

# SurfSeis<sup>®</sup>

## Surface Wave Processing Software

for use with Microsoft<sup>®</sup> Windows<sup>™</sup>

SurfSeis<sup>®</sup> software was developed as a product of our research at the Kansas Geological Survey (KGS). It was written to process both active and passive seismic data to obtain shear-wave velocity ( $V_s$ ) models, using the multichannel analysis of surface waves (MASW) method, which was also originally conceived and developed at the KGS.

Surface waves have historically been the bane of near-surface reflection seismologists. With the development of MASW has come a global explosion in research and use of the MASW method for application to engineering, groundwater, and environmental problems. Our fifth generation (SurfSeis<sup>®</sup> 5.0 – 5.3) provides industry-leading features and capabilities.

### Active and Passive MASW

#### Dispersion Curve Imaging

- Phase-shift method
- Advanced
- HRLRT

#### Inversion of the surface waves for $V_s$

- Fundamental mode
- Higher modes

#### 2-D $V_s$ Imaging

#### Research Tools

- Multi-mode Monte-Carlo (a.k.a. “effective/apparent” mode) Inversion
  - Maximum-energy multi-mode models
- Modeling
  - Dispersion-curve estimations from layer models (check if  $V_p$  matters)
  - Comparison of calculated dispersion-curve values to dispersion-curve images (“effective/apparent” mode)

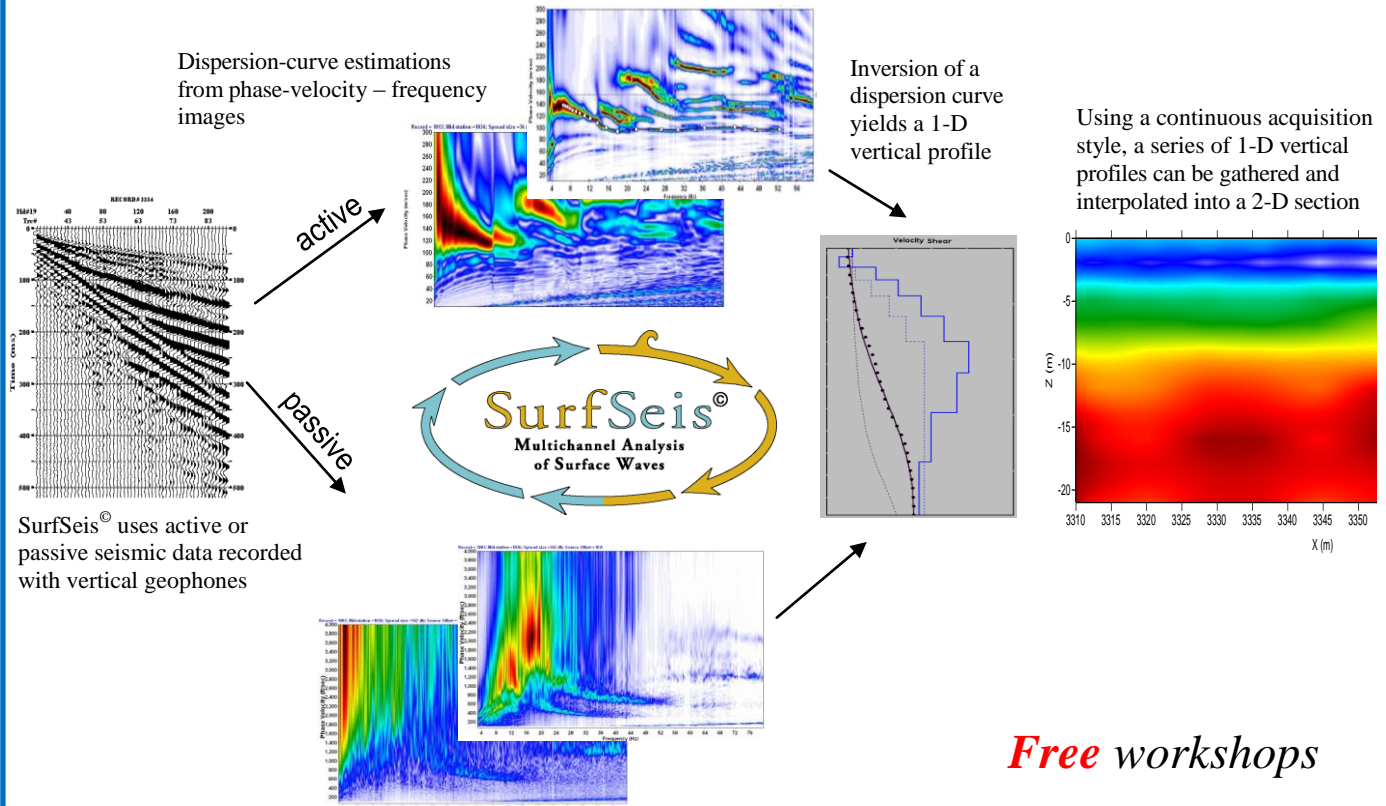
#### Seismic Data General Processing

- Bandpass filter
- Fk filter

#### SurfSeis<sup>®</sup> Capabilities

- Mute
  - AGC
  - Trace-by-trace frequency spectra
- #### Seismic Data Utilities
- Data conversion
    - SEG2 to KGS
    - SEGY to KGS
    - KGS to SEGY
  - Geometry assignment
  - Extract/resample records/traces
    - Roll-along from a fixed spread
  - Assemble walkaway records into one
  - Seismic data display (b/w and color)

### Rayleigh waves – Love waves – Scholte waves

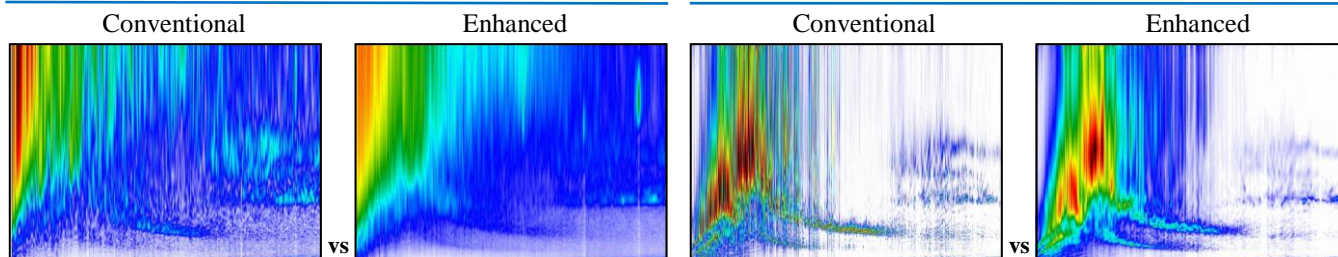


*Free workshops*

# SurfSeis<sup>®</sup> 5

Enhanced **passive** data dispersion-curve imaging  
(Introduced in SurfSeis 4.0)

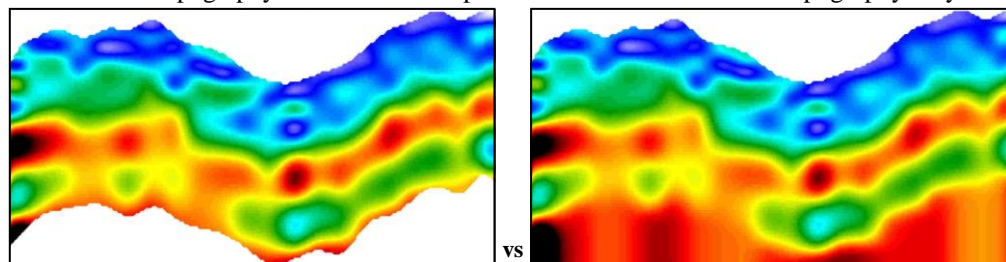
HRLRT applied to **passive** data  
(New with SurfSeis 5.2)



Initial models and final 2-D results displayed with or without variable **topography**  
and maximum-depth inversion (New with SurfSeis 5.0)

With variable topography and maximum depth

With variable topography only



Rayleigh-  
Love-  
Scholte-  
waves



HRLRT Multi-mode  
inversion

## New to SurfSeis<sup>®</sup> 5

- 2-D initial model and final results displayed with or without varying topography or maximum depth.
- Maximum-depth inversion based on each dispersion-curve data set.
- Love-wave modeling and inversion (optional, new in v5.1).
- HRLRT's better (sharper) dispersion-curve imaging and mode separation (and interpretation), can be useful with multi-mode inversion (accessible since v.3.0); it is now available for use with passive data and works jointly with enhanced passive imaging (optional in v5.2).
- Scholte-wave (i.e., underwater MASW) modeling and inversion.
- Expanded modeling and random inversion on dispersion-curve images (a.k.a., "effective/apparent" mode).
- Display old 2-D results with elevations and other improvements.

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## SurfSeis 6

expected release – March 2017

Check for **free** workshops,  
publications, and new exciting  
features at our web site

### SurfSeis<sup>®</sup> 5.0 – SurfSeis<sup>®</sup> 5.3

Released March 2016

Contact us for pricing and visit our webpage for more information (email and web address below).  
Upgrade pricing available with current serial number.



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When you ask for a quote, please tell us which  
version suits you best—  
SurfSeis 5.0 is our standard software (no modules)  
SurfSeis 5.1 includes the Love-wave module  
SurfSeis 5.2 includes the HRLRT module  
SurfSeis 5.3 includes both modules

To read about our successful application  
of both modules, see Ivanov et al., 2015, at  
[www.kgs.ku.edu/software/surfseis/publications.html](http://www.kgs.ku.edu/software/surfseis/publications.html).