



Getting started with FuncLab



Rob Porritt, G. G.
University of Arizona
rwporritt@gmail.com



FuncLab is a graphical user interface for managing receiver functions in Matlab

It was originally written by Kevin Eagar and Matt Fouch

Functionally has been greatly expanded by me (Rob Porritt)

Now incorporates other matlab packages such as

processRFmatlab

m_map

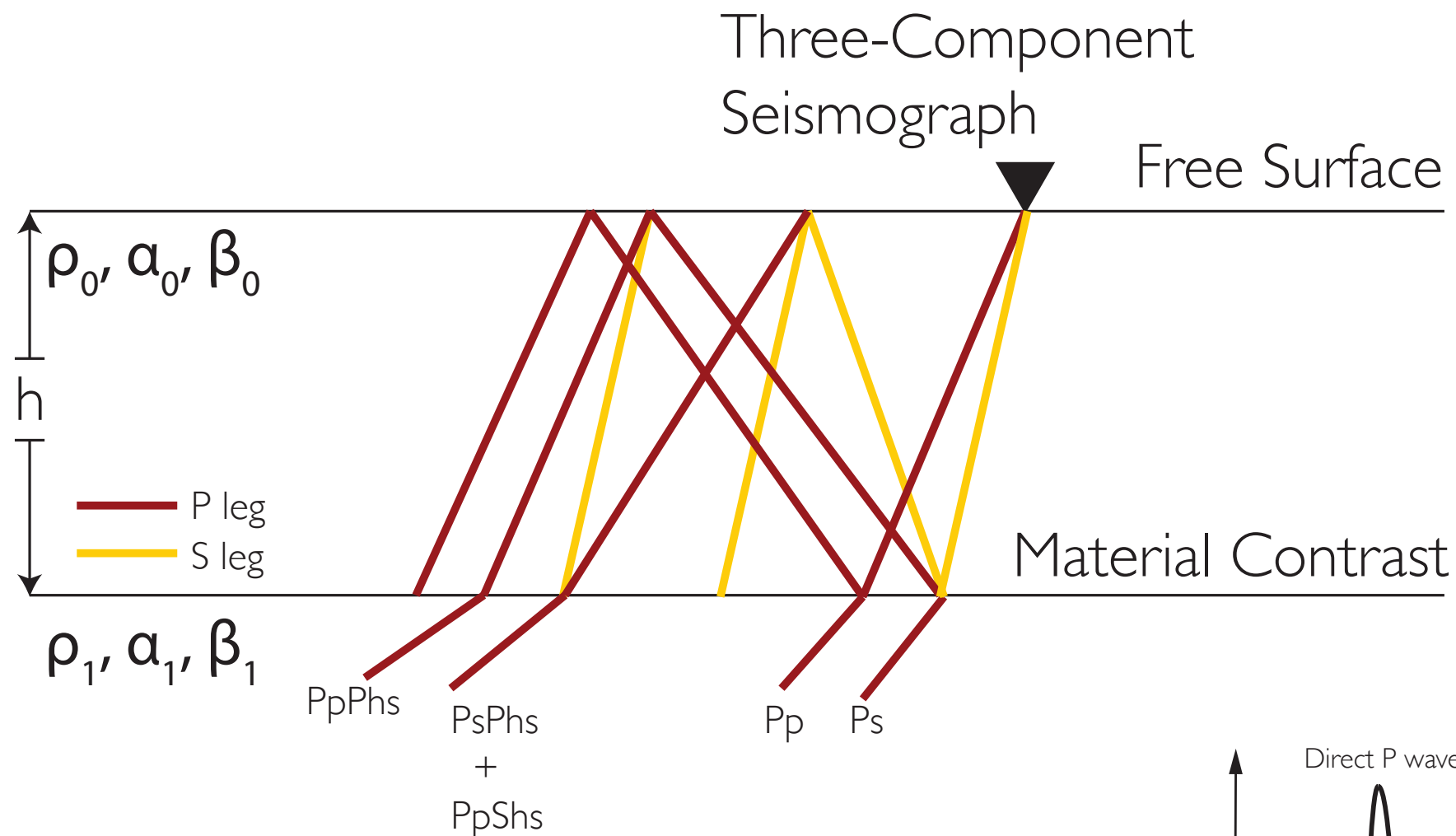
cptcmap

irisFetch

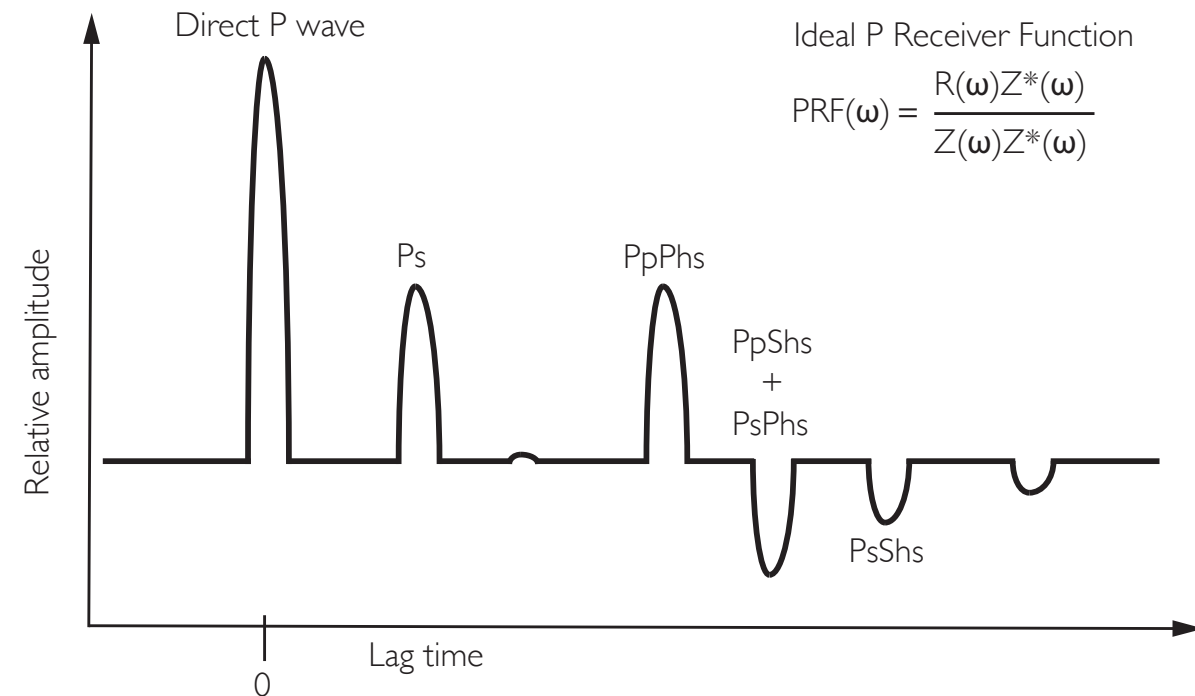
matTaup

New version still needs documentation; volunteers?

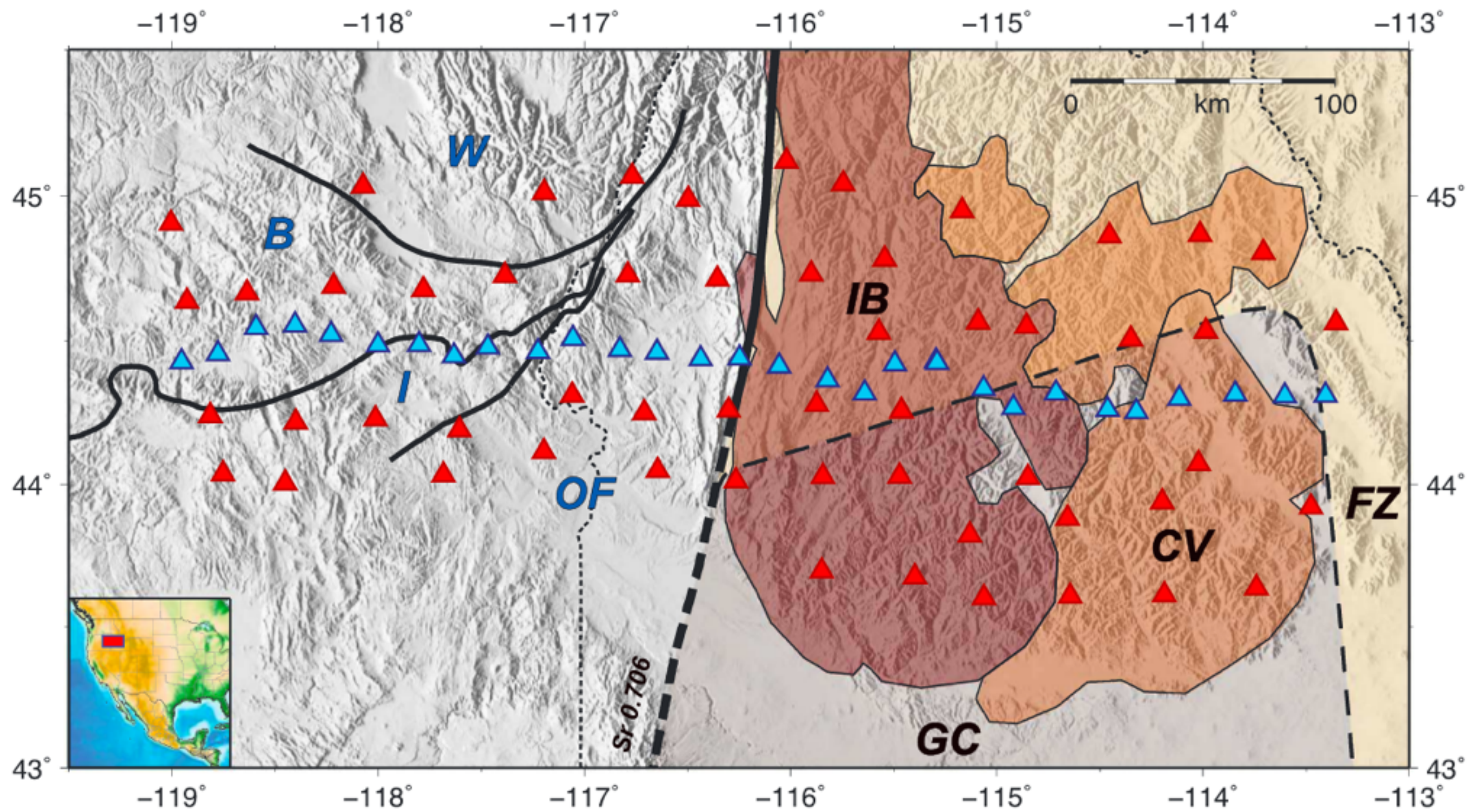
Receiver Functions



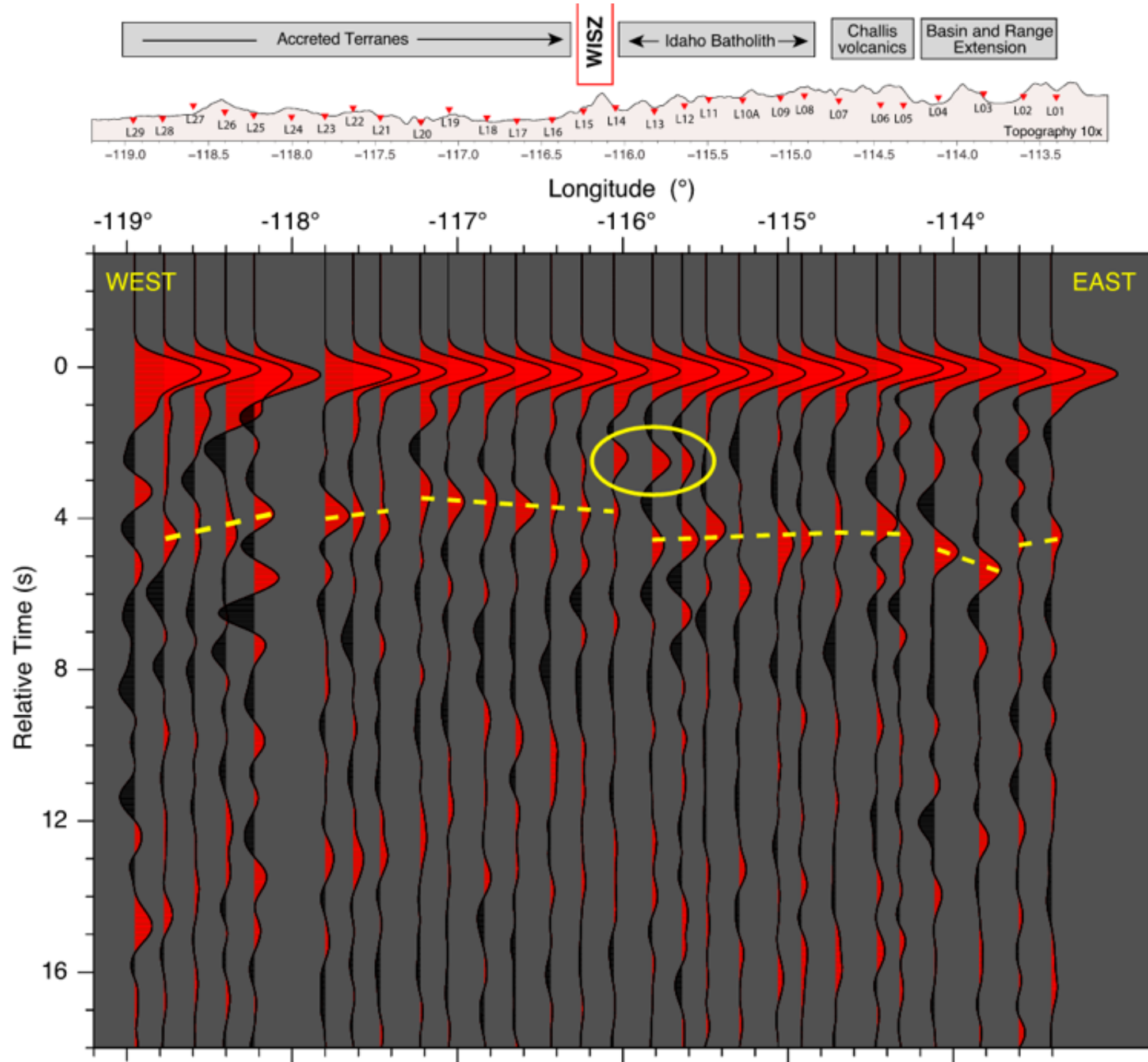
Receiver Function = $\frac{\text{Observed P or SV waveform}}{\text{Incident source waveform}}$



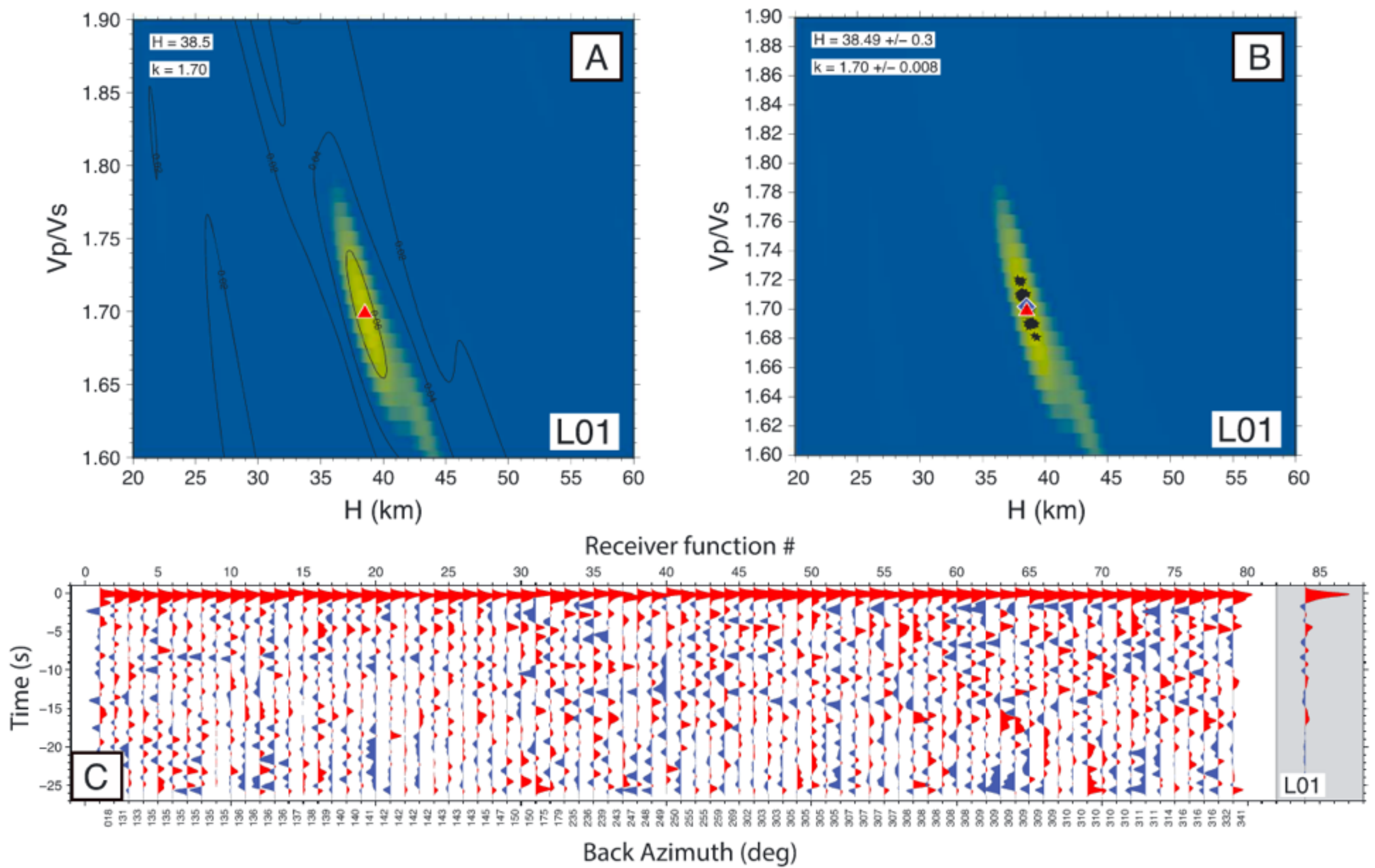
Modified from Chuck Ammon: <http://eqseis.geosc.psu.edu/~cammon/HTML/RftnDocs/rftn01.html>



Stanciu, et al, JGR, 2016

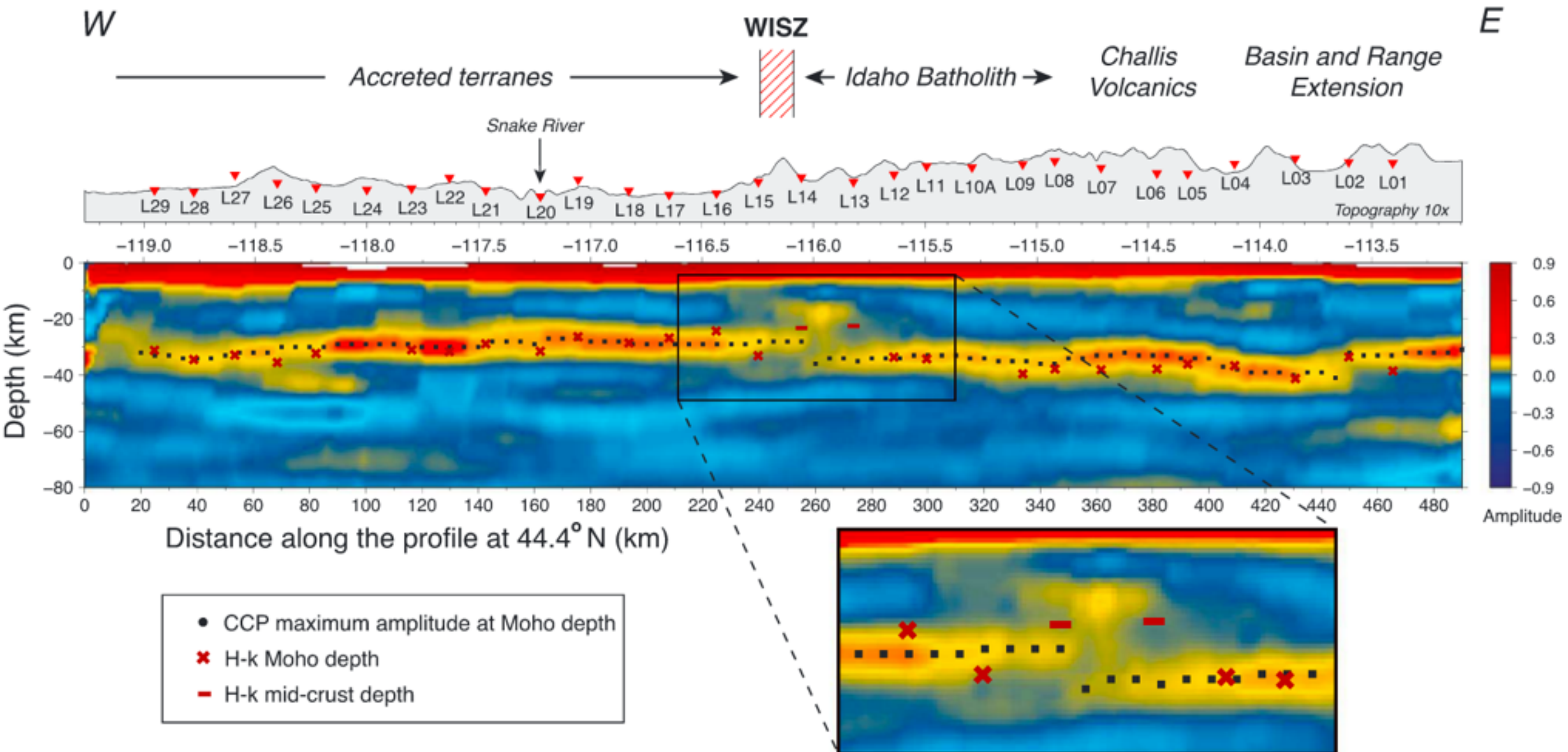


Stanciu, et al, JGR, 2016

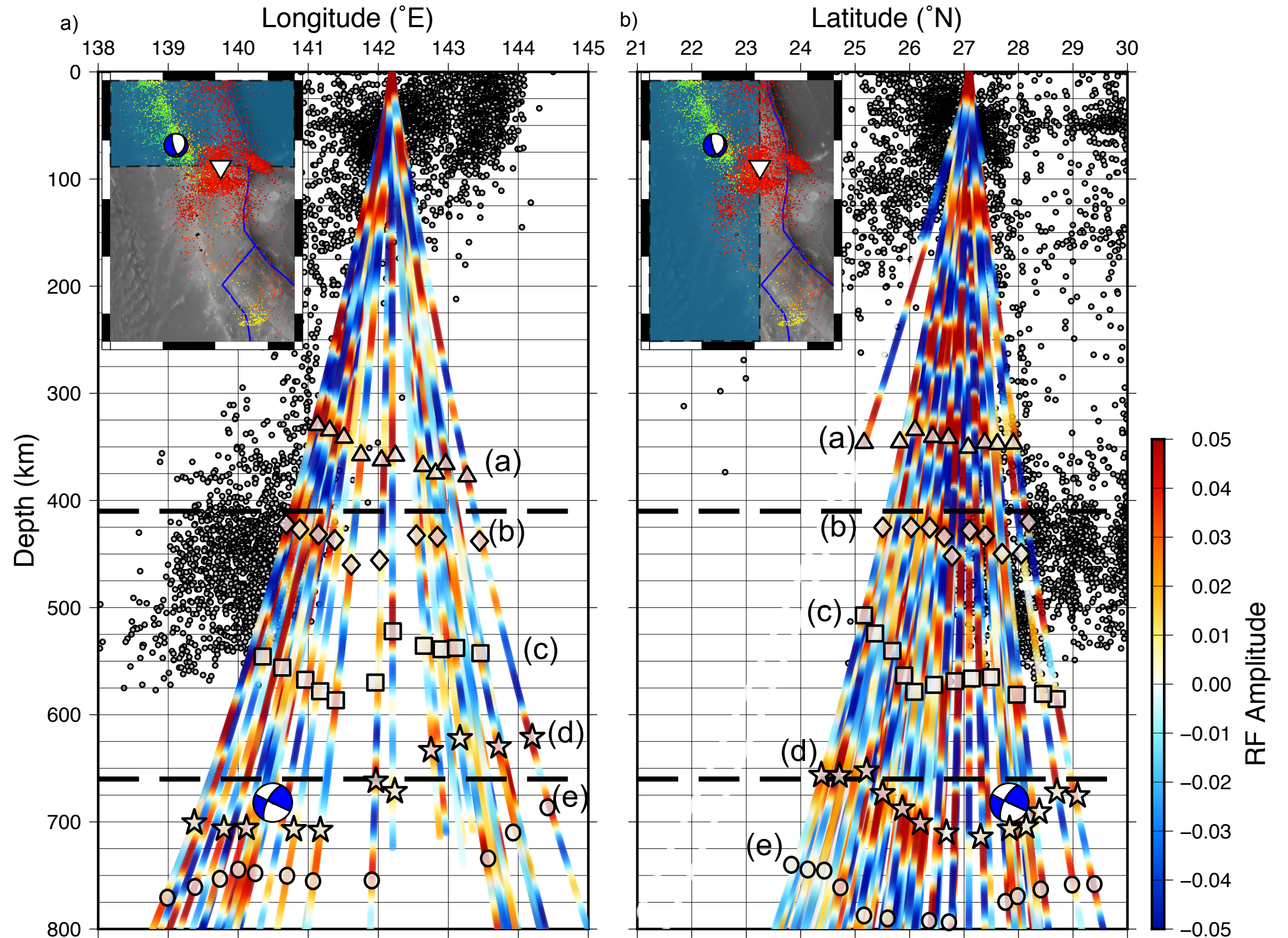


Stanciu, et al, JGR, 2016

CCP Stacking result



P to S Receiver functions for Transition Zone structure



Create/load project
Edit preferences

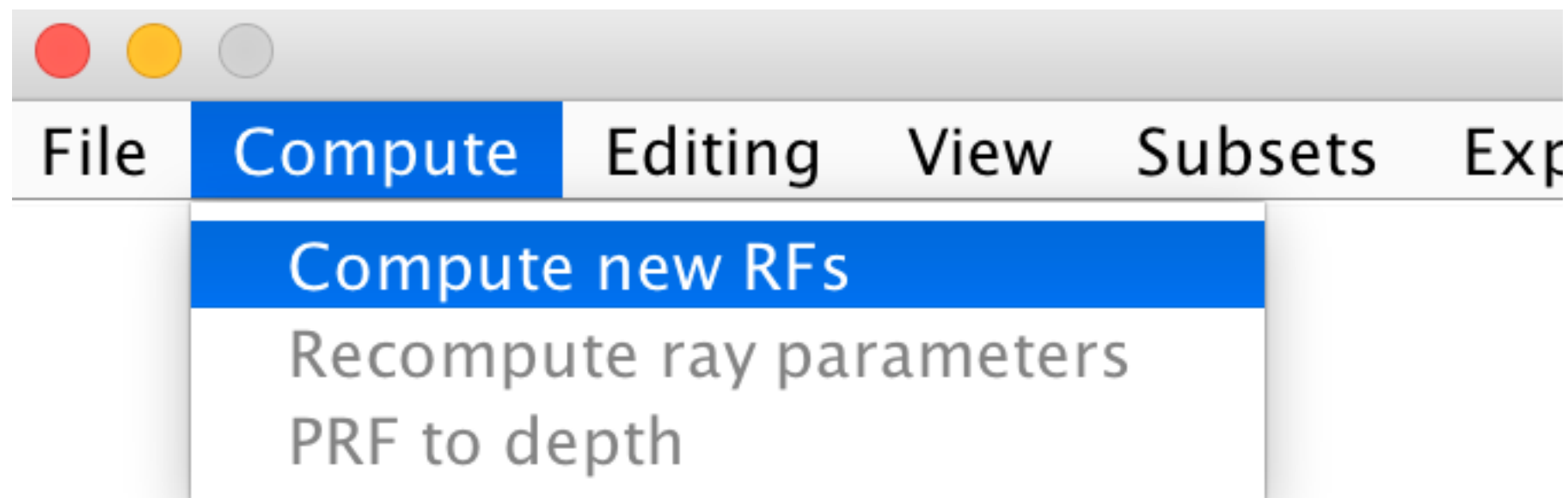
New PRFs from raw data

Welcome to FuncLab!

Start a new project (File > New Project from existing RFs) or load an existing project (File > Load Project)

To setup a project and obtain data from webservices, use File > New Project via irisFetch

To create a new project and compute RFs from raw waveforms, use Compute > Compute new RFs



New RFs Params

New RFs

Primary RF Deconvolution:	Waterlevel	Set Params
Secondary RF Deconvolution:	Waterlevel	Set Params
Raw waveform dir:		Data Dir
SAC Filenames:	FuncLabFetch	
New project dir:		Project Dir

Requires:

Data directory with sub-directories formatted as:

Event_YYYY_JJJ_HH_MM_SS

East, North, and Vertical component sac files in each
event sub-directory

Event metadata in sac headers

Select:

Time (iterative) or Frequency (waterlevel/damped) domain
deconvolution

Filtering parameters and gaussian pulse filter

Station Tables

Records (Listed by Event)

Record Information

CN-PNPO-	2012/249/14:42:08	Path: RAWDATA/Event 2012 249 14 42 08/CN PNPO- 2
CN-SUNO-	2013/144/05:44:50	Station: CN-PNPO-
N4-D41A-	2014/091/23:46:47	Event Time: 2012/249/14:42:08
N4-E38A-	2014/093/02:43:13	Edited: 0
N4-E43A-	2014/174/20:53:10	Status: 1
N4-E46A-	2015/150/11:23:02	Time Delta: 0.1
N4-F42A-	2015/259/22:54:33	Number of Samples: 1001
N4-G40A-	2015/328/22:45:39	Begin Time: -10
N4-G45A-	2015/328/22:50:54	End Time: 90
N4-H43A-	2016/107/23:58:37	Gaussian: 2.5
N4-I40B-		Radial RF Fit: 81.637
N4-I42A-		Transverse RF Fit: 43.0933
N4-I45A-		Station Latitude: 48.5957
N4-I49A-		Station Longitude: -86.2846
N4-J47A-		Station Elevation: 0.2193
N4-K43A-		Event Latitude: 10.085
N4-K50A-		Event Longitude: -85.315
N4-L40A-		Event Depth: 35
N4-L42A-		Event Magnitude: 7.6
N4-L46A-		Event Distance: 38.3945
N4-L48A-		P-wave Slowness: 0.075587
N4-M44A-		Event Backazimuth: 178.4625
N4-M50A-		
N4-M52A-		
NW-HQIL-00		
PO-BASO-		
PO-BMRO-		
PO-BRCO-		
PO-BWLO-		
PO-ELFO-		
PO-PLIO-		
PO-TOBO-		
TA-C40A-		
TA-D46A-		
TA-D47A-		

Stations: 141

Events: 10

Active: 9

Message:

/Users/usarray/Modules/Tuesday/FuncLab/

Michigan/RAWTRACES

ProjectDirectory/

1. Open Matlab and cd to the project directory
2. Start funclab by entering “funclab”
3. Load the Michigan project
4. Explore

- 1: Plot a map of stations
- 2: Plot seismograms for one station-event pair
- 3: Plot a record section for an event
- 4: Plot a move out image
- 5: Manually trace edit radial RFs for one station or event
- 6: Use add-ons to compute H-k crustal thickness and V_p/V_s
- 7: Map PRFs to depth and plot ray diagram
- 8: Compute a CCP Stack via CCPV2