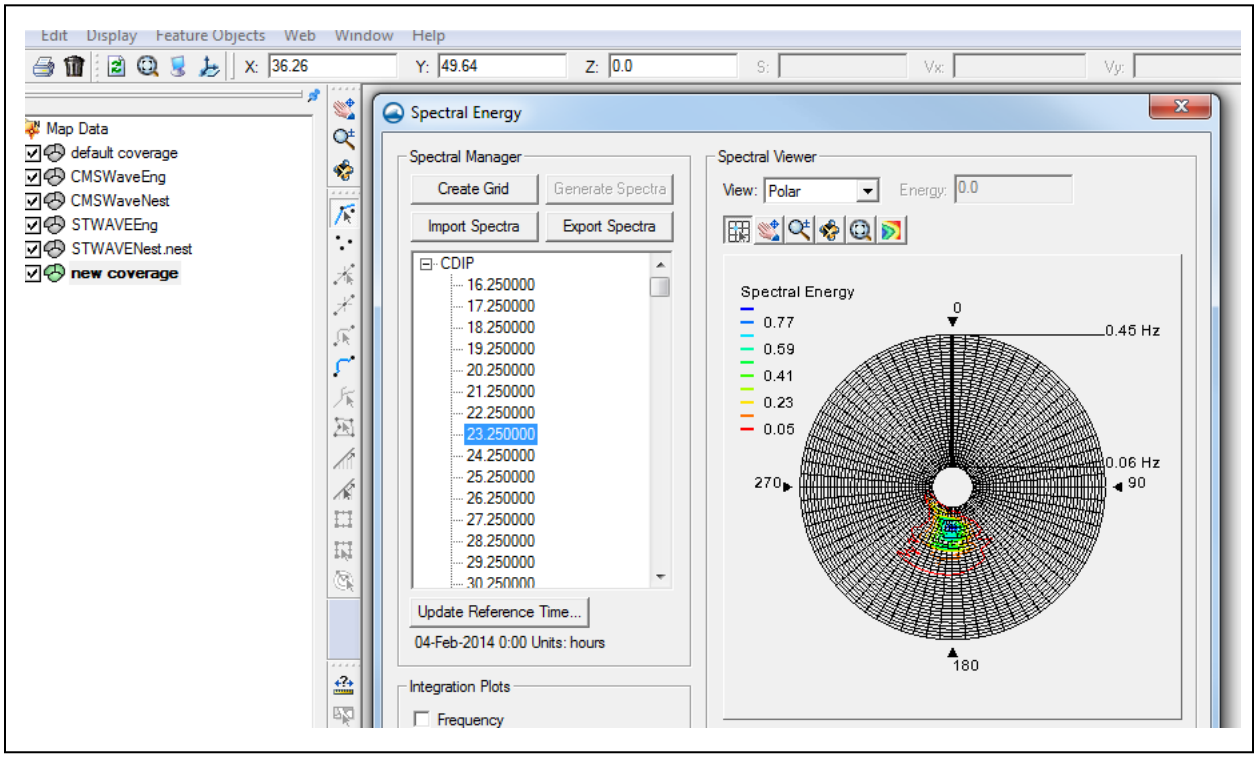
SMS 11.2 Tutorial

Importing Spectral Data



Objectives

This tutorial shows a few different ways to collect spectral data and import it into SMS. SMS currently supports spectral data from files used for STWAVE, CMS-Wave, BOUSS-2D, and the Coastal Data Information Program (CDIP). This tutorial steps through each type.

Prerequisites

- Overview

Requirements

- STWAVE
- Mesh Module
- Map Module

Time

- 15-30 minutes

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1 Introduction

SMS has the capacity to open spectral data coming from a variety of sources. The data sources covered in this tutorial are:

- STWAVE ENG files
- STWAVE nesting files
- CMS-Wave ENG files
- CMS-Wave nesting files
- Directional Wave Spectrum files
- Coastal Data Information Program data

2 STWAVE ENG Files

STWAVE ENG files contain spectral data for a single location. SMS can be used to export spectral data in the STWAVE ENG format.

1. Go to *File* | **Open**, select "STWAVEEng.eng," and click **Open**.
2. The *Open Files* dialog will appear. SMS has the option to open multiple spectral files simultaneously and put all of the data into one coverage. For this case, only open one file. Click **OK**.
3. In the *Spectral Coverage* dialog, make sure the combo box is set to "Create new coverage" and select **OK**.

STWAVE ENG files may contain time stamps for each time step. If the file has an 8 or 12 digit time stamp, SMS will read it in and assign the times accordingly. If the ENG file is not using time stamps, it will just have an integer ID for each set of data. In this case, it's necessary to give SMS a reference time, and SMS will treat each ID as the number of hours past the specified reference time.

4. Click **OK** on the reference time warning dialog.
5. Select a reference time in the *Time Settings* dialog and click **OK** again.

The spectral data has been read in now and is assigned to a node in the coverage named "STWAVEEng." The location of the node was specified in the STWAVE file. Next is to view the data.

6. Select the "STWAVEEng" coverage to make it active in the Project Explorer, then use the **Frame** tool to center the node.

7. Use the **Select Feature Point** tool and double-click on the node. This will bring up the *Spectral Energy* dialog (Figure 1).

The *Spectral Energy* dialog is used to visualize the spectral data, as well as create, edit, or import spectral data. The dataset that was just read in is listed on the left as "1.000000", meaning that its time is 1.0 hours past the reference time displayed below the list control. The dataset contours are shown on the right.

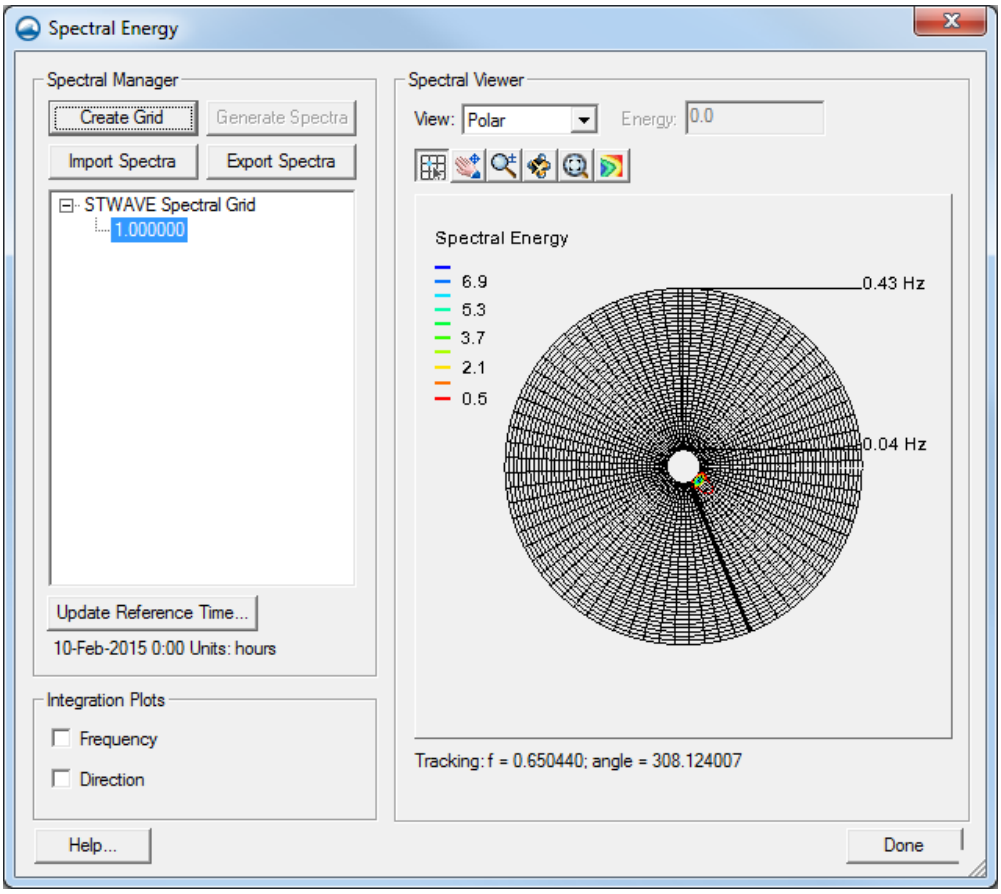

Figure 1 Spectral Energy dialog

STWAVE ENG files can also be imported on specific nodes in case the user wants to assign the spectral data to a location other than the one specified in the ENG file.

8. Exit out of the *Spectral Energy* dialog by clicking **Done**.

9. Create a new node using the **Create Feature Point** tool.

10. Double-click on the node with the **Select Feature Point** tool. This brings up the *Spectral Energy* dialog again. This time, the list on the left should be empty because no data has been assigned to the node yet.
11. Click on the **Import Spectra** button to bring up the *Import Spectra* dialog.
12. Make sure the file type is set to STWAVE (*.eng), click on the **File Selector** button, select "STWAVEEng.eng", and click on **Import**.
13. The *Open Files* dialog will appear. As before, multiple files can be read in and assigned to this node, but only read in one file at this time. Click **OK**.
14. A warning dialog will appear. Click **OK**.
15. The *Time Settings* dialog will appear. Once again, set a reference time, and click **OK**.
16. The spectral data has been imported and should be listed on the left. After viewing the data, click **Done** to exit the dialog.

3 STWAVE Nesting Files

STWAVE nesting files contain spectral data for one or more locations. They are created by running STWAVE with specified nesting points or by exporting SIM files using SMS.

1. Go to *File* | **Open** and select "STWAVENest.nest.out."
2. Click **Open** to bring up the *Open Files* dialog and then click **OK**.
3. In the *Spectral Coverage* dialog, make sure the combo box is set to "Create new coverage" and click **OK**. A new coverage named "STWAVENest.nest" should be in the Project Explorer and it should contain three nodes, representing the three nesting points in the file.
4. View the spectral data by double-clicking on one of the nodes using the **Select Feature Point** tool. In the *Spectral Energy* dialog, notice that this file has data with two time steps. It's possible to see contours for each time step by clicking on the desired time step in the list on the left.
5. To exit the *Spectral Energy* dialog, click **Done**.

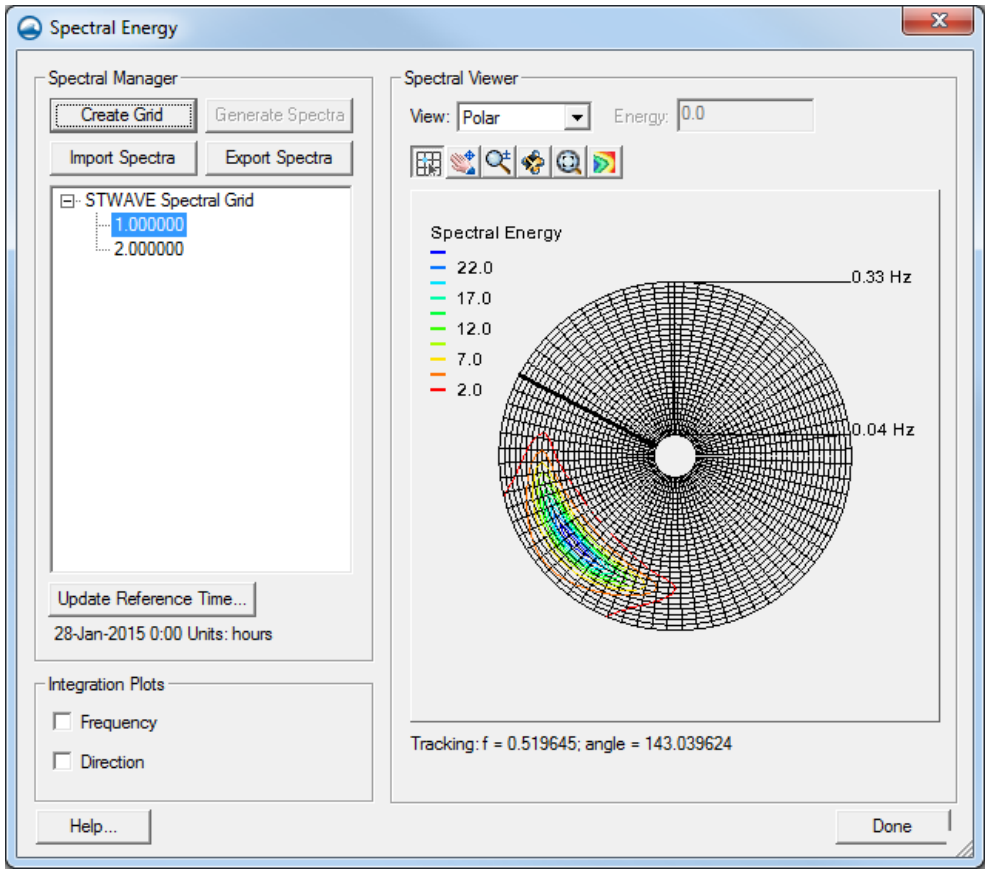

Figure 2 Spectral Energy dialog showing two entries

4 CMS-Wave ENG Files

CMS-Wave ENG files contain spectral data for a single location. SMS can be used to export spectral data in the CMS-Wave ENG format.

1. Go to *File* | **Open**, select "CMSWaveEng.eng," and click **Open**.
2. In the *Select Spectral File Format* dialog, set the file type to "CMS-Wave" and click **OK**.
3. In the *Spectral Coverage* dialog, make sure the combo box is set to "Create new coverage" and select **OK**.
4. CMS-Wave ENG files do not specify the grid angle, so it's necessary to enter one here. For this case, set the grid angle to "110.0" in the *Grid Angle* dialog and click **OK**.

5. CMS-Wave ENG files also do not specify the location of the spectral data. It's necessary to enter in the location manually. In the *Specify Location* dialog, enter in "0.0" for *X* and "0.0" for *Y*.

The spectral data has been read in now and is assigned to a node in the coverage named "CMSWaveEng". The data can be viewed in the same way as the STWAVE ENG data previously.

CMS-Wave ENG files can also be imported on specific nodes by using the **Import Spectra** button in *Spectral Energy* dialog using the same process was used previously for the STWAVE ENG file.

5 CMS-Wave Nesting Files

CMS-Wave nesting files contain spectral data for one or more locations. They are created by running CMS-Wave with specified nesting points or by exporting sim files using SMS.

1. Go to *File* | **Open** and select CMSWaveNest.nst. Click **Open**.
2. The *Open Files* dialog will appear. Click **OK**.
3. In the *Spectral Coverage* dialog, make sure the combo box is set to "Create new coverage" and click **OK**.
4. A new coverage named "CMSWaveNest" should be in the Project Explorer and it should contain three nodes, representing the three nesting points in the file.
5. As before, the data can be viewed by double-clicking on one of the nodes using the **Select Feature Point** tool.

6 BOUSS-2D Directional Wave Spectrum (dws) Files

Directional Wave Spectrum files are created by SMS and can only be opened from the *Spectral Energy* dialog. These files are used for BOUSS-2D.

1. Create a new spectral coverage by right-clicking on "Map Data" and selecting **New Coverage**.
2. In the *New Coverage* dialog, select "Spectral," and click **OK.**
3. Select the new "Spectral" coverage and create a feature point using the **Create Feature Point** tool.
4. Double-click on the feature point using the **Select Feature Point** tool. The *Spectral Energy* dialog should appear.

5. In the dialog, click on the **Import Spectra** button to bring up the *Import Spectra* dialog.
6. In the *Import Spectra* dialog, set the file type to "Directional Spectrum File (*.dws)."
7. Click on the **File Selector** button, select "DWS.dws" and click **Open**.
8. Click **Import** to close the *Import Spectra* dialog.
9. The *Open Files* dialog will appear. Click **OK**.
10. A warning dialog will appear. Click **OK**.
11. It's necessary to specify a reference time for the dataset. In the *Time Settings* dialog, specify a time and click **OK** again.
12. Each dataset in the DWS file will be offset by a specified number of hours from the reference time. Set the offset of "1.0" in the *Time Increment* dialog and then click **OK**.
13. The datasets should now be listed on the left and displayed on the right. Click **Done** to exit the *Spectral Energy* dialog.

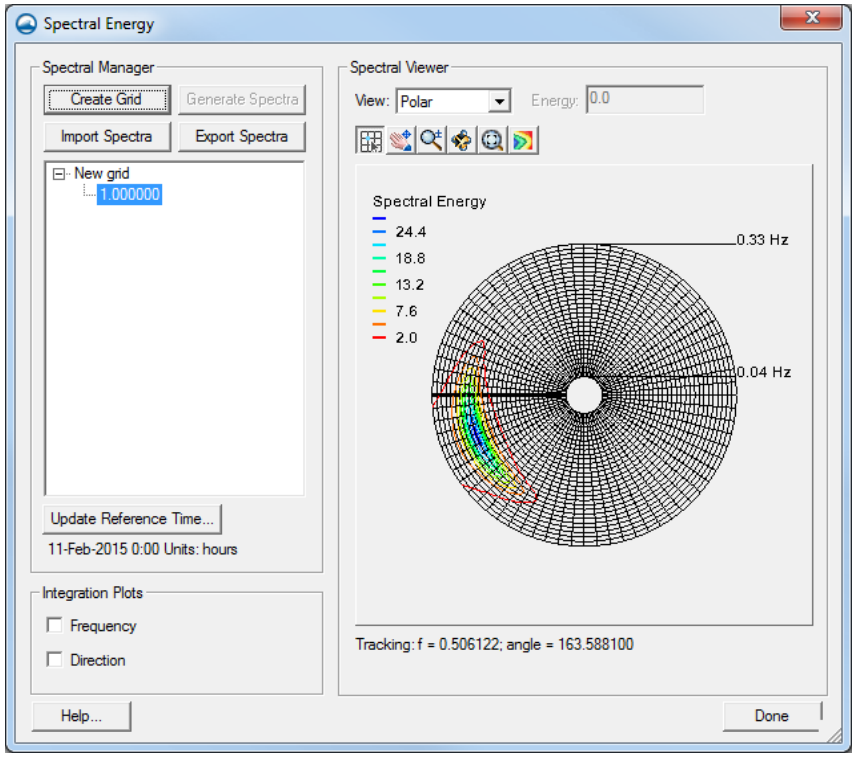

Figure 3 Spectral Energy dialog

7 Coastal Data Information Program

Spectral data from the Coastal Data Information Program (CDIP) can be downloaded from the internet (at https://cdip.ucsd.edu/) and then imported into SMS. For this tutorial, we downloaded spectral data for Hanalei, Hawaii for October 2-4, 2013.

1. Create another feature point in the spectral coverage using the **Create Feature Point** tool.
2. Double-click on it with the **Select Feature Point** tool to bring up an empty *Spectral Energy* dialog.
3. Click the **Import Spectra** button to bring up the *Import Spectra* dialog.
4. Set the file type to "Coastal Data Information Program CDIP (*.cdip)."
5. Click the **File Selector** button, select the "sp202p101_201310020000-201310042359.cdip" file in the *202 Hanalei Hawaii* folder,
6. Click **Open**.
7. Select **Import** in the *Import Spectra* dialog
8. Select **OK** in the *Open Files* dialog
9. In the *Times to Import* dialog, make sure the times in *Start time* and *End time* are valid (if the CDIP file is corrupted or empty, there will be unusual dates in these fields), and click **OK**.
10. In the *Spectral Energy* dialog, the datasets will be listed on the left and can be viewed on the right. When done viewing the spectral energy data, click **Done** to exit the dialog.

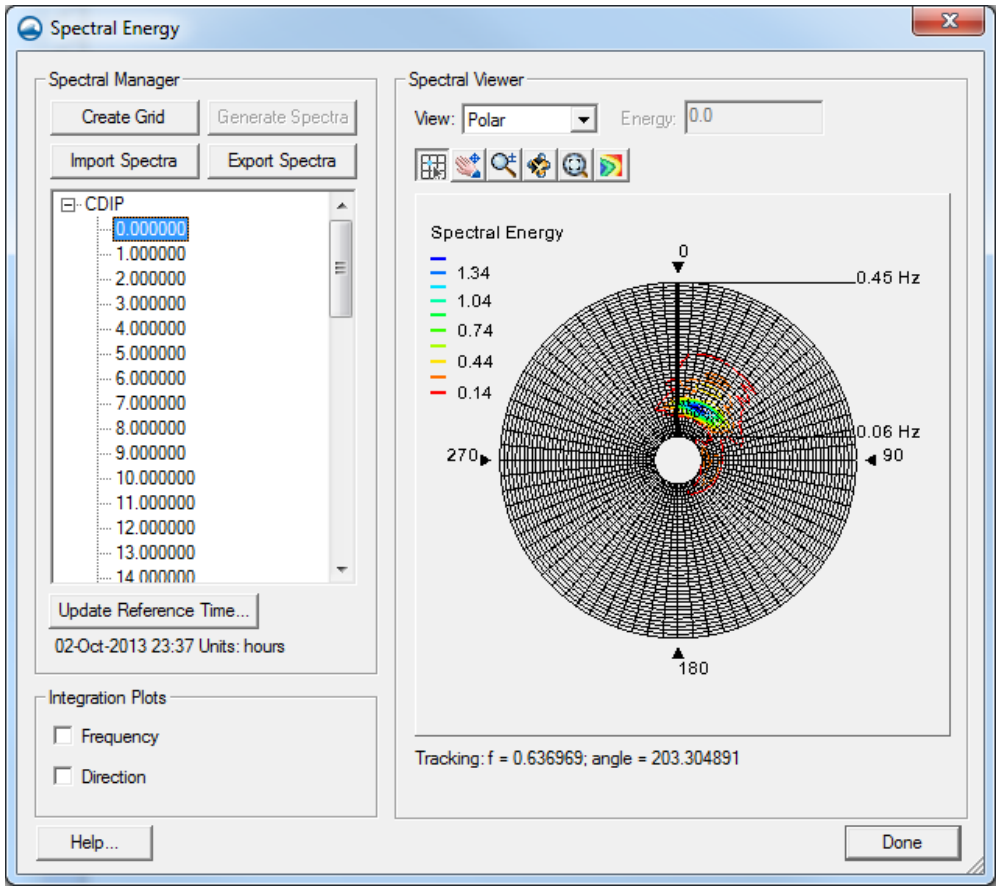

Figure 4 Spectral Energy dialog showing CDIP data from Hanalei, Hawaii

8 Conclusion

This concludes the *Importing Spectral Data* tutorial. It is not necessary to save the project, though this can be done if desired. The user may continue to experiment with importing spectral data into SMS, or exit the program.