SurfSeis™
Surface Wave Processing Software
for use with Microsoft® Windows™

SurfSeis™ 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 (Vs) 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™ 5.0 – 5.3) provides industry-leading features and capabilities.

**SurfSeis™ Capabilities**

**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 Vp matters)
  - Comparison of calculated dispersion-curve values to dispersion-curve images (“effective/apparent” mode)

**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)

**Dispersion Curve Imaging**
- Phase-shift method
- Advanced
- HRLRT

**Inversion** of the surface waves for Vs
- Fundamental mode
- Higher modes

**2-D Vs Imaging**

**Seismic Data General Processing**
- Bandpass filter
- Fk filter

**Rayleigh waves – Love waves – Scholte waves**

Dispersion-curve estimations from phase-velocity – frequency images

Inversion of a dispersion curve yields a 1-D vertical profile

Using a continuous acquisition style, a series of 1-D vertical profiles can be gathered and interpolated into a 2-D section

**Free workshops**

SurfSeis™ uses active or passive seismic data recorded with vertical geophones
**SurfSeis® 5**

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

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<th>Enhanced</th>
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| HRLRT applied to **passive** data  
(New with SurfSeis 5.2) |
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Initial models and final 2-D results displayed with or without variable **topography**  
and maximum-depth inversion  
(New with SurfSeis 5.0)

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<th>With variable topography only</th>
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New to **SurfSeis® 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® 5.0 – SurfSeis® 5.3**  
Contact us for pricing and visit our webpage for more information (email and web address below).  
Upgrade pricing available with current serial number.

**Released March 2016**

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 applications  
of both modules, see Ivanov et al., 2015, at  
www.kgs.ku.edu/software/surfSeis/publications.html.