

An introduction to Reproduce the results in the manuscript

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1. Prerequisite

- (1) An x64 Microsoft Windows OS is required for the current program.
- (2) An X64 python which can be found in [<https://www.python.org/downloads/>] or [[KrigLavByGA\Compiled_exe_programs\prerequisite\python-2.7.14.amd64.msi](#)] is also needed.
- (3) The data and source code applied in this manuscript can be obtained by visiting: https://github.com/lizhanglin/GK_V1. Please see **Figure 1**.

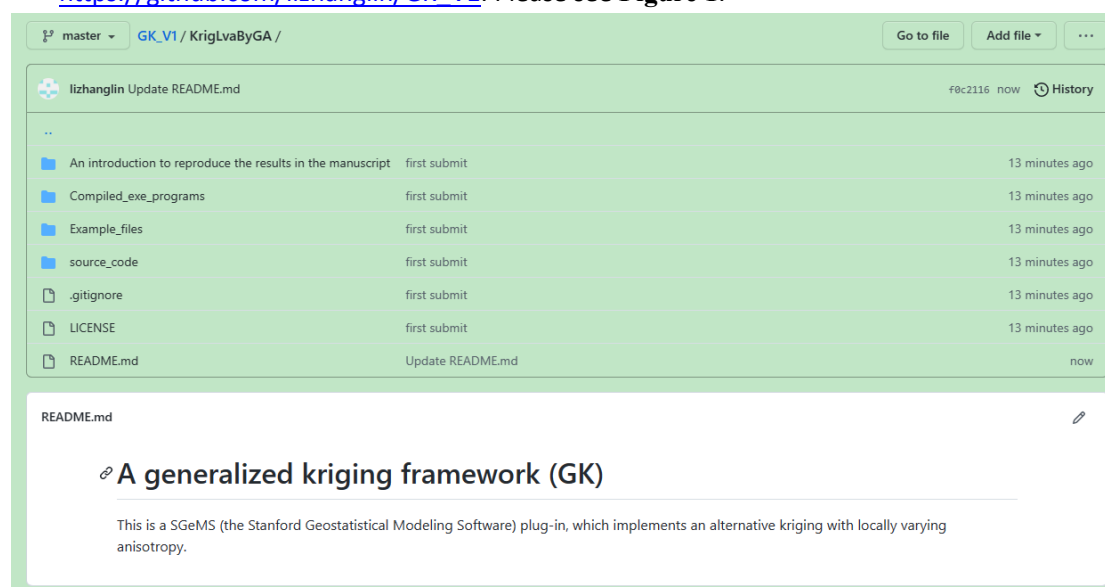


Figure 1

2. Operation steps

There are four operation steps to perform the GK-based estimation.

- (1) Open the file “[GK-Data\Compiled_exe_programs\LibX64\Sgems_X64.exe](#)” (**Figure 2**). Usually, the plug-in of GK will be loaded automatically and shown in the estimation category of the algorithm panel (**Figure 3** and **Figure 4**).

名称	修改日期	类型	大小
Sgems_X64.exe	2018/2/2 11:32	应用程序	71 KB
GsTLAppli_gui.dll	2018/2/2 11:32	应用程序扩展	3,143 KB
GsTLAppli_geostat.dll	2018/2/2 11:32	应用程序扩展	1,461 KB
GsTLAppli_extragui.dll	2018/1/30 15:10	应用程序扩展	155 KB
GsTLAppli_filters.dll	2018/1/30 15:08	应用程序扩展	532 KB

Figure 2

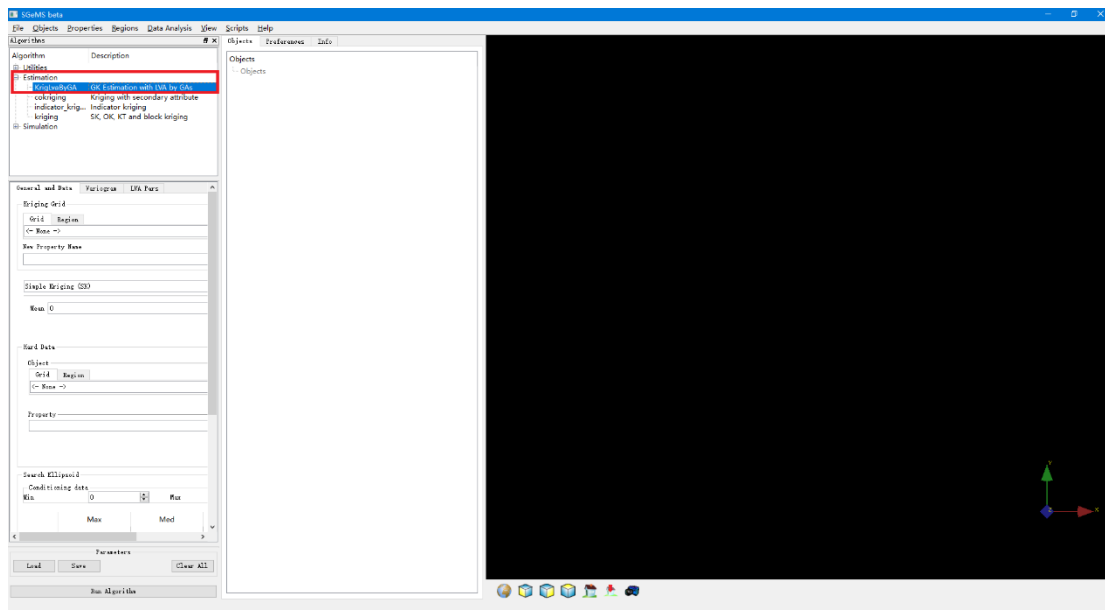


Figure 3

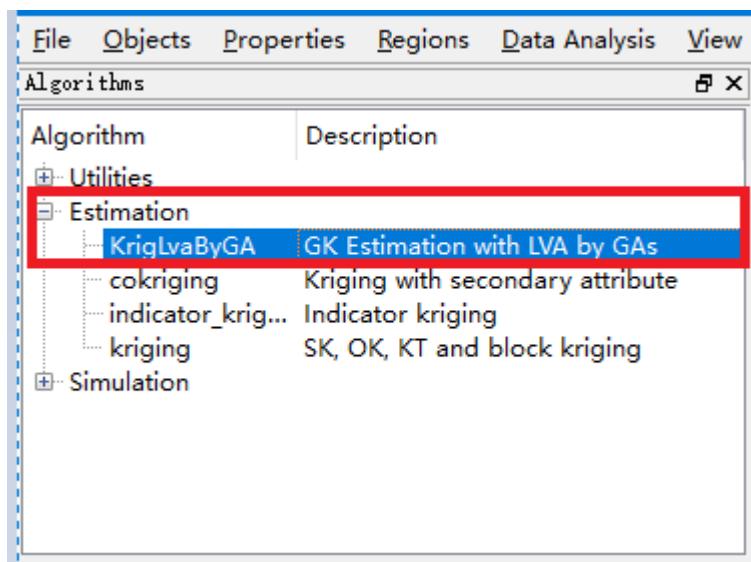


Figure 4

- (2) Use the menu “File | Open project” to open the test project files “GK-Data\data and pars\1. original data\case study 2\s_dataset_2.prj” (Figure 5 and Figure 6).

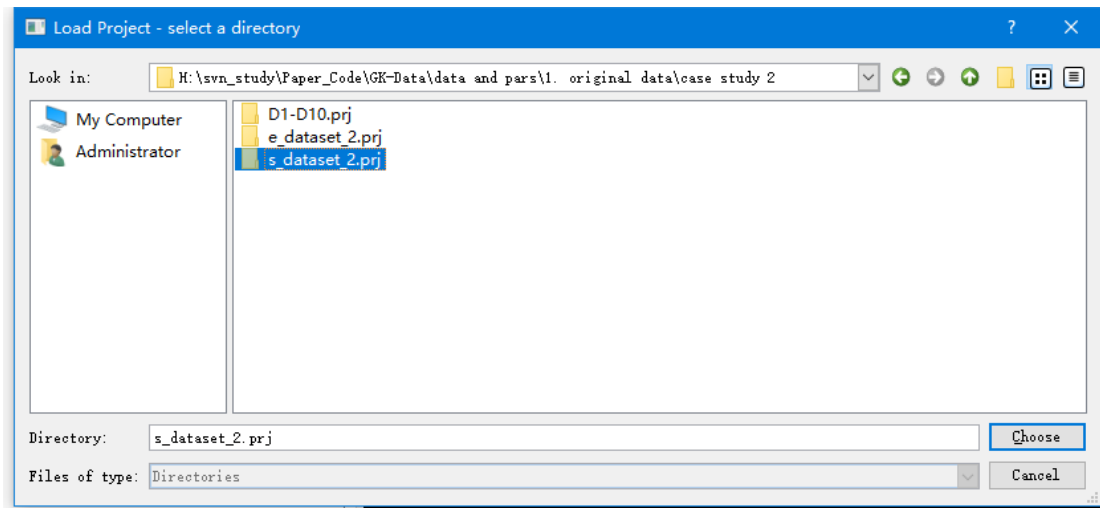


Figure 5

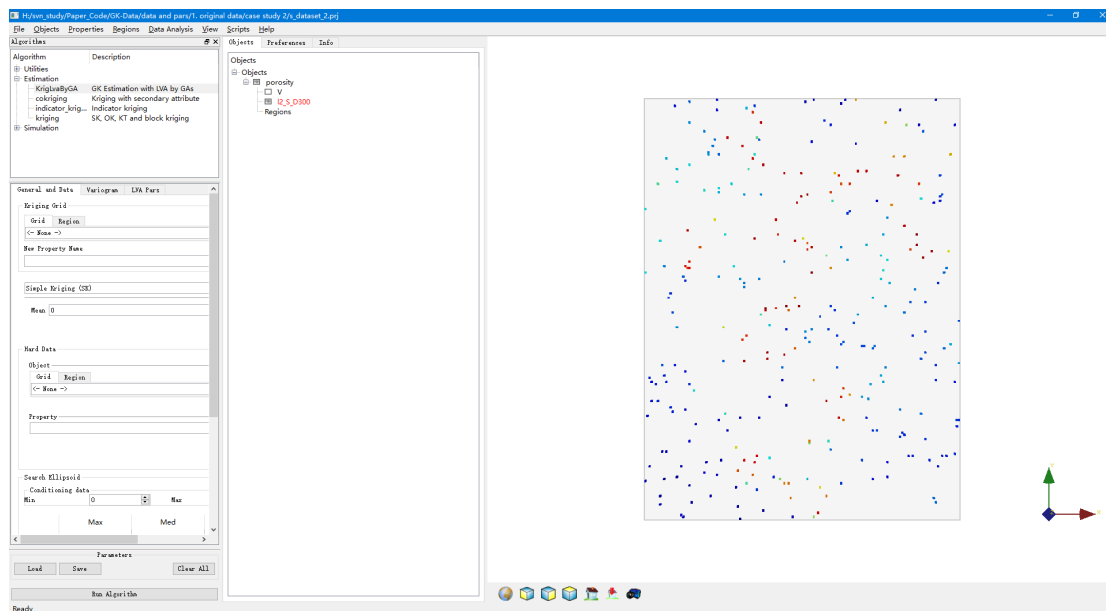


Figure 6

- (3) Click the “load” button (**Figure 6**) to open one of the test parameters. The GK-estimation algorithm will be located, and the standard parameters in an estimation process, such as the variogram model, search neighborhood, estimation grid and property, hard data, and property, will also be set automatically. See **Figure 7**, **Figure 8**, **Figure 9**, and **Figure 10**.

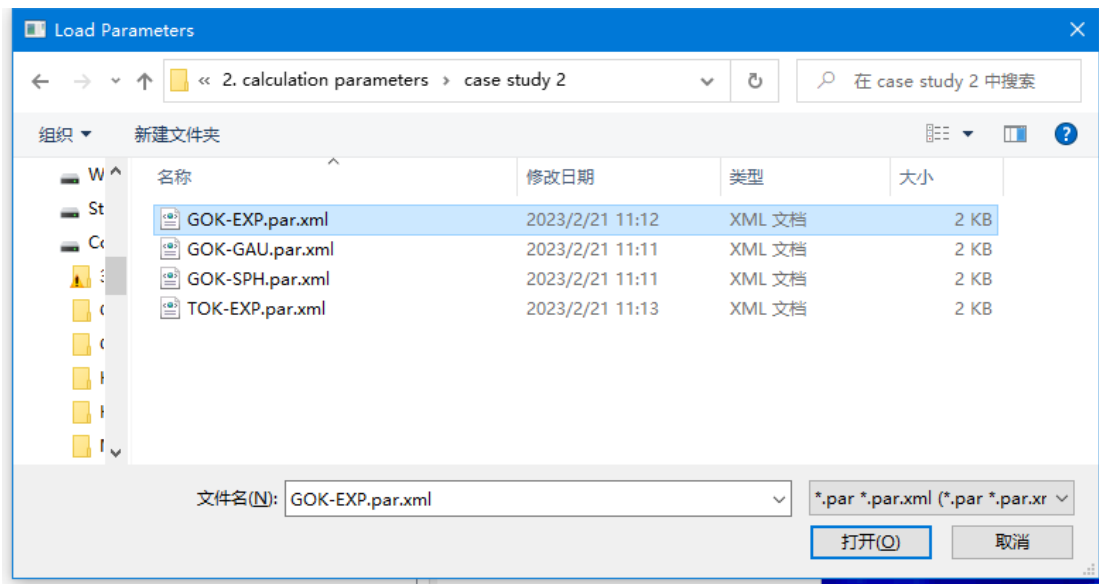


Figure 7

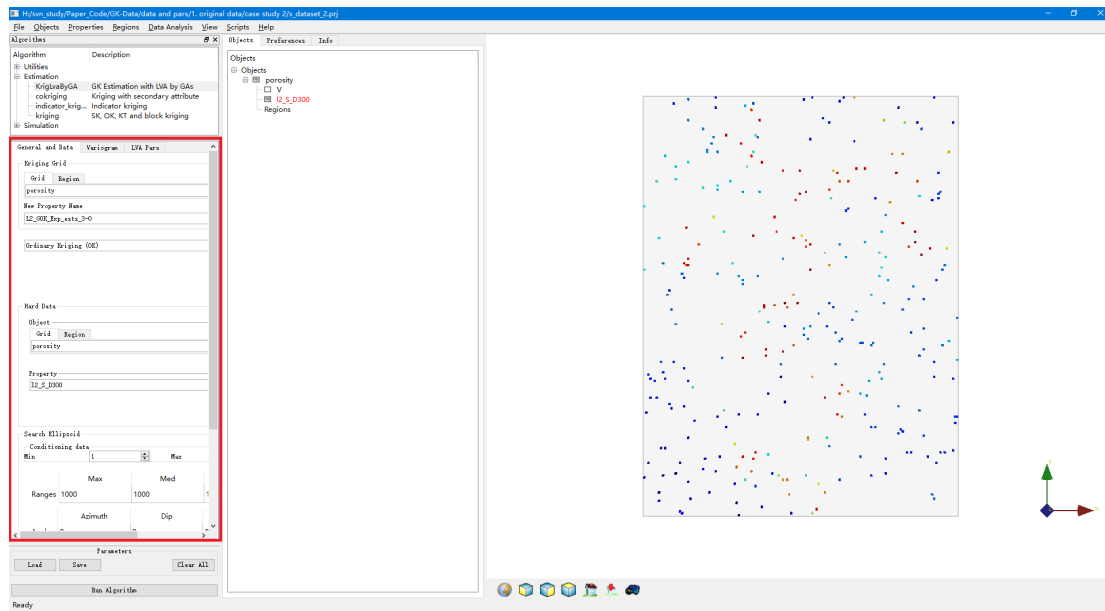


Figure 8

General and Data	Variogram	LVA Pars
MSPD/OSPD Distance File		
ford vi-e porosity\l2_s_1000_random_data\300_data\osp		
LVA Field File Name		
Standard_test_data_circle/LVA_field.out		
Experimental Variogram File Name		
/expvariograms/l2_10		
Will experimental variogram be used? (0- NO; 1- YES)		
0		
LVA Field Size (e.g., 50 50 1)		
260 300 1		
Performed with LVA? (0- NO; 1- YES)		
1		
Type of Search ellipsoid (0- LVA; 1- DSE-DCF; 2- DSE;		
0		
Valid value range of estimates (e.g., [-9999999999.9 9999999999.9])		
-9999999999.9 9999999999.9		
Will OK weights be used as initial values? (0- NO; 1- YES)		
0		
Weight Value Range (e.g., -31 0.0 1.0)		
-31 0.0 1.0		
Servo-System Correction_W		
-0.9 -0.9		
Is Full random path used for SIM? (0- NO; 1- YES)		
0		
Estimation Method (-p -IDW; 1-Kriging-lva; 2-GK-lva; 3-OK)		
2		
Opt Method (1-GALIB; 2-Simulated Annealing)		
1		
GA Type (0-SteadyStateGA 1-IncrementalGA 2-DCrowdingGA)		
0		
Parameters		
Load	Save	Clear All
Run Algorithm		

Figure 9

General and Data
Variogram
LVA Pars

Kriging Grid

Grid
Region

porosity

New Property Name
L2_GOK_Exp_ests_3-0

Ordinary Kriging (OK)

Hard Data

Object

Grid
Region

porosity

Property
l2_S_D300

Search Ellipsoid

Conditioning data

Min
1
Max

	Max	Med	
Ranges	1000	1000	1
	Azimuth	Dip	

Parameters

Load
Save
Clear All

Run Algorithm

Figure 10

- (4) Click the “Run algorithm” button in **Figure 10** to perform the algorithm. When the estimation is finished, the estimates shown in **Figure 11** will be produced.

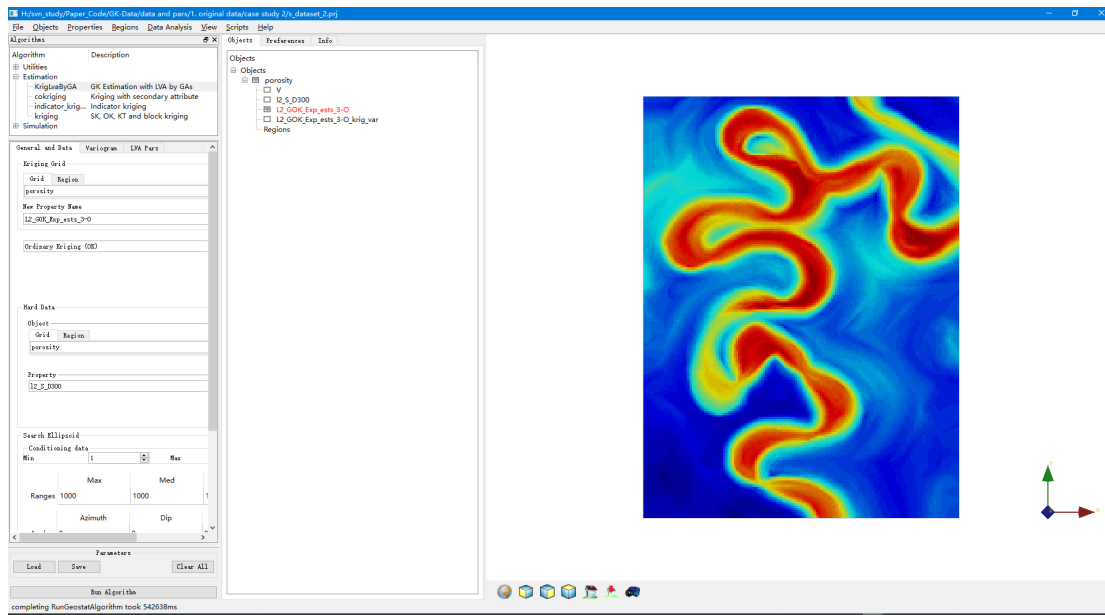


Figure 11

3. Notes

- (1) All calculation parameters such as those shown in **Figure 9** and **Figure 10**. can be altered to perform the corresponding estimation.
- (2) The simplest way to check the results shown in the manuscript is to view the resulted files. All of estimated results can be explored in the file dictionary: data and pars\3. result data\case study 3\D1-D9.prj, and data and pars\3. result data\case study 2\D1-D10.prj, corresponding to **Figure 12** and **Figure 13**.
- (3) Using the menu “Object| Save Object”, the original or resulted data can also be exported (in **Figure 14**) as a CSV or GSLIB file for additional analysis.

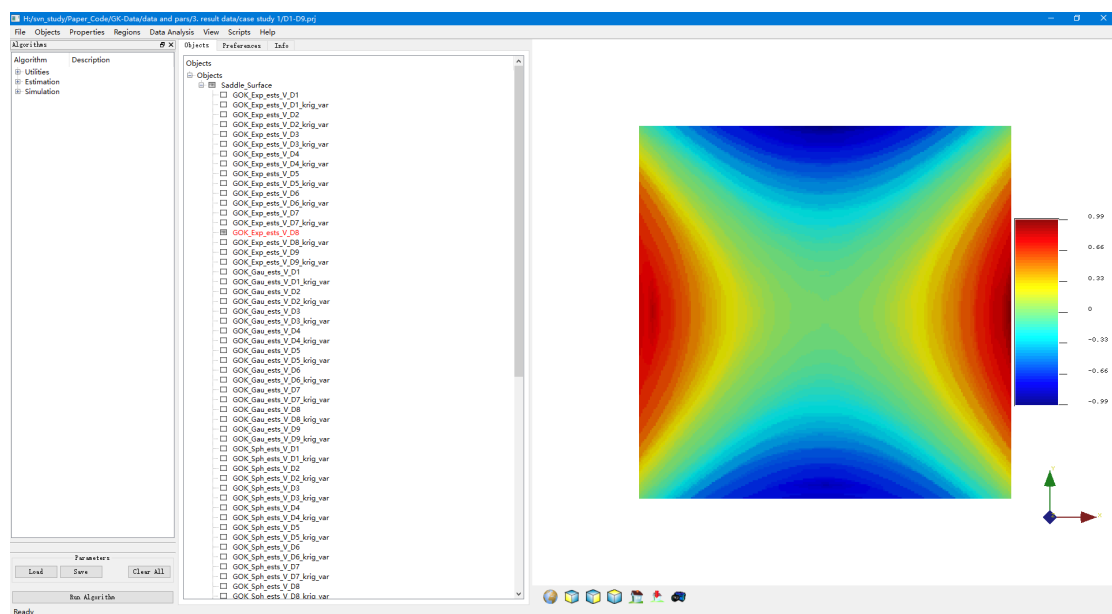


Figure 12

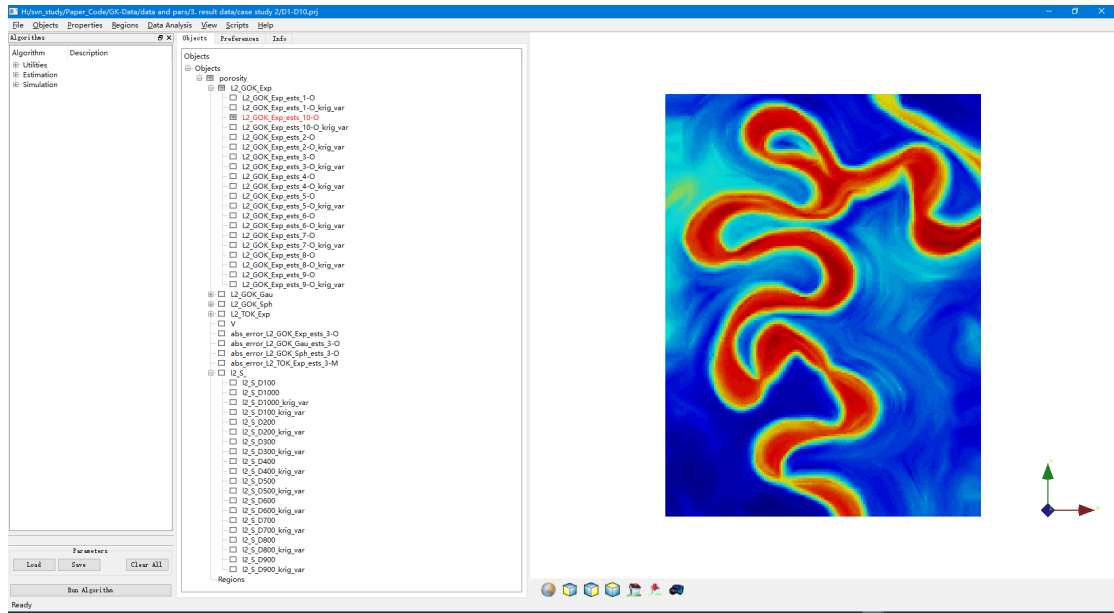


Figure 13

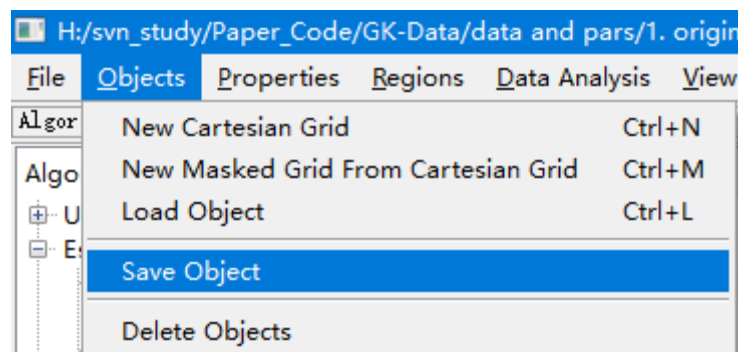


Figure 14