ShakeMap Background Information for Software Installation
(January, 2016)

This document describes a few issues you should consider before installing ShakeMap.

1) ***Parametric Data***: You need to consolidate peak ground motions for each earthquake. PGA and PGV are required and Spectral Accelerations at 0.3,1.0, and 3.0 sec are highly recommended. Instrumental Intensity comes from the PGA and PGV with one of our Ground Motion/Intensity Conversion Equation (GMICE) modules. Intensity data from field reports or internet responses (such as the USGS's "Did You Feel It?" system) are also allowed. These parametric data can be in a flat file (later converted to XML format) or queried from a database as is done for systems running AQMS.

2) ***Site Corrections***: ShakeMap requires a uniformly spaced (dx=dy) grid of Vs30 (shear wave velocity in the top 30 meters) from which to make site corrections when performing interpolation between stations. We rely on NEHRP Classification (A-E, given as an associated average 30m shear velocity) and their corresponding amplification factors. The factors are built in for Vs30, so it's best if you can construct such a grid: 30m shear velocity at uniform sampling on the order of a 1km X 1km (or at whatever resolution you intend to make your ShakeMaps) for all of your region. If these data cannot be obtained locally from geology or geotechnical data, one can use the global Vs30 Server grid generator at: http://earthquake.usgs.gov/research/hazmaps/interactive/vs30/

The VS30 server currently provides GMT grd files in pixel node registration and ShakeMap works in gridline node registration. You can fix your Vs30 file by:

```
grdsample your_vs30_grid.grd -Gnew_file_name.grd –T
```

You then configure grind.conf to look at "new_file_name.grd" and it should work. See grind.conf for details.

Likewise, local data may need to be embedded in a regional Vs30 data map as obtained from above Vs30 Server, or from other approaches.

3) ***Ground Motion Prediction Equation (GMPE's, or Attenuation Relations):*** We several ground motion prediction equations, GMPEs, (used for filling in data gaps or drop-outs) to the ShakeMap software, including two subduction regressions, as well as crustal regressions. These will be a suitable starting point for you, but you may want to a consider GMPEs specific to your region. These are separate PERL modules that can be simply modified from the existing ones.

4) ***Software/Hardware***. ShakeMap requires the freely-available PERL, MySQL, and GMT (Generic Mapping Tools) and a few other packages. PERL and GMT are used quite extensively so any background with them is advantageous. You will need to

assemble the basic GMT-formatted base maps, road, city data files, etc., but such data may already be available for your area.

Before you even begin with the installation note the following: Do not attempt to install ShakeMap on Ubuntu Linux. Again: **Do not attempt to install ShakeMap on Ubuntu Linux**. It has been nothing but a problem for everyone who has tried it, and we will no longer provide any support. The problems usually stem from the way GMT works (or doesn't) on Ubuntu. So again: Do not attempt the install on Ubuntu. You will very likely have problems and we will not help you with them.

The latest version of ShakeMap, V3.5 available at the svn repository at:

https://vault.gps.caltech.edu/repos/products/shakemap/tags/release-3.5/

The most up-to-date, stable version is r1496, so you should check that out. You'll need an svn client to check it out from the repository. **The installation and configuration process is described in the document found at <install_directory>/doc/SoftwareGuideV3_5.pdf.**

You also should sign up for the *shake-dev mailing list*:

https://geohazards.usgs.gov/mailman/listinfo/shake-dev

We use this mailing list to communicate software updates, as well as provide support when people have problems, suggestions, etc.

NOTE: There is a new version of the ShakeMap Manual online at http://usgs.github.io/shakemap. This version supersedes the older (2005) ShakeMap Manual that was published as an USGS Open File Report.

ShakeMap currently runs on various flavors of the (U)nix operating system. We are currently running ShakeMap on PC's running Red Hat and Debian Linux, and on Macintosh computers running MAC OSX. Others have been successful with FreeBSD and Solaris. But again: Do not use Ubuntu Linux. Windows is not supported. See the Software Guide for more information.

5) ***Public Relations***. We have ShakeMap Fact Sheets, but we're in the process of updating them with a more national (rather than California) perspective. We'll provide those to US ShakeMap operators when they are printed. In the mean time, we'd be glad to send along some PowerPoint Presentations if that would be of any help to you in providing background for potential ShakeMap users in your area (Utilities, Emergency Responders/Managers, Media, Private Companies., etc.)

Well, that's the brief introduction. While it is a sophisticated package, ShakeMap does allow fairly simple customization for local use (local web pages, etc.). We've been making these maps and working on this software for some time now. We'll be glad to

help you get it going, but of course we're always overcommitted, so our time may be limited.