

## Lecture 1.4:

### **Interpolation, gridding, selection, reformatting, prediction.**

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GRAVSOFT includes software for

Interpolation: (GEOIP)

Gridding: (GEOGRID)

Selection: (SELECT)

Reformatting: (FCOMP, GCOMB, GBIN,  
G2SUR)

Prediction: (GEOGRID, GEOID, GPCOL,  
GEOCOL)



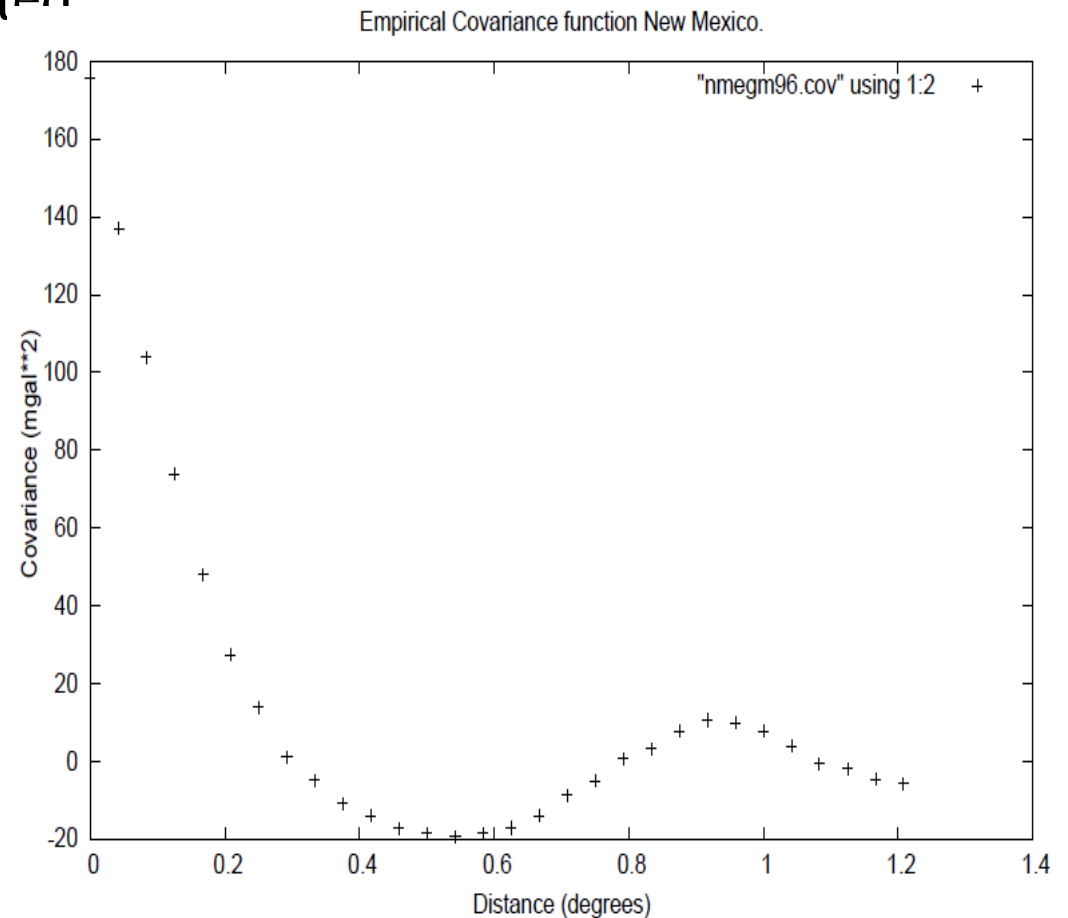
## Preparation: Covariance estimation.

In Lecture 3.5 we will explain covariance estimation.

Gravity anomalies correlated

as a function of distance, because the "geology" is the same for two values close to each other, and may have opposite sign for points further away.

Value at zero distance is the **VARIANCE**.



# Preparation: Covariance estimation by EMPCOV

## EMPCOV - Emperical Covariance Estimation

Input data filename: data/nmfa-egm96-tc.dat  
Input position of data element: 3  
Input sample intervalsize (arcmin): 2.5  
Input number of sampling intervals: 30

### Configure parameters

Should mean value be subtracted:  Yes  No

Should data in subarea be used:  Yes  No

Input area boundaries: 54.5 57.5 7.0 13.0

Input histogram bin size: 5.0

Name of file to hold result: data\nmegm96.covt

Running options. Working in H:\GRAVSOFT\pyGravsoft

Data send to empcov

Quit

Write settings

Start program

Help



# Preparation: Covariance estimation: empcov.log

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2920 VALUES INPUT FROM FILE data/nmfa-egm96-tc.dat  
NUMBER OF OBS 1= 2920 MEAN = 0.3066 VAR. = 173.53

HISTOGRAM, USING BIN SIZE= 5.000

0 0 0 0 3 9 34 49 118 248 372 887 357 343 233 127 59 35 18 18 10 0 0  
OUT-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9' 10OUT  
PSI COVA( 1, 1) PROD. STDV OF COV..

O	M	(UNIT)**2	NUMB	(UNIT)**2	
0	0.00	175.509014	3132	4.9	0.330449
0	2.00	145.042029	4762	3.4	20.163033
0	4.00	119.317243	9487	2.3	45.463833
0	6.00	90.458667	14003	1.8	75.421001
0	8.00	67.998329	17995	1.5	101.052568
0	10.00	48.805606	21731	1.3	119.723639
0	12.00	31.054065	25167	1.2	136.020523
0	14.00	18.040267	28540	1.1	149.844158

Important value: Half correlation distance, 6'.

# Interpolation: GEOIP.

**76** GEOIP - Grid interpolation

Input grid filename:	<input type="text" value="nmfa-egm96-tc.egr"/>	<input type="button" value="Browse"/>	<input type="button" value="?"/>
Operation mode:	<input type="text" value="4"/>		<input type="button" value="?"/>
Spline windows size:	<input type="text" value="0"/>		<input type="button" value="?"/>
Minimum distance:	<input type="text" value="0"/>		<input type="button" value="?"/>
<b>Pointfile definition (mode = 1-3, 5-7 and mode &gt; 10)</b>			
Point filename:	<input type="text" value="mfa_s.txt"/>	<input type="button" value="Browse"/>	<input type="button" value="?"/>
Data number in record:	<input type="text" value="1"/>		<input type="button" value="?"/>
<b>Gridfile definition (mode = 4)</b>			
Output grid definition:	<input type="text" value=".0 34.0 -107.0 -106.0 0.25 0.25"/>		
Elipsoide and zone numbers:	<input type="text" value="0 0"/>		<input type="button" value="?"/>
Subgrid coordinates:	<input type="text" value="0.0 0.0 0.0 0.0"/>		<input type="button" value="?"/>
Should grid values be integers:	<input type="button" value="Yes"/>	<input checked="" type="button" value="No"/>	<input type="button" value="?"/>
<b>Height definition (mode &gt; 100)</b>			
Altitude of grids:	<input type="text" value="0 1000"/>		
<b>Running options. Working in C:\pyGravsoft-297\pyGravsoft-297</b>			
Name of file to hold interpolated values:	<input type="text" value="nmfa-egm96-tc_i.egr"/>	<input type="button" value="Save as"/>	<input type="button" value="?"/>
<b>Data send to geoip</b>			
<input type="button" value="Quit"/>	<input type="button" value="Write settings"/>	<input type="button" value="Run program"/>	<input type="button" value="Help"/>



# Gridding. GEOGRID

**76** GEOGRID - Gridding or interpolation of irregular distributed data

Input data filename:	data/nmfa-egm96-tc.dat	Browse ?
Number of data values:	2	?
Input position of data element :	1	?
File to hold predictions:	nmfa-egm96-tc.gri	Save as ?
File to hold errorestimates:	nmfa-egm96-tc.egr	Save as ?
<hr/>		
Number of closest points:	1	?
Trend surface removal method	0	?
Select prediction method:	1	?
Prediction variables	10.0 0.2	?
Mode number:	1	?
Specify prediction points:	31.5 35.0 -108.0 -105.0 0.5 0.5	?
Margin for data selection area:	10.0	?
Running options. Working in C:\pyGravsoft-297\pyGravsoft-297		
Data send to geogrid		
Quit	Write settings	Run program Help



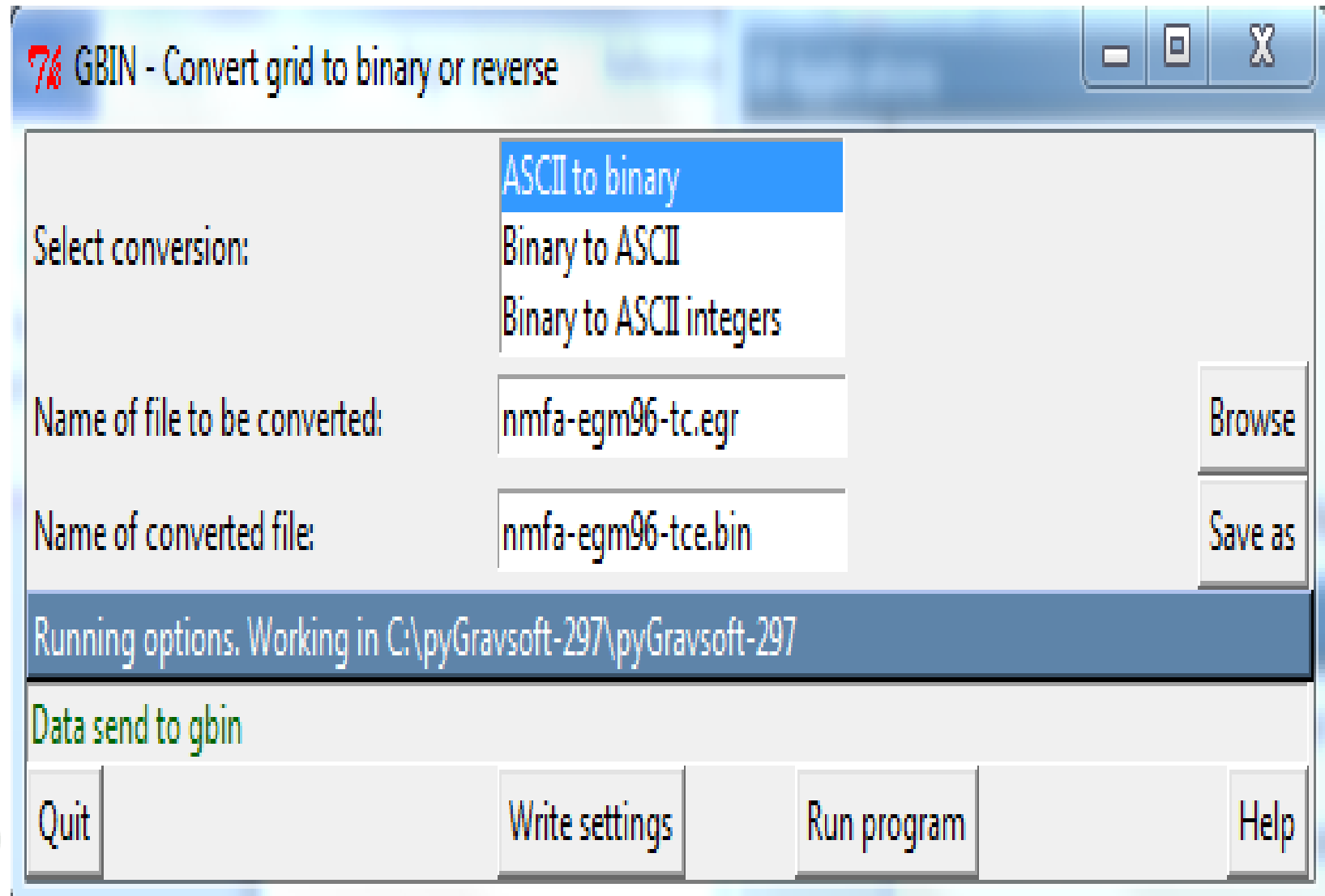
## Selection: SELECT

7% SELECT - Thin and/or average data

Input data file:	<input type="text" value="data/nmfa"/>	<input type="button" value="Browse"/>	<input type="button" value="?"/>
Operation mode:	<input type="text" value="1"/>		<input type="button" value="?"/>
Code for coordinates and format:	<input type="text" value="1"/>		<input type="button" value="?"/>
Data cloumn number:	<input type="text" value="1"/>		<input type="button" value="?"/>
Pixel definition (mode > 0)			
Pixel definition:	<input type="text" value="33.0 34.0 -107.0 -106.0 0.1 0.1"/>		<input type="button" value="?"/>
Rejection level (mode 5 and 7 only)			
Rejection level:	<input type="text" value="0"/>		<input type="button" value="?"/>
Window specification (mode 6 and 7)			
Windows specification:	<input type="text" value="0.0 0.0 0.0 0.0"/>		<input type="button" value="?"/>
Running options. Working in C:\pyGravsoft-297\pyGravsoft-297			
Name of file to hold ouput:	<input type="text" value="nmfa_sel.dat"/>	<input type="button" value="Save as"/>	<input type="button" value="?"/>
Data send to select			
<input type="button" value="Quit"/>	<input type="button" value="Write settings"/>	<input type="button" value="Run program"/>	<input type="button" value="Help"/>



# Reformatting. GBIN





## Reformatting. FCOPM,, gcomp

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- Fcomp
- GCOMP
- GLIST
- G2GMT
- G2SUR



# Prediction: geocol

**76 GEOCOL - Geodetic Collocation**

Select reference system: 5 - GRS80  
7 - Best current

Analytic covariance function definition

Input covariance model parameters: -1.0 400.0 360 ?

Input error degree variance scale factor: 1.0 ?

Input name of error degree variance file: data/egm96.edg Browse ?

Observation dataset parameters

Input code for observations: 13 ?

Input name of datafile (Gravsoft format): data/nmfa-egm96-tc.dat Browse ?

Observation error: 0.1 ?

Data column number: 1 ?

Second observation dataset parameters (optional)

Input code for observations: ?

Input name of datafile (Gravsoft format): Browse ?

Observation error: ?

Data column number: ?

Prediction type definition

Number of already reduced equations: 0 ?

Input code for predictions: 11 ?

Should a grid be used in computations: Yes No ?

Input grid specification: 54.5 57.5 7.0 13.0 0.1 0.2 ?

Input grid altitude (m): 0.0 ?

Input name of predictionfile: data/nmzeta.dat Browse ?

Should computed values be subtracted from observed: Yes No ?

Data column number: 2 ?

Should statistics be output: Yes No ?

Input histogram bin size: 5.0 ?

File to hold suspected gross errors: Save as ?

File to hold result: grid11.ex4 Save as ?

Running options. Working in C:\pyGravsoft-297\pyGravsoft-297

Quit Write settings Run program Help

