MINUTES of the SESAME WP02 Meeting

Nice, April 7-11 2003

The WP02 is devoted to the evaluation of experimental conditions for "H/V on ambient noise" method. All participants had to perform numerous test before conclusions can be reached. During the last months, participants agreed on a common procedure to build the data set collected by all of us. During Roma meeting (2002 October) we decided a new way to analyse and present the results. As planed, most of the teams sent their reports and data to Nice team in February 2003 (except Grenoble and Thessaloniki). During this time, in 2003 January, a meeting took place between Nice and Grenoble teams: the analysis was modified another time. In February, a synthesis was written on the available tests performed by all teams. This report also explains the comments made during January 2003 meeting. During March 2003, Nice and Grenoble teams performed new tests and processed all their data (together with Swiss data) with the latest version of presentation decided in 2003 January. Then finally in April the present meeting was devoted to make a synthesis of the work and write the final report. This meeting was also aimed to write a paper with the WP02 results for AFPS conference (July 2003, dead-line for paper submission: end of 2003 April).

I Partners attending the meeting

Jean Luc Chatelain		LGIT – Grenoble
Bertrand Guillier		LGIT – Grenoble
Mathilde Bøttger Sørensen		UiB Bergen
Anne-Marie Duval		CETE Nice
+ on the 11th April:	Kuvvet Attakan	UiB Bergen
	Donat Faeh	ETHZ Zürich
	Pierre-Yves Bard	LGIT – Grenoble
	Corinne Lacave	Résonnace - Genève

II Scientific matters

II.1 Review on available analysis and data-base

We first made a review on all the works performed by the different teams until April 2003. A synthesis of these works until February 2003 is already performed in document (annexe 1: 23 pages).
As planed during Roma meeting (Oct 2002), the participants processed their data with the common procedure using "student test" algorithm and wrote a report.
The documents available in Nice lab have been gathered in 2003 February in a CD rom sent to all partners with the synthesis report. Data are processed with the SESAME software : winselect3.f rsaf.f hvproc2.f. All the primary data base are not included in CD because of size.

- INGV: WP02 Report January 2003 + graphs (data base is available but not included in the joined CDrom)
- UiB: WP02 Report January 2003 (first version the process is not performed with the common software, data were not available in february; the March version should include data in SAF format and process with the right software)
- CETE: WP02 Report January 2003 including graph (data are available but not included in the joined CDrom) 254 pages
- ETHZ: data were processed by CETE team: graphs are on word document (in each test directory).
- ICTE/UL: WP02 Report march 2003 + data base
- LCPC/LGIT/IRD: Grenoble team did not convert their data in SAF format at that time. They processed it with their own software. Their results are not available in Nice.

- "WP02.state of the survey. march 2003.pdf": review and synthesis (by Nice team) of the work perfomed by all teams (except Grenoble and Thessaloniki) on the bases of the previous reports and data. (annexe 1 of the present minutes)

After February, Nice team recorded new data and perfomed new analyses (on its own data and on swiss data) with the common sofware and parameters. Two new reports were produced:
- "WP02.Zurich.Nice.avril 2003.v1.pdf" (50 pages) is concerned with Swiss data processed by Nice team
- "rapport CETE avril 2003.v1.pdf" (389 pages) is concerned with Nice data

Grenoble team recorded new data and performed new analyses of its data with its own software and parameters.

II.2 Results overview

After gathering all graphs by parameter, we tried to have a new overview of the results including Grenoble ones. For each parameter:
- we gathered all data and graphs from all teams: we systematically reviewed all test performed by all teams, filling tables to control for each parameter the number of test with positive result (same "H/V" curves for test and reference record) on one side, and negative results on the other side;
- we tried to explain the difference of results (in term of "H/V" curves and student curves);
- we drawn some global conclusion and some recommendations;
- we have selected some representative test as examples;
- a first draft of the WP02 final report was therefore produced. This document is available in annexe 2 of the present minutes. But this first draft is now to write again since all data has to be processed again: this new process will change both graphs, analyses and therefore conclusions.

II.3 Choice for final analysis and presentation of results

As we gathered the results we simultaneously argued on the relevance of the process and the presentations of the results.

Grenoble team do not use the same software than other team (the fortran version of winselect.f and Hvproc.f established by SESAME WP03 with common parameters). One sample of data from Nice has been processed by Grenoble to make sure that results were the same, which was established.

The way to present the result was another time argued during several hours: during the previous meetings, we defined clearly a presentation based on "H/V" superposition and student test (see annexe 1). But this point was another time argued and new presentation of results appeared necessary. Here is a brief overview of the discussions that bring to the conclusion that all data had to be processed again:

During the previous meeting (Roma Oct 2002) some of us proposed to compared some remarkable values to quantify the difference between a test and a reference record, both in frequency and amplitude, filling a table for each parameter. The Swiss team sent a Matlab routine that allows to get such information:
- it takes as input the "H/V" curve of the reference and of the tested record.
- it calculates differences between the two "H/V" curves at every point of the curve (in the specified interval e.g. a flank of the peak) as absolute values
- it calculates the mean of these differences (-> now called mean_diff)
- it takes standard deviation values from file of first curve ("log_std")
- it calculates mean of the standard deviation (-> now called mean_std)
- it computes comparison:
    Check if mean_diff < 50% of mean_std (Yes/No)
    Check if mean_diff < 100% of mean_std (Yes/No)

During the present meeting, M. Bøttger Sørensen (Bergen) kindly performed a demonstration of this routine.
The resulting values of this software were another argued. We finally agreed on the fact that at least the frequency of the maximum peak is relevant as well as the variation of amplitude around the major peak. But these values had to be studied for each window of each record.
On the other hand, the computation leading to the curve called here "student test" was another time argued. This curve is plotted between two other curves that form an envelop. At the beginning of the present meeting analysis, we choose to declare that a tested record was significantly different from the reference record when the student

curve is out of this envelop. But this case occurred very often. That is why the experimental conditions were argued each time to try to explain this difference. Then the last day of the meeting, after deep discussions it was decided:

- that the student test had to be performed using logarithm values.
- that the major point was to check the variability of Fo between each windows of a record. The aim is to obtain a value comparable to the standard deviation in frequency domain. The student test should be applied in this sense.
- the variability of the amplitude Ao of the major peak of each window should also be studied by the same way.
- this resulting analysis can be illustrated as a box:
  - width of box = frequency mean Fo (over all windows of one reference record) + or- std
  - height of box= amplitude Ao (over all windows of one reference record) + or – std

  when the mean values of the tested record (Fo and Ao) are inside this box following the student test processing, the tested and reference "H/V" curves can be said similar.

III Conclusion of the meeting

From the discussions, it appears that all tests have to be processed again. Indeed, the information both on frequency and on amplitude variability over all windows of each record are now required to give a ruling on the similarity of two curves (tested and reference "H/V") and by the way to reach conclusions about the influence of each parameter. This new requirement implies to process again all the data collected (and already processed) by all teams.

Grenoble team is proposed to perform this final process. All data base (that were not already send in the CD rom of February) are then forwarded to this team so that the process can be performed as quickly as possible.

It is also decided to meet again (Nice and Grenoble teams at least) to have a new overview of the results, draw final conclusions, choose example and finally write the final version of WP02 report. This should be done before the end of May 2003.

C. Lacave (Resonance SA) proposed to participate to the review of the document.

The aims of the meeting were not totally reached:

- the final report is not written.
- the paper for AFPS 2003 is not written.
- but additional work has been decided to improve the accuracy of the evaluation. This work is required before starting to analyse, make the synthesis and then write conclusions: The drawbacks of such an arrangement and that the report will be delayed and only one team will be in charge of the final results. But of course all the data-base will be distributed again to WP02 participants with the used processing code and the results, so that every participant will be able to understand what was done and to reproduce it.

IV Annexes

1. WP02 State of the survey: Comments on available tests performed by several teams March 2003
file: WP02.state of the survey. march 2003.pdf

2. First draft of WP02(Influence of experimental condition for "H/V on ambient noise")
comments, examples and conclusion by parameter written during April 2003 meeting

The annexes are now part of the deliverables D08.02.