



## Changes between GLOBEClaritas V7.4 and 2023.1.1

1st June 2022 to 31st December 2022 (Revisions 16715:16970, libclaritas 1281:1308, python 1515:1652, Condor202:242)

GLOBEClaritas is excited to deliver the 2023.1.1 release to clients, with significant improvements to the user experience and technical capabilities.

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

[Follow us on LinkedIn](#) to keep up to date with the latest news and information from the Claritas team.

## Release Highlights

- The GLOBEClaritas Condor application has new functionality to allow the review of standard RMS/Peak Amplitude and other qc's and kill bad traces/shots/Receivers or channels and apply those edits to the trace header.
- New Raptor application for automated generation of dense high fidelity NMO velocity fields.
- New RTM/FWI application, whilst staying a separate installation can be started from the main Claritas launcher.
- Improvements to the new Job Editor.
- Further improvements to the Tomo3D/Refstat2D and Refstat3D applications.
- FBQC application can run on both CPU and GPU architecture.

## Supported platforms

Supported platforms for 2023.1.1 are:

- RHEL7/8, CentOS7, AlmaLinux8
- Ubuntu 20.04/22.04,

and on Windows via,

- Windows Subsystem for Linux (WSL1/WSL2)

Please note: CentOS8 operating system is no longer available. We are now building on AlmaLinux8.

## Important note on Cygwin support

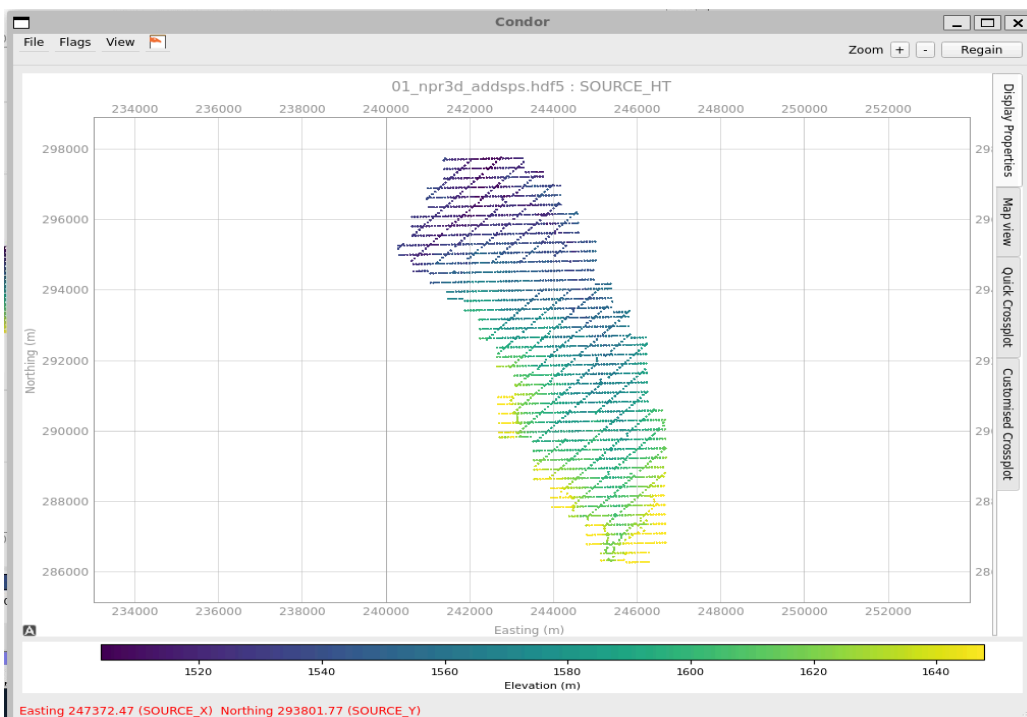
We decided during the development of the V7-4 release to drop support of Cygwin due to issues obtaining packages that were needed for Tomo3D and FBQC applications. This made support for Cygwin exceedingly difficult and as such we have ceased supporting Claritas on this platform. For Windows users we now support Claritas via the Windows Subsystem for Linux, and we have resources available to aid you installing on an Ubuntu O/S under WSL.

## Updated CONDOR application

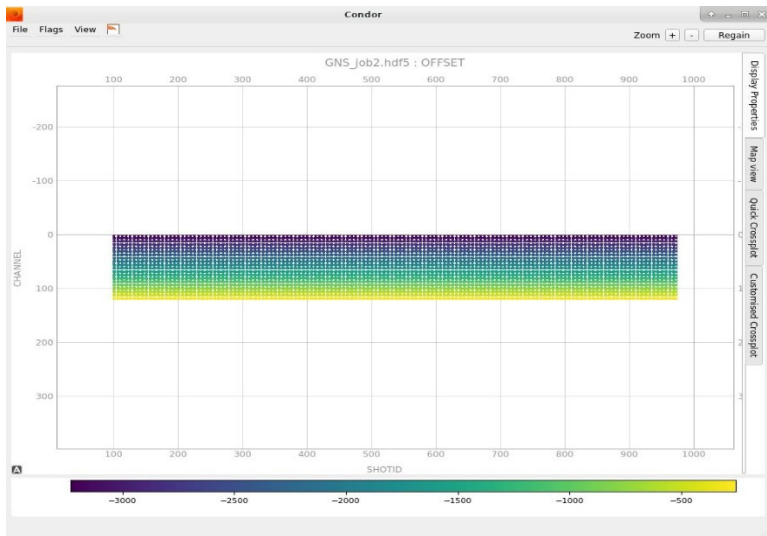
A major part of this release focused on updating and improving the Condor application, particularly adding the same functionality as currently available in the AREAL application to pick and apply trace edits interactively to an HDF5 format seismic dataset.

On start up Condor will for Land datasets display, Source and Receiver peg locations in a MAP interface based XY coordinates, marine data will open and display the Offset header plotted against Shotid/Channel.

### Land data – Source/receiver geometry displayed



## Marine data – Shotid/Channel/Offset displayed



One of our main focuses for this release was implementing the bad trace/shot/channel picking capability from the AREAL application into Condor to supply a more modern interface and improved user experience. Condor uses standard zoom and pan functionality making zooming in/out or pan up/down or right and left through the dataset simple and intuitive.

Condor can now flag traces selected by user, as in the AREAL application, this functionality can be selected from a right mouse button drop down menu: -

- ✓ Click to select traces to kill (set TRATYPE=2)
- Click to select traces to flag (set CONDOR\_FLAG\_1=1)

---

- Click selects individual traces
- Click selects rows (CHANNEL)
- Click selects columns (SHOTID)

---

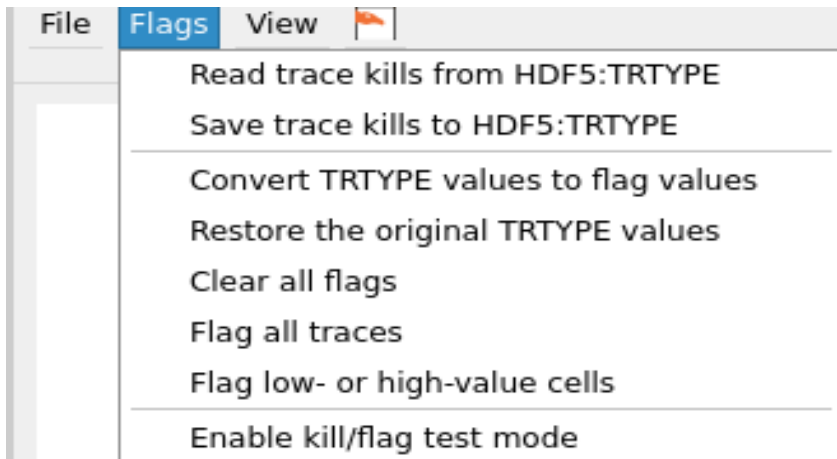
- Disable de-select of flagged traces

---

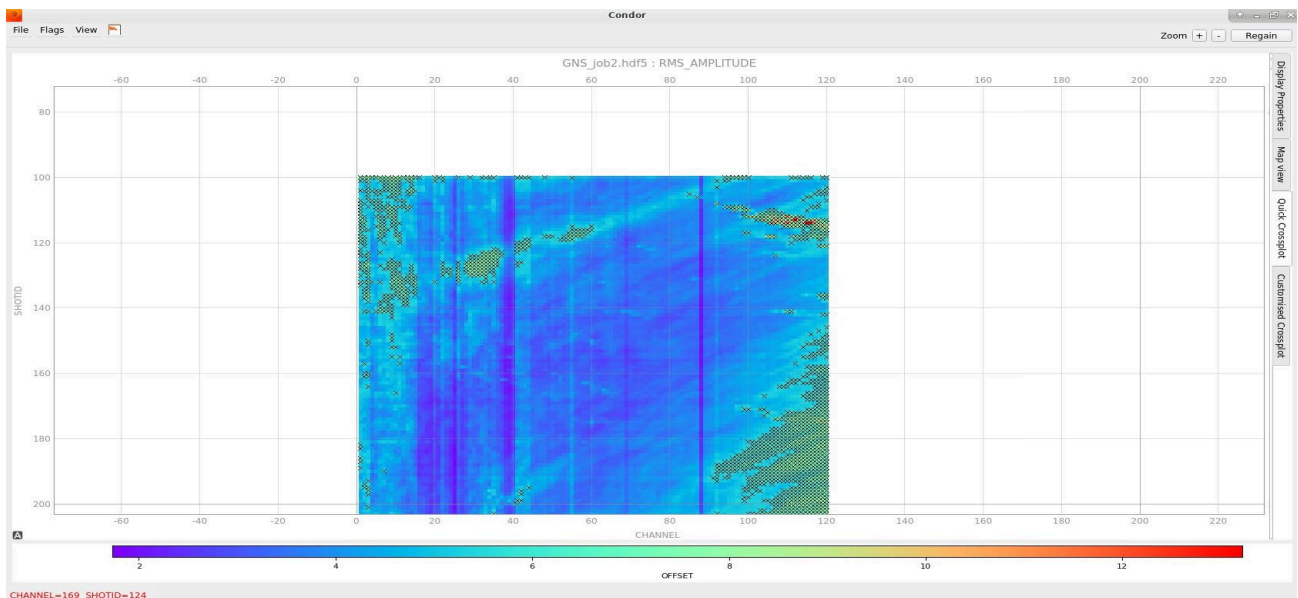
- Re-gain automatically with trace kills

You can select traces to edit or kill, which updates the TRATYPE trace header from 1 to 2 in the input HDF5 file, i.e., changing the trace from a live trace to a non-live trace. Alternatively, you can choose to set a trace flag which will be written into a dedicated new trace header called CONDOR\_FLAG\_1. The user can choose to edit or flag individual traces, an entire SHOTID, or an entire CHANNEL. The display can optionally be re-gained after each edit, and flagging already selected traces can optionally be set to un-select them.

The flags drop down menu available from the top menu bar, provides access to additional functionality: -



The option to enable the kill/flag test mode is included here. This is where the position of the mouse on the colour bar is used to set a cut off value, where all values equal to or greater than the position on the colour bar would be flagged/killed. Also includes the option to flag low or high values, clear all flags/flag all traces, Restore the original trtype header values, convert the trtype header to the flag header, and Read or Save the trace kills from or to the hdf5 trtype header.



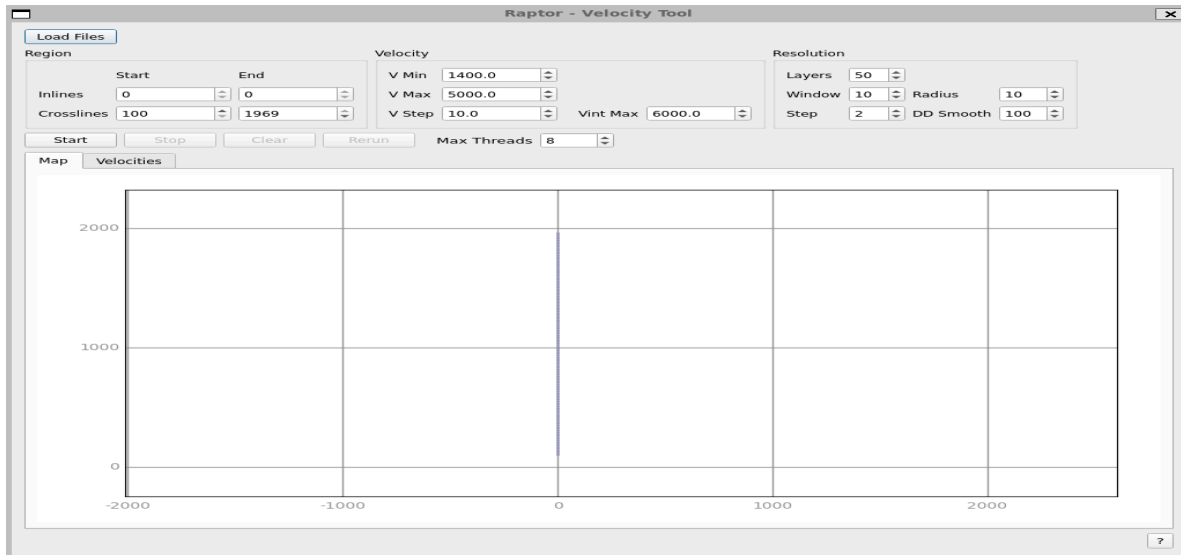
## 2D Marine tutorial line – Kill test mode

We would appreciate your feedback on the CONDOR application on how we could improve it and what other features or capability you would like to see incorporated in the future.

# RAPTOR: New dense automated velocity analysis application

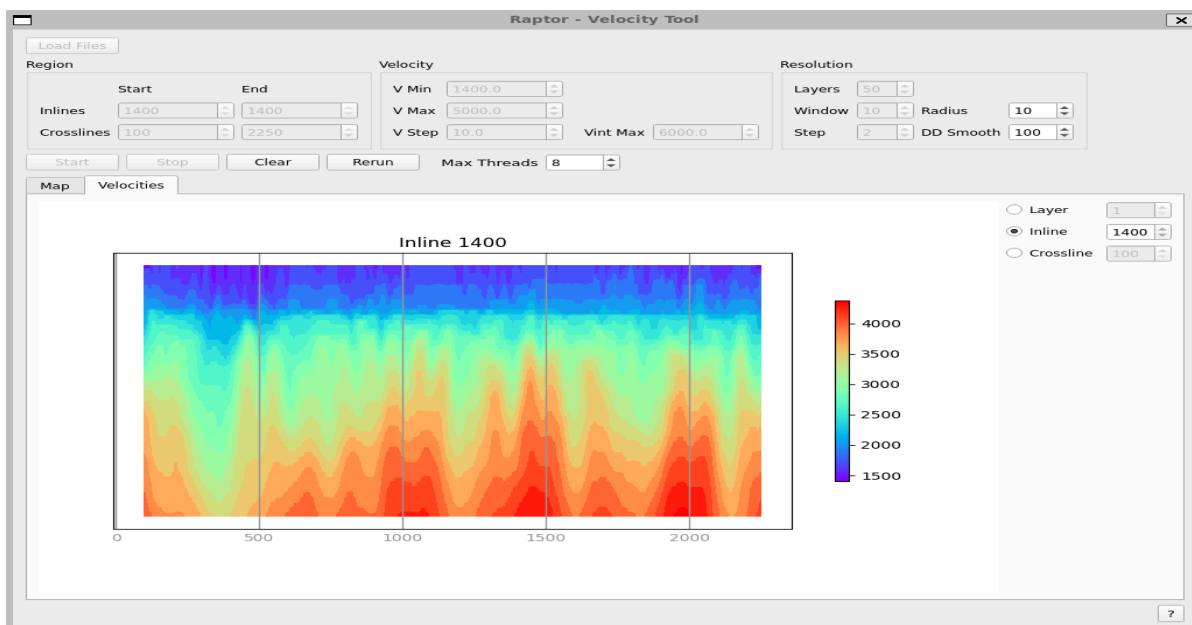
As part of the 2023.1.1 release we have developed a new application: Raptor. This application is designed to analyse uncorrected CDP gathers and generate a dense NMO velocity field that can produce the best stack. The user supplies a Claritas HDF5 seismic file.

## Raptor initial start-up and parameter form: -



The initial parameter form displays a map of the line or survey you are going to run Raptor on and provides access to the initial parameters for the application.

## Raptor – QC display of output velocity field: -



When the application starts you can click on the Velocities tab and view a QC display of the velocity field as it develops, user can choose to display an inline/crossline or time slice Iso-velocity contour

map. As the process runs this display will be data pre-smoothing so may look quite jittery after the entire volume is picked the smoothing operators will be applied.

Raptor uses a four-tier approach to estimating the RMS velocity.

### **Tier 1: Estimation of Windowed Trace Correlations**

Raptor uses inter-trace correlation between windows of samples in neighbouring traces. The locations of the windows in each trace are functions of moveout time which is in turn a function of the two-way travel time at the origin and the RMS velocity. If arrivals stay centred within the windowed zone in each trace across the gather (the arrival matches the moveout time) then the correlation values will be larger than if the arrivals shift relative to the window. Raptor collects information about how the correlations vary with velocity and time and stores this in a compressed form for later processing.

### **Tier 2: Collect Weighted Correlation Data from around each CDP**

Raptor then performs a group estimate for a velocity trace that is: monotonic, maximises the correlation and fulfils the user requirements (e.g., minimum, and maximum values and largest interval velocity). One issue with these preliminary velocities is that they can, despite the group estimation method, still have abrupt lateral velocity variations. This is due to ambiguity in the best velocity values, i.e., two or more velocity profiles being compatible with the correlation information. The estimated velocities can flicker between solutions causing abrupt variations.

### **Tier 3: Smooth Out the Flickering**

If this is detected then the velocity is smoothed laterally, in effect averaging the solutions.

### **Tier 4: Depth-dependent Smoothing**

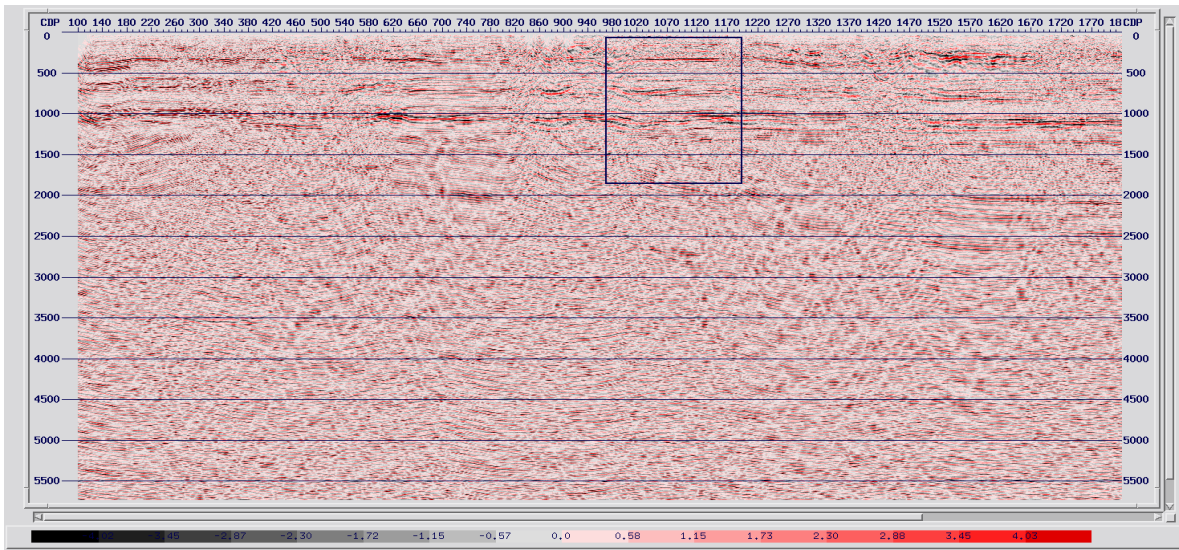
The final tier is the depth- dependent smoothing, where smoothing increases with depth, which is used to improve the lateral consistency of velocity estimates, at the end of the velocity traces.

When the user performs a run (clicks Start and allows Raptor to complete), Raptor collects and stores the correlation information. The user can select any new group Radius or DD Smooth parameter and then rerun the estimation without the need for Raptor to redo its correlation calculations. This means that results are created much more quickly than if a full run is performed.

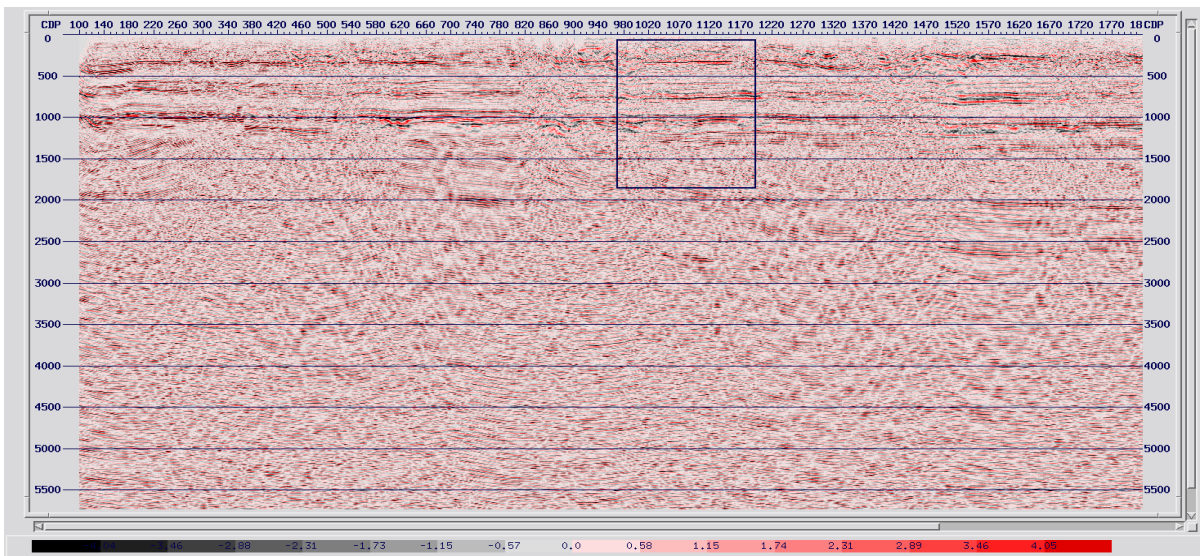
There are a variety of user-controlled parameters that will enable the user to optimise the solution generated by the Raptor application. QC/QA of the resulting velocity field can be performed within the application with users being able to visualise the velocities in INLINE/CROSSLINE and TIMESLICE mode. The velocity field is exported as a SegY revision 1 format which can be used directly by the Claritas modules and applications.

**Example stacks – 2D Land: -**

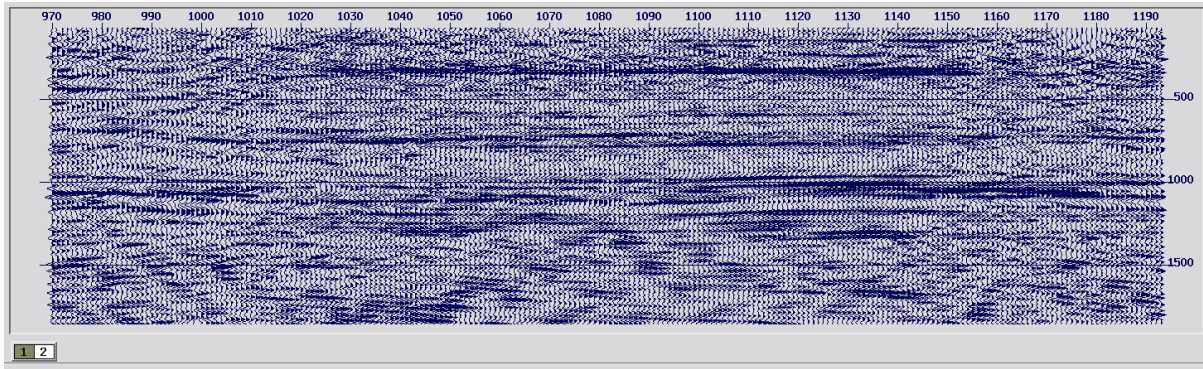
**Human Picked Velocities: -**



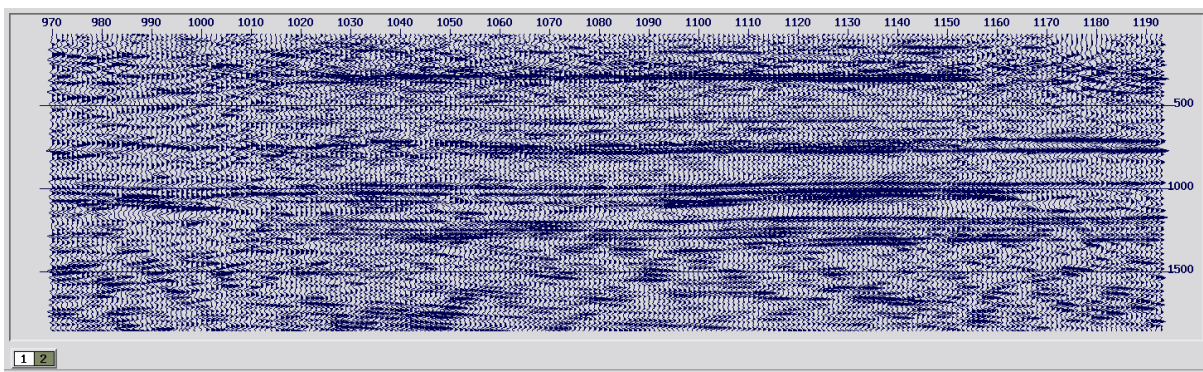
**Raptor velocities: -**



## Human picked Velocities.

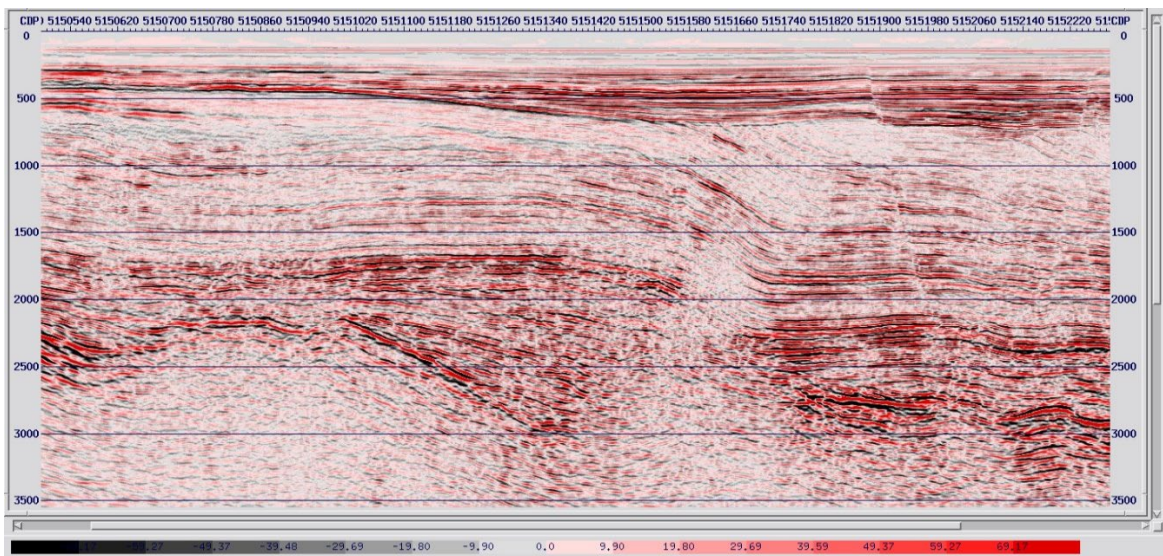


## Raptor Stack



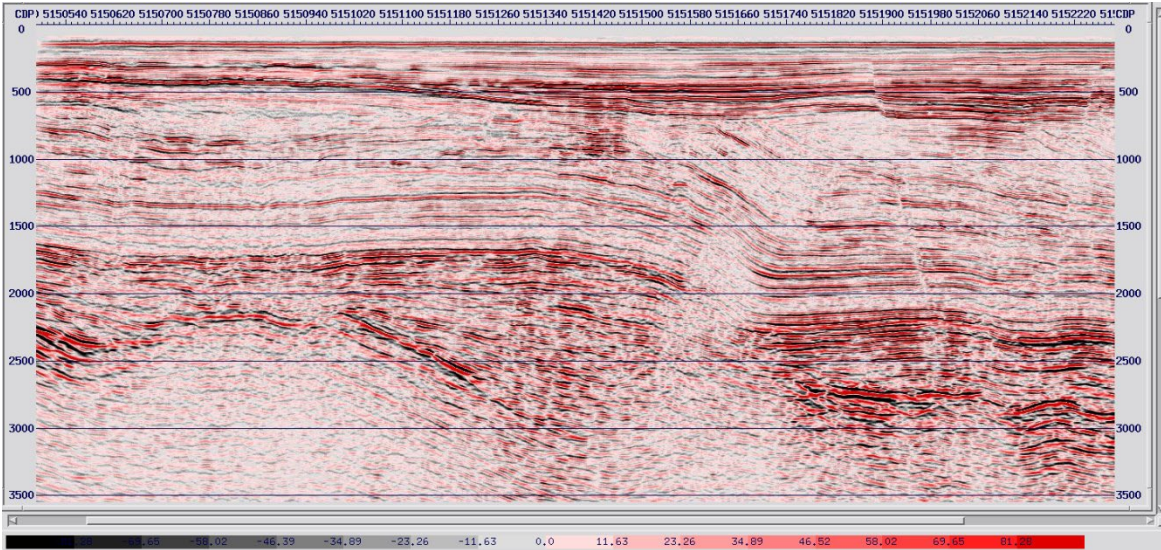
## Example Stacks – 3D Marine: -

### Human picked Vels






## Raptor Vels



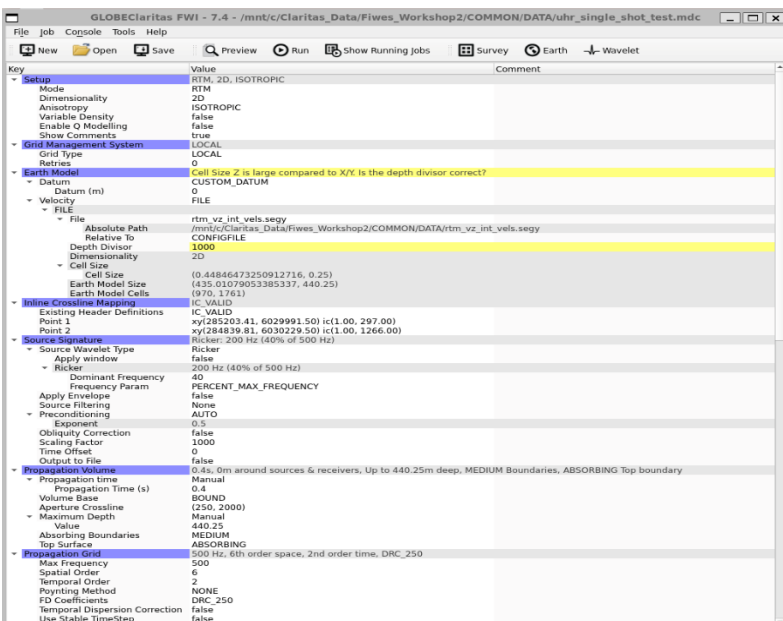
## RTM/FWI Application.

As part of this release we have added the option to launch the RTM/FWI and forward modelling application from the Claritas launcher, this is available from the Job Flows tab of the launcher.

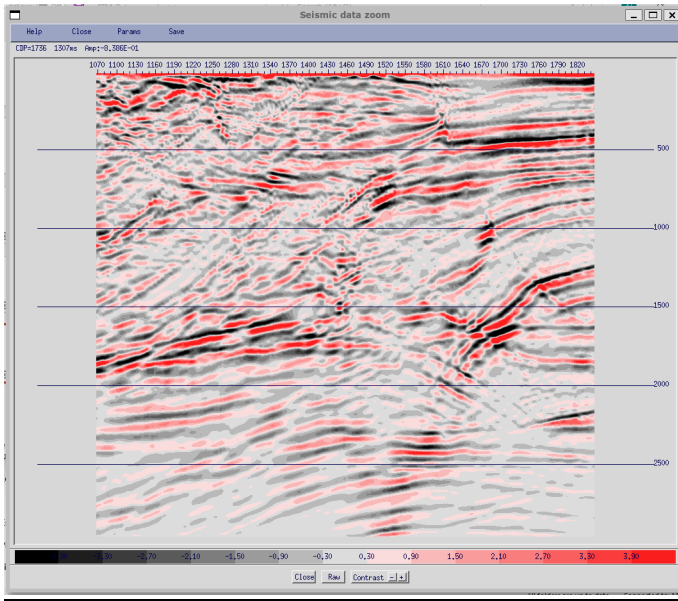
If you have the package installed with a license key you can run the software by clicking on the FWI/RTM button  to launch the application

Contact [support@globeclaritas.com](mailto:support@globeclaritas.com) to request an eval license and access to the software.

### RTM/FWI Parameter form: -



## **RTM result – Marmousi model: -**



## **Tomo3D and Refraction Statics Improvements**

The Tomo3D and Refstat2D/3D applications now allow user control for a selection of the seismic trace header used to access the first break picks. By default these applications read the FIRST\_BREAK\_TIME header populated by the Claritas first break picking tools in the SV application or by the ADDPICK module in a processing flow. Users can also select from the FBQC\_REPICK\_NN and FBQC\_REPICK\_TF headers created and populated by the FBQC application.

Tomo3D has a new option to allow users to control the number of cores used by the application, the first version of Tomo3D would utilise all available resources, the user can now select the number of cores on the machine to use for this application.

## **FBQC - Updates**

There are number of updates to the FBQC application in this release.

These include improved use of RAM; the first release was very RAM intensive and could under duress cause the application to fail.

In addition, we have also enabled the application to run on GPU architecture, this is turned on using a simple tick box on or off functionality for the GPU option.

## Job Editor - improvements

In the older Claritas job editor and forms, the Tab key acted as a filename completer on all parameter form fields.

In the newer interface, the Tab key can either be used to navigate to the next field (default behaviour) or can be set to perform filename completion (legacy behaviour). This can be set from File -> Preferences in the JobEditor menubar.

From 2023.1.1, if the legacy behaviour is not enabled, the Tab key will navigate to the next field, but filename completion will also be available via the now-standard drop-down menus; this applies to all fields which are expecting an input or output filename.

## Bugs found and fixed

202 - SV: - If requested gather/ensemble not available, SV jumps to nearest available gather.

1417 - Add functionality in job editor to step up and down through the job flow editor using forward and back arrows.

2429 - BUTTERFILT/FDFILT now allow users to only specify 2 frequency points when applying a High or lowpass filter rather than previous requirement that user supply four frequency points when only two would be used.

3048 - In the geometry application, a glitch in the display of traces currently in the shot information window has been corrected.

3388 - Default behaviour in Geometry now displays Source pegs as red boxes, and receiver pegs as blue boxes, this matches Claritas standards in ViewStatics/Refstat other applications.

3604 - refstat2d and refstat3d now use ViewStatics to display statics files if those files contain a geometry timestamp to identify the correct geometry database to use.

3665 - Improved documentation for SRME2D and other modules to make it obvious to users that input data can be in CSEG Y or HDF5 formats.

3705 - cva could mis-position velocity labels if the input stack file contained rogue CDPs (eg CDP=0); this has been fixed and input files are checked for uniformly increasing keys.

3743 - (and others) More flexibility added to file selection widgets to allow multiple filetypes to be selected from (e.g., NMO & SEG-Y for velocity files)

3772 - New Job editor not killing jobs properly, log file stopped, but process would continue running in the background.

3781 - The new job editor now supports new ("Default") and old ("Legacy") behaviour for the Tab, Escape and F11/Shift F11 keystrokes; accessed via File -> Preferences.

3782 - The REREAD module has been speeded up significantly for HDF5 input, which now matches run-times for CSEGY input.

3800 - The ViewStatics utility warns the user if multiple files are requested, that don't share common or adjacent geometries.

3807 : JobEditor (and others) : Scrolled lists could appear corrupted when there were multiple columns in the list (e.g. alphabetical module choice in the job editor).

3808 - Further improvements to SegD revision 3 formats.

3812 - An issue with channel incrementing in the ADDSPS module has been fixed; previously a receiver point increment of 2 caused the channels to also increment by 2.

3320 - REREAD module updated to improve reads times with HDF5 files, these read times now match CSEGY format.

3823 : The first release of the new job editor was not reading in the defaults for locally written modules (now fixed)

3825 : Geometry application : Fixed a bug in the CDP/shot/peg information windows, where the back arrow button was not working

3825: Geometry application CDP information window – solved a bug where the back arrow button was not allowing the user to navigate back through the data.

3826 – Improvement to DUSWELL/SNAWT modules to add more information to the processing history.

3851 - Added support for reading Seg-Y Revision 2 formats.

3866 - JobEditor - the log-file window would freeze and the job could hang, when the log contained more than about half a million lines. This problem has been fixed and updating the log file window is also much faster.

3867 - Refstat2D/3D - these applications now allow users to import V0 information form an ASCII text file.

3868 - ADDDIG : This module now supports horizon names with 8 or 9 characters.

3869 - Implemented an Inverse parameter in the DATUM\_FLT/DATUM\_SRD and DATUM\_FIX modules, to reverse previously applied static shifts

3875 - FBQC : Improvements to prevent use of excessive amounts of RAM.

3877 - The TRFUDGE module has had new library routines made available, so users can easily read/write extended trace headers of any datatype.

3881 - geometry: SPS files exported from the geometry application for 2D datasets now populate the source and receiver line columns with a user-specified line-ID string

3882 - ADDSPS – Reduce the number of missing Peg warnings from the log flow as previous behaviour led to excessive number of messages in the log file.

3884: Allow users to select the maximum number of cores.

3888: FBQC – Now supports CPU and GPU architecture.

CONDOR-57 – Opens Marine datasets with default display of SHOTID/CHANNEL and OFFSET

CONDOR-60 – User control of colourbar ranges now works with pyqtgraph as well as matplotlib.

CONDOR-64: Add AREAL functionality to the Condor application

CONDOR-68 – Get the save to png option working with pyqtgraph.

CONDOR-69: Display properties i.e., peg size parameter now works with pyqtgraph as well as matplotlib.

CONDOR-70 – The colourbar label was previously not being updated if the header being cross plotted was changed

CONDOR-71 – Colourbar label was overprinting the values on the colourbar.

CONDOR-73 – Update the CONDOR documentation to cover the new trace edit/flag etc functionality