

First Look at Madagascar

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WHAT STARTS HERE CHANGES THE WORLD
THE UNIVERSITY OF TEXAS AT AUSTIN



BUREAU OF
ECONOMIC
GEOLOGY



Texas Consortium for
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SCHOOL OF GEOSCIENCES

First Look at Madagascar

- ◆ Presentation Outline
 - Assume you have installed Madagascar. Start very simple, quick tour some key features.
- ◆ Check your installation
- ◆ Some basic Madagascar programs
- ◆ Some basic scons
- ◆ Basic processing 2D marine
- ◆ Exercise

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Check your Installation

- ◆ Follow the online installation instructions
- ◆ Go to reproducibility.org -> installation -> Testing and quick start
- ◆ The section “check your installation” provides a first look at Madagascar.
- ◆ Review what you should have learned while you were focused on checking install.

Check your Installation

NAME

sfbandpass

DESCRIPTION

Bandpass filtering.

SYNOPSIS

```
sfbandpass < in.rsf > out.rsf flo= fhi= phase=n verb=n nplo=6 nphi=6
```

COMMENTS

November 2012 program of the month: <http://ahay.org/.../program-of-the-month>

PARAMETERS

float **fhi=** High frequency in band, default is Nyquist

float **flo=** Low frequency in band, default is 0 ...

USED IN

[cwp/geo2006TimeShiftImagingCondition/zicig](#)

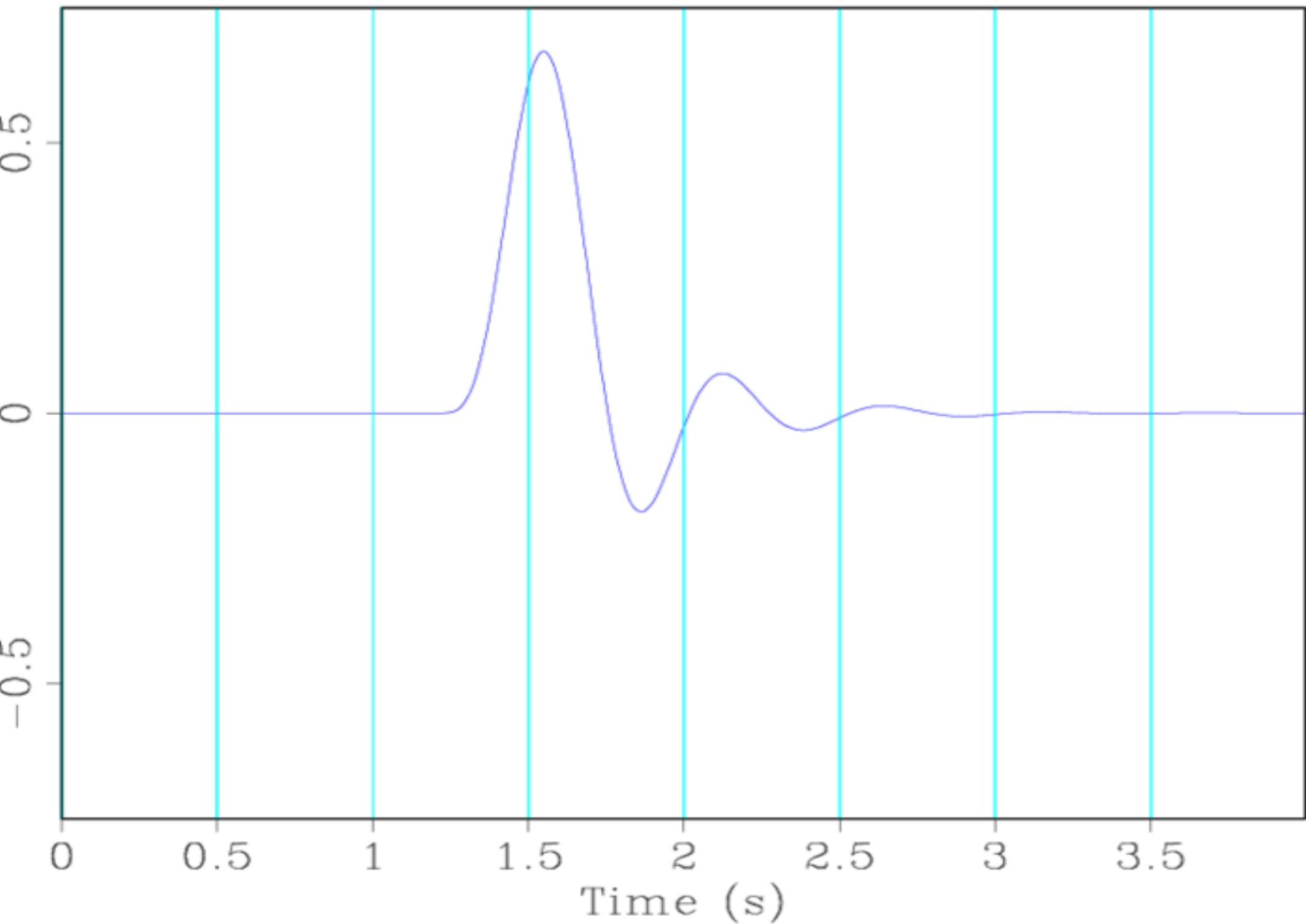
[cwp/geo2008IsotropicAngleDomainElasticRTM/marm2oneA...](#)

- ◆ Self doc provides description, parameters, and location of example scripts:

Check your Installation

- ◆ Make a simple spike file:
sfspike n1=1000 k1=300 > spike.rsf
sfin <spike.rsf
sfbandpass fhi=2 phase=y < spike.rsf > filter.rsf
sfwiggle clip=0.02 < filter.rsf > filter.vpl
sfpen < filter.vpl
- ◆ Data saved in .rsf files. (Regularly Sampled Format)
- ◆ Most programs use STDIN and STDOUT
Displays saved in .vpl files (vplot)
- ◆ sfpen sends vplot to sceen. vpconvert converts to gif or pdf for papers and presentation.

Welcome to Madagascar



Check your Installation

- ◆ Create, filter, and display spike “all at once”:

```
sfspike n1=1000 k1=300 \  
| sfbandpass fhi=2 phase=y \  
| sfwiggle clip=0.02 \  
| sfpn
```

- ◆ No intermediate files
- ◆ If displays do not appear on screen you have an install problem. Probably:
`sudo apt-get install libx11-dev libxaw7-dev`

Check your Installation

- ◆ A file called SConstuct best for scripts:

```
from rsf.proj import *  
Flow('filter',None,'spike n1=1000 k1=300 | bandpass  
fhi=2 phase=y')  
Result('filter','wiggle clip=0.02 title="Welcome to  
Madagascar"')  
End()
```
- ◆ Running it in terminal in same directory:
scons view
- ◆ Just “scons” runs without sending to screen.
Good to get vpl files for presentation & papers.
- ◆ sf prefix optional on program names.

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Some Basic scon

- ◆ Online documentation:
 - Go to reproducibility.org
 - Enter scon in the search box in upper right, <enter>
 - Select “Reproducible computational experiments using Scons”
- ◆ Madagascar uses scon, an alternative to make
- ◆ Rules to create files are defined in SConstruct file.
- ◆ scon in terminal recreates any files if input data, programs, or program parameters change.
- ◆ It is best to know some python to read Madagascar SConstruct files.

Basic Madagascar SConstruct Functions

- ◆ **Fetch(data_file,dir[,ftp_server_info])**
download data_file from directory dir on a server
- ◆ **Flow(target[s],source[s],command[,stdin][,stdout])**
generate target[s] from source[s] using command[s]
- ◆ **Result(plot[,source],plot_command)**
generate a final plot in the Fig directory of the working directory.
- ◆ **End()**
- ◆ Collect default targets.

Basic Madagascar SConstruct Functions

- ◆ Functions to make plots that contain subplots
- ◆ **Plot(intermediate_plot[,source],plot_command)** or **Plot(intermediate_plot,intermediate_plots,combined)**
generate intermediate_plot in the working directory.
- ◆ **Result(plot,intermediate_plots,combination)**
generate a final plot in the Fig directory of the working directory.

Simple Spike SConstruct

```
# import the Madagascar functions  
from rsf.proj import *
```

```
# create filter.rsf, no input file
```

```
Flow('filter',None,'spike n1=1000 k1=300 |  
bandpass fhi=2 phase=y')
```

```
# create filter.vpl from filter.rsf in ./Fig directory
```

```
Result('filter','wiggle clip=0.02 title="Welcome to  
Madagascar"')
```

```
# wrap up
```

```
End()
```

Check your Installation Exercise

- ◆ The previous section reviewed what you should have learned from the “check your installation” section from the online installation?
- ◆ If you did not previously learn this, you can use some of the exercise time later.

First Look at Madagascar

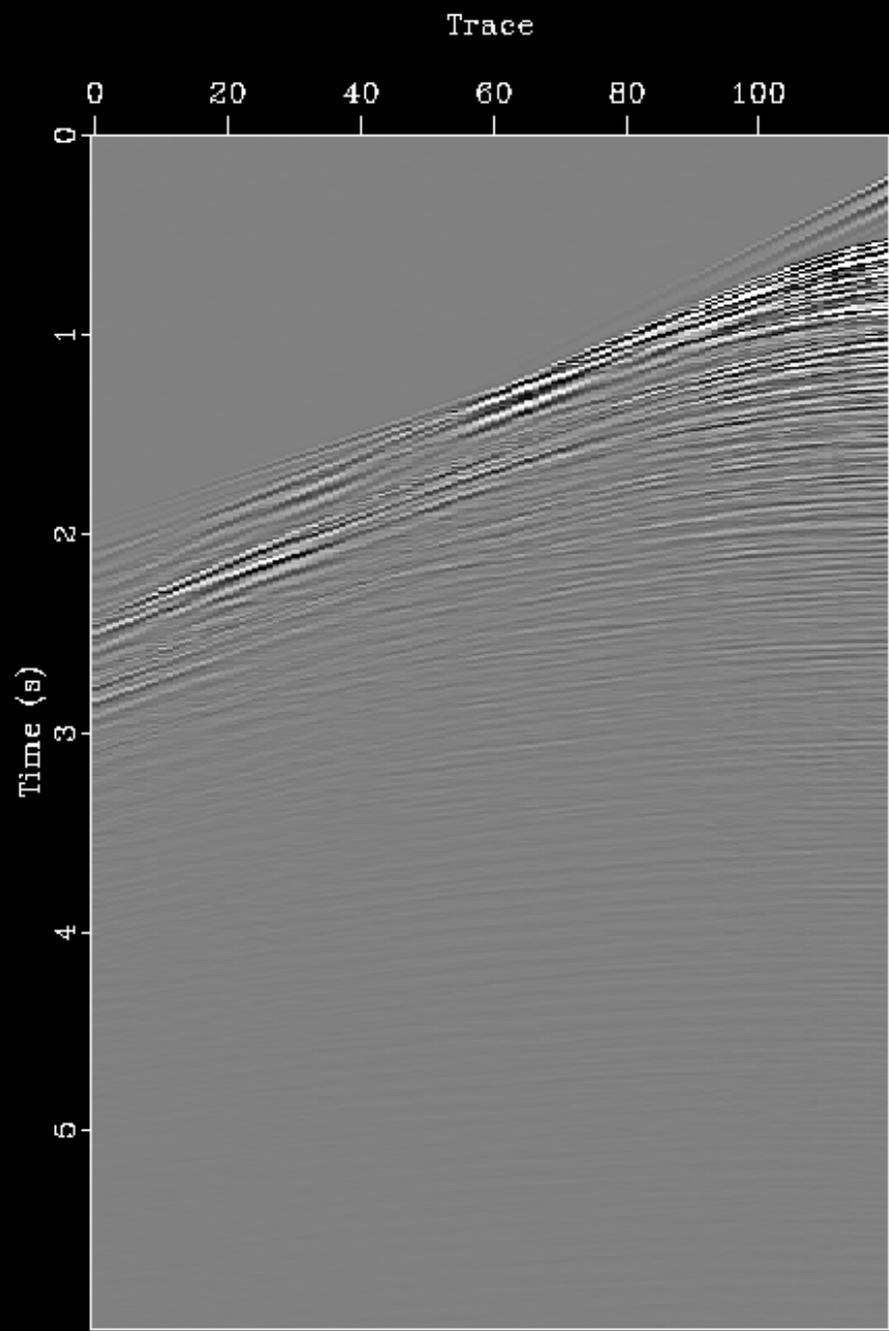
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Basic Processing 2D Marine

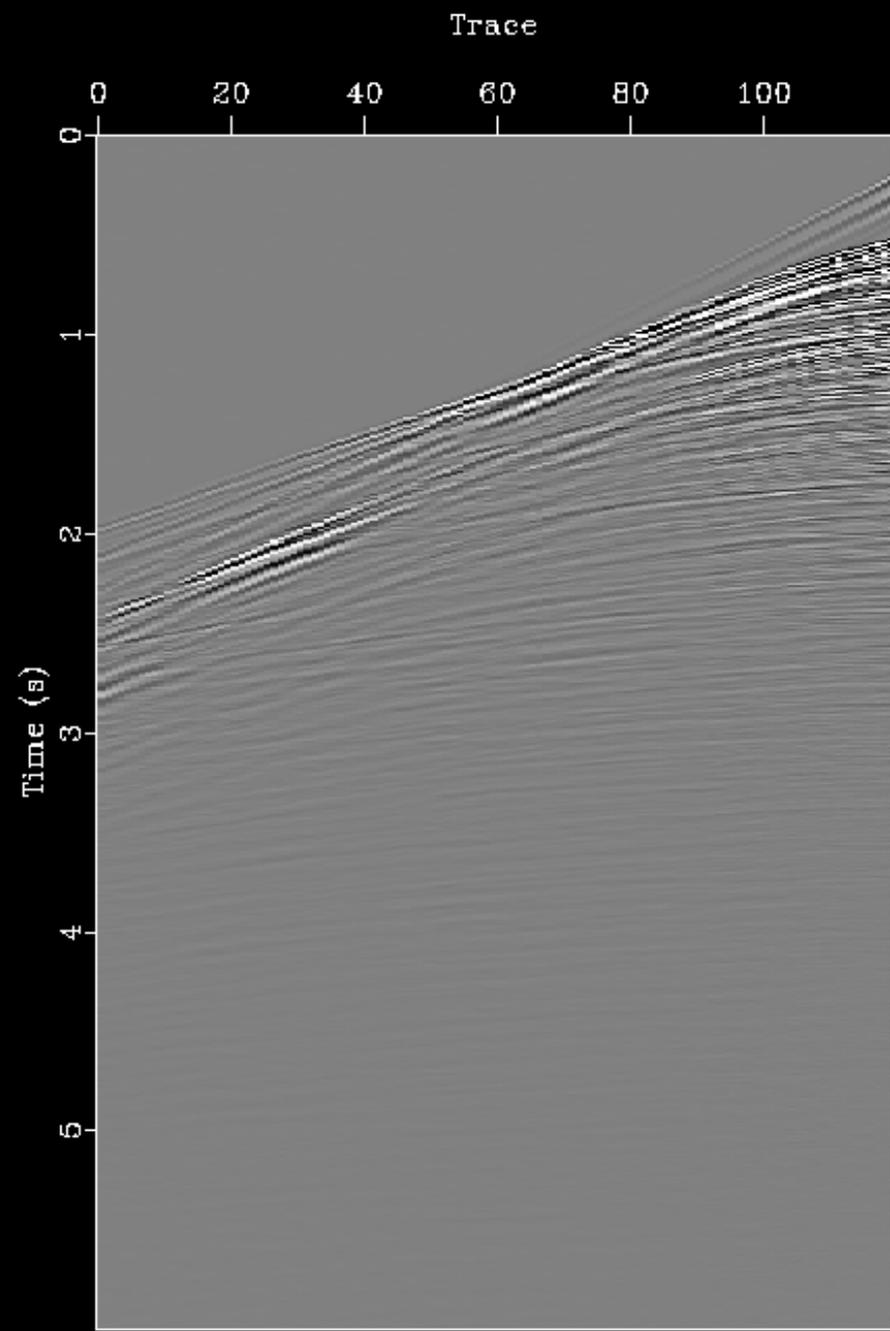
- ◆ I will step through instructions to show what to expect when you run basic processing Viking Graben 2D line.
- ◆ In a terminal window
`cd $RSFSRC/book/data/viking/fetch`
- ◆ Madagascar uses scones, an alternative to make, to create files based on rules.
- ◆ The rules are defined in the SConstruct file.
- ◆ To prevent fetching data from Internet and killing network, copy the files from viking/fetch on the thumb drive to this directory. This comments Fetch in SConstruct file and provides required files.

Basic Processing 2D Marine

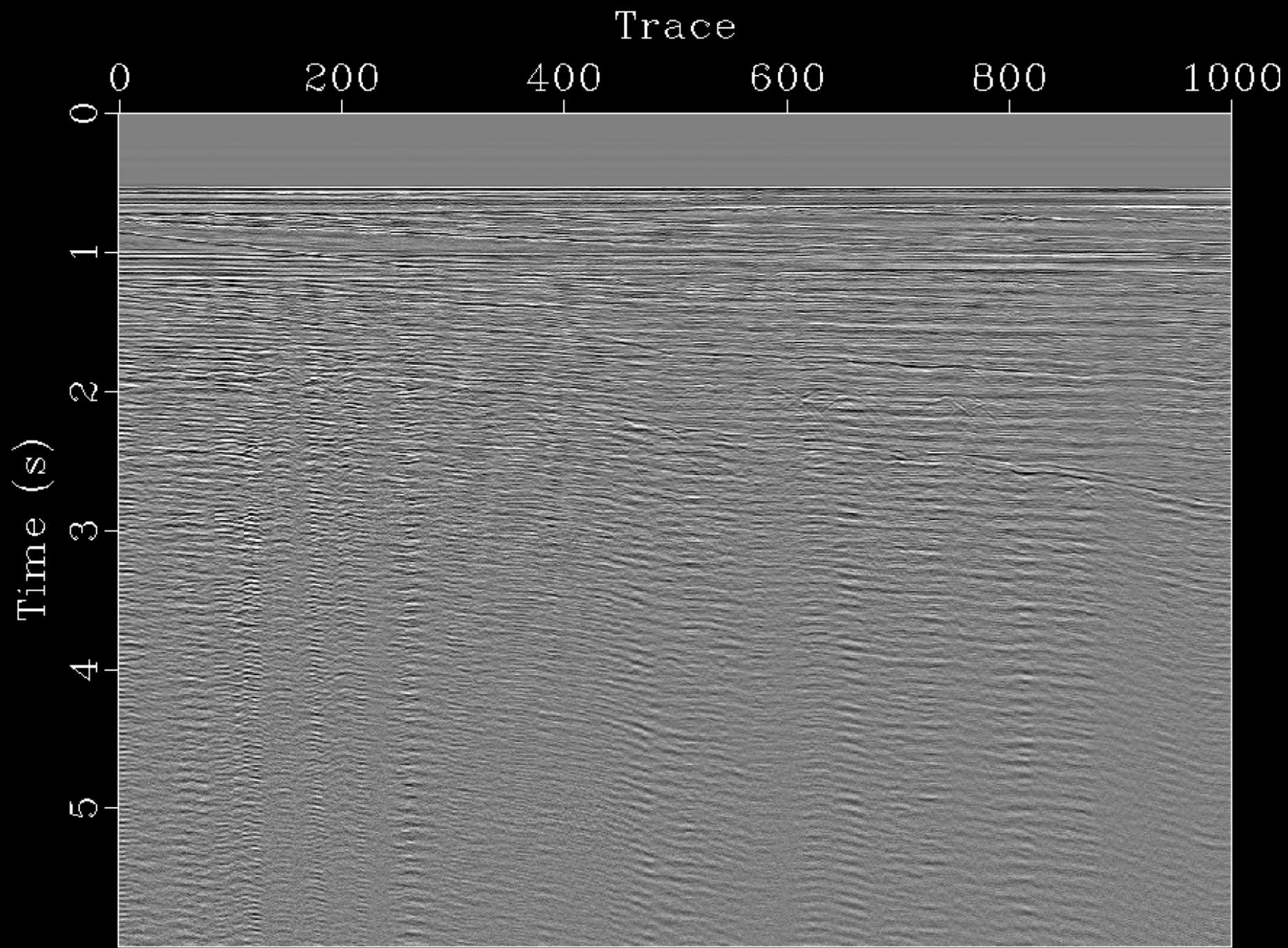
- ◆ In the terminal type:
scons view
- ◆ This will create and display results saved in the Figs directory. These results include two shots and a near trace gather.
- ◆ In the terminal type:
scons
- ◆ This will plot pdf jpg's and a movie of selected shots



shot 300



shot 600



near trace gather

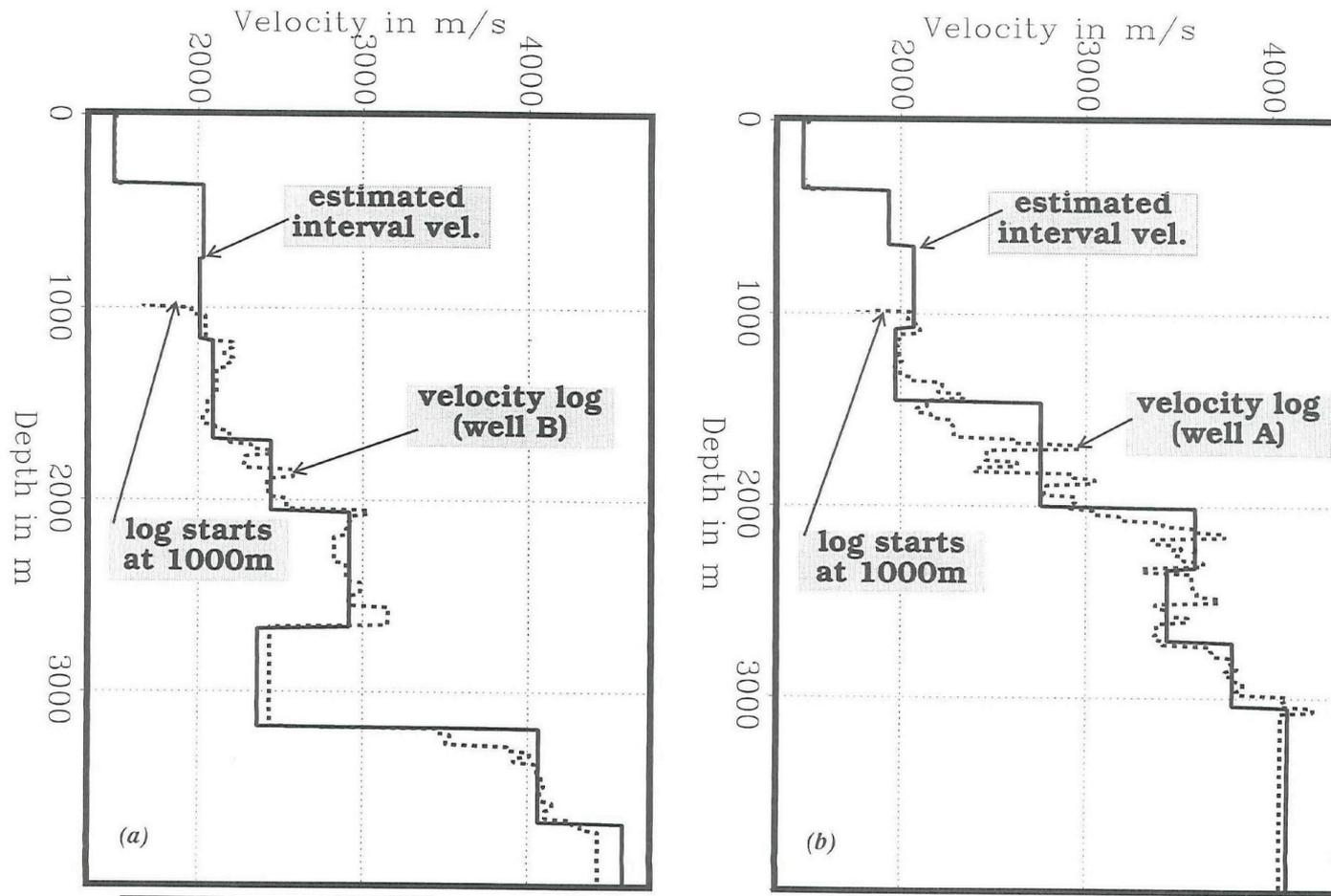
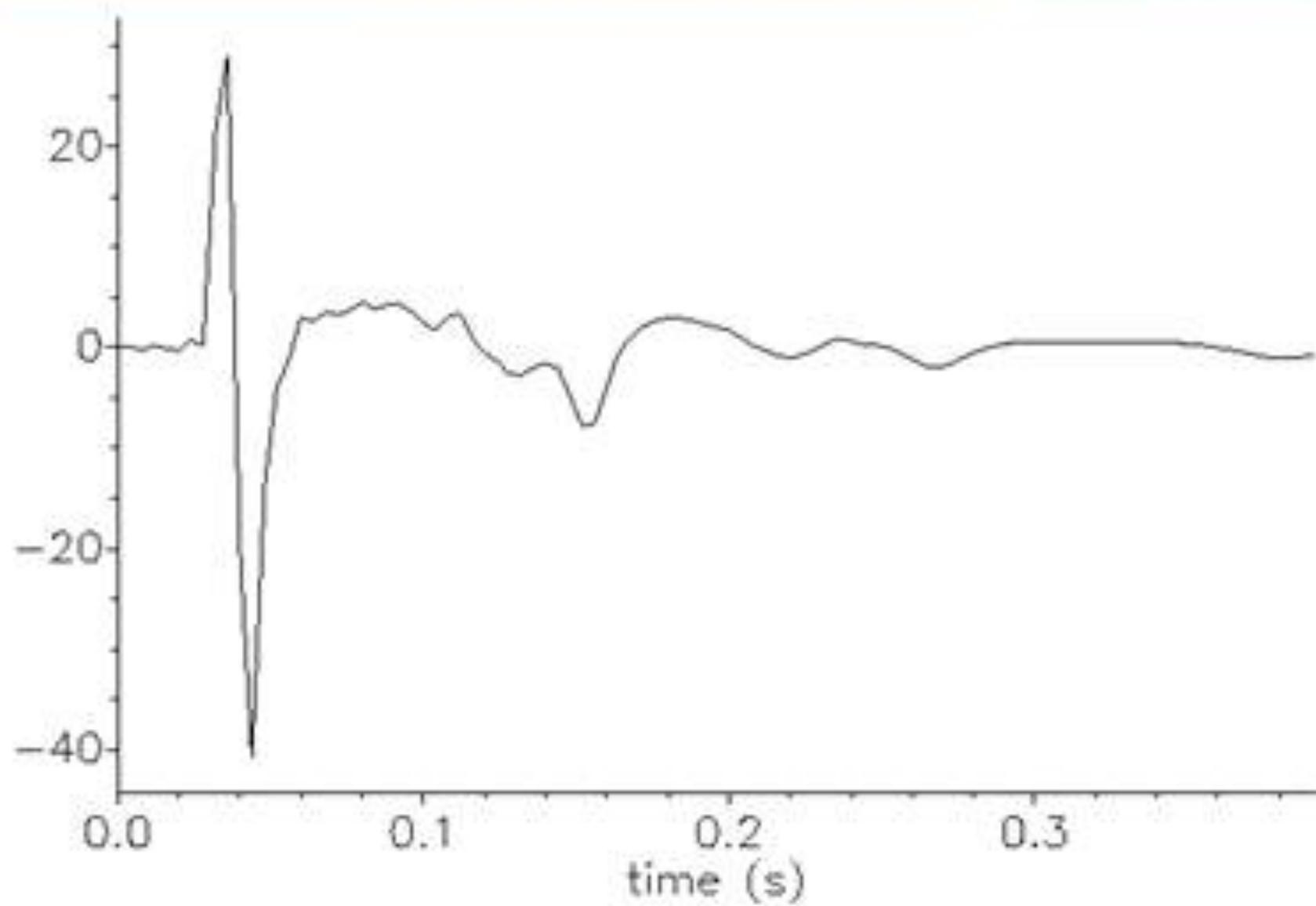


Figure 4.19 Velocity model estimation using curvature parameters and comparison with the well logs. a) Well B located around CMP 1572.
b) Well A located around CMP 808



Basic Processing 2D Marine

- ◆ Experiment with scon
 - ◆ scon shot.view will show the two shot
 - ◆ It will skip some processes because it “knows” a rerun will create same results (eg sfseggyread is skipped)
 - ◆ scon -n (no execute) prints commands to be executed.
 - ◆ scon -c (clean) removes all the target files)

Basic Processing 2D Marine

- ◆ Read the SConstruct file.
- ◆ Key programs are:
 - ◆ sfsegypread – convert segy format data to rsf format
 - ◆ sfput reorganizes the 2D file (time,trace) into 3D (time, offset, shot)
 - ◆ sfwindow selects a subset of the traces
 - ◆ sfheaderattr prints summary of trace header values

Basic Processing 2D Marine

- ◆ Continue to process the data:
cd ../firstlook
scons view
- ◆ This will display variety of fold plots, cdp gathers, cdp gathers with nmo, near trace gathers, velocity analysis, and a stack section.
- ◆ The plots suggest deconvolution and multiple attenuation should be applied.

Basic Processing 2D Marine

- ◆ Processing in the firstlook directory use “**trace and header**” (tah) programs. They start with sftah and are similar to Seismic Unix.
- ◆ Data is read with sftahread or sftahsort, passed through pipes for processing with sftah programs and piped to sftahwrite to be saved
- ◆ A typical sequence is:

```
sftahsort sort="cdp:200,200,1 -offset"\  
      input=../fetch/seismic.rsfs \  
| sftahwindow tmax=3.0 \  
| sftahwrite verbose=1 output=cdp200.rsfs \  
      mode=seq >/dev/null
```

Basic Processing 2D Marine

- ◆ A basic description of additional scripts can be read with:
`../readme.txt`

Basic Processing Exercises

Your Turn!

- ◆ Run “check your installation”.
- ◆ Run the book/data/viking/fetch, and firstlook directories.
- ◆ cd to the decon directory and run. What differences do you observe?
- ◆ Copy the decon directory to gapdecon. Change decon operator to be 32 ms gapped.
 - ◆ Eliminate all processing except that required for gapped decon stack.
 - ◆ Plot SideBySideAniso the rawstack, deconstack, and gappeddeconstack.
- ◆ Apply deterministic decon using sftahfilter.