
SuperMap
SMC
Mini Classroom
SuperMap
SMC
SuperMap Mini Classroom
webinar

SuperMap

Beijing, 1997
Found by Dr. Ershun Zhong

23+ Years for GIS software

4k Employees

1k Partners in 30+ countries

38 Branch offices and subsidiaries

SuperMap

5 Main Key Technologies

BIG DATA GIS

AI GIS

THREE DIMENSION GIS

CROSS PLATFORM GIS

CLOUD COMPUTING

SuperMap

Mapping the Movement of Tornadoes using GIS

Firdausi Zahara **Gandes** – SuperMap Instructor

SuperMap

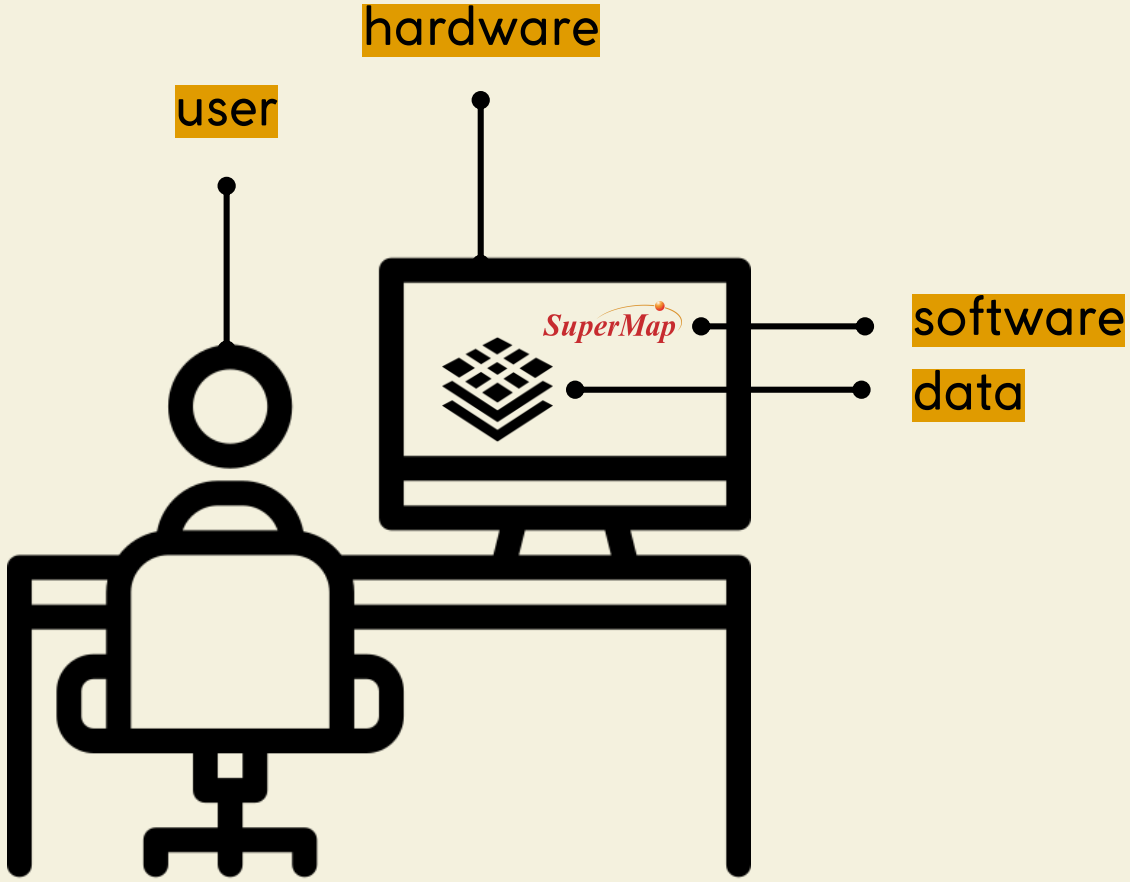
WHAT IS ?

Geographic Information System (GIS)

GIS?

Computer based database system designed to spatially analyze and display data

(Debo and Reese, 2002)



WHY?

we need to mapping the tornadoes movements

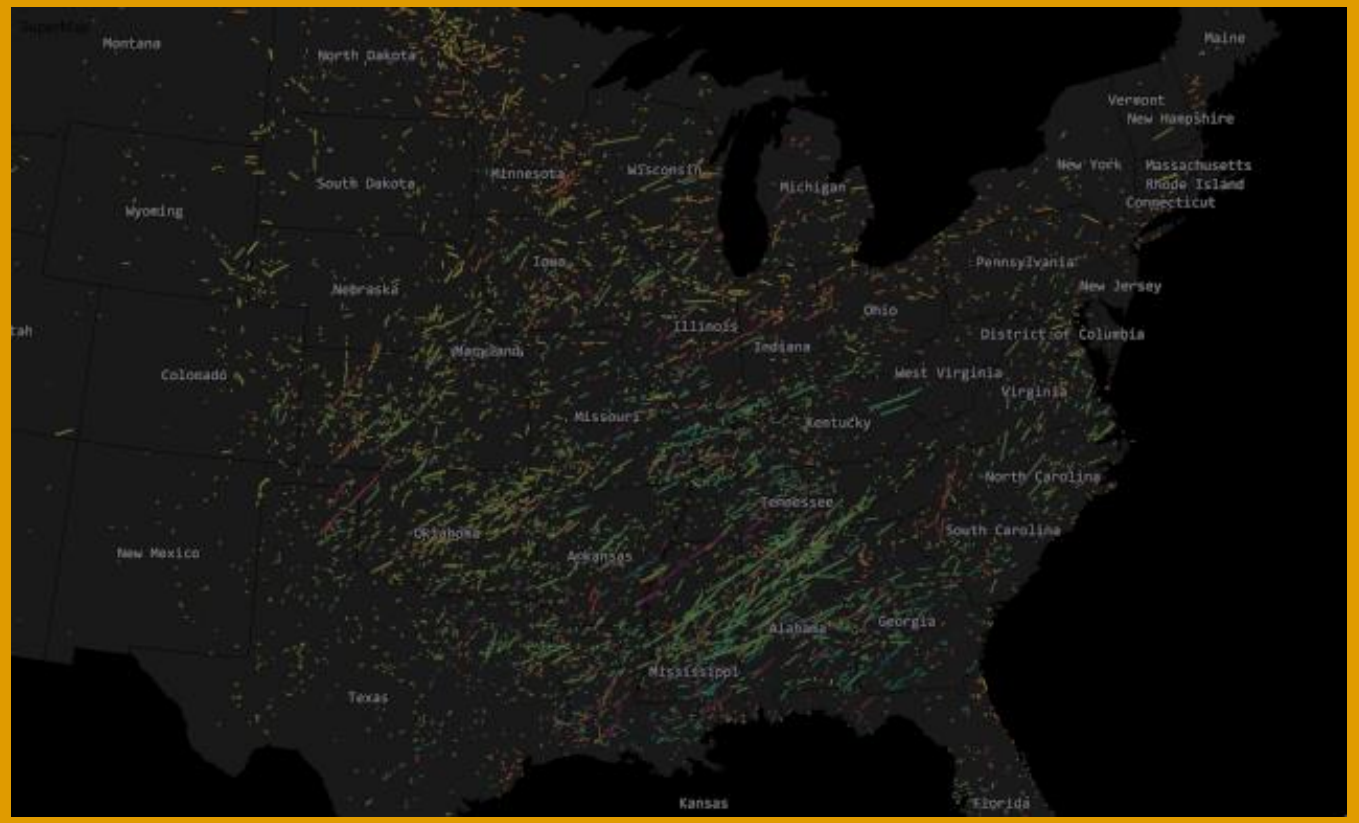
WHY?

Climate conditions needed for tornado formation are complex, so it is difficult to make timely warning, but its occurence is not completely irregular

By mapping the tornado, we can get its migration rule which will be useful as a basis for making policy in the face of a tornado going forward

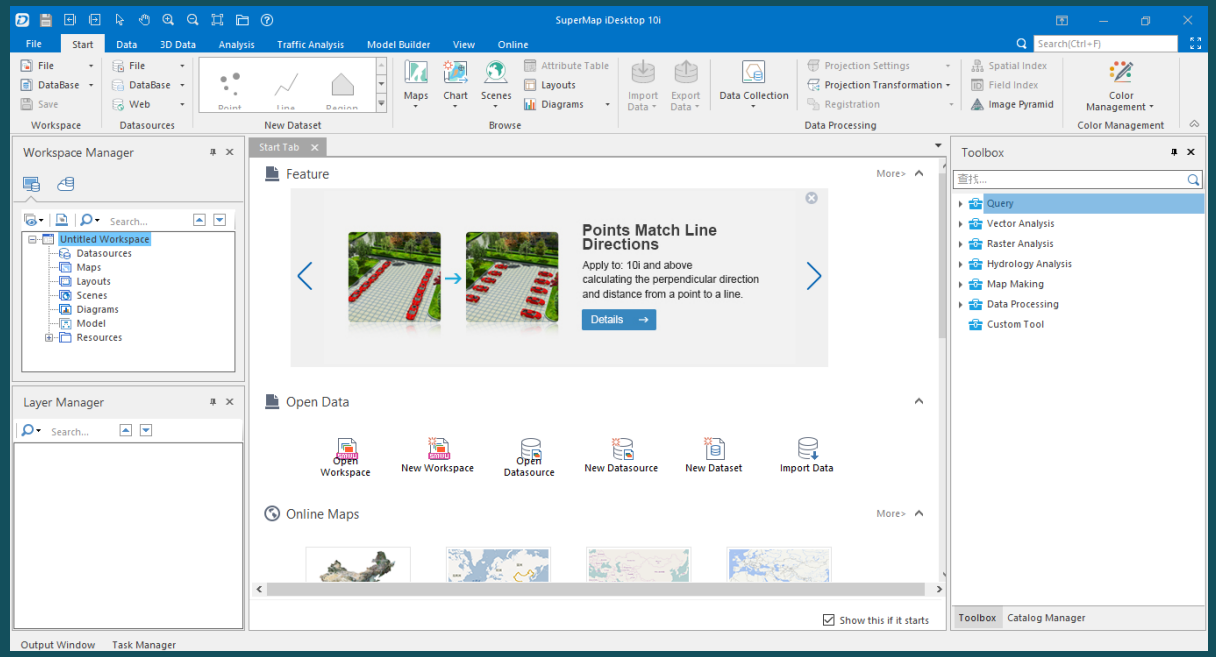
SuperMap

Tornado Map



Software

SuperMap iDesktop 10i



Download here

SuperMap iDesktop 64 bit
https://bit.ly/SuperMap_iDesktop64

SuperMap iDesktop 32 bit
https://bit.ly/SuperMap_iDesktop32

SuperMap

Data

Source : www.spc.noaa.gov/

TORNADO	HAIL	DAMAGING WIND
2018_torn.csv (0.1 mb) Updated: 30 Sep 2019	2018_hail.csv (0.8 mb) Updated: 30 Sep 2019	2018_wind.csv (1.7 mb) Updated: 30 Sep 2019
2017_torn.csv (0.2 mb)	2017_hail.csv (1.2 mb)	2017_wind.csv (2.0 mb)
2016_torn.csv (0.1 mb)	2016_hail.csv (1.1 mb)	2016_wind.csv (1.9 mb)
2015_torn.csv (0.1 mb)	2015_hail.csv (0.9 mb)	2015_wind.csv (1.5 mb)
2014_torn.csv (0.1 mb)	2014_hail.csv (0.9 mb)	2014_wind.csv (2.8 mb)
2013_torn.csv (0.1 mb)	2013_hail.csv (1.0 mb)	2013_wind.csv (1.5 mb)
2012_torn.csv (0.1 mb)	2012_hail.csv (1.4 mb)	2012_wind.csv (1.7 mb)
2011_torn.csv (0.2 mb)	2011_hail.csv (2.0 mb)	2011_wind.csv (2.5 mb)
2010_torn.csv (0.1 mb)	2010_hail.csv (1.1 mb)	2010_wind.csv (1.6 mb)
2009_torn.csv (0.1 mb)	2009_hail.csv (1.4 mb)	2009_wind.csv (1.5 mb)

Tornadoes magnitude data from 2009 - 2018

	om	yr	mo	dy	date	time	tz	st	stf	stn	mag	inj	fat	loss	closs	slat	slon	elat	elon	len	wid	ns	sn	sg	f1
2	1	2009	1	3	########	13.13.00	3	MS	28	0	1	0	0	00.04	00.00	31.875	-89.331	31.888	-89.327	0,064583	175.00.00	1	1	1	
3	2	2009	1	6	########	16.05.00	3	GA	13	0	0	0	0	00.05	00.00	343.227	-853.844	343.515	-853.727	02.01	100.00.00	1	1	1	
4	3	2009	1	7	########	02.00.00	3	GA	13	0	0	0	0	0.025	00.00	329.789	-838.904	329.858	-838.414	0,144444	100.00.00	1	1	1	
5	4	2009	1	10	########	15.33.00	3	MS	28	0	0	0	0	00.00	0.002	324.983	-885.795	325.089	-885.495	01.09	30.00.00	1	1	1	
6	5	2009	1	10	########	17.05.00	3	AL	1	0	1	0	0	02.05	00.00	31.269	-88.032	312.751	-880.055	01.06	200.00.00	1	1	1	
7	6	2009	1	24	########	17.00.00	3	CA	6	0	0	0	0	00.01	00.00	393.602	-122.041	393.602	-122.041	00.01	40.00.00	1	1	1	

Magnitude

Starting point

End point

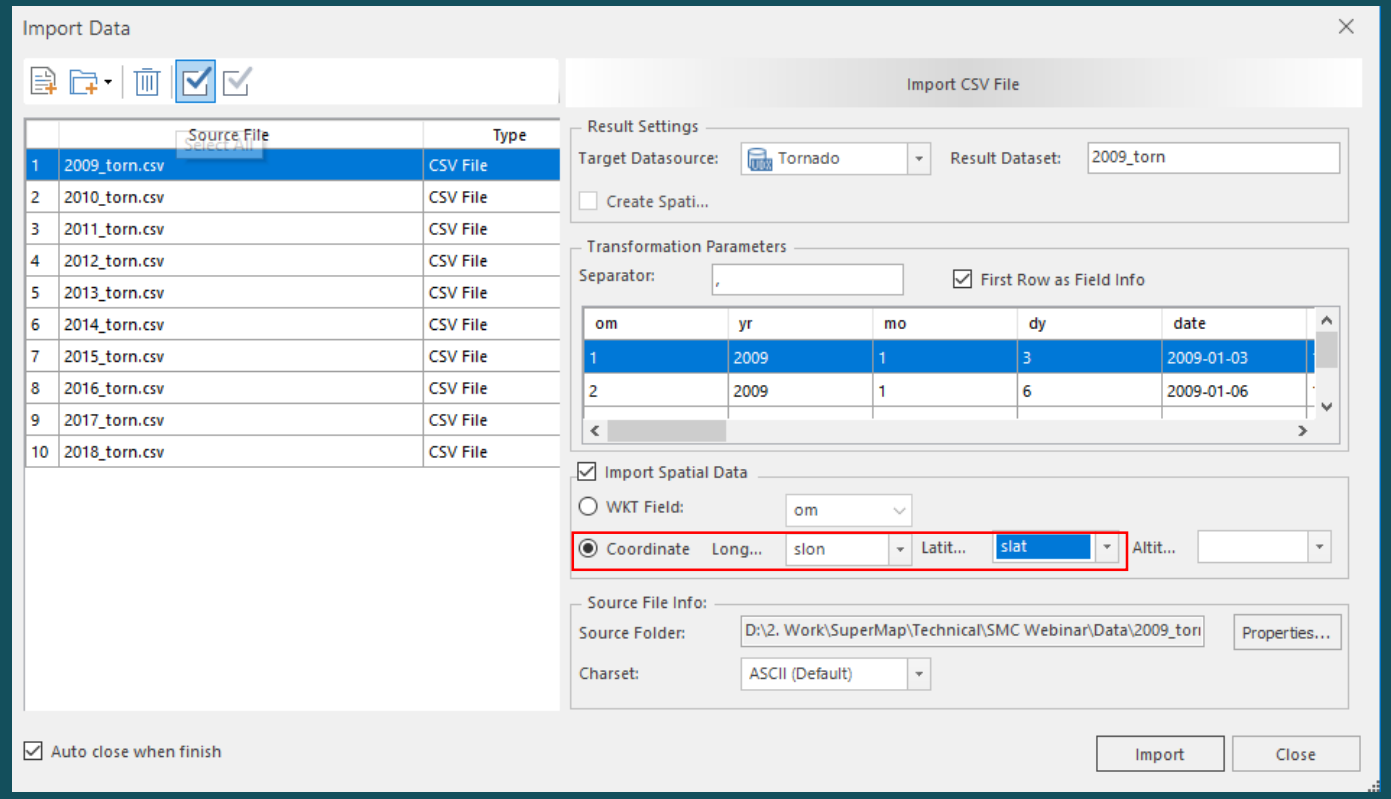
Data Processing Flow

SuperMap

- Import and append data
- Mean center analysis
- Connect Tornado center point
- Symbolization
- Trajectory visualization

1

Import and append data

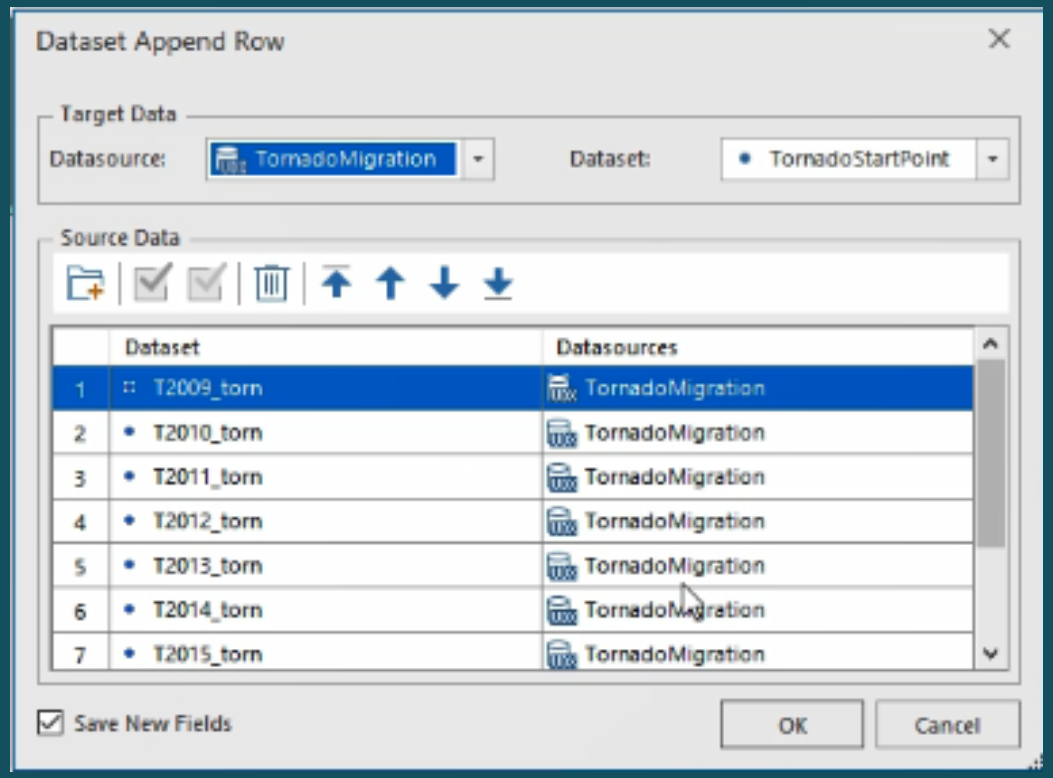


The data were in the csv format, we will import them as spatial data by set the longitude and lattitude coordinate

SuperMap

1

Import and append data



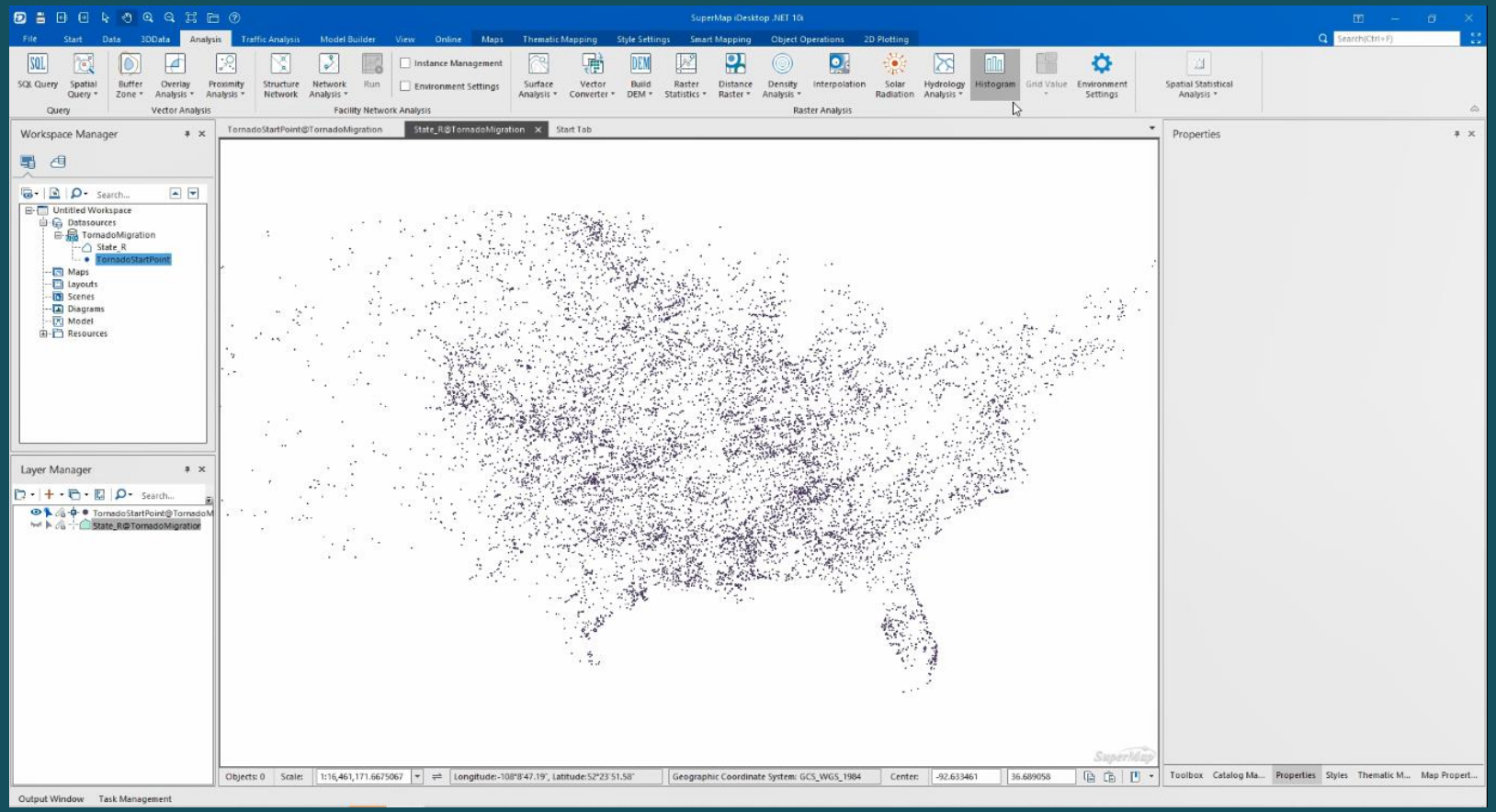
T_2009 T_2010 T_2011
T_2012 T_2013 T_2014
T_2015 T_2016 T_2017
T_2018 T_2019

Tornado Starting Point

SuperMap

1

Import and append data

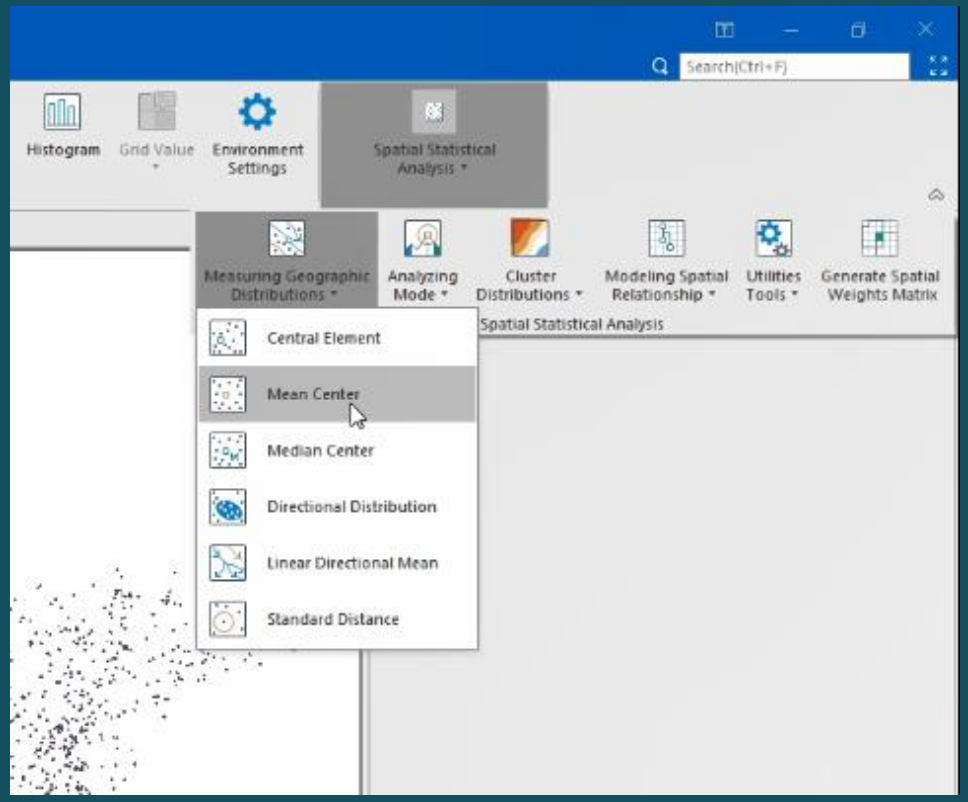


Tornado Starting Point visualize in the form of **points**

SuperMap

2

Mean Center Analysis



The Mean Center function can be used to identify the center of density of a set of core elements, namely the geographic average center.

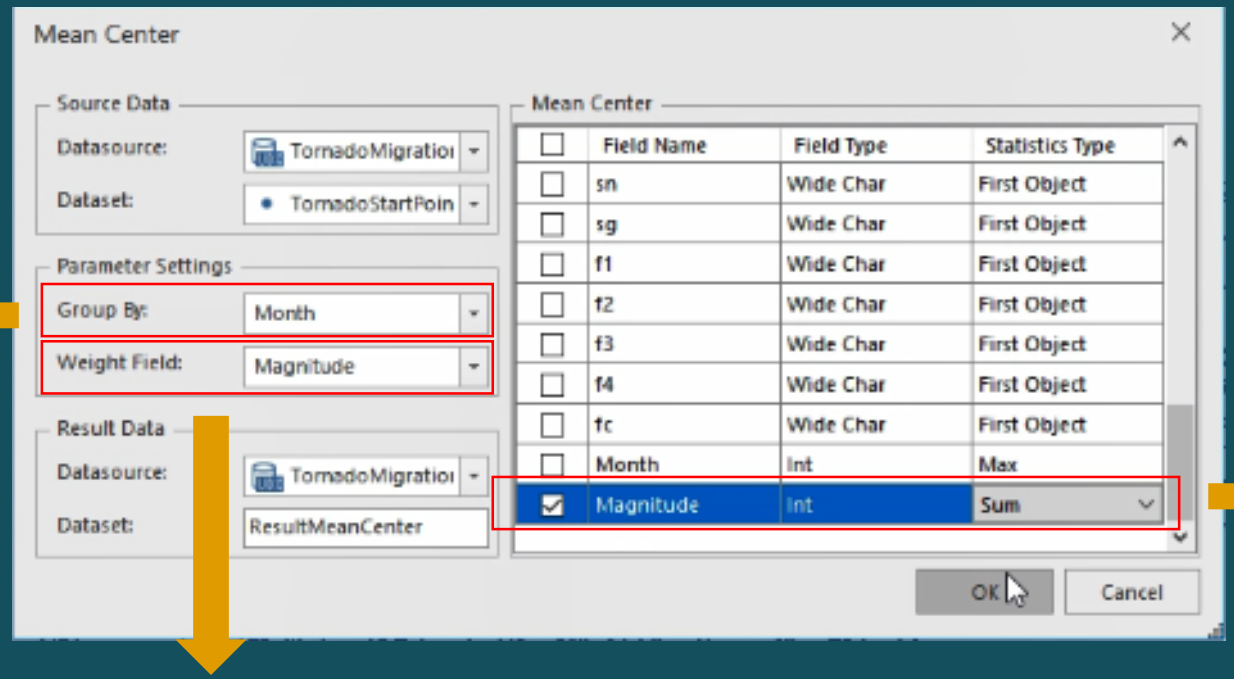
$$\bar{X}_w = \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i} \quad , \quad \bar{Y}_w = \frac{\sum_{i=1}^{n} w_i y_i}{\sum_{i=1}^{n} w_i}$$

X = Longitude
Y = Latitude
W = weight

SuperMap

2

Mean Center Analysis



Calculate the center value group by month

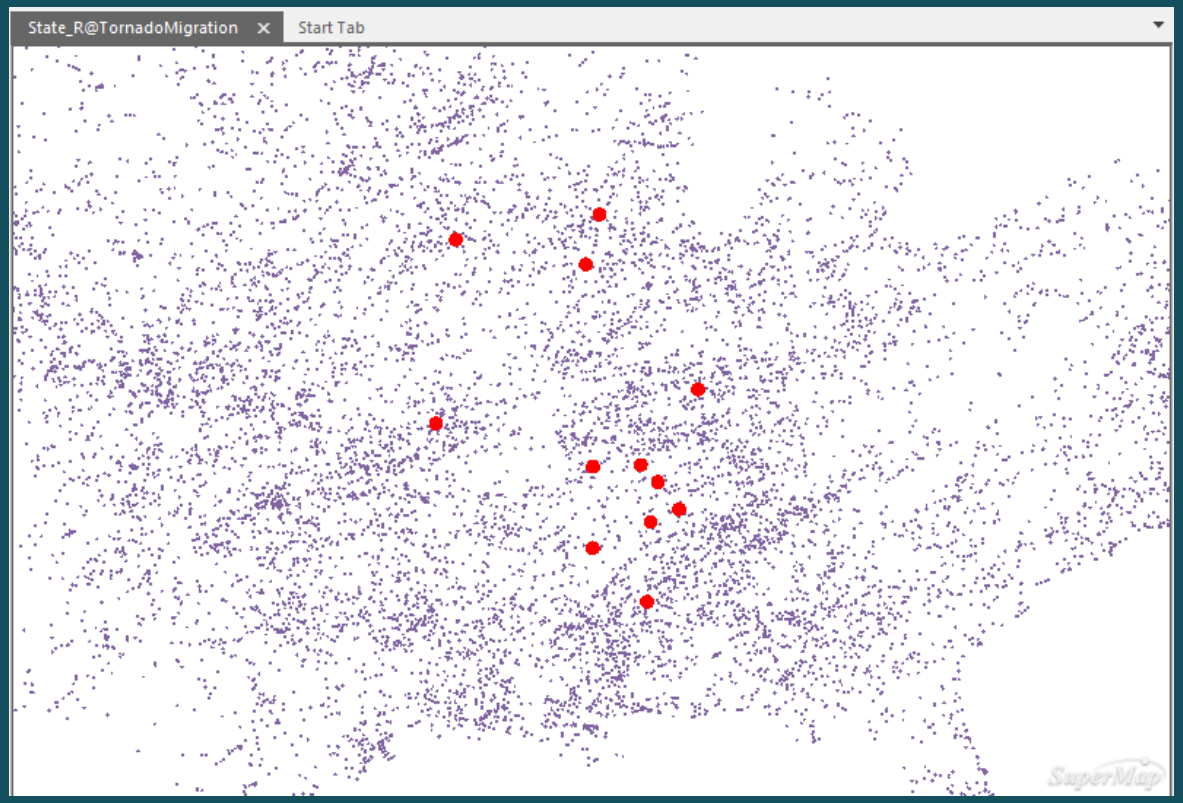
Magnitude will be act as weight value

The statistic type of the weight is sum

SuperMap

2

Mean Center Analysis



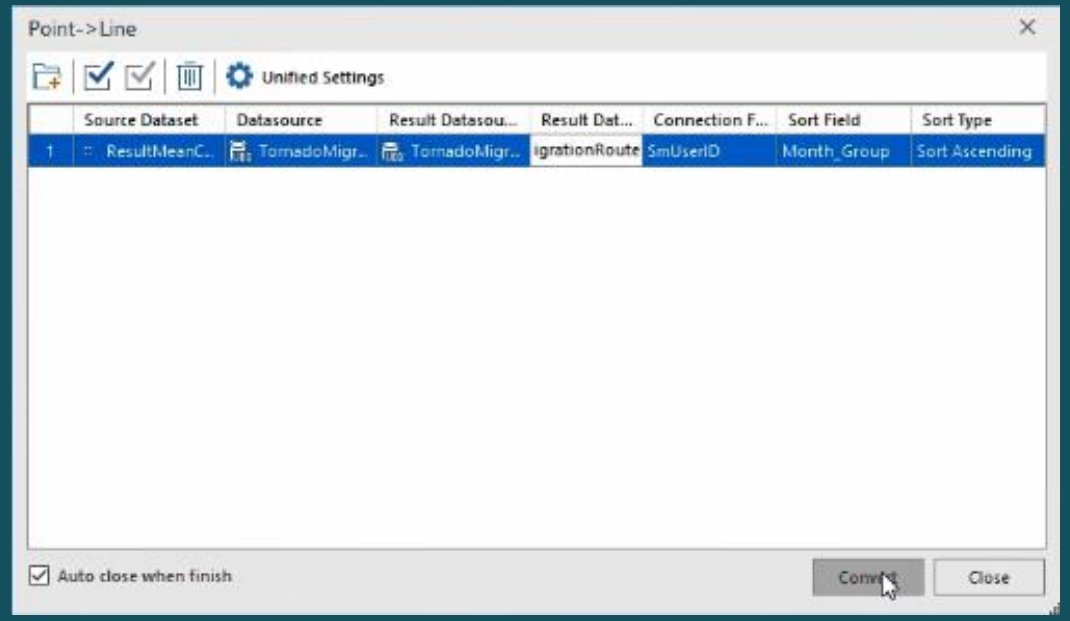
ResultMeanCenter@TornadoMigration | State_R@TornadoMigration | Start Tab

No	SmID	SmUserID	SmGeometry	Month_Group	Magnitude_Sum
1	1	0	BinaryData	1	319
2	2	0	BinaryData	2	435
3	3	0	BinaryData	3	515
4	4	0	BinaryData	4	1,718
5	5	0	BinaryData	5	694
6	6	0	BinaryData	6	793
7	7	0	BinaryData	7	372
8	8	0	BinaryData	8	202
9	9	0	BinaryData	9	177
10	10	0	BinaryData	10	333
11	11	0	BinaryData	11	452
12	12	0	BinaryData	12	310

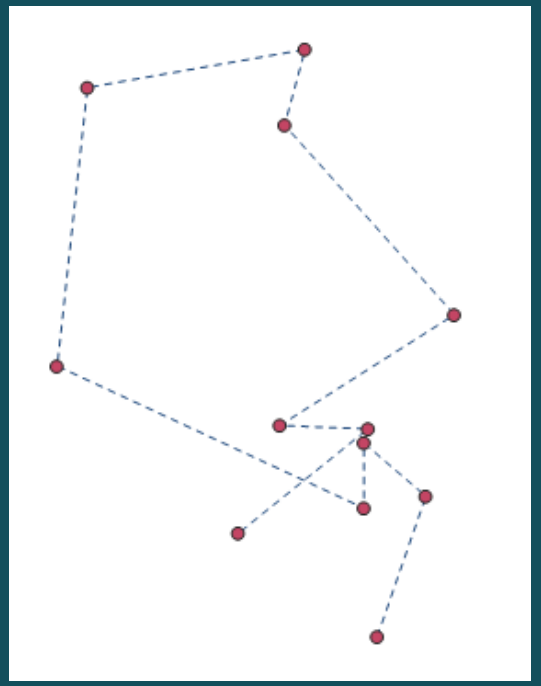
SuperMap

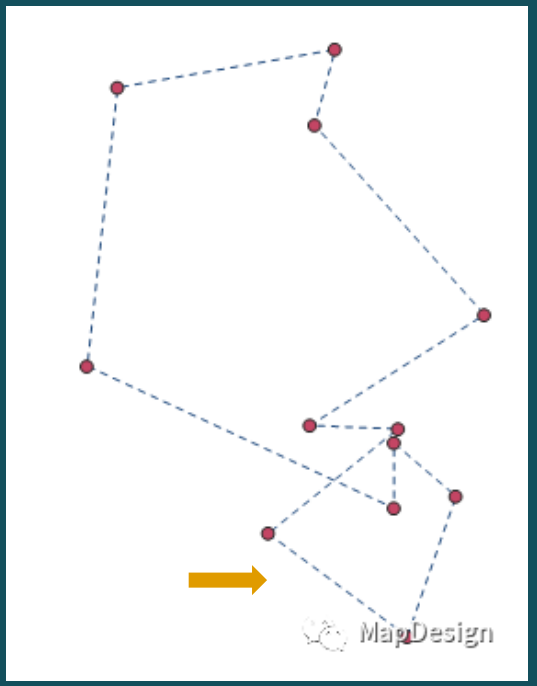
3

Connect Tornado Center Point



The point to line feature will allow you to get the connection line between each point, SmUsersID will be act as the connector function

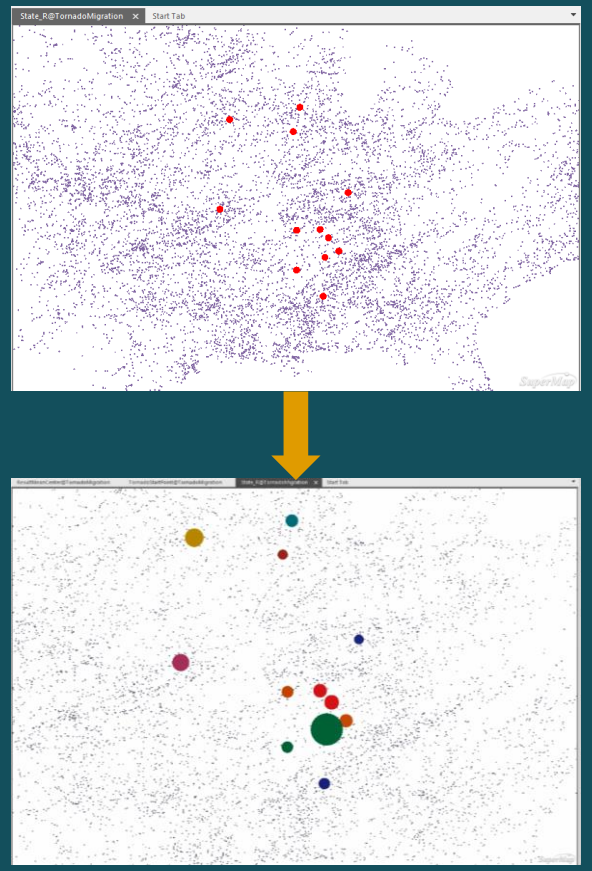


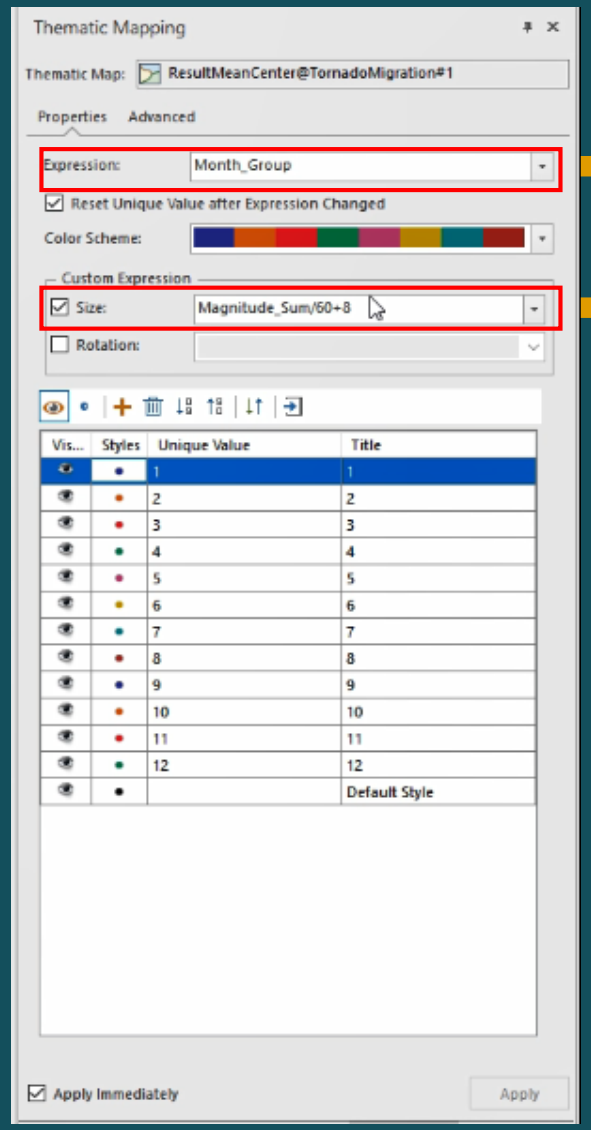


You need to draw the last line by your own

SuperMap

Symbolization



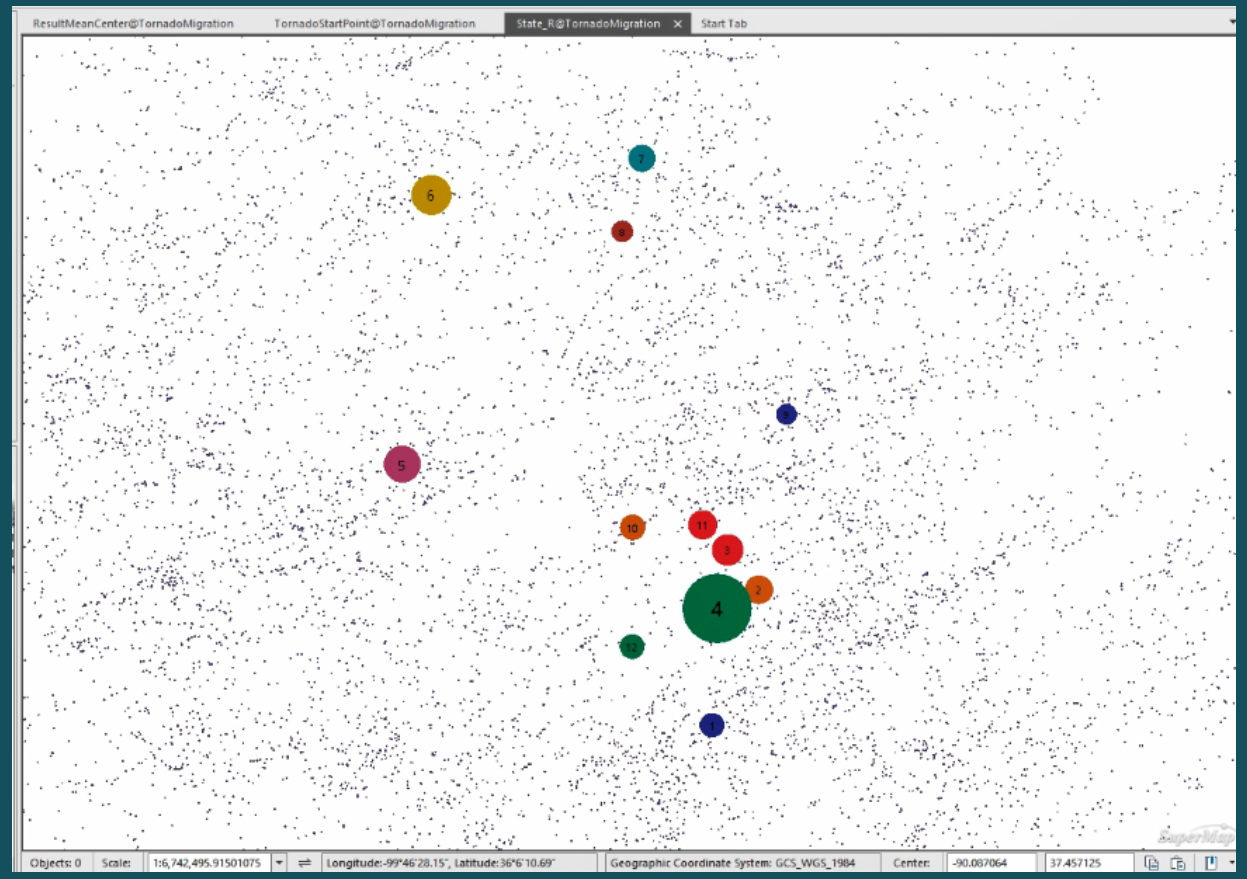


Different color for each month

Use expression = Magnitude_Sum/60+8

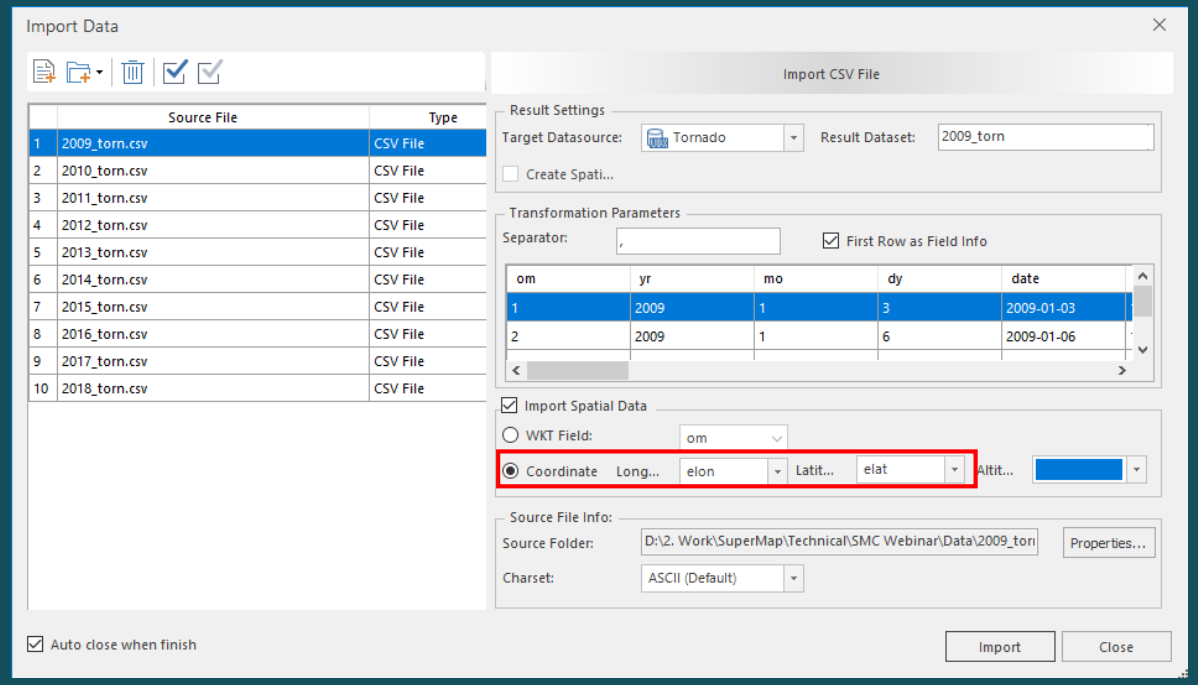
SuperMap

Symbolization

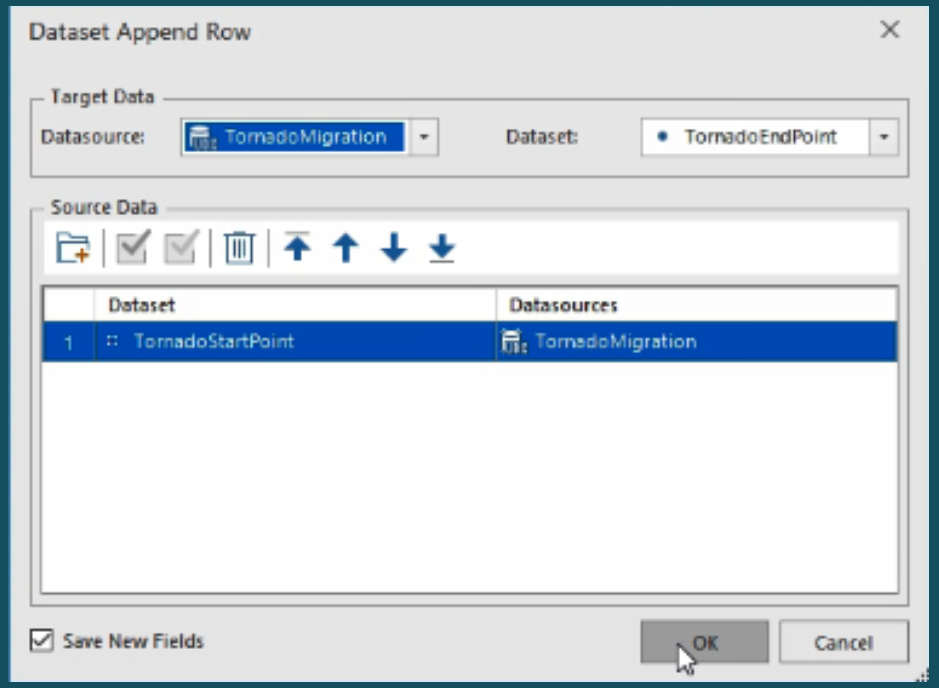


Add the number of month on each tornado center point

Trajectory Visualization



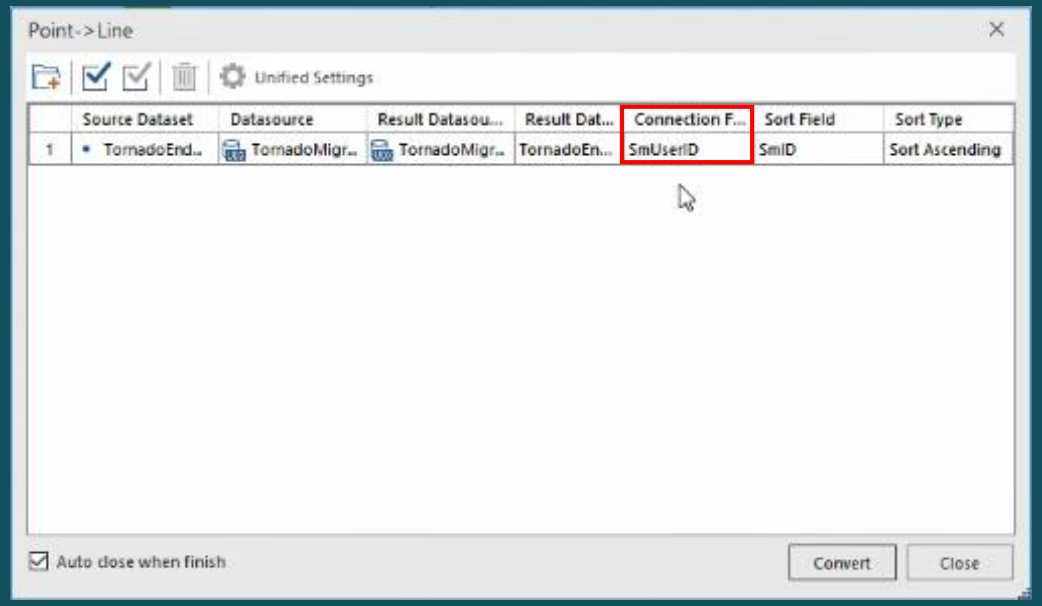
Import the tornado csv data with end point information



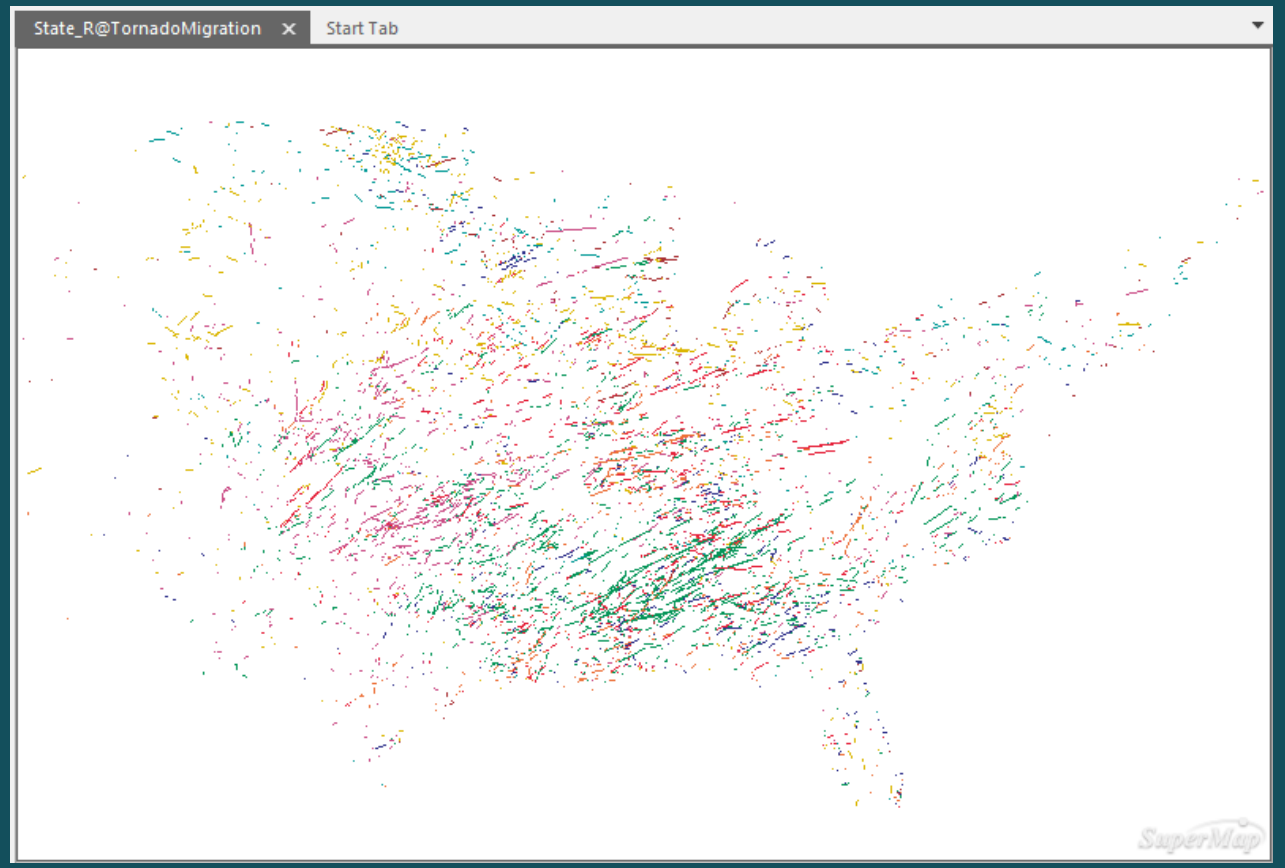
Append the end point and start point into one dataset => Tornado migration

SuperMap

Trajectory Visualization



Convert the Tornado Migration point into line with SmUserID as the connector



try now!

Tornado Mapping – Tutorial Video

https://youtu.be/YkfN-LepKn8

Download material

bit.ly/SMCweb_material

If you succesfully got the result,
kindly share yours to this link

bit.ly/SMCweb_submission1

Participant who send their submission
will get certificate from us!

For students :

- Undergraduates
- Postgraduates
- PhDs students

Category :

- Mapping
- Development
- Aplication Analysis
- Paper

Further information please visit

http://www.giscontest.com/en/

Thank you!

Further information you can reach us by email at global@supermap.com

Or visit supermap.com/en