Advanced seismic microzoning of the complex sedimentary basin of Martgny (Switzerland) by two-dimensional Aki-Larner method and three-dimentional spectral-element method.

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ADVANCED SEISMIC MICROZONING OF THE COMPLEX SEDIMENTARY BASIN OF MARTIGNY (SWITZERLAND) BY TWO-DIMENSIONAL AKI-LARNER METHOD AND THREE-DIMENSIONAL SPECTRAL-ELEMENT METHOD

Florent De Martin* - Corinne Lacave** - Emmanuel Chaljub*** - Jean-Daniel Rouiller****

*BRGM, French Geological Survey
3 av. Claude-Guillemin - BP 36009, 45060 Orléans Cedex 2, France
f.demartin@brgm.fr

**Résonance Ingénieurs-Conseils SA
21 rue Jacques Grosselin, 1227 Carouge, Suisse
corinne.lacave @resonance.ch

***ISTerre, Université J. Fourier
BP 53, 38041 Grenoble Cedex 09, France
Emmanuel.Chaljub@ujf-grenoble.fr

****CREALP
Rue de l'industrie 45, CH-1951 Sion, Suisse
jean-daniel.rouiller@admin.vs.ch

The region of Martigny (Valais, Switzerland) is located at the confluence of two ancient Alpine glaciers: the Rhone and Dranse glaciers. Such a confluence had for consequence the creation of adeep, steep-sided and complex three-dimensional (3D) valley reaching 1 km depth and spreading 3 km wide (at maximum, see Figure 1). The valley is filled with quaternary sediment formations whose shear-wave velocity structure has been determined by geophysical campaigns performed duringformer projects (e.g., geothermal prospection): the shear-wave velocities range from 250 m/s at the shallowest formation to 1350 m/s at 1 km depth.The underlying seismological bedrock'sshear-wave velocity has been approximated to 3000 m/s.In order to determine elastic response spectra for the future seismic microzoning of the region, the "Centre de Recherche sur l'Environnement Alpin" (CREALP) mandated three institutes to perform two- and three-dimensional advanced numerical seismic wave propagations toquantify the complex basin's seismic response and its associated uncertainties.This presentation aims at showing: i) the semi-automatic meshing/refiningtechnique developed for arbitrary3D sedimentary basin surrounded by steep topography, ii) the medium homogenization technique to include arbitrary 2D sediment/bedrock interface in a 3D finite-element mesh and iii) the results obtained by a 2D Aki-Larner method code and two spectral-element method codes (SPECFEM3D and EFISPEC3D).

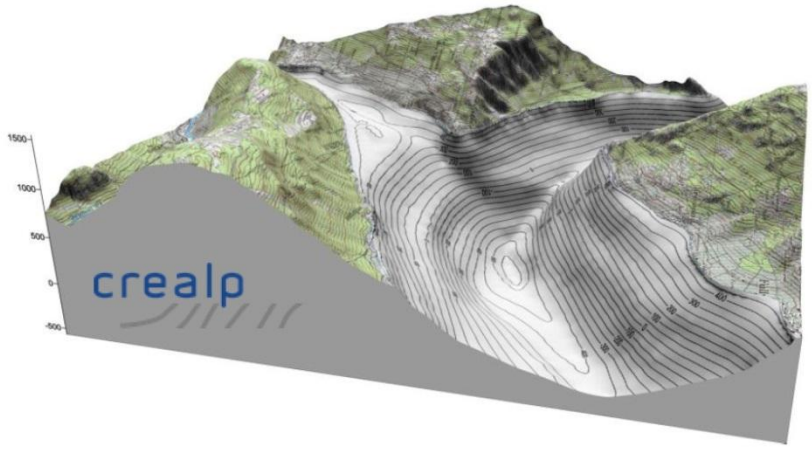

Figure 1: 3D view of the deep steep-sided basin of the region of Martigny.