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Shear wave Velocity Map –Global V_s^{30} Map (USGS)

Wald et al. (2004) first, and Wald and Allen (BSSA, 2007, in press), more fully, describe a methodology for deriving maps of seismic site conditions using topographic slope as a proxy. V_s^{30} measurements (the average shear-velocity down to 30 m) are correlated against topographic slope to develop two sets of coefficients for deriving V_s^{30}: one for active tectonic regions that possess dynamic topographic relief, and one for stable continental regions where changes in topography are more subdued. These coefficients have been applied to continental U.S. by Wald and Allen, and in other regions around the world by Allen and Wald (USGS Open File Report, 2007, in review). They also compared topographic slope-based V_s^{30} maps to existing site condition maps based on geology and observed V_s^{30} measurements, where they were available, and found favorable results.

Having a first-order assessment of seismic site conditions anywhere in the world provides a valuable tool in the prediction of ground-motions following a global earthquake, the primary motivation for this research. These V_s^{30} maps will enable us to better quantify possible ground-shaking and rapidly deliver these predictions to emergency managers and responders. However, the V_s^{30}maps for the Globe will also have practical applications for numerous related probabilistic- and scenario-based studies, hence this Web delivery service allows users to download maps and grids of seismic site conditions for specified regions.

The Global V_s^{30} Server allows a user to select from a map or input a rectangular region of interest. It then provides (optionally) a V_s^{30} grid in ASCII or GMT grid format, and a JPEG V_s^{30} map.

The underlying computation is a PERL Generic Mapping Tools (GMT) script that pastes appropriate sheets of the global SRTM30 database (30 arc-sec global topography, Farr and Kobrick, 2000), performs slope calculations and converts slope to V_s^{30} values based on the input coefficients relating V_s^{30} to slope. The grid can also be customized by the user if they choose to modify the predefined correlations determined by Wald and Allen.

USGS LINK : http://earthquake.usgs.gov/hazards/apps/vs30/

Type of soil depending on Shear Velocity in m/s (NEHRP,2003)

Site Class	Shear Velocity (Vs 30) m/s	Type of soil
A	> 1500 m/s	Hard Rock
B	760 -1500	Rock
C	360 - 760	Very Dense Soil and Soft Rock
D	180 - 360	Stiff Soil
E	<180	Soft clay Soil
F	<180	Soils requiring site - specific evaluations Liquefiable soils, Quick and sensitive clays.
	Extracted from NEHRP, 2003	

Source of Global V_s^{30} Map Server: U.S. Geological Survey

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