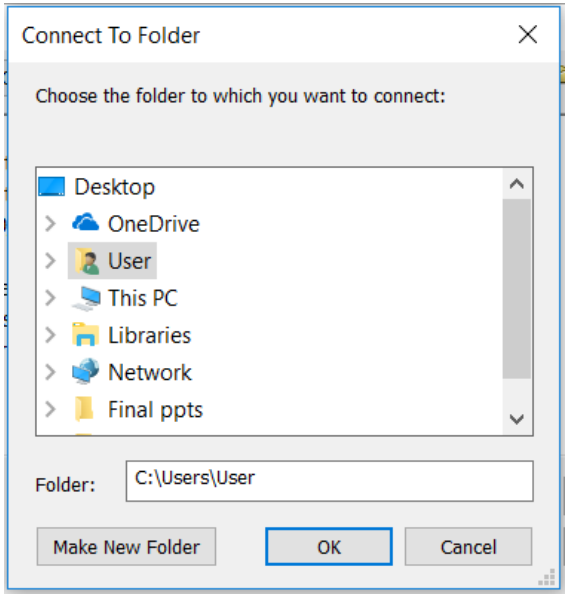
PRACTICE. Getting familiar with the data

Visualisation of the spatial data

1. Open ArcMap
2. Click to Add Data
3. Connect to the folder where you have saved the data
4. Add the “points” shapefile to the workspace



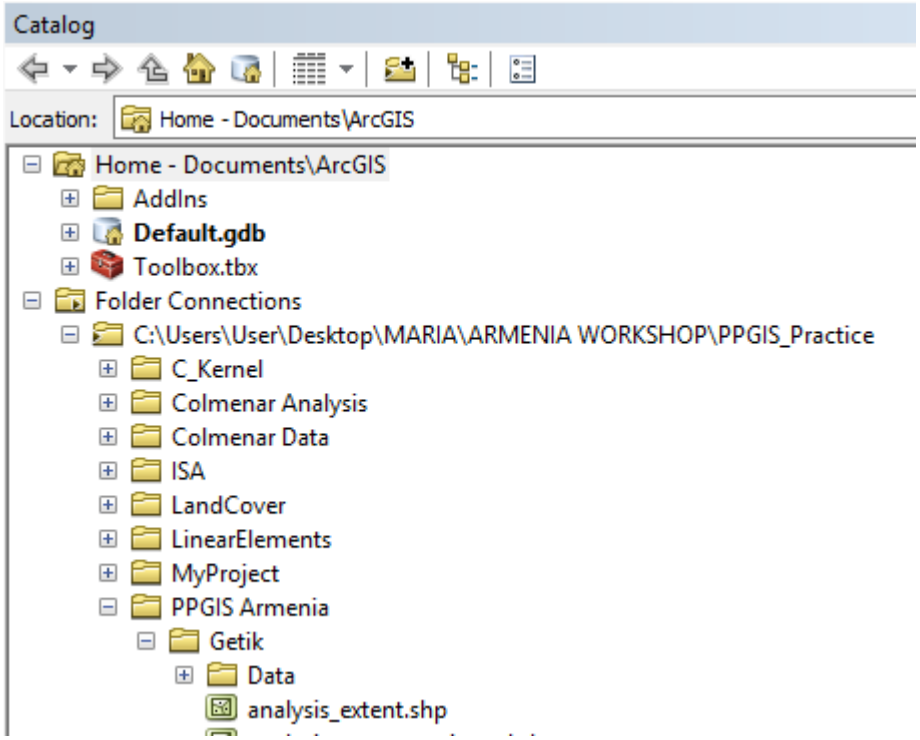


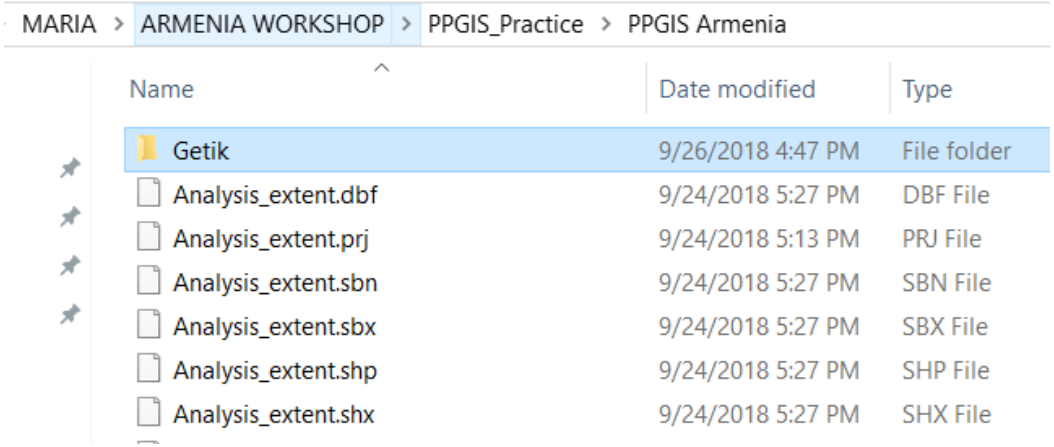


PRACTICE. Getting familiar with the data

Visualisation of the spatial data

- Open the Catalog. Notice that there is 1 file in the folder
- Open your folder. Notice that there are several files with different extentions
- Use always Catalog to: rename, copy, delete, move… the files

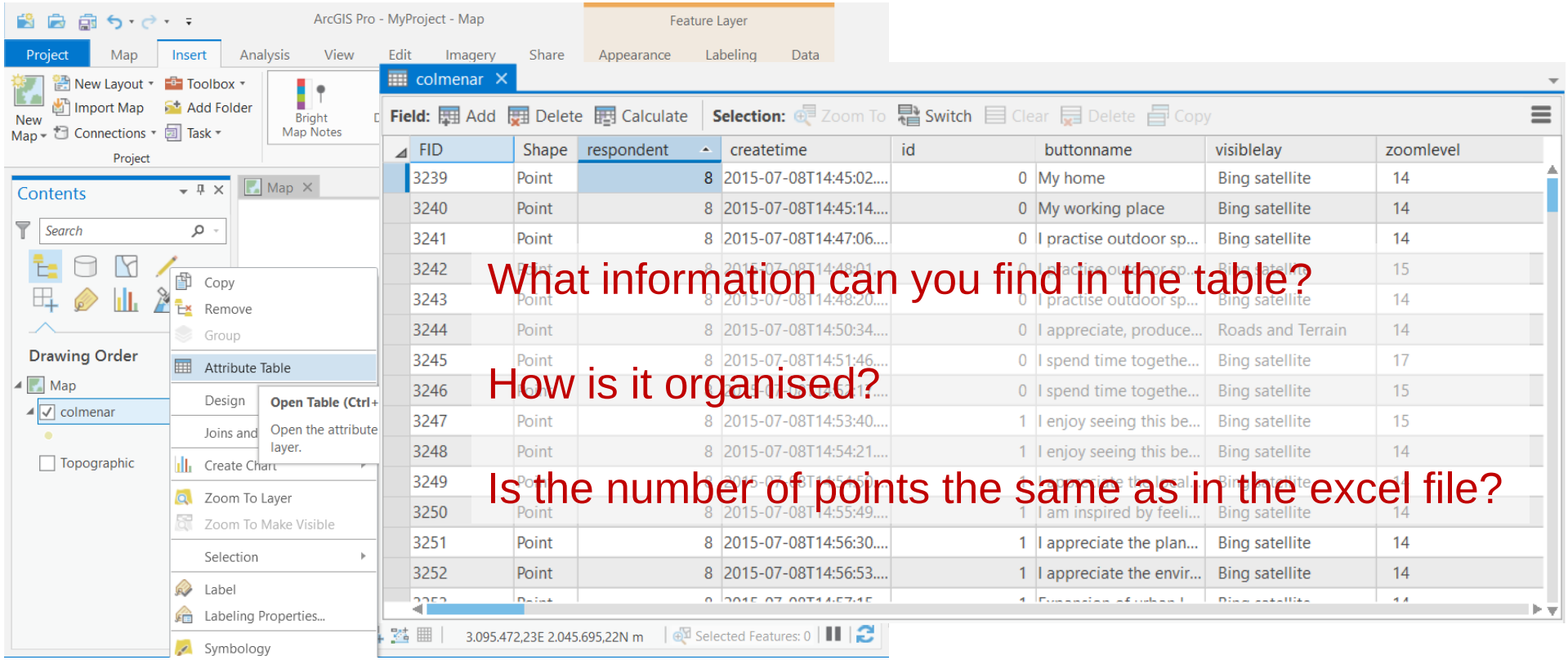




PRACTICE. Getting familiar with the data

Visualisation of the spatial data

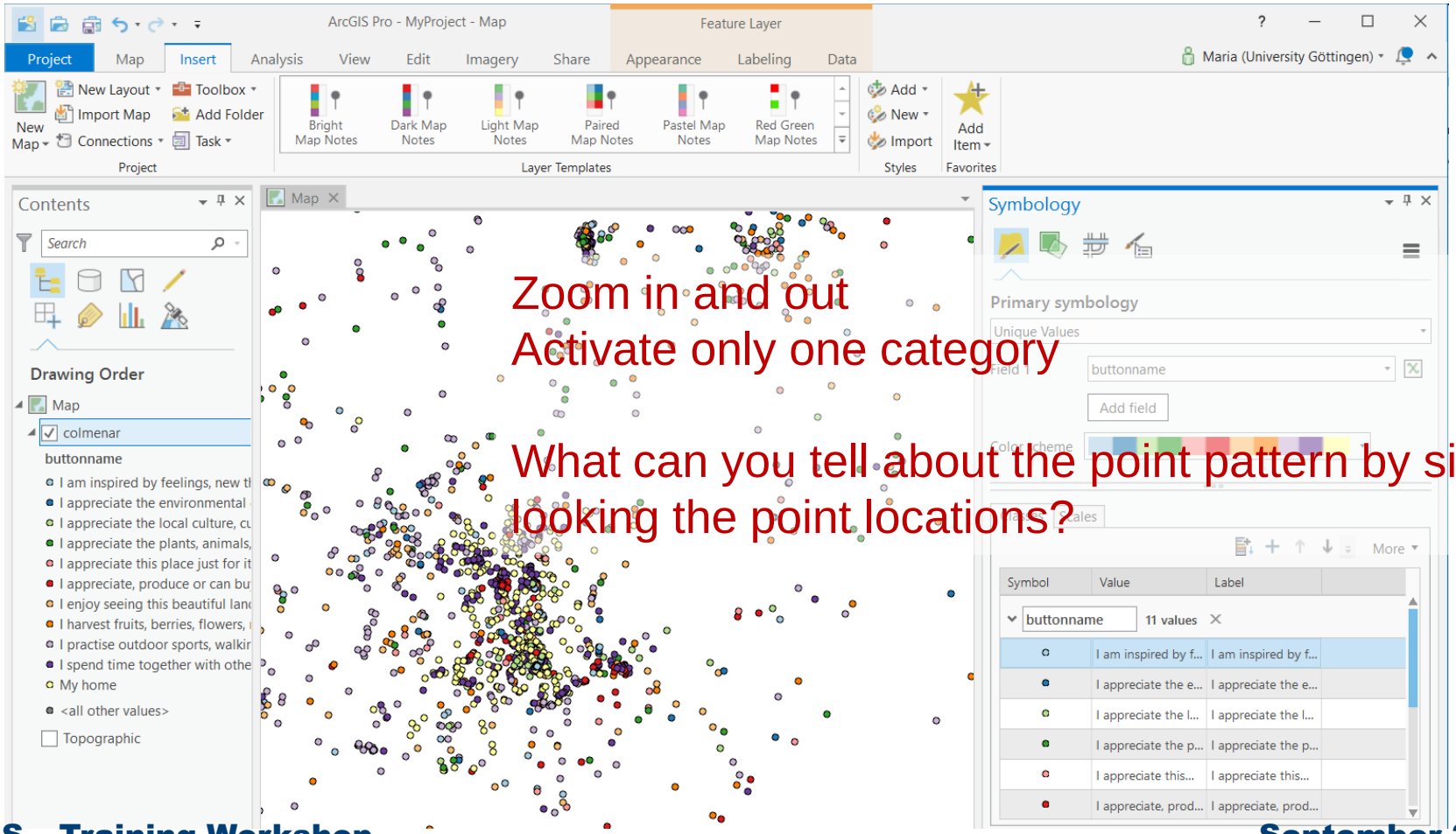
- Open the attribute table



PRACTICE. Getting familiar with the data

Visualisation of the spatial data

- Visualise the points/lines/polygons adjusting the symbology



PRACTICE. Getting familiar with the data

Visualisation of the spatial data

- Add the roads and buildings layers
- What can you observe by just looking at the distribution of the points on top of these other layers?
- Discuss with the members of your group
- Share with the rest of the participants

PRACTICE. Getting familiar with the data

Filtering the data

In the Excel file

- Any unfinished survey?
- Any respondent that has mapped too few points?

Note down all respondents that should be deleted and remove them from the excel files and shapefiles

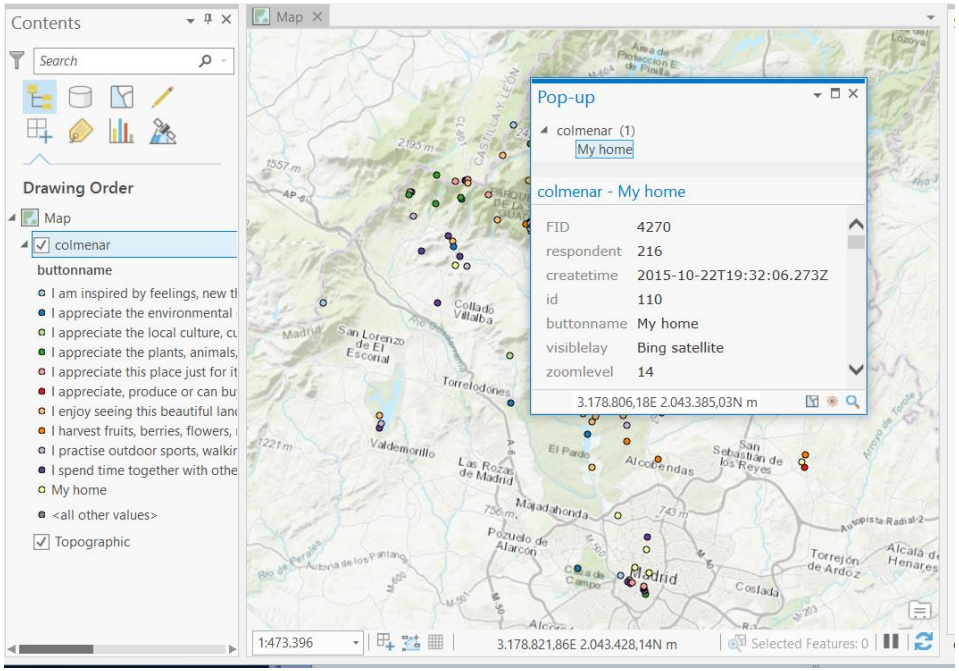
IMPORTANT! Save a copy of the original data and do not modify it EVER. Work always on a duplicated file.

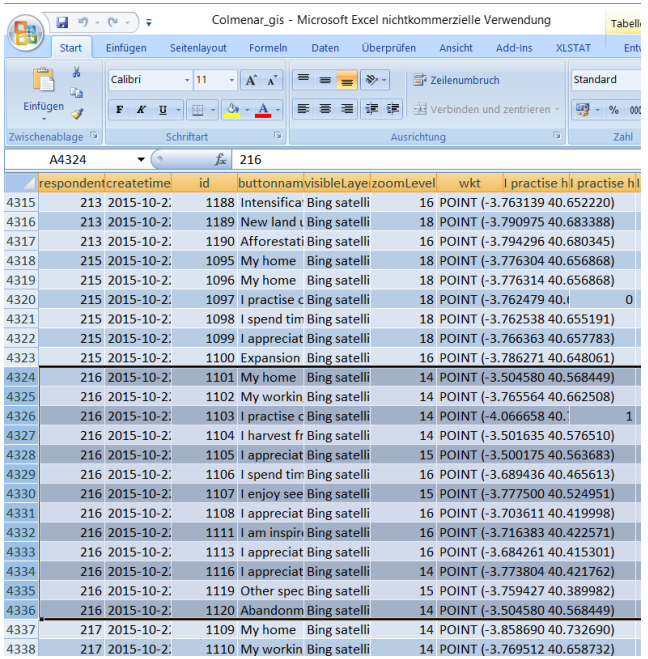
PRACTICE. Getting familiar with the data

Filtering the data

In the shapefile

- Any suspicious point? Too far away from the others?
- Look at its information. Identify the respondent and the attribute.
- Check with the background data in the Excel file. Is everything normal?





	respondent	createtime	id	buttonnam	visibleLaye	zoomLevel	wkt	l practise h	l practise h
4315	213	2015-10-2	1188	Intensifica	Bing satelli	16	POINT (-3.763139 40.652220)		
4316	213	2015-10-2	1189	New land u	Bing satelli	18	POINT (-3.790975 40.683388)		
4317	213	2015-10-2	1190	Afforestati	Bing satelli	16	POINT (-3.794296 40.680345)		
4318	215	2015-10-2	1095	My home	Bing satelli	18	POINT (-3.776304 40.656868)		
4319	215	2015-10-2	1096	My home	Bing satelli	18	POINT (-3.776314 40.656868)		
4320	215	2015-10-2	1097	I practise c	Bing satelli	18	POINT (-3.762479 40.(		0
4321	215	2015-10-2	1098	I spend tim	Bing satelli	18	POINT (-3.762538 40.655191)		
4322	215	2015-10-2	1099	I appreciat	Bing satelli	18	POINT (-3.766363 40.657783)		
4323	215	2015-10-2	1100	Expansion	Bing satelli	16	POINT (-3.786271 40.648061)		
4324	216	2015-10-2	1101	My home	Bing satelli	14	POINT (-3.504580 40.568449)		
4325	216	2015-10-2	1102	My workin	Bing satelli	14	POINT (-3.765564 40.662508)		
4326	216	2015-10-2	1103	I practise c	Bing satelli	14	POINT (-4.066658 40.:		1
4327	216	2015-10-2	1104	I harvest fr	Bing satelli	14	POINT (-3.501635 40.576510)		
4328	216	2015-10-2	1105	I appreciat	Bing satelli	15	POINT (-3.500175 40.563683)		
4329	216	2015-10-2	1106	I spend tim	Bing satelli	16	POINT (-3.689436 40.465613)		
4330	216	2015-10-2	1107	I enjoy see	Bing satelli	15	POINT (-3.777500 40.524951)		
4331	216	2015-10-2	1108	I appreciat	Bing satelli	16	POINT (-3.703611 40.419998)		
4332	216	2015-10-2	1111	I am inspir	Bing satelli	16	POINT (-3.716383 40.422571)		
4333	216	2015-10-2	1113	I appreciat	Bing satelli	16	POINT (-3.684261 40.415301)		
4334	216	2015-10-2	1116	I appreciat	Bing satelli	14	POINT (-3.773804 40.421762)		
4335	216	2015-10-2	1119	Other spec	Bing satelli	15	POINT (-3.759427 40.389982)		
4336	216	2015-10-2	1120	Abandonm	Bing satelli	14	POINT (-3.504580 40.568449)		
4337	217	2015-10-2	1109	My home	Bing satelli	14	POINT (-3.858690 40.732690)		
4338	217	2015-10-2	1110	My workin	Bing satelli	14	POINT (-3.769512 40.658732)		

INTRODUCTION TO NON SPATIAL ANALYSIS

Analysis methods for PGIS data

Analysis possibilities:

- **Non-spatial and descriptive analysis (for sample profile and attribute data)**
- Analysing spatial patterns of mapped attributes
- Analysing spatial relationships of mapped attributes and to other data sets e.g. physical landscape features

Nora Fagerholm, 2014

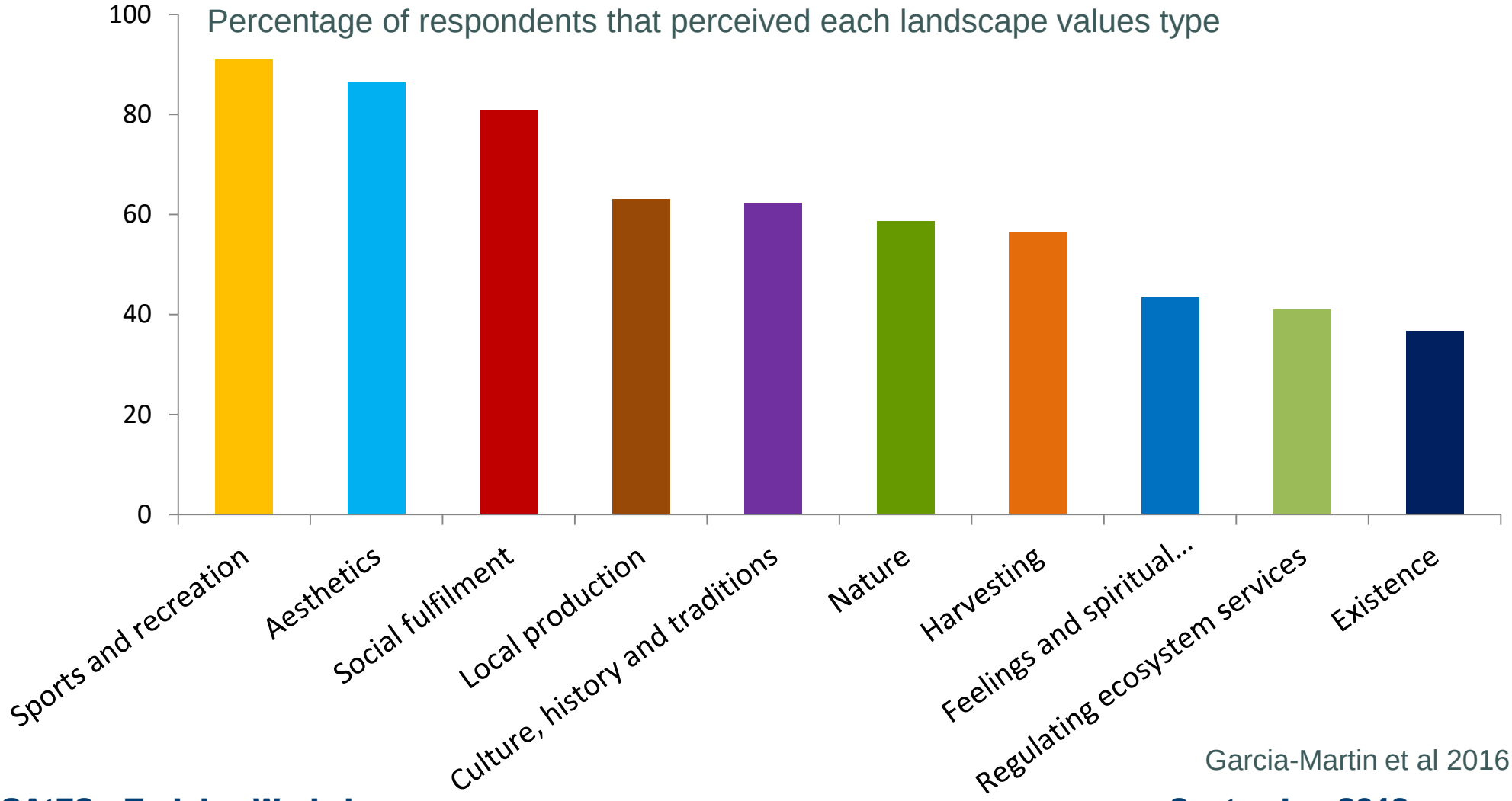
Analysis methods for PGIS data

Non-spatial and descriptive analysis (for sample profile and attribute data)

- Frequencies analysis (e.g. most and least commonly perceived attributes)
- Contingency tables (e.g. associations between perceived attributes and respondents characteristics)
- Multiple correspondence analysis (e.g. associations between perceived attributes and respondents characteristics)

Analysis methods for PGIS data

Non-spatial and descriptive analysis (for sample profile and attribute data)



Garcia-Martin et al 2016

Analysis methods for PGIS data

Non-spatial and descriptive analysis (for sample profile and attribute data)

Statistically significant relationships between age and the perception of landscape values

Age respondent group	15–29 (%)	30–59 (%)	60–95 (%)	Value (df 2)
Local products				
	46	55	68	7.1*
Harvesting				
	30	40	56	10.6**
Culture				
	45	60	68	10.1**
Aesthetics				
	73	90	88	15.2***

* $P \leq 0.05$; ** $P \leq 0.005$; *** $P \leq 0.001$

Garcia-Martin et al 2016

Analysis methods for PGIS data

Non-spatial and descriptive analysis (for sample profile and attribute data)

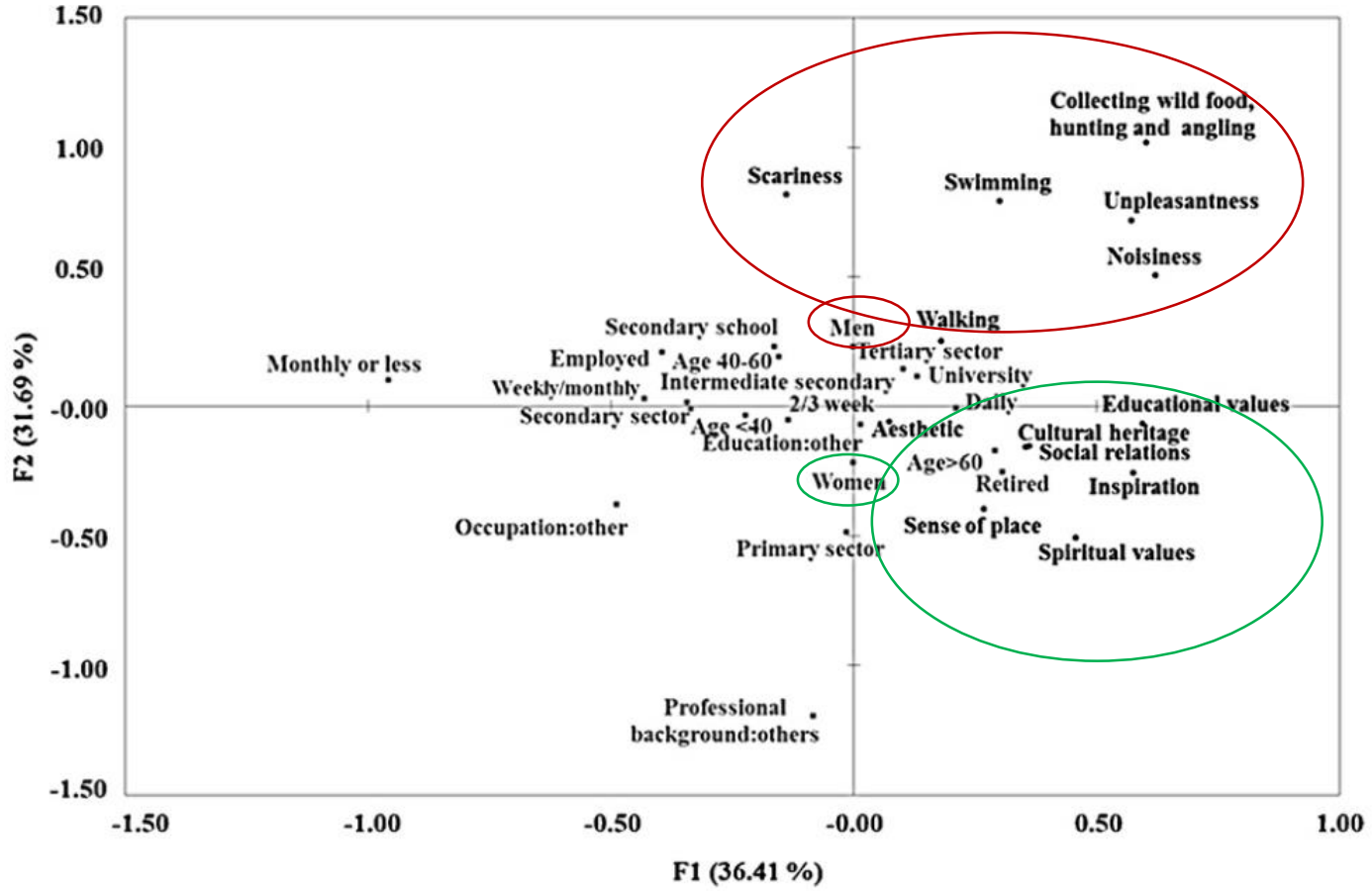
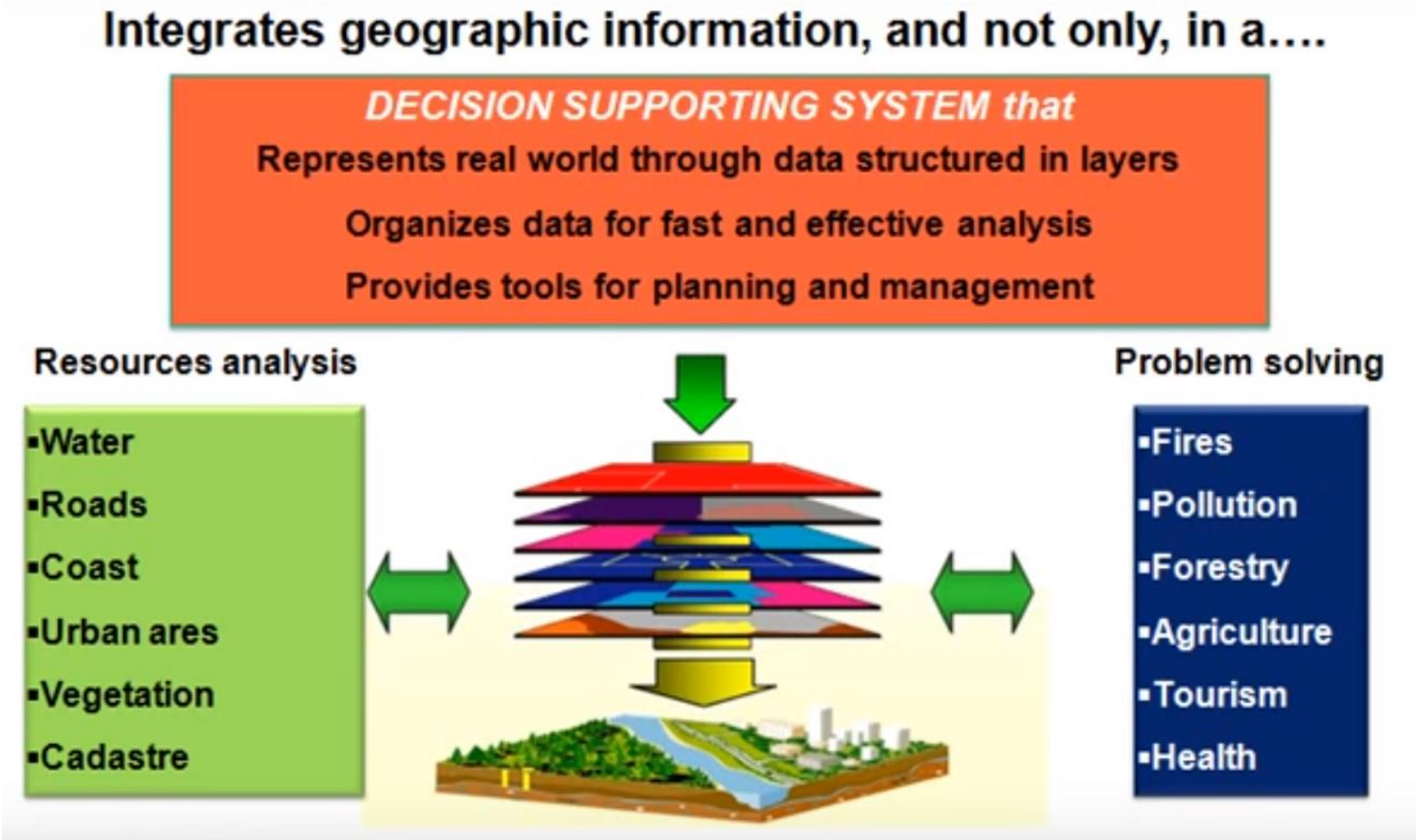


Fig. 3. Scatter plot of the two first axes of the multiple correspondence analysis (MCA). The active variables (black) represent the ecosystem services perceptions of every interviewee, and the supplementary variables (gray) are their social characteristics.

PRACTICE. Preliminary steps for the spatial analysis

Introduction to ArcGIS

What is GIS?

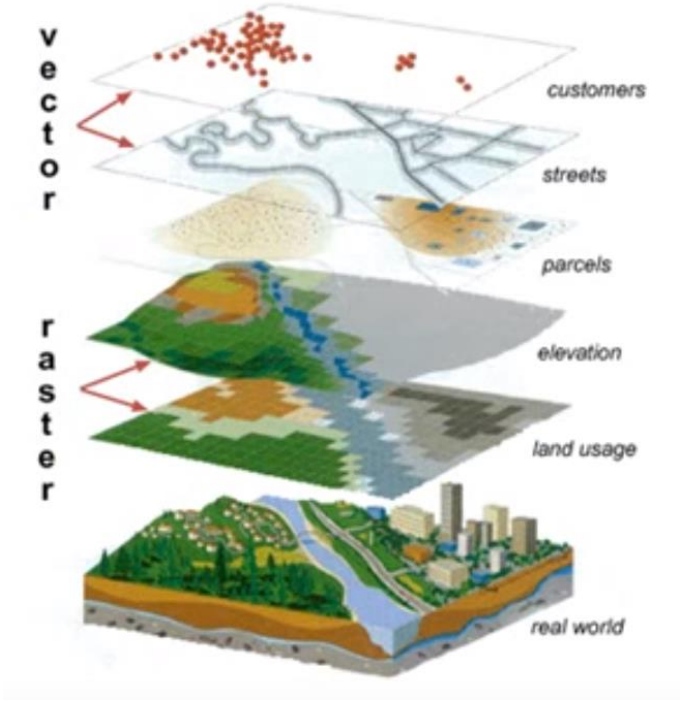


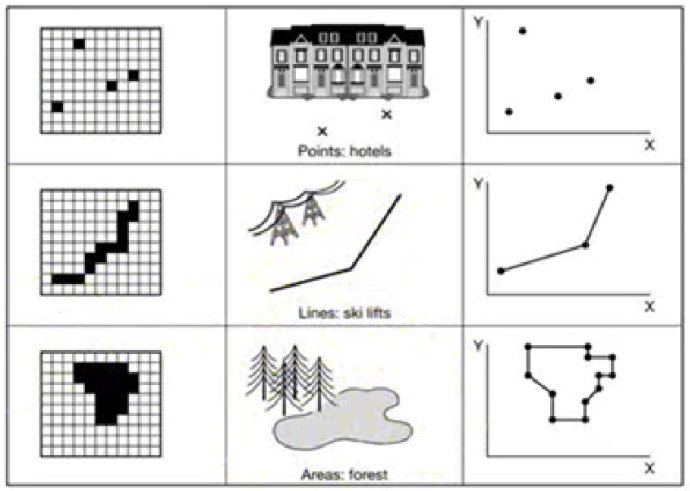
https://www.youtube.com/watch?v=kKGtUWMktPE

Map layers

Reading: https://gisgeography.com/spatial-data-types-vector-raster/

Video: 3.00. https://www.youtube.com/watch?v=kKGtUWMktPE

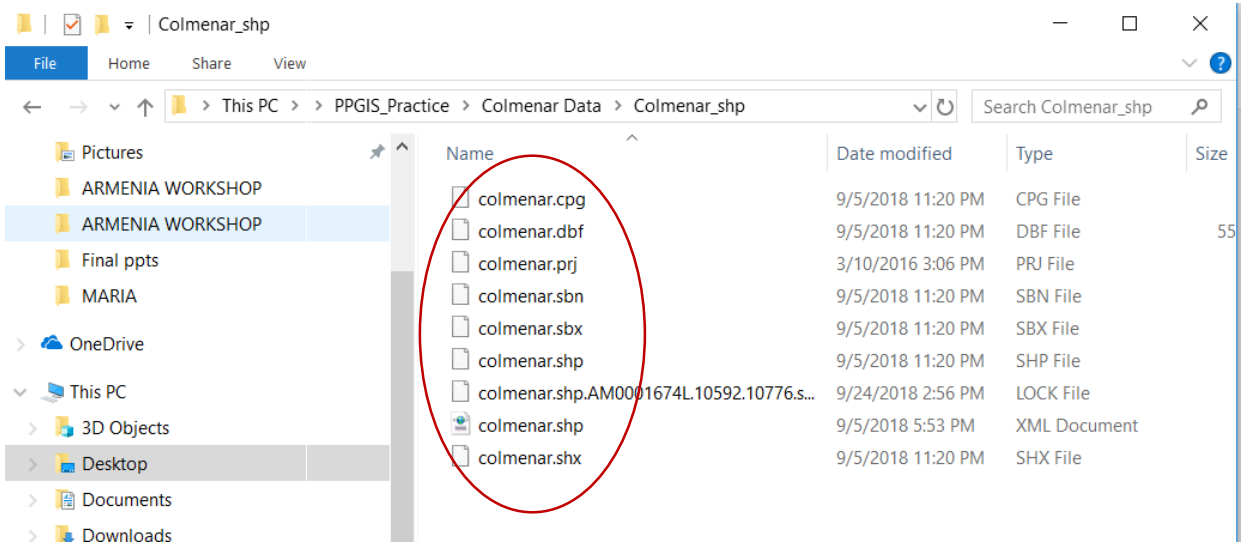


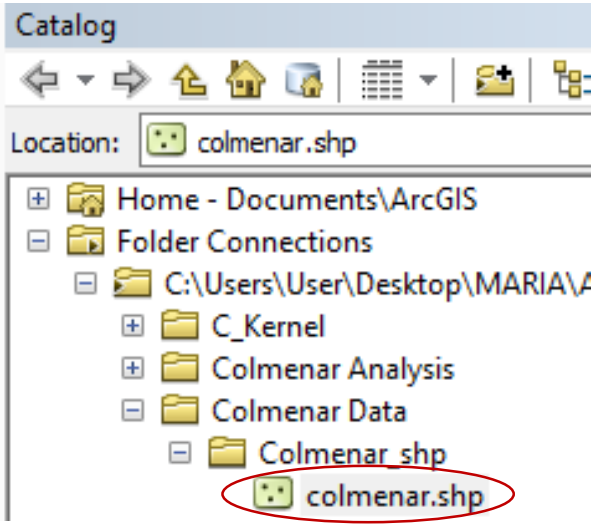


ArcGIS

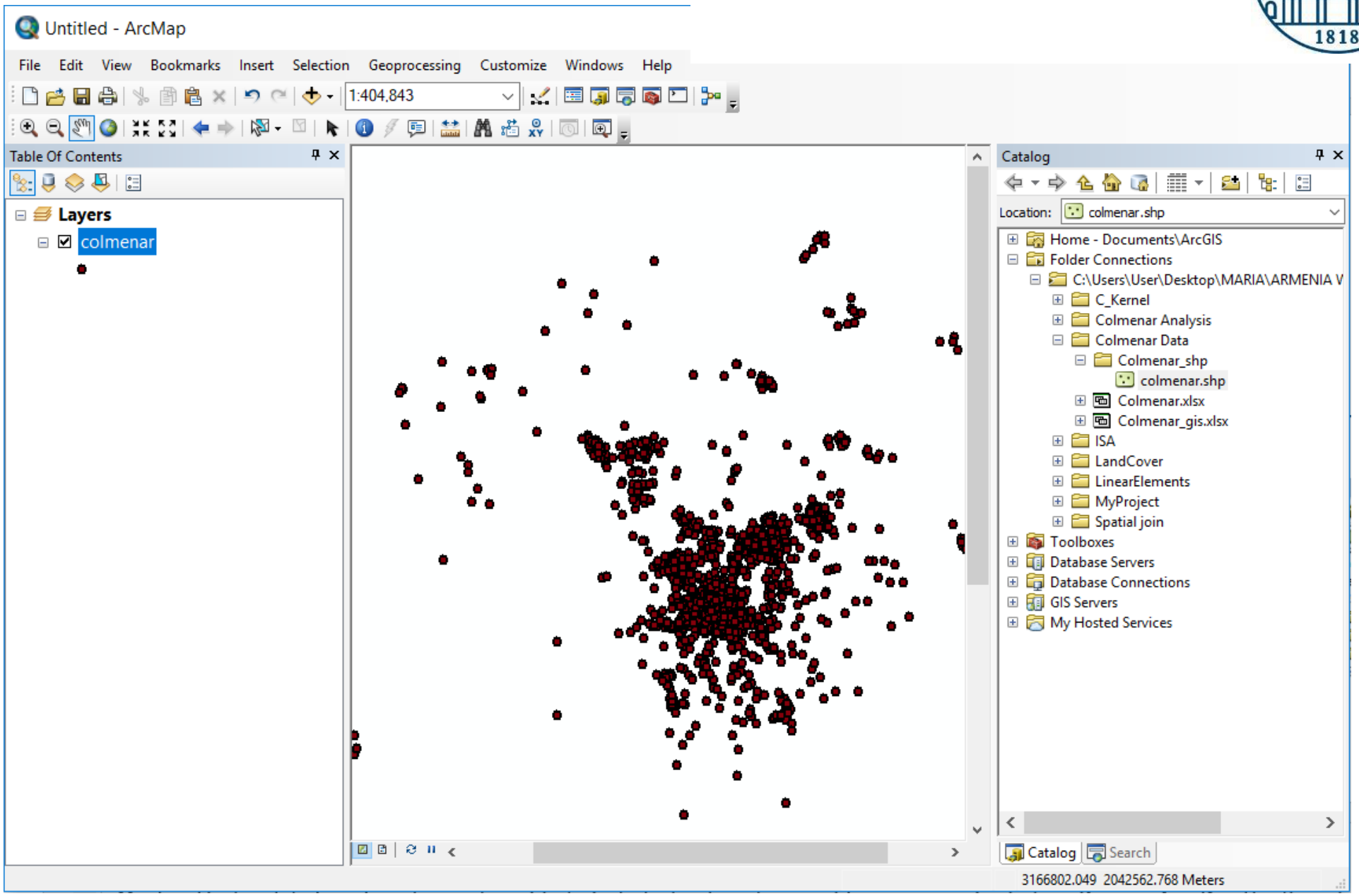
ArcMap does not store data, just the layout

As each file is made up of several extensions data can be better managed by using the Catalog



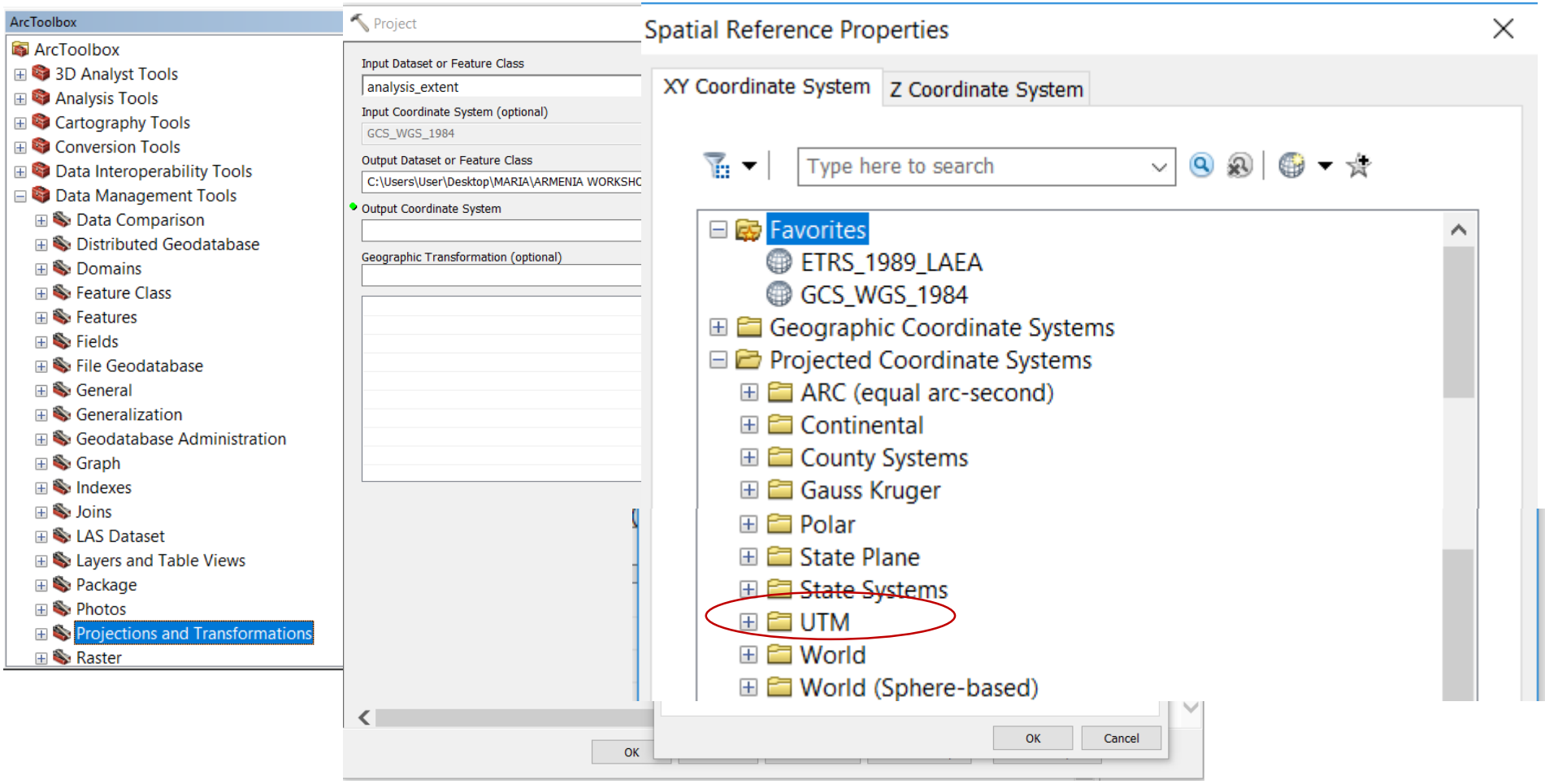


Introduction to ArcGIS



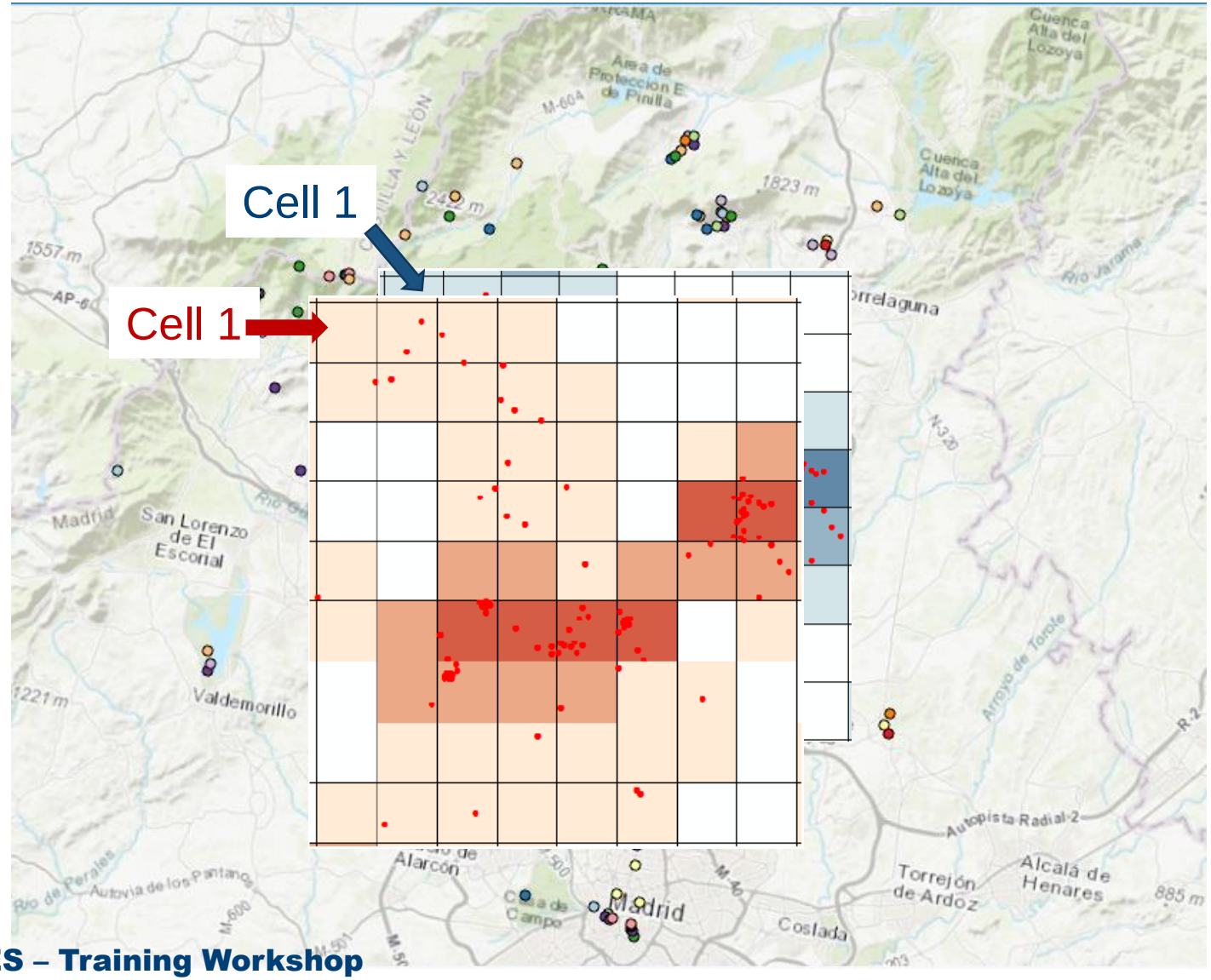
Preliminary steps for the spatial analysis

Preparing for the spatial analysis: Projected coordinate system



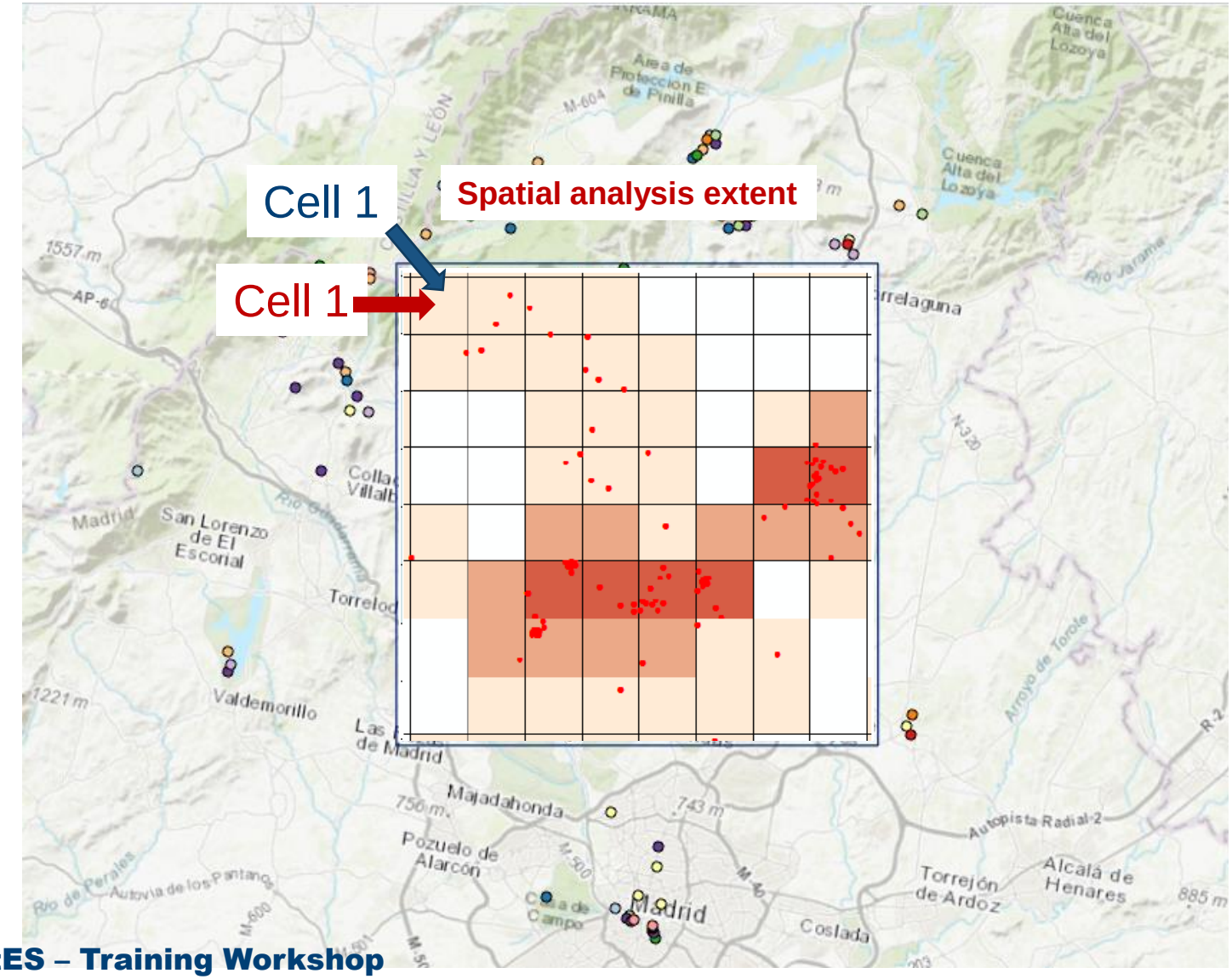
Preliminary steps for the spatial analysis

Preparing for the spatial analysis: analysis extent



Preliminary steps for the spatial analysis

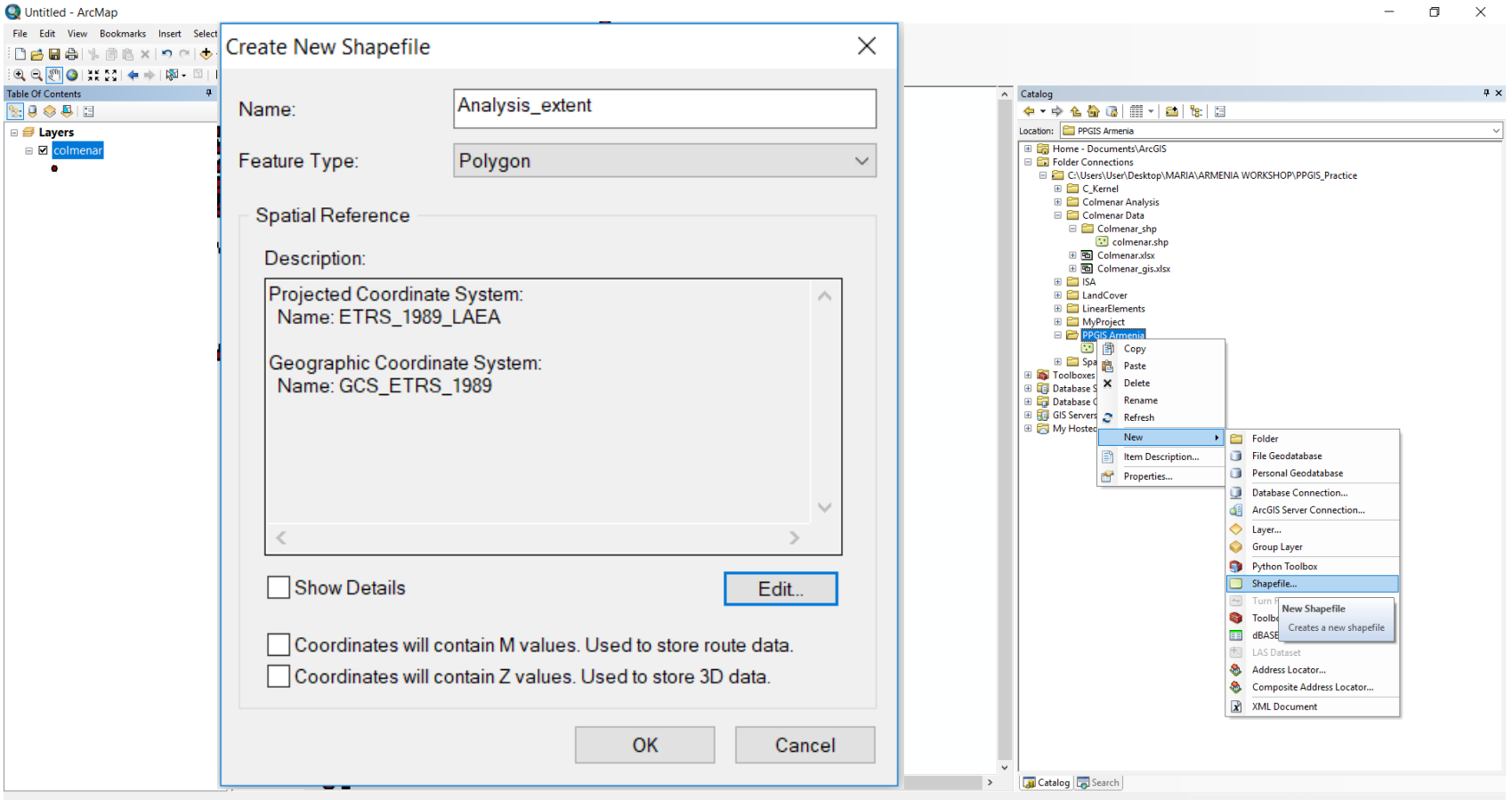
Preparing for the spatial analysis: analysis extent



Preliminary steps for the spatial analysis

Preparing for the spatial analysis: analysis extent

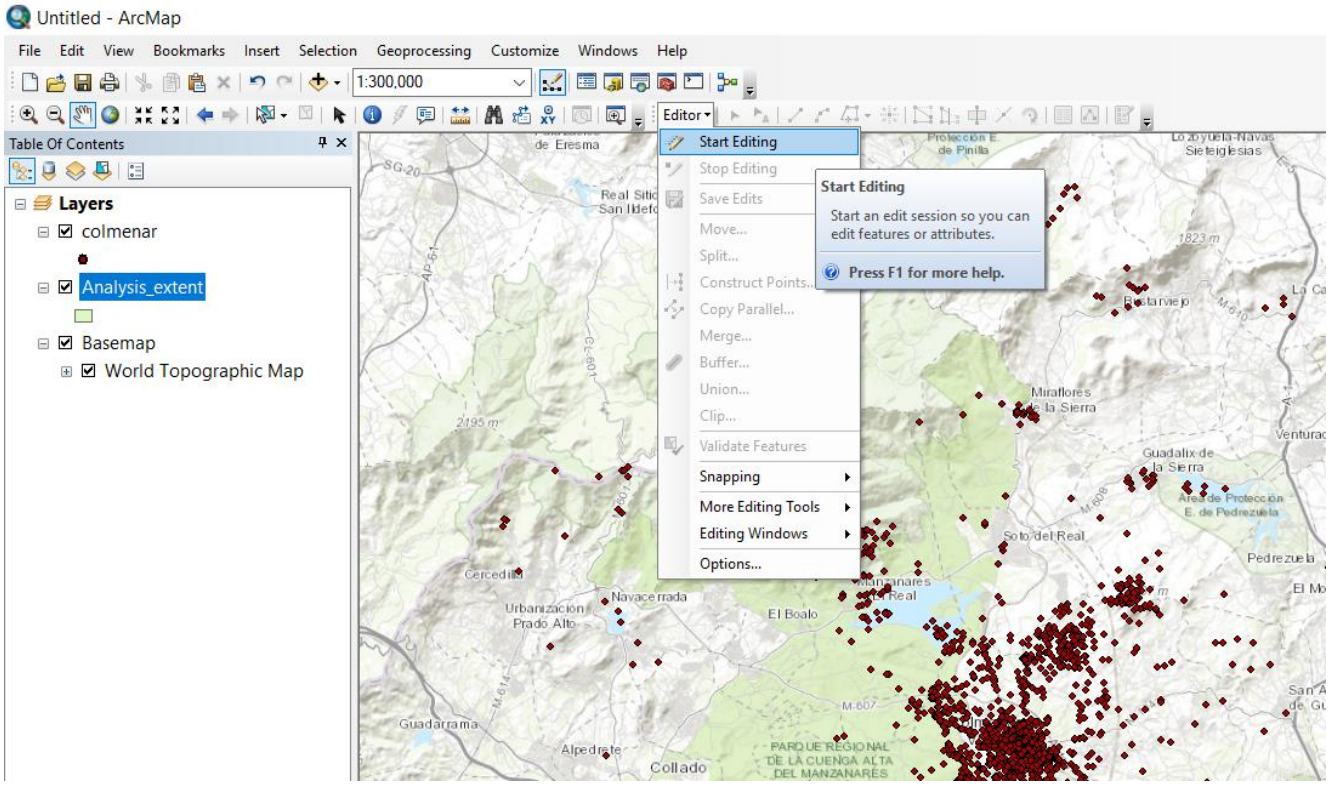
1. Open ArcMap and the point layer
2. Create a new shapefile using ArcCatalog

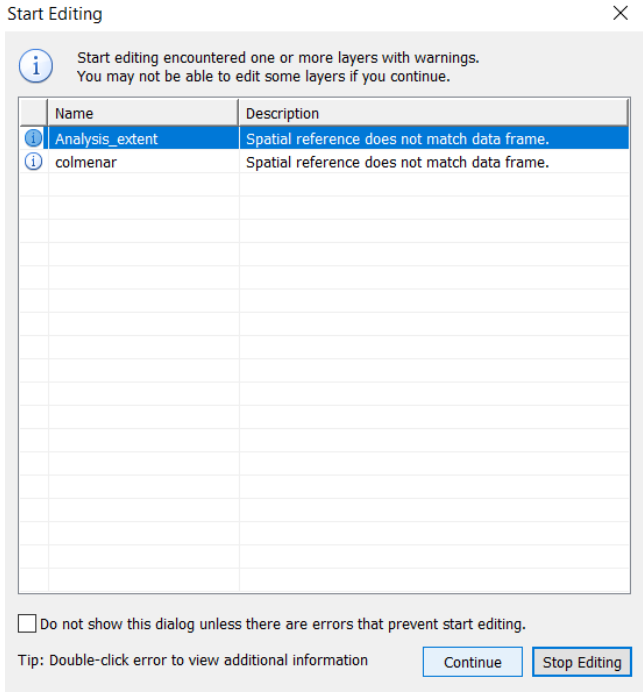


Preliminary steps for the spatial analysis

Preparing for the spatial analysis: analysis extent

3. Start the Editor
4. Draw the analysis extent

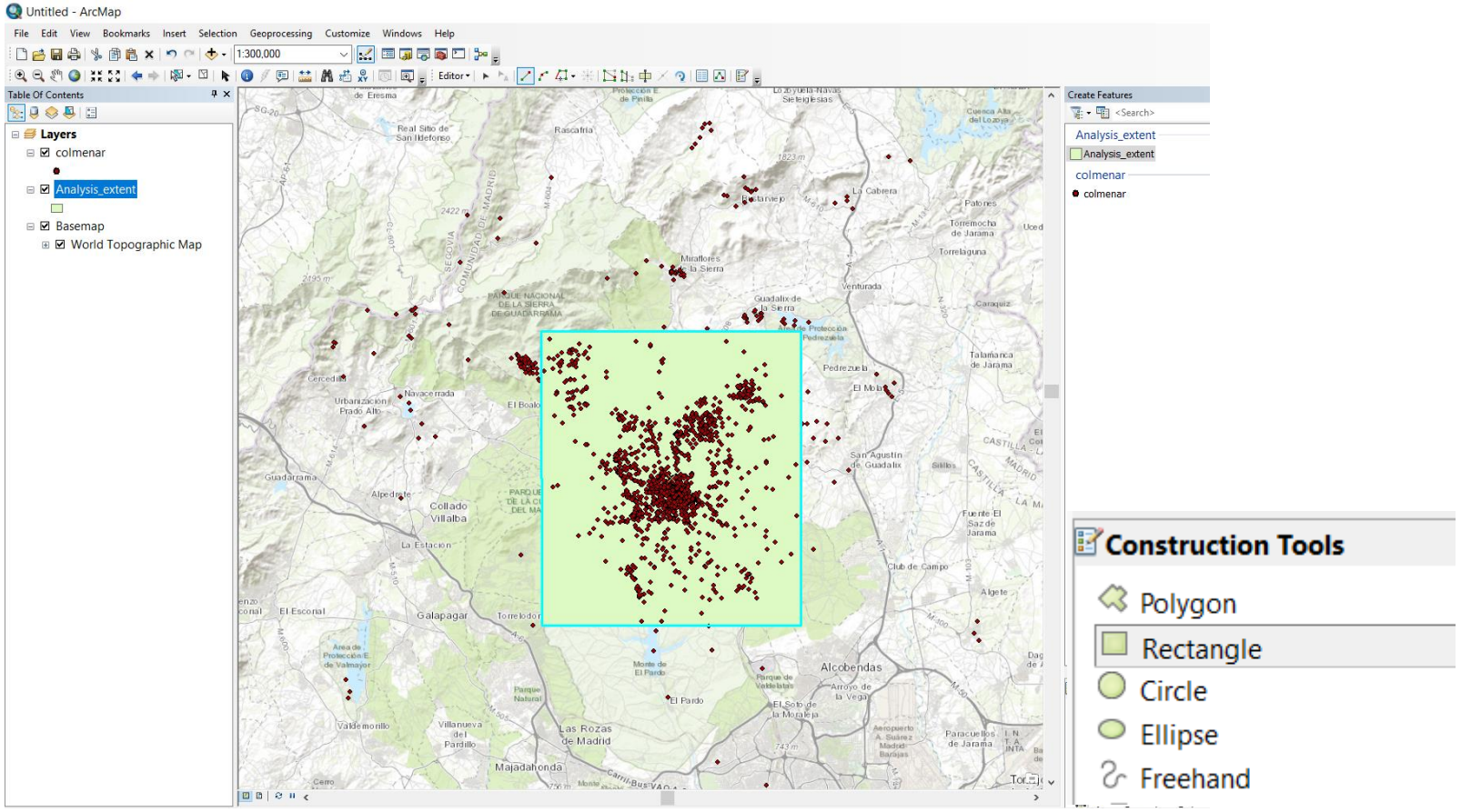




Preliminary steps for the spatial analysis

Preparing for the spatial analysis: analysis extent

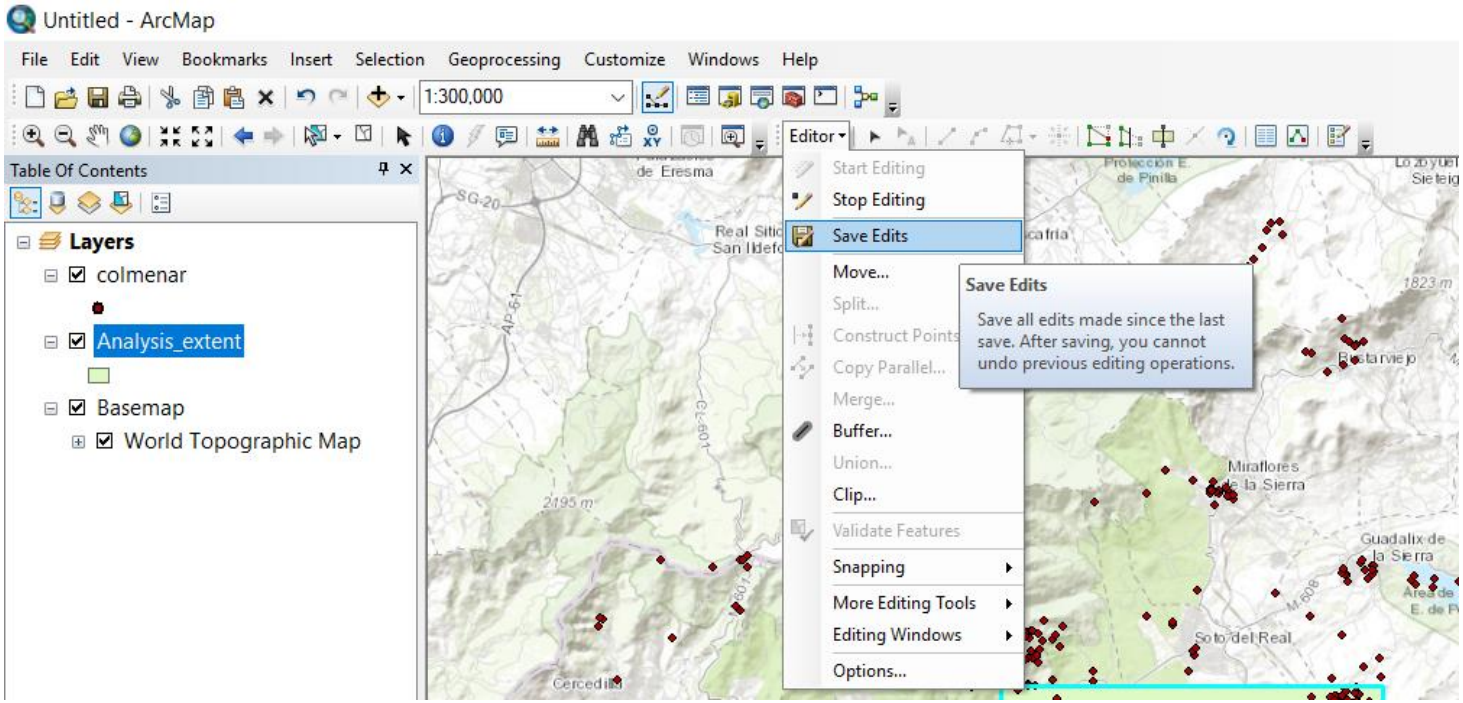
3. Start the Editor
4. Draw the analysis extent



Preliminary steps for the spatial analysis

Preparing for the spatial analysis: analysis extent

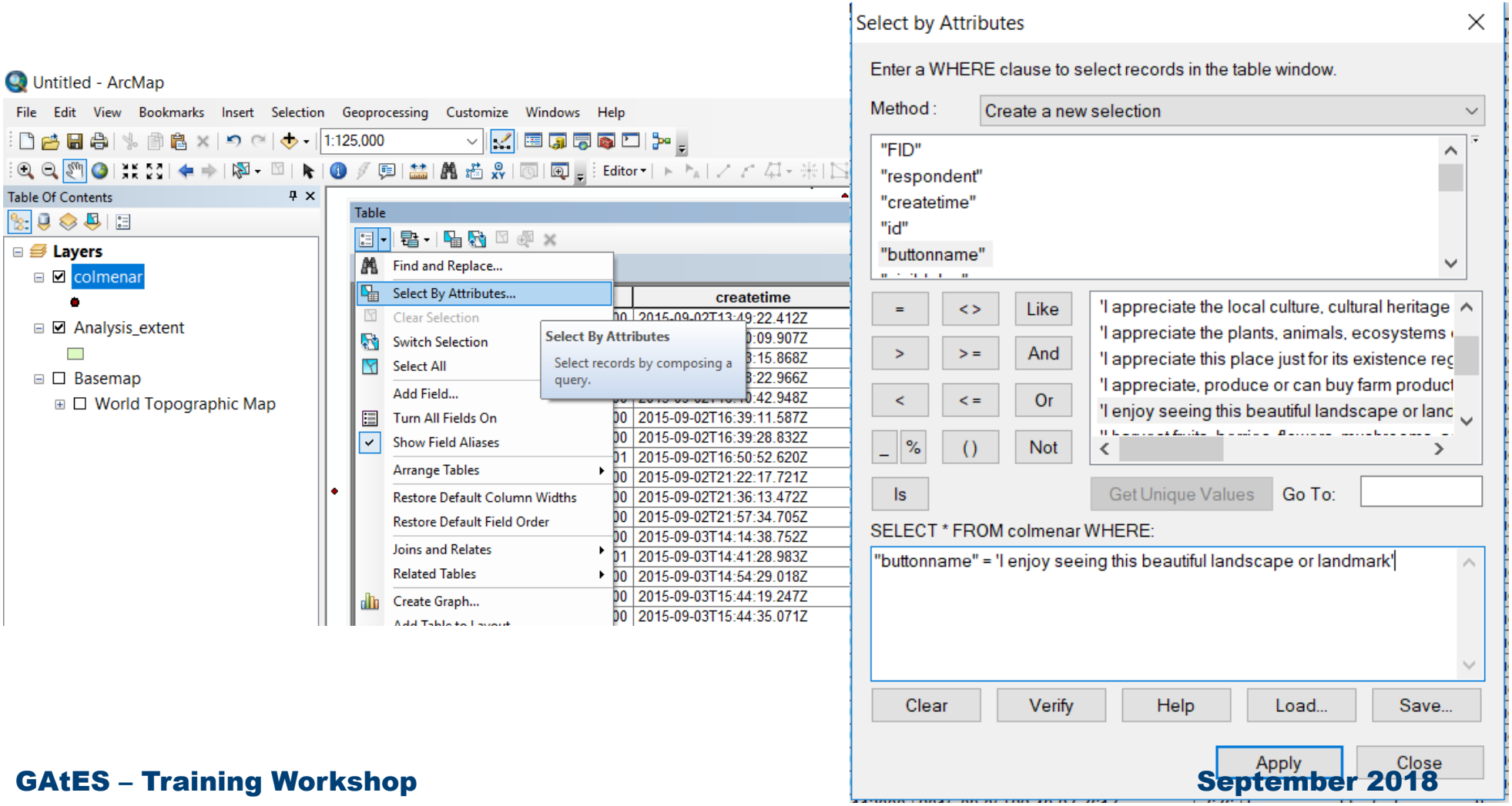
3. Start the Editor
4. Draw the analysis extent
5. Save the edits



Preliminary steps for the spatial analysis

Preparing for the spatial analysis: creating individual layers for each attribute

1. Select all the points of one of the attributes in the Attribute table (“buttonname”)



Preliminary steps for the spatial analysis

Preparing for the spatial analysis: creating individual layers for each attribute

1. Select all the points of one of the attributes in the Attribute table (“buttonname”)

Table

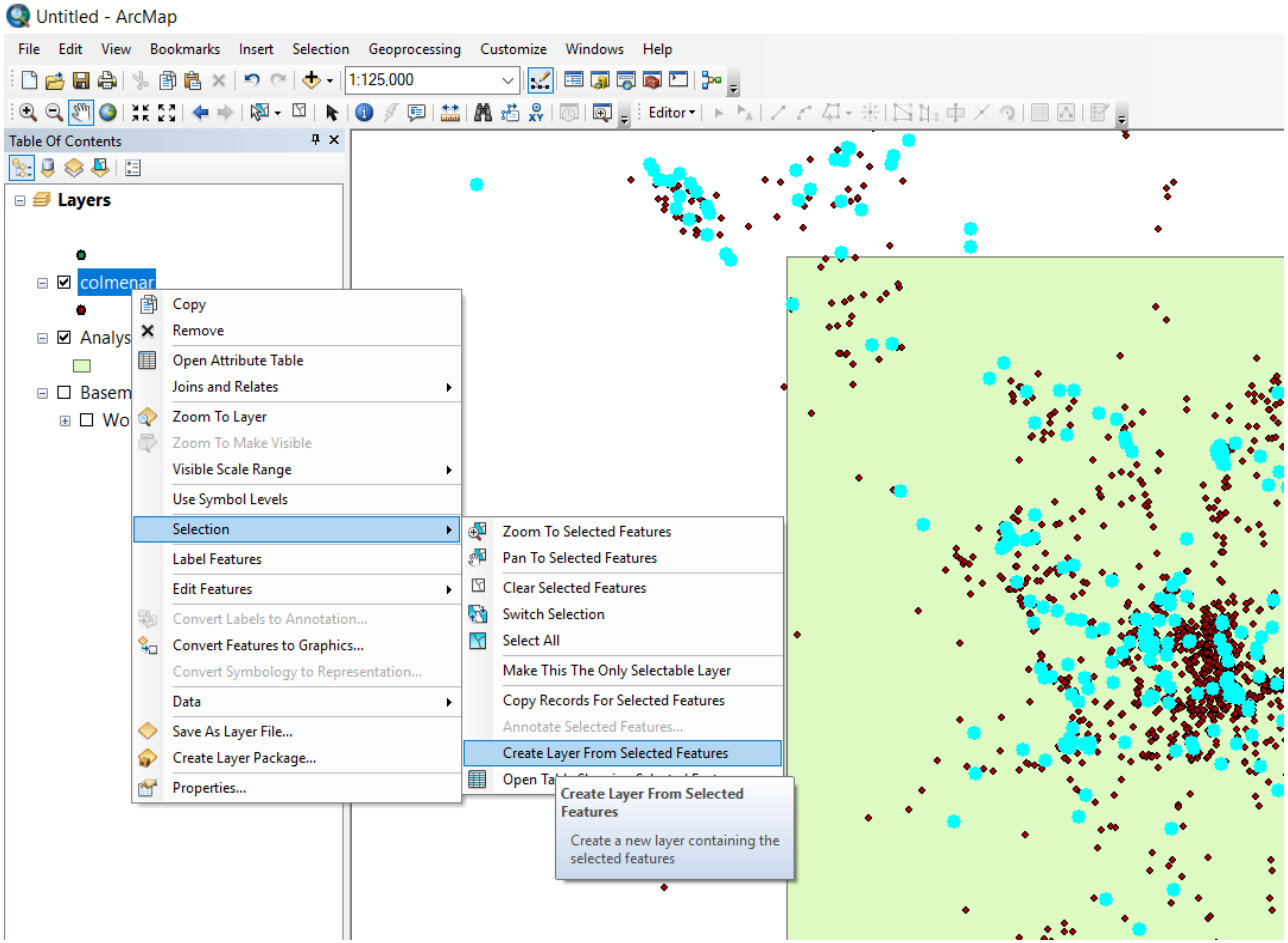
colmenar

FID	Shape *	respondent	createtime	id	buttonname	visiblelay	zoomlevel
1398	Point	10069001	2015-09-02T16:48:44.625Z	168	I practise outdoor sports, walking, hiking, biking, dog walking etc.	Bing satellite	14
1253	Point	10069001	2015-09-02T16:49:02.120Z	169	I harvest fruits, berries, flowers, mushrooms, asparagus, fish, game etc.	Bing satellite	14
1901	Point	10069001	2015-09-02T16:49:16.432Z	170	I spend time together with other people	Bing satellite	14
906	Point	10069001	2015-09-02T16:49:36.266Z	171	I enjoy seeing this beautiful landscape or landmark	Bing satellite	14
907	Point	10069001	2015-09-02T16:50:25.263Z	172	I enjoy seeing this beautiful landscape or landmark	Bing satellite	14
447	Point	10069001	2015-09-02T16:50:43.380Z	173	I appreciate the local culture, cultural heritage or history	Bing satellite	14
7	Point	10069001	2015-09-02T16:50:52.620Z	174	I am inspired by feelings, new thoughts, religious or spiritual meanings etc.	Bing satellite	14
802	Point	10069001	2015-09-02T16:51:19.040Z	175	I appreciate this place just for its existence regardless of benefits for me or others	Bing satellite	14
632	Point	10069001	2015-09-02T16:51:34.298Z	176	I appreciate the plants, animals, ecosystems etc.	Bing satellite	14
1399	Point	10069001	2015-09-02T16:52:06.521Z	177	I practise outdoor sports, walking, hiking, biking, dog walking etc.	Bing satellite	14
336	Point	10069001	2015-09-02T16:52:22.962Z	178	I appreciate the environmental capacity to produce, preserve, clean, and renew air, soil, and/or water	Bing satellite	14
2106	Point	10073000	2015-09-02T20:57:20.947Z	183	My home	Bing satellite	15
1400	Point	10073000	2015-09-02T20:58:45.003Z	184	I practise outdoor sports, walking, hiking, biking, dog walking etc.	Bing satellite	15
1254	Point	10073000	2015-09-02T21:00:03.247Z	185	I harvest fruits, berries, flowers, mushrooms, asparagus, fish, game etc.	Bing satellite	14
170	Point	10073000	2015-09-02T21:01:01.977Z	186	I appreciate, produce or can buy farm products here	Bing satellite	14
1902	Point	10073000	2015-09-02T21:01:40.676Z	187	I spend time together with other people	Bing satellite	14
908	Point	10073000	2015-09-02T21:02:15.530Z	188	I enjoy seeing this beautiful landscape or landmark	Bing satellite	14
448	Point	10073000	2015-09-02T21:02:46.542Z	189	I appreciate the local culture, cultural heritage or history	Bing satellite	14
803	Point	10073000	2015-09-02T21:03:26.728Z	190	I appreciate this place just for its existence regardless of benefits for me or others	Bing satellite	14

Preliminary steps for the spatial analysis

Preparing for the spatial analysis: creating individual layers for each attribute

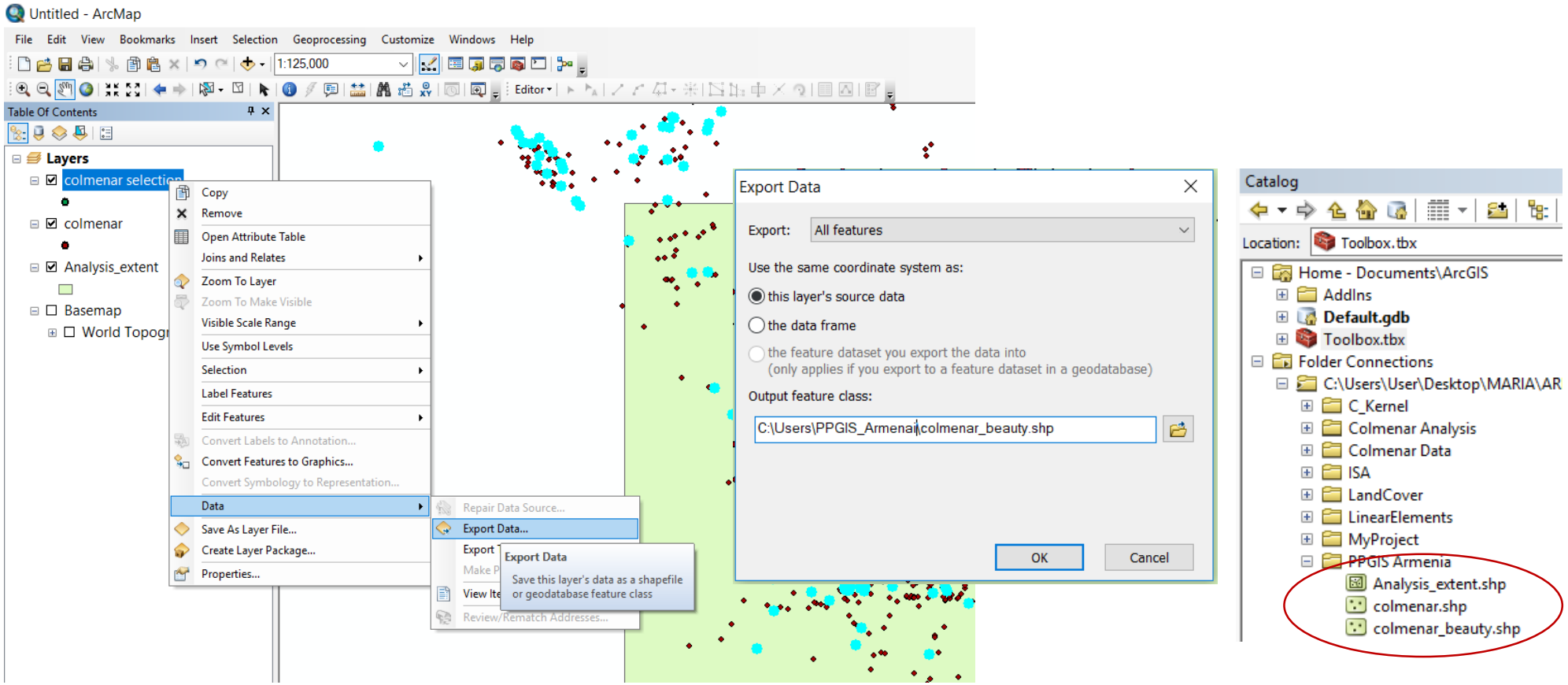
2. Click on the layer and select create layer from selection



Preliminary steps for the spatial analysis

Preparing for the spatial analysis: creating individual layers for each attribute

2. Click on the layer and select create layer from selection
3. Export the selected layer to create a shapefile

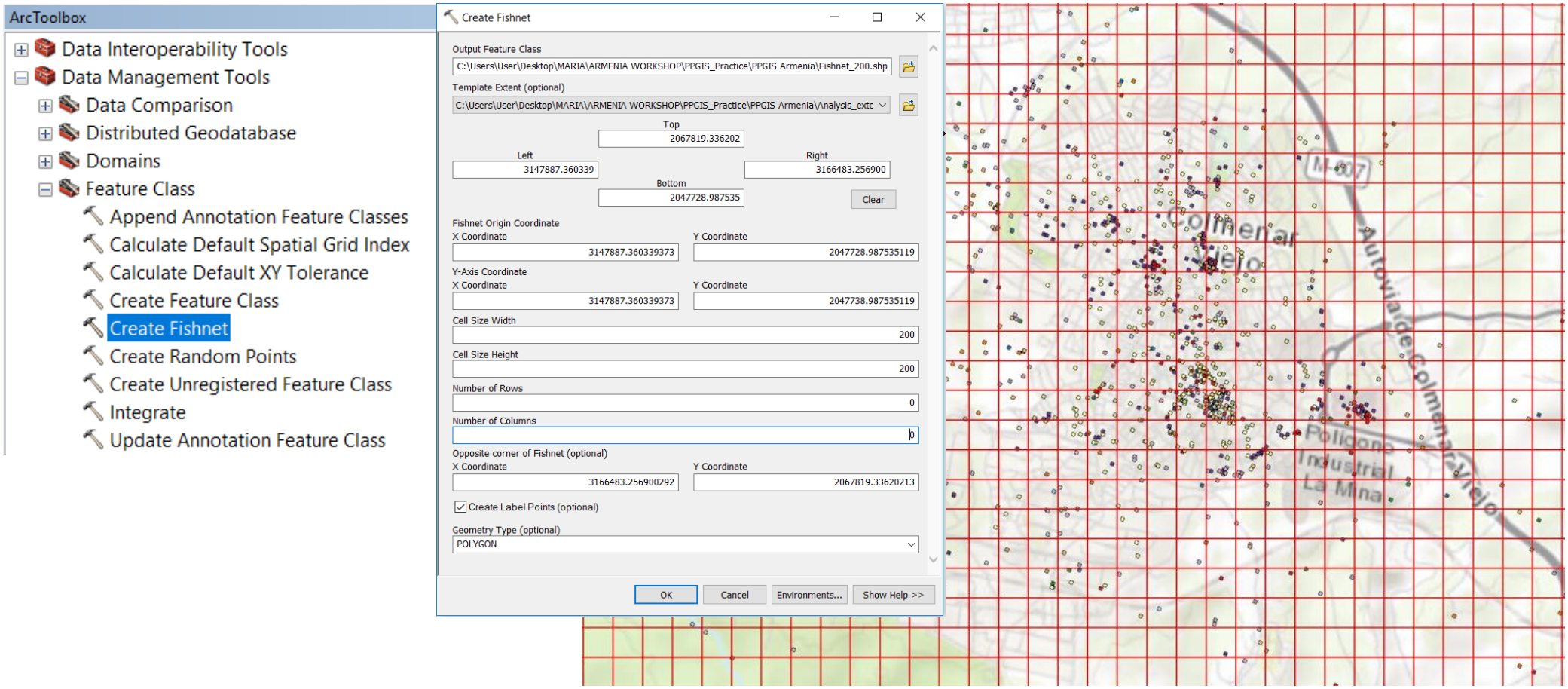


Preliminary steps for the spatial analysis

Preparing for the spatial analysis: creating a fishnet (polygon grid)

1. Use the “analysis extent” layer as “template extent”
2. Introduce the size of the cells (200 m)

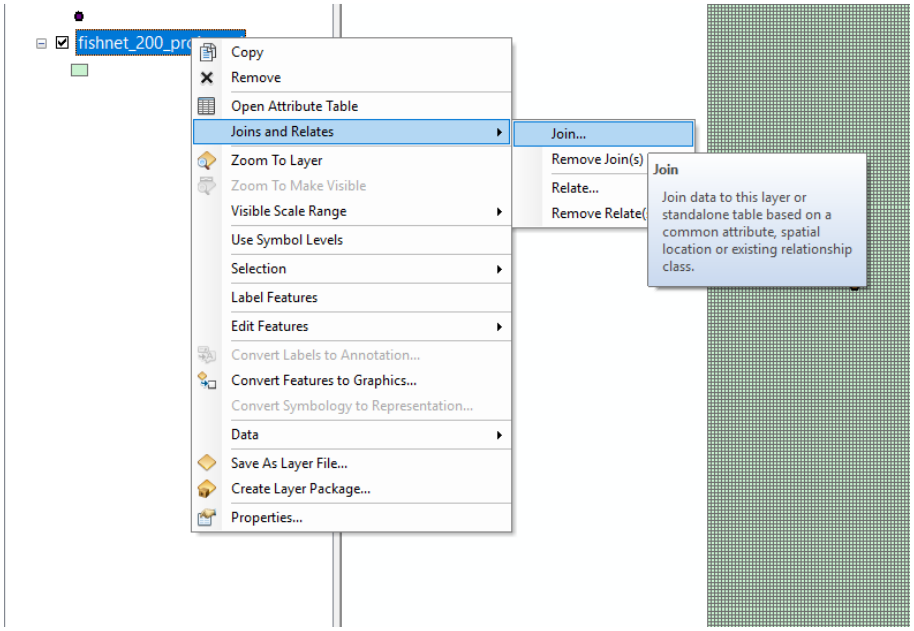
How many cells have been created?

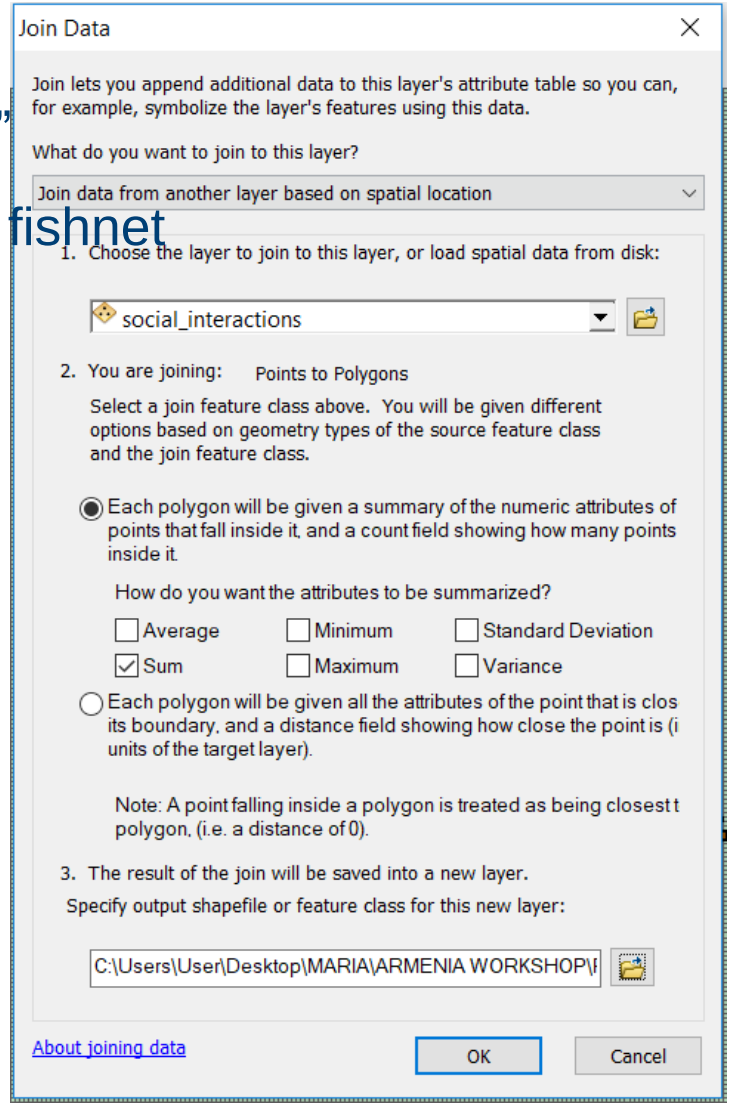


Preliminary steps for the spatial analysis

Preparing for the spatial analysis: spatial join of points into fishnet

1. Open the “Join” tool for the fishnet layer
2. Select the join option based on the “spatial location”
3. Choose the points layer you are going to join to the fishnet
4. Select “Sum” as the summarising option



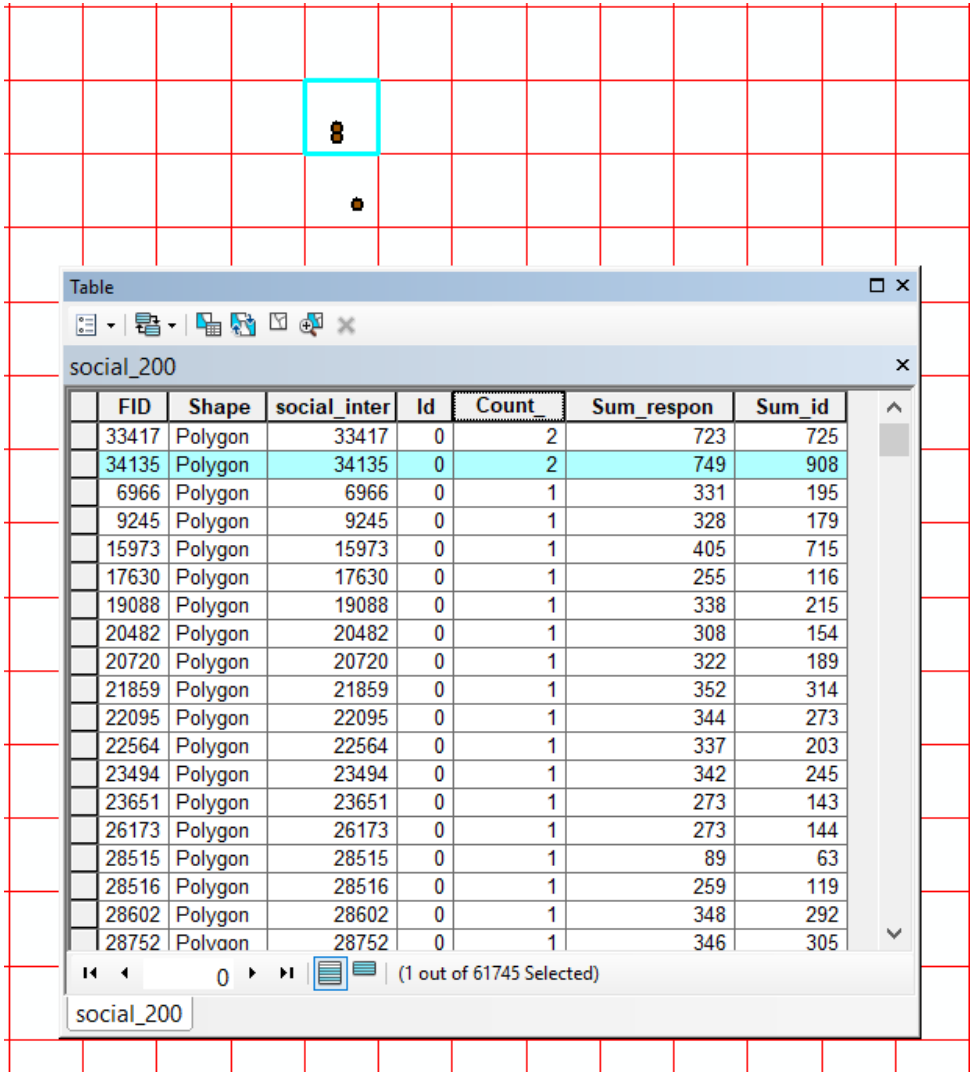


Preliminary steps for the spatial analysis

Preparing for the spatial analysis:

spatial join of points into fishnet

5. Zoom in and select a cell that has more than one point. Can you find it in the attribute table?
6. How many empty cells are there in the attribute table?



Preliminary steps for the spatial analysis

Preparing for the spatial analysis: activating the spatial analysis tools