

GF-TADs Foot and Mouth Disease Risk Assessment Training Workshop

19 - 21 September 2023 Johannesburg, South Africa



Atelier de formation sur l'évaluation des risques liés à la FIÈVRE APHTEUSE

Johannesburg, Afrique du sud 19-21 Septembre 2023

Détermination des groupes spatiaux et évaluation des groupes

Pratique



SaTScanTM
Software for the spatial, temporal, and space-time scan statistics



Télécharger et installer

- <https://www.satscan.org/>
- <https://www.satscan.org/download.html>

Register and Download

Current Version: SaTScan v10.1.2 released May 2023.

1. Request a Password

A password is required to download the SaTScan software. Please fill out all the fields in the following form and click on submit. You will then receive an email with the password. **Fields marked with an * are required.**

*Your Name:
First Last

*Organization:

*E-mail address:

*Country:

Send Information when SaTScan Software Workshops are Scheduled

Your e-mail address will not be used for any other purpose and will not be distributed to any other party.

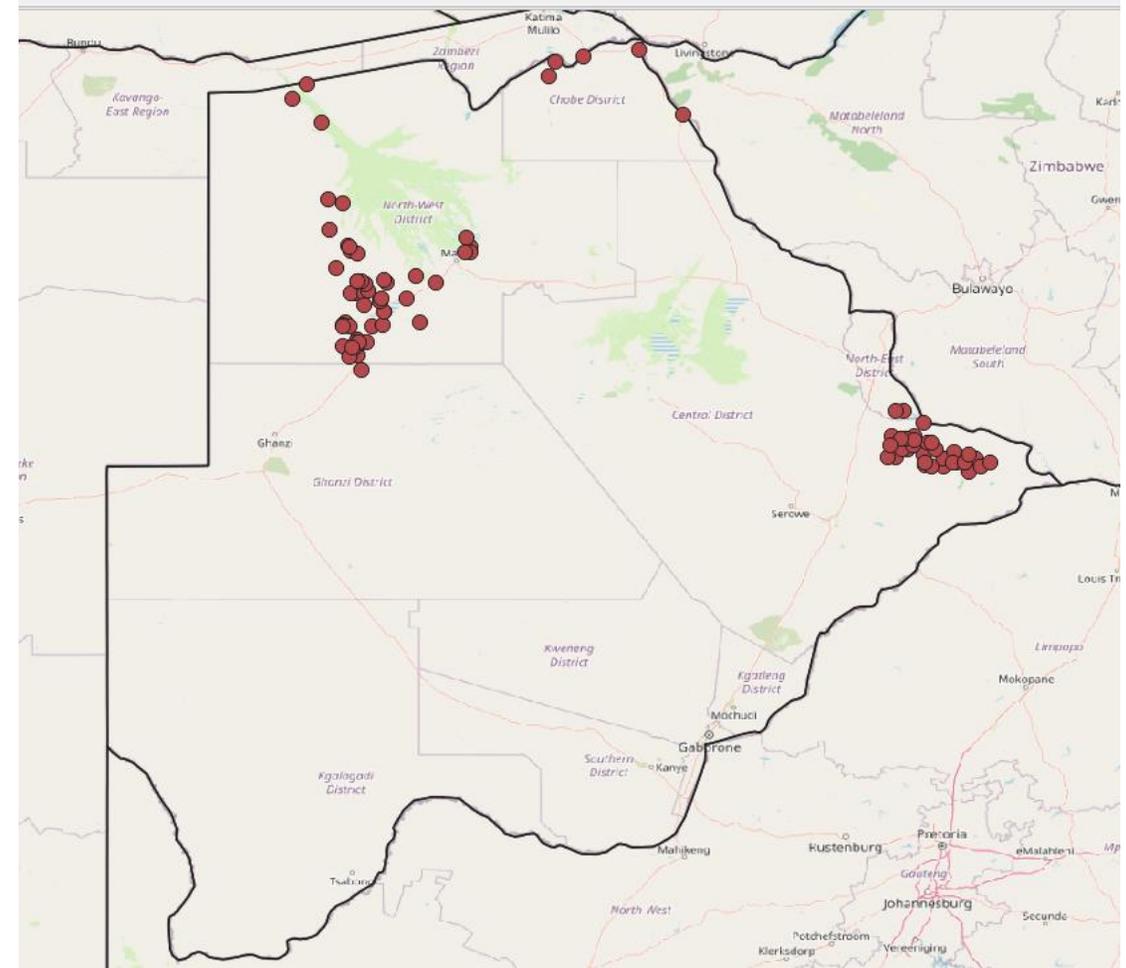
Téléchargez et suivez
les instructions

SaTScan - Principes de base

- Modèle basé sur Poisson
 - où le nombre d'événements dans une zone géographique est distribué selon la loi de Poisson, en fonction d'une population sous-jacente connue à risque
- Modèle Bernoulli
 - avec des données d'événement 0/1 telles que les cas et les contrôles
- modèle de permutation espace-temps
 - en utilisant uniquement les données de cas
- un modèle ordinal
 - pour les données catégorielles ordonnées
- modèle exponentiel
 - données de temps de survie avec ou sans variables censurées
- n modèle normal
 - pour d'autres types de données continues

Exemple – Foyers de fièvre aphteuse signalés à WOAHA - Botswana

- 2005 – 2020
- Bovins uniquement
- Chaque emplacement d'épidémie par ligne de données
- Totaux de cas non inclus – évaluation des groupes au niveau de l'épidémie
- Données de cas uniquement – modèle de permutation espace-temps



SaTScan - Software for the Spatial and Space-Time Scan Statistic

File Session Windows Help

Input Analysis Output

Case File: ...

Control File: (Bernoulli Model) ...

Study Period

Start Date: Year: 2000 Month: 1 Day: 1 End Date: Year: 2000 Month: 12 Day: 31

Population File: (Poisson Model) ...

Coordinates File: ...

Grid File: (optional) ...

Time Precision: None Year Month Day Generic

Coordinates: Cartesian Lat/Long

Advanced >>

Import File Wizard

Case File: ...

The expected format of the case file, using the Poisson probability model is:
<Location ID> <Number of Cases> <Date/Time> <Covariate 1> ... <Covariate N>

If the selected file is not SaTScan formatted (whitespace delimited) or fields are not in the expected order, select the 'Next' button to specify how to read this file.

Ok Clear Import Next >

Import File Wizard

Sampling of File Contents:

```
eventRef, cases, eventStartDate
15218, 1, 2005/07/28
10031, 1, 2006/04/11
9864, 1, 2006/04/11
10030, 1, 2006/04/11
10033, 1, 2006/04/11
10032, 1, 2006/04/11
```

Ignore first rows First row is column name

Field Separator
 Comma Semicolon Whitespace Other

Group Indicator
 Double Quotes Single Quotes

< Previous **Next >**

Import File Wizard

Display SaTScan Variables For:

SaTScan Variable	Source File Variable
location ID	eventRef
Number of Cases	cases
Date/Time (optional)	eventStartDate
Covariate1 (optional)	unassigned
Covariate2 (optional)	unassigned
Covariate3 (optional)	unassigned
Covariate4 (optional)	unassigned

Clear

Generated Id #	One Count #	eventRef	cases	eventStartDate
location2	1	15218	1	2005/07/28
location3	1	10031	1	2006/04/11
location4	1	9864	1	2006/04/11
location5	1	10030	1	2006/04/11
location6	1	10033	1	2006/04/11
location7	1	10032	1	2006/04/11
location8	1	10035	1	2006/04/11
location9	1	10034	1	2006/04/11
location10	1	10037	1	2006/04/11
location11	1	10036	1	2006/04/11
location12	1	10039	1	2006/04/11
location13	1	10038	1	2006/04/11

= Column is not actually defined in file but can be used as SaTScan variable.

< Previous **Next >**

Import File Wizard

Case file contains line list data

Event ID (optional) Event Latitude (optional) Event Longitude (optional)

unassigned unassigned unassigned

Source Column	Label
---------------	-------

Add
Remove
↑
↓

eventRef	cases	eventStartDate
15218	1	2005/07/28
10031	1	2006/04/11
9864	1	2006/04/11
10030	1	2006/04/11
10033	1	2006/04/11
10032	1	2006/04/11
10035	1	2006/04/11

< Previous **Next >**

Import File Wizard

Save imported input file as:

D:\OneDrive\jDATA\git\epiCourse_jdata_GIS_Introduction\Cases.cas Change

Save these settings and read directly from file source when running the analysis.

Cancel < Previous **Import**

Input Analysis Output

Case File:
D:\OneDrive\jDATA\git\epiCourse_jdata_GIS_Introduction\Cases.cas ...

Control File: (Bernoulli Model) ...

Study Period
Start Date: Year: 2005 Month: 7 Day: 1 End Date: Year: 2020 Month: 9 Day: 30

Population File: (Poisson Model) ...

Coordinates File: ...

Grid File: (optional) ...

Time Precision
 None Year
 Month Day
 Generic

Coordinates
 Cartesian
 Lat/Long

Advanced >>

Import File Wizard

Coordinates File:
D:\OneDrive\jDATA\git\epiCourse_jdata_GIS_Introduction\data\fmd_botswana_satScan_geo.csv ...

The expected format of the coordinates file, using Latitude/Longitude coordinates is:
<Location ID> <Latitude> <Longitude>

If the selected file is not SaTScan formatted (whitespace delimited) or fields are not in the expected order, select the 'Next' button to specify how to read this file.

Ok Clear Import Next >

Import File Wizard

Sampling of File Contents:

```
eventRef,latitude,longitude
15218,-18.53,25.65
10031,-21.99,28.03
9864,-21.91,27.74
10030,-21.89,28.02
10033,-22.01,28.21
10032,-22,28.1
```

Ignore first rows First row is column name

Field Separator
 Comma Semicolon Whitespace Other

Group Indicator
 Double Quotes Single Quotes

< Previous **Next >**

Import File Wizard

Display SaTScan Variables For: Latitude/Longitude Coordinates

SaTScan Variable	Source File Variable
Location ID	eventRef
Latitude (y-axis)	latitude
Longitude (x-axis)	longitude

Clear

Generated Id #	eventRef	latitude	longitude
location2	15218	-18.53	25.65
location3	10031	-21.99	28.03
location4	9864	-21.91	27.74
location5	10030	-21.89	28.02
location6	10033	-22.01	28.21
location7	10032	-22	28.1
location8	10035	-21.96	28.34
location9	10034	-21.93	28.21
location10	10037	-22	28.46
location11	10036	-21.96	28.45
location12	10039	-21.93	28.53
location13	10038	-22.05	28.46

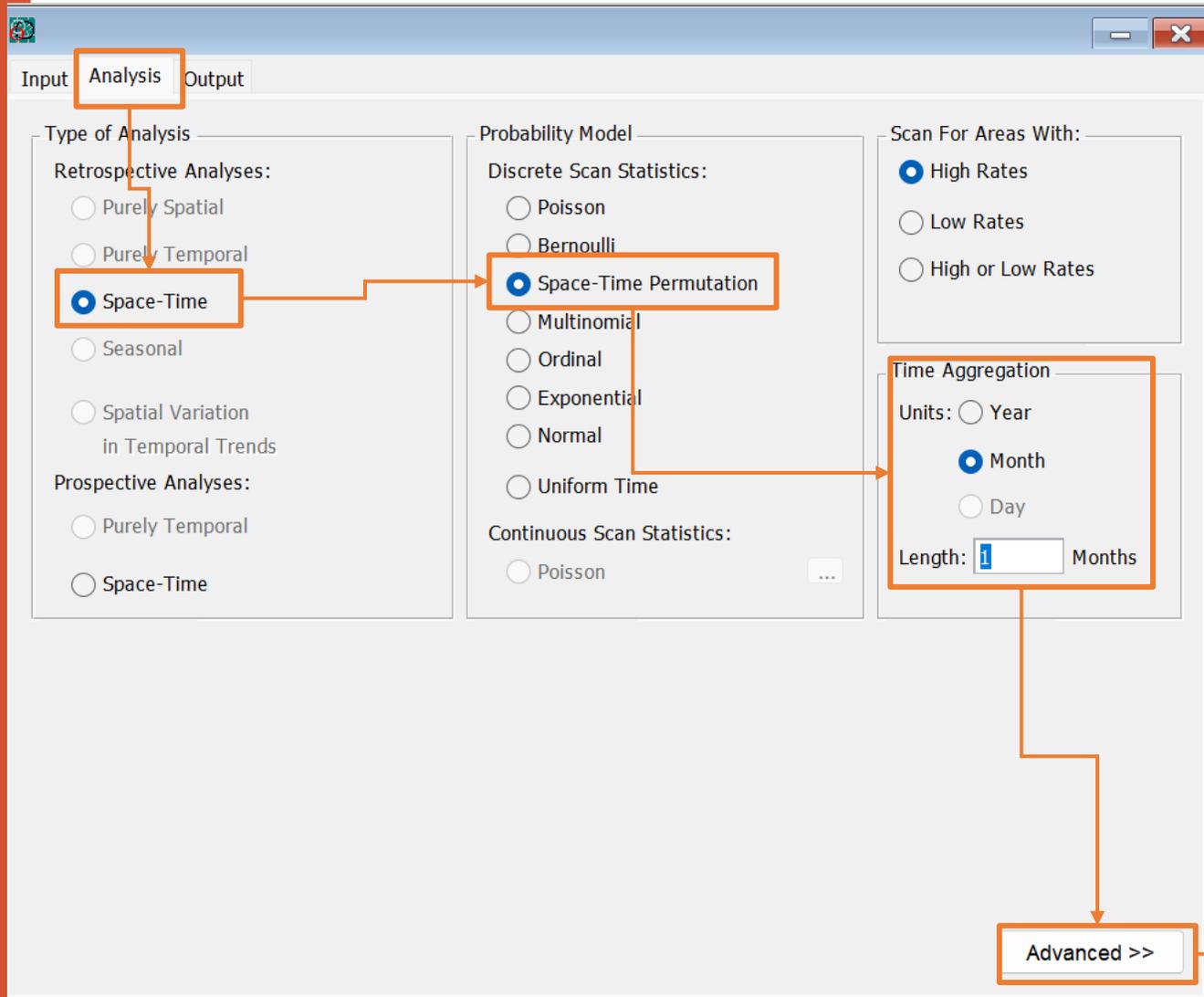
= Column is not actually defined in file but can be used as SaTScan variable.

< Previous **Next >**

Import File Wizard

Save imported input file as:

Save these settings and read directly from file source when running the analysis.



Input Analysis Output

Type of Analysis

Retrospective Analyses:

- Purely Spatial
- Purely Temporal
- Space-Time
- Seasonal
- Spatial Variation in Temporal Trends

Prospective Analyses:

- Purely Temporal
- Space-Time

Probability Model

Discrete Scan Statistics:

- Poisson
- Bernoulli
- Space-Time Permutation
- Multinomial
- Ordinal
- Exponential
- Normal
- Uniform Time

Continuous Scan Statistics:

- Poisson

Scan For Areas With:

- High Rates
- Low Rates
- High or Low Rates

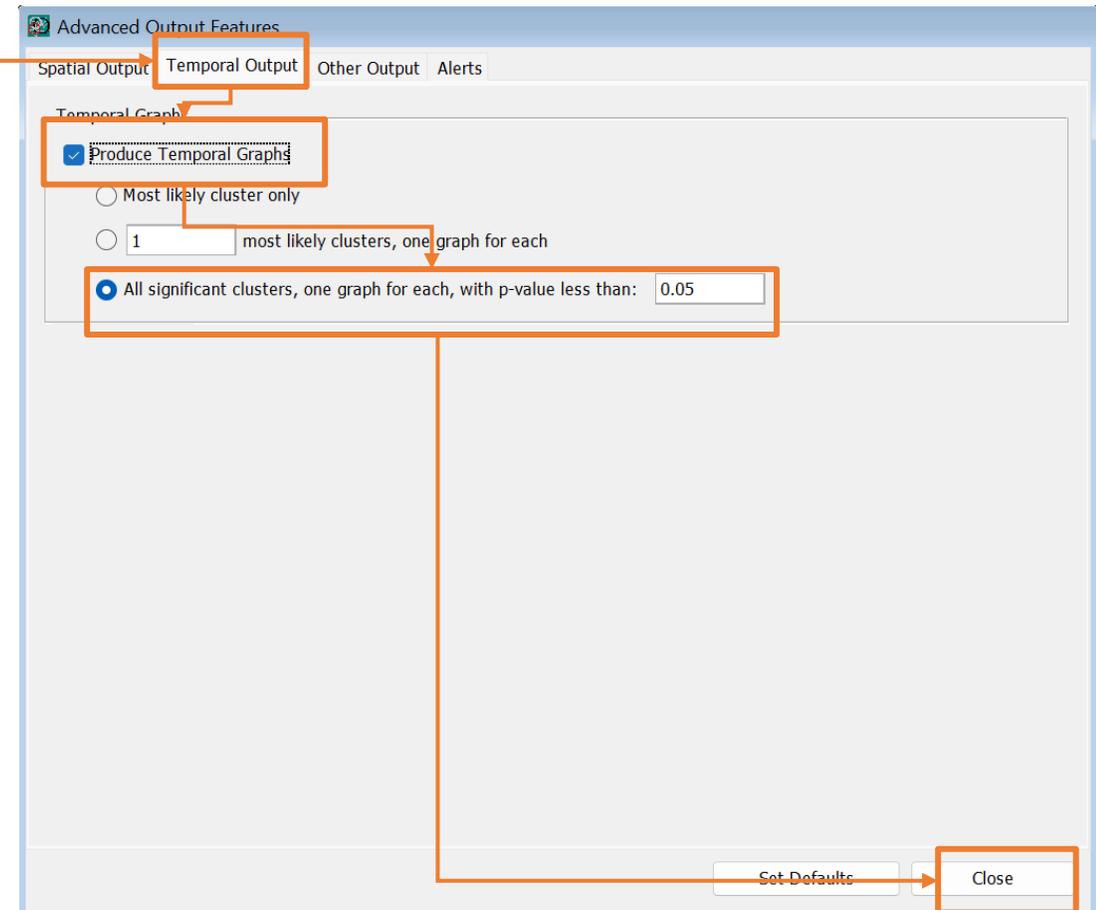
Time Aggregation

Units: Year

- Month
- Day

Length: 1 Months

Advanced >>



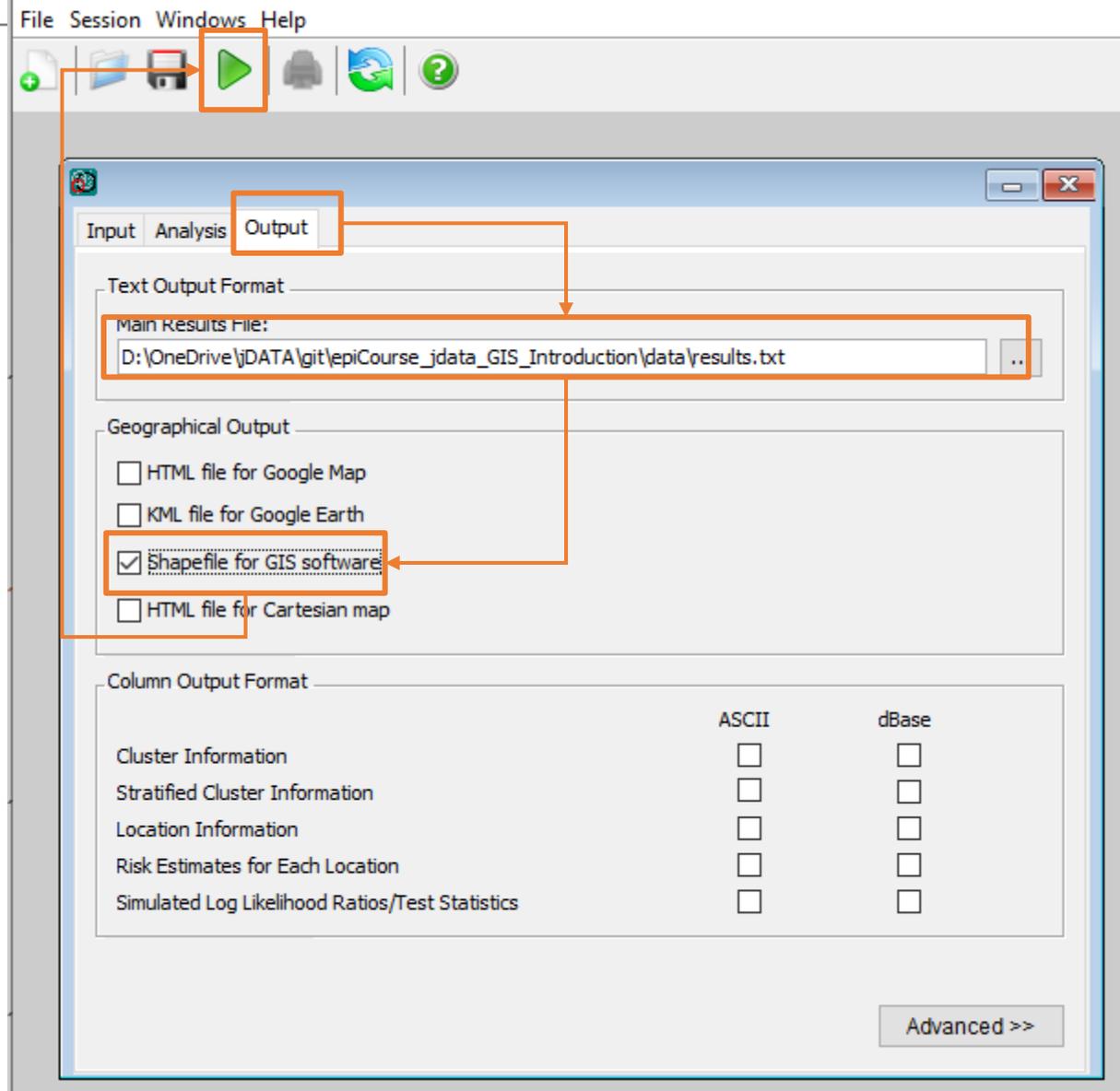
Advanced Output Features

Spatial Output Temporal Output Other Output Alerts

Temporal Graphs

- Produce Temporal Graphs
- Most likely cluster only
- 1 most likely clusters, one graph for each
- All significant clusters, one graph for each, with p-value less than: 0.05

Set Defaults Close



File Session Windows Help

Input Analysis **Output**

Text Output Format

Main Results File:
D:\OneDrive\jDATA\git\epiCourse_jdata_GIS_Introduction\data\results.txt

Geographical Output

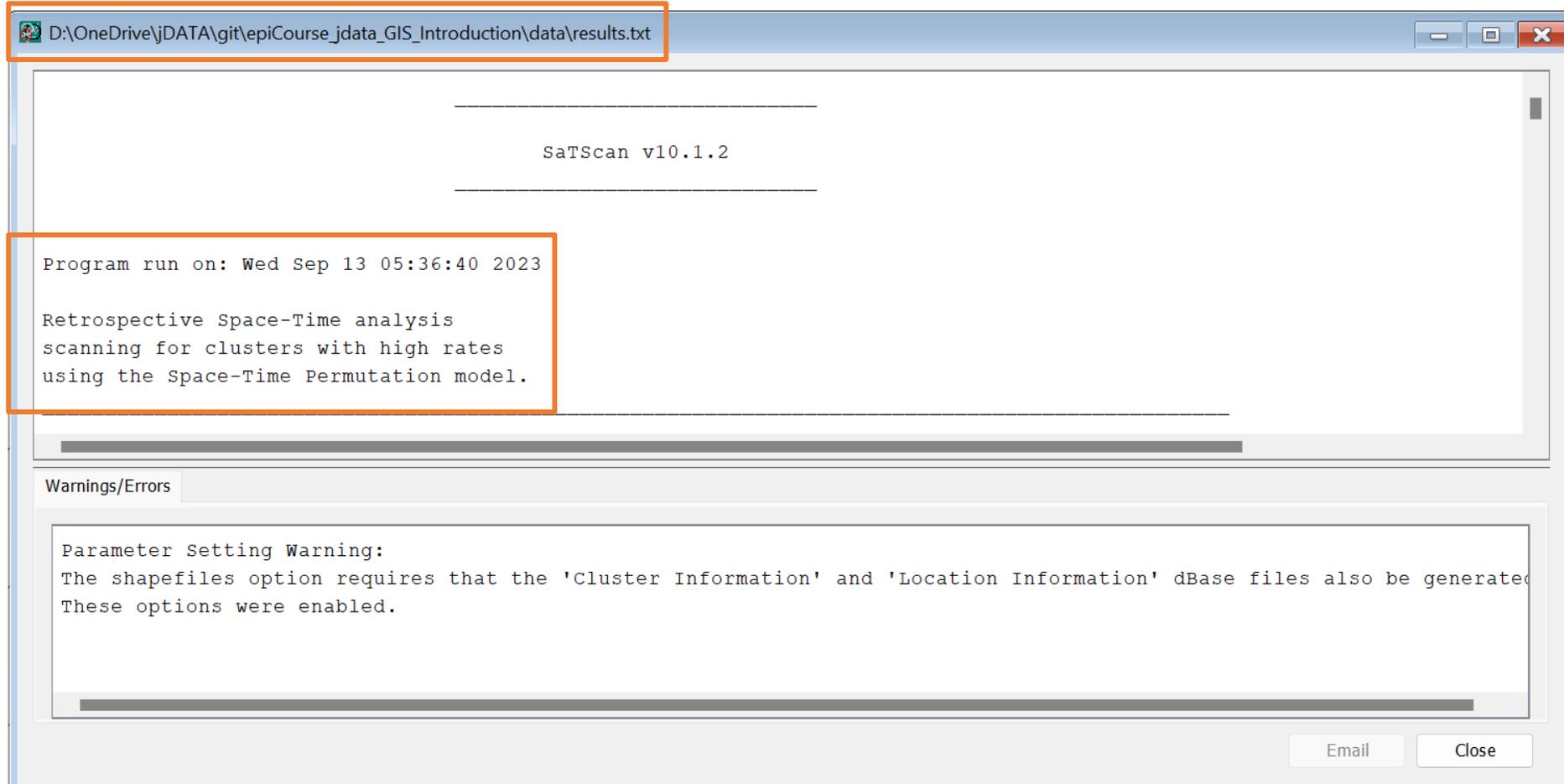
- HTML file for Google Map
- KML file for Google Earth
- Shapefile for GIS software
- HTML file for Cartesian map

Column Output Format

	ASCII	dBase
Cluster Information	<input type="checkbox"/>	<input type="checkbox"/>
Stratified Cluster Information	<input type="checkbox"/>	<input type="checkbox"/>
Location Information	<input type="checkbox"/>	<input type="checkbox"/>
Risk Estimates for Each Location	<input type="checkbox"/>	<input type="checkbox"/>
Simulated Log Likelihood Ratios/Test Statistics	<input type="checkbox"/>	<input type="checkbox"/>

Advanced >>

Le fichier de sortie



```
D:\OneDrive\jDATA\git\epiCourse_jdata_GIS_Introduction\data\results.txt

-----
SaTScan v10.1.2
-----

Program run on: Wed Sep 13 05:36:40 2023

Retrospective Space-Time analysis
scanning for clusters with high rates
using the Space-Time Permutation model.

Warnings/Errors

Parameter Setting Warning:
The shapefiles option requires that the 'Cluster Information' and 'Location Information' dBase files also be generated.
These options were enabled.

Email Close
```

Le fichier de sortie

- Cliquez

```
D:\OneDrive\jDATA\git\epiCourse_jdata_GIS_Introduction\data\results.txt

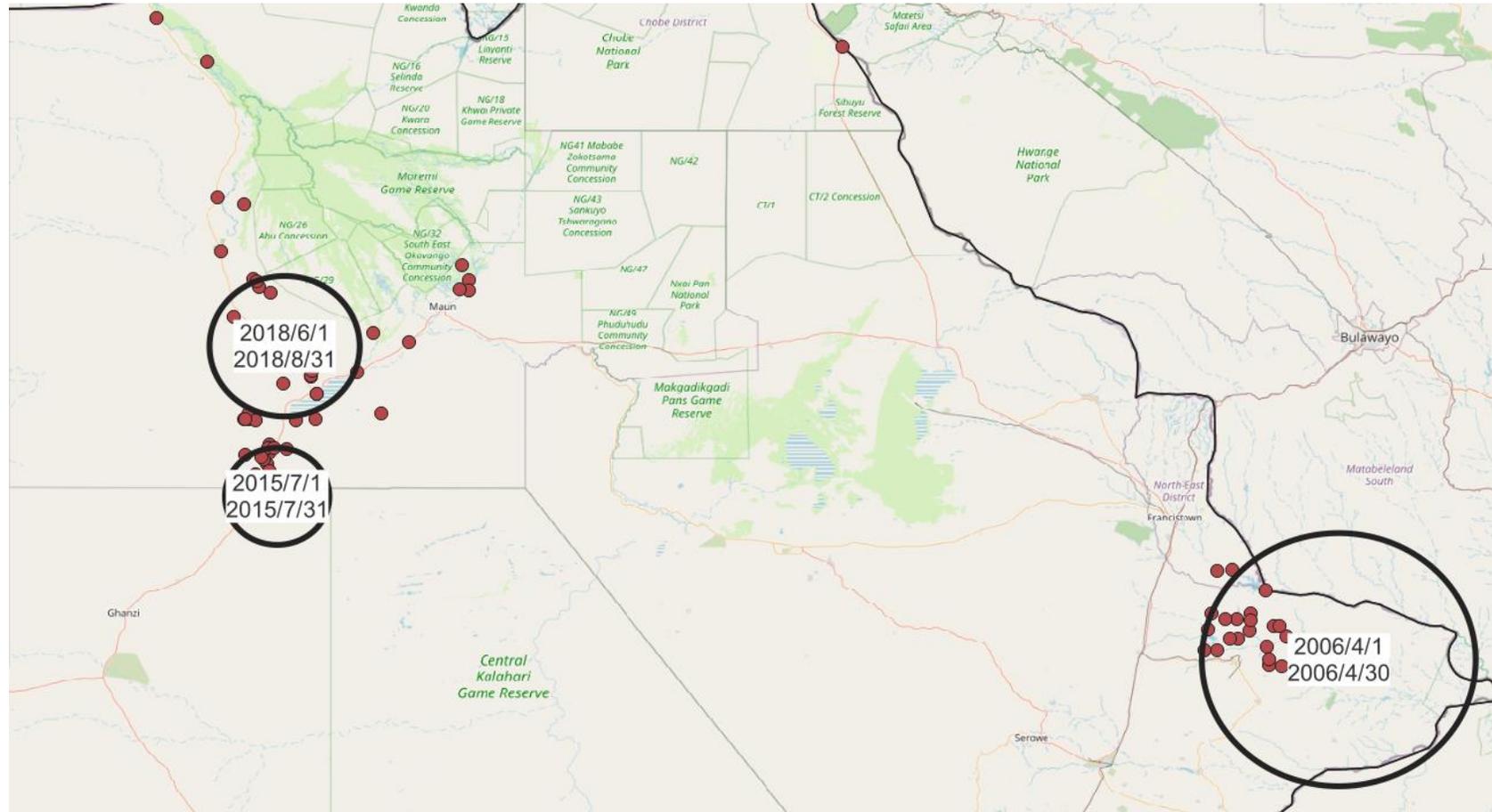
SUMMARY OF DATA

Study period.....: 2005/7/1 to 2020/9/30
Number of locations.....: 93
Total number of cases.....: 95

CLUSTERS DETECTED

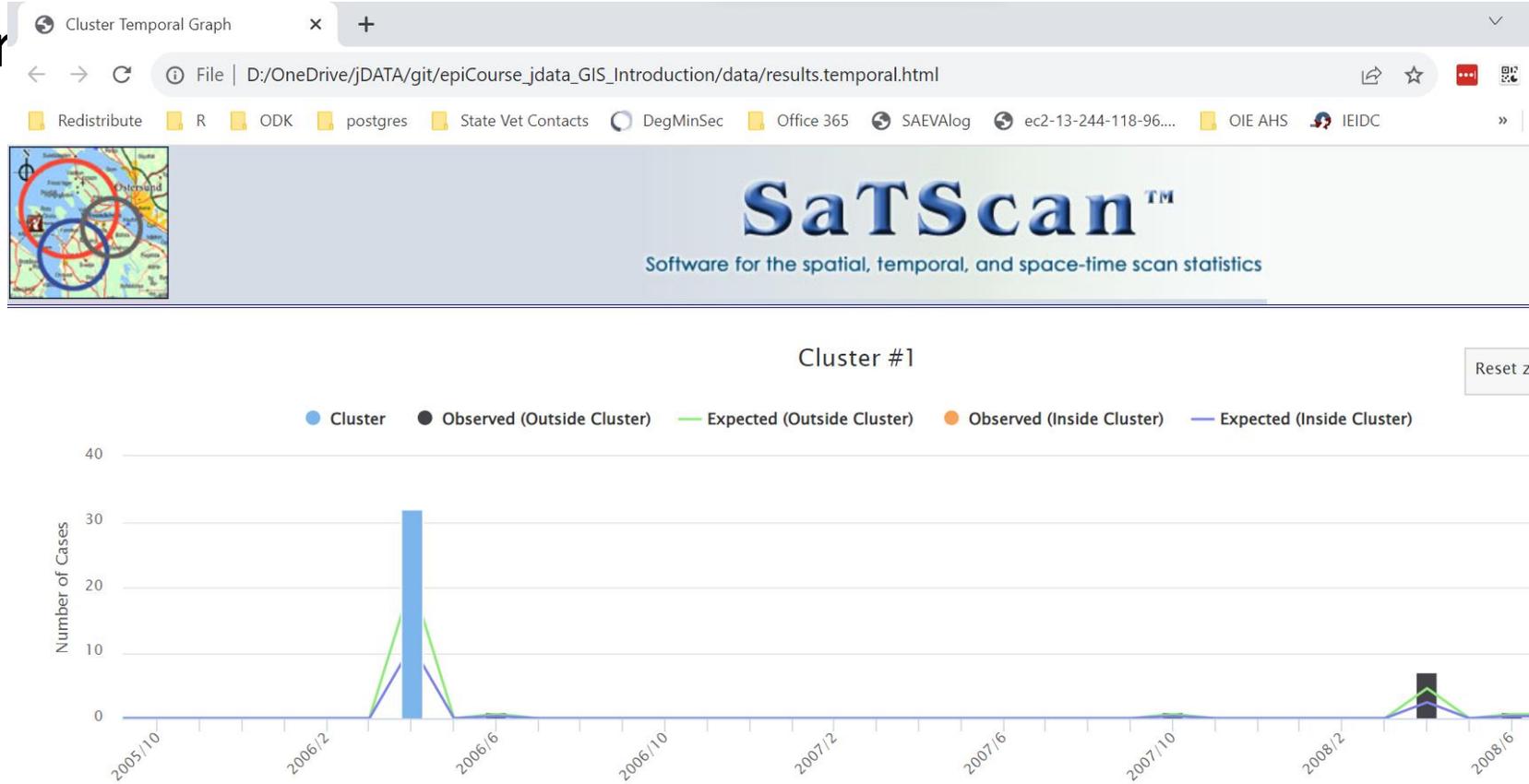
1.Location IDs included.: 10024, 9871, 10036, 10037, 10035, 10048, 10038, 10039, 9875, 9874,
                          10040, 10034, 10033, 10041, 9877, 10032, 10047, 10042, 10031, 10030,
                          9873, 10029, 10028, 10046, 9872, 1000019988, 10045, 9876, 10027,
                          9864, 10043, 10049, 10044
Coordinates / radius...: (21.960000 S, 28.420000 E) / 78.73 km
Time frame.....: 2006/4/1 to 2006/4/30
Number of cases.....: 32
Expected cases.....: 11.12
Observed / expected...: 2.88
Test statistic.....: 15.798750
P-value.....: 0.000000018
```

Cartographie des sorties du fichier de formes

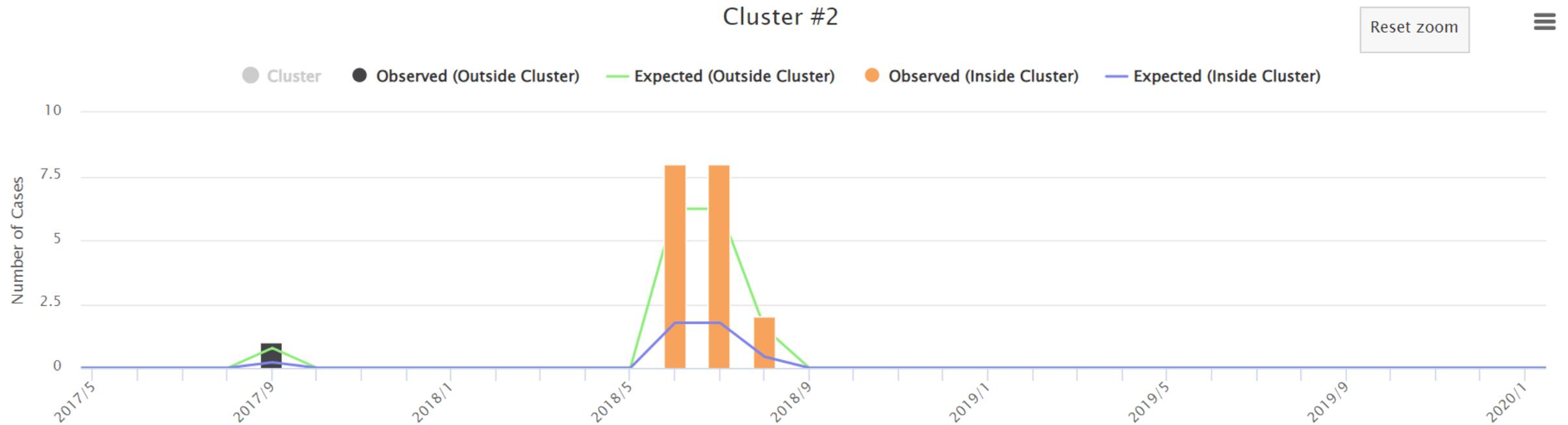


Résultats temporels

- Cliquer



Résultats temporels – groupes spécifiques



Questions et réponses et pratique