

SeisWare™

Interpretation Software

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SHARAD/MARSIS Data Users' Workshop
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What is SeisWare?

- Seismic data analysis software developed primarily for the oil & gas industry.
- Radargrams ~ seismograms, so it works for radar data analysis, too.
- Integrated mapping, custom projections.
- Only available for Microsoft Windows.
(*I run it via VMware Fusion on my Mac.*)

Radar ⇨ SeisWare

- Use SEG-Y format for input data. My IDL utility `raw2sgy.pro` converts all flavors of SHARAD binary radar data:

<http://nathaniel.putzig.com/research/tools/seisware>

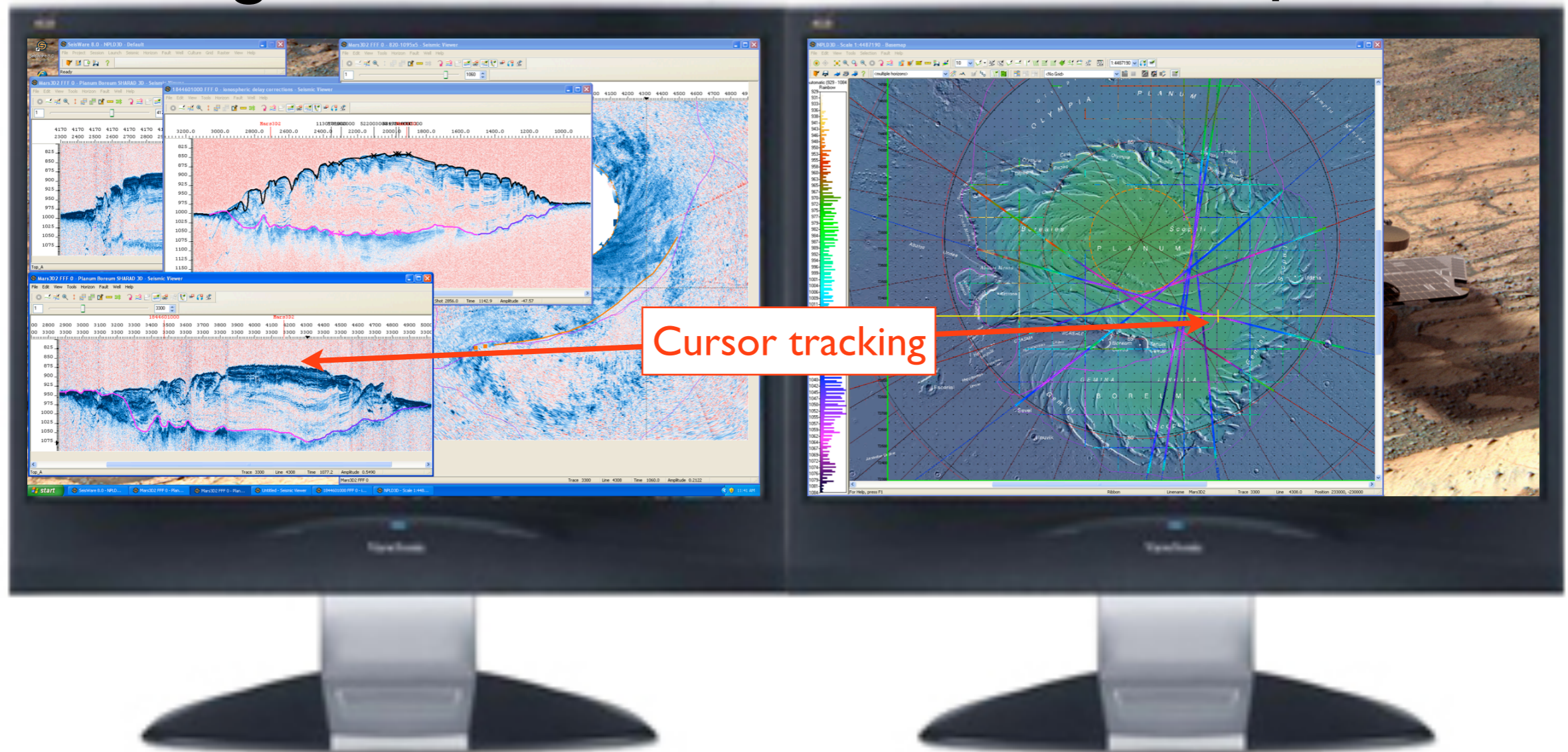
- SEG-Y requires a unitary sample rate in μs . `raw2sgy` presents sample rates of 37.5 ns as 375 μs ($\times 10,000$ cheat). Thus, SeisWare delay times of “ms” are actually $\times 10 \mu\text{s}$.

I will add `raw2sgy` as an option in CPB.

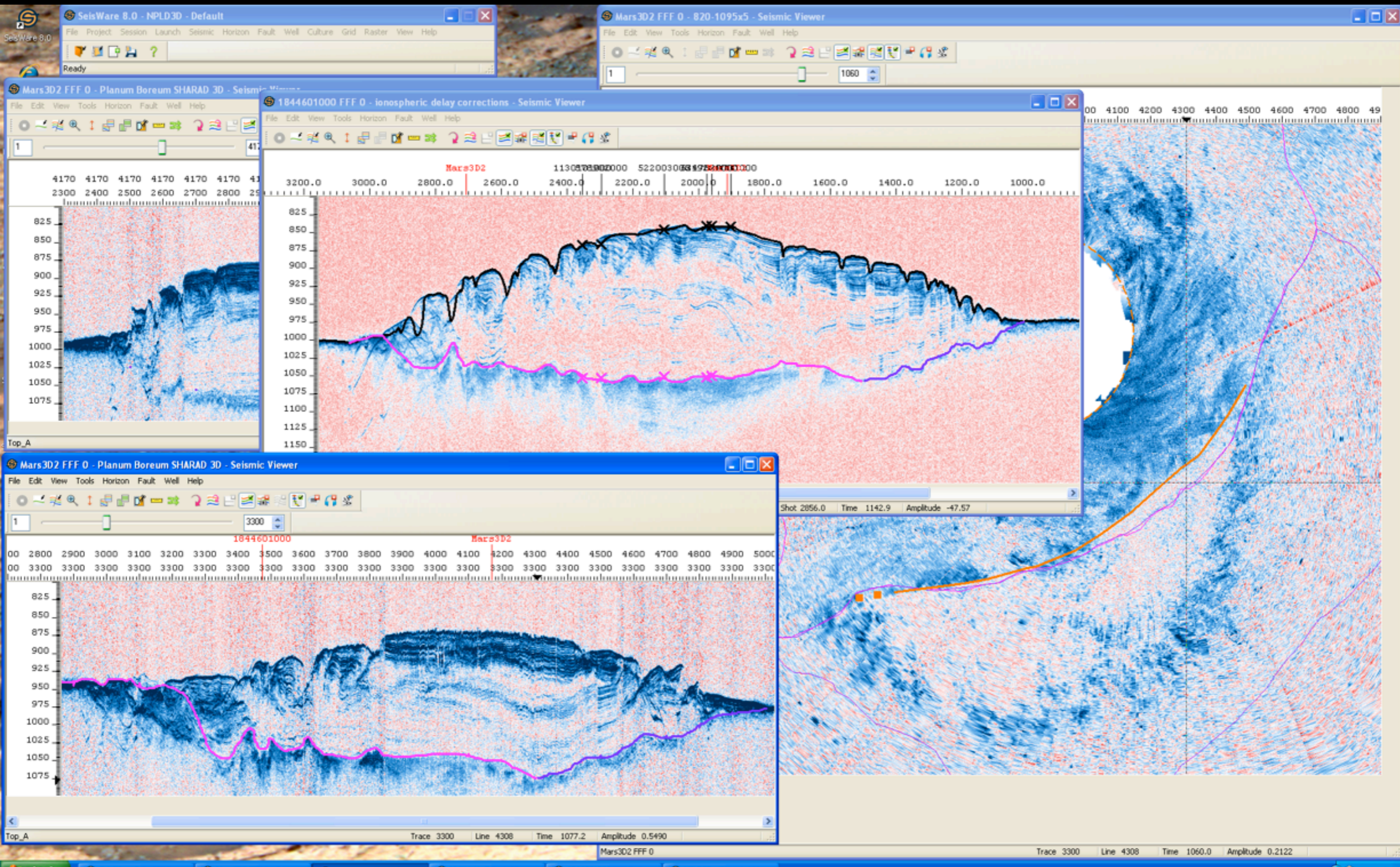
You will want at least two monitors!

Radargrams & Utilities

Basemap



“Seismic” Viewer Features



“Seismic” Viewer Features

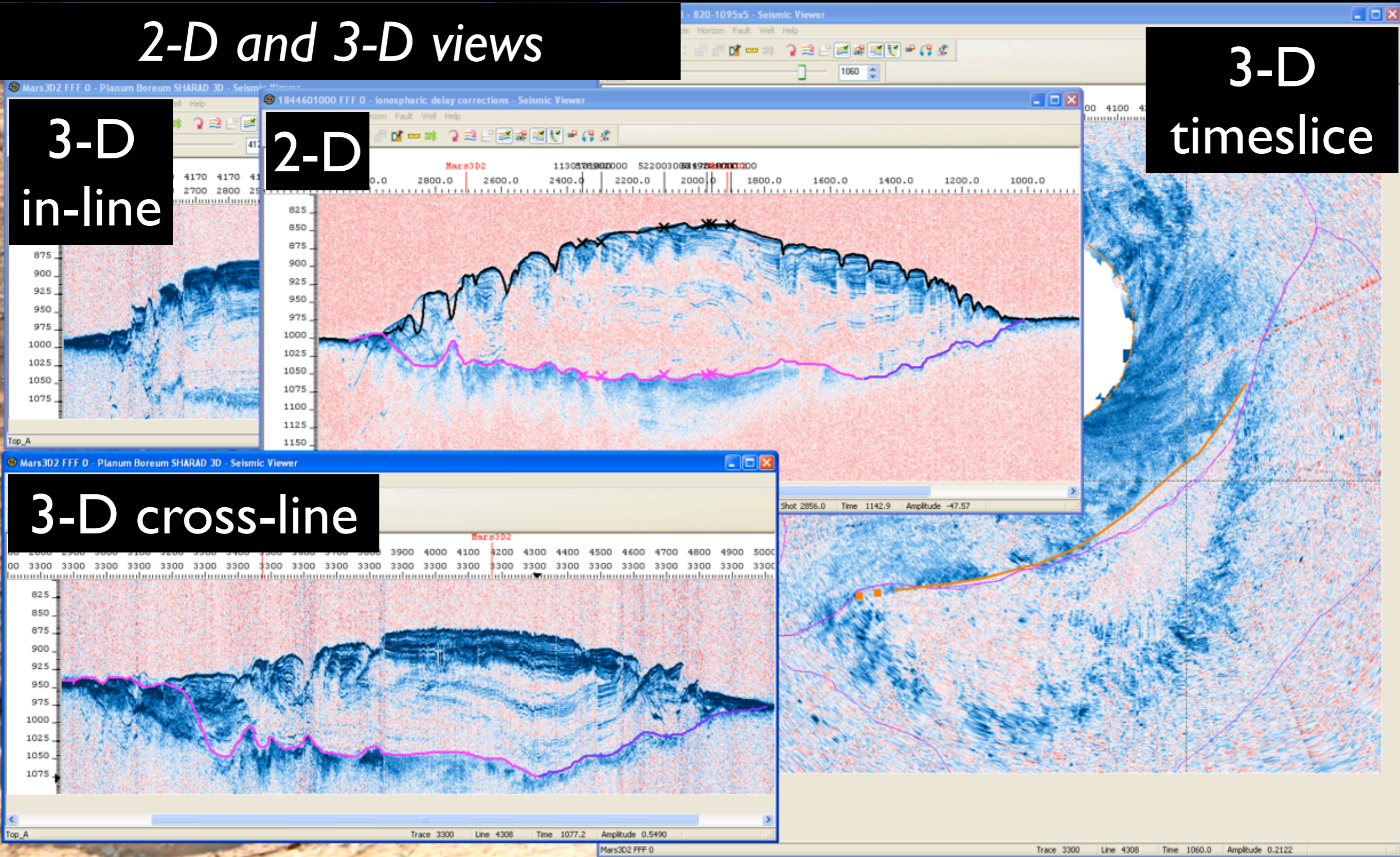
2-D and 3-D views

3-D
timeslice

3-D
in-line

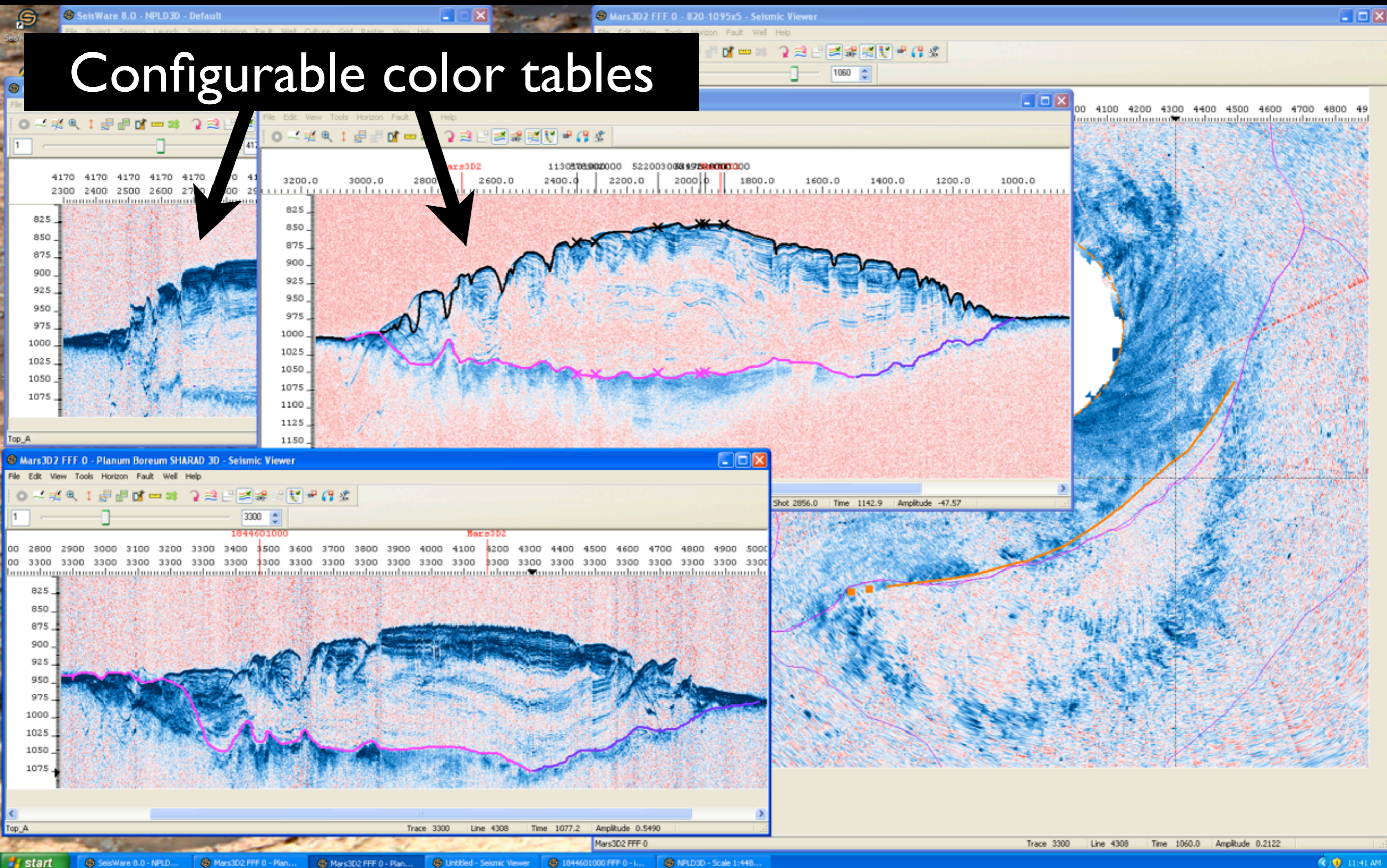
2-D

3-D
cross-line



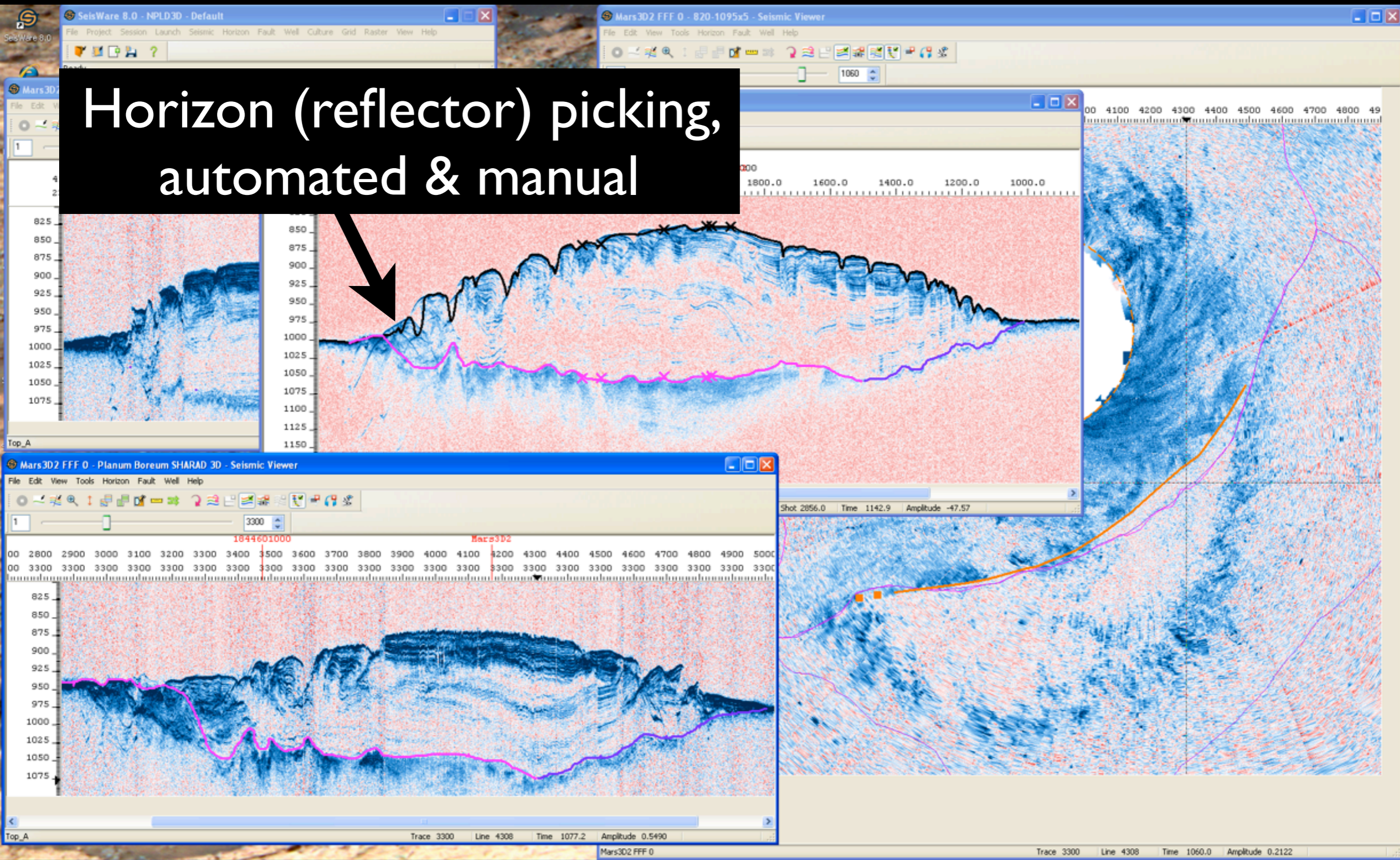
“Seismic” Viewer Features

Configurable color tables



“Seismic” Viewer Features

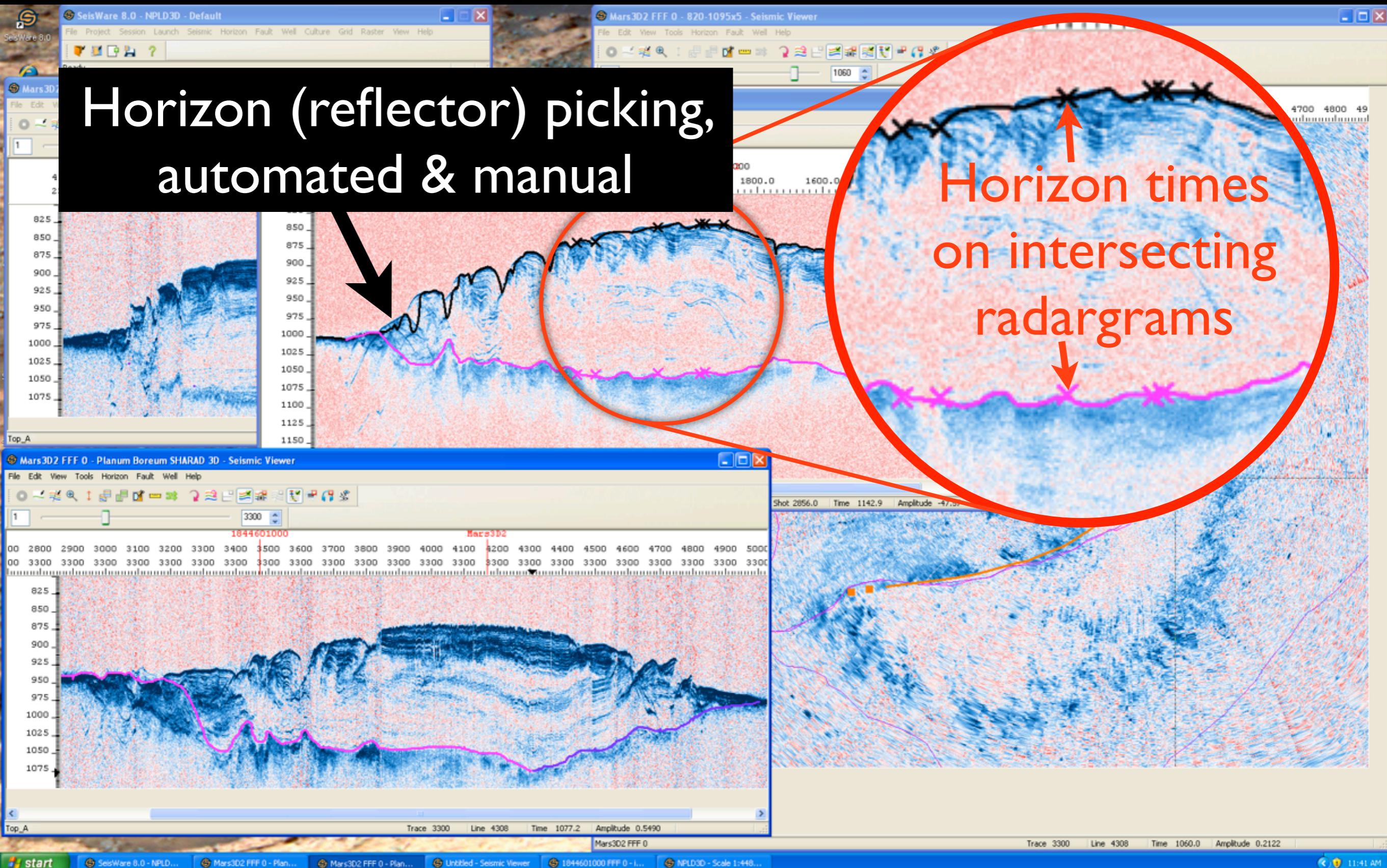
Horizon (reflector) picking,
automated & manual



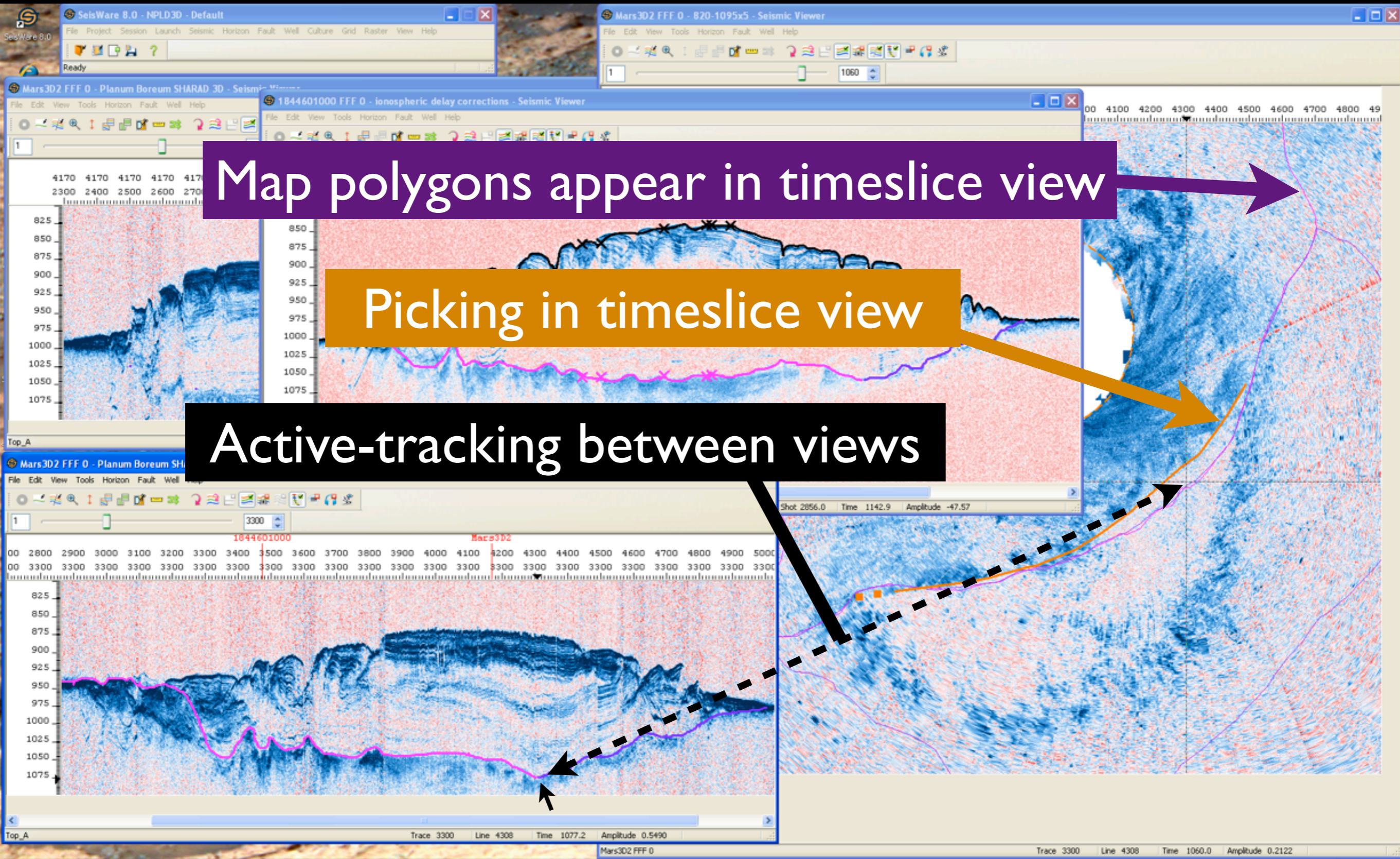
“Seismic” Viewer Features

Horizon (reflector) picking,
automated & manual

Horizon times
on intersecting
radargrams



“Seismic” Viewer Features



Utility Features

Select Coordinate System

Coordinate System Groups

- <Custom>
- All Coordinate Systems
- Asian Coordinate Systems
- State Planes - NAD 27
- State Planes - NAD 83
- UTM Zones - North America - NAD 27
- UTM Zones - North America - NAD 83
- UTM Zones - Northern Hemisphere - NAD 27
- UTM Zones - Northern Hemisphere - NAD 83
- UTM Zones - Northern Hemisphere - WGS 84
- UTM Zones - Southern Hemisphere - NAD 27
- UTM Zones - Southern Hemisphere - NAD 83
- UTM Zones - Southern Hemisphere - WGS 84

Coordinate Systems

- Mars North

Data File Folder

Edit Coordinate System

Coordinate System

Name:

EPSG Number:

Units:

Surface Units:

Projection Parameters

Projection Method:

Natural Origin Latitude:

Natural Origin Longitude:

Natural Origin Scale:

False Easting:

False Northing:

Easting/Northing Units:

Geographic Coordinate System

Name:

Datum Name:

Ellipsoid

Name:

Semi-major Axis:

Semi-minor Axis:

Inverse Flattening:

Axis Units:

Prime Meridian

Name:

Offset to Greenwich:

WGS 84 Transformation

X Shift (meters):

Y Shift (meters):

Z Shift (meters):

X Rotation:

Y Rotation:

Z Rotation:

Scale Difference:

OK Cancel

Custom coordinate systems
(Input data: lat, lon)

Utility Features

Edit Coordinate System

Coordinate System

Name

Mars North

EPSG Number

Units

Metre

Surface Units

Metre

Projection Parameters

Projection Method

Polar Stereographic

Natural Origin Latitude

90

Natural Origin Longitude

0

Natural Origin Scale

1

Geographic Coordinate System

Name

Mars

Datum Name

Mars

Ellipsoid

Name

Mars

Semi-major Axis

3396000

Semi-minor Axis

3376000

Inverse Flattening

Axis Units

Metre

Prime Meridian

Name

Greenwich

Offset to Greenwich

0

WGS 84 Transformation

X Shift (meters)

Y Shift (meters)

Z Shift (meters)

X Rotation

Y Rotation

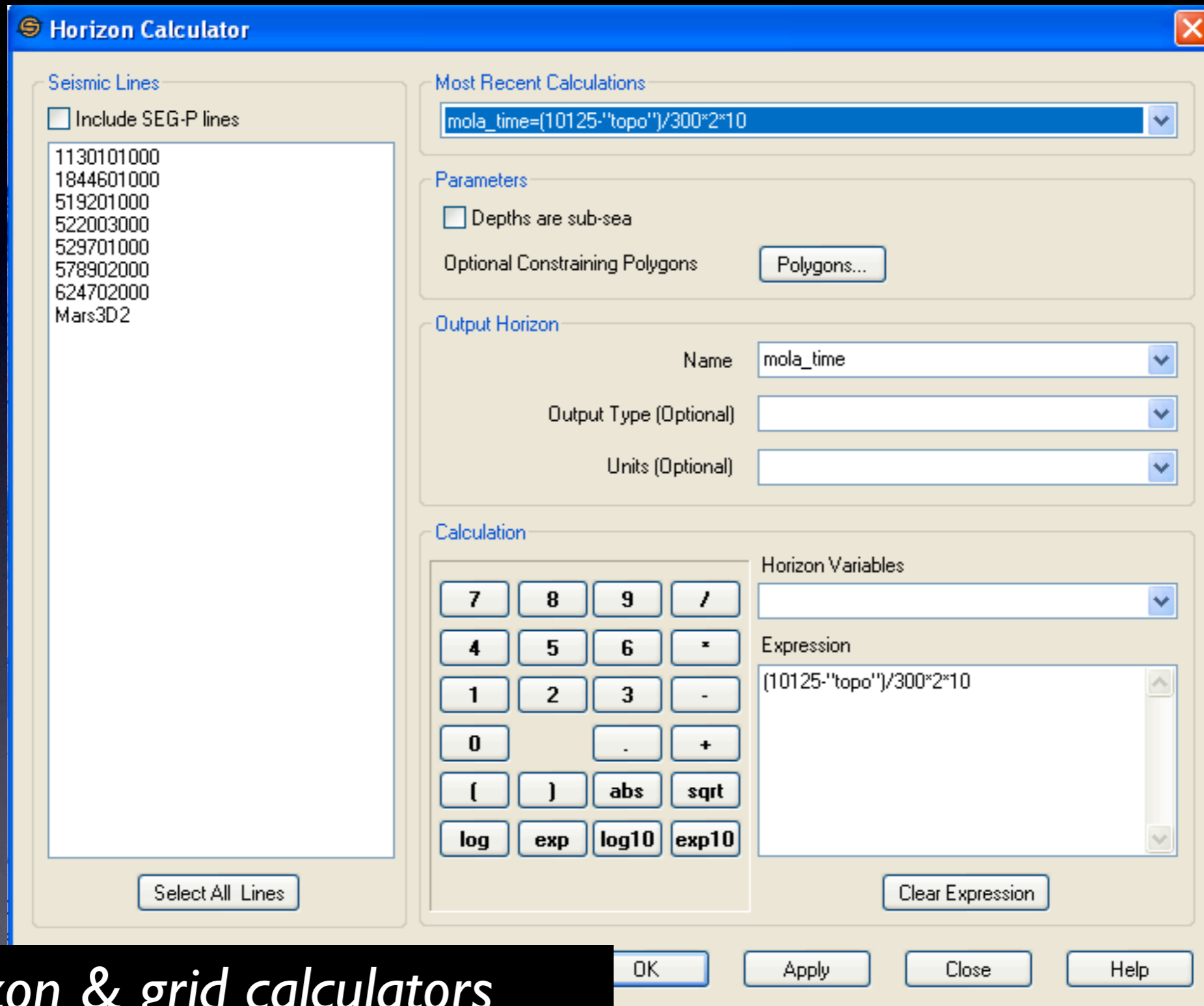
Z Rotation

Scale Difference

Imagine what I had to do
before SeisWare added this
feature (Putzig et al., 2009)

Custom coordinate systems
(Input data: lat, lon)

Utility Features



Horizon & grid calculators

Utility Features

The screenshot shows the 'Horizon Calculator' window. On the left, under 'Seismic Lines', there is a list of line IDs including '1844601000'. A red oval highlights the 'Most Recent Calculations' field, which contains the formula $mola_time = (10125 - 'topo') / 300 * 2 * 10$. A red oval also highlights the main calculation display area, which shows the same formula. A yellow circle highlights the '10' at the end of the formula. A calculator keypad is visible at the bottom. Several text boxes with arrows point to specific parts of the interface: 'Imported MOLA topography' points to the 'topo' variable; 'c (μs/m)' points to the '300' constant; 'two-way time' points to the '2' constant; 'FPB areoid @ sample 1800' points to the '10125' constant; and a large yellow text box explains that the 'Factor of 10 accounts for the sample-rate cheat when converting MOLA elevation to delay time'.

Seismic Lines

Include SEG-P lines

1130101000
1844601000
519201000
522003000
529701000
578902000
624702000
Mars3D2

Most Recent Calculations

$mola_time = (10125 - 'topo') / 300 * 2 * 10$

Parameters

Depths are sub-sea

$mola_time = (10125 - 'topo') / 300 * 2 * 10$

7 8 9 /
4 5 6 *
1 2 3 -
0 . +
() abs sqrt
log exp log10 exp10

Select All Lines

Clear Expression

OK Apply Close Help

Imported MOLA topography

c (μs/m)

two-way time

FPB areoid @ sample 1800

Factor of 10 accounts for the sample-rate cheat when converting MOLA elevation to delay time

Horizon & grid calculators

Utility Features

Grid And Contour

Name Extension: Top_A Grid

Gridding Technique: Minimum Curvature

Smooth grid

Use gridding distance (map units)

Use subsea

Metric

Data Value To Use: Shallowest value, Deepest value, All values

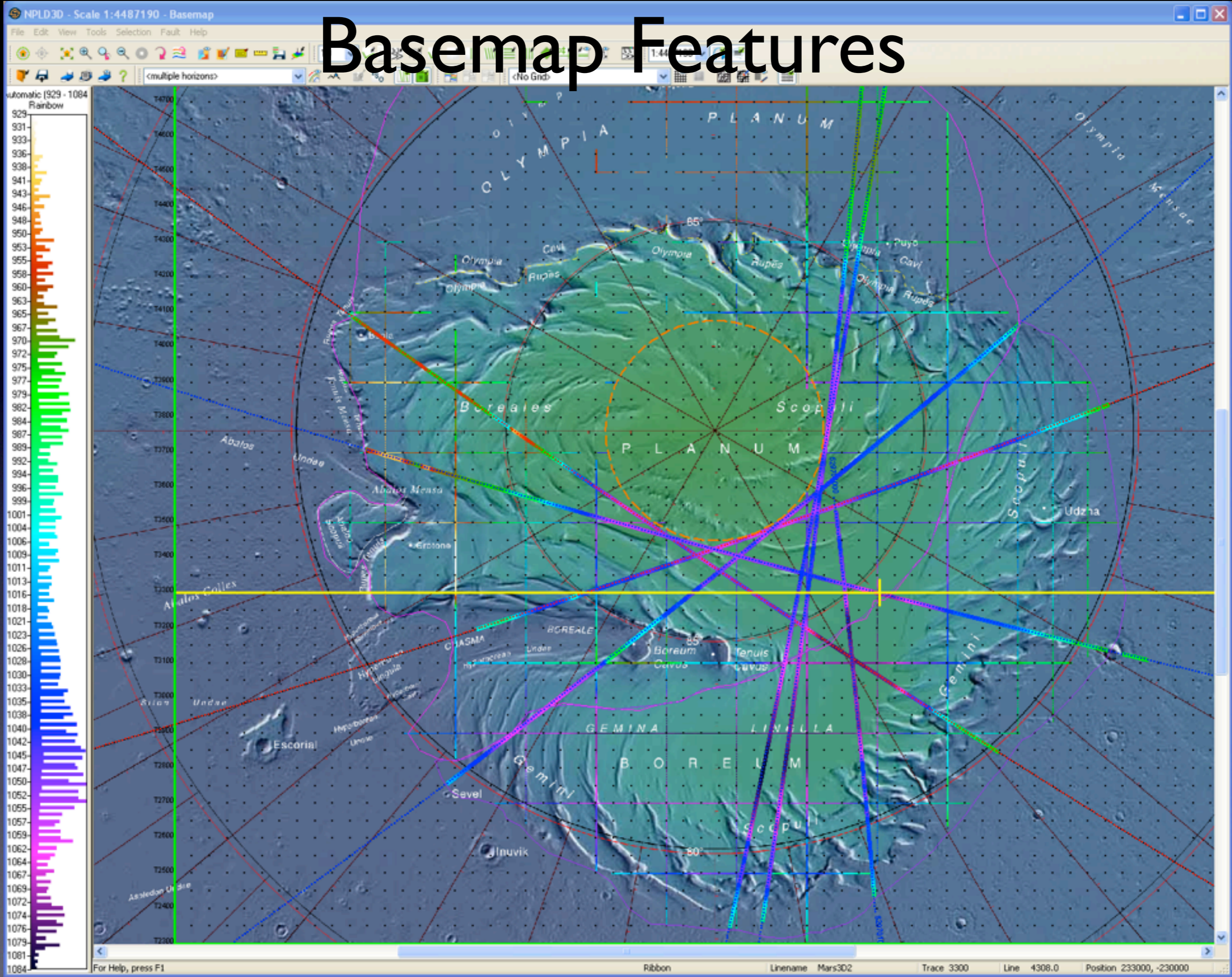
Description of Technique
Minimum Curvature is widely used in the earth sciences. Minimum Curvature generates the smoothest possible surface while attempting to honor your data as closely as possible. Minimum Curvature is not an exact interpolator however. This means that your data is not always honored exactly.

e.g. If the name extension is "RUN1" and horizons is "HZN_A", then the output name will be "HZN_A RUN1 Grid".

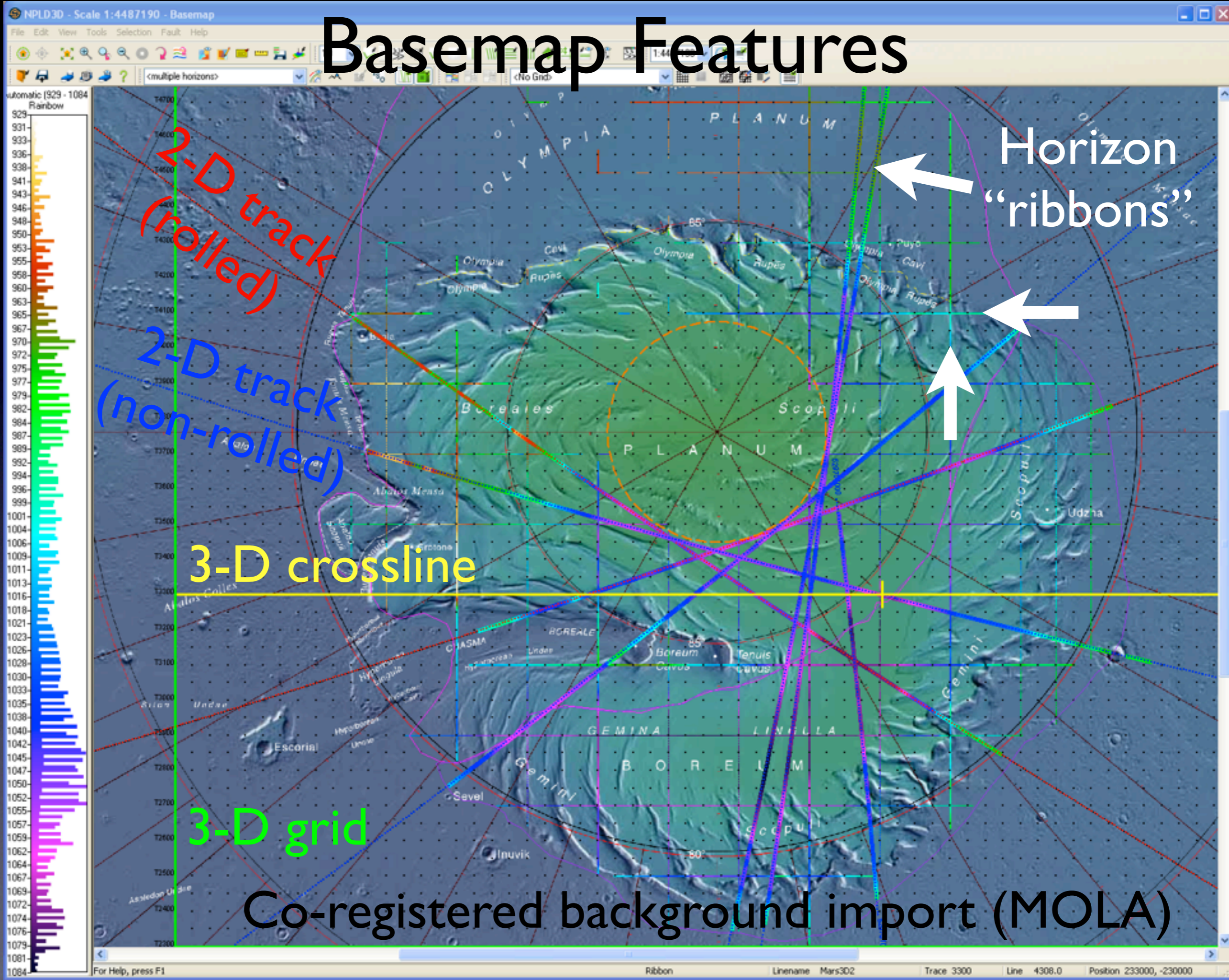
< Back Next > Cancel Help

Horizon gridding & contouring

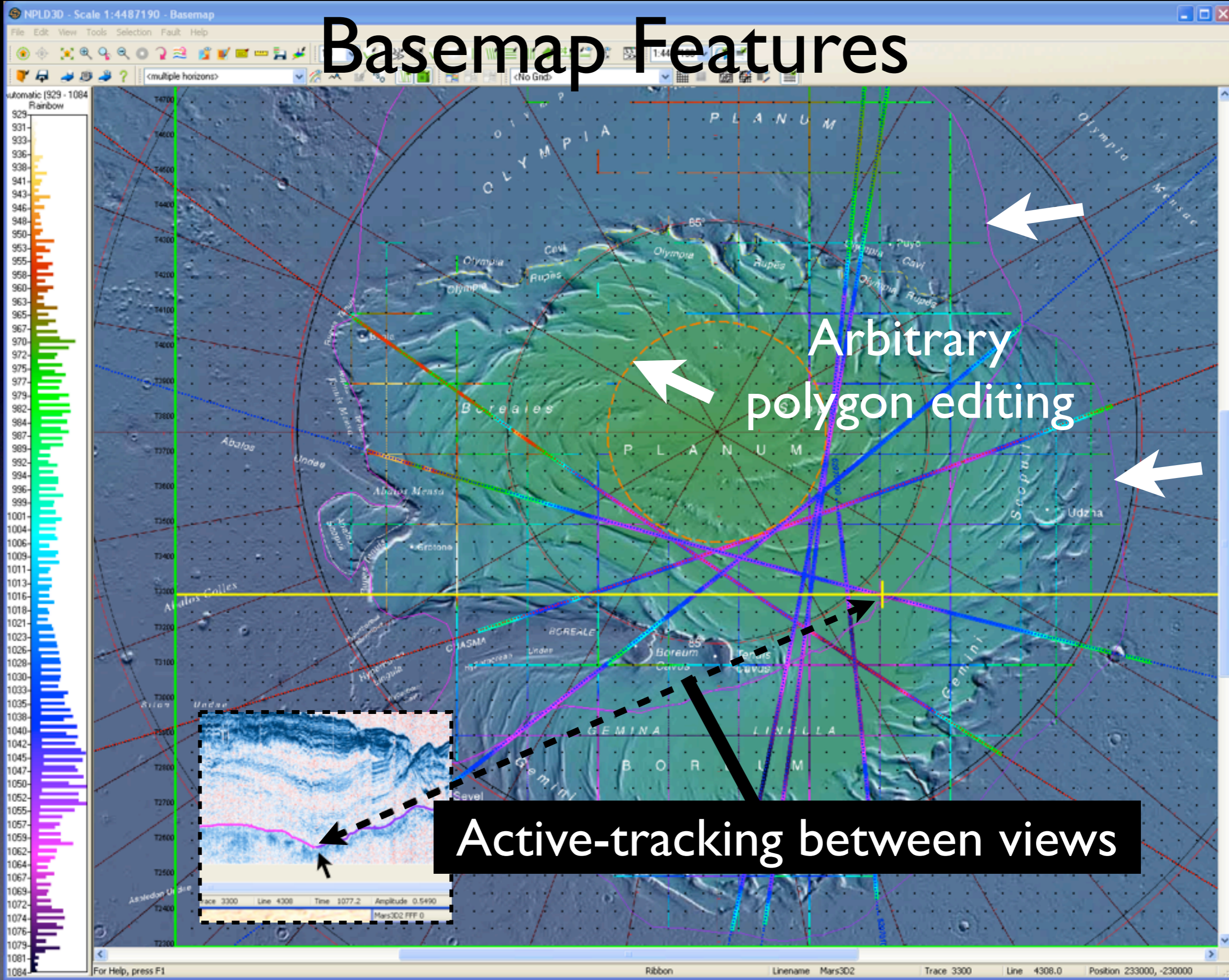
Basemap Features



Basemap Features



Basemap Features

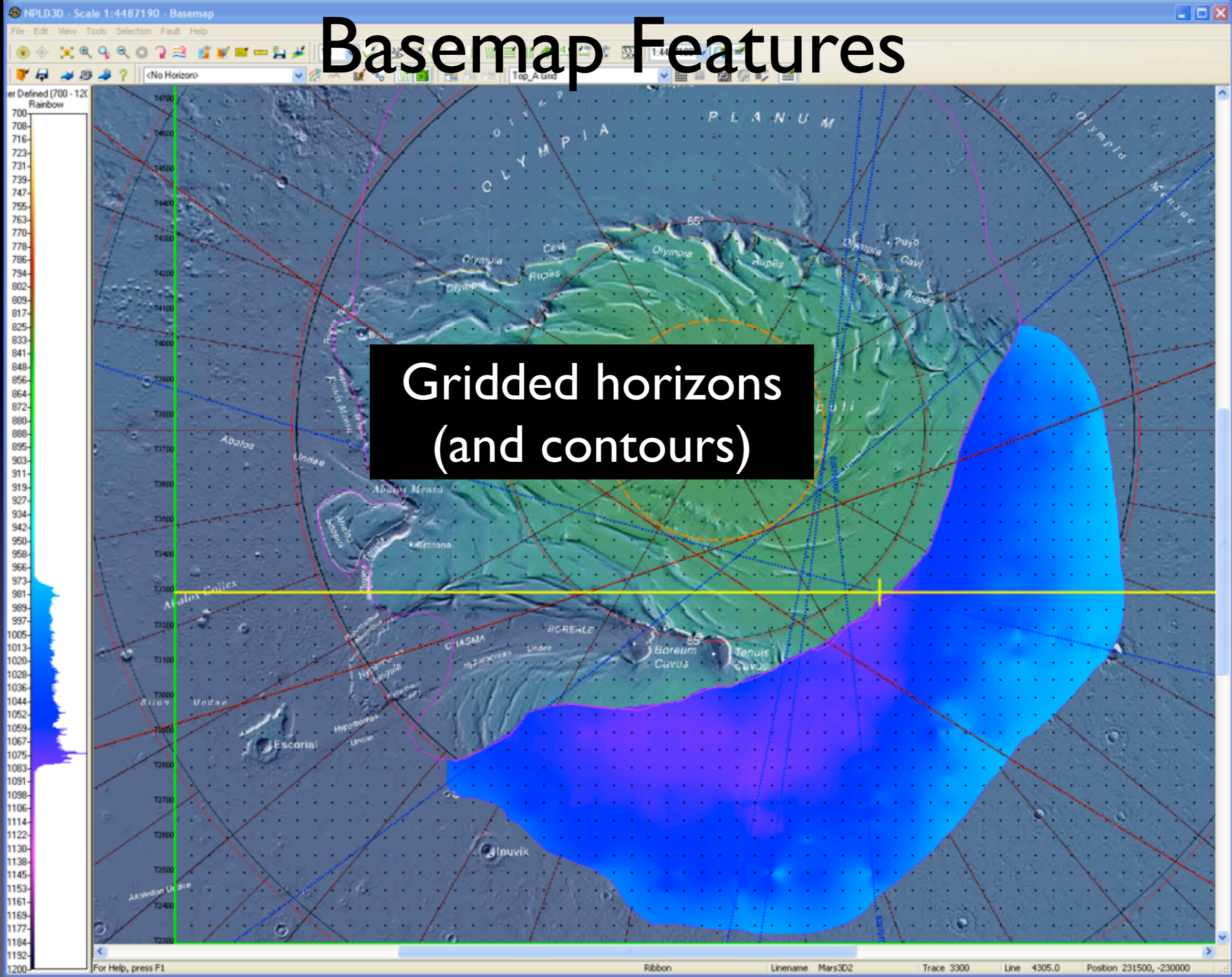


Arbitrary polygon editing

Active-tracking between views

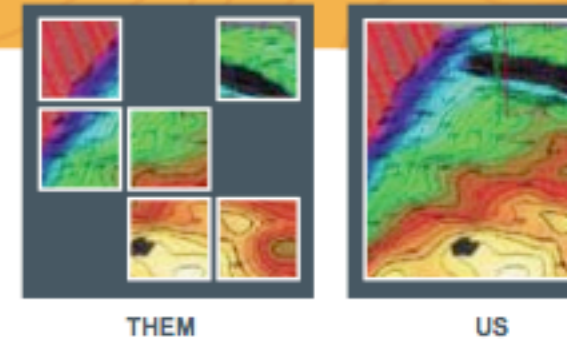
Basemap Features

Gridded horizons
(and contours)



Excerpt from the SeisWare brochure:

www.seisware.com

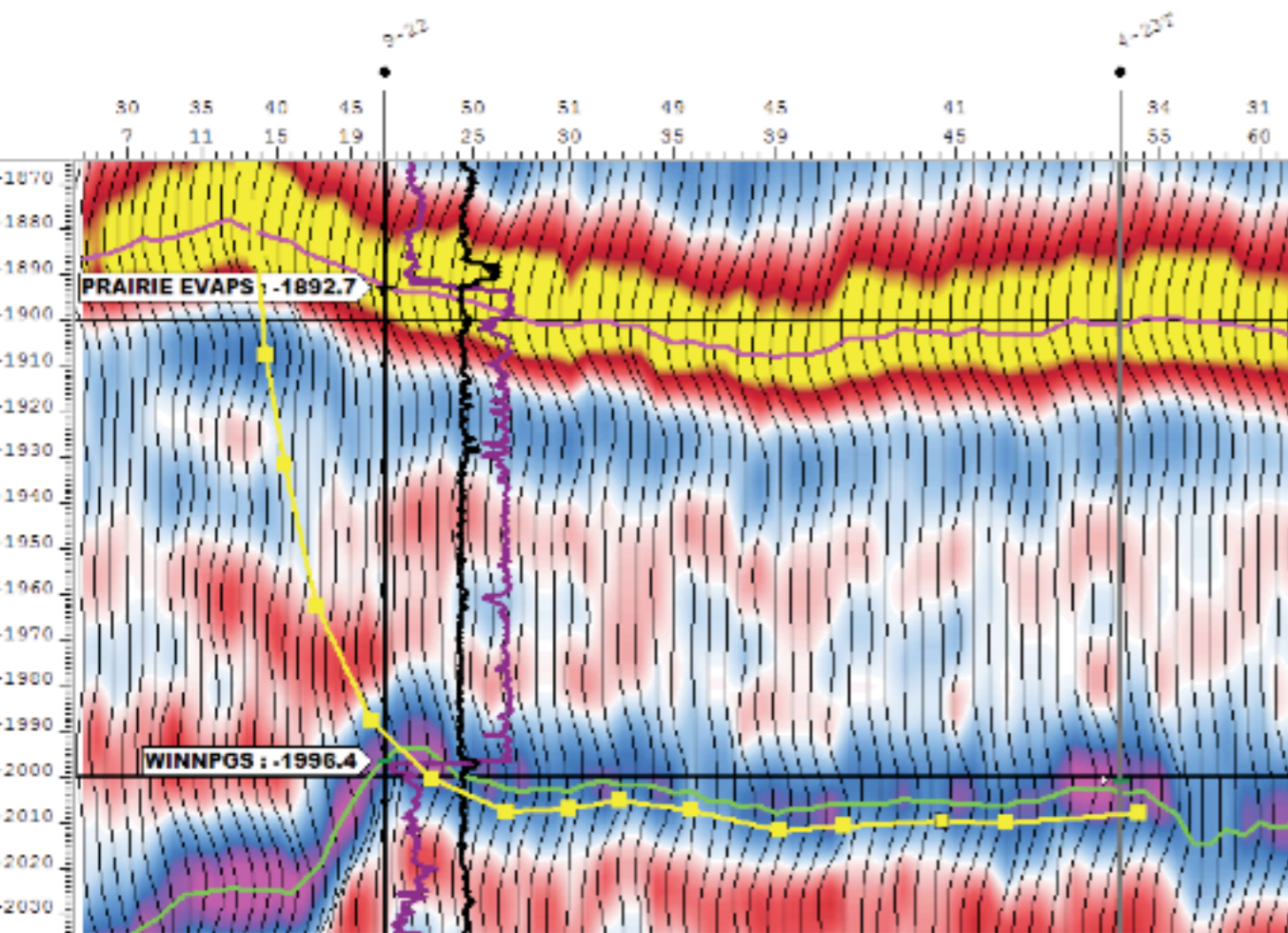


**NO ADD-ONS
NO MODULES**

EVERYTHING YOU NEED TO INTERPRET SEISMIC DATA

Seismic Solutions

- 15 seismic line selection options for data display
- Time and depth seismic interpretation
- Integrated synthetic to seismic tie with interactive bulk shift and stretch/squeeze
- Least squares 2D and 3D mistie analysis
- Cloned seismic displays for version comparison and event tracking
- Six horizon pick modes
- 3D auto picking with wavelet and trace correlation options
- 2D auto picking
- Proportional seismic slice generation
- Fault picking in simple and complex environments
- Well planning on seismic sections
- Calculators for seismic, log, horizon, top and grid data with recent calculations saved
- Customizable seismic display properties



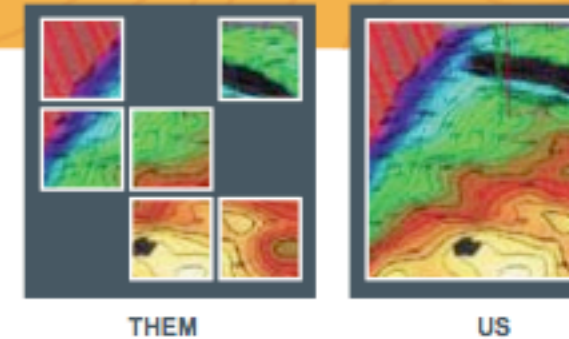
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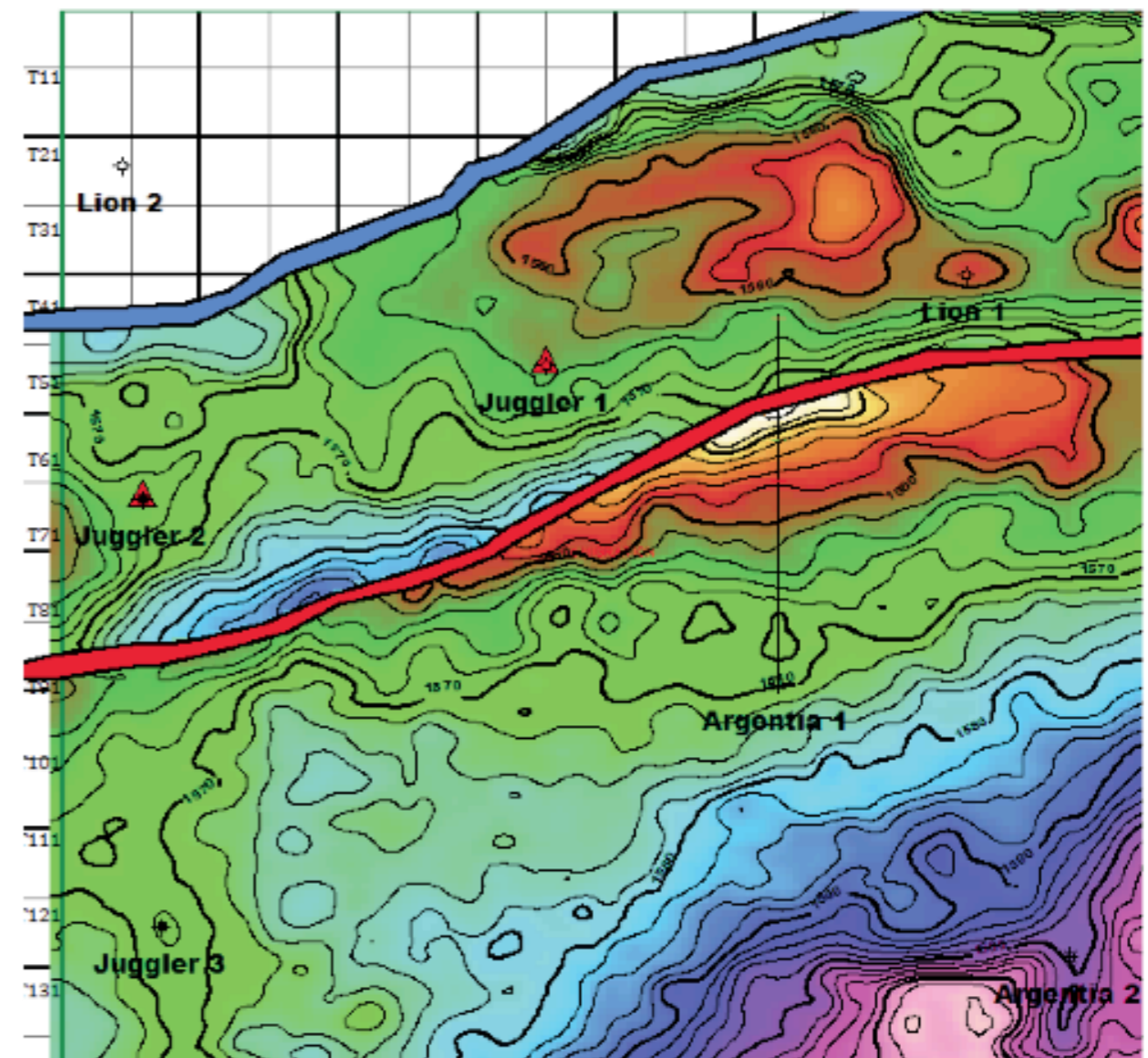
**NO ADD-ONS
NO MODULES**

EVERYTHING YOU NEED TO INTERPRET SEISMIC DATA



Mapping Solutions

- Customizable Basemap displays with object layer ordering and visibility preferences
- Batch gridding and contouring with five algorithms including minimum curvature and Kriging
- Integration with Surfer™ gridding algorithms
- Quick Grid and Contour™ option for gridding displayed horizon and well information
- Quick Iso™ for instant isochron and isopach creation
- Horizon and grid editing and smoothing directly from the Basemap
- Culture creation, display and editing on the Basemap
- Well criteria and well bubble displays
- Tops displayed and colored based upon formation top values
- Log signature curves posted for displayed wells
- Quick volumetrics tool for distance, area and volume calculations
- Raster image display
- Slice display including spectral decomposition and time slice files
- Montage editor for customized plots



Licensing

- Annual fee is currently \$9500 per seat.
- Fee is waived if you are a non-commercial, non-profit entity.
- See www.seisware.com for more details.