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RELEASE NOTES OF THE RESCO DATA ANALYSIS PROGRAM

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RELEASE NOTES
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by
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Abstract

This release contains information about RESCO 2000 - Data Analysis Program and additional helpful information. It shows the main characteristics of the program, including locations of the menus and fields. It explains how each procedure works and gives a general idea about the evaluations. It informs the name of all files needed for the processing and the name of all files generated during de evaluation. It explains also why these files are created and its content.

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1. INSTALLING THE DATA ANALYSIS PROGRAM

This program is for Windows 98 or upper. It was created for scientific propose and this is the first version. Therefore, there is not any installation, initialization or setup program.

To run the program it is enough copy it and its components to any directory of preference. It is possible to create a shortcut in the desktop area or add it in the taskbar. Consult the Windows manual or the Windows help file about it.

1.1. Program RESCO 2000 Components

This software is constituted of the main program RESCO.EXE, the help file README.DOC, the sound files in wave format: EOGET.WAV, EOFFT.WAV, EORTI.WAV, EOSPE.WAV, EODTRTI.WAV, EODTSPE.WAV, EOBRTI.WAV, EOBSPE.WAV; and the optional icons RESCO2K.ICO and RESCO3K.ICO.

2. DATA FILE FORMAT AND DIRECTORY STRUCTURE

This section presents the data file format acquired and stored by RESCO coherent backscatter radar. It presents the directories structure, either.

2.1 Raw Data Stored from RESCO Coherent Radar

The raw data stored came from two digitalization performed over the two components (real and imaginary) of signal echo back scattered from ionospheric irregularities. The data are stored continuously and sequentially in a binary format file. Each data sizes 2 bytes and the number of data stored in a file is obtained from the product of transmitted pulses number, gates number and components (real and imaginary) number. In the case of 512 transmitted pulses and 16 gates, the file will size (512 x 16 x 2 x 2 bytes = 32768 bytes) 32 kB.

A file is stored corresponding to each sequence of transmitted pulses. The file name is composed with radix "rdat" and four more numbers, which represents the recording order. Thus, the maximum number of binary files in each directory is 10000.

2.2. Directory Structure

As mentioned before the maximum number of binary files in each directory is limited in 10000. But they are separated according its attenuation level. And each change in attenuation level therefore represents a change of directory. So, there are directories in which the number of data file is less then 10000.

Each directory is named with two digits representing the month, two digits representing the day and one or more alphabetic letters to characterize the sequence.

All the directories obtained during the whole day are arranged in one directory named with two digits representing the year, two digits representing the month and two digits representing the day.

3. MAIN FORM FIELDS, MENUS AND ITS SHORTCUTS

The main menu is found in the main form. It contains the items: "Files", "Evaluate", "Build" and "Help". There are also the fields: "Files to Load", "Interval", "Informations" and "% File Evaluated". The main form is shown in the figure 1.

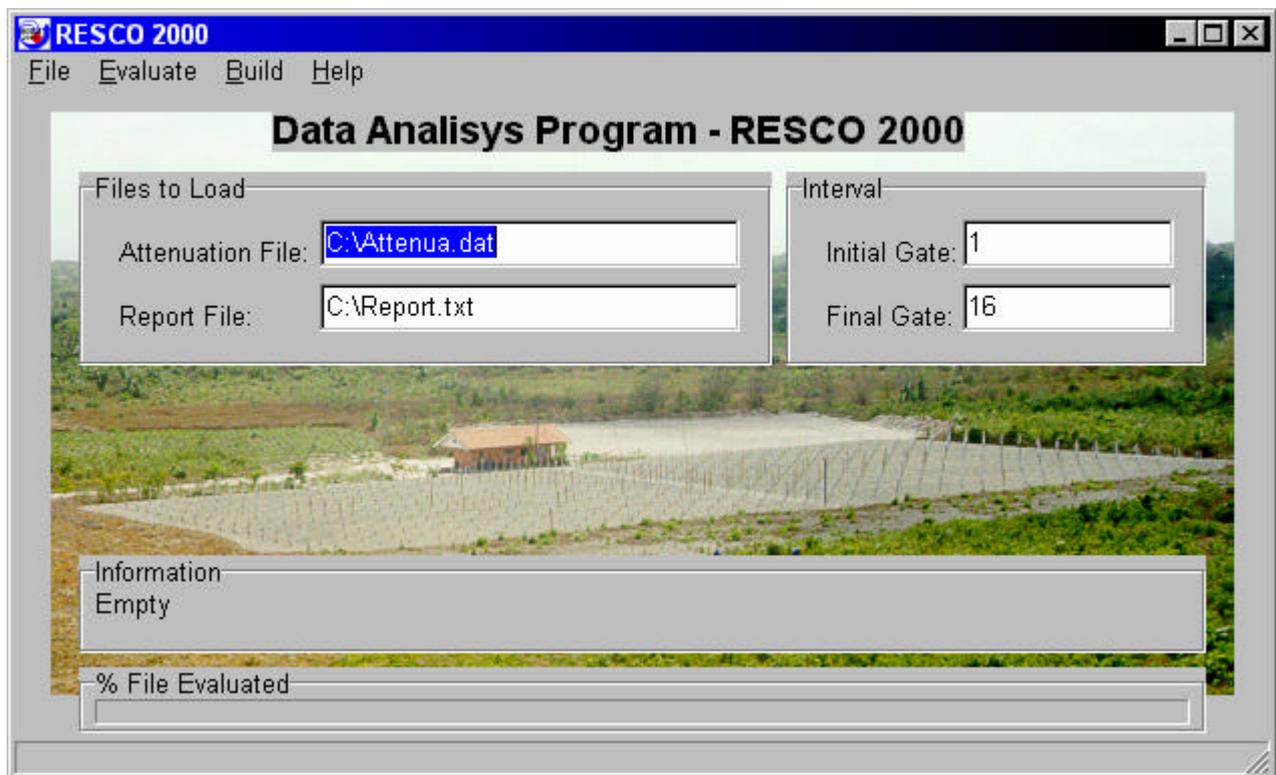


FIG. 1 - RESCO 2000 Data Analysis Program Main Form.

3.1. Main Form Fields Description

The complete paths to the files needed to the first part of the program operation are displayed in the field "Files to Load". The files needed are the attenuation file and the report file. The function of these files and its content are discusses in the section 4.

The field "Interval" presents the blanks to choose which range of gates the program will process. The initial gate represents the lower height and the end gate represents the higher height. The minimum initial gate permitted is 1 (one) and the maximum final gate permitted is 32 (thirty-two). Nevertheless, there is a head file in each data directory. If the head information about the number of gates in the directory was lower than 32, the head information will be assumed as the final gate.

The "% File Evaluated" field contains a progress bar, which is set to zero at the begging of each evaluation step and increased during the evolutions of the evaluation to show its progressions.

The "Informations" field is used to show the result of each step of the evaluation to confirm the consistence of the analysis. It is also used to show error messages, making easier to solve the problem when something undesirable happened.

3.2. Main Form Menus Description

The menu "Files" contains the menu items "Attenuation...", "Report..." and "Exit". They can be reached through mouse or pressing Alt and arrows keys. These item process special functions when clicked the mouse with the pointer over the selected menu item or pressed enter when the item is highlighted, as well as any other menu item described in this release.

The "Attenuation..." menu item opens a default windows open dialog box, which helps to find the attenuation file. The "Report..." menu item opens a default windows open dialog box to help choosing the path to the report file.

Finally, the "Exit" menu item exits the Data Analysis Program - RESCO 2000. It is possible also exit by clicking on "x" box in the top right corner of the main field (see figure 1) as any default window. Figure 2 shows the aspect of the menu "File", when the "Exit" item is highlighted.

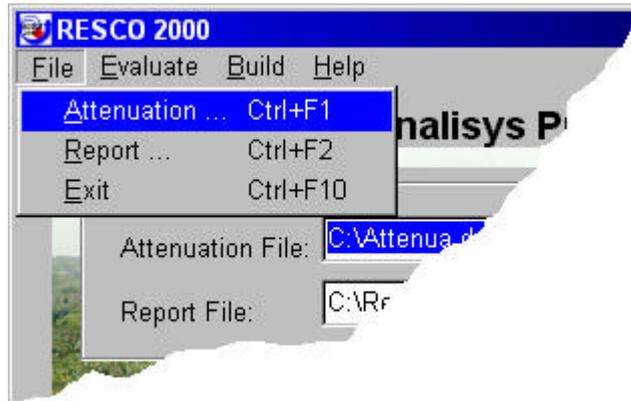


FIG. 2 - RESCO 2000 Data Analysis Program File Menu.

The menu "Evaluate" contains the menu items: "Get Informations", "FFT Analysis", "RTI Map", "Spectra" and "Shrink". These menu items perform specific functions when they are running. These functions will be described in the appropriated following sections. Figure 3 shows the aspect of the menu "Evaluate", when the "Get Informations" item is highlighted.

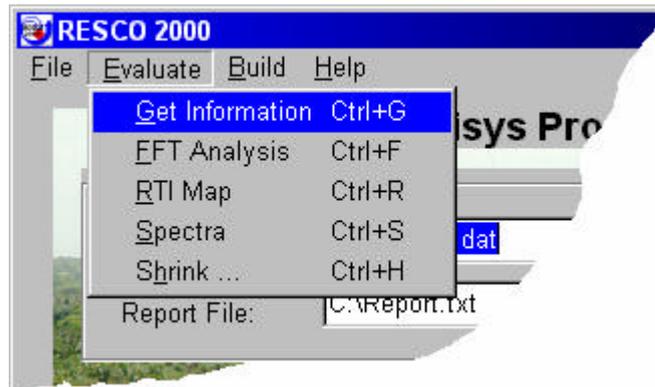


FIG. 3 - RESCO 2000 Data Analysis Program Evaluate Menu.

The menu "Build" contains the menu items "RTI Map" and "SPE Map". These menu items perform specific functions when they are running. These functions will be described in the appropriated following sections. Figure 4 shows the aspect of the menu "Build", when the "RTI Map" item is highlighted.

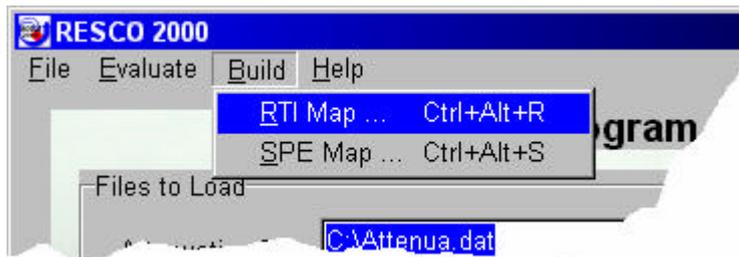


FIG. 4 - RESCO 2000 Data Analysis Program Build Menu.

The menu "Help" contains the menu items "RTI Map" and "SPE Map". The menu item "Contents" are not ready to run yet, but the menu item "About", as show in the Figure 5, opens an information window about the program version and credits.



FIG. 5 - RESCO 2000 Data Analysis Program Help Menu.

Figure 6 shows the window with the information mentioned before.

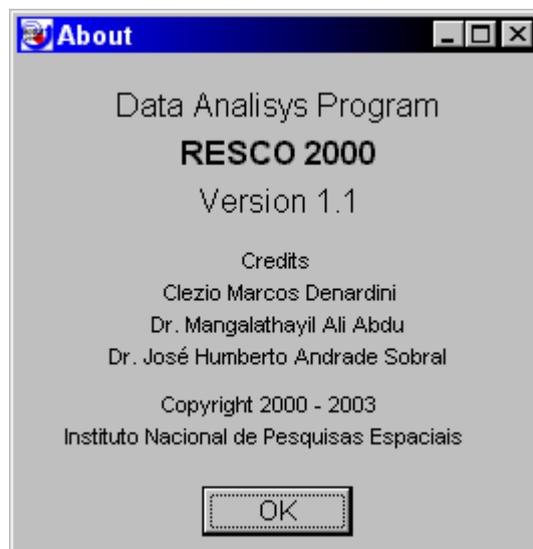


FIG. 6 - RESCO 2000 Data Analysis Program About Window.

3.3. Main Form Menus Shortcuts

All the sub menu items cited above can also be reached through its related shortcut. Below, it follows the list of shortcut and its associated sub menu item.

In the main menu "File" the related shortcuts are:

<u>A</u> ttenuation ...	Ctrl + F1
<u>R</u> eport ...	Ctrl + F2
<u>E</u> xit	Ctrl + F10

In the main menu "Evaluate" the related shortcuts are:

<u>G</u> et Information	Ctrl + G
<u>F</u> FT Analysis	Ctrl + F
<u>R</u> TI Map	Ctrl + R
<u>S</u> pectra	Ctrl + S
<u>S</u> hrink ...	Ctrl + H

In the main menu "Build" the related shortcuts are:

<u>R</u> TI Map ...	Ctrl + Alt + R
<u>S</u> PE Maps ...	Ctrl + Alt + S

In the main menu "Help" the related shortcuts are:

<u>C</u> ontents	Ctrl + C
<u>A</u> bout ...	Ctrl + A

4. GETTING INFORMATION

"Getting Informations" is the routine that execute a series of functions to get all information needed for the program evaluation. Its first function is to check the gates intervals. It first verifies if the initial gate number is less then the final gate number, and changes it if necessary. Then it checks the maximum and minimum limits as specified in the section 3.1.

Step two is to create the report file as specified by the user and a time file, which will contains the elapsed time during each evaluation. The next step is to verify if the attenuation file is in the right directory. In the sequence a search on attenuation file is made, changing the decimal Brazilian system to American decimal system.

Then the directories of data list is obtained and stored in the DIR.INF file. By using the directory name from the file list the information about whole raw data in all directories are gotten. These raw data informations are stored in the report file as well as in the RESUME.GET file.

The RESUME.GET file is generated at the end of "Get Informations" procedure. It contains in its first line the total number of directories analyzed, and in the next lines the transmitted pulse number and gate number for all directories arranged in two columns.

4.1. Attenuation File

The attenuation file is a list of float point correction values used to equalize the attenuation over all radar data. The number

of factors must be equal to the number of data directories (see directory structure). The value of the factor that is applied to each directory must be in accordance with the attenuation level applied during the radar operation. Each factor, in the order of appearance, is applied over one directory, in alphabetic order.

The integrity of the attenuation file is verified during getting information, as mentioned earlier. If attenuation file is omitted or not found the program will not run.

If the number of factors is higher than number of directories, the exceeding factors will not be applied. In the other hand, if the number of factors is lower than number of directories, it will applied a factor equal to 0(zero) over the data in the directories exceeding, invalidating these data.

4.2. Report File

When the routine "Get Informations" runs a new report file is created, with the name and path chosen by the user. Although, the report file name or path can be omitted with no problems. But if is omitted the program will created a report file called "report.txt" on root of C drive. Once created, every important information related to the evaluations performed will be added to the report file. And if an unexpected error occur one of those error messages listed in the section 11 will be saved in the report file.

4.3. Factor Files

The acquisition system allows storing raw data with different resolution times in subsequent directories. In addition we may need different resolution time for different calculations involving both RTI map and Spectra maps. Due this, the program is perfectly flexible. It allows applying different factor to different directories of raw data through the factor files.

There are two factor files, one with the factors to be applied during the procedure "Shrink RTI Map" and other to be applied during the procedure "Shrink SPE Map". Although, it is possible to use only one file, hence the same factors will be applied to the same directories during creating RTI and Spectra maps. So, these files will have the same number of rows after applied the factors.

The content of these files is a column of integer values. Indeed, the number of factors in the file must be equal to the number of directories of raw data.

4.4. Lines File

The lines file is important during building RTI maps and SPE maps. This file must contain a list of integer number, and as well as attenuation file the number of integer must be equal to the number of data directories.

Each integer value corresponds to the quantity of lines that should be added in the maps at the end of the directory data to fill up data gaps. For example, if the file contains the following list:

```
0
2
3
0
```

First, it means that there are four directories of data. Second, the programs must add 2 (two) lines at the end of directory B, 3 (three) at the end of directory C, and none at the end of the others because a 0 (zero) means that no lines will be added. And it will be done during the "Build RTI" and "Build SPE" procedures.

5. APPLYING FFT ANALYSIS

The "Evaluate" menu is shown in the figure 3. The "FFT Analysis" item is found in this menu.

After perform a check if exist the RESUME.GET file, meaning that the "Get Information" ran first, the Fast Fourier Transform (FFT) is applied over all data files in each directory gotten in the "Getting Information". As result of "FFT Analysis" a series of ASCII files is stored in each data directory: one RTIx.DAT file and one SPEx.DAT file related to each RDATAxxx raw file.

Each RTIx.DAT file contains a total power integrated in each gate. Thus its size is in according to the number o gates. Each SPEx.DAT has a half part of the number of data in the RDATAxxx raw data file. It contains the spectral analysis performed by FFT on each gate stored as a sequential stream. The number of data is a consequence of FFT Analysis. Therefore, the number of data is a product of the gate number and the transmitted pulse number.

Finally, it is import mention that in this procedure the attenuation factors was not applied yet. Thus, the both RTIx.DAT and SPEx.DAT files are not already equalized with the rest of the data set.

At the end of "FFT Analysis" it is created a RESUME.FFT file, which contains the information about the total number of directories and the total number of raw files analyzed in its first line. It contains the complete path to the attenuation file in the third line and the complete path to the report file in the fourth line, either.

6. EVALUATING THE RTI MAP

The procedure "RTI Map" performs the first arrangement of the integrated power per gate in a data matrix format. The arrangement is made over the gates specified by the user in the field "Interval". Due this, its first function is to check the gates interval. It first verifies if the initial gate number is less than the final gate number, and changes if necessary. Then it checks the maximum and minimum limits as specified in the section 3.1.

The arrangement in a matrix format begins with a check if exist the RESUME.FFT file, meaning that the "FFT Analysis" ran first. Then, the stored informations are obtained from this file. And the procedure set of parameters is saved in the file RESUME.RTI. The initial gate and the final gate used during this procedure are stored in the first line, the complete path to the attenuation file is stored in the third line and the complete path to the report file is stored in the fourth line.

The next step is to get the attenuation factors that will be applied in each directory. Therefore, the already checked file with the attenuation levels is open and the values are transferred to a vector. In the same way the informations stored in the file RESUME.GET, about the total number of directories analyzed, transmitted pulse numbers and gate numbers for all directories are obtained.

By using the above vectors it is performed the arrangements in each directory from the file list of directory names. In each directory all RTIx.DAT ASCII files are read, the attenuation factor is applied equalizing all data files, and the data are rearranged in only one matrix file named RTI.DAT. This matrix data file is an ASCII file with all integrated power spectrum values arranged in the right way. The number of raw files in the directory determines the number of rows and the number of gates determines the number of columns. Hence, one RTI.DAT file is created in each directory.

7. EVALUATING THE SPECTRA MAPS

The procedure "SPECTRA Map" performs the first arrangement of the spectra per gate in data matrix format. The arrangement is made over the gates specified by the user in the field "Interval". Due this, its first function is to check the gates interval. It first verifies if the initial gate number is less then the final gate number, and changes if necessary. Then it checks the maximum and minimum limits as specified in the section 3.1.

The arrangement in a matrix format begins with a check if exist the RESUME.FFT file, meaning that the "FFT Analysis" ran first. Then, the stored informations are obtained from this file. And the procedure set of parameters is saved in the file RESUME.SPE. The initial gate and the final gate used during this procedure are stored in the first line, the complete path to the attenuation file is stored in the third line and the complete path to the report file is stored in the fourth line.

The next step is to get the attenuation factors that will be applied in each directory. Therefore, the already checked file with the attenuation levels is open and the values are transferred to a vector. In the same way the informations stored in the file RESUME.GET, about the total number of directories analyzed, transmitted pulse numbers and gate numbers for all directories are obtained.

By using the above vectors it is performed the arrangements in each directory from the file list of directory names. In each directory all SPEX.DAT ASCII files are read, the attenuation factor is applied equalizing all data files, and the data are rearranged in a set of matrix files named GATxxCx.DAT.

Here the number of data per gate is the number of transmitted pulses. Due this, there are too many data to manipulate and for convenience each gate was divide in eight cells having the same number of data. Thus, in this procedure it is generated as many files as are 8 times the number of gate multiplied by the number of files.

Each of these matrix files is an ASCII file with 1/8 part of spectra from each gate. The number of raw files in the directory determines the number of rows and the number of transmitted pulses divided per eight determines the number of columns.

8. DECREASING THE TIME RESOLUTION

The decreasing time resolution form is shown in the figure 7. Using this form it is possible to change the time resolution of the RTI map and the SPECTRA maps. The changes operate through taking the mean value from those into the interval determined by the factor in the file chosen in the field "Factors File". It is also during this procedure that the standard deviation maps are generated. How this calculation is taken and the contents of these files will be property explained bellow.

The load buttons open a default windows open dialog box to help finding the path to the factor files. It is possible also to type the complete path directly on the blanks "Factors File". Finally, after obtaining the complete path to the factor files, these procedures can run through clicking on the evaluate buttons.

To perform these evaluations this procedure needs to read resume files stored during obtaining RTI and SPECTRA maps, and the factor files. If one of these files is not present, this procedure can not run.

On clicking on the reset button it will reset all fields to default values, while the exit button will close this form, as well as the "x" button on the top right corner of the window.

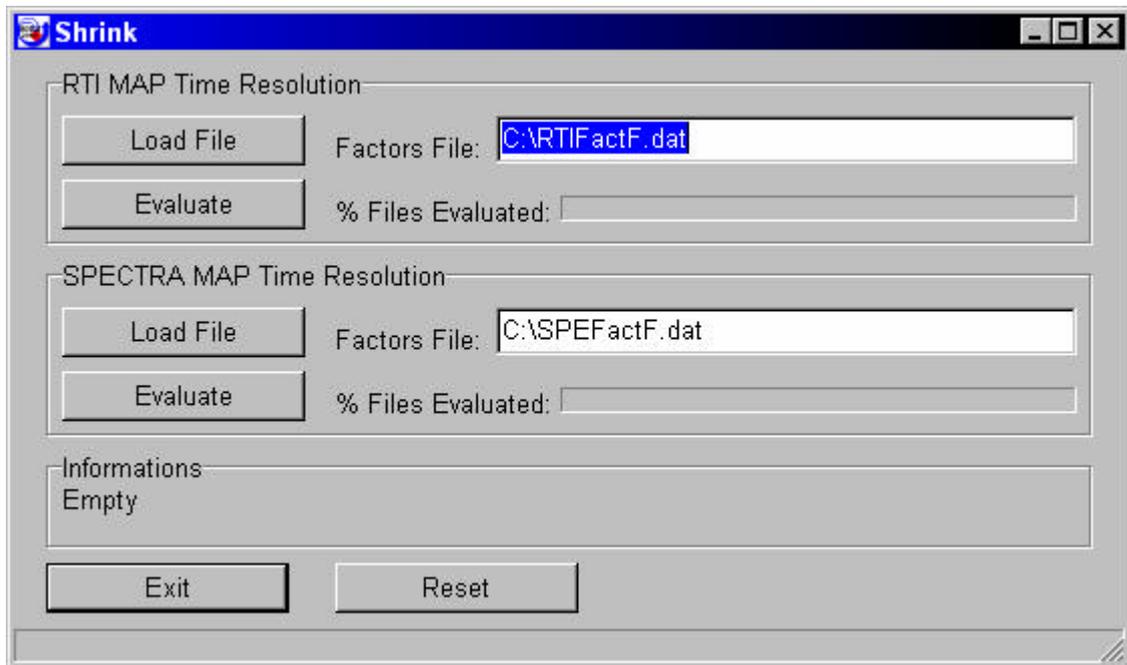


FIG. 7 - RESCO 2000 Data Analysis Program Shrink Form.

8.1. Decreasing Time Resolution from RTI Map

To perform this evaluation click on the evaluation button inside the "RTI MAP Time Resolution" field. The progress bar will provide an idea about the status during the evaluations while the information field will inform about errors, until information or finishing evaluations.

This evaluation starts with a check if exist the RESUME.RTI file, meaning that the "RTI Map" ran first. Thereafter, the informations stored in this file are gotten. Then, the factor in the file chosen in the field "Factors File" are checked to do not be less than one, and changed if necessary. The complete path to the factor file with the factors applied during this procedure is stored in the RFACTOR.RTI file for future evaluations propose.

The main functions performed in this procedure is to get all directory name from the file list of directories names and decrease the number of rows of its RTI.DAT file by the factors in the file chosen in the field "Factors File". Indeed, a file named DTRTI.DAT is created in each directory, which contains the mean values taken from the RTI.DAT columns. This DTRTI.DAT file is an ASCII file with as many columns as the RTI.DAT file but the number of rows is less than the last by the factor applied over the data from the directory.

The second, but not less important, function performed in this procedure is to take the standard deviation map SDRTI.DAT, which contains the standard deviation values linked to the mean values taken from the RTI.DAT. Thus, the SDRTI.DAT file contains as many columns and rows as the DTRTI.DAT file.

8.2. Decreasing Time Resolution from SPECTRA Maps

To perform this evaluation click on the evaluation button inside the "SPECTRA MAP Time Resolution" field. The progress bar will provide an idea about the status during the evaluations while the information field will inform about errors, until information or finishing evaluations.

This evaluation starts with a check if exist the RESUME.SPE file, meaning that the "SPECTRA Map" ran first. Thereafter, the informations stored in this file are gotten. Then, the factor in the file chosen in the field "Factors File" are checked to do not be less than one, and changed if necessary. The complete path to the factor file with the factors applied during this procedure is stored in the RFACTOR.SPE file for future evaluations propose.

The main functions performed in this procedure is to get all directory name from the file list of directories names and decrease the number of rows of its GATxxCx.DAT set of files by the factors in the file chosen in the field "Factors File". Indeed, a new set of files named DTGxxCx.DAT is created in each directory, and each DTGxxCx.DAT file contains the mean values taken from its corresponding GATxxCx.DAT file columns. These new DTGxxCx.DAT files are ASCII files with as many columns as the corresponding GATxxCx.DAT files but the number of rows is less than the last by the factor applied over the data from the directory.

The second, but not less important, function performed in this procedure is to take the standard deviation maps SDGxxCx.DAT, which contain the standard deviation values linked to the mean values taken from the GATxxCx.DAT. Thus, these SDGxxCx.DAT files contain as many columns and rows as the DTGxxCx.DAT files.

9. BUILDING THE RTI MAP

The build RTI map form is shown in the figure 8. On this form it is possible to build the final RTI map and the standard deviation map linked to this one. To perform this evaluation this procedure needs to read resume file stored during obtaining RTI map and the lines file, which contains the information about lines to add at the end of each directory of data. If one of these files is not present, this procedure can not run.

Through choosing the American decimal system only, it will result in just one RTI map and one standard deviations map created from this procedure. Whereas, through choosing the Brazilian decimal system too, it will result in two RTI maps and two standard deviations maps created from this procedure. One of those will use the Brazilian system while the other one will use the American system.

Clicking on the reset button all fields will be reset to default values, while clicking the exit button will close this form. The progress bar provides an idea of the status during the evaluations and the information field informs about errors, util information or finishing evaluations.

The load button opens a default windows open dialog box to help finding the path to the lines file. It is possible also to type the complete path directly on the blank "Build Info File". Finally, after obtaining the complete path to the lines file, this procedure can run through clicking on the build button.

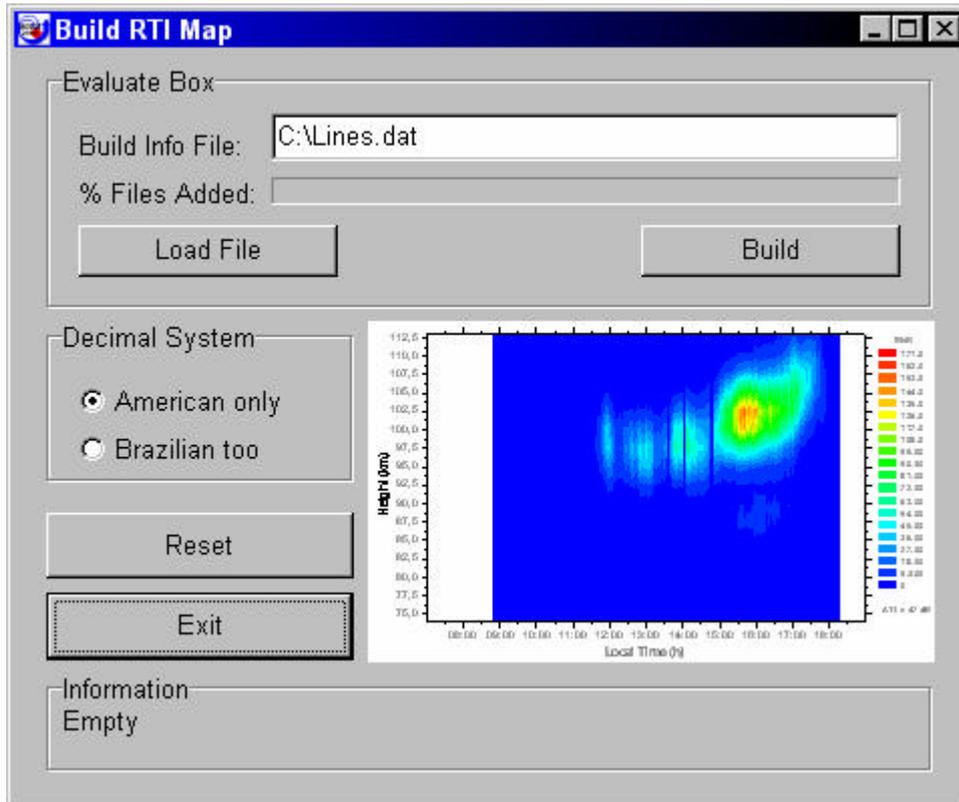


FIG. 8 - RESCO 2000 Data Analysis Program Build RTI Map Form.

9.1. The Process of Building the RTI Map

This evaluation starts with two checks of precedence. The first check is if exist the RESUME.RTI file, meaning that the "RTI Map" ran first. Thereafter, this information file is read. The second check is if exist the RFACTOR.RTI file, meaning that the "Shrink" (Decrease Time Resolution of RTI Map) ran first. Then, this information file is read. After these checks, the lines file is opened and its values are transferred to a vector. Then the RTIMAP.DAT and RTIMAPSD.DAT files are created in the main data directory. The RTIMAP.DAT file as well as the RTIMAPSD.DAT file is ASCII file in a matrix format. These files will contain, respectively, the RTI map and the standard deviations map at the end of the procedure. If the Brazilian decimal system button is checked, RTIMAPBR.DAT and RTIMAPSD.B.DAT files are also created like the first ones.

Now, the building of the RTI and standard deviation maps is performed through all directories from the file list of directory names. In each directory the DTRTI.DAT and SDRTI.DAT ASCII files are read and its values transferred, respectively, to the RTIMAP.DAT and RTIMAPSD.DAT. During this transference the data gaps at the end of each directory of data are filled up owing the

number of lines to add. Finally, if the Brazilian decimal system button is checked, the RTIMAPBR.DAT and RTIMAPSDB.DAT files are filled with the same values than the RTIMAP.DAT and RTIMAPSD.DAT files, respectively. But the last ones will use the Brazilian decimal system.

10. BUILDING THE SPECTRA MAPS

The build SPE map form is shown in the figure 9. On this form it is possible to build the final SPECTRA maps and the standard deviation maps linked to these ones. To perform this evaluation this procedure needs to read resume file stored during obtaining SPECTRA map and the lines file, which contains the information about lines to add at the end of each directory of data. If one of these files is not present, this procedure can not run.

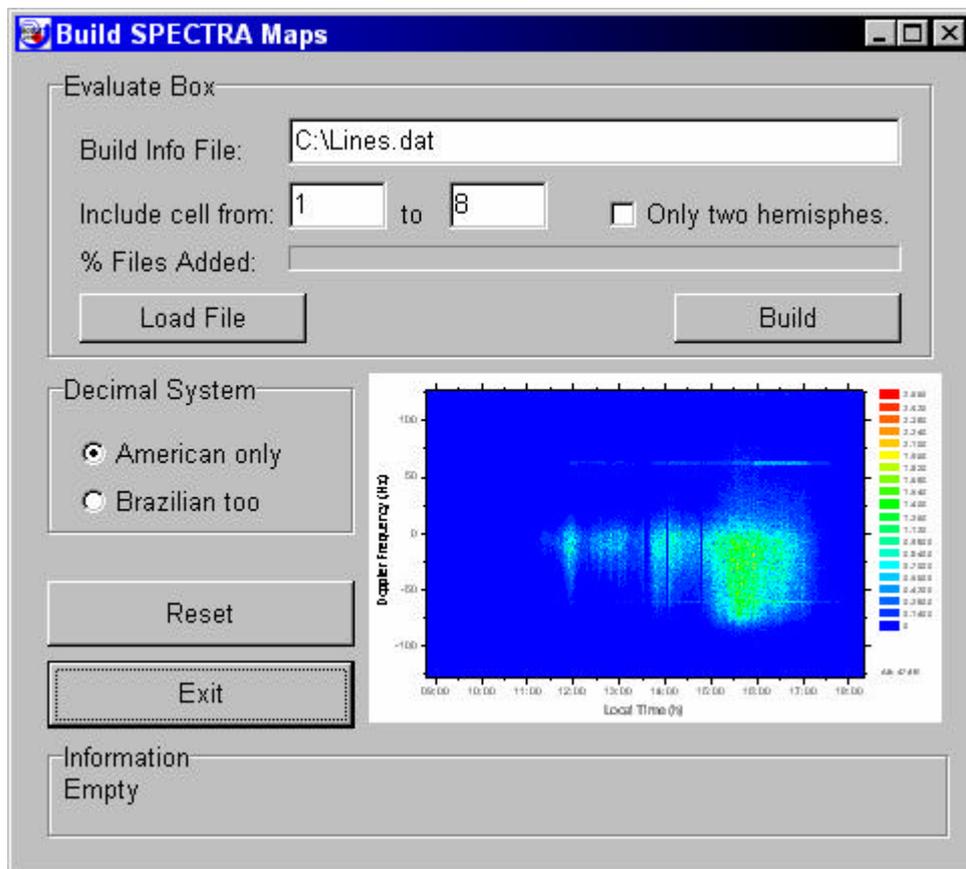


FIG. 9 - RESCO 2000 Data Analysis Program Build SPE Map Form.

Through choosing the American decimal system only, it will result in just one set of SPE maps and one set of standard deviations maps created from this procedure. Whereas, through choosing the Brazilian decimal system too, it will result in two sets of SPE maps and two sets of standard deviations maps created from this

procedure. One of those sets will use the Brazilian system while the other one will use the American system.

Its possible also, chooses between build a set of cell composing the whole spectrum or build two hemispheres only, one negative and other positive. It is applied to the standard deviation maps associates to the SPE maps too.

Clicking on the reset button all fields will be reset to the default values, while clicking the exit button will close this form. The progress bar provides an idea of the status during the evaluations and the information field informs about errors, util information or finishing evaluations. The include cells blanks in this form are used to choose the interval of interest of the eight possible cells.

The load button opens a default windows open dialog box to help finding the path to the lines file. It is possible also to type the complete path directly on the blank "Build Info File". Finally, after obtaining the complete path to the lines file and filling up de "Include cell from - to" blanks, this procedure can run through clicking on the build button.

10.1. The Process of Building the SPECTRA Maps

This evaluation starts with two checks of precedence. The first check is if exist the RESUME.SPE file, meaning that the "SPECTRA Map" ran first. Thereafter, this information file is read. The second check is if exist the RFACTOR.SPE file, meaning that the "Shrink" (Decrease Time Resolution of SPECTRA Map) ran first. Then, this information file is read. After these checks a verification of the cell intervals is done. It first verifies if the initial cell number is less then the final cell number, and changes it if necessary. Then the maximum and minimum limits are checked. So, the lines file is opened and its values are transferred to a vector, which will be used in the right time.

In the sequence there are two ways to follow. The default way comes when the "Only two hemispheres" box is not checked. In this case a set of GxCx.DAT and GxCxSD.DAT files is created in the main data directory. The number of GxCx.DAT files, which is the same of the GxCxSD.DAT files, is determined by the number of gates specified in the "SPECTRA Map" procedure multiplied by the number of cells in the interval specified in the field "Include cell from - to". The files GxCx.DAT are ASCII files in a matrix format and will contain the SPECTRA maps per gate divided in a set of cells belonging to the same gate at the end of the procedure. In the same way the GxCxSD.DAT are ASCII files in a matrix format and

will contain the standard deviation SPECTRA maps per gate divided in a set of cells belonging to the same gate at the end of the procedure. Besides, if the Brazilian decimal system button is checked, a set of GxCxBR.DAT files and a set of GxCxSDB.DAT files are also created like the first ones.

Alternatively, the other way comes when the "Only two hemispheres" box is checked. In this case there will be an extra check. The program will verify the necessity of having only the positive hemisphere, only the negative hemisphere or both. Then, the corresponding set of files is created in the main directory. This set can be composed by PHGx.DAT and PHGxSD.DAT files (respectively the positive hemisphere for each gate and its standard deviation associated), by NHGx.DAT and NHGxSD.DAT files (respectively the negative hemisphere for each gate and its standard deviation associated) or by both sets of files. As well as earlier, if the Brazilian decimal system button is checked, others sets of SPE maps files and standard deviation files are also created like the first ones. The last ones are named PHGxBR.DAT and PHGxSDB.DAT for the positive hemisphere and NHGxBR.DAT and NHGxSDB.DAT for the negative hemisphere.

Now, the building of the SPECTRA and standard deviation maps per gate is performed through all directories from the file list of directory names. In each directory all DTGxxCx.DAT and SDGxxCx.DAT ASCII files are read and its values transferred to the corresponding files in the main directory. By default the data are transferred to the GxCx.DAT and GxCxSD.DAT files. However, if "Only two hemispheres" box is checked the data are transferred to the corresponding hemisphere files: positive (PHGx.DAT and PHGxSD.DAT) for cells from 1 (one) through 4 (four) and negative (NHGx.DAT and NHGxSD.DAT) for cells from 5 (five) though 8 (eight). During this transference the data gaps at the end of each directory of data are filled up owing the number of lines to add.

Furthermore, if Brazilian decimal system button is checked, the extra files in the main directory (GxCxBR.DAT and GxCxSDB.DAT, or PHGxBR.DAT, PHGxSDB.DAT, NHGxBR.DAT and NHGxSDB.DAT), which correspond to the SPECTRA and standard deviations associated, are filled up with the same values than the last ones. But these ones use the Brazilian decimal system.

11. PROGRAM ERROR MESSAGES

Here there are the error messages that the RESCO 2000 - Data Analysis Program can produce. Reading these messages it is easier to identify the source of possible error during the evaluations.

ERROR: Beam position not correct!
ERROR: Can't create information file!
ERROR: Can't create temporary rti file to FFT analysis!
ERROR: Can't create temporary spe file to FFT analysis!
ERROR: Could not change directory!
ERROR: Could not create cell.dat file!
ERROR: Could not create dtgate.dat file!
ERROR: Could not create dtrti.dat file!
ERROR: Could not create reduce factor file!
ERROR: Could not create report file!
ERROR: Could not create resume.fft file!
ERROR: Could not create resume.get file!
ERROR: Could not create resume.rti file!
ERROR: Could not create resume.spe file!
ERROR: Could not create rti.dat file!
ERROR: Could not create rtimap.dat file!
ERROR: Could not create rtisd.dat file!
ERROR: Could not create sdspe.dat file!
ERROR: Could not create spex.dat file!
ERROR: Could not create temporary attenuation file!
ERROR: Could not create the new cell files!
ERROR: Could not create the new cell SD files!
ERROR: Could not create the new RTI Map file!
ERROR: Could not create the new RTI SD Map file!
ERROR: Could not create the new SPE SD Map!
ERROR: Could not create the SPE SD Map!
ERROR: Could not create time file!
ERROR: Could not leave directory!
ERROR: Could not obtain directories information!
ERROR: Could not open attenuation file!
ERROR: Could not open directory information file!
ERROR: Could not open dtg.dat file!
ERROR: Could not open dtrti.dat file!
ERROR: Could not open gate.dat file!
ERROR: Could not open head file!
ERROR: Could not open lines informations file!
ERROR: Could not open number of file information!
ERROR: Could not open reduce factor file!
ERROR: Could not open report file!
ERROR: Could not open resume file!
ERROR: Could not open resume.get file!
ERROR: Could not open RTI factors file!
ERROR: Could not open rti.dat file!
ERROR: Could not open sdgatcel.dat file!
ERROR: Could not open sdrti.dat file!
ERROR: Could not open sdspe.dat file!
ERROR: Could not open SPE factors file!
ERROR: Could not open spex.dat file!
ERROR: Could not open temporary attenuation file!
ERROR: Could not open the cell files!
ERROR: Could not open the cell SD files!
ERROR: Could not open the new SPE SD Map!
ERROR: Could not open the RTI Map file!
ERROR: Could not open the RTI SD Map file!
ERROR: Could not open the SPE SD Map!
ERROR: Could not open time file!
ERROR: Could not read temporary file!
ERROR: FFT Analysis must come before RTI Map!
ERROR: FFT analysis must come before SPE!

ERROR: FFT Analysis must come before Spectra!
ERROR: GET Information must come before FFT Analysis!
ERROR: GET information must come first!
ERROR: Head file not closed ok!
ERROR: Memory allocation error of farrayin!
ERROR: Memory allocation error of parrayout!
ERROR: Memory allocation error of rdata!
ERROR: Not enough data in file!
ERROR: Number of gates beyond the limits!
ERROR: Problems writing data!
ERROR: The attenuation file is needed!
ERROR: The attenuation file is no present or name mistake!
ERROR: Unable to open head file!

12. CONTACTING INPE'S TEAM

We encourage you to see the "About" item on "Help" menu of the RESCO 2000 program. This will keep you actualized about the versions, which you are using. The "About" item is located on the "Help" menu as show in the figure 5.

You can also contact the INPE's Coherent Radar Team through one of the following way listed bellow.

Conventional mail address:

Instituto Nacional de Pesquisas Espaciais - INPE
Ciências Espaciais e Atmosféricas - CEA
Divisão de Aeronomia - DAE
São José dos Campos, SP - Brazil
P. O. Box 515
Zip Code 12201-970

Calling or faxing to:

Phone +55 12 345 6796
Fax +55 12 345 6990

On Internet

By the following e-mail:

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Dr. José H. A. Sobral	sobral@dae.inpe.br

Or in these pages:

DAE Home Page	http://www.dae.inpe.br/
Clezio's Home Page	http://www.dae.inpe.br/~clezio/