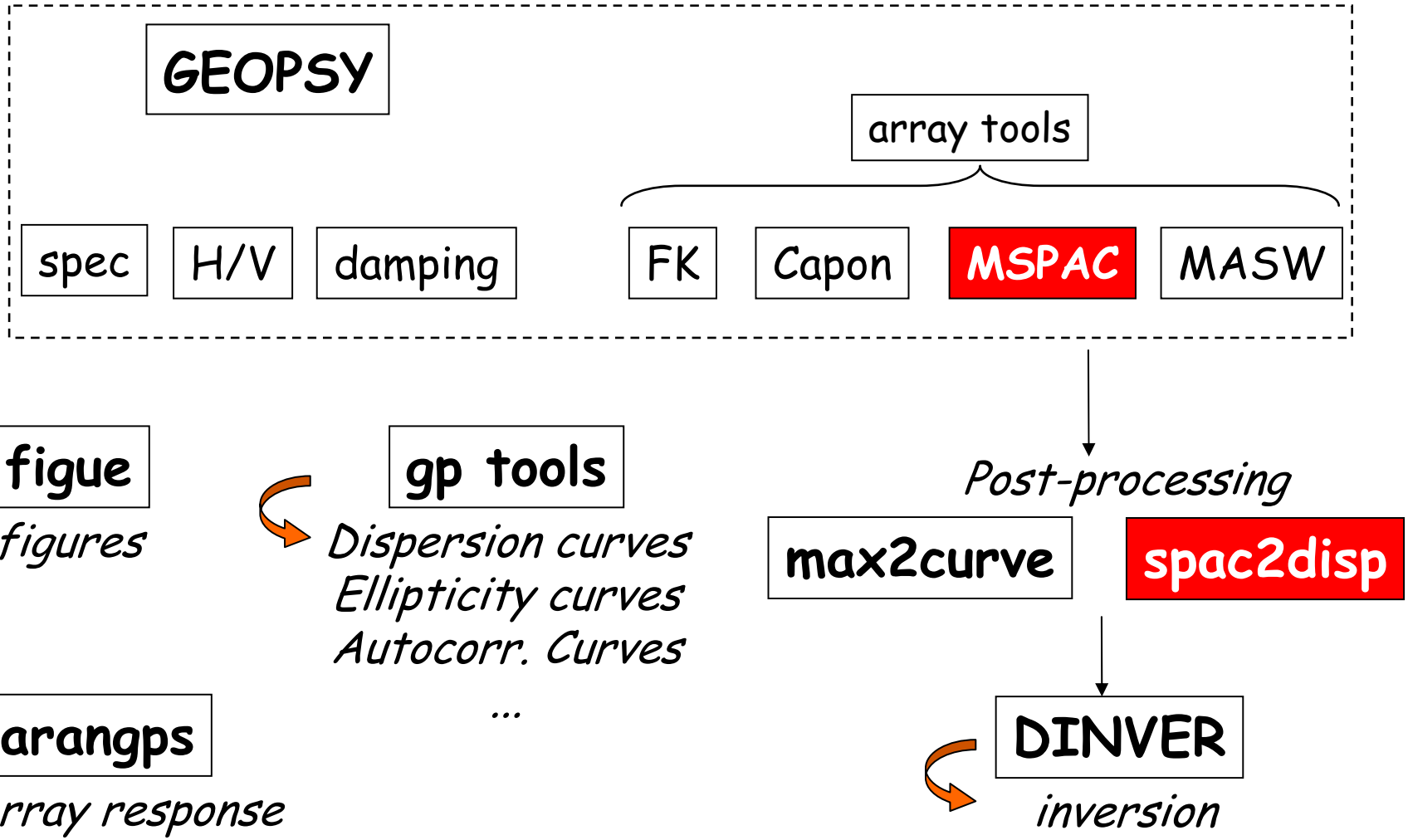
Using Ambient Vibration Array Techniques for Site Characterization

Spatial Autocorrelation

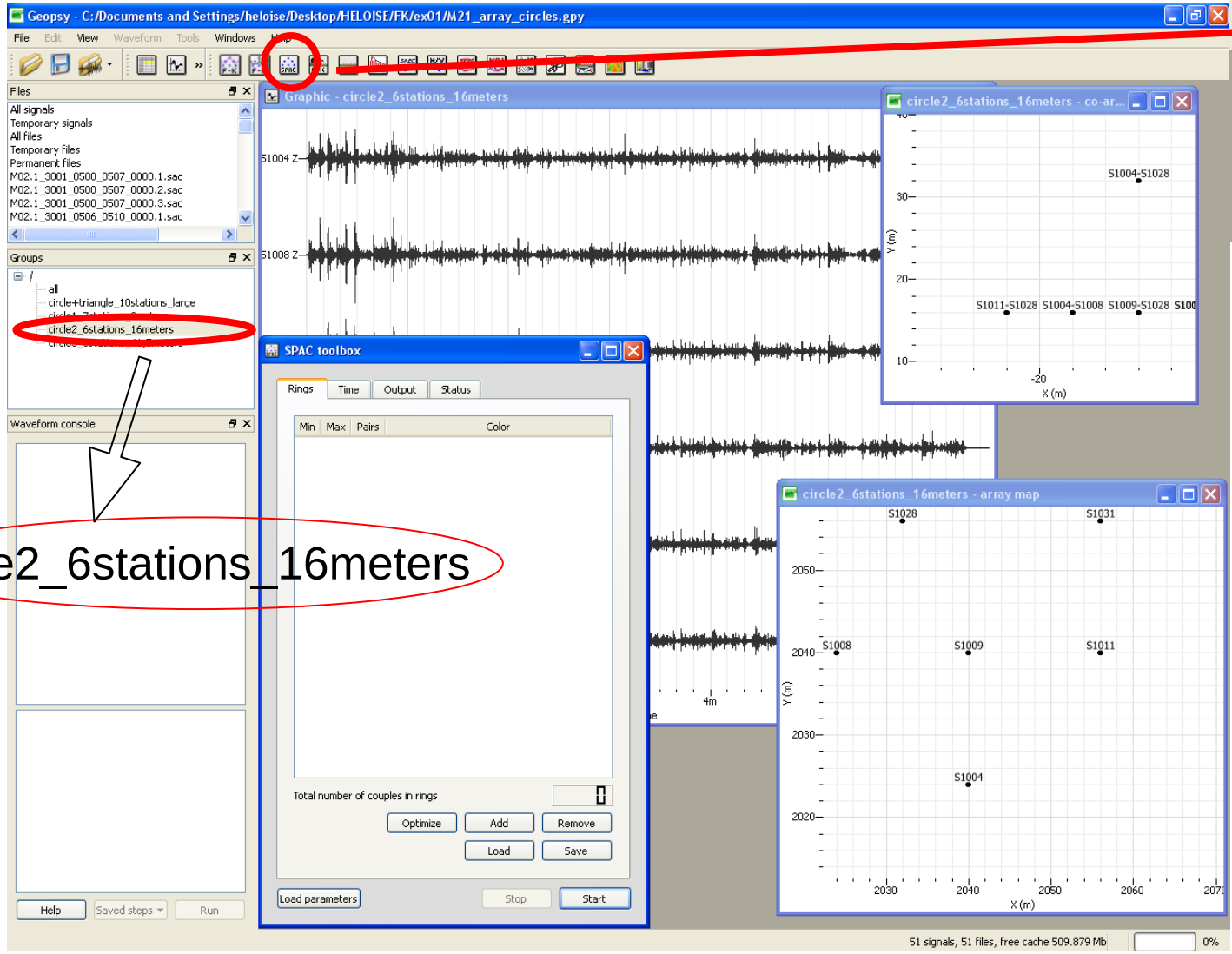
Tutorial

geopsy PACKAGE

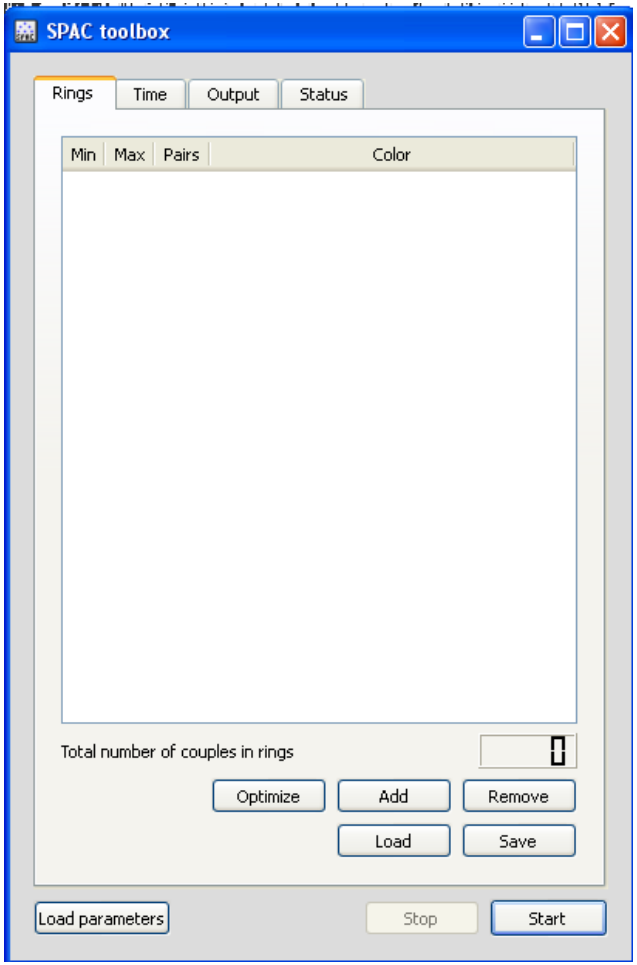


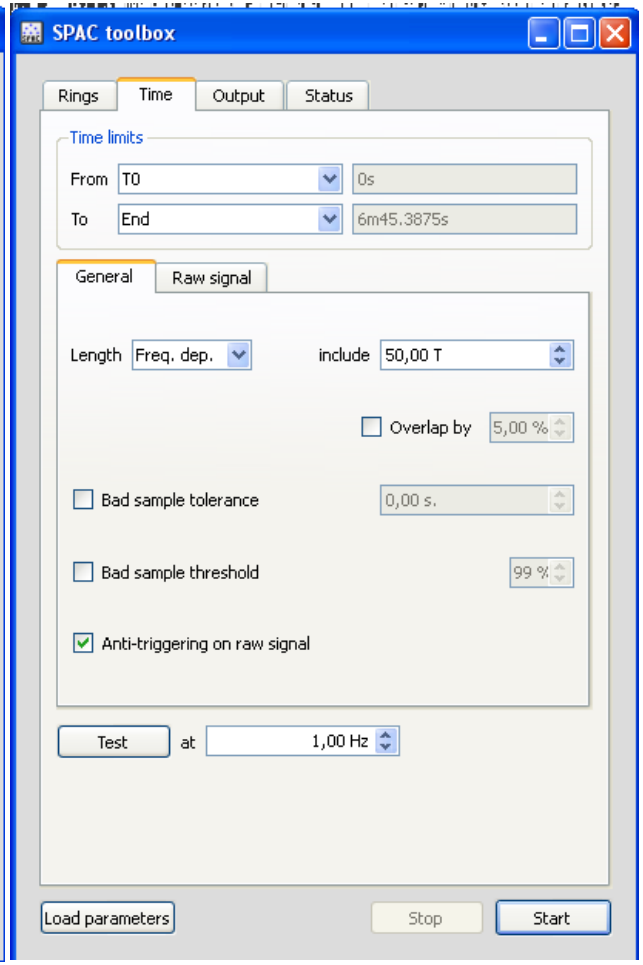
Loading database and launch spac

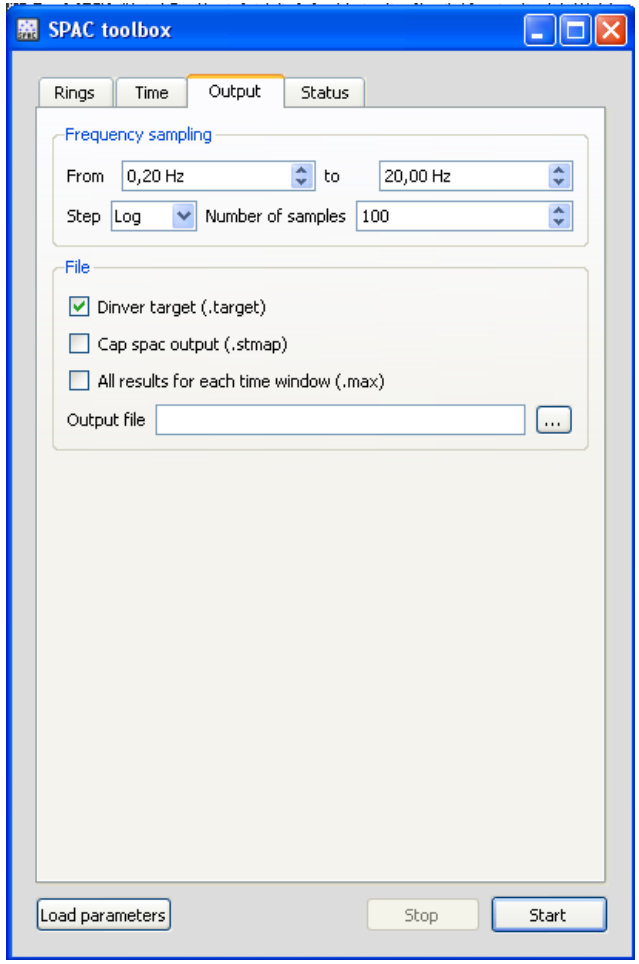
EX01/M21_array_circles.gpy



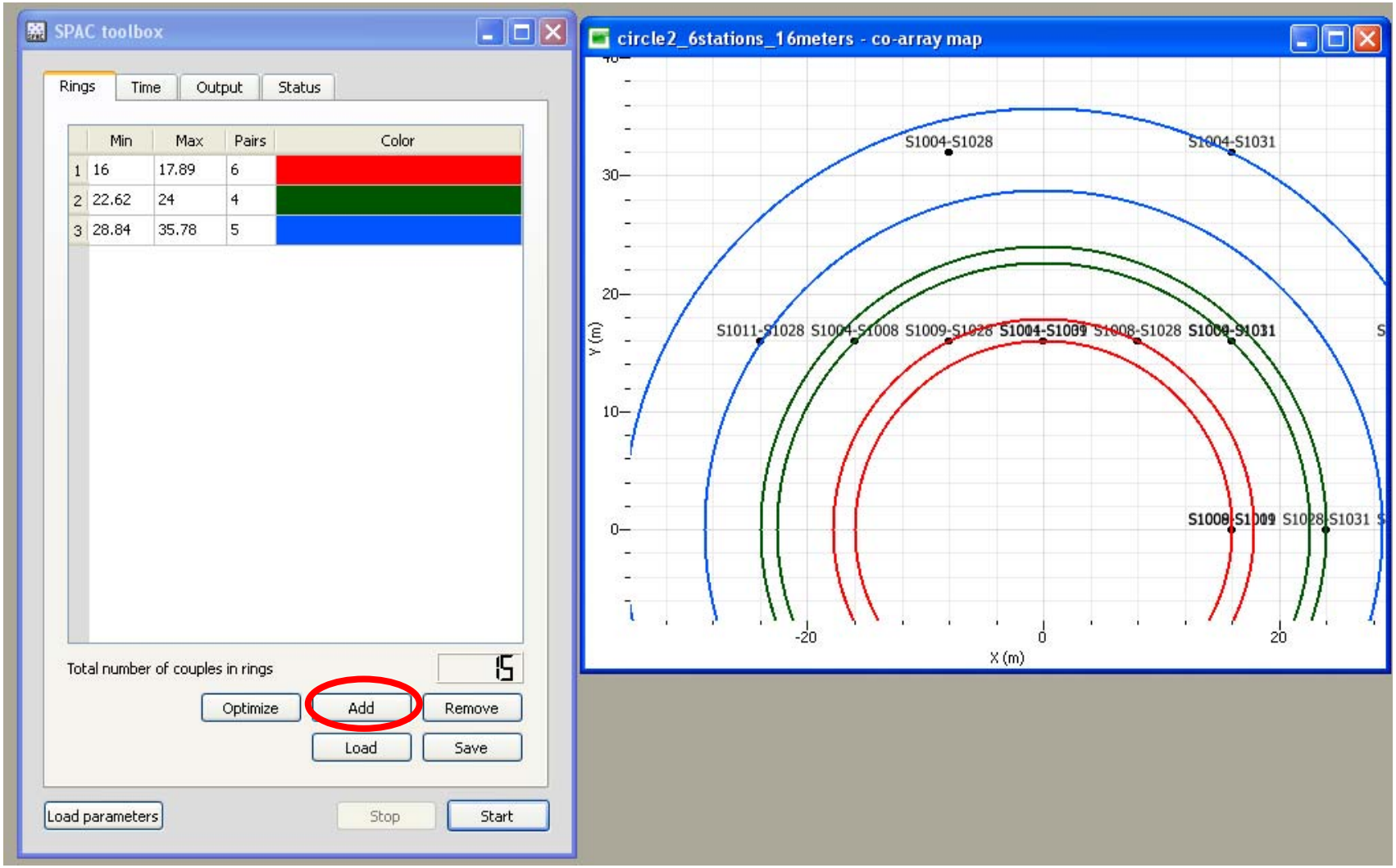
The toolbox


SPAC toolbox
Rings
Time
Output
Status
Min
Max
Pairs
Color
Total number of couples in rings
0
Optimize
Add
Remove
Load
Save
Load parameters
Stop
Start

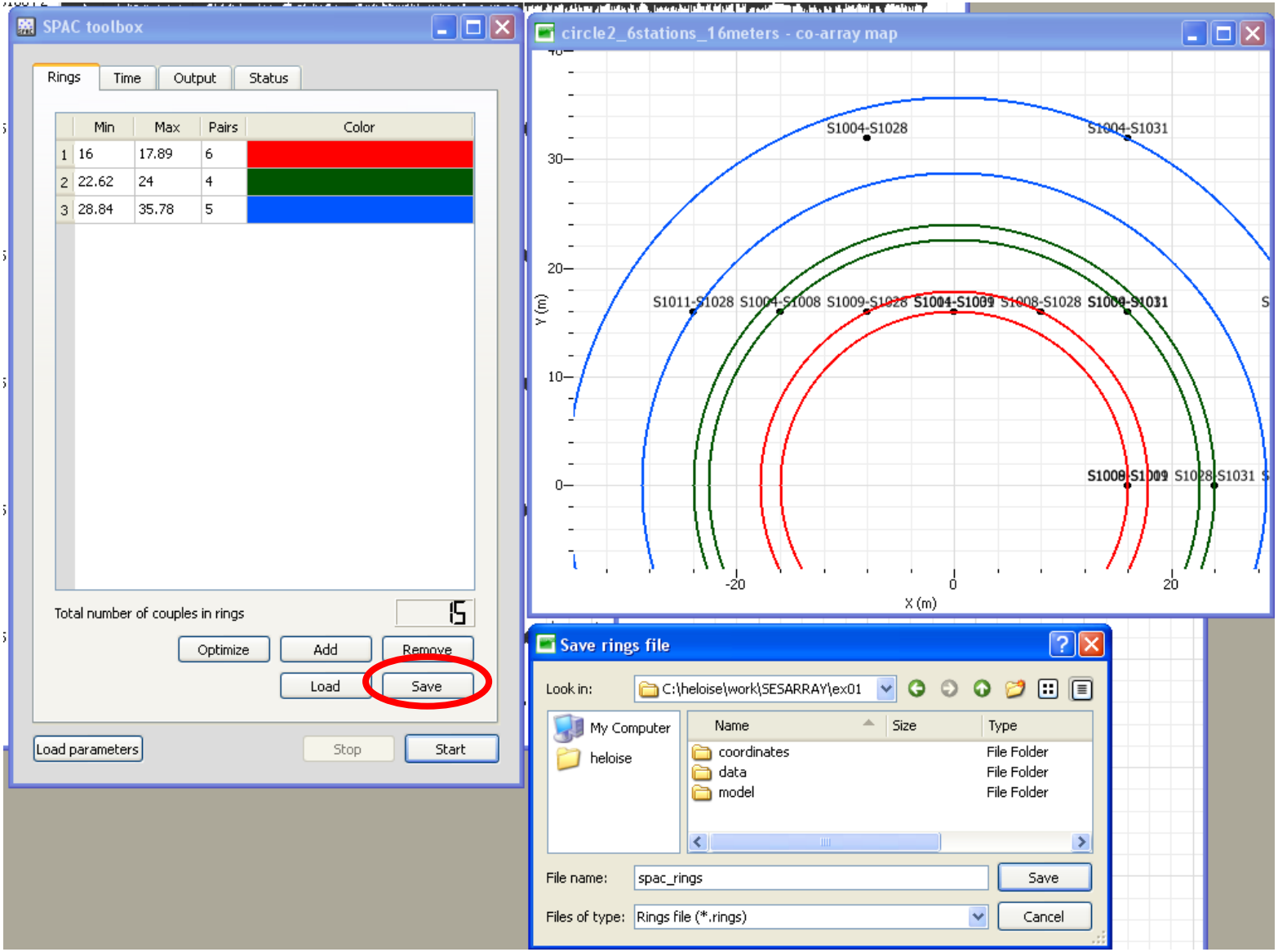

SPAC toolbox
Rings
Time
Output
Status
Time limits
From
T0
0s
To
End
6m45.3875s
General
Raw signal
Length
Freq. dep.
include
50,00 T
Overlap by
5,00 %
Bad sample tolerance
0,00 s.
Bad sample threshold
99 %
Anti-triggering on raw signal
Test
at
1,00 Hz
Load parameters
Stop
Start


SPAC toolbox
Rings
Time
Output
Status
Frequency sampling
From
0,20 Hz
to
20,00 Hz
Step
Log
Number of samples
100
File
Dinver target (.target)
Cap spac output (.stmap)
All results for each time window (.max)
Output file
...
Load parameters
Stop
Start

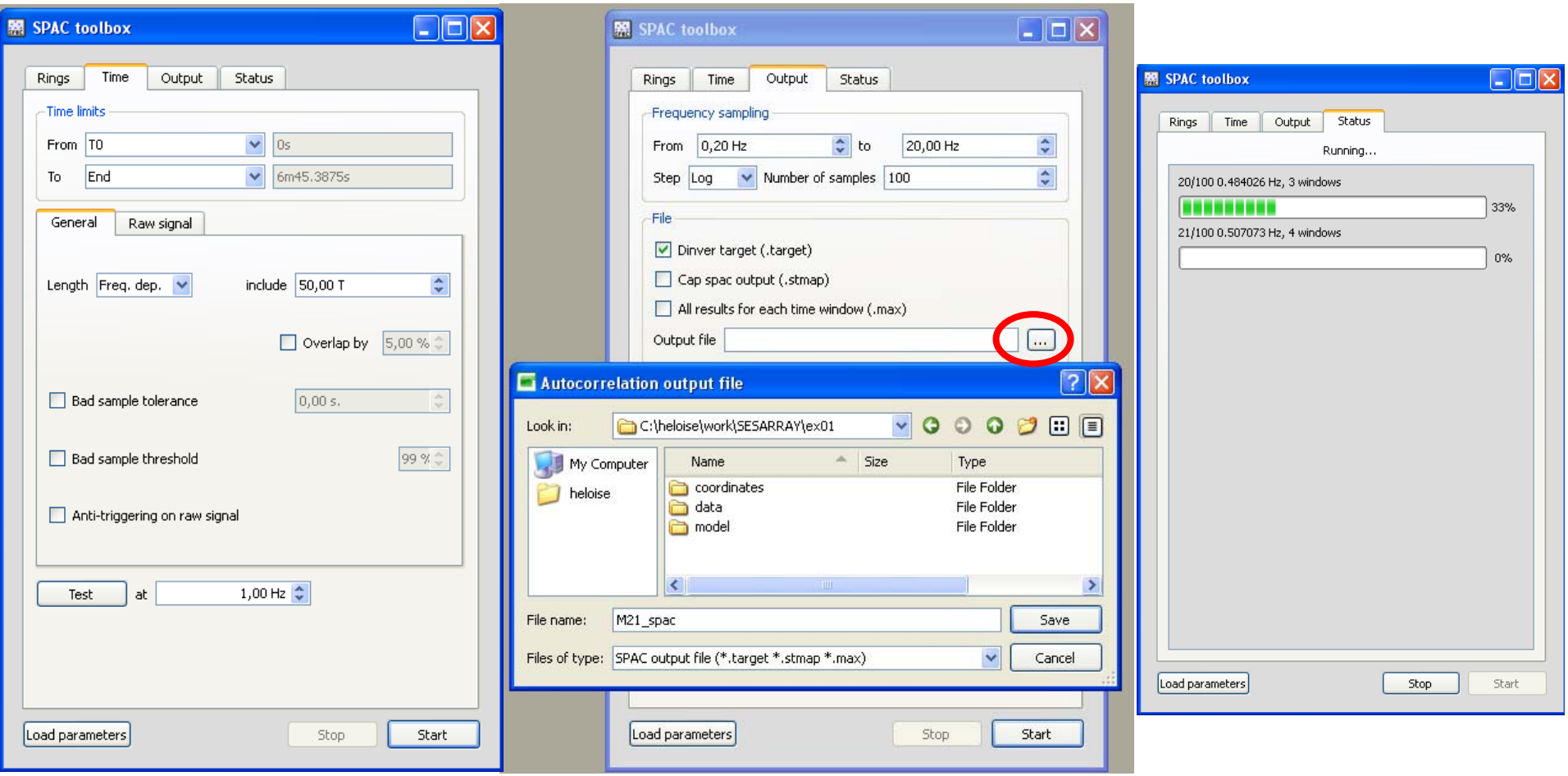
Design the rings



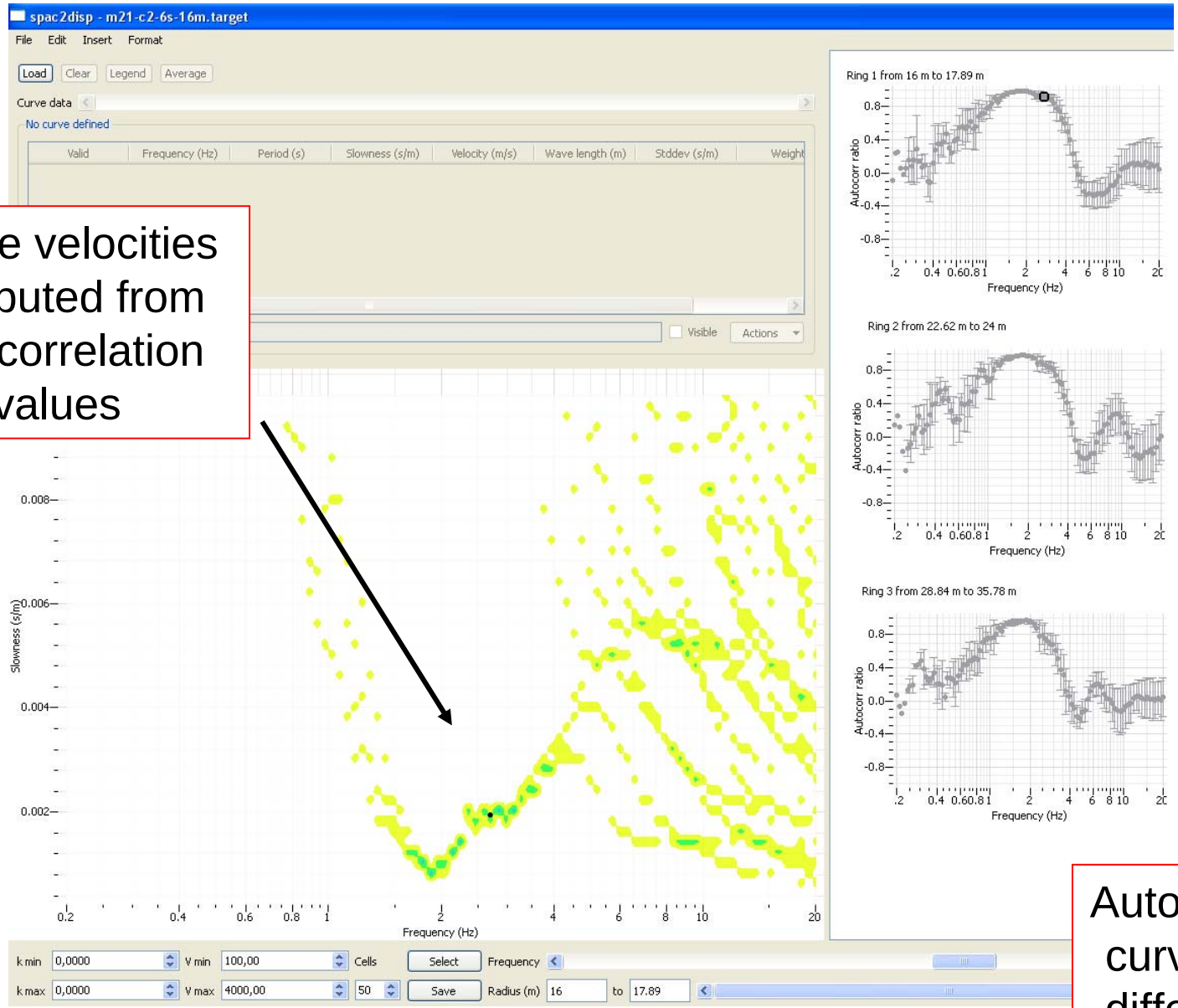
Save the rings



Run MSPAC


SPAC toolbox
Rings
Time
Output
Status
Time limits
From T0
0s
To End
6m45.3875s
General
Raw signal
Length Freq. dep.
include 50,00 T
Overlap by 5,00 %
Bad sample tolerance 0,00 s.
Bad sample threshold 99 %
Anti-triggering on raw signal
Test at 1,00 Hz
Load parameters
Stop
Start
SPAC toolbox
Rings
Time
Output
Status
Frequency sampling
From 0,20 Hz to 20,00 Hz
Step Log Number of samples 100
File
Dinver target (.target)
Cap spac output (.stmap)
All results for each time window (.max)
Output file
...
Autocorrelation output file
Look in: C:\heloise\work\SESARRAY\ex01
My Computer
heloise
Name
Size
Type
coordinates File Folder
data File Folder
model File Folder
File name: M21_spac
Save
Files of type: SPAC output file (*.target *.stmap *.max)
Cancel
Load parameters
Stop
Start
SPAC toolbox
Rings
Time
Output
Status
Running...
20/100 0.484026 Hz, 3 windows
33%
21/100 0.507073 Hz, 4 windows
0%
Load parameters
Stop
Start

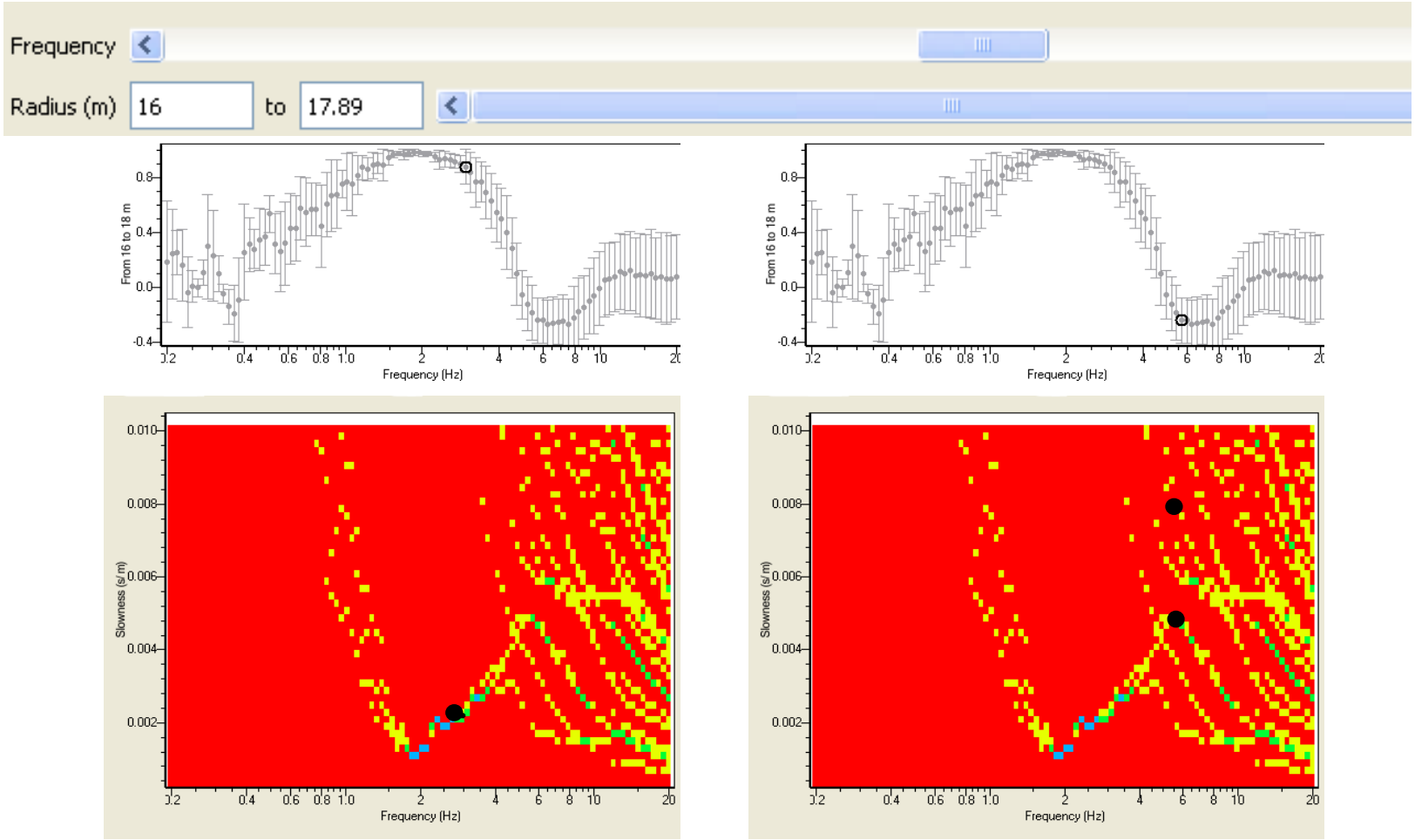
Display MSPAC results using *spac2disp*



Phase velocities computed from autocorrelation values

Autocorrelation curves for the different rings

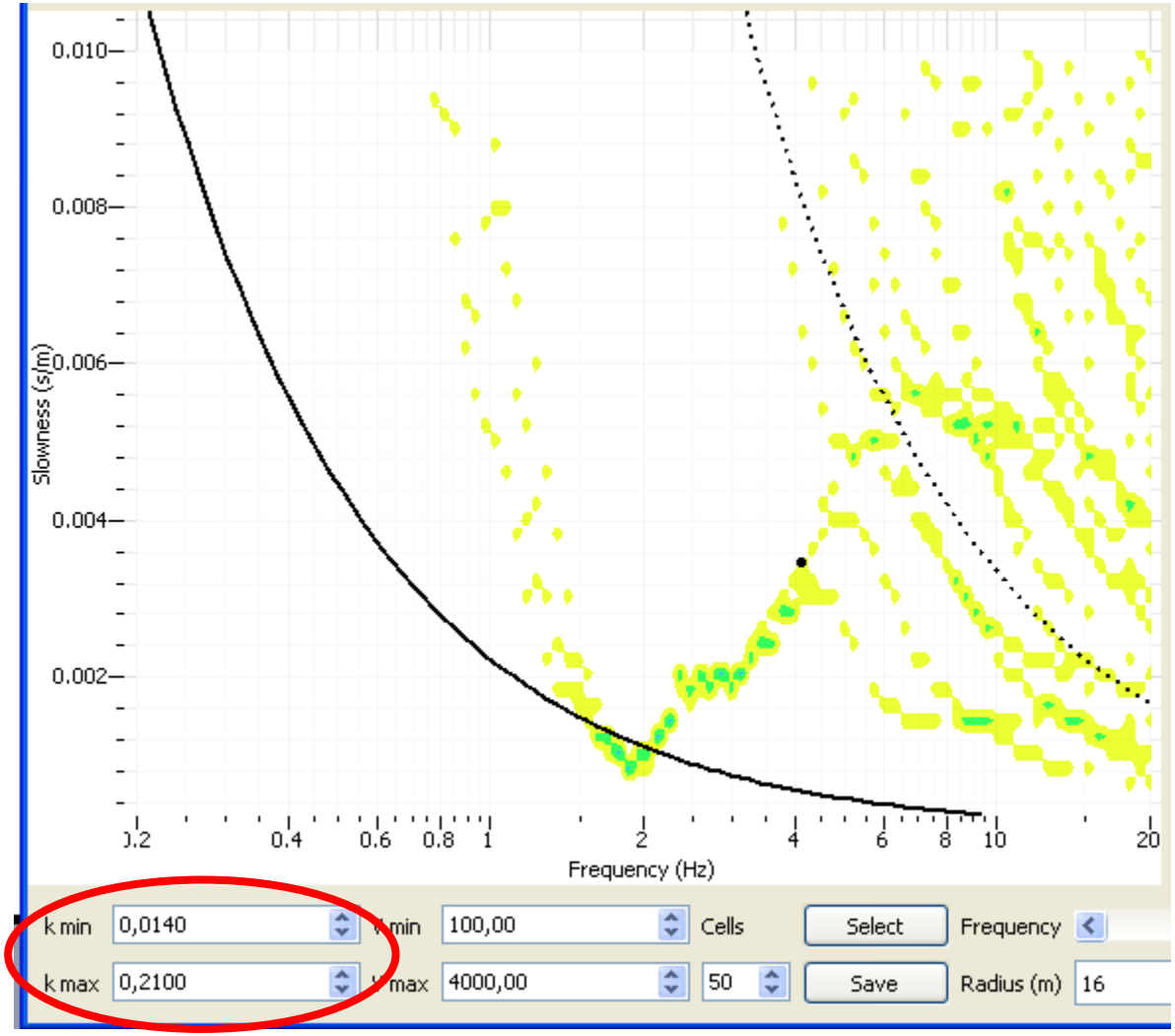
Relationship between autocorrelation coefficients and phase velocities



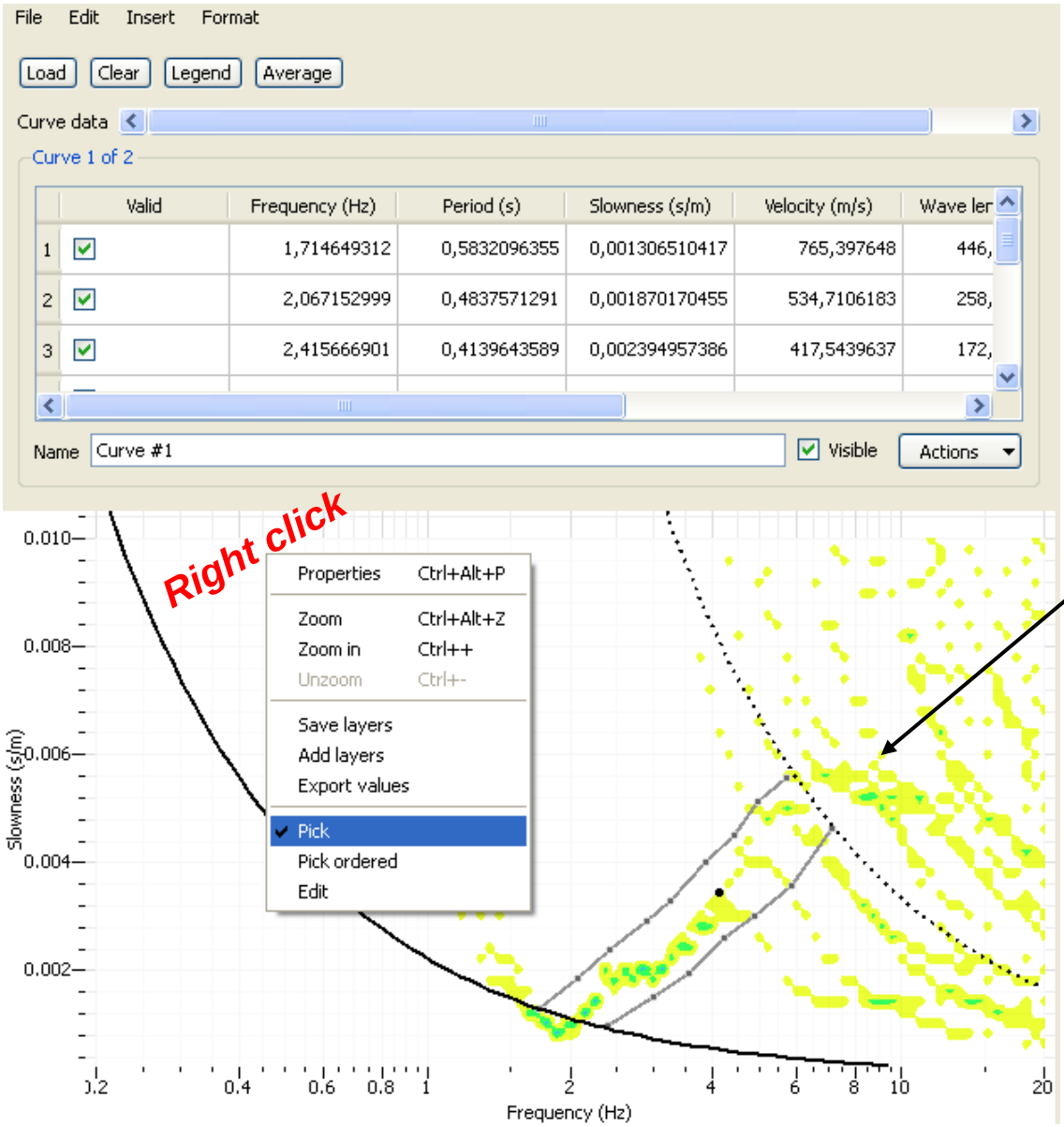
Uniqueness of phase velocity

Non-uniqueness of phase velocity

Selection of the autocorrelation coefficients

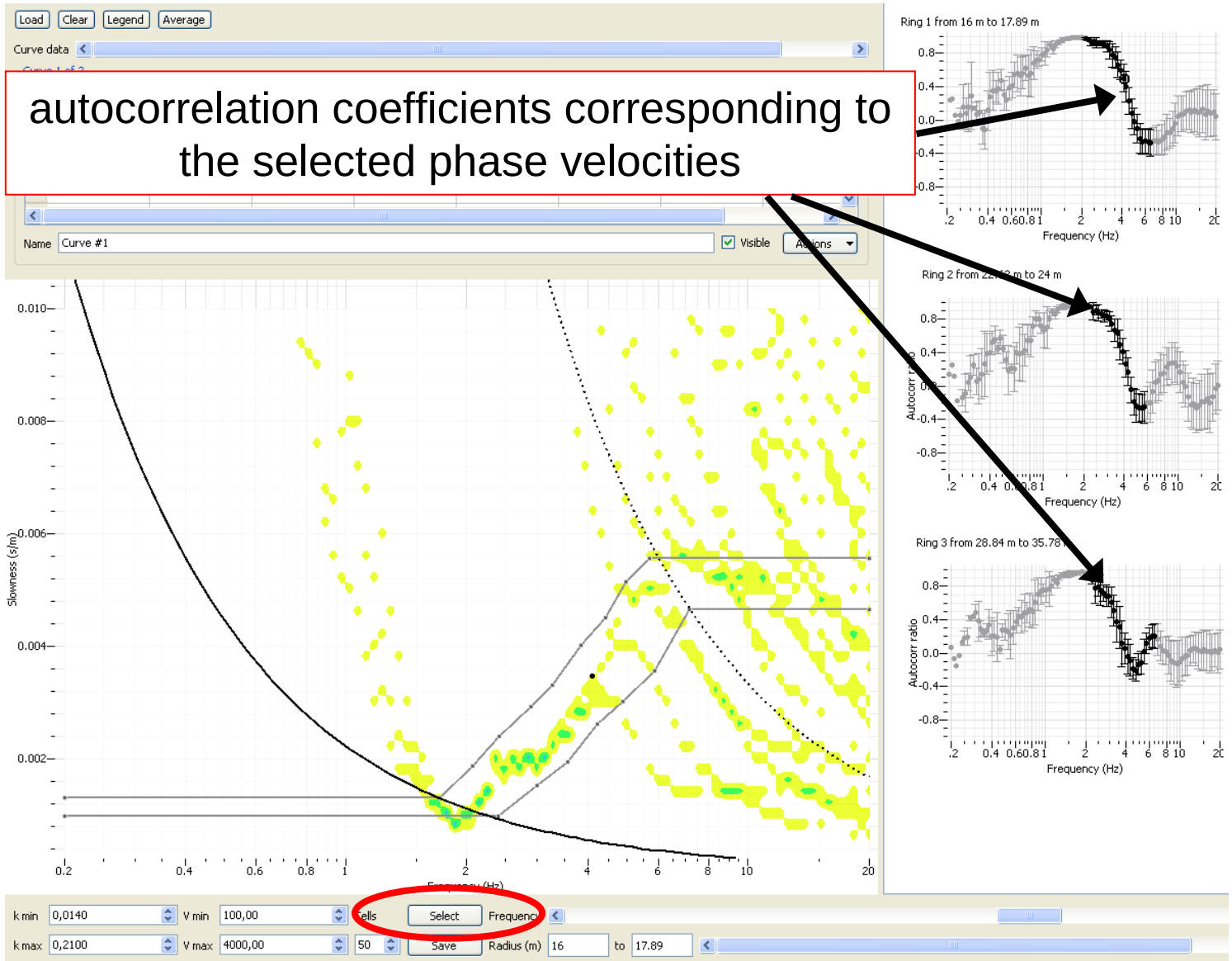


Selection of the autocorrelation coefficients



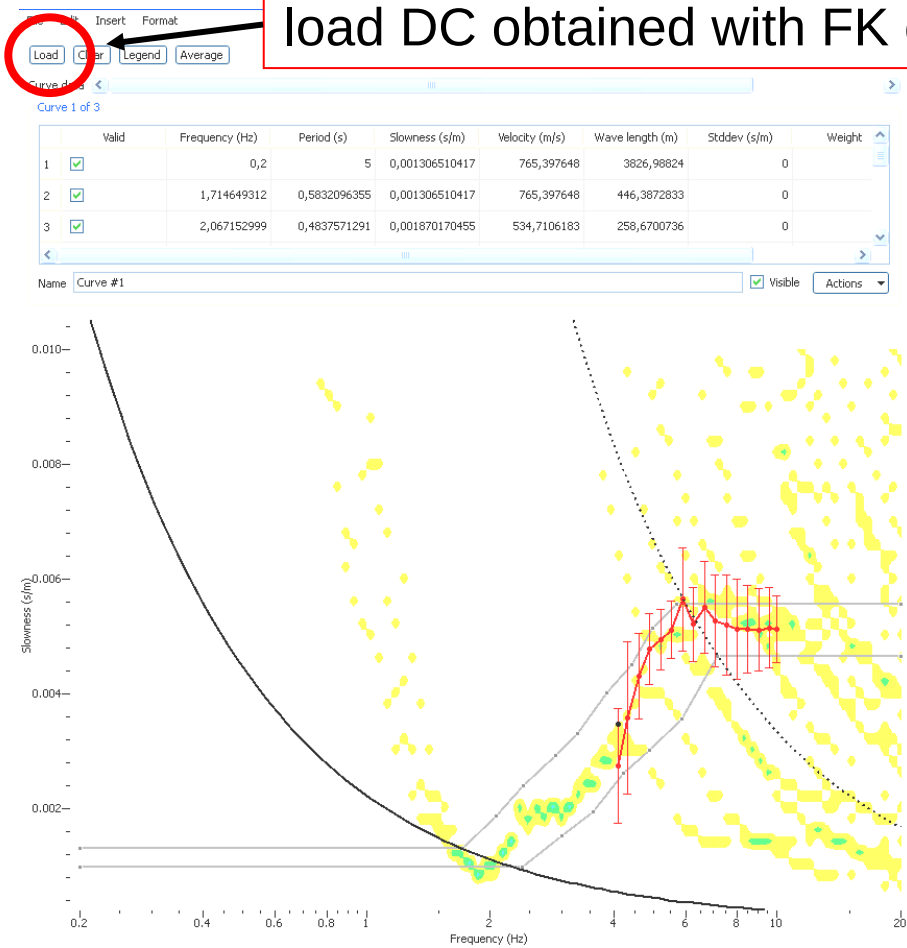
Select
the slowness band
using the *pick* icon

Selection of the autocorrelation coefficients



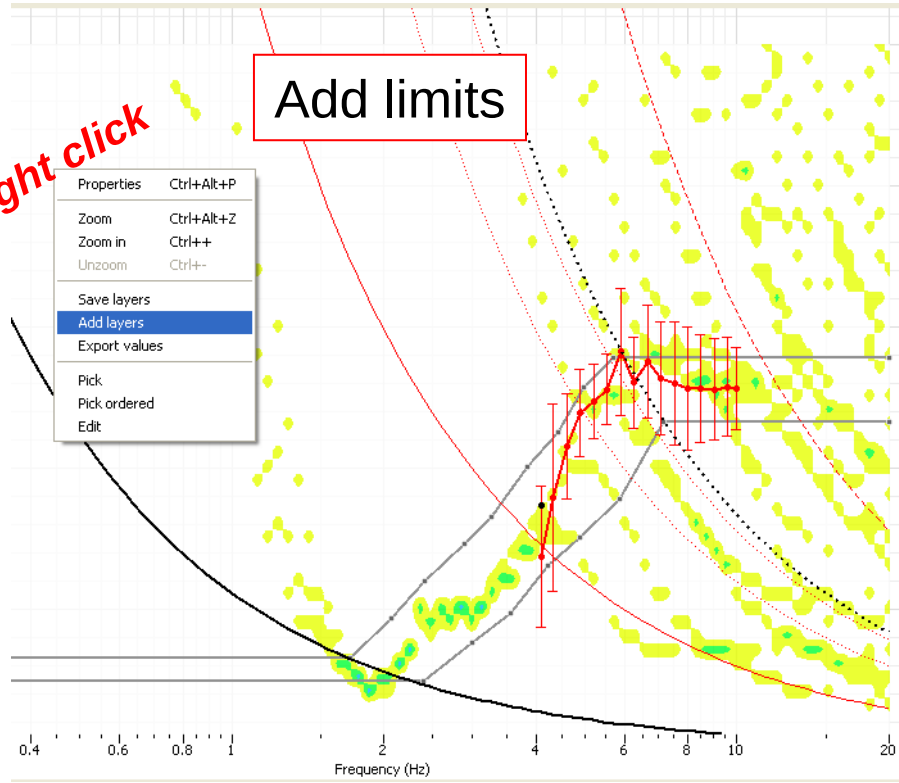
Comparison between DC estimated by MSPAC and FK analysis

load DC obtained with FK or HRFK

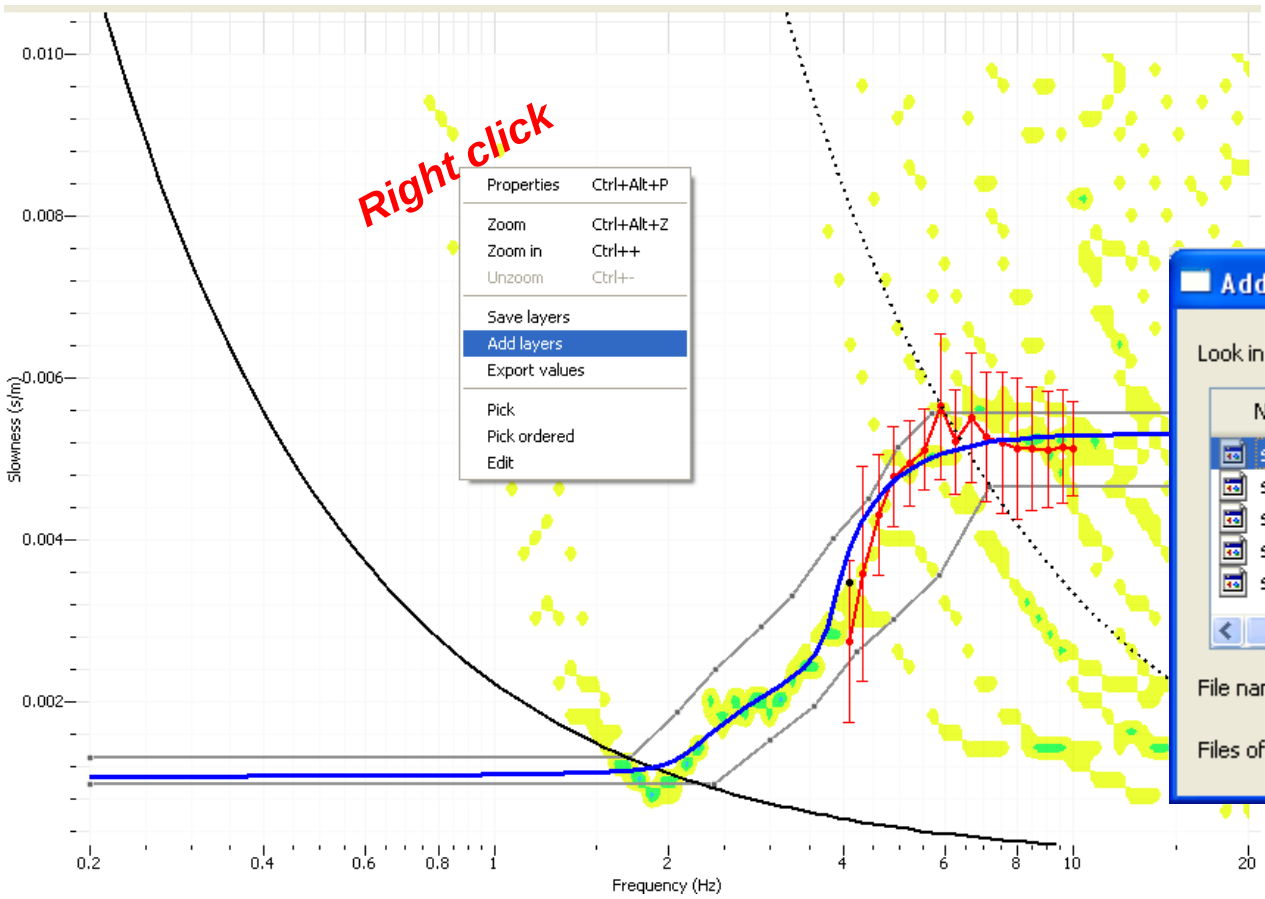


Add limits

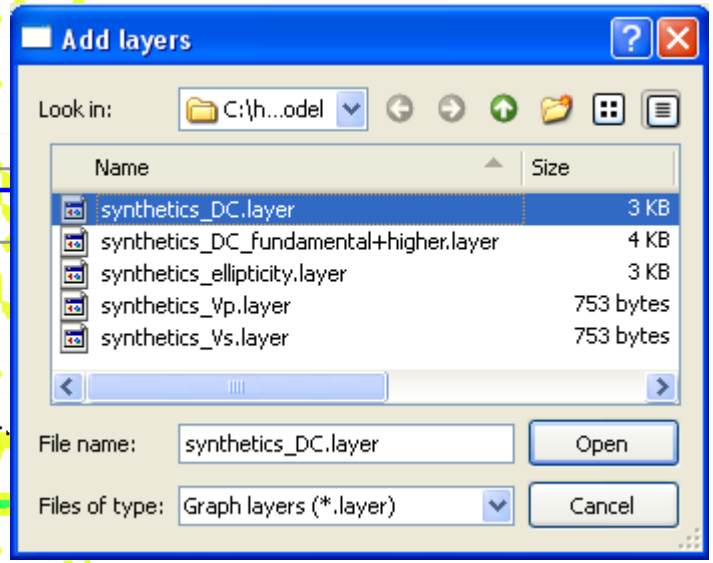
Right click



Comparison between DC estimated by MSPAC and theoretical DC



Path:
FK\ex01\model



In this case, resolution of MSPAC (FK)
is better at low frequency (high frequency)

Do the same exercise with the two other predefined arrays

- Rings design
- MSPAC computation
- Selection of reliable autocorrelation coefficients
- Comparison of DC estimated by MSPAC and FK