RadExPro 2024.4 release notes

Happy Holidays and All the Best in the New Year 2025!

We are excited to announce our final software release of the year -- **RadExPro 2024.4** !
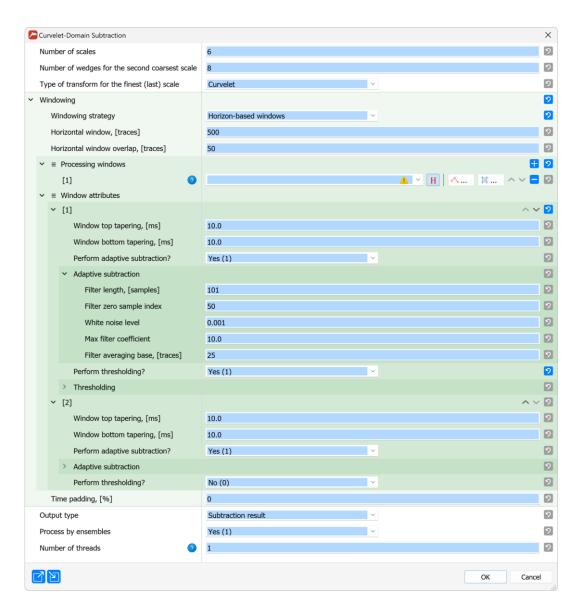
Here is the list of the key new features and improvements:

- Module **Curvelet-Domain Subtraction** was updated. There is a new windowing strategy, which enables the separation of input data into time windows based on horizons provided by headers or picks similar to the **Wave Field Subtraction** module. Subtraction parameters can differ between the windows. This allows, for example, for different subtraction parameters for different orders of multiple waves. The previously introduced sliding window-based strategy is also available.

  A new subtraction algorithm based on thresholding has been introduced. This algorithm computes the curvelet transform of both the data and the noise models, then applies soft or hard thresholding to the curvelet-domain data amplitudes, using the curvelet-domain noise amplitudes as threshold values. This is a nonlinear operation that can sometimes further improve the adaptive subtraction results. This new method is completely independent of the adaptive subtraction in the curvelet domain and can be used separately or in conjunction with it.

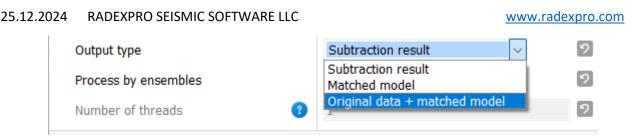 Additionally, the module's performance has been enhanced for faster operation in multithreaded mode.
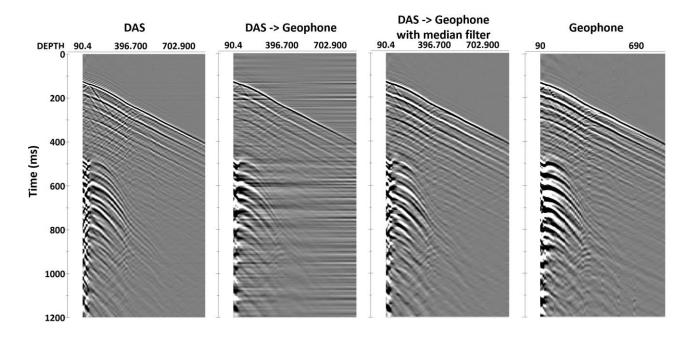
Updated module window with chosen Horizon-based windowing strategy.

- An output selector has been added to the **Wave Field Subtraction** module. In addition to the conventional output (Subtraction result), the module can now output the Matched model or interleaved data traces and matched model traces (Original data + matched model). The latter option simplifies using the module as an initial step before the **Curvelet-Domain Subtraction**, as the Original data + matched model output is precisely what the **Curvelet-Domain Subtraction** requires as input.

New output type selector of the Wave Field Subtraction module parameters

- The **Geophone <-> DAS Conversion** module has been updated and now enables the conversion of data acquired with Distributed Acoustic Sensors (DAS) to particle velocity along the cable axis as measured by geophones. This procedure assumes the gauge length to be infinitely small but provides high-quality results for a range of typical gauge lengths used in DAS equipment for seismic acquisition. An example of the conversion result for a DAS VSP is compared to the geophone dataset acquired in the same well is shown in the figure below.

Here, the input dataset is a VSP survey acquired with both DAS and geophones which was published as an open-source dataset at Research Data Australia by Zulic et al. (2022) (https://doi.org/10.25917/7h0e-d392). The dataset was provided under a CC BY 4.0 license. More details can be found at https://creativecommons.org/licenses/by/4.0/.

- **The Source-Receiver Repositioning** module has been updated. A new option for processing each receiver station separately has been introduced, ensuring more stable results when the input data includes numerous receiver stations. Additionally, the source and receiver ID headers
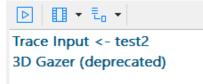
have been extended to include line and location pairs (with receiver and source line headers being optional, allowing for straightforward conversion from the previous parameters).

- In the **Python Proxy** module, you can now specify a name for your script, which will be displayed in the flow next to the module's name.

Python Proxy module in the flow with the 'Semblance computation' label

- We have transitioned several modules to the new universal parameter style. These modules now offer full support for replicas and include standard export/import functionality. The affected modules are as follows:
  - **Time Variant Bandpass Filtering**
  - **Spherical Divergence Correction**
  - **Derive Match Filter**
  - **2C Rotation**
  - **Add zero trace**
  - **Add Event**
  - **Source-Receiver Repositioning**

- Several legacy modules have been explicitly labeled as 'deprecated.' We strongly discourage using these modules and recommend replacing them with alternative options in your workflows. These deprecated modules are planned for removal in a future software update.

A deprecated module in the flow

The following issues were fixed:

- In the Trace Header Math dialog, syntax color highlighting does not work correctly with replicas -- **FIXED!**
- Starting from 2024.2, 3D Regularization crushes the software when run several times in a row -- **FIXED!**
- In Surface Consistent Decon, operators are not computed when Amplitude rejection is non-zero -- **FIXED!**

As always, if your licenses are under maintenance, feel free to contact us at support@radexpro.com to receive your complimentary update.

With Season Greetings, Your RadExPro Team:

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