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Escola Tècnica Superior d'Enginyeria  
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# GRASP Builder User Manual

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Master Thesis  
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Advisor: name of the advisor  
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# 1 Project management

When the application is launched, the home screen is displayed showing three different buttons to manage projects.



Figure 1: Home screen

First button will open a dialog to create a new project (Figure 2). Second button will open a dialog that allows the user to open an existing project (Figure 3). Third button will open a dialog that allows the user to import a project from a zip file (Figure 6).

When creating a new project, the user must provide a name for the project and select a location to save it. In the project folder, a new file called "project.grasp" will be created. This file will contain the corresponding project configuration.

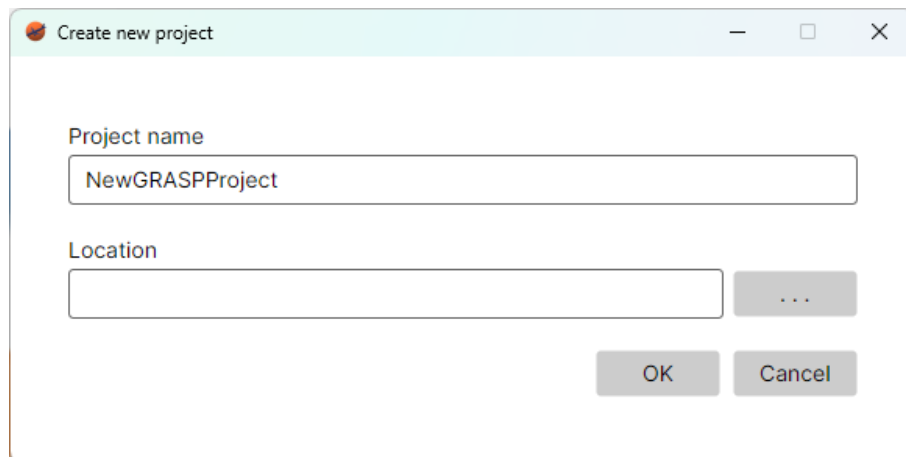


Figure 2: Create new project window

When opening a project, the user must select a project folder that contains an existing project.

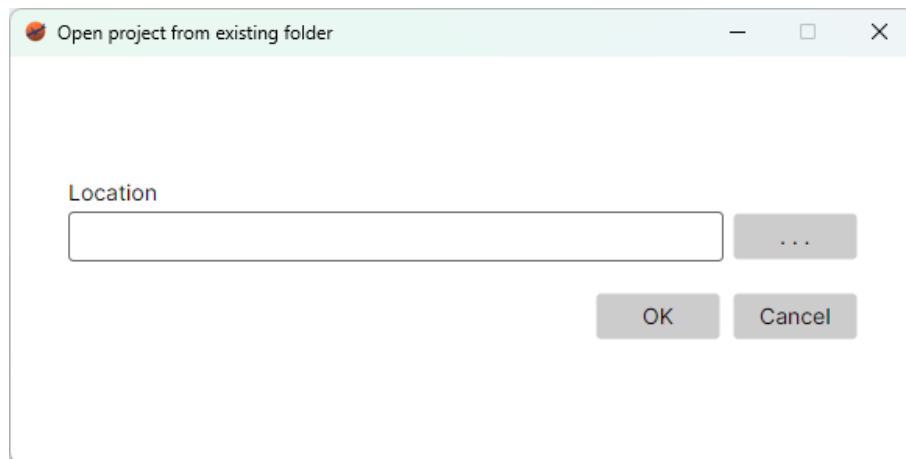


Figure 3: Open project window

All dialogs allow the user to navigate through the file system to select a project folder by using the browser button "...". (Figure 4).

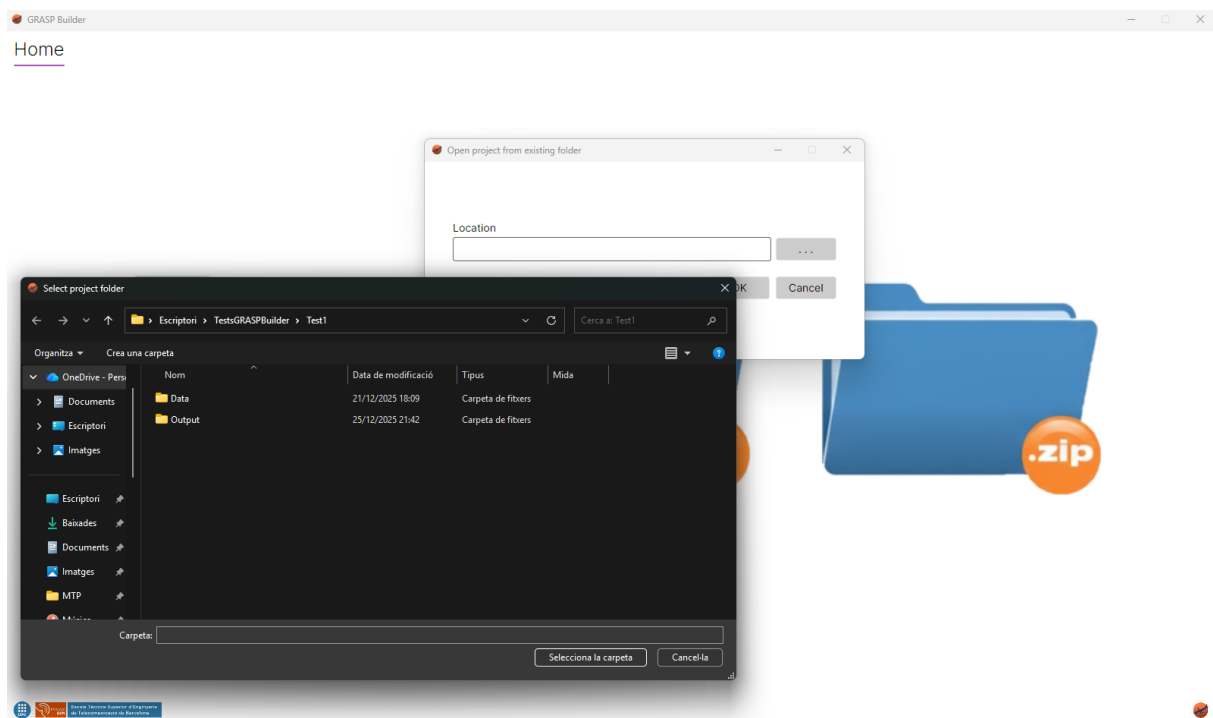


Figure 4: Open project browser

In the project folder, it is necessary it exists the file "project.grasp". Without this file, the application will not be able to load the project and an error message will be displayed (Figure 5).

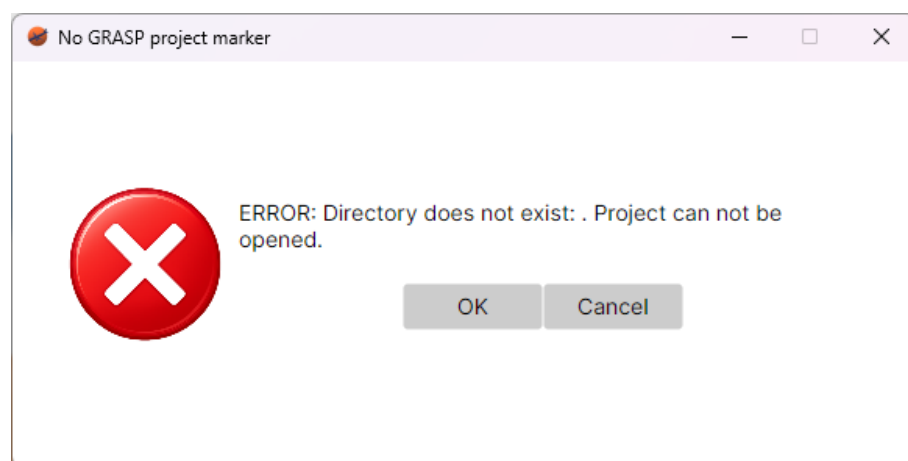


Figure 5: Error when opening a project

When importing a project, the user must select a zip file that contains an existing project. This zip file must also contain the file "project.grasp". Zip file should be located in the directory where the user wants the project to be created.

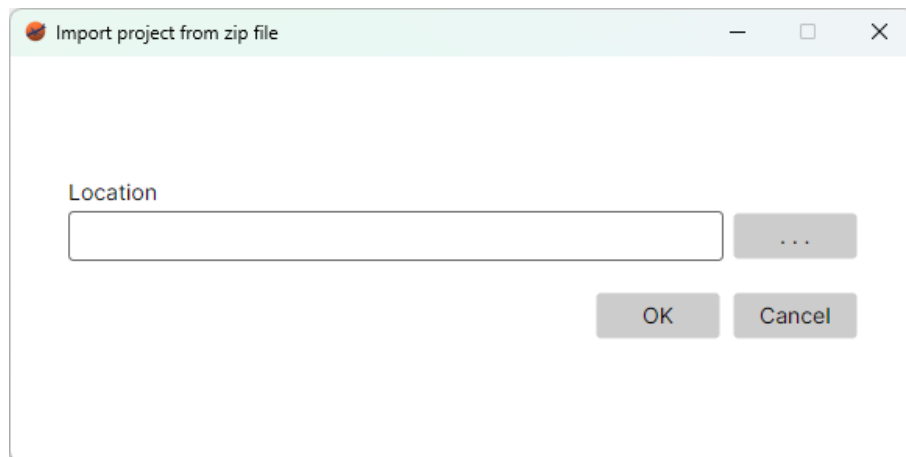


Figure 6: Import project window

Once a project is initialized, the user can access the File menu to perform different actions, in order to manage the current project (Figure 7).

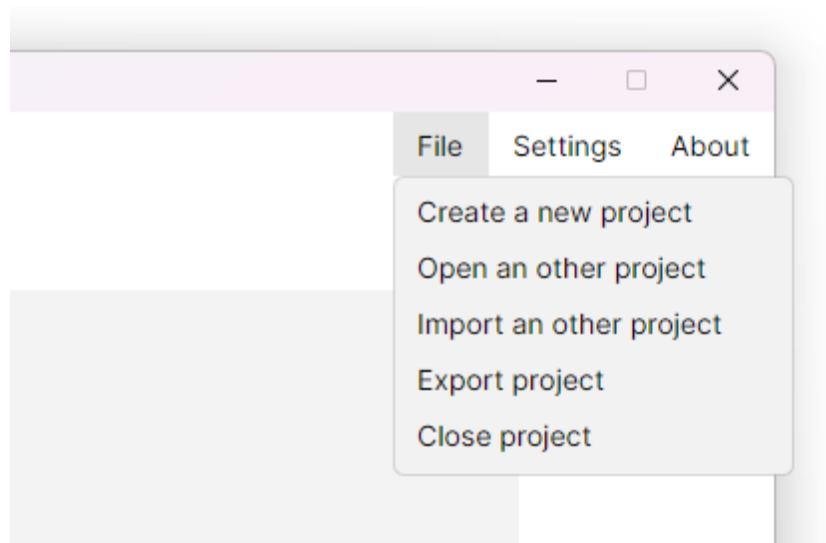


Figure 7: Menu options

Next to the File menu, it can be located the Settings button. This button opens a dialog that allows the user to configure different options of the application Figure 8.

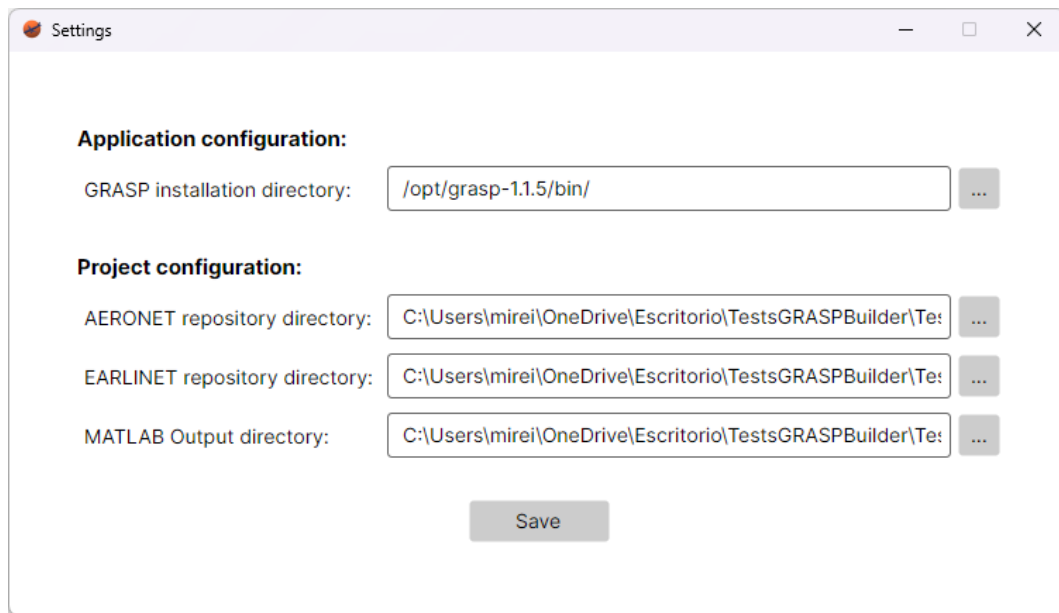


Figure 8: Settings window

The different parameters that can be configured are separated by application configuration parameters and project configuration parameters. The application configuration parameters have the same value for all projects. For now, it only includes the installation directory of GRASP algorithm.

Project configuration parameters are specific for each project. For now, it only includes the corresponding repository directories where the downloaded data will be stored for both, EARLIENT and AERONET sites, and the MATLAB output directory, where all the files created after running the corresponding scripts and GRASP algorithm will be created.

## 2 Download files

Once a project is created, the first step is to download the files from the different websites in order to have the data available. .

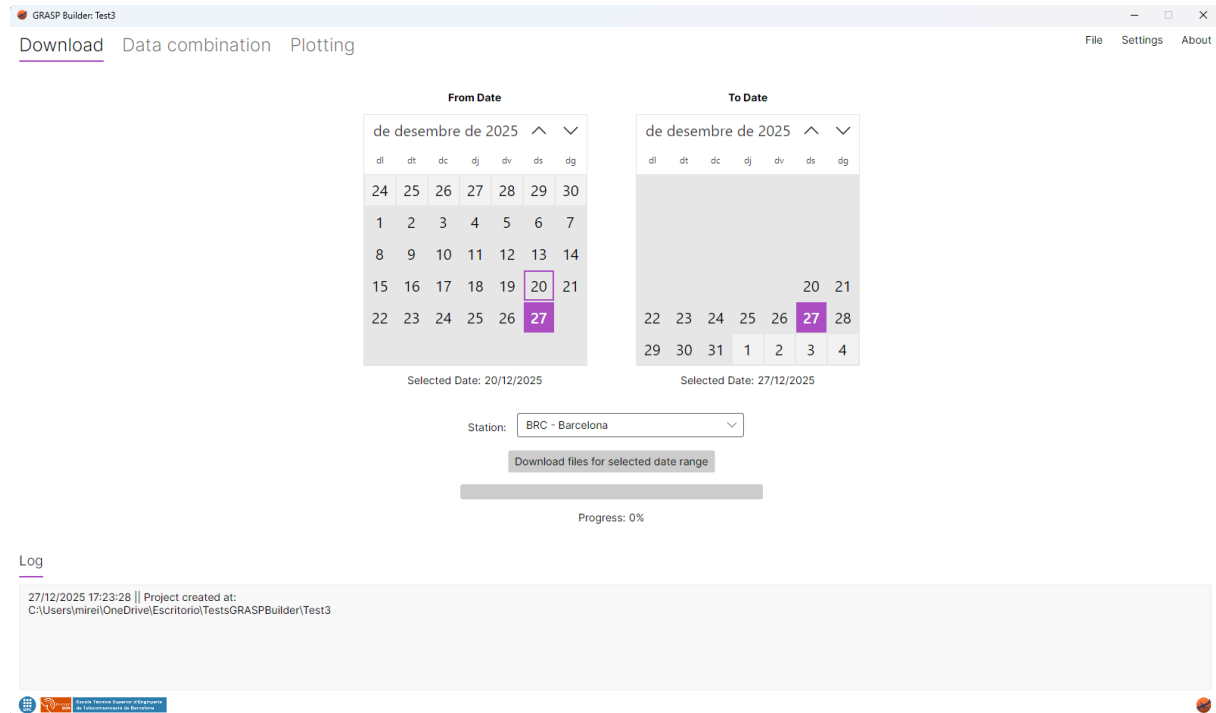


Figure 9: Project loaded

In this tab, the user is available to choose the range of dates to download the files from the different websites. For the moment, it is only available to download files from Barcelona site, but it is planned in the near future to add the option to download files from other sites.

During the process, all buttons will be disabled and the progress bar will show the percentage of files downloaded. Once all files are downloaded, a new section will be shown where the user will be able to see the list of files downloaded and select the files that desires to keep. This section will be also shown if the user opens a project with already downloaded files (Figure 10).



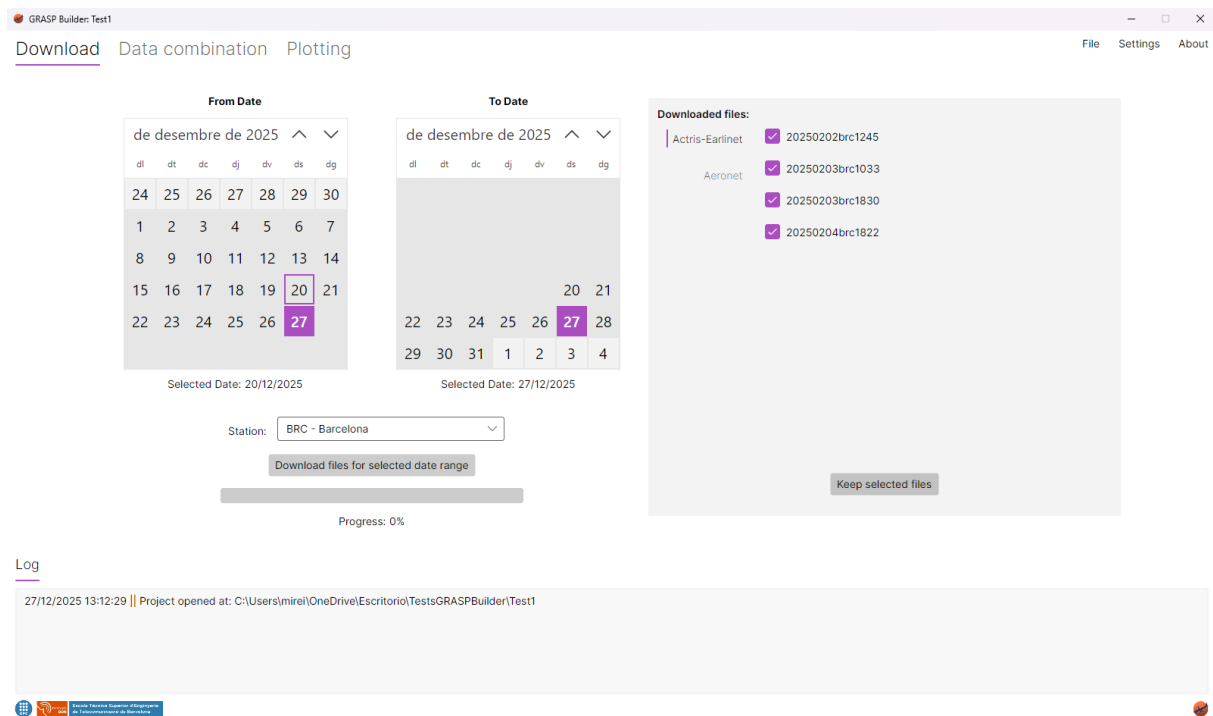


Figure 10: Files downloaded

### 3 Data Combination

Once all files have been downloaded, the user should the Data Combination tab. In this view, it can be selected a Measure ID from the options available (Figure 11). All measure IDs shown in downloaded files may be not available, since the list of measure IDs is filtered depending on the data contained. Measure IDs containing files with code 007 will not be added to the list, since these measurements will not contain all the data needed for the analysis.

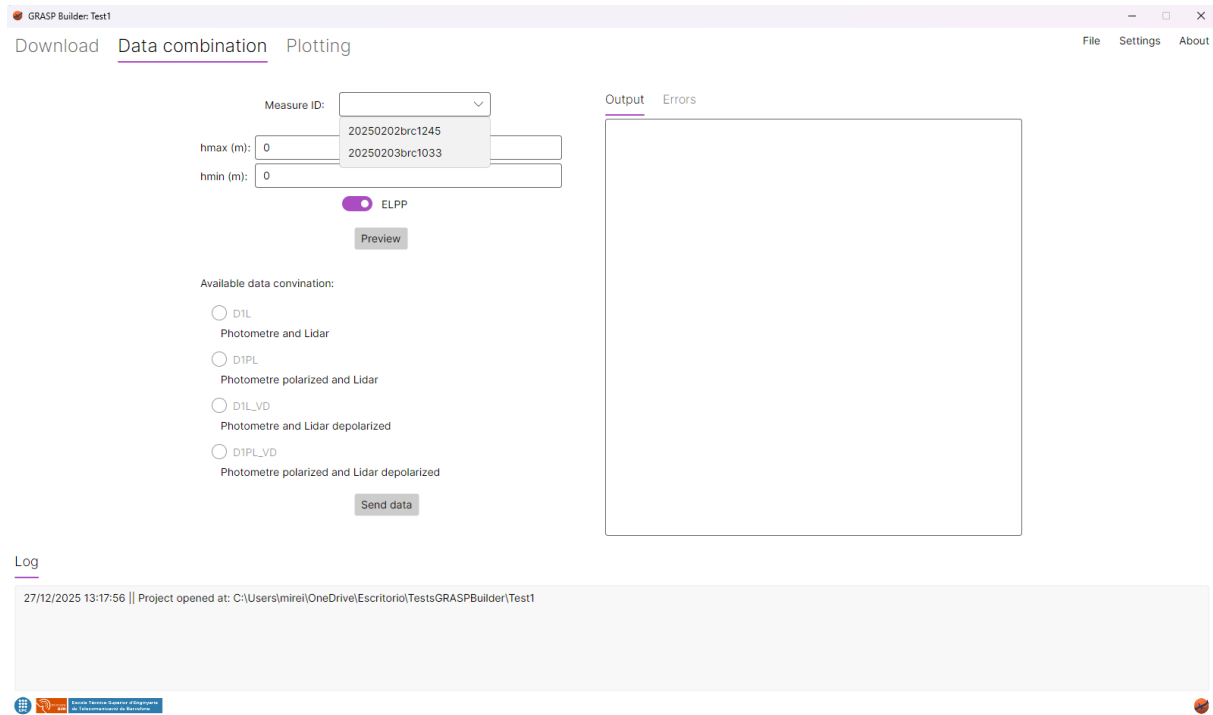


Figure 11: Data combination view

When a Measure ID is selected, the SendFiles script is executed, so the data can be previewed, in order to choose the correct height options. This script can be launched manually using the "Preview" button all the desired times with two different type of data. Default configured data type to show is ELPP (Figure 12). The other option is VD (Figure 13).



Figure 12: Execute preview without ELPP

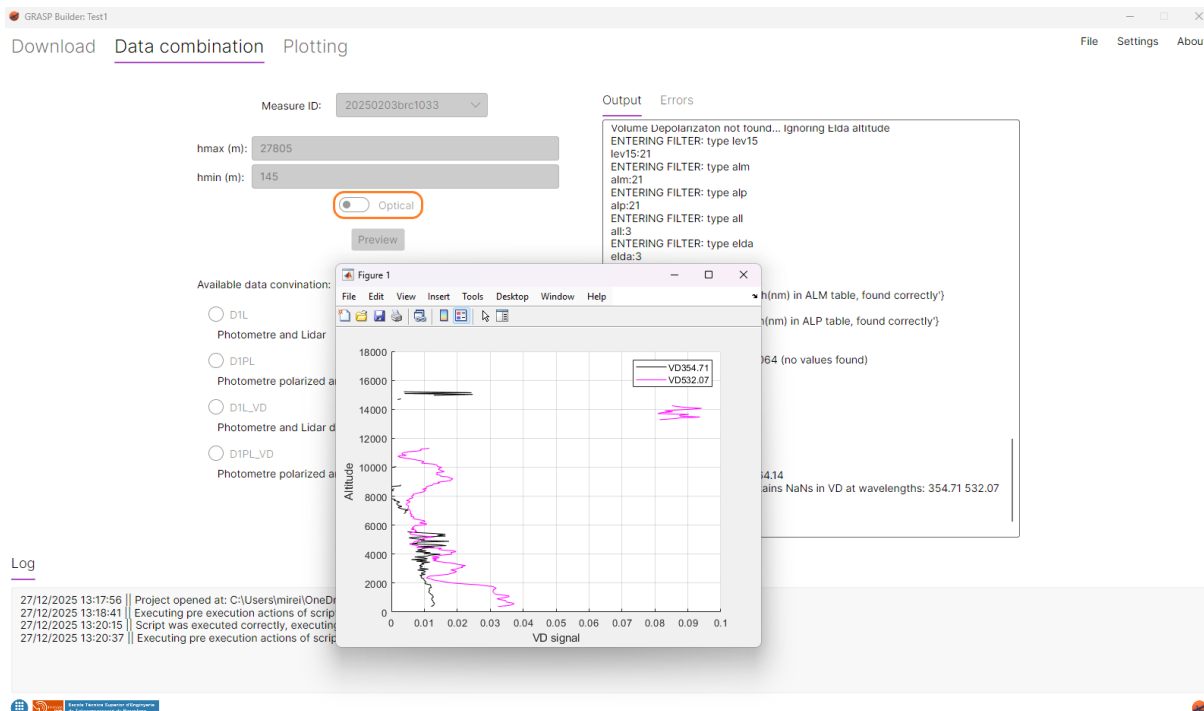


Figure 13: Execute preview with VD option and heights defined

Once the script has been executed, if there are no heights defined, their value will be filled

automatically with the maximum and minimum height detected. It is recommended to review the values before starting the data combination process, since NaN values must be avoided in order to run the algorithm successfully.

Figure 14 shows an example of the preview window with the heights defined and Optical data selected.

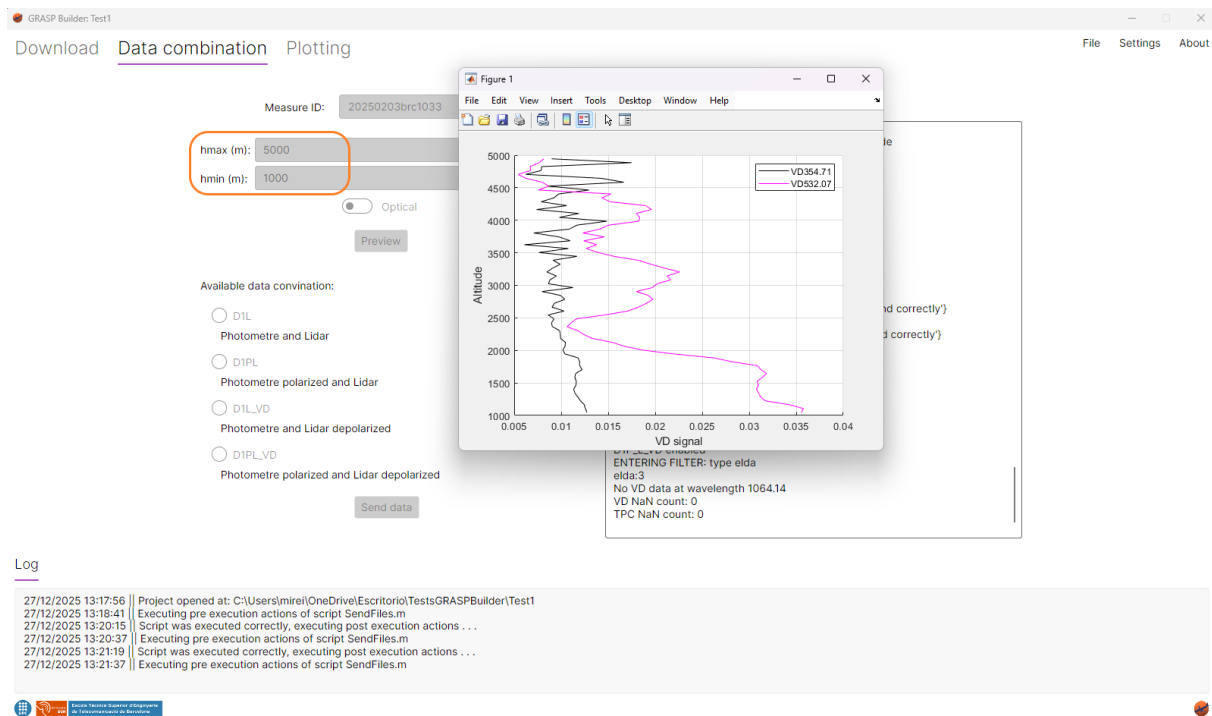


Figure 14: Execute preview with VD option

Every time the script is executed, all buttons will be disabled, and once the plot window is closed, GUI elements will be updated and enabled again.

In this particular case, the Script defines which configurations can be selected depending on the retrieved data.

When a configuration is selected, by clicking the "Send data" button, the SendFiles script is executed. If the script is executed successfully, the corresponding messages will be shown in Output and Logging tabs, as it can be seen in the following example in Figure 15.

GRASP Builder: Test1

Download Data combination Plotting

File Settings About

Measure ID: 20250203brc1033

hmax (m): 5000

hmin (m): 1000

☒ Optical

Preview

Available data combination:

☒ D1L  
Photometre and Lidar

☐ D1PL  
Photometre polarized and Lidar

☐ D1L\_VD  
Photometre and Lidar depolarized

☐ D1PL\_VD  
Photometre polarized and Lidar depolarized

Send data

Output Errors

```

ENTERING FILTER: type alm
alm:21
ENTERING FILTER: type alp
alp:21
ENTERING FILTER: type all
all:3
ENTERING FILTER: type elda
elda:3
T-ADD:21
T-ALM:21
{[ALM] Nominal_Wavelength(nm) in ALM table, found correctly}
{[ALP] Nominal_Wavelength(nm) in ALP table, found correctly}

Status 0532: 1
VD not found in wavelength 1064 (no values found)
Status 0532: 2
Status 0355: 2
D1L enabled
D1P_L enabled
D1L_VD enabled
D1P_L_VD enabled

URL_output =

°C:
\Users\mirei\OneDrive\Escritori\Tests\GRASPBuilder\Test1\Output\20250203brc1033\D1L-20250203brc1033-1000_5000"

Output directory created.
GARRLIC: output file 20250203103355_GARRLIC_D1L.sdat written correctly
    
```

Log

```

27/12/2025 13:24:54 | Loading Measures IU
27/12/2025 13:24:54 | Subcarpetas en la carpeta measureID:
27/12/2025 13:24:54 | Measure ID found: 1
27/12/2025 13:24:54 | Measure ID: 20250203brc1033
27/12/2025 13:25:24 | Script was executed correctly, executing post execution actions...
27/12/2025 13:25:24 | SaveOutputNameInConfigFile: replaced token with '20250203103355_GARRLIC_D1L.sdat' in C:
\Users\mirei\OneDrive\Escritori\Tests\GRASPBuilder\Test1\Output\20250203brc1033\D1L-20250203brc1033-1000_5000\UPC_D1L.yml
    
```

Figure 15: Execute SendFiles script

## 4 Plotting

Once GRASP has been executed, the user can plot the result data in the Plotting tab (Figure 16).

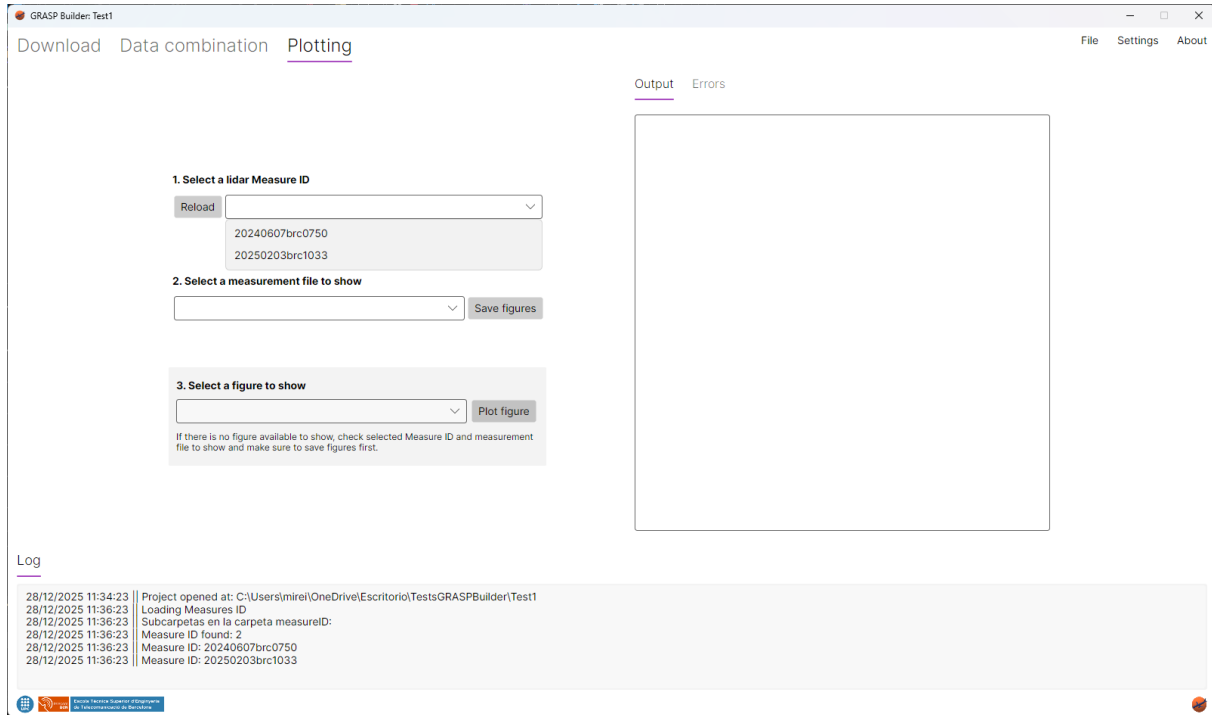


Figure 16: Plotting Tab with available Measure IDs

In this tab, the user can see the available Measure IDs and select the ones that desires to plot. If there are no Measure IDs available, click in "Reload" button, it will scan the MatalabOutputDirectory folder again.

Once the Measure ID is selected, the list of available measurement files will be updated automatically. There the user will be able to choose between the different options (Figure 17).

If this process has already been executed, it will not be needed to execute "Save figures". In the case it is not it is necessary to do it, in order to read all the GRASP output data and save it in the corresponding files.

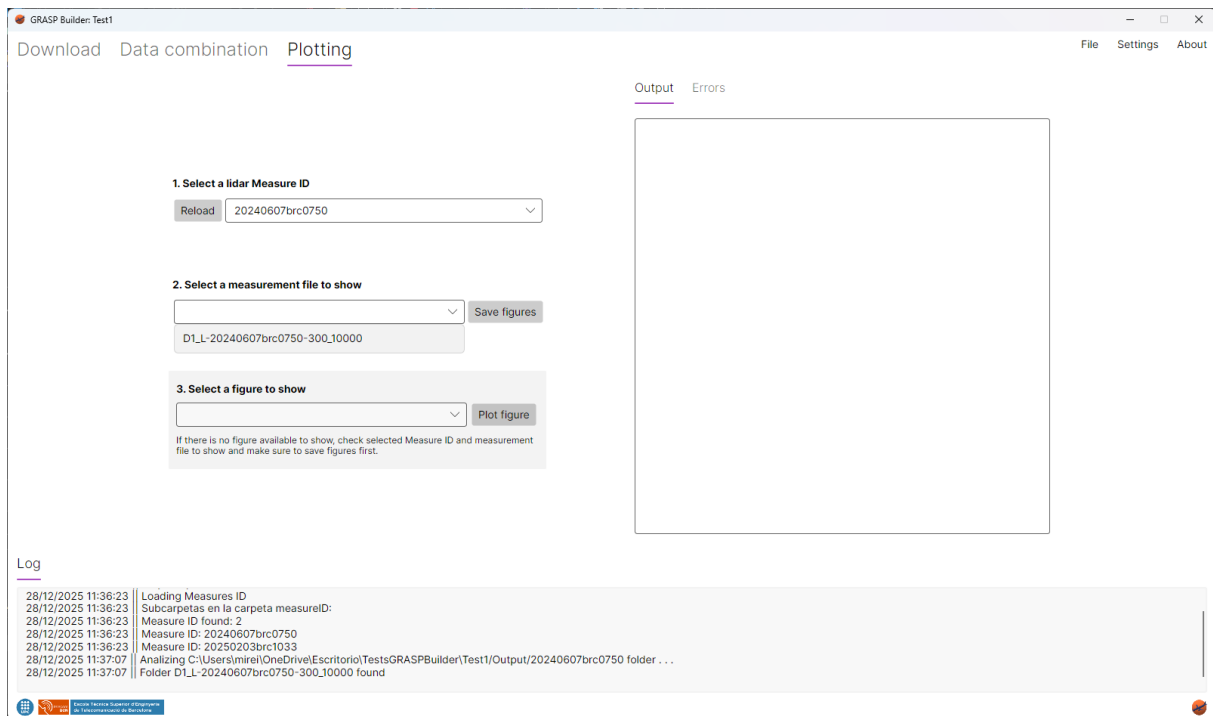


Figure 17: Plotting Tab with available measurement files

All available figures will be listed (Figure 18), the user will be able to choose between the different options.

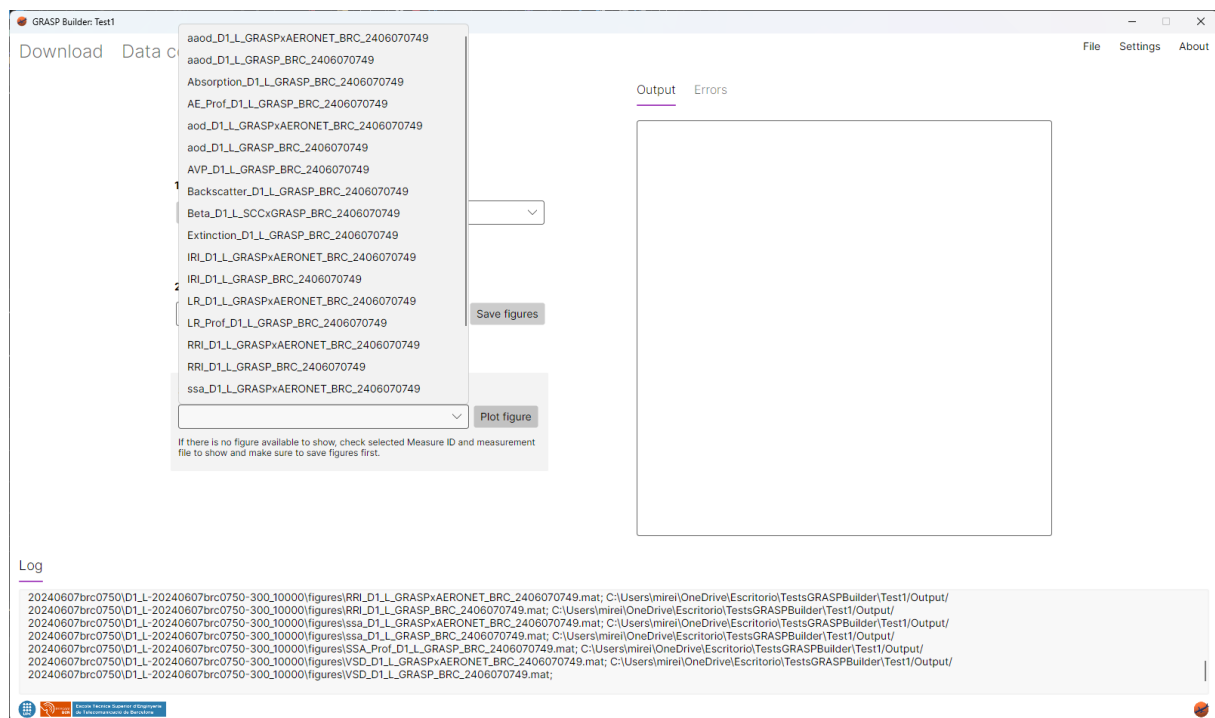


Figure 18: Plotting Tab with available figures

Once a figure is chosen, button "Plot figure" can be clicked in order to start corresponding MATLAB script execution. During the script execution, the corresponding figure will be shown (Figure 19).



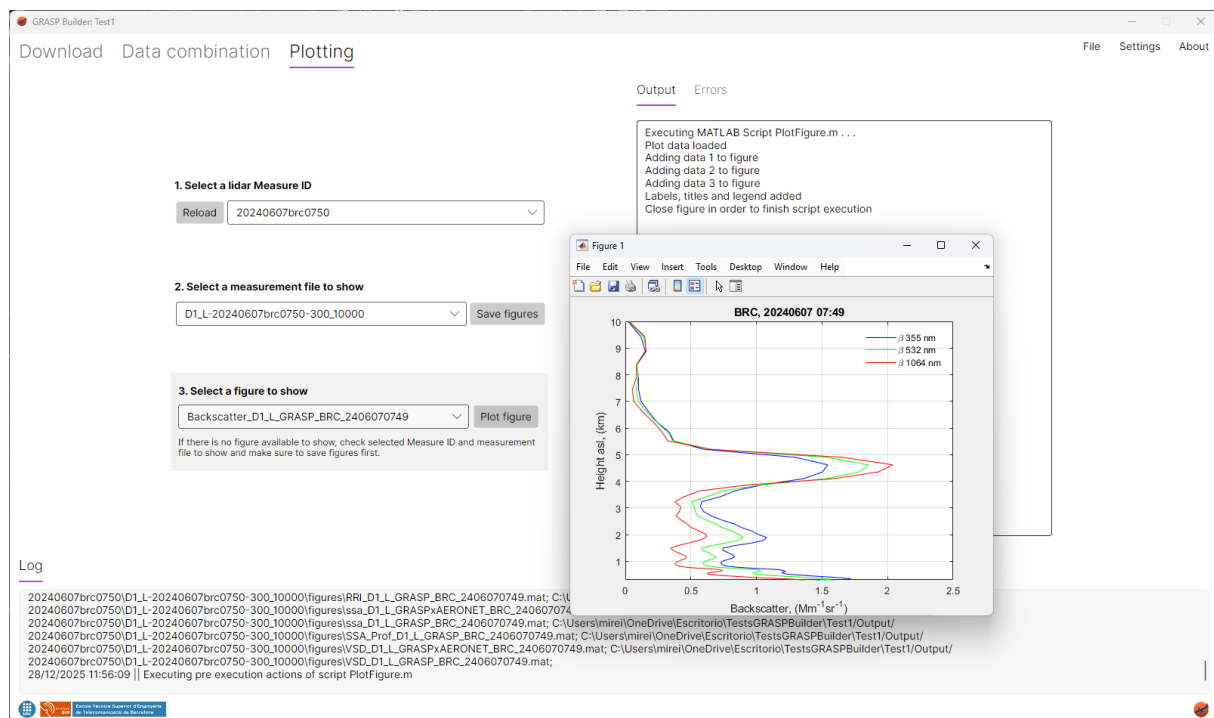


Figure 19: Plotted figure example