Alaska 2018 update for USGSG18AP00017: Initial Development of Alaska Community Seismic Velocity Models

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Seismic velocity model AKEP2018 uses earthquake travel-time and ambient noise group velocity data to update Eberhart-Phillips et al. (2006: AK2006)

This 2018 model will be expanded with additional data in 2019 in the second year of the funded project.

The model is provided in a table: vlAKEP2018xyzltlnSFDRE.tbl.txt

and in the simul output from velocity inversion: vlaku40.out.txt

Map plots of Vp and Vp/Vs are also provided, with masking where

low data.

Velocity Inversion Procedure Notes for AKEP2018 model

The 2006 AK model and the 2018 updated model both use Transverse

Mercator coordinate transformation with central meridian= -150; and earth-flattening transformation.

The depths are relative to sea-level and station elevations are used.

For the group-velocity data, the surface is taken as the

30-km median filtered topography.

Velocity with the 3D gridded model is defined by linearly interpolating between nodes.

The table provides, from the computed resolution matrix, the diagonal resolution element (DRE), and the spread function (SF), for each Vp and Vp/Vs node.

Velocity Inversion Procedure:

Used the 2006 AK model as initial model.

Did gradational inversions: coarse inversion (~50-km), fine inversion (~25-km), with travel-time data.

Then did joint inversion (Eberhart-Phillips and Fry, 2017) with group velocity data for central area where good group velocity data (x= -150 to 150, y= -700 to 700).

Data:

Used selected earthquake travel-time data from AEIC (Natalia Ruppert) for 201701-201803, with some additional U Wisconsin-Madison (UWM) data (Avinash Nayak), and Moose data (Geoff Abers). Also included the earthquake and active source data from the AK2006 model.

Used group velocity data from 6-15 sec period from UWM (Avinash Nayak).

Refs:

Eberhart-Phillips, D., D.H.Christensen, T. M. Brocher, R. Hansen, N.A. Ruppert, P. J. Haeussler and G. A. Abers, Imaging the Transition From Aleutian Subduction to Yakutat Collision in Central Alaska, With Local Earthquakes and Active Source Data, *J. Geophys. Res*, *doi:10.1029/2005JB004240,* 2006.

Eberhart-Philips, D. and Fry, B., 2017. A new scheme for joint surface wave and earthquake travel-time inversion and resulting 3-D velocity model for the western North Island, New Zealand, *Phys. Earth and Plan. Int.,* 269**,** 98–111.