

WP02 meeting

Rome (Italy), 23-24 October 2002

The aim of this meeting was to review all the work done and to prepare the final tests to be done to conclude this workpackage.

I Partners attending the meeting

K. Atakan, J.-L. Chatelain B. Guillier, P. Teves-Costa, D. Faeh, R. Azzara, F. Carra, G. Cultrera, P.-Y. Bard and A-M Duval.

II Scientific matters

II.1 Explanations about modification of planning

First WP02 leader explained what has been done during the last months: as a matter of fact, we couldn't follow the planning fixed during Nice meeting concerning test to perform to check the influence of experimental parameters:

- Even if records were performed, we couldn't process it with a common SESAME software during the summer as planned.
- This is due to the fact that the final version of SAF format was delivered by the end of August 2002 instead of May as planned
- Then Nice and Roma team had to write transformation software from local format to SAF format.
- Then we had to wait for the first version of SESAME H/V software and also for the first version of Windowing soft.
- Roma, Nice and Grenoble teams had to test those software and proposed modification
- wait for new version of software and made a parametric survey to propose a default parameter file (**Appendix A**). F. Cara from INGV came in Nice to work during 15 days mainly on that topic. There F. Cara, E. Querendez and AM Duval summarized the individual reports written on that test by Grenoble, Nice and Roma teams (*see individual and common reports on software test WP03, sept 2002*).
- by the end of September SESAME software was available for WP02 teams together with the default parameter file fixed for WP02.
- This explain the delay in progress of WP02 and the request for delay for deliverable D08.02. This delay is accepted by SESAME coordinator.

II.2 State of each team "WP02 data-base"

Table 1: number of records used in each database.

Total = 1 896

878

50 ?

Each team explains what was done until now and how is its data base. These information are reported in **Appendix C**.

The table of tested parameters (in **Appendix B**), already updated in 2002 April (Nice) is also partially updated in Roma.

During this Roma meeting, we had no time to check each of the test or to drawn any conclusion on the effect of any parameter. The only thing that can be surely said is that there is some variation due to experimental condition.

II.3 Decisions

We all agreed that comparison between all our results must take place as soon as possible. But this meeting in Roma is not the right place to check the precise conditions of each of the very numerous tests. These comparisons will mainly take time for Grenoble and Nice teams which have performed the more numerous test.

To be able to compare our result test by test and to argue on the conclusion, we need to present the result in the same format. For this reason we decide the following:

- the records should be processed with SESAME HVproc soft (including automatic windowing SESAME) with the default parameter file (soft and default file joined to this mail).
- remark : in the default parameter file, the computation of the standard deviation is : log
- Definition of graphs to perform: see **Appendix D**
- **As soon as possible and in any case before January the 15th 2003, each team (ITSAK, INGV, UiB, LGIT, CETE, UTH) will send** to Nice team:
 - ➔ a word document containing for each test
 - the name of the test
 - some comments on the experiment conditions
 - some comments on the process (windowing)
 - the required plots (**Appendix D**)
 - the conclusion of the team for each test
 - ➔ data:
 - the records in SAF format
 - the output files from SESAME soft
 - the organization of the database should follow the one described by Nice team in appendices C of these minutes.
- Nice team will make a rough compilation of these 6 documents (sort by parameter number) and send it back in February.

Nice meeting April. 7-11th 2003:

- Nice and Grenoble team will meet in Nice during few days to have a deep review of the overall results.
- P. Teves-Costa is in charge of an international bibliographic review on the subject of influence of experimental. She will join Grenoble and Nice team in April the 11 at least.
- Other participants (M. Koller, D. Faeh) may be invited in 2002 April the 11, in Nice to conclude on the tests.
- The synthesis and conclusions should be oriented toward the different use made of H/V: only Fo or Ao or peak thickness, or rate of slope. For each use, the rate of difference in H/V induced by one parameter as to be quantified. D Faeh and F. Scherbaum already proposed some computation and categories to apply to our future results. D. Faeh proposed to write a matlab routine to fill these tables by test. He will send it to Nice team in December 2002. Nice team will try to apply it to the more representative test.
- These tables will be discussed during next meeting (2002, April the 11, in CETE Nice).
- During this meeting we will also design the final report « user guideline » and share the work. The final report will be produced for the end of may 2003.

Instrument influence, Bergen WS:

- We should write a paper as soon as possible. Each person responsible for one task (design during Potsdam meeting Janv 2002, see minutes) should write his part. B. Guillier proposed to gather all the part. After large discussion, we decided:
 - ➔ not to identify the instrument but to give their specification,
 - ➔ to clearly indicate the limit of our experiment,
 - ➔ to propose a more complete protocol to test instrument;
- this paper would be devoted to highlight the need of common calibration protocol for all seismological instrument.

III Appendixes

III.1 Appendix A: default parameter file for HVproc

```
#PARAMETER FILE
### section processing

## possible options for frequency spacing
# syntax: freq_spacing:<type>:<arg1>:<arg2>[:<arg3>]
#
#   type  arg1  arg2  arg3
#   fft   -    -    -
#   fft_red    f_min f_max -
#   linear f_min f_max # points
#   log     f_min f_max # points
freq_spacing:fft

## possible options for offset removal
# syntax
# offset_rem:<type>[:<arg>]
# type:
# no
# r_mean
# high-pass: frequency
offset_rem:r_mean

## tapering
# syntax:
# taper:<type>[:<arg1>]
#
#   type  arg1  arg2  arg3
#   boxcar -    -    -
#   cos   percentage - -percentage of the window that is affected by the
#                                     tapering on both ends
#
taper:cos:5

## instrument correction
# syntax:
# instrument_resp:<arg>
#
# where arg is either 'yes' or 'no'
#
instrument_resp:no

## smoothing section
# syntax:
# smooth:<type>[:<arg1>[:<arg2>]]
#
# type arg1  arg2
# none -    -
# linear bandwidth box   linear smoothing with constant weight in the interval [f-
bw/2 f+bw/2]
```

```
# linear      bandwidth  tri      linear smoothing with triangular weight in the interval [f-
bw/2 f+bw/2]
# log percentage box      smoothing with constant weight in an interval [f/(1+p/100)
f*(1+p/100)]
# log percentage tri      smoothing with triangular weight in an interval [f/(1+p/100)
f*(1+p/100)]
# konno-ohmachi bandwidth -      bandwith for the smoothing window
#
smooth:konno-ohmachi:40

## merging of horizontal components
# syntax:
# merge_type:<type>
#
# type
# arithmetic (H_ew+H_ns)/2
# geometric  sqrt(H_ew*H_ns)
# quadratic  sqrt(H_ew^2+H_ns^2)
#
merge_type:quadratic

## output of single components
# syntax:
# single_component:<arg>
#
# arg: 'yes' or 'no'
single_component:no

## average of horizontal components
# syntax:
# average_type:<type>
#
# type
# linear
# log
average_type:log

## output of single window information]
# syntax:
# single_win_out:<arg>
#
# arg is either 'yes' or 'no'
single_win_out:no

### end processing
```

III.2 Appendix B: tested parameters

The table on the tested parameters **has been updated** on the 26th October 2002 in Roma for Nice, Roma and Lisbon teams only

Parameter:	Grenoble	Roma	Nice	Bergen	Thessaloniki	Lisbon	Zurich
P1-1	▲					▲	
P1-2	X●					▲	
P1-3		▲	▲				
P1-4	▲	▲	▲			▲	
P1-5	▲	▲	▲				
P1-6	X▲		▲				
P1-7	▲		▲				● synthetic
P1-8	▲		▲				
P2-1	▲●	▲	▲			▲●	
P2-2	▲		▲				▲
P2-3			▲			●	
P2-4	▲●	▲	▲▲			▲●	▲
P2-5				▲			
P3-1	▲●		▲▲			▲	▲
P3-2	▲		▲	X			▲
P3-3	▲		▲			● no	
P3-4	▲		▲				
P3-5	▲		▲				
P4-1			▲			▲	
P4-2	X●		▲		●	●no	
P5-1	●					▲	
P5-2	X		▲			● no	

P6-1	•		▲				
P6-2	•		▲				
P6-3							
P6-4	X				X	▲	
P7-1	X•				X		
P7-2			▲				
P8-1		▲	▲		X	X▲	
P8-2	X•	X	▲		X		▲X
P8-3		▲	▲				X
P8-4				•			
P9-1-1	X	X	▲			•no	
P9-1-2			▲			•no	
P9-1-3			▲			•no	
P9-1-4	▲		▲				
P9-2			▲				▲

▲: record already performed •: record to be performed X: old data to integrate

III.3 Appendix C: data base of each team

III.3.1 Grenoble/IRD-LGIT team

Processed all its about 100 tests (several records per test) with its own software and prepared graphs for the meeting. Graphs included average H/V and standard deviation for both reference and test, plus a graph of comparison featuring the difference between reference and test H/V divided by H/V of the reference.

The data-base organized as follows:

- a directory for each task
- inside this directory, a sub-directory for each sub-task
- inside the subdirectories :
 - ➔ a sub-sub directory containing the row data in CityShark format
 - ➔ a sub-sub directory containing the data used for graphics, in Macintosh format
 - ➔ a Macintosh file containing description of data acquisition
 - ➔ files with the graphs

III.3.2 Nice/CETE team

Build a data base containing:

- around 150 tests (several records by test). (about 145 Nice tests + swiss tests: 4)
- one directory by test
- for each test: one directory containing the original data files
- for each test: one directory containing the photographs (referenced in excel shet by records)
- for each record : fill the excel file containing information on experimental parameters during the record. for each test: one directory contains these files

Although almost all Nice data were already processed with a local software during June and July 2002, from the end of 2002 September, all those data were:

- transform in SAF format
- processed again with the common SESAME soft
- for some experiments, we didn't use automatic windowing soft but we had to select window manually (effect of sources)

Then for each test, the data base was completed:

- for each test: one directory containing the SAF data files, these directories also contains parameter files used and window limit files for each records.
- for each test: one directory contains the output files for each record.

For each test, graphs were prepared by superimpositon of H/V of individual records.

- for each test: one word document is elaborated that contains:
 - ➔ a graph, a comment and the header of the SAF file
- for some test, the time history and the window selection.
- a synthetic word document was elaborated that gathered all those previous document for each test.
- table 1 is elaborated with the following parameters (one line = one record=333 lines):
- Date, Site Géographique, Precise measurement location, name of original ascii file, name of SAF file, comments
- table 2 is elaborated to related a number of map to locate precisely point location
- table 3: header of each original files
- table 4: header of each SAF file
- several map and plan were gathered that explain the different experiments

III.3.3 Rome/INGV team

Build a data base containing:

- 15 tests (several records by test) concerning 8 parameters
- one directory by parameter
- for each parameter:
 - ➔ one directory containing the original data files, divided by number of test and when possible by record. Sometimes the original files were cut to be processed; in this case there is another directory with the cut files
 - ➔ when available one directory containing the photographs (referenced in excel sheet by records) referred to the tests about the single parameter
- for each record : fill the excel file containing information on experimental parameters during the record. for each parameter: the directory referred to that parameter contains the excel file

Although almost all Rome data were already processed with a local software during March 2002, from the end of 2002 September, all those data were:

- transform in SAF format
- processed again with the common SESAME soft
- for some experiments, we didn't use automatic windowing soft but we had to select window manually (for example for the stabilization of the sensors)

Then for each test, the data base was completed for each parameter: one directory:

- containing the SAF data files (from the whole original files and from the cut files, as explained before).
- one directory containing the analysis that have been carried out, divided by tests and when possible by record. For each test (and record): one directory containing the window files used for the processing, one directory containing the output files from the Sesame software (sometimes we asked to have the output for each window processed; in this case another subdirectory is present); we add similar directory where the results are given in SAC format and in ASCII-1 column format, useful for the visualization of the results; a directory containing the pictures that have been carried out for a preliminary interpretation of the results: graphs were prepared by superimposition of H/V of individual records.

A very synthetic word document was elaborated in order to summarize the main conclusions and comments about the single test.

Two of the tested parameters with several tests performed by Nice team were processed by Rome team (stabilization of the sensor and artificial source effects); as above some graphs have been prepared.

III.3.4 Lisbon/ICTE team

Build a data base containing:

- about 12 tests (two or more records by test) concerning 8 parameters
- one directory by parameter
- Inside this, subdirectories containing (i) the original data files; (ii) the saf files; (iii) the excel sheets; (iv) the photos (if available, as referenced in the excel sheets) and/or drawn scheme showing the location of the sensors

Although all data were already processed with a local software, during June to September 2002, some of the tests were processed with the SESAME software (always with manual window selection, accordingly to the previous analysis) bilization of the sensors)

- for each processed test the data base was completed with:
- results obtained with the local software (graphs with mean H/V)
- results obtained with the SESAME software (graphs with mean H/V± standard deviation)

III.4 Appendix D: definition of graph to perform

For each record: plot 1 graphs (graph 1) + For each test : plot 2 graphs (graph 2 and graph 3)

All graphs should be:

- x-axis: log plot from 0.2 to 20 Hz
- y-axis: linear plot amplitude: from 0 to 10 (20 or more if necessary)

The output file of SESAME software contains:

- the frequency (*freq*)
- the mean H/V ratio ($M = \text{av_HV}$, geometric mean)
- the standard deviation ($\text{std_}M = 10^{\text{std_logHV}}$, where *std_logHV* is the standard deviation of log(H/V))

let's call: $A = M_{\text{reference record}}$ and $B = M_{\text{tested record}}$

graph 1) For each record: plot of the average (*M*) with standard deviation (3 curves):

$$\begin{aligned} &M \\ &M * \text{Std_}M \\ &M / \text{Std_}M \end{aligned}$$

graph 2) For each test: superimposition of the averages ($M=A, B$) for all records concerning the test with different color (reference A in red)

graph 3) For each test: superimposition of C for the different records:

$$C = (A-B) / A =$$

$$= [(M_{reference\ record} - M_{tested\ record}) / M_{reference\ record}] \text{ for all records concerning the test.}$$