



Changes between GLOBEClaritas V7.2 and V7.3

1st February 2021 to 31st July 2021 (Revisions 16073:16340, libclaritas 1120:1205, python-shared 990:1138)

GLOBEClaritas is pleased to deliver another quality release, with significant improvements to the user experience and technical capabilities. This is the fourth release as part of the Petrosys group.

We would like to take this opportunity to remind users of our email addresses for support (support@globeclaritas.com) and for general information (info@globeclaritas.com) We appreciate your continued support of the GLOBEClaritas software and welcome your feedback that enables us to continually improve the software.

Release Highlights

- Tomographic Refraction Statics Application: complementing existing 3D Refraction Statics
- ViewStatics: new statics review and QC application, greatly enhances GLOBEClaritas capability to review and QC 2D and 3D statics datasets.
- 2D Re-datuming: new solution for source and receivers using Kirchhoff imaging technology.
- New tools to aid automatic first break picking and QC: a new initial pick method for automated picking, and new CALCPICK module to assist QC.
- Improvements to Geometry application: allows users to display all pegs, source pegs only or receiver pegs only. New Receive peg info window assists QC of user defined geometries.
- Improvements to the SEISREAD module reads past corrupted portions of data, allowing for recovery of data if required.
- SeisCAT: now allows users to launch 3DGrid display tool to display 3dgrid files.

Supported platforms

Supported platforms for V7.3 are:

- RHEL7/8,
- Ubuntu 18.04/20.04,

and on Windows via,

- Cygwin-64 or
- Windows Subsystem for Linux.

Windows are incorporating an X-server into the Windows Subsystem for Linux (WSL 2) allowing us to retire support of Cygwin. We will continue to support and release Claritas on Cygwin for Windows users until the release of WSL2.

New refraction tomography application for near surface refraction statics

Tomo3D is a new standalone application for performing 3D refraction tomography and for estimating static corrections. The application is designed to allow users to produce results quickly:

- load pick or hdf5 seismic files and initial velocities (nmo-style or the new hdf5 grid format), click the Auto button and Tomo3D will take over.

Or, if the user wishes, they may take full control over:

- the dimensions and resolution of the model, how the topography is modelled, velocity update smoothing, the handling of erroneous observations, inversion sensitivity and algorithm termination conditions.

After each iteration, outliers and residual spreads are graphed and the current velocity estimate can be examined. Any mistakes can be easily reverted with the click of a button. When a satisfactory velocity model has been produced, this can then be used to estimate static corrections, which are written directly to the Claritas HDF5 seismic files.

To run the application:

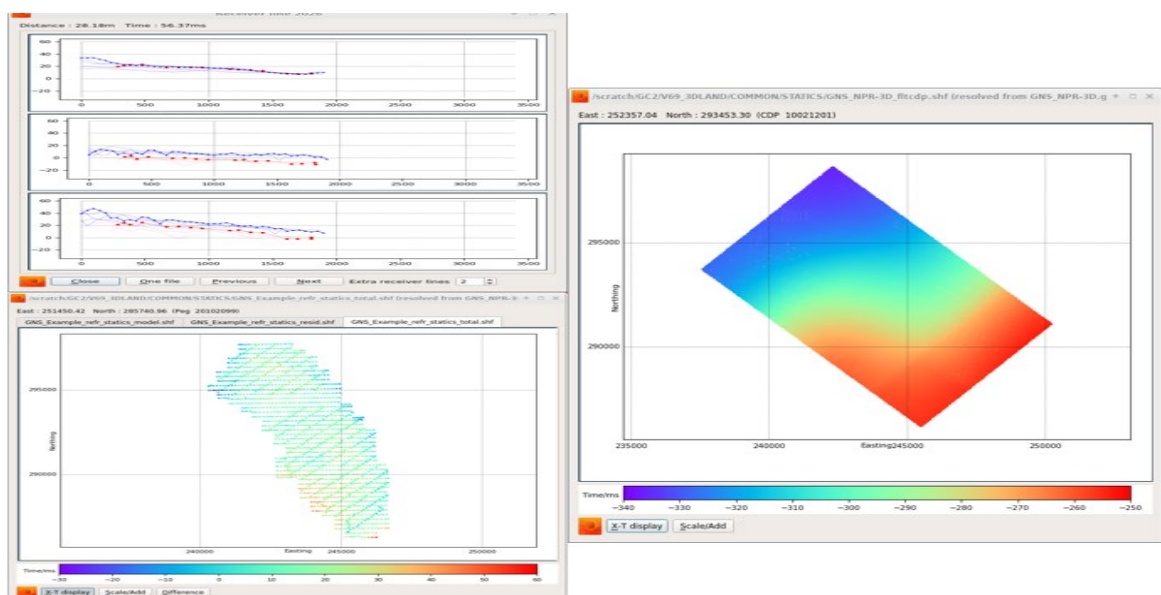
- Tomo3D can be started from the Tomo3D button on the Claritas launcher or by typing Tomo3D in a terminal window.
- Input First breaks picks from a .pic file or an HDF5 seismic dataset with the header First_Break_Time populated.
- A simple velocity model is supplied as either an .nmo or grid file, defining Depth in metres and Velocity in Metres/Second.

And a suitable Claritas .geom geometry database is also required.

New 'ViewStatics' application

The ViewStatics application is available from the Statics tab of the Claritas launcher. Click on the ViewStatics button or highlight a .shf file in the SeisCAT application (when user displays statics files). From the RMB drop down menu select View Static Shifts (ViewStatics).

- Users can display 2D and 3D statics files.
- Statics files can be Source/Receiver statics from 2D/3D REFSTAT.
- Source/Receiver Statics files from the RESSTAT and SPSTAT/SPSTAT2 modules.
- CDP Floating datum statics from the Geometry application



The ViewStatics application uses the new PyQt5 graphics frameworks giving a clean user interface that is intuitive and easy to use. ViewStatics has a similar look and feel to other new applications such as Condor/Griffon and SeisCAT.

The application is designed to be able display single or multiple 2D lines, as well as 3D volumes., Users can display multiples shifts files for the same 2D line or 3D volume, it opens with a map display of the 2D line(s) or 3D volume, and each shf file displayed on its own tab.

The user can then choose to open an XT display of the static time shifts and has the option to have this either as a tabbed display, or with shift files displayed vertically one above the other. For 3D datasets the XT display shows the current Receiver line and Sources close to

that receiver line, adjacent receiver lines are displayed as dashed or dotted lines. The User can also choose to display the ASCII text file in a pop-up window or display sources or receivers only if required.

The user can manipulate the shf files in the ViewStatics application, applying scalars, adding and merging files together as well as generating difference displays. The results of these operations are then displayed in a new tab of the map display and XT Display is refreshed and updated. The results of these operations can be saved to new shf files.

The ViewStatics application uses information in the shf file header to identify the appropriate Geometry database to be used when displaying the statics. If this information in the form of a time stamp is missing from the shf file or differs from the information in the Geometry database, the user is prompted to select an appropriate Geometry database and can optionally update or add the timestamp into the shf file.

Source and Receiver Re-datuming.

As part of the V7-3-1 release we have implemented the Seismic Unix (SU) 2D re-datuming solution that utilises Kirchhoff imaging technology. To achieve this, we have added two modules to Claritas that perform the re-datuming of data and then a new utility that takes the depth interval velocity model, in a suitable grid format, and generates the travel time information used by the modules.

The SU RAYT2D application takes a gridded Depth Interval velocity model and calculates the travel times needed by the re-datuming modules. The interface and parameterisation of RAYT2D is quite complex requiring care and attention to detail to parameterise. The input velocity model should be in a gridded format such as SegY or the binary .grid format that can be exported from the ISOVELS application.

Once the gridded depth velocity model has been generated, the DATUMK2DS and DATUMK2DR modules can be used to re-datum the seismic data.

The re-datuming process is a two step process where you re-datum based on the source elevations or depths and then apply the re-datuming based on the receiver elevations or depths hence the two new modules.

- DATUMK2DS corrects for the sources
- DATUMK2DR corrects for the receivers

These tools are provided as an alternative to the current DATUM_FLT/DATUM_SRD and DATUM_FIX modules for Land data and simple static correction solution for Marine datasets.

First Break Picking Improvements

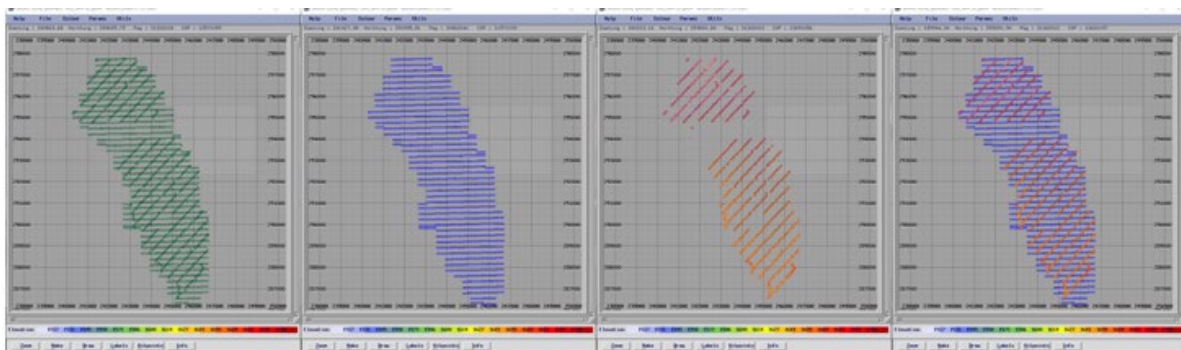
As part of this release, we have added a new initial pick method to the Automatic picking routines available in the SV application., The new Composite method combines the LMO and Envelope threshold methods to provide a robust and effective initial pick solution that will be particularly effective for datasets with variable near surface velocities. Users can control how the method works by setting and updating LMO velocity, cosine weighting window length, envelope threshold and median filter length.

In addition, the new CALCPICK module has been developed, allowing users to take a sparse set of first break picks. For example, every 20th SP, and interpolating between these sparse locations to generate picks for all SP's. The picks created by CALCPICK can then be used as the initial pick time when autopicking the dataset in SV, or to QC existing autopicked first breaks.

Geometry Application – UI/UX updates

We have made enhancements to the User Interface and experience for the Geometry application, making the behaviour more consistent with other Claritas applications.

Users can now choose how to display shot and receiver pegs, either displaying source and receivers separately or together. They are colour coded blue for receiver and red for source pegs for ease of identification. There is also the option to display all pegs regardless of type which will then be displayed in green.



Geometry application – L-R – All pegs displayed, Receiver pegs only, Source pegs only, Source and Receiver pegs

In addition when exporting SPS files from the Geometry application the .S and .R files generated now only have the correct pegs written i.e.:

- .R file only has Receiver pegs,
- .S file only has Source pegs.

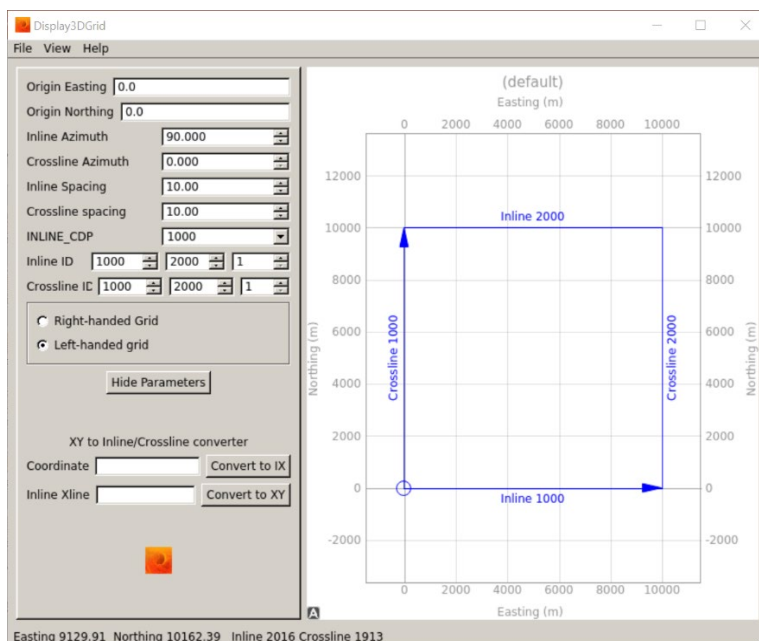
Earlier versions of the Geometry application created .R files with both Source and Receiver peg information which was incorrect.

SEISREAD(HDF5) – Data Recovery

Available in this release is an improvement to our SEISREAD module that should allow users to recover data that has been corrupted by a disc crash or to read a partially written dataset., For example if a migration has aborted part way through you should now be able to read the data written and restart the migration from the point it failed.

SEISCAT – 3D Grid display tool

We have added the 3D Grid creation and display tool to the dropdown menu available when displaying Geometry files and inputs. The 3D Grid display tool is the default application to open/view 3dgrid files. Double left mouse button click on a highlighted 3d grid file to launch the application or select the application from the RMB drop down menu.



3D Grid tool available via SeisCAT

Bugs found and fixed

3478: Geometry application – Allow the user to display only Receiver's and to write only Receivers to the .R file when creating SPS files.

3485: Geometry application – Tidy up the peg/shot range lines from the Info – Header's text option.

3486: Geometry application – Improvements to the info – Receivers window.

3488: Geometry application updated so the default for 3D CDP's is an 8 digit compound number (iiiixxx) with four digits each for Inline (i) and Crossline (x)

3490: Improvements to the SMAP application to provide improved display of 3D statics files.

3493: Bug in task builder prevented DEBUG= functionality being used.

3496: Geometry application/MAKEGEOM module, the restriction limiting the number of channels per shotpoint to less than 32768 has been removed, this allows for modern nodal acquisition with large channel counts to work correctly with Claritas.

3498: The *ADDNAV* module was aborting with an error sizing UKOOA file as the module was not coping with null characters.

3500: SCALE module was generating confusing and unwarranted error messages with regards to INLINE_CDP binary header on 2D datasets.

3505: Geometry application now correctly understands the KL1 flags for receivers in SPS files.

3506: Improvements to the loading and export of exchange velocity formats to and from the ISOVELS application, allows for more flexibility so that variation in standard formats are coped with.

3516/3518: Wavelet application deriving Vibroseis sweeps now supports creation of both cosine and linear tapers. This option is now also fully documented.

3523 – DMO3D module didn't support right handed grids, this has been resolved and users can now process data with a geometry based on right handed processing grids.

3525: Geometry application – When the RPEG information is set in the Geometry database, the interpolation can sometimes become trapped in a local this has been fixed for this release.

3524: Geometry application when started from a .sur file, initial display should be pegs not receivers.

3527: RESSTAT used to require that data was CDP/CDPTRACE ordered when creating CDP trim statics, this would result in a corrupted .cas file as CDP/CDTRACE values were randomly ordered, application now sorts the information stored in the .cas file before output to CDP/CDPTRACE order.

3528: READSONAR – Now handles Water Column Datagrams (wcd) files where some datagrams are missing, the module can now read past gaps in the data supplied.

3529: UNSLICE Module fixed memory allocation issues that users could encounter.

3546: ATTRIBUTE Module – added an option to generate the Envelope threshold output and output to a pseudotrace if required.

3547: Add an option to the Utilities menu to display the input file headers in the SV application.

3549: READSEGD module – Now copes with Sercel format SEGD 8015 files with the wrong sample count.