What is UCVM?

The UCVM (Unified Community Velocity Model) framework enables you to query 3D velocity models for material properties through a standardized software interface. UCVM returns Vp, Vs, and density for any latitude, longitude, and depth/elevation. UCVM bundles mesh generation, verification, and querying tools into one package.

UCVM can query:
- CVM-S4.26
- CVM-H 11.9.1
- CVM-S4
- CenCal

UCVM has been verified to work on NCSA Blue Waters, OLCF Titan, and TACC Stampede. It can also be installed on regular computers. Currently, multiple versions of Linux are supported.

Small-scale Heterogeneities

Included within UCVM 14.3.0 are tools to generate and add small-scale heterogeneities to meshes. These heterogeneities are statistical distributions designed to be used with ground motion simulations. This tool was built upon the C language open-source library, FFTW. Many parameters of the distribution are user customizable, including distance, Hurst, correlation length, and stretching factor.

An example to generate and add these heterogeneities to a mesh would be as follows:

```
./ssh_generate -m ssh.out --d1 20
   --hurst 0.1 --l1 150 --st23 20
   --n1 2048 --n2 9000 --n3 9000

./ssh_add -i ssh.out -m cvms426.mesh
   -o cvms426meshwithssh.out
```

What Else is Included in UCVM 14.3.0?

CVM-S4.26 Support

UCVM 14.3.0 includes full support for CVM-S4.26, which improves upon CVM-S4 using full 3D wave tomography. These calculations have resulted in material properties that more accurately reflect the underlying earth structure and should produce more accurate ground motion simulations.

Easy Plotting Utilities

The latest version of UCVM includes plotting scripts that allow you to visualize these velocity models easily. Plot horizontal slices, vertical cross-sections, Z1.0 and Z2.5 maps, as well as Vs30 maps. For horizontal slices and cross-sections, the plot can either be of Vp, Vs, density, or Poisson’s ratio.

Generating these maps can be done interactively whereby the script asks a few questions or they can be generated via the command-line, should you wish to include it within a batch script, for example.

Improved Documentation and Install

UCVM now ships with a user’s guide, advanced user’s guide, and a developer’s guide so that users of all levels can get started using UCVM. It also has been tested to work across multiple Linux distributions and environments as well as the latest supercomputers. The installation script has been tuned to better detect these new environments and offer suggestions that will make the installation process more efficient.

Download UCVM at http://www.scec.org/scecpedia/UCVM_14.3.0

Requires Linux or OS X, GNU GCC 4.3+ (MPI compiler required for parallel mesh extraction), Python 2.5+, and an internet connection for downloading models. To install UCVM, simply run ./ucvm_setup.py and follow the directions.

Want to Learn More?

Scan the QR code with your smartphone to learn more about UCVM and visit our web page.