

## **GEOPHYSICAL EXPLORATION FOR SITE EFFECTS ASSESSMENT : BOREHOLE MEASUREMENTS AND VIBROSEIS PROFILING IN THE ISÈRE VALLEY NEAR GRENOBLE, FRANCE**

**M. Dietrich** (1), C. Cornou (1), C. Bordes (1), P.-Y. Bard (1,2) and F. Lemeille (3)

(1) LGIT, UMR C5559, CNRS & Univ. Joseph Fourier, Grenoble, France, (2) LCPC, Paris, France, (3) IPSN, Fontenay-aux-Roses, France.

`Michel.Dietrich@ujf-grenoble.fr`

The detailed knowledge of the near-surface geological conditions is of prime importance for the understanding of the site amplifications experimentally measured by using earthquakes, quarry blasts or seismic background noise. The information on the geometry and mechanical characteristics of the shallow subsurface is equally essential to the computation of realistic synthetic seismograms in three-dimensional structures, which demand a complete description of the models considered. Over the last few years, the Isère valley near Grenoble has been extensively studied both in terms of site effects and geophysical imaging in order to investigate the relationship between the geological structures and the observed amplifications. These studies greatly benefited from a borehole drilled for scientific purposes in November 1999 near Grenoble across the entire sedimentary column down to the bedrock at 532 m depth. We report here some of the results of the logging operations performed in the borehole, as well as the contribution of vertical and offset seismic profiles to the knowledge of the local structure around the borehole. These investigations were completed in September 2000 by two seismic reflection surveys acquired with a Vibroseis source, and by a 6 km long seismic refraction profile recorded with 30 seismic stations deployed along the valley axis. Most of the seismic measurements show that the valley bottom has a complex topography. The sediments within the valley are mainly composed of clay and sand. The  $P$ - and  $S$ -wave velocity distributions inside the alluvial fill are described by linear gradients of  $\simeq 1.4 \text{ s}^{-1}$ : the  $P$ -wave velocity varies between 1450 m/s and 2150 m/s, and the  $S$ -wave velocity, between 250 m/s and 950 m/s from the surface down to the bedrock.