Task C meeting

Zürich (Switzerland) 2002

In the following, we give the minutes of the task C (WP08/09/10) discussions during the meeting in ETH-Zürich, 30-31 May 2002. The meeting was mainly focused on defining the parameters that will be used for noise computation for canonical models and real sites (source-receiver configuration, array configuration, local/distant sources, etc). These minutes end with the status of the time-frequency analysis and draw the work plan.

I Partners attending the meeting

Pierre-Yves Bard, Sylvette Bonnefoy	LGIT - Grenoble
Cécile Cornou, Donat Fäh, Ivo Oprsal	ETH – Zürich
Jozef Kristek, Miriam Kristekova, Peter Moczo	GPI SAS – Bratislava

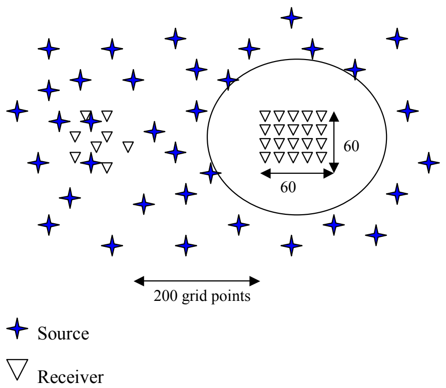
II Scientific matters

II.1 Noise computation

Because of large time computations, it was decided to skip some of the canonical models that were defined during the last meeting (Zürich, august 2001). The final models that will be considered in priority are presented in Appendix 1. Simulations will be performed in SAS GPI, ETHZ and LGIT. Noise pieces of 100 s will be computed on several receivers and then be gathered to get 10 minutes of noise recordings.

II.2 Canonical models: sources and source-receiver configuration

It was agreed to consider sources outside the array and possible sources inside the array as depicted in the following figures.



For the deep canonical models, local and long distant sources (incident Rayleigh waves) will be considered separately in a first step. Characteristics of long distance sources (frequency content, azimuth, location) are given hereafter for each deep model. The computation will first focus on local sources since the incorporation of long-distance sources in the code requires some slight adjustments by the SAS-GPI team.

II.3 Real sites

At the present time, only Grenoble and Basle models are enough well constrained to allow noise simulations. Grenoble model was prepared by Jozef Kristek and Basle model will be very soon available. Other sites will be considered after their improvement (Volvi and Colfiorito models expected next september/october). As for deep canonical models, long distance sources will be considered using a source excitation box. Besides, positions of receivers will fit as much as possible positions of experimental points used for H/V or array analysis purposes and completed by additive receivers.

II.4 Reliability of the 3D modelling

Simulation of noise was performed for the half-space model and reliability of simulated noise was checked through correlation and autocorrelation analysis between signals recorded at close receivers. Further check (ETHZ) will be performed through a comparison between the simulated spatial noise correlation decrease and the observed one for the Basle area.

II.5 Canonical models

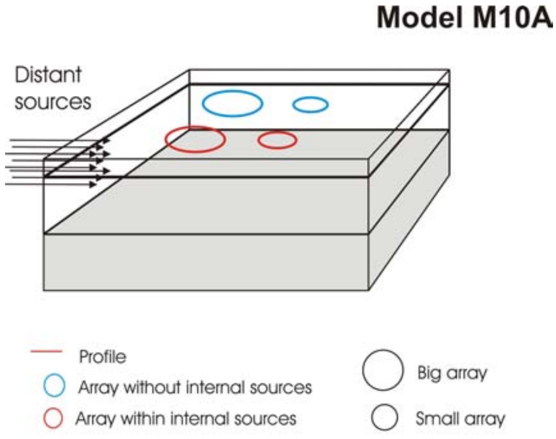
II.5.1 Shallow 1D model

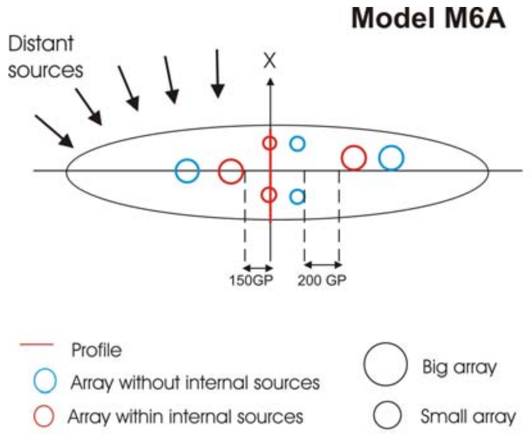
Model #	Number of models	Computation grid spacing	Array grid spacing	Frequency Range	Institute
M2	4	4 m	4 m	0.1 – 10 Hz	GPI SAS
M10B	1	4 m	4 m	0.1 – 10 Hz	GPI SAS
M11	2	4 m	4 m	0.1 – 10 Hz	GPI SAS

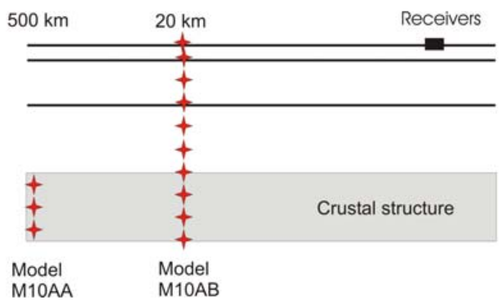
For the M2 Liege model, five different depth intervals for source volume will be considered as defined in the previous meeting. Besides, it was agreed to test on that model the effects of various proportions of harmonic/pulses sources: 20-80%, 80-20% and 50-50% (ETHZ).

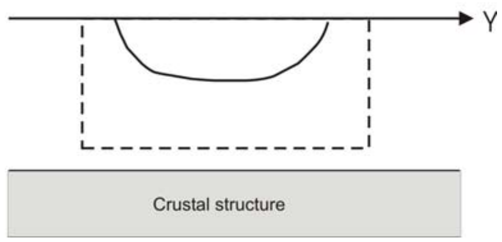
II.5.2 Deep models

Model #	Comp. grid spacing	Big array grid spacing	Small array grid spacing	Freq. Range (Hz)	Distant sources	Institute
M2 (Grenoble)	16 m	16 m	no	0.1-3	no	GPI SAS
M6A	4 m	16 m	4 m	0.1–10	Use of an excitation box Freq. content: 0.1 – 1 Hz	GPI SAS / ETHZ
M10AA M10AB	4 m	16 m	4 m	0.1–10	Single sources located either in the crustal structure (M10AA) either in the whole soil column (M10AB) Freq. content: 0.1 – 1 Hz Crustal model from Pegasos SP2 (mean crust model for swiss/germany area with a S-wave surface layer velocity of 2000 m/s) – see Appendix 2	GPI SAS / LGIT









II.6 Real sites

Grenoble site

- 10 km X 10 km model
- Local + long distant sources
- Frequency range for computation:0.1 – 1.5 Hz
- Time pieces of 120 s
- Grid spacing = 30 m
- 8 arrays within 100 receivers each
- receivers at the location of experimental H/V points completed with receivers located every 12 grid points (≈ 360 m)

Basle site

- 8 X 8 km model
- Local + long distant sources
- Time pieces of 120 s
- Frequency range for computation 0.1 – 3 Hz
- Grid spacing = 20 m
- 6 arrays
- receivers at the location of experimental H/V points completed with receivers located every 20 grid points (≈ 400 m)

II.7 Time-frequency analysis

Miriam Kristekova wrote the Fortran95 code for time-frequency method of H/V ratio computations (Fäh et al., 2001) with 2 different methods of time-frequency analysis: windowed Fourier transform and continual wavelet transform. Since the commonly used wavelets did not work well for this method of H/V ratio computation, she proposed a modification of Morlet wavelet. In the next, the method will be tested on the synthetic Rayleigh wave signals and on the synthetic/real noise signals.

III Work plan

The simulations are starting now for canonical and real sites (local sources only). Some first analysis using the WP03 software are expected before the 22th of October meeting in Roma. The next meeting is planned at the end of March 2003 in Grenoble.