

Summary

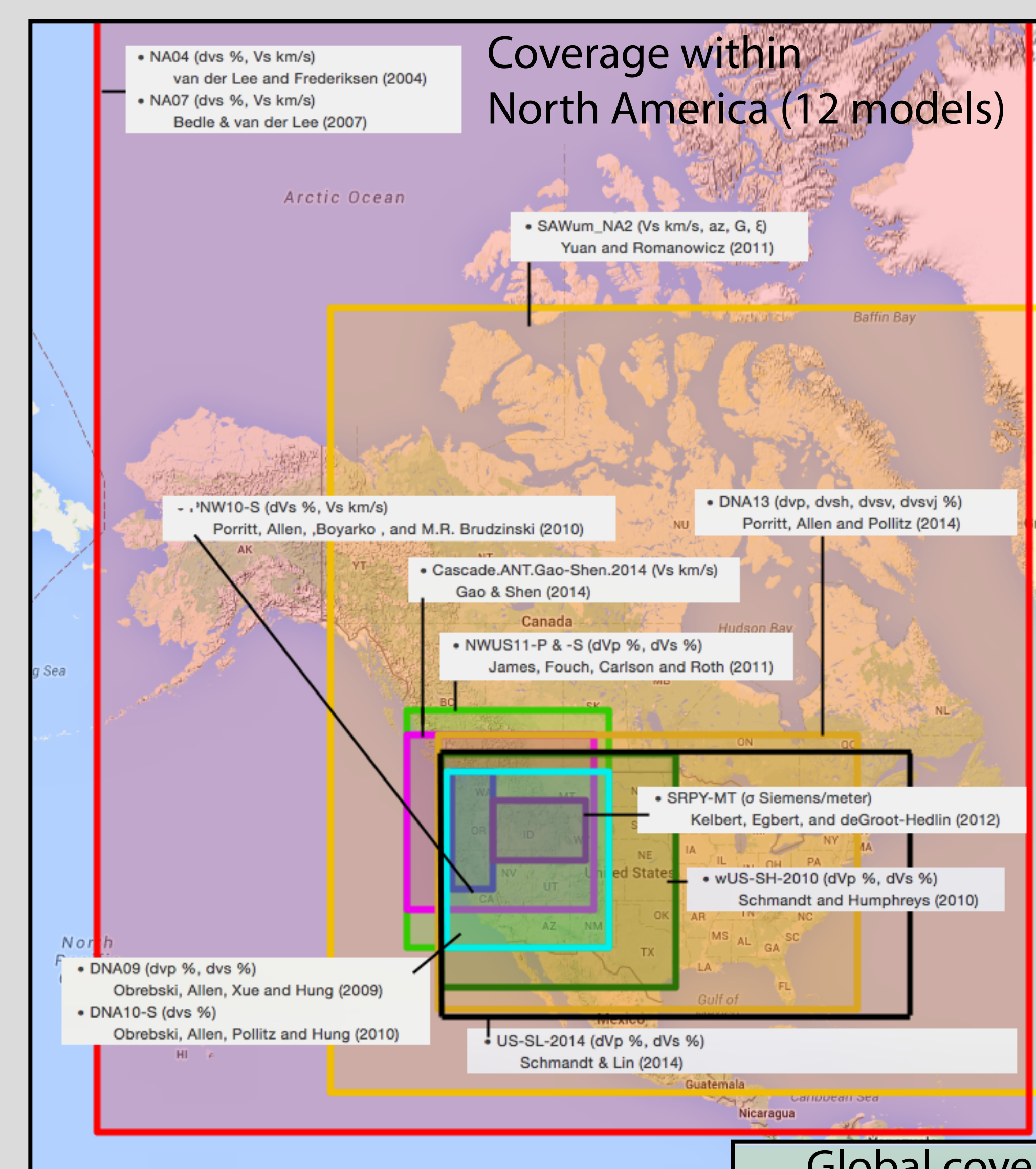
Since November 2011 IRIS Data Management Center (DMC) Earth Model Collaboration (EMC) has served as a community-supported repository of Earth models with the aim of providing access to various Earth models with a uniform format and visualization tools for model preview. The repository currently holds:

- 23 seismic velocity models (3D)
- 7 reference Earth models (1D)
- 1 seismic attenuation (Q) model (3D)
- 1 electrical conductivity model (3D)

EMC provides a set of online 2D visualization tools that allow users to produce a variety of horizontal slices, vertical slices and velocity profiles from the Earth models. Auxiliary data such as topography, earthquake locations, plate boundaries, etc. may also be included on these plots.

EMC's 3D visualization tool is at its final stage of development. The upcoming 3D display tool will be simple compared to many currently available visualization packages such as Unidata's IDV and ParaView. The intention is to provide simple 3D visualization capabilities that bridge the gap between a very complex viewer and simple 2D model slices.

Currently in EMC



Formats:

- Original format
- netCDF network Common Data Form

Download:

- via model pages
- using SPUD

ds.iris.edu/spud/earthmodel



Global coverage (13 models)

- GyPSUM (dvs %, vs km/s, dvp %, dvp km/s) Simmons, Fortin, Boschi & Grand (2010)
- HMSL-PDS & -SDS (dvp %, dvs %) Houser, Masters, Shearer and Laske (2006)
- QRLWB, [d(1/2Q)]1000 wrt QL6c:1D, din(1/Q) % wrt QL6c:1D Gung & Romanowicz (2002)
- S2.9EA (dVs %, Vs km/s, dVav %, Vav km/s, dVsh %, Vsh km/s) Kustowski, Ekstrom and Dziewonski (2008)
- S3E2ANI (dVs %, Vs km/s, dVsv %, Vsv km/s, dVsh %, Vsh km/s) Kustowski, Ekstrom and Dziewonski (2008)
- S3E2WANI (dVs %, Vs km/s, dVsv %, Vsv km/s, dVsh %, Vsh km/s) Kustowski, Ekstrom and Dziewonski (2008)
- S3E2ANI+M (Vs km/s, Vsv km/s, Vsh km/s) Moulle and Ekstrom (2014)
- SAW24B16 (dVsh %, Vsh km/s) Megnin and Romanowicz (2000)
- SAW642AN (dVs %, E, Vs km/s, Vp km/s, p kg/m³, Qa) Panning and Romanowicz (2006)
- SAW642ANb (dVs %, E, Vs km/s, Vp km/s, p kg/m³, Qa) Panning, Lekic and Romanowicz (2010)
- SEMUM (dVs %, Vs km/s, E) Lekic & Romanowicz (2011)
- TX2000 (dVs %) Grand (2000)
- TX2011 (dVs %) Grand & Simmons (2011)

Variables:

- Vp compressional velocity
- Vs shear velocity
- G anisotropy strength
- Az anisotropy fast axis direction
- ξ anisotropy parameter
- ρ density
- Q attenuation
- σ electrical conductivity

Model Information

Model information available via model description pages:

- uniform format
- one page per model
- model overview
- reference information
- link to a supplemental Information page, if provided
- model-related internal and external links
- model download links
- sample image

Data Services Products: EMC-Cascade.ANT.Gao-Shen.2014 3D shear-wave velocity model of the Cascades from full-wave ambient noise tomography

Summary
Cascade.ANT.Gao-Shen.2014, Gao and Shen (2014), is based on a full-wave ambient noise tomographic method and the analysis of Rayleigh waves from ~1000 stations between 1995 to 2012, including the EarthScope USArray Transportable Array and many other permanent and flexible arrays.

Quicklinks

- EMC home
- Reference Earth models
- Earth models
- Earth model download via SPUD
- Earth model visualization

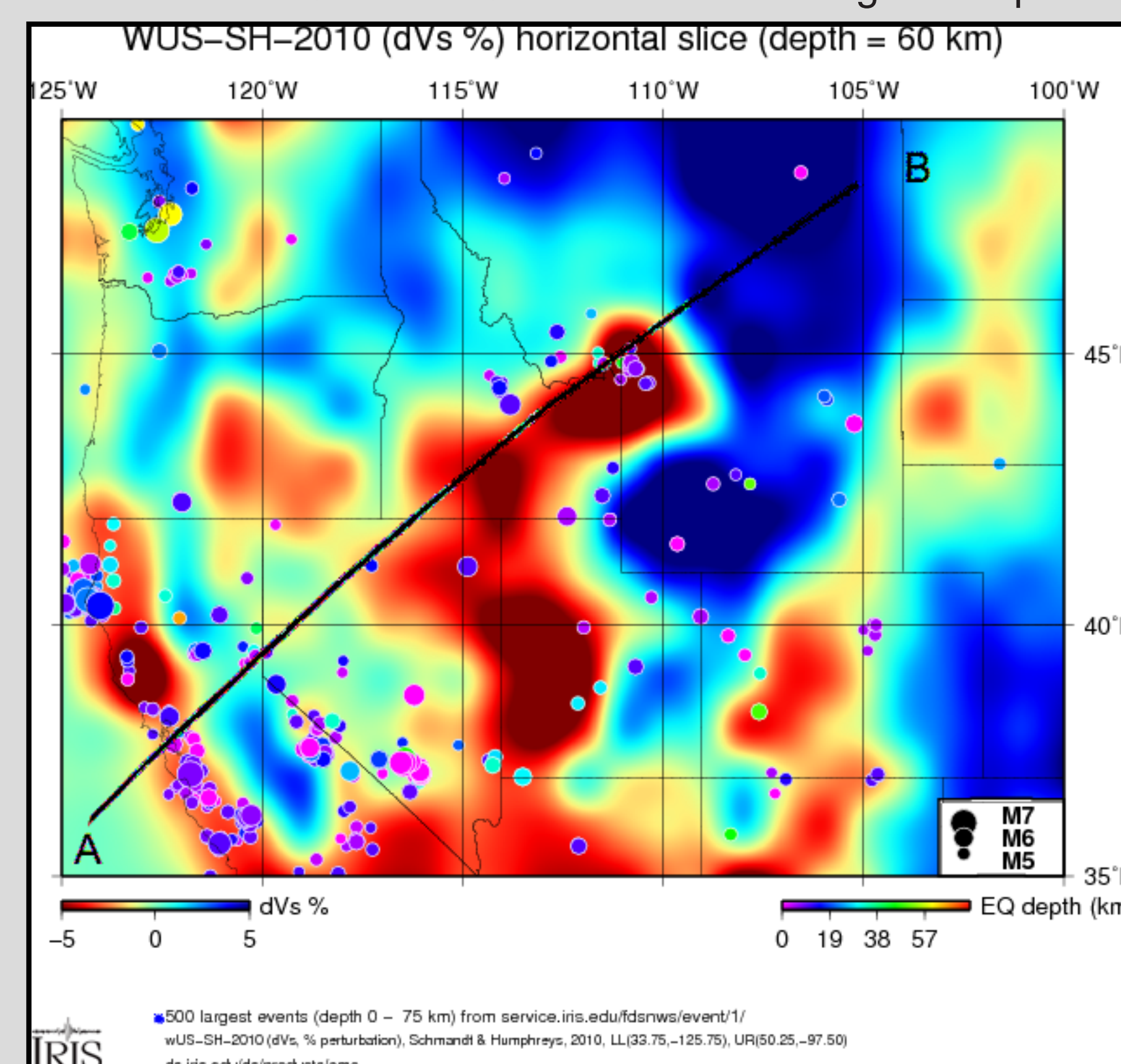
Description
Name: Cascade.ANT.Gao-Shen.2014
Title: 3D shear-wave velocity model of the Cascades from full-wave ambient noise tomography
Type: 3-D Tomography Earth Model
Sub Type: Shear-wave velocity (km/s)
Year: 2014
Short Description: The model is based on a full-wave ambient noise tomographic method and the analysis of Rayleigh waves from ~1000 stations between 1995 to 2012, including the EarthScope USArray Transportable Array and many other permanent and flexible arrays.
Authors: Haiying Gao, Department of Geosciences, University of Massachusetts Amherst, Amherst, MA 01003, USA; Yang Shen, Graduate School of Oceanography, University of Rhode Island, Narragansett, RI 02882, USA
Previous Model: None
Reference Model: CASCADE.ANT.GAO-SHEN.2014 (netCDF binary for the above model expressed as shear velocity in km/s 0 to 200 km, (best resolution 20-20 km))
Depth Coverage: The Cascades (latitude 36°N; longitude 230°E)
Areal Coverage: The Cascades (latitude 36°N; longitude 230°E)
Data Set Description: (Gao and Shen (2014)) The dataset includes multi-frequency Rayleigh-wave phase delay times between the observed and synthetic waveforms from ~1000 stations.
Supplemental Information: The supplemental information page for this model contains information on model resolution.

2D Visualization

Web-based model visualization with downloadable GMT scripts for offline refinement

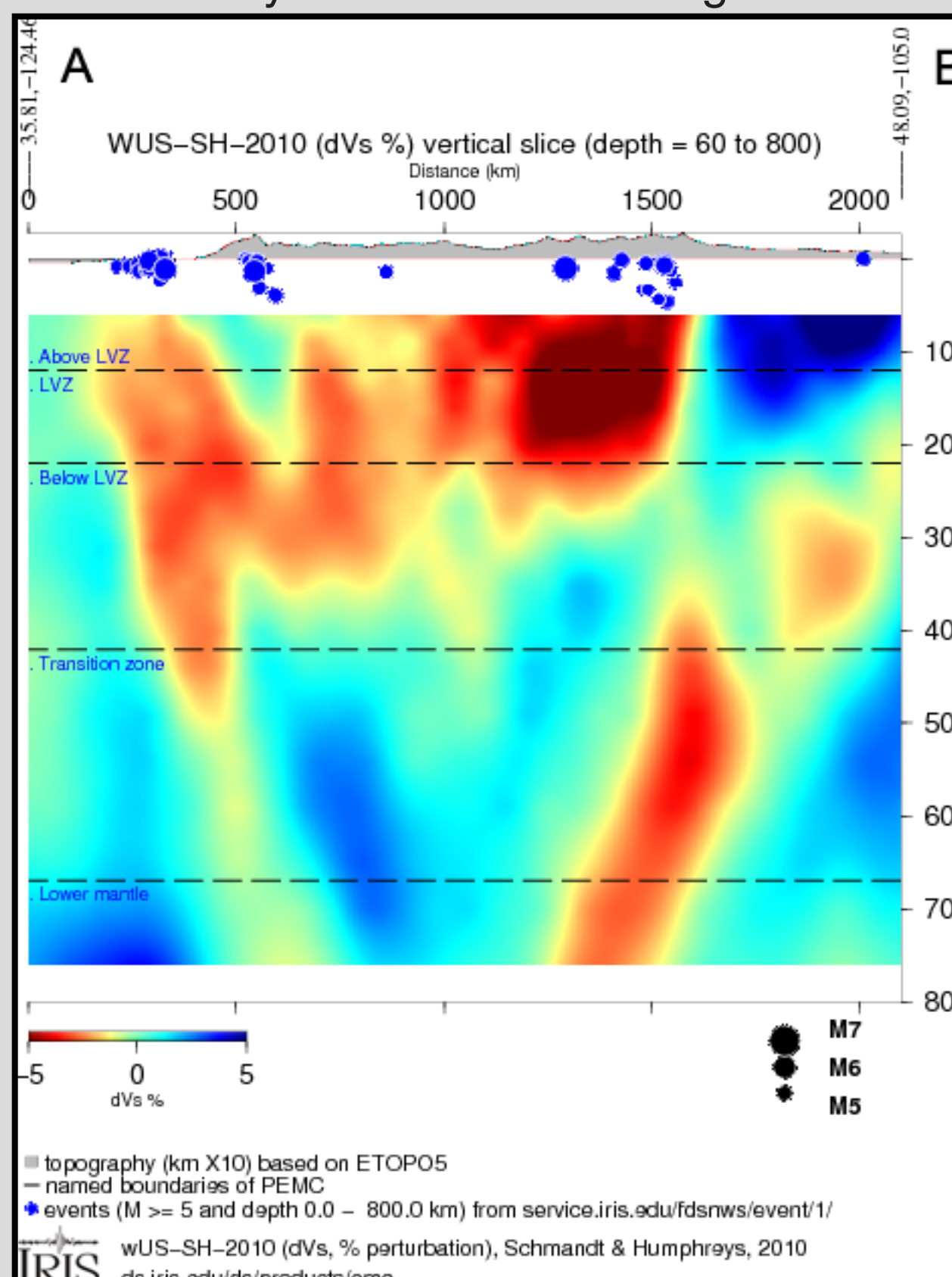
Horizontal Slice Viewer*

a horizontal slice of a selected model at a given depth



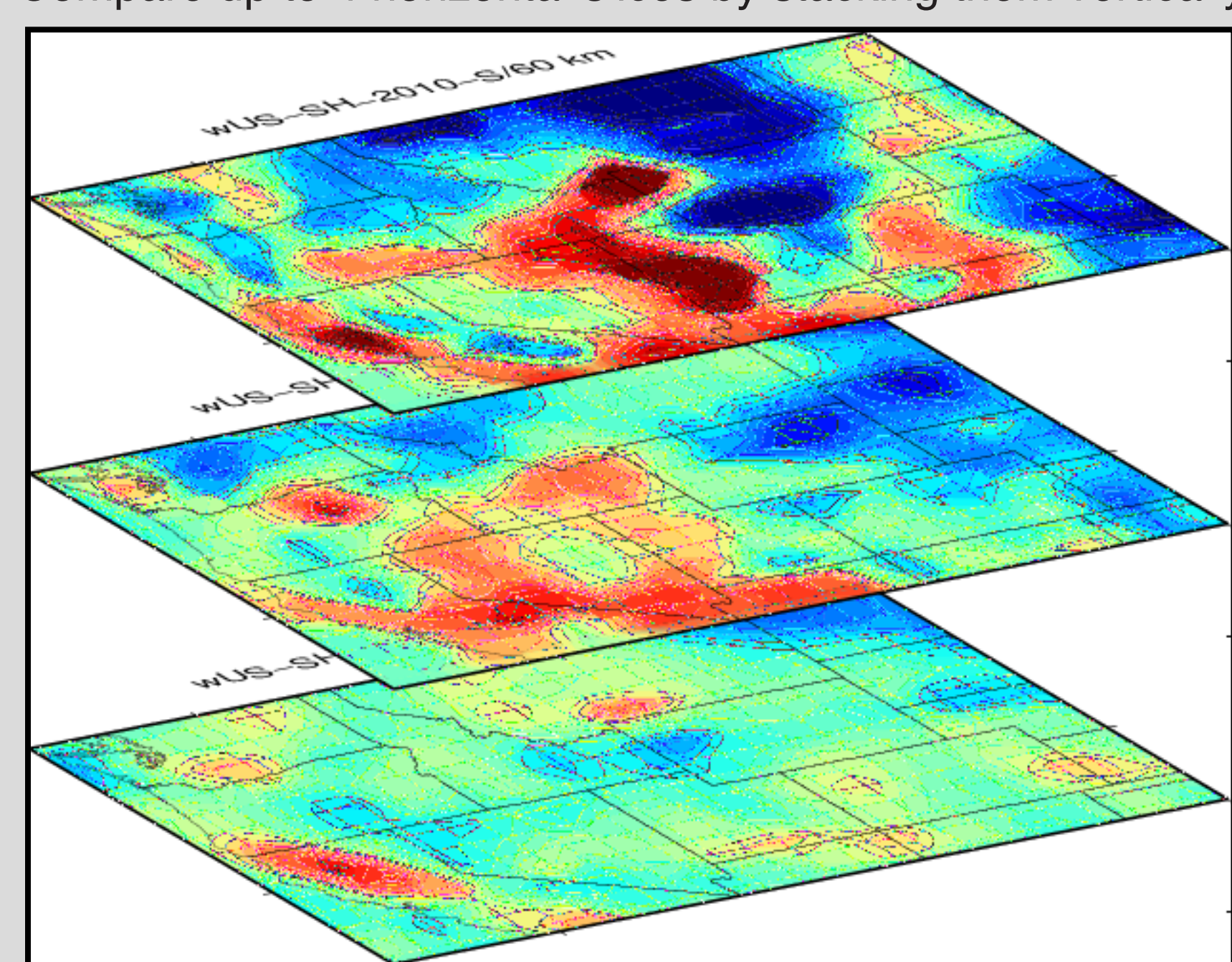
Cross-section Viewer*

an arbitrary vertical slice through a model



Slice Stack Viewer

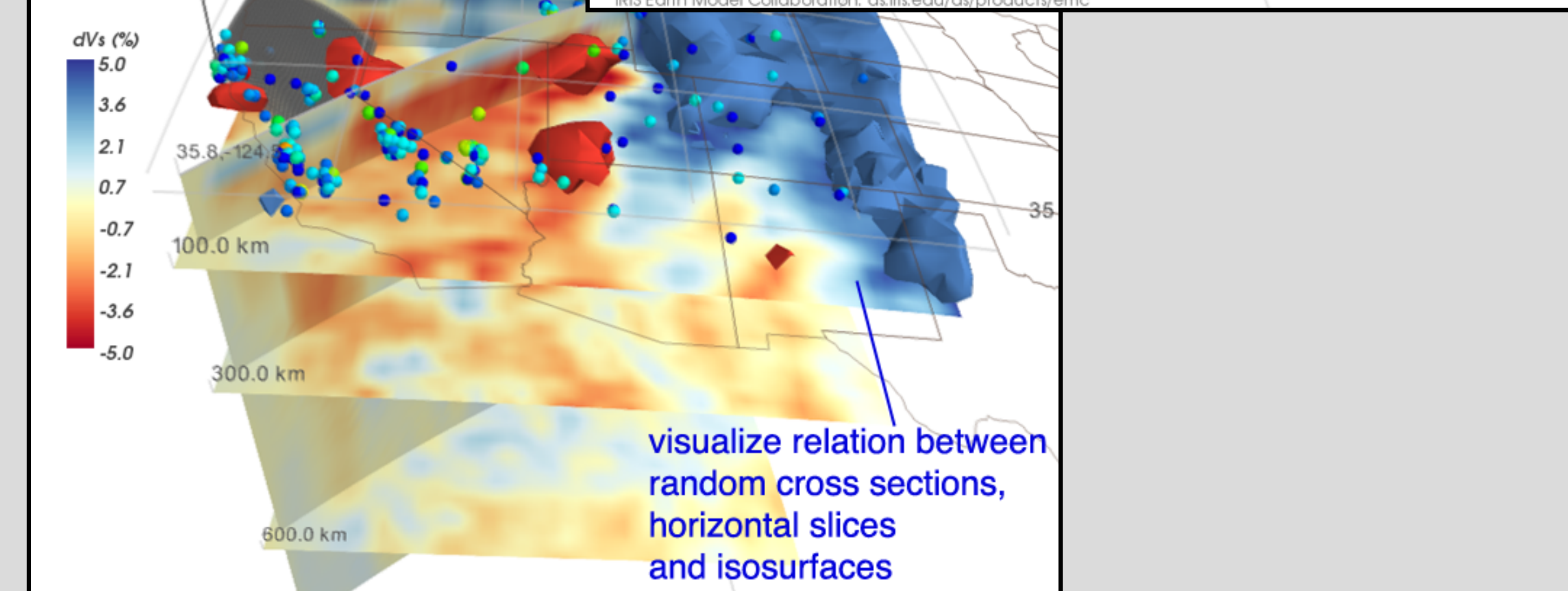
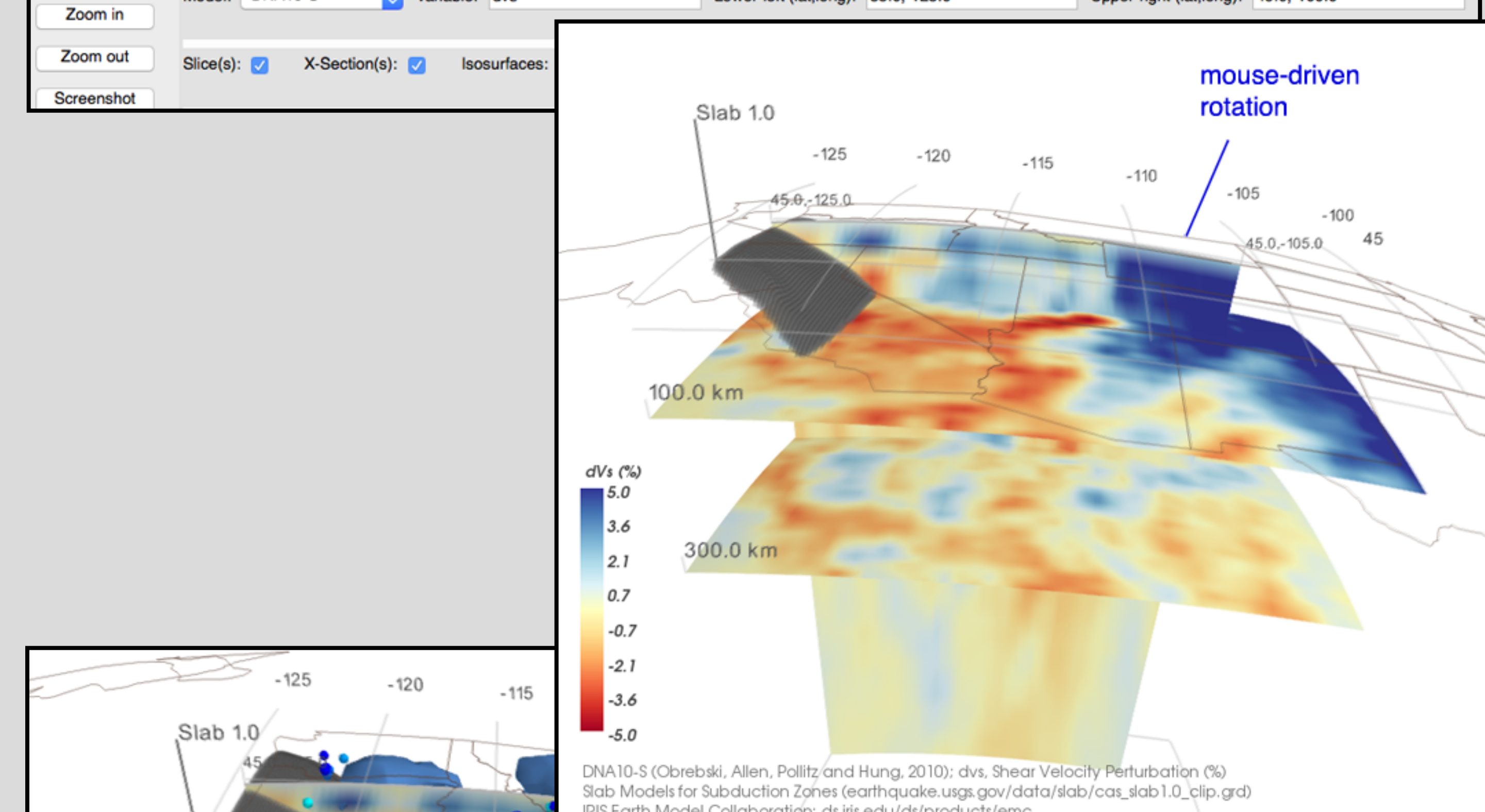
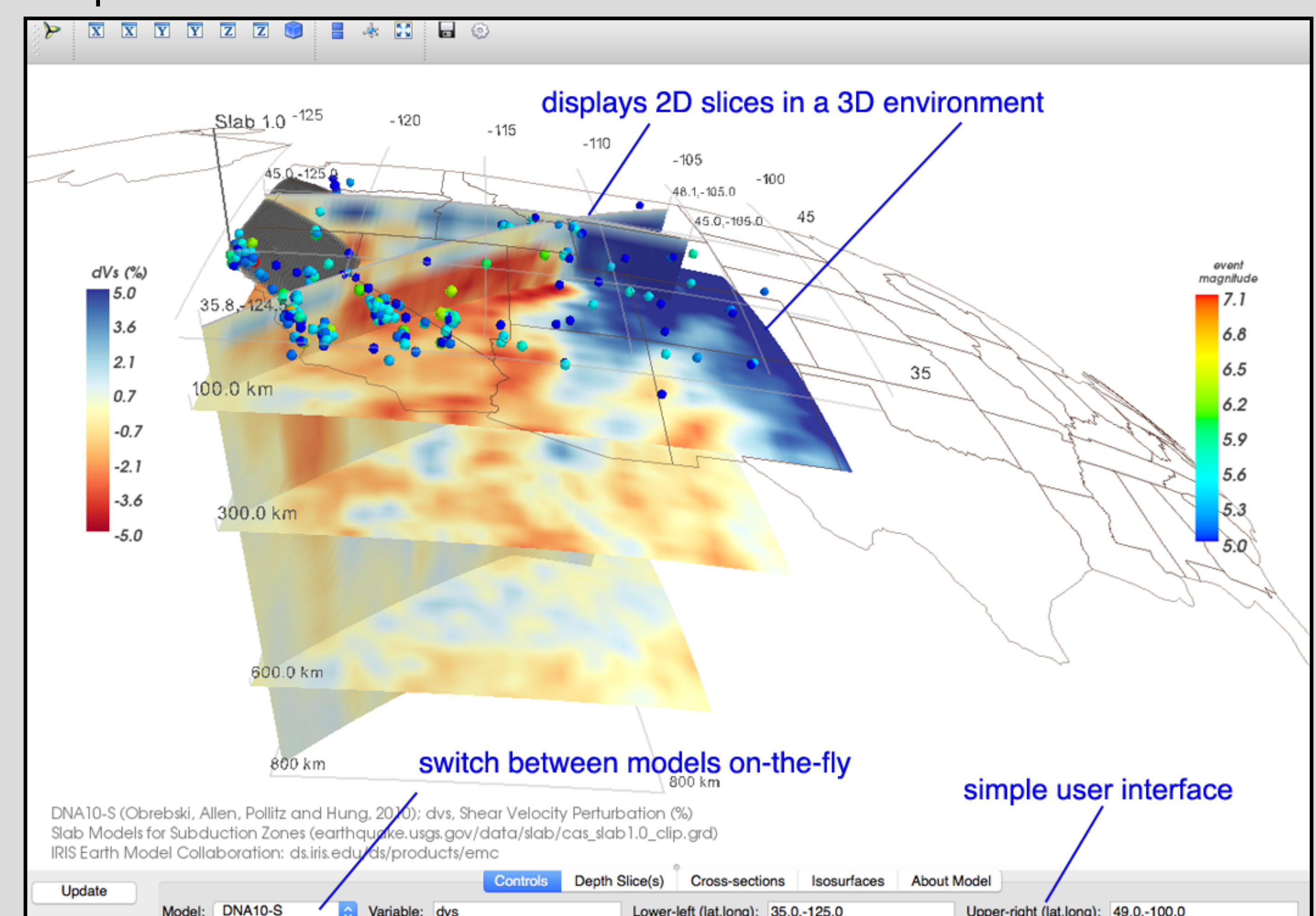
Compare up to 4 horizontal slices by stacking them vertically



* supports auxiliary data (topography, earthquake locations, gCMT solutions, plate boundaries, etc.) for plotting

3D Visualization (coming soon)

The upcoming 3D visualization tool will be an open source Python desktop application that is intended to provide simple interactive 3D visualization capabilities that bridge the gap between very complex viewers (e.g. Unidata's IDV and ParaView) and the existing EMC's simple 2D model slices.



Contributions are strongly encouraged and instructions have been provided for model creators who wish to share their model via EMC. Contact us at product@iris.washington.edu