

# Datathon para la visualización de los ODS utilizando Datos Abiertos

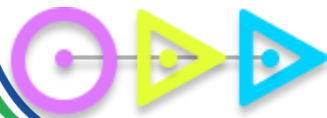
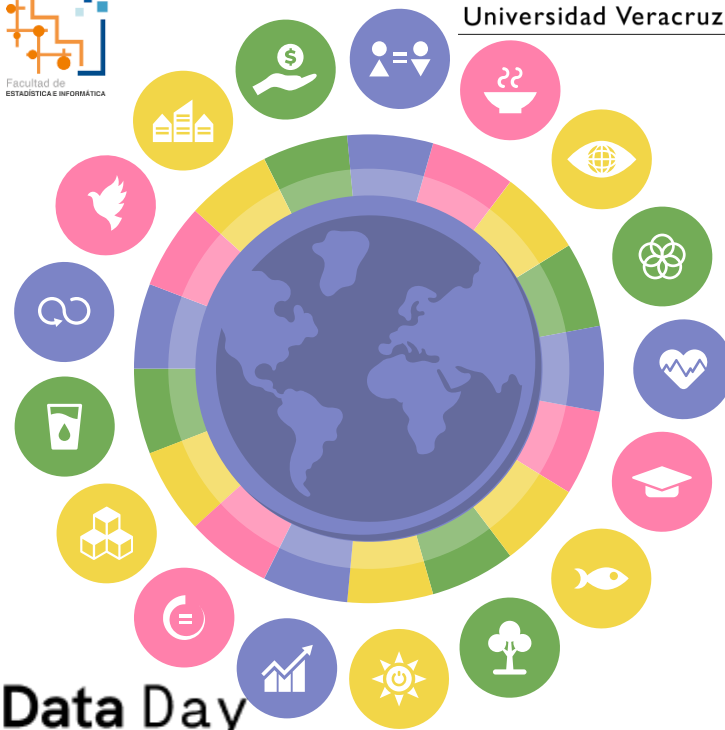


Universidad Veracruzana



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## Día de los Datos Abiertos, 2024



## Open Data Day



# Programa



01

## ODS de la Agenda 2030

MCD Lorena López Lozada

02

## Introducción al manejo de datos

Dr. Ángel Juan Sánchez García

03

## Visualización espacial de datos

Dr. Angel Fernando Argüello Ortiz

04

## Introducción al Aprendizaje Automático

MIA Juan Luis López Herrera

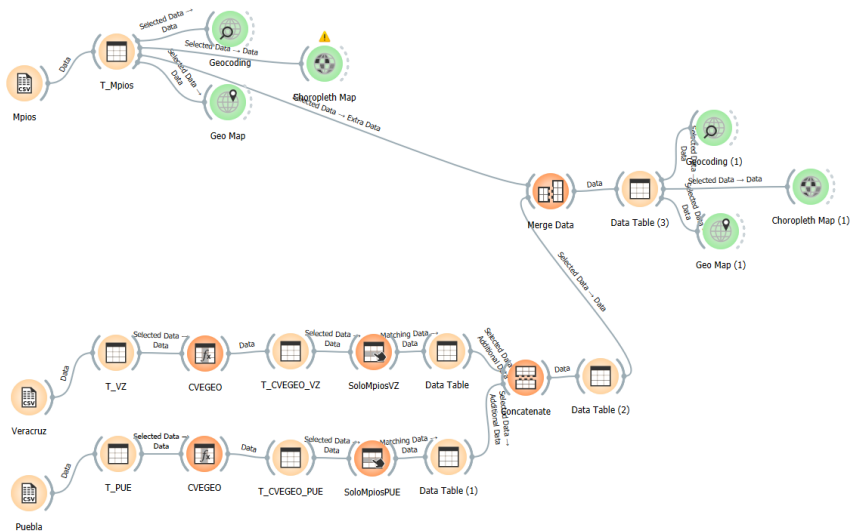
# Dr. Ángel Fernando Argüello Ortiz



[aarguello@uv.mx](mailto:aarguello@uv.mx)



# 03



# Visualización espacial de datos

# Datos para trabajar

INEGI 2020

[https://www.inegi.org.mx/programas/ccpv/2020/#datos\\_abiertos](https://www.inegi.org.mx/programas/ccpv/2020/#datos_abiertos)

Principales Resultados por AGEB Urbana

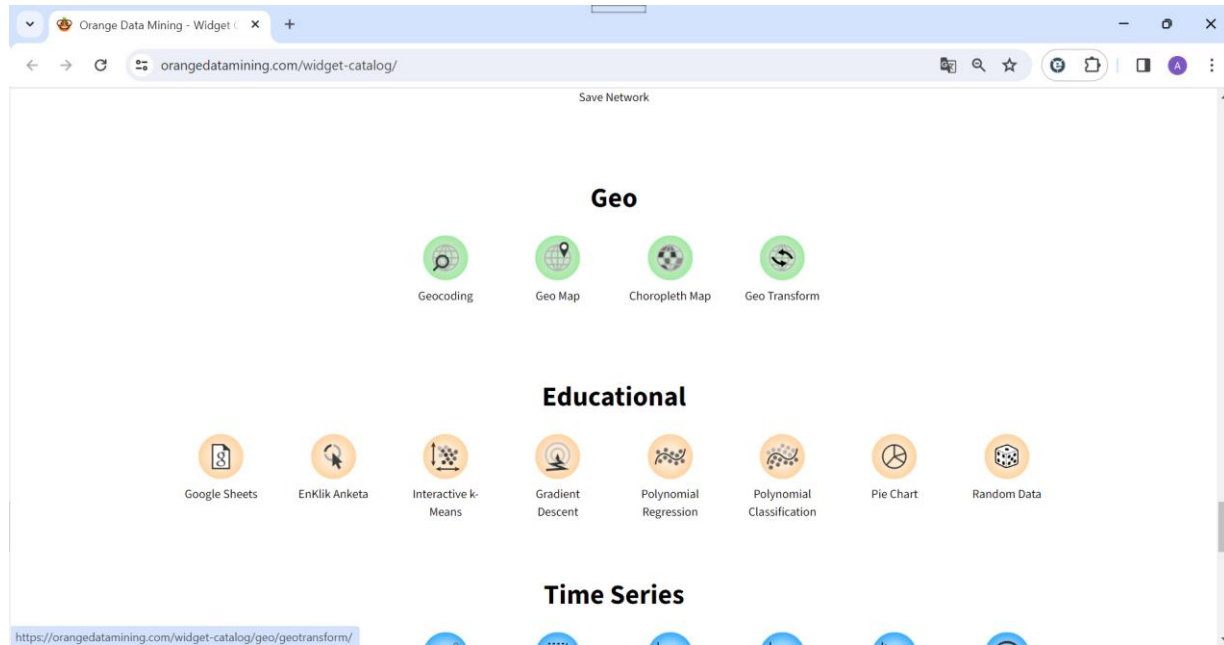
Datos municipales a nivel nacional

Enlace para descargar las bases de datos:

[https://drive.google.com/drive/folders/14qjB8AM\\_jRkip9m\\_mTQbnmRPN\\_uXBQqk-?usp=sharing](https://drive.google.com/drive/folders/14qjB8AM_jRkip9m_mTQbnmRPN_uXBQqk-?usp=sharing)

# Widget GEO

<https://orangedatamining.com/widget-catalog/>

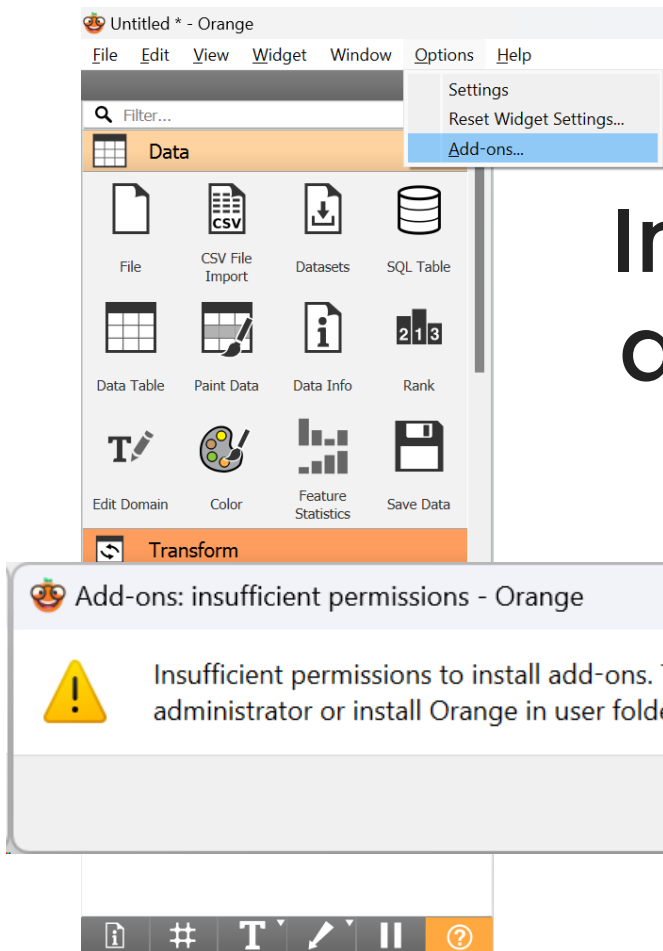
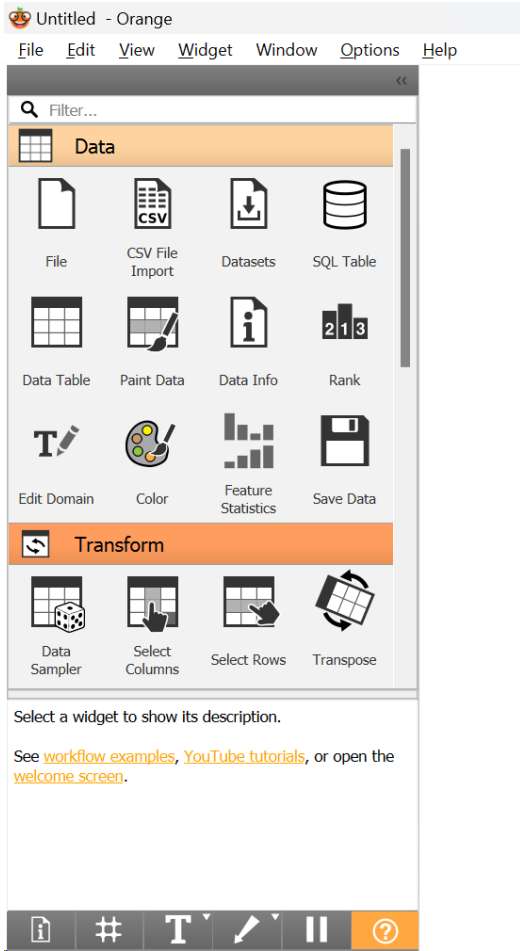


# Instalación del Widget GEO

El plugin de mapas en Orange, conocido como **Orange3-Geo**, es una extensión que permite la visualización y análisis de datos geoespaciales dentro del entorno de Orange.

Este plugin se basa en la librería **Folium** de Python, que a su vez utiliza **Leaflet.js** para la visualización interactiva de mapas.

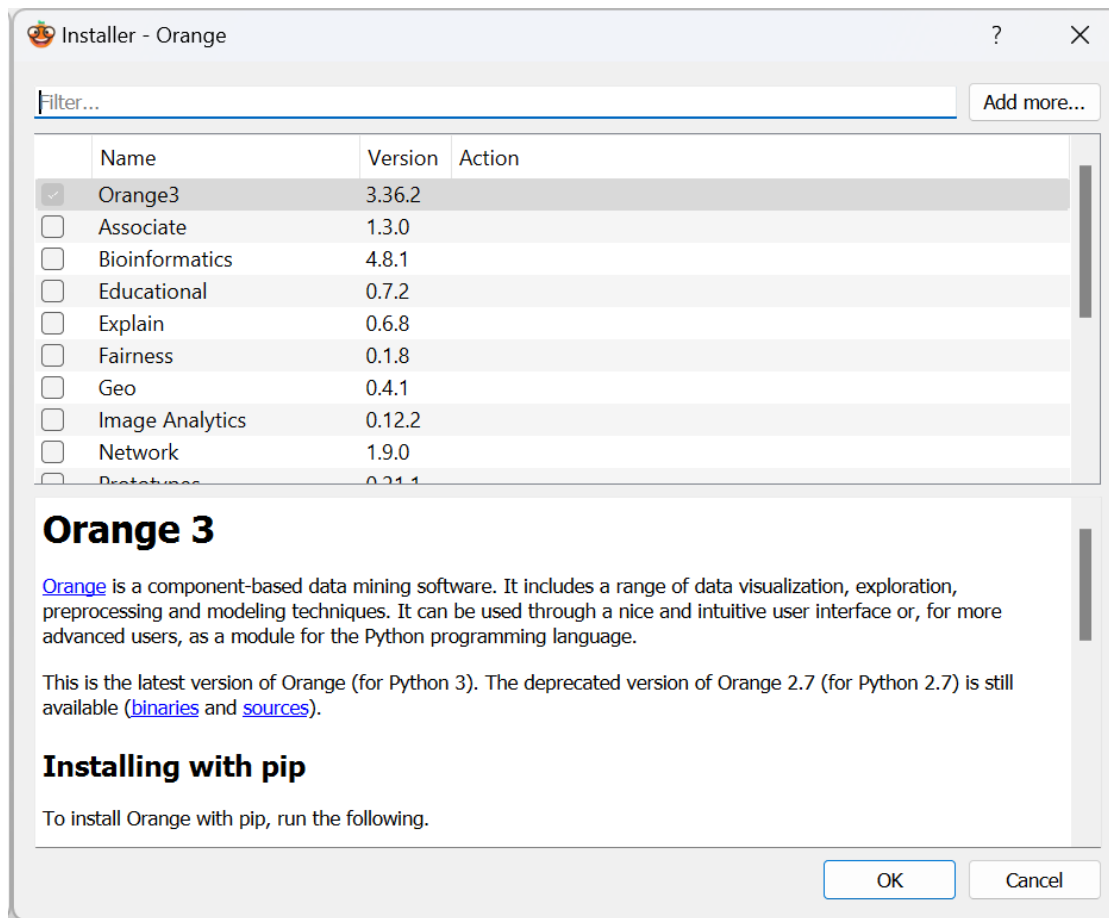
Para utilizar el plugin de mapas en Orange, debe ser instalado a través de la interfaz gráfica de Orange desde **Options > Add-ons**, buscando **Orange3-Geo** en la lista de complementos disponibles y luego haciendo clic en **Install**.



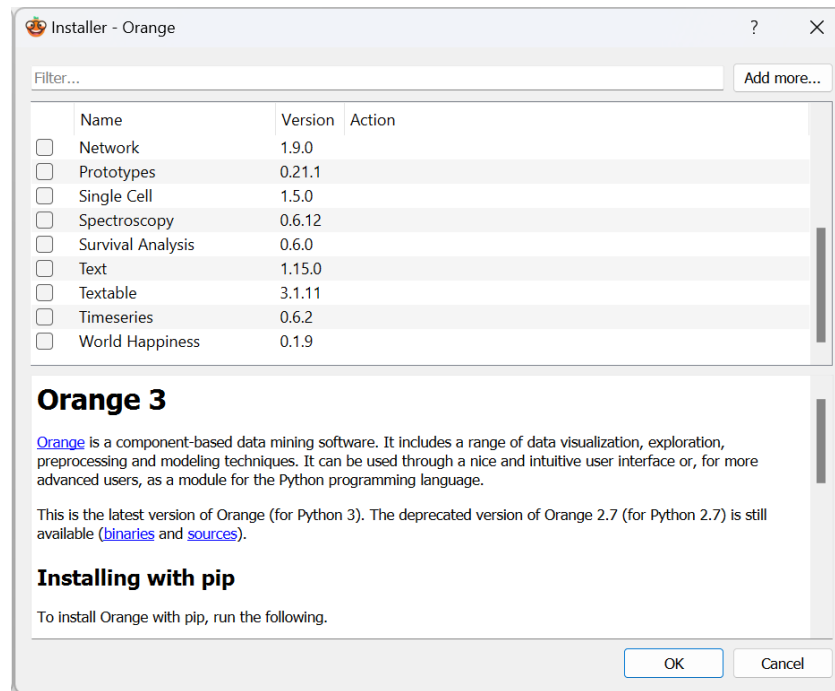
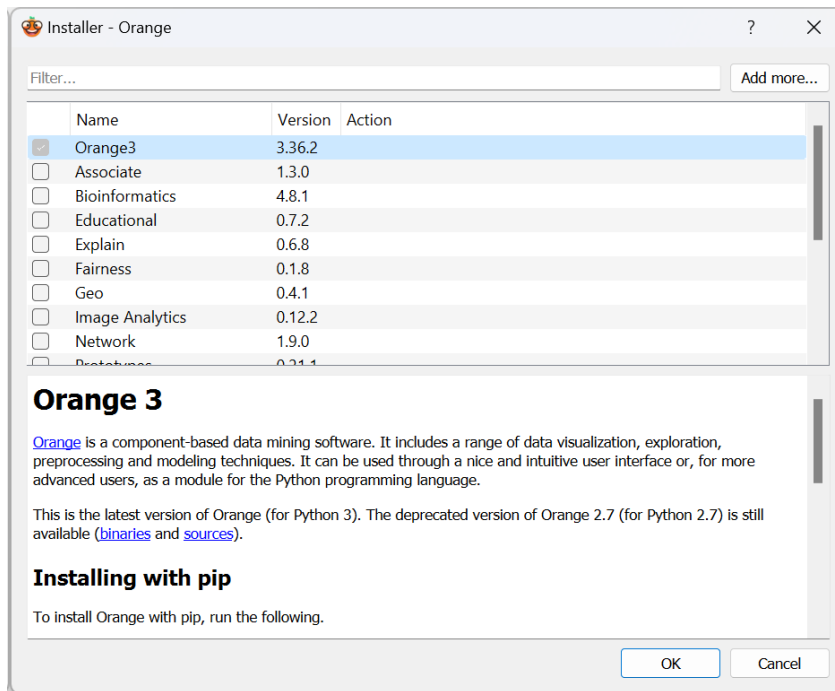
# Instalación del Widget GEO



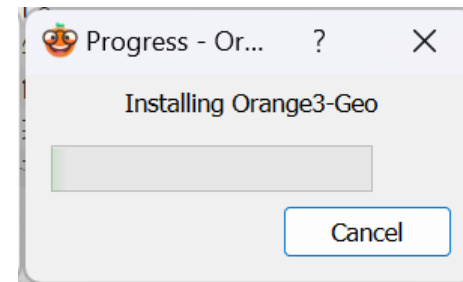
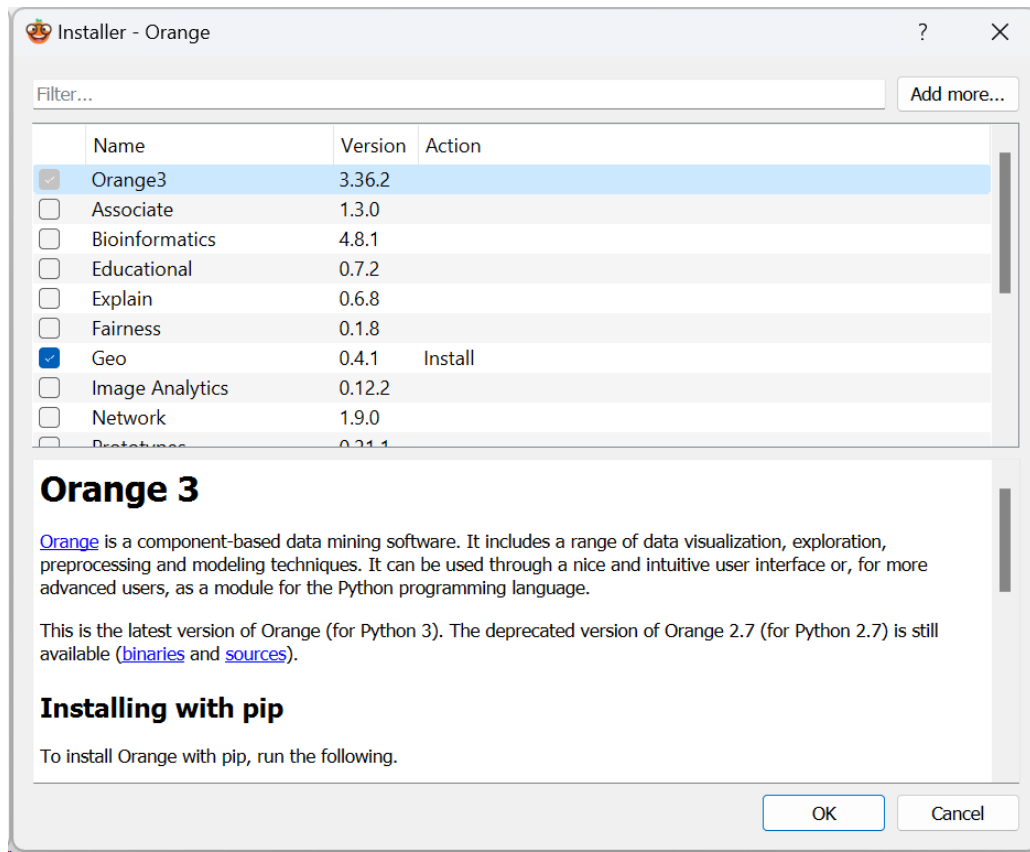
# Instalación del Widget GEO



# Instalación del Widget GEO



# Instalación del Widget GEO



# Instalación del Widget GEO

Orange 3

Orange is a component-based data mining software. It includes a range of data visualization, exploration, preprocessing and modeling techniques. It can be used through a nice and intuitive user interface or, for more advanced users, as a module for the Python programming language.

This is the latest version of Orange (for Python 3). The deprecated version of Orange 2.7 (for Python 2.7) is still available ([binaries](#) and [sources](#)).

**Installing with pip**

To install Orange with pip, run the following.

Name	Version	Action
<input checked="" type="checkbox"/> Orange3	3.36.2	
<input type="checkbox"/> Associate	1.3.0	
<input type="checkbox"/> Bioinformatics	4.8.1	
<input type="checkbox"/> Educational	0.7.2	
<input type="checkbox"/> Explain	0.6.8	
<input type="checkbox"/> Fairness	0.1.0	
<input checked="" type="checkbox"/> Geo	0.4.0	
<input type="checkbox"/> Image Analytics	0.1.0	
<input type="checkbox"/> Network	1.5.0	
<input type="checkbox"/> Preprocessing	0.1.0	

Information - Orange

Orange needs to be restarted for the changes to take effect.  
Press OK to restart Orange now.

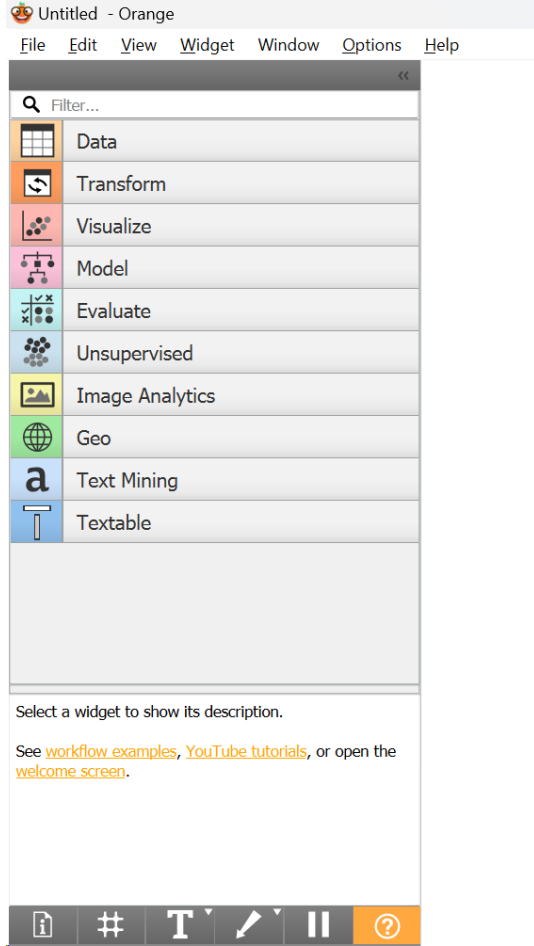
OK Close later

Save Changes? - Orange

Do you want to save this workflow?  
Your changes will be lost if you do not save them.

Save Discard Cancel

# Widget GEO



# Preparación de las bases de datos

The screenshot shows the ArcMap interface with a data table open. The table contains population data for various municipalities in Mexico. A context menu is displayed over the 'Agregar campo...' option, with a sub-menu showing 'Agregar campo' and 'Agregar un nuevo campo a la tabla.' The map on the right shows the geographical outline of Mexico with a grid overlay.

NOMGEO	POB1	POB2	POB4	POB5
Calientes	948990	44372	48767	97947
os	51536	3170	3342	6605
	58250	3159	3530	6748
	17000	1032	1062	2086
María	129929	6945	7998	15597
in de Arteaga	47646	2746	2967	5645
de Romos	57369	3545	3615	7121
sé de Gracia	9552	663	609	1212
alá	22485	1255	1430	2869
o	20853	1268	1274	2459
ancisco de los Romo	61997	3709	4239	8394
ada	443807	18918	21114	42133
ili	1049792	37394	45624	99545
	108440	4659	5405	10156
	1922523	76912	89708	187414
de Rosarito	126890	4420	5696	12601
uintín	117568	7654	7739	14089
dú	73021	3080	3444	7422
	64022	3231	3634	6832
	292241	10882	12776	26992
bos	351111	17967	19158	38304
	18052	803	858	1926
	59232	2899	3202	6289

# Agregar campos de longitud y latitud

EdoMpal - ArcMap

Archivo Editar Vista Marcador Insertar Selección Geoprocamiento Personalizar Ventanas Ayuda

1:16,716,049 Georreferenciación Geostatistical Analyst

Dibujo Arial 10 B I U A Editor

Tabla

municipal

FID	Shape	CVEGEO	NOM_ENT	NOMGEO	POB1	POB2	POB4	POB5
0	Poligono	01001	Aguascalientes	Aguascalientes	948990	44372	48767	97947
1	Poligono	01002	Aguascalientes	Asientos	51536	3170	3342	6605
2	Poligono	01003	Aguascalientes	Calvillo	58250	3159	3530	6748
3	Poligono	01004	Aguascalientes	Cosío	17000	1032	1062	2086
4	Poligono	01005	Aguascalientes	Jesús María	129929	6945	7998	15597
5	Poligono	01006	Aguascalientes	Pabellón de Arteaga	47646	2746	2967	5645
6	Poligono	01007	Aguascalientes	Rincón de Romos	57369	3545	3615	7121
7	Poligono	01008	Aguascalientes	San José de Gracia	9552	663	609	1212
8	Poligono	01009	Aguascalientes	Tepezalá	22485	1255	1430	2869
9	Poligono	01010	Aguascalientes	El Llano	20853	1288	1274	2459
10	Poligono	01011	Aguascalientes	San Francisco de los Romo	61997	3709	4239	8394
11	Poligono	02001	Baja California	Ensenada	443807	18918	21114	42133
12	Poligono	02002	Baja California	Mexicali	1049792	37394	45624	99545
13	Poligono	02003	Baja California	Tecate	108440	4659	5405	10156
14	Poligono	02004	Baja California	Tijuana	1922523	76912	89708	187414
15	Poligono	02005	Baja California	Playas de Rosarito	126890	4420	5696	12601
16	Poligono	02006	Baja California	San Quintín	117568	7654	7739	14089
17	Poligono	03001	Baja California Sur	Comondú	73021	3080	3444	7422
18	Poligono	03002	Baja California Sur	Mulegé	64022	3231	3634	6832
19	Poligono	03003	Baja California Sur	La Paz	292241	10882	12776	26992
20	Poligono	03008	Baja California Sur	Los Cabos	351111	17967	19158	38304
21	Poligono	03009	Baja California Sur	Loreto	18052	803	858	1926
22	Poligono	04001	Campeche	Calkiní	59232	2899	3202	6289

Resultados ArcToolbox Tabla de Contenidos Catalogo

Agregar campo

Nombre: Latitud

Tipo: Flotante

Propiedades: Flotante

Precisión: Doble

Escala: Texto

Fecha

Aceptar Cancelar

2862025.432 359155.27 Metros

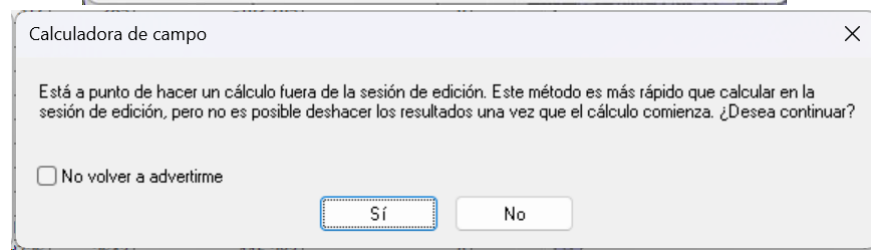
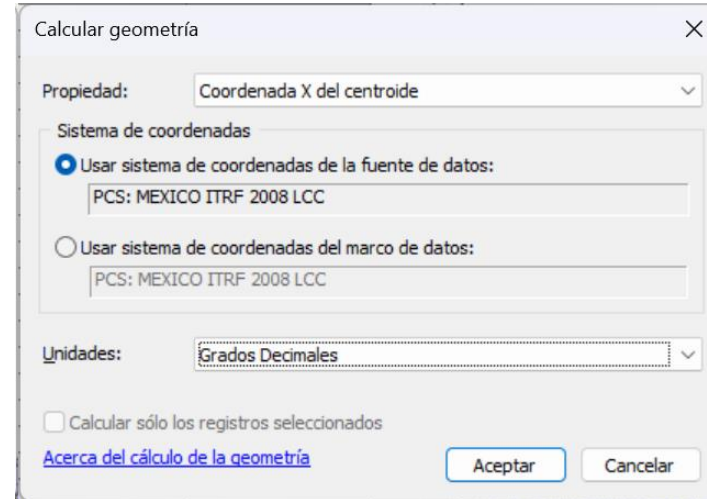
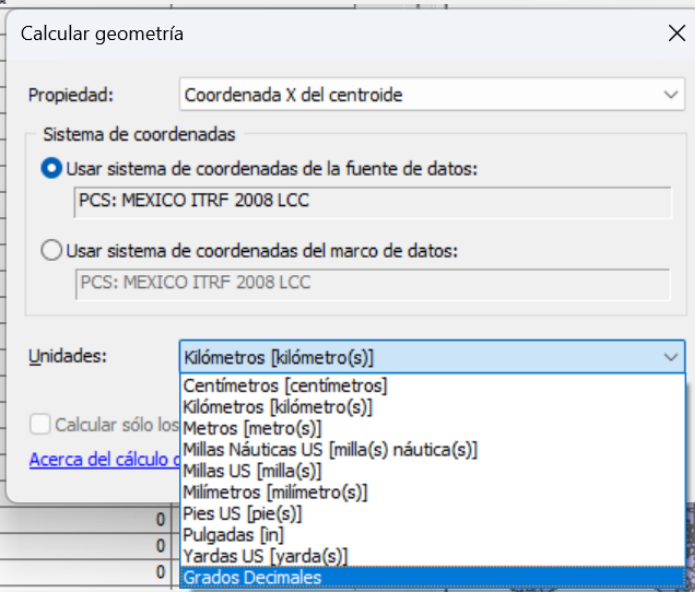
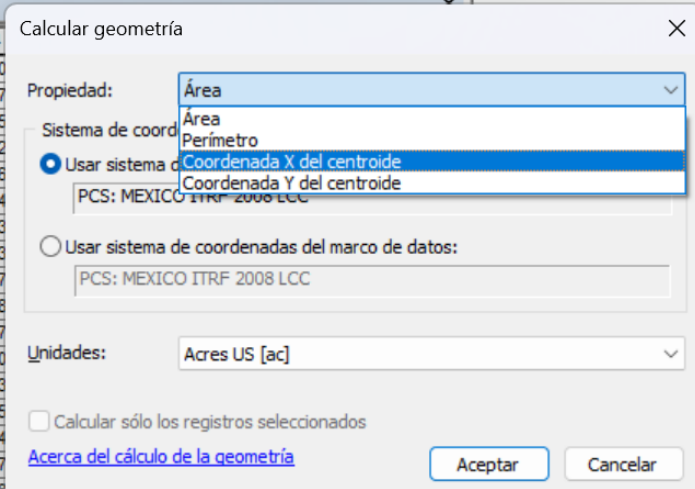
# Estimar centroides mediante calculadora de geometría

The screenshot shows the ArcMap interface with a data table named 'municipal'. The table contains columns for population (POB118 to POB124), longitude, and latitude. A context menu is open over the table, with 'Calcular geometría...' selected. A dialog box titled 'Calcular geometría' is displayed, asking for confirmation to perform a calculation outside the edit session. The dialog includes a 'No volver a advertirme' checkbox and 'Sí' and 'No' buttons. A tooltip for the 'Calcular geometría' command is also visible, explaining its function.

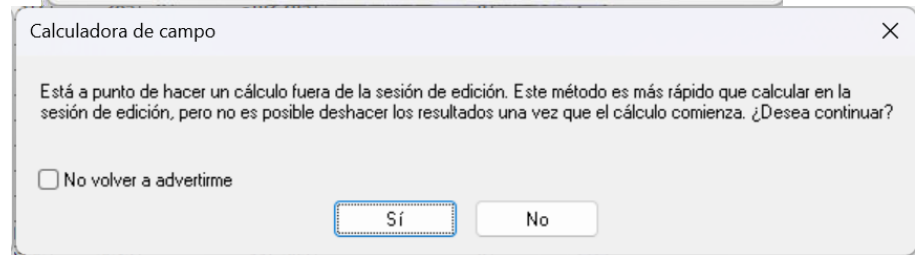
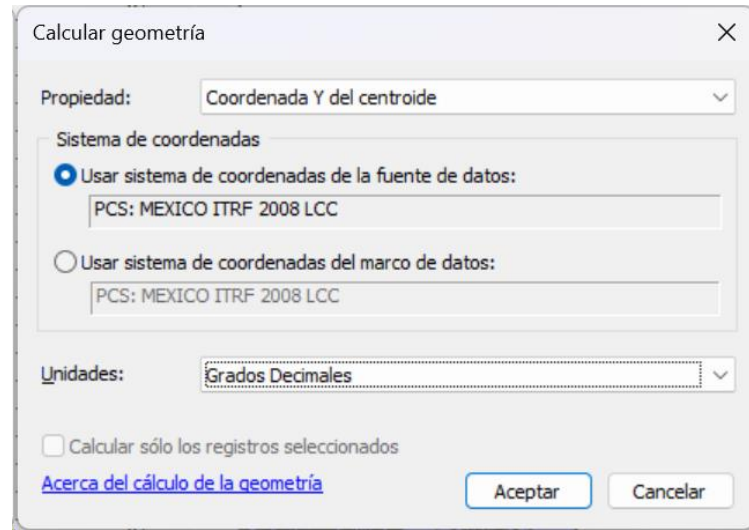
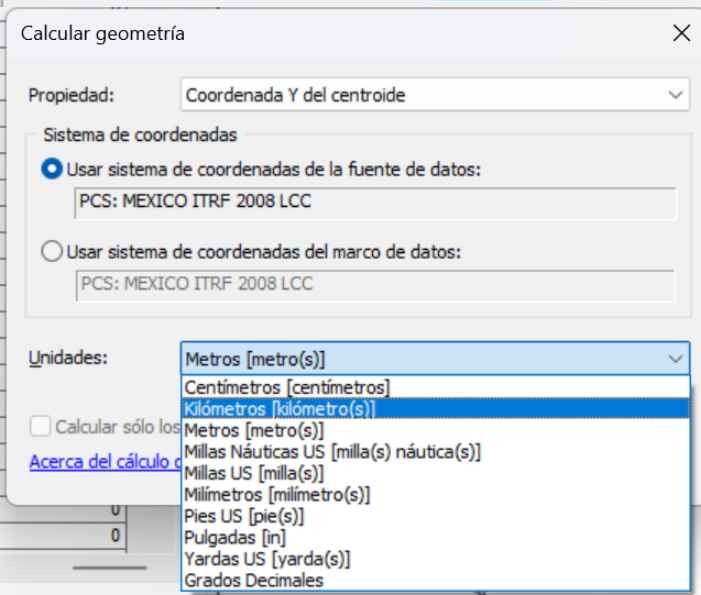
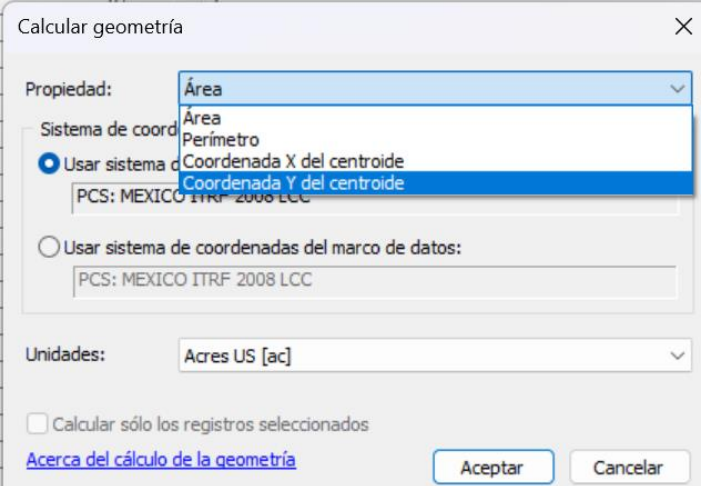
POB118	POB119	POB120	POB121	POB122	POB123	POB124	Longitud	Latitud
24200	19631	11770	8177	5230	2817	2180		
1105	883	507	425	285	217	197		
1335	1067	915	723	529	317	285		
349	322	192	151	97	51	62		
3039	2121	1205	826	530	311	246		
1048	826	514	335	222	171	144		
1196	944	594	426	307	196	183		
199	158	101	69	62	52	43		
459	383	217	187	157	85	97		
504	397	249	159	135	68	88		
1177	876	434	304	185	112	97		
12922	10427	6401	4526	2913	1625	1100		
32183	25424	14459	9707	6205	3726	2643		
3501	2753	1487	1040	631	337	305		
57650	41280	19782	13529	7787	4655	3234		
4041	3064	1893	1367	824	471	297		
2492	1830	960	643	473	246	198	0	0
2152	1924	1184	805	556	372	259	0	0
1897	1581	804	571	445	235	198	0	0
8653	7083	4659	2977	1915	991	813	0	0
8660	5822	2677	1631	946	478	360	0	0
548	495	263	181	122	58	38	0	0
1386	1128	891	608	459	317	312	0	0



# Estimar centroides mediante calculadora de geometría



# Estimar centroides mediante calculadora de geometría



# Centroides municipales

EdoMpal - ArcMap

Archivo Editar Vista Marcador Insertar Selección Geoprocamiento Personalizar Ventanas Ayuda

1:16,716,049

Georreferenciación

Gegstatistical Analyst

Dibujo

Editor

Tabla

Resultados

ArcToolbox

Tabla de Contenidos

Catálogo

POB118	POB119	POB120	POB121	POB122	POB123	POB124	Longitud	Latitud
24200	19631	11770	8177	5230	2817	2180	-102.296	21.8114
1105	883	507	425	285	217	197	-102.046	22.1265
1335	1067	915	723	529	317	285	-102.705	21.9007
349	322	192	151	97	51	62	-102.297	22.3606
3039	2121	1205	826	530	311	246	-102.446	21.9321
1048	826	514	335	222	171	144	-102.302	22.1045
1196	944	594	426	307	196	183	-102.341	22.2674
199	158	101	69	62	52	43	-102.526	22.1486
459	383	217	187	157	85	97	-102.192	22.237
504	397	249	159	135	68	88	-102.035	21.9215
1177	876	434	304	185	112	97	-102.229	22.0331
12922	10427	6401	4526	2913	1625	1100	-115.622	31.103
32183	25424	14459	9707	6205	3726	2643	-115.283	31.9015
3501	2753	1487	1040	631	337	305	-116.291	32.4348
57850	41280	19782	13529	7787	4655	3234	-116.847	32.4121
4041	3064	1893	1367	824	471	297	-116.889	32.2516
2492	1830	960	643	473	246	198	-114.517	29.3832
2152	1924	1184	805	556	372	259	-111.82	25.4913
1897	1581	804	571	445	235	198	-113.231	27.2861
8653	7083	4659	2977	1915	991	813	-110.663	24.1905
8660	5822	2677	1631	946	478	360	-109.753	23.2766
548	495	263	181	122	58	38	-111.448	25.9532
1386	1128	891	608	459	317	312	-90.2174	20.3838

0 (0 de 2469 Seleccionado)

municipal

2857602.635 1867328.983 Metros

# Centroides municipales

The screenshot shows the ArcMap interface with a data table titled 'MpiosGMS'. The table contains 22 rows of data, each representing a municipality with its centroid coordinates. A 'Guardando Datos' dialog box is open, showing the file path 'Inicio - Datathon\Mapas' and a list of files including 'Base00.xlsx' and 'Estadosxlsx.xlsx'. The dialog also shows the file name 'Export\_Output.dbf' and a dropdown menu for the file type, with 'Archivo de texto' selected.

FID	Shape *	CVEGEO	NOM_ENT				
0	Poligono	01001	Aguascalientes	Aguascalientes			
1	Poligono	01002	Aguascalientes	Asientos			
2	Poligono	01003	Aguascalientes	Calvillo			
3	Poligono	01004	Aguascalientes	Cosío			
4	Poligono	01005	Aguascalientes	Jesús María			
5	Poligono	01006	Aguascalientes	Pabellón de			
6	Poligono	01007	Aguascalientes	Rincón de R			
7	Poligono	01008	Aguascalientes	San José de			
8	Poligono	01009	Aguascalientes	Tepezalá			
9	Poligono	01010	Aguascalientes	El Llano			
10	Poligono	01011	Aguascalientes	San Francis			
11	Poligono	02001	Baja California	Ensenada			
12	Poligono	02002	Baja California	Mexicali			
13	Poligono	02003	Baja California	Tecate			
14	Poligono	02004	Baja California	Tijuana			
15	Poligono	02005	Baja California	Playas de R			
16	Poligono	02006	Baja California	San Quintín			
17	Poligono	03001	Baja California Sur	Comondú			
18	Poligono	03002	Baja California Sur	Mulegé			
19	Poligono	03003	Baja California Sur	La Paz			
20	Poligono	03008	Baja California Sur	Los Cabos			
21	Poligono	03009	Baja California Sur	Loreto			
22	Poligono	04001	Campeche	Calkiní	59232	2899	3202 628:

Untitled \* - Orange

File Edit View Widget Window Options Help

Filter...

Data

File CSV File Import Datasets SQL Table

Data Table Paint Data Data Info Rank

Edit Domain Color Feature Statistics Save Data

Transform

Visualize

Model

Evaluate

Unsupervised

Image Analytics

Geo

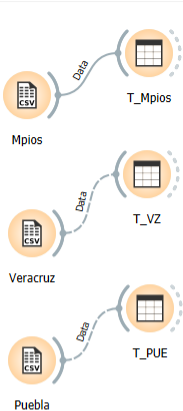
Text Mining

Textable

CSV File Import

Import a data table from a CSV formatted file.

more...



Mpios - Orange

View Window Help

File:  ...

Info

2469 rows, 129 features, 3 metas

Import Options... Cancel Reload

2469

# Municipios (Nacional) Veracruz Puebla

# Cargar las bases de datos

Import Options - Orange

Encoding:

Cell delimiter:

Quote character:

Number separators: Grouping:  Decimal:

Column type:

	1	S 2	S 3	S 4	5	6	7	8
1	FID	CVEGEO	NOM_ENT	NOMGEO	POB1	POB2	POB4	POB
2	0	01001	Aguascalientes	Aguascalientes	948990.000000000...	44372.000000000...	48767.000000000...	97947.000
3	1	01002	Aguascalientes	Asientos	51536.000000000...	3170.000000000...	3342.000000000...	6605.0000
4	2	01003	Aguascalientes	Calvillo	58250.000000000...	3159.000000000...	3530.000000000...	6748.0000
5	3	01004	Aguascalientes	Cosío	17000.000000000...	1032.000000000...	1062.000000000...	2086.0000
6	4	01005	Aguascalientes	Jesús María	129929.000000000...	6945.000000000...	7998.000000000...	15597.0000
7	5	01006	Aguascalientes	Pabellón de ...	47646.000000000...	2746.000000000...	2967.000000000...	5645.0000
8	6	01007	Aguascalientes	Rincón de Romos	57369.000000000...	3545.000000000...	3615.000000000...	7121.0000
9	7	01008	Aguascalientes	San José de ...	9552.000000000...	663.000000000...	609.000000000...	1212.0000

Reset Restore Defaults OK Cancel

Filter...

Data

- File
- CSV File Import
- Datasets
- SQL Table
- Data Table
- Paint Data
- Data Info
- Rank
- Edit Domain
- Color
- Feature Statistics
- Save Data

Transform

Visualize

Model

Evaluate

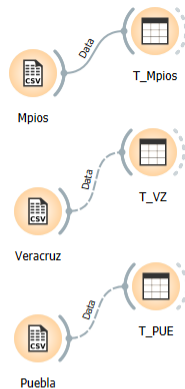
Unsupervised

Image Analytics

Geo

Text Mining

Textable



# Cargar la base de datos de Veracruz

Veracruz - Orange

View Window Help

File:

Info

97957 rows, 1 feature, 21 metas

|

Import Options - Orange

Encoding: Unicode (UTF-8)

Cell delimiter: Comma

Quote character: "

Number separators: Grouping: , Decimal: .

Column type: Auto

Column	Type
1	ENTIDAD

Column	Type
1	ENTIDAD
2	30
3	Veracruz de ...
4	Veracruz de ...
5	Veracruz de ...
6	Veracruz de ...
7	Veracruz de ...
8	Veracruz de ...
9	Veracruz de ...
10	Veracruz de ...
11	Veracruz de ...
12	Veracruz de ...
13	Veracruz de ...
14	Veracruz de ...
15	Veracruz de ...
16	Veracruz de ...
17	Veracruz de ...
18	Veracruz de ...

CSV File Import

Import a data table from a CSV formatted file.

[more...](#)

Filter...

Data

- File
- CSV File Import
- Datasets
- SQL Table
- Data Table
- Paint Data
- Data Info
- Rank
- Edit Domain
- Color
- Feature Statistics
- Save Data

Transform

Visualize

Model

Evaluate

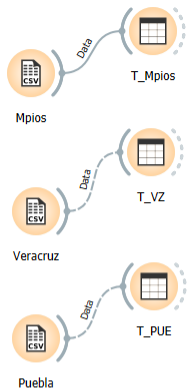
Unsupervised

Image Analytics

Geo

Text Mining

Textable



Puebla - Orange

View Window Help

File:

Info

76085 rows, 1 feature, 21 metas

76.1k

# Cargar la base de datos de Puebla

Import Options - Orange

Encoding: Unicode (UTF-8)

Cell delimiter: Comma ,

Quote character: "

Number separators: Grouping: Decimal: .

Column type: Auto

1	ENTIDAD	1	21	21	21	21	21	21	21
1	Puebla	001	Acajete	0000	Total del ...	0000	000	72894	
4	Puebla	001	Acajete	0001	Total de la ...	0000	000	13922	
5	Puebla	001	Acajete	0001	Total AGEB ...	0118	000	4853	
6	Puebla	001	Acajete	0001	Acajete	0118	001	133	
7	Puebla	001	Acajete	0001	Acajete	0118	002	205	
8	Puebla	001	Acajete	0001	Acajete	0118	003	67	
9	Puebla	001	Acajete	0001	Acajete	0118	004	0	
10	Puebla	001	Acajete	0001	Acajete	0118	005	291	
11	Puebla	001	Acajete	0001	Acajete	0118	006	57	
12	Puebla	001	Acajete	0001	Acajete	0118	007	132	
13	Puebla	001	Acajete	0001	Acajete	0118	008	164	
14	Puebla	001	Acajete	0001	Acajete	0118	009	64	
15	Puebla	001	Acajete	0001	Acajete	0118	010	57	
16	Puebla	001	Acajete	0001	Acajete	0118	011	81	
17	Puebla	001	Acajete	0001	Acajete	0118	012	13	
18	Puebla	001	Acajete	0001	Acajete	0118	013	203	

Info  
 97957 instances (no missing data)  
 1 feature  
 No target variable.  
 21 meta attributes

- Variables
- Show variable labels (if present)
  - Visualize numeric values
  - Color by instance classes

- Selection
- Select full rows

	ENTIDAD	NOM_ENT	MUN	NOM_MUN	LOC	NOM_LOC	AGEB	MZA	POBFEM	POBMAS
1	30	Veracruz de Ign...	000	Total de la enti...	0000	Total de la enti...	0000	000	4190805	3871774
2	30	Veracruz de Ign...	001	Acajete	0000	Total del munic...	0000	000	4781	4920
3	30	Veracruz de Ign...	001	Acajete	0001	Total de la local...	0000	000	882	928
4	30	Veracruz de Ign...	001	Acajete	0001	Total AGEB urb...	0028	000	707	734
5	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	001	*	*
6	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	002	0	0
7	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	003	13	14
8	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	004	7	7
9	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	005	10	15
10	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	006	59	60
11	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	007	67	66
12	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	008	12	10
13	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	009	44	50
14	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	010	20	19
15	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	011	62	63
16	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	012	23	17
17	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	013	23	22
18	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	014	43	45
19	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	015	21	19
20	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	016	31	38
21	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	017	10	13
22	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	019	14	17
23	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	020	50	51
24	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	022	35	43
25	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	023	26	16
26	30	Veracruz de Ign...	001	Acajete	0001	Acajete	0028	024	23	30

Restore Original Order

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## Info

76085 instances (no missing data)  
 1 feature  
 No target variable.  
 21 meta attributes

## Variables

- Show variable labels (if present)
- Visualize numeric values
- Color by instance classes

## Selection

- Select full rows

	ENTIDAD	NOM_ENT	MUN	NOM_MUN	LOC	NOM_LOC	AGEB	MZA	POBFEM	POBMAS
1	21	Puebla	000	Total de la enti...	0000	Total de la enti...	0000	000	3423163	3160115
2	21	Puebla	001	Acajete	0000	Total del munic...	0000	000	37755	35139
3	21	Puebla	001	Acajete	0001	Total de la local...	0000	000	7166	6756
4	21	Puebla	001	Acajete	0001	Total AGEB urb...	0118	000	2466	2387
5	21	Puebla	001	Acajete	0001	Acajete	0118	001	61	72
6	21	Puebla	001	Acajete	0001	Acajete	0118	002	106	99
7	21	Puebla	001	Acajete	0001	Acajete	0118	003	32	35
8	21	Puebla	001	Acajete	0001	Acajete	0118	004	0	0
9	21	Puebla	001	Acajete	0001	Acajete	0118	005	143	148
10	21	Puebla	001	Acajete	0001	Acajete	0118	006	32	25
11	21	Puebla	001	Acajete	0001	Acajete	0118	007	69	63
12	21	Puebla	001	Acajete	0001	Acajete	0118	008	86	78
13	21	Puebla	001	Acajete	0001	Acajete	0118	009	30	34
14	21	Puebla	001	Acajete	0001	Acajete	0118	010	29	28
15	21	Puebla	001	Acajete	0001	Acajete	0118	011	41	40
16	21	Puebla	001	Acajete	0001	Acajete	0118	012	7	6
17	21	Puebla	001	Acajete	0001	Acajete	0118	013	106	97
18	21	Puebla	001	Acajete	0001	Acajete	0118	014	50	67
19	21	Puebla	001	Acajete	0001	Acajete	0118	015	35	32
20	21	Puebla	001	Acajete	0001	Acajete	0118	016	55	49
21	21	Puebla	001	Acajete	0001	Acajete	0118	017	40	26
22	21	Puebla	001	Acajete	0001	Acajete	0118	018	56	66
23	21	Puebla	001	Acajete	0001	Acajete	0118	019	14	13
24	21	Puebla	001	Acajete	0001	Acajete	0118	020	135	138
25	21	Puebla	001	Acajete	0001	Acajete	0118	021	102	76
26	21	Puebla	001	Acajete	0001	Acajete	0118	022	94	94

Restore Original Order

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The screenshot shows the Orange3 software interface. On the left is the widget palette with categories like 'Data', 'Transform', and 'Form'. A workflow diagram on the right shows three data sources: 'Mpios', 'Veracruz', and 'Puebla', each connected to a 'Data' widget, which are then connected to 'T\_Mpios', 'T\_VZ', and 'T\_PUE' widgets respectively. A tooltip for the 'Formula' widget is visible, providing instructions on how to use it.

**Formula (from Orange3)**  
Construct new features (data columns) from a set of existing features in the input dataset.  
Inputs:  
• Data (Orange.data.table.Table)  
Outputs:  
• Data (Orange.data.table.Table)

**Formula**  
Construct new features (data columns) from a set of existing features in the input dataset.

This screenshot shows the same workflow as the previous image, but with the addition of 'Formula' widgets. The 'T\_VZ' and 'T\_PUE' widgets are now connected to 'Formula (1)' and 'Formula (2)' widgets, respectively. The 'Formula' widget is highlighted, and its tooltip is visible.

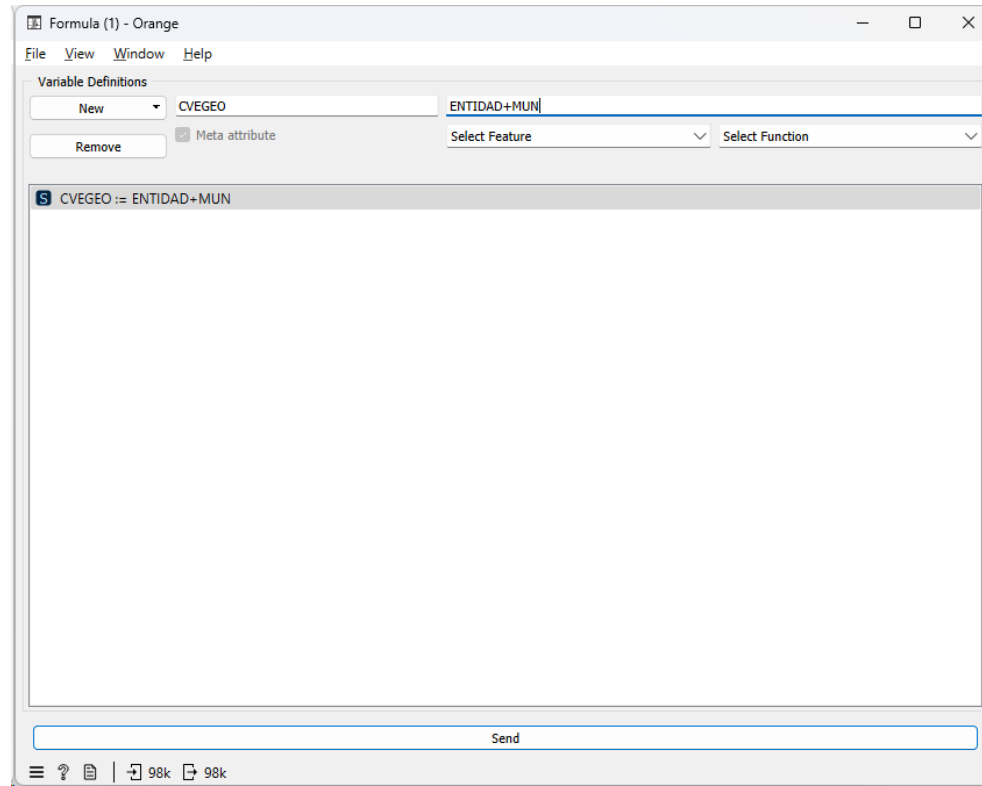
**Formula (1)**  
Construct new features (data columns) from a set of existing features in the input dataset.  
Inputs:  
• Data (Orange.data.table.Table)  
• Selected Data (Orange.data.table.Table)  
Outputs:  
• Data (Orange.data.table.Table)

**Formula (2)**  
Construct new features (data columns) from a set of existing features in the input dataset.  
Inputs:  
• Data (Orange.data.table.Table)  
• Selected Data (Orange.data.table.Table)  
Outputs:  
• Data (Orange.data.table.Table)

**Data Table**  
View the dataset in a spreadsheet.  
[more...](#)

# Crear la clave geostatística

# Crear la clave geoestadística



Data Table - Orange

File Edit View Window Help

Info  
97957 instances (no missing data)  
1 feature  
No target variable.  
22 meta attributes

Variables  
 Show variable labels (if present)  
 Visualize numeric values  
 Color by instance classes

Selection  
 Select full rows

	PEA	PEA_F	PEA_M	POCUPADA	TOTHOOG	HOGJEF_F	HOGJEF_M	TIVIHAB	CVEGEO	POBTOT
1	851221	1506726	2344495	3776676	2390726	813074	1577652	2391262	30000	8062579
2	1559	1407	3152	4467	2630	649	1981	2630	30001	9701
3	346	268	578	817	491	121	370	491	30001	1810
4	175	220	455	653	385	94	291	385	30001	1441
5	*	*	*	*	*	*	*	1	30001	2
6	0	0	0	0	0	0	0	0	30001	0
7	12	4	8	12	9	5	4	9	30001	27
8	3	*	6	8	3	0	3	3	30001	14
9	15	5	10	14	8	0	8	8	30001	25
10	12	12	30	41	31	10	21	31	30001	119
11	1	22	39	56	33	11	22	33	30001	133
12	3	*	6	8	7	*	5	7	30001	22
13	12	15	37	47	29	5	24	29	30001	94
14	15	4	11							
15	18	15	43							
16	17	6	11							
17	11	11	10							
18	19	19	30							
19	16	*	14							
20	18	9	19							
21	14	4	10							
22	15	3	12							
23	13	19	34							
24	16	13	23							
25	10	10	10							
26	10	4	16							
27	18	8	20							
28	15	0	16							

Restore Original Order

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Universidad Veracruzana

Quedó ...

Info  
76085 instances (no missing data)  
1 feature  
No target variable.  
22 meta attributes

Variables  
 Show variable labels (if present)  
 Visualize numeric values  
 Color by instance classes

Selection  
 Select full rows

	PEA	PEA_F	PEA_M	POCUPADA	TOTHOOG	HOGJEF_F	HOGJEF_M	TIVIHAB	CVEGEO	POBTOT
1	198118	1310547	1887571	3145110	1713381	543681	1169700	1713865	21000	6583278
2	1752	11462	20290	31180	15226	4206	11020	15230	21001	72894
3	1790	2086	3704	5590	2995	838	2157	2999	21001	13922
4	2019	742	1277	1967	1010	336	674	1011	21001	4853
5	13	12	31	42	27	6	21	27	21001	133
6	14	32	62	89	42	12	30	42	21001	205
7	19	*	17	19	13	6	7	13	21001	67
8	0	0	0	0	0	0	0	0	21001	0
9	17	19	78	97	65	11	54	65	21001	291
10	10	12	18	30	12	4	8	12	21001	57
11	19	23	36	58	25	9	16	25	21001	132
12	10	15	35	49	28	4	24	28	21001	164
13	11	4	17	21	11	*	10	11	21001	64
14	12	4	18	19	14	12	*	14	21001	57
15	16	10	16	25	16	*	14	16	21001	81
16	3	5	3	8	5	3	*	5	21001	13
17	14	35	59	93	47	13	34	47	21001	203
18	18	15	33	48	24	4	20	24	21001	117
19	11	10	21	30	16	5	11	16	21001	67
20	17	7	20	26	29	11	18	29	21001	104
21	15	17	18	34	10	3	7	10	21001	66
22	10	8	32	38	26	19	7	26	21001	122
23	18	10	8	18	5	*	4	5	21001	27
24	14	29	65	88	47	33	14	47	21001	273
25	10	35	45	77	35	7	28	35	21001	178
26	14	37	47	83	35	8	27	35	21001	188
27	10	19	31	50	21	*	19	21	21001	115
28	110	16	72	118	56	18	38	56	21001	242

Restore Original Order

Send Automatically

Quedó ...

Data Table (1) - Orange

File Edit View Window Help

Info  
76085 instances (no missing data)  
1 feature  
No target variable.  
22 meta attributes

Variables  
 Show variable labels (if present)  
 Visualize numeric values  
 Color by instance classes

Selection  
 Select full rows

	PEA	PEA_F	PEA_M	POCUPADA	TOTHOOG	HOGJEF_F	HOGJEF_M	TIVIHAB	CVEGEO	POBTOT
1	198118	1310547	1887571	3145110	1713381	543681	1169700	1713865	21000	6583278
2	1752	11462	20290	31180	15226	4206	11020	15230	21001	72894
3	1790	2086	3704	5590	2995	838	2157	2999	21001	13922
4	2019	742	1277	1967	1010	336	674	1011	21001	4853
5	13	12	31	42	27	6	21	27	21001	133
6	14	32	62	89	42	12	30	42	21001	205
7	19	*	17	19	13	6	7	13	21001	67
8	0	0	0	0	0	0	0	0	21001	0
9	17	19	78	97	65	11	54	65	21001	291
10	10	12	18	30	12	4	8	12	21001	57
11	19	23	36	58	25	9	16	25	21001	132
12	10	15	35	49	28	4	24	28	21001	164
13	11	4	17	21	11	*	10	11	21001	64
14	12	4	18	19	14	12	*	14	21001	57
15	16	10	16	25	16	*	14	16	21001	81
16	3	5	3	8	5	3	*	5	21001	13
17	14	35	59	93	47	13	34	47	21001	203
18	18	15	33	48	24	4	20	24	21001	117
19	11	10	21	30	16	5	11	16	21001	67
20	17	7	20	26	29	11	18	29	21001	104
21	15	17	18	34	10	3	7	10	21001	66
22	10	8	32	38	26	19	7	26	21001	122
23	18	10	8	18	5	*	4	5	21001	27
24	14	29	65	88	47	33	14	47	21001	273
25	10	35	45	77	35	7	28	35	21001	178
26	14	37	47	83	35	8	27	35	21001	188
27	10	19	31	50	21	*	19	21	21001	115
28	110	16	72	118	56	18	38	56	21001	242

Restore Original Order

Send Automatically

Untitled - Orange  
File Edit View Widget Window Options Help

Filter...

File CSV File Import Datasets SQL Table

Data Table Paint Data Data Info Rank

Edit Domain Color Feature Statistics Save Data

**Transform**

Data Sampler Select Columns Select Rows Transpose

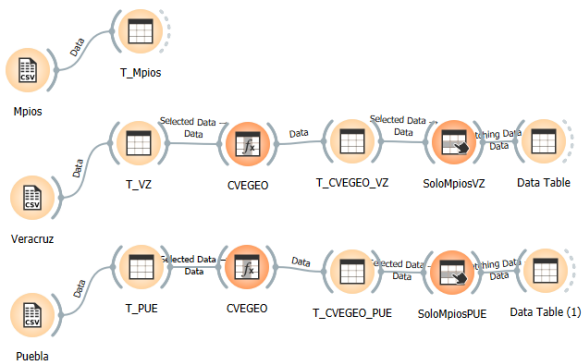
Merge Data Concatenate Select by Data Index Unique

Aggregate Columns Group by Pivot Table Apply Domain

Preprocess Impute Continuize Discretize

Randomize Purge Domain Melt Formula

Create Class Create Instance Python Script



# Selección de municipios de Veracruz

Data Table  
View the dataset in a spreadsheet.

[more...](#)

Data Table - Orange  
File Edit View Window Help

Info

212 instances (no missing data)  
1 feature  
No target variable.  
22 meta attributes

Variables

- Show variable labels (if present)
- Visualize numeric values
- Color by instance classes

Selection

- Select full rows

	ENTIDAD	NOM_ENT	MUN	NOM_MUN
1	30	Veracruz de Ign...	001	Acajete
2	30	Veracruz de Ign...	002	Acatlán
3	30	Veracruz de Ign...	003	Acazacan
4	30	Veracruz de Ign...	004	Actopan
5	30	Veracruz de Ign...	005	Acuña
6	30	Veracruz de Ign...	006	Acultzingo
7	30	Veracruz de Ign...	007	Camarón de Tej...
8	30	Veracruz de Ign...	008	Alpatláhuac
9	30	Veracruz de Ign...	009	Alto Lucero de ...
10	30	Veracruz de Ign...	010	Altotonga
11	30	Veracruz de Ign...	011	Alvarado
12	30	Veracruz de Ign...	012	Amatitlán
13	30	Veracruz de Ign...	013	Naranjos Amat...
14	30	Veracruz de Ign...	014	Amatlán de los ...
15	30	Veracruz de Ign...	015	Angel R. Cabada
16	30	Veracruz de Ign...	016	La Antigua
17	30	Veracruz de Ign...	017	Apazapan
18	30	Veracruz de Ign...	018	Aquila
19	30	Veracruz de Ign...	019	Astacinga
20	30	Veracruz de Ign...	020	Atlahuilco
21	30	Veracruz de Ign...	021	Atoyac
22	30	Veracruz de Ign...	022	Atzacan
23	30	Veracruz de Ign...	023	Atzacan
24	30	Veracruz de Ign...	024	Tlaltetela
25	30	Veracruz de Ign...	025	Ayahualulco
26	30	Veracruz de Ign...	026	Banderilla

Restore Original Order

Send Automatically

Untitled \* - Orange  
File Edit View Widget Window Options Help

Filter...

File CSV File Import Datasets SQL Table

Data Table Paint Data Data Info Rank

Edit Domain Color Feature Statistics Save Data

**Transform**

Data Sampler Select Columns Select Rows Transpose

Merge Data Concatenate Select by Data Index Unique

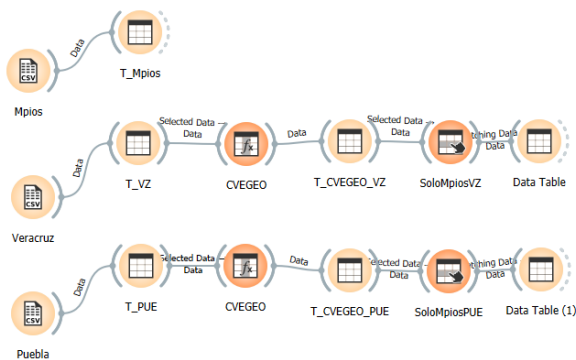
Aggregate Columns Group by Pivot Table Apply Domain

Preprocess Impute Continue Discretize

Randomize Purge Domain Melt Formula

Create Class Create Instance Python Script

**Data Table**  
View the dataset in a spreadsheet.  
[more...](#)



# Selección de municipios de Puebla

Data Table (1) - Orange  
File Edit View Window Help

**Info**  
217 instances (no missing data)  
1 feature  
No target variable.  
22 meta attributes

**Variables**

- Show variable labels (if present)
- Visualize numeric values
- Color by instance classes

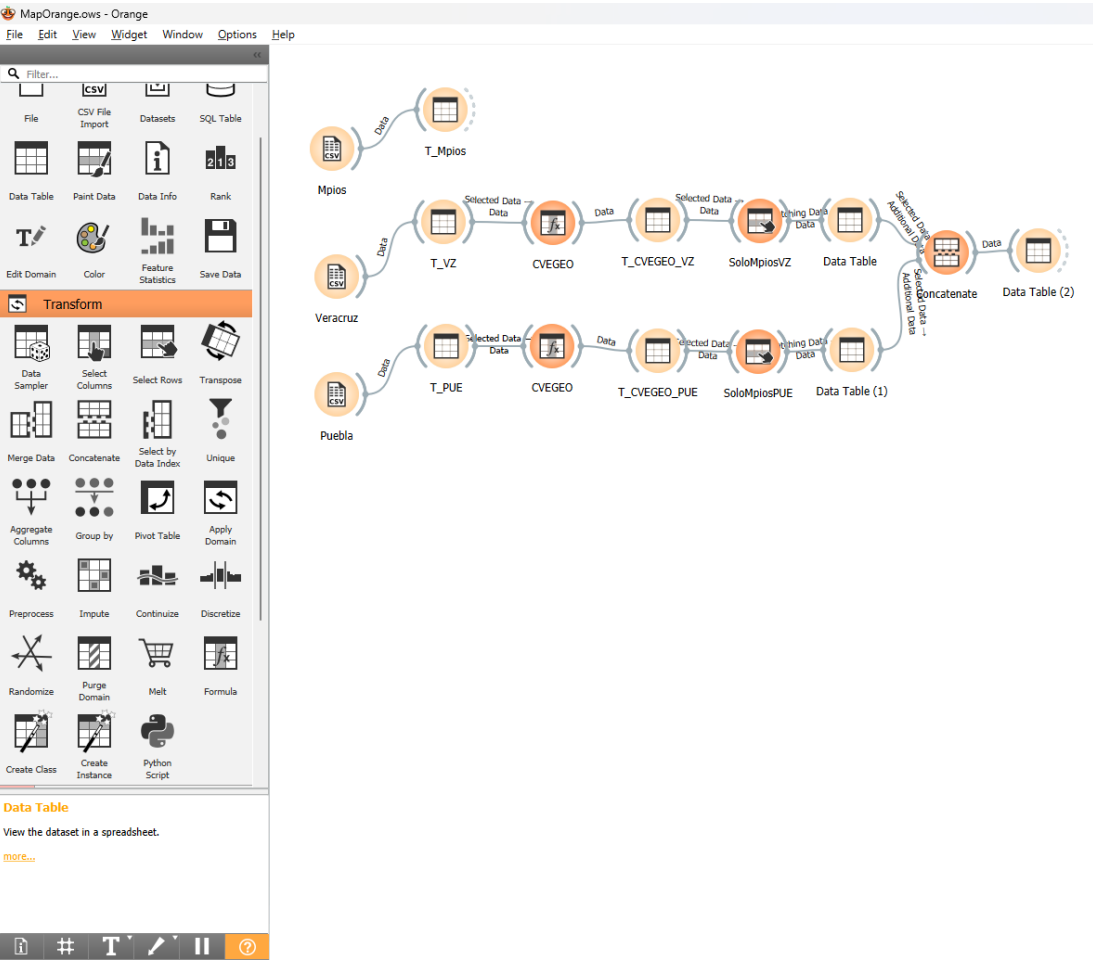
**Selection**

- Select full rows

	ENTIDAD	NOM_ENT	MUN	NOM_MUN
1	21	Puebla	001	Acajete
2	21	Puebla	002	Acateno
3	21	Puebla	003	Acatlán
4	21	Puebla	004	Acatzingo
5	21	Puebla	005	Acteopan
6	21	Puebla	006	Ahuacatlán
7	21	Puebla	007	Ahuatlán
8	21	Puebla	008	Ahuazotepec
9	21	Puebla	009	Ahuehuetitla
10	21	Puebla	010	Ajalpan
11	21	Puebla	011	Albino Zertuche
12	21	Puebla	012	Aljojuca
13	21	Puebla	013	Altepeixi
14	21	Puebla	014	Amixtlán
15	21	Puebla	015	Amozoc
16	21	Puebla	016	Aquixtla
17	21	Puebla	017	Atempan
18	21	Puebla	018	Atexcal
19	21	Puebla	019	Atlixco
20	21	Puebla	020	Atoyatempan
21	21	Puebla	021	Atzala
22	21	Puebla	022	Atzitzihuacán
23	21	Puebla	023	Atzitzintla
24	21	Puebla	024	Axutla
25	21	Puebla	025	Ayotoxco de G...
26	21	Puebla	026	Calpan

Restore Original Order

Send Automatically



# Unir las bases de Veracruz y Puebla

## Info

429 instances (no missing data)  
 1 feature  
 No target variable.  
 22 meta attributes

## Variables

- Show variable labels (if present)
- Visualize numeric values
- Color by instance classes

## Selection

- Select full rows

	ENTIDAD	NOM_ENT	MUN	NOM_MUN	LOC	NOM_LOC	AGEB	MZA	POBFEM	POBMAS
199	30	Veracruz de Ign...	199	Zaragoza	0000	Total del munic...	0000	000	6262	5637
200	30	Veracruz de Ign...	200	Zentla	0000	Total del munic...	0000	000	6293	6288
201	30	Veracruz de Ign...	201	Zongolica	0000	Total del munic...	0000	000	23263	21765
202	30	Veracruz de Ign...	202	Zontecomatlán ...	0000	Total del munic...	0000	000	7490	7154
203	30	Veracruz de Ign...	203	Zozocolco de H...	0000	Total del munic...	0000	000	7504	7020
204	30	Veracruz de Ign...	204	Agua Dulce	0000	Total del munic...	0000	000	23040	21064
205	30	Veracruz de Ign...	205	El Higo	0000	Total del munic...	0000	000	9767	9635
206	30	Veracruz de Ign...	206	Nanchital de Lá...	0000	Total del munic...	0000	000	15322	13887
207	30	Veracruz de Ign...	207	Tres Valles	0000	Total del munic...	0000	000	23279	21699
208	30	Veracruz de Ign...	208	Carlos A. Carrillo	0000	Total del munic...	0000	000	12286	11090
209	30	Veracruz de Ign...	209	Tatahuicapan d...	0000	Total del munic...	0000	000	7861	7183
210	30	Veracruz de Ign...	210	Uxpanapa	0000	Total del munic...	0000	000	15451	15440
211	30	Veracruz de Ign...	211	San Rafael	0000	Total del munic...	0000	000	15454	14897
212	30	Veracruz de Ign...	212	Santiago Sochi...	0000	Total del munic...	0000	000	6747	6315
213	21	Puebla	001	Acajete	0000	Total del munic...	0000	000	37755	35139
214	21	Puebla	002	Acateno	0000	Total del munic...	0000	000	4584	4586
215	21	Puebla	003	Acatlán	0000	Total del munic...	0000	000	20119	17836
216	21	Puebla	004	Acatzingo	0000	Total del munic...	0000	000	32820	30923
217	21	Puebla	005	Acteopan	0000	Total del munic...	0000	000	1624	1446
218	21	Puebla	006	Ahuacatlán	0000	Total del munic...	0000	000	7690	6852
219	21	Puebla	007	Ahuatlán	0000	Total del munic...	0000	000	1605	1557
220	21	Puebla	008	Ahuazotepec	0000	Total del munic...	0000	000	5890	5549
221	21	Puebla	009	Ahuehuetitla	0000	Total del munic...	0000	000	1154	1053
222	21	Puebla	010	Ajalpan	0000	Total del munic...	0000	000	38577	36191
223	21	Puebla	011	Albino Zertuche	0000	Total del munic...	0000	000	999	886
224	21	Puebla	012	Aljojuca	0000	Total del munic...	0000	000	3491	3100

Restore Original Order

 Send Automatically



MapOrange.ows - Orange

File Edit View Widget Window Options Help

Filter...

Sampler

Columns

Merge Data Concatenate Select by Data Index Unique

Aggregate Columns Group by Pivot Table Apply Domain

Preprocess Impute Continuize Discretize

Randomize Purge Domain Melt Formula

Create Class Create Instance Python Script

Visualize

Model

Evaluate

Unsupervised

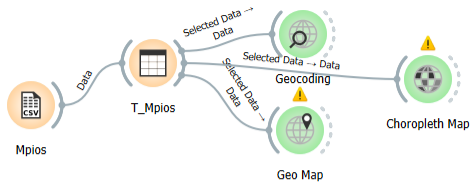
Image Analytics

Geo

Geocoding Geo Map Choropleth Map Geo Transform

Text Mining

Textable



Geocoding - Orange

View Window Help

Encode region names into geographical coordinates:

Region identifier: **S** NOMGEO

Identifier type: Country name

Decode latitude and longitude into regions:

Latitude: **N** Latitud

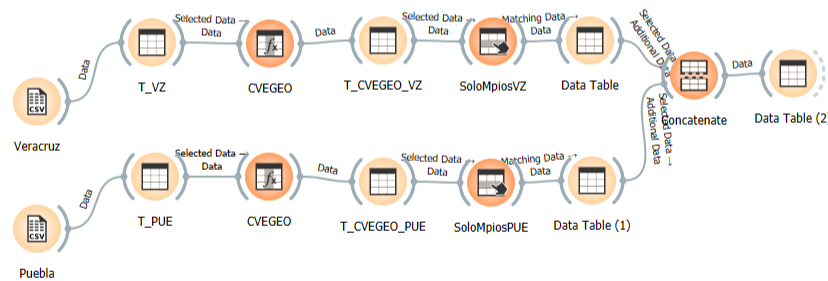
Longitude: **N** Longitud

Administrative level: Country

Extend coded data with additional region properties

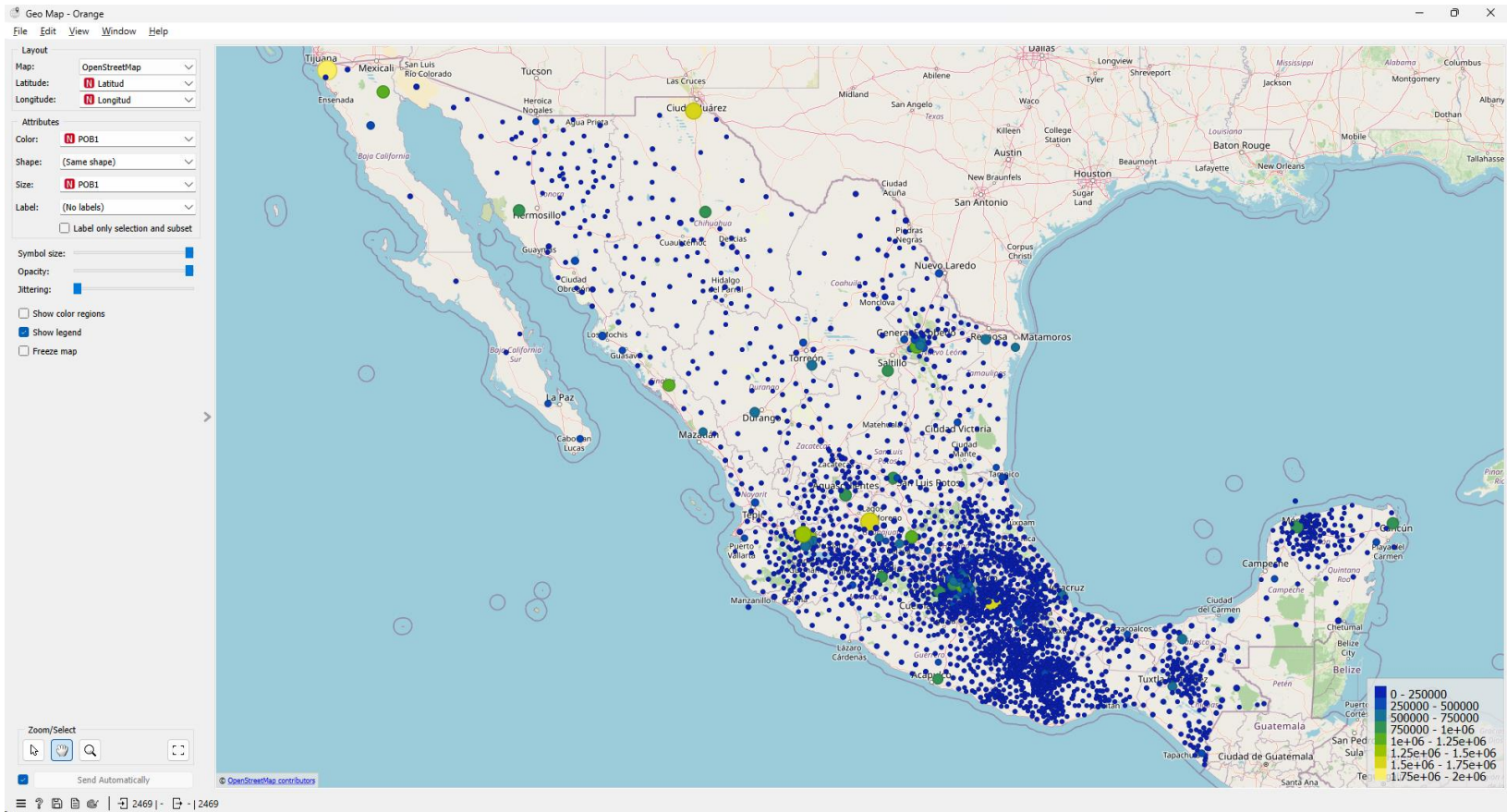
Apply Automatically

2469 2469

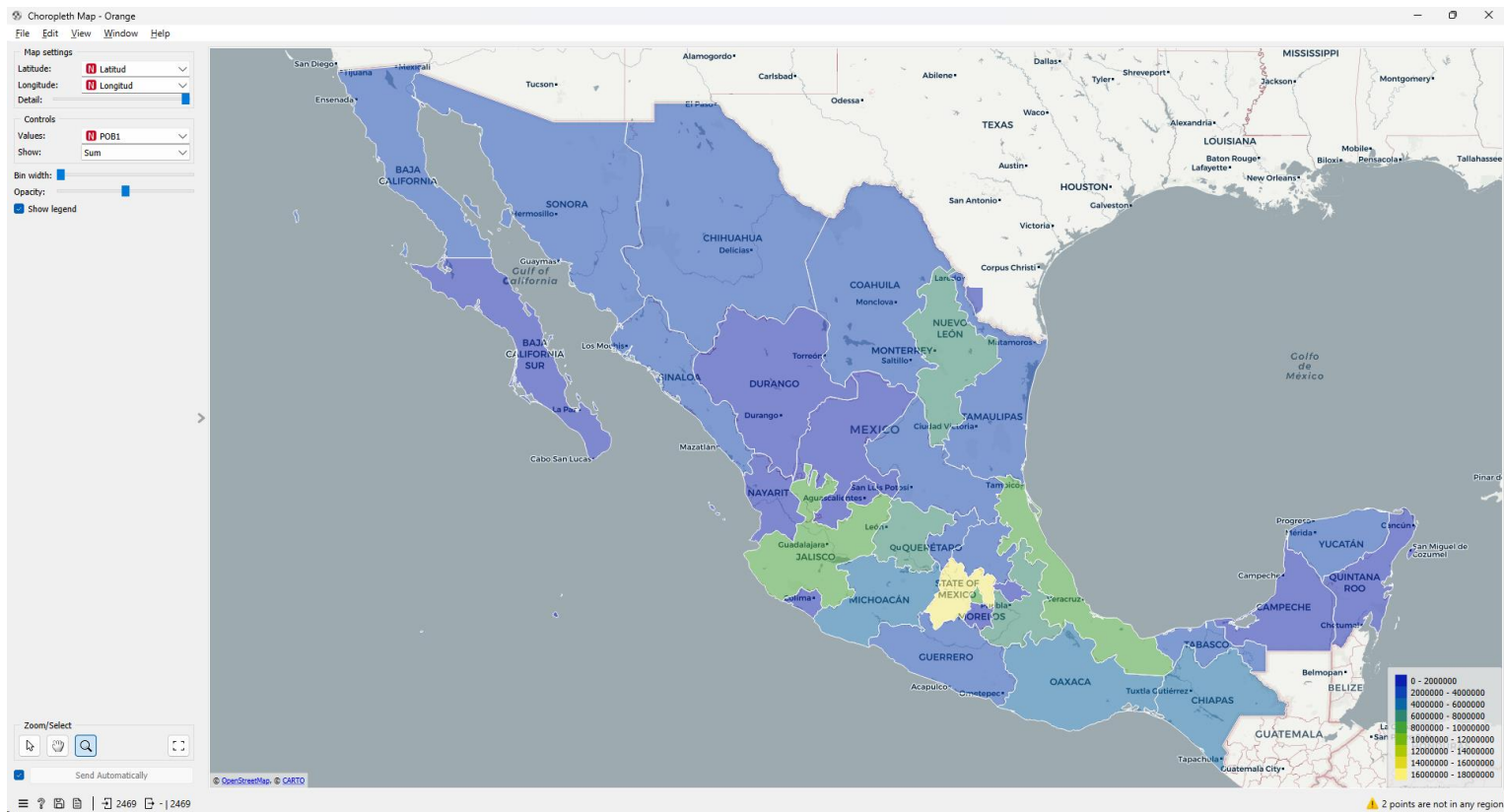


# Generación del mapa de puntos de los municipios

# Mapa de puntos de municipios



# Mapa nacional de coropletas



# Unión de la base de datos de los municipios de Veracruz y Puebla con la nacional

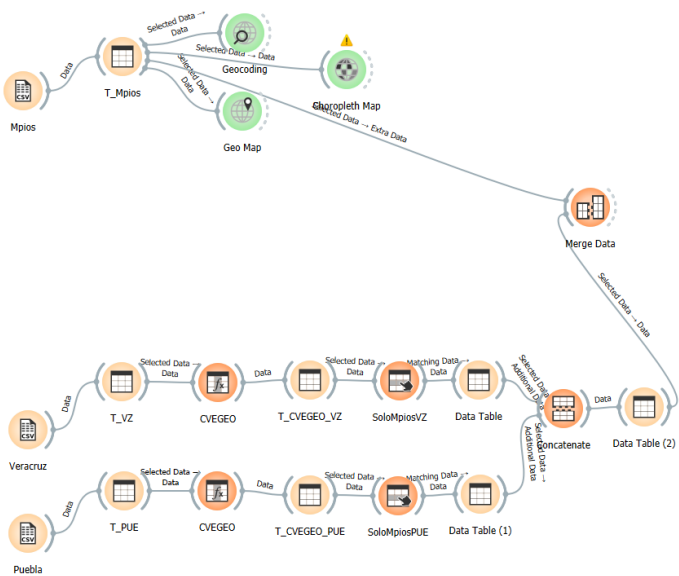
MapOrange.ows\* - Orange  
 File Edit View Widget Window Options Help

Filter: Columns

Sampler  
 Merge Data Concatenate Select by Data Index Unique  
 Aggregate Columns Group by Pivot Table Apply Domain  
 Preprocess Impute Continuize Discretize  
 Randomize Purge Domain Melt Formula  
 Create Class Create Instance Python Script

Visualize  
 Model Evaluate Unsupervised Image Analytics  
 Geo  
 Geocoding Geo Map Choropleth Map Geo Transform  
 Text Mining Textable

Merge Data  
 Merge datasets based on the values of selected features.  
[more...](#)



Merge Data - Orange

File View Window Help

Merging

- Append columns from Extra data
- Find matching pairs of rows
- Concatenate tables

Row matching

matches

Apply Automatically

429 | 2469 429

## Info

429 instances (no missing data)  
130 features  
No target variable.  
23 meta attributes

## Variables

- Show variable labels (if present)
- Visualize numeric values
- Color by instance classes

## Selection

- Select full rows

	HOGJEF_M	TVIVHAB	CVEGEO	NOMGEO	POBTOT	FID	POB1	POB2	POB4	POB5
1	81	2630	30001	Acajete	9701	2093	9701	514	526	1091
2	1	863	30002	Acatlán	3441	2094	3441	198	202	386
3	643	23832	30003	Acayucan	80815	2095	80815	3566	3878	8236
4	53	13456	30004	Actopan	41742	2096	41742	1398	1640	3522
5	18	1704	30005	Acula	5253	2097	5253	196	236	510
6	56	5991	30006	Acultzingo	23100	2098	23100	1359	1366	2826
7	74	1930	30007	Camarón de Tej...	6538	2099	6538	291	313	639
8	11	2514	30008	Alpatláhuac	10338	2100	10338	688	672	1362
9	14	8830	30009	Alto Lucero de ...	28184	2101	28184	955	1122	2616
10	441	16708	30010	Altotonga	64234	2102	64234	3728	3782	8589
11	647	18446	30011	Alvarado	57035	2103	57035	1878	2183	4879
12	07	2732	30012	Amatitlán	7866	2104	7866	307	300	642
13	82	8369	30013	Naranjos Amatl...	26843	2105	26843	987	1279	2464
14	03	13305	30014	Amatlán de los ...	46955	2106	46955	1715	2233	4742
15	24	10876	30015	Angel R. Cabada	33839	2107	33839	1331	1436	2955
16	19	9177	30016	La Antigua	28682	2108	28682	1090	1224	2589
17	31	1520	30017	Apazapan	4709	2109	4709	189	207	442
18	0	486	30018	Aquila	1978	2110	1978	128	151	286
19	25	1694	30019	Astacinga	6909	2111	6909	523	524	1023
20	61	2955	30020	Atlahuilco	11577	2112	11577	824	706	1378
21	58	7094	30021	Atoyac	23461	2113	23461	970	1105	2370
22	49	5631	30022	Atzacan	22651	2114	22651	1122	1258	2713
23	597	14103	30023	Atzalan	49180	2115	49180	2488	2643	5816
24	00	4274	30024	Tlaltetela	16485	2116	16485	887	922	1947
25	24	6424	30025	Ayahualulco	27217	2117	27217	1840	2011	4023
26	33	7609	30026	Banderilla	25993	2118	25993	903	1209	2696

Restore Original Order

 Send Automatically

# Generación del mapa de puntos de los municipios de Veracruz y Puebla

MapOrange.ows\* - Orange

File Edit View Widget Window Options Help

Filter...

Sampler Columns

Merge Data Concatenate Select by Data Index Unique

Aggregate Columns Group by Pivot Table Apply Domain

Preprocess Impute Continimize Discretize

Randomize Purge Domain Mult Formula

Create Class Create Instance Python Script

Visualize Model Evaluate Unsupervised Image Analytics

**Geo**

Geocoding Geo Map Choropleth Map Geo Transform

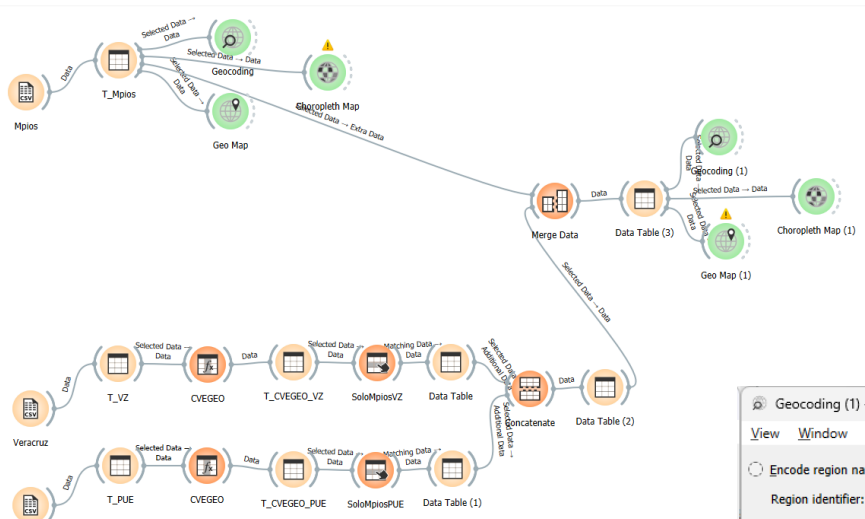
Text Mining Textable

Geocoding

Encode region names into geographical coordinates, or reverse-geocode latitude and longitude pairs into regions.

more...

429 429



Geocoding (1) - Orange

View Window Help

Encode region names into geographical coordinates:

Region identifier: **NOMGEO**

Identifier type: Country name

Decode latitude and longitude into regions:

Latitude: **Latitud**

Longitude: **Longitud**

Administrative level: Country

Extend coded data with additional region properties

Apply Automatically

429 429

Layout

Map: OpenStreetMap ▾

Latitude: N Latitud ▾

Longitude: N Longitud ▾

Attributes

Color: N POBTOT ▾

Shape: (Same shape) ▾

Size: N POBTOT ▾

Label: (No labels) ▾

Label only selection and subset

Symbol size:

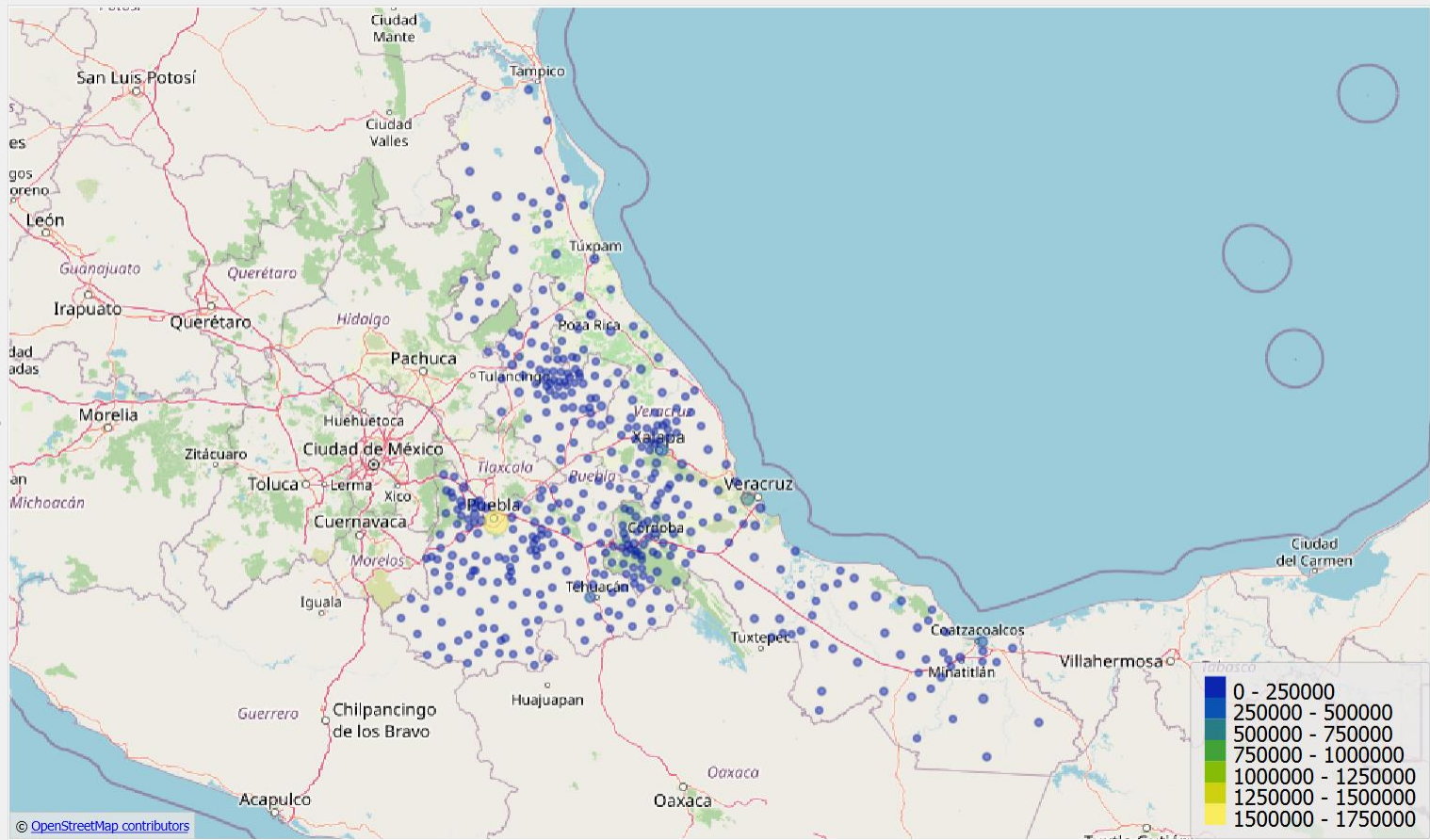
Opacity:

Jittering:

- Show color regions
- Show legend
- Freeze map

Zoom/Select

Send Automatically



Map settings

Latitude:  ▼

Longitude:  ▼

Detail:

---

Controls

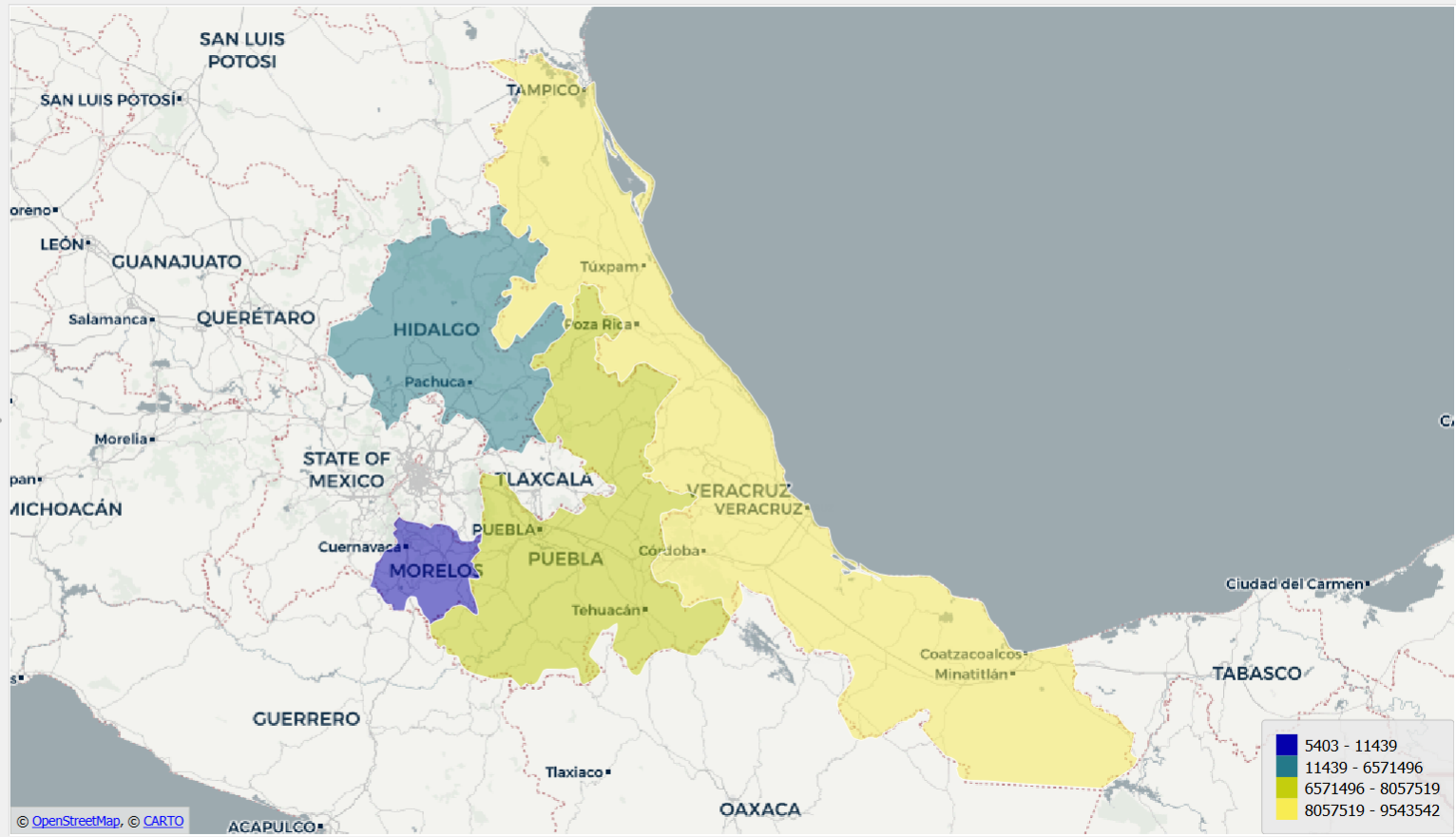
Values:  ▼

Show:  ▼

Bin width:

Opacity:

Show legend



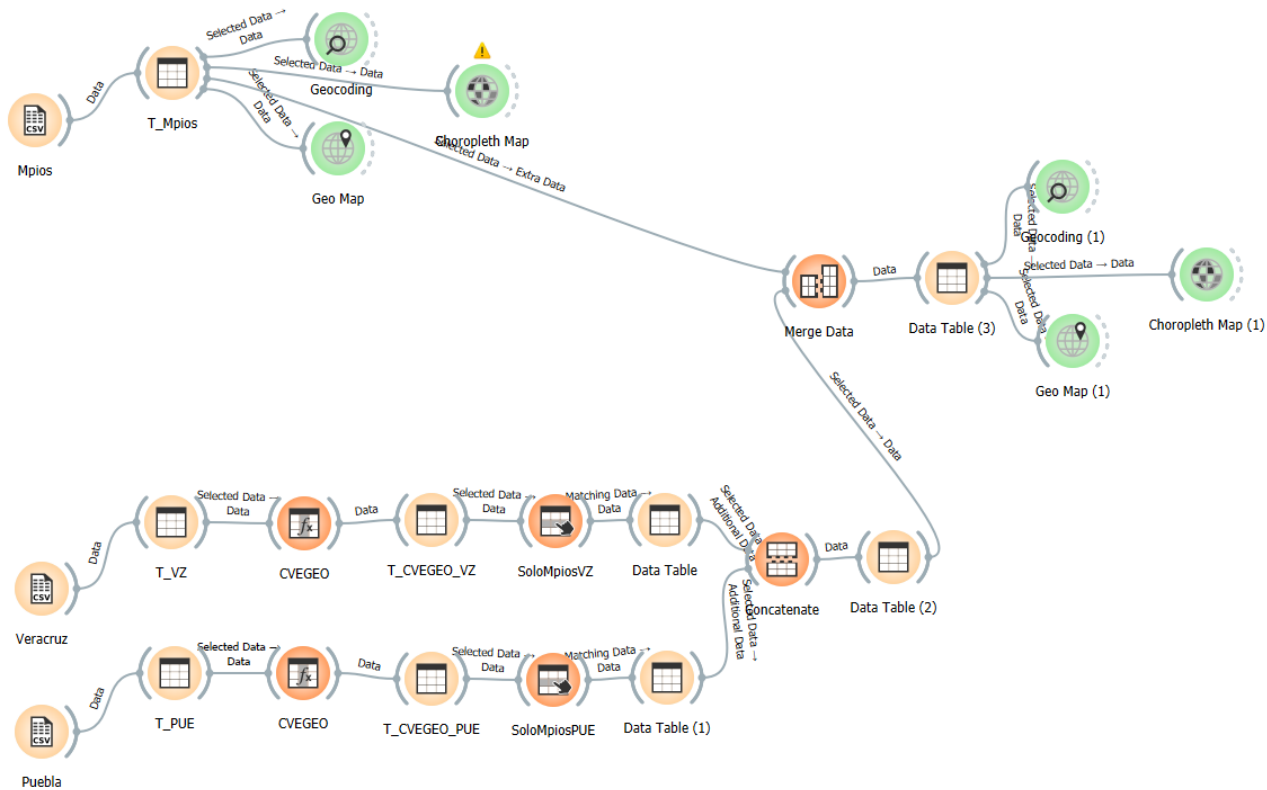
Zoom/Select

Send Automatically

<span style="display:inline-block; width:15px; height:15px; background-color:blue;"></span>	5403 - 11439
<span style="display:inline-block; width:15px; height:15px; background-color:teal;"></span>	11439 - 6571496
<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen;"></span>	6571496 - 8057519
<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span>	8057519 - 9543542



# Estructura final





Facultad de  
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LINCID



Open Data Day

**¡Muchas gracias!**