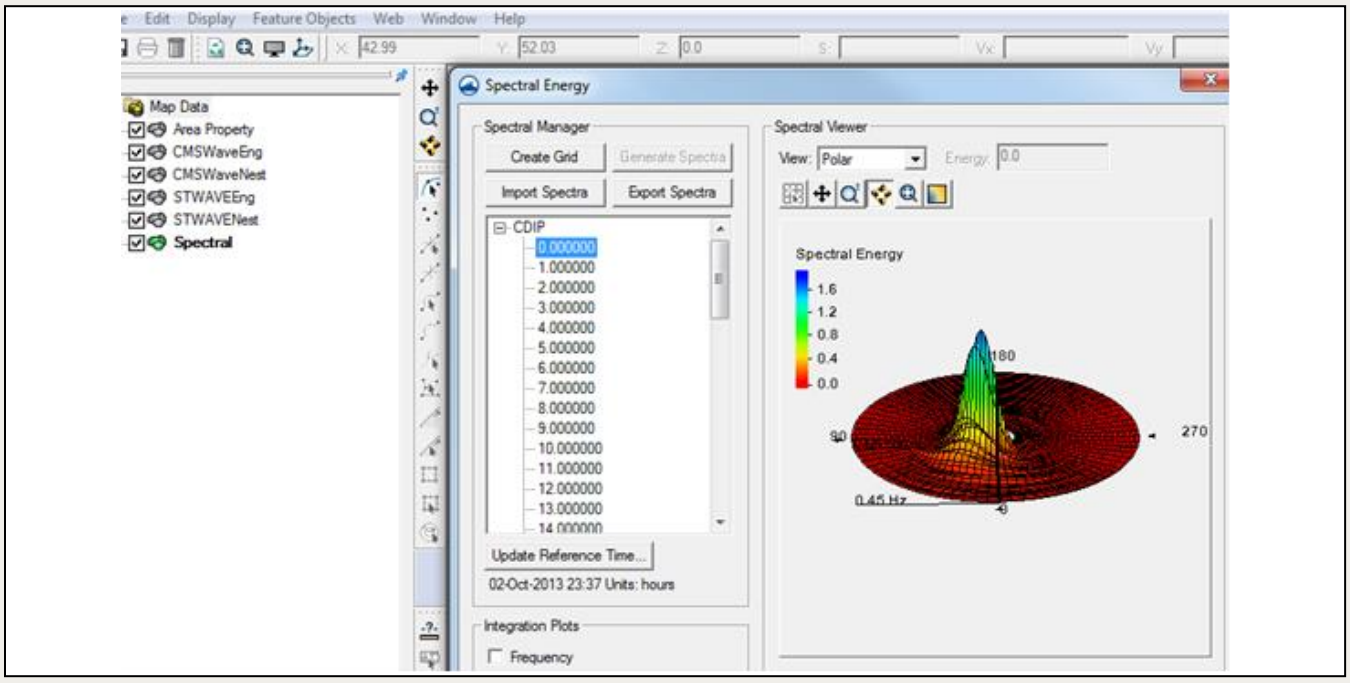
SMS 13.3 Tutorial

Importing Spectral Data

Using spectral data in SMS



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.

Prerequisite Tutorials

- Overview

Required Components

- SMS Core
- STWAVE, CMS-Wave, or BOUSS-2D Model & Interface

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

To complete the parts of the tutorial using STWAVE, CMS-WAVE, or BOUSS-2D, the model used in that section must be installed.

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.

To import spectral data in the STWAVE ENG format, a spectral coverage is required in the Map module. The coverage must have a feature point created at the location of the spectral data.

1. Right-click on "Map Data" in the Project Explorer and select **New Coverage** to open the *New Coverage* dialog.
2. In the *Coverage Type* section, select *Generic* | **Spectral**.
3. Click **OK** to exit the *New Coverage* dialog.
4. Select the "Spectral" coverage in the Project Explorer to make it active.
5. Using the **Create Feature Point** tool, create a new point in the spectral coverage.

The point will define the location of the spectral data. Next to import the data.

6. Using the **Select Feature Point** tool, double-click on the new node to bring up the *Spectral Energy* dialog.
7. Click **Import Spectra** to bring up the *Import Spectra* dialog.
8. In the *Select Spectral Energy File* section, select "STWAVE (*.eng)" from the *File type* drop-down.
9. Click the **File Selector** button to bring up the *Open* dialog.

10. Browse to the *data files*\ folder for this tutorial.
11. Select “STWAVEEng.eng” and click **Open** to exit the *Open* dialog and to read in the file.
12. Click **Import** to close the *Import Spectra* dialog and bring up the *Open Files* dialog.

SMS can open multiple spectral files simultaneously and put all of the data into one location. For this case, only open one file.

13. Click **OK** to close the *Open Files* dialog.

STWAVE ENG files may contain time stamps for each time step. If the file has an 8 or 12 digit time stamp, SMS will import it 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 is necessary to give SMS a reference time, and SMS will treat each ID as the number of hours past the specified reference time.

14. When advised that a reference time needs to be specified, click **OK**.
15. Accept the default *Reference time* in the *Time Settings* section and click **OK** to close the *Time Settings* dialog and finish importing the spectral data.

The spectral data has now been imported. The *Spectral Energy* dialog (Figure 1) is used to visualize the spectral data, as well as create, edit, or import spectral data Next is to view the data.

16. Expand the “STWAVE Spectral Grid” tree item on the left side of the dialog.
17. Select the dataset "0.0000".

The dataset is named "0.0000" because it is the time at the reference time displayed below the list control. The dataset contours are shown on the right.

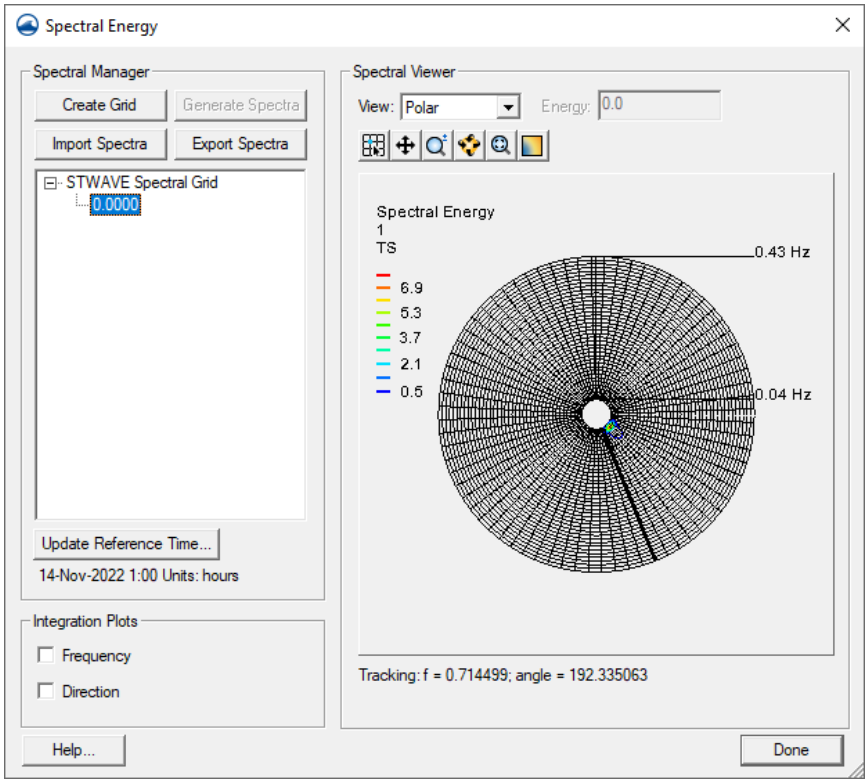

Figure 1 Spectral Energy dialog

18. After reviewing the data, click **Done** to exit the *Spectral Energy* 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. Select *File* | **Open…** to bring up the *Open* dialog.
2. Select "STWAVENest.nest.out" and click **Open** to exit the *Open* dialog and bring up the *Open Files* dialog.

A new coverage will be created.

3. Select "NEST" to make it active.
4. **Frame** the project.

"STWAVENest.nest" should contain three nodes, representing the three nesting points in the file.

5. Using the **Select Feature Point** tool, double-click on one of the nodes to open the *Spectral Energy* dialog.

Notice that this file has data with two time steps (see Figure 2). It's possible to see contours for each time step by clicking on the desired time step in the list on the left.

6. When done reviewing the contours for each time step, click **Done** to exit the *Spectral Energy* dialog.

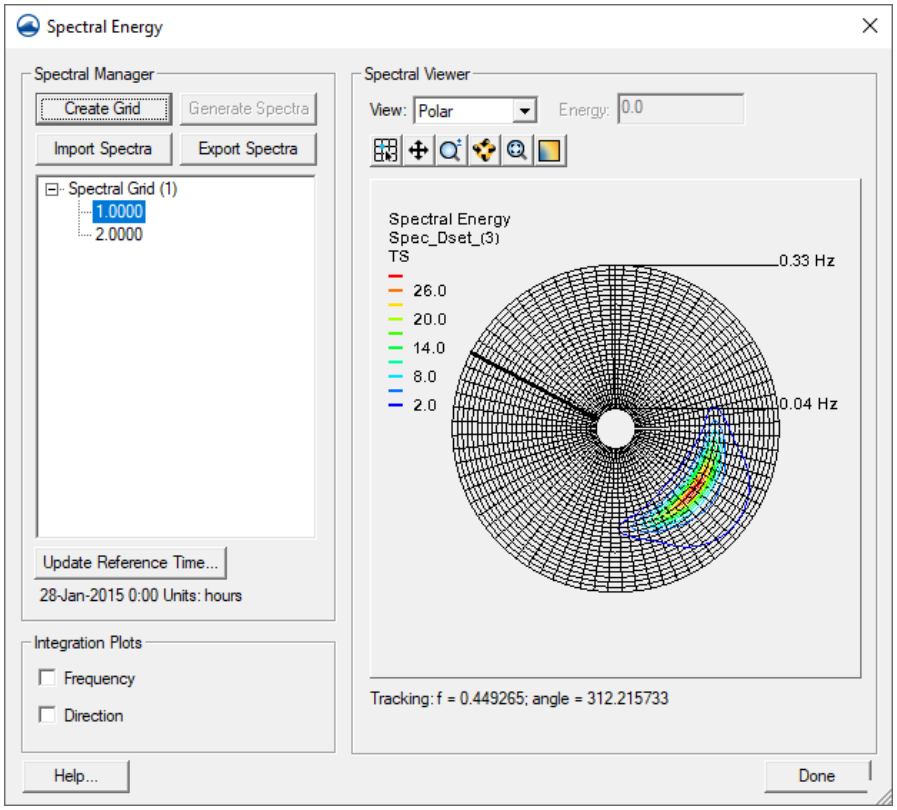

Figure 2 Spectral Energy dialog showing two entries

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. Click **Open** to bring up the *Open* dialog.
2. Select "CMSWaveEng.eng," and click **Open** to exit the *Open* dialog and bring up the *Select Spectral File Format* dialog.
3. Select "CMS-Wave" from the *Type* drop-down and click **OK** to close the *Select Spectral File Format* dialog and bring up the *Spectral Coverage* dialog.
4. Select "Create new coverage" from the *Select an option for the spectral coverage* drop-down.
5. Click **OK** to close the *Spectral Coverage* dialog and bring up the *Grid Angle* dialog.

CMS-Wave ENG files do not specify the grid angle, so one must be entered here.

6. Enter "110.0" as the *Angle* and click **OK** to close the *Grid Angle* dialog and bring up the *Specify Location* dialog.

CMS-Wave ENG files also do not specify the location of the spectral data, so it is necessary to manually enter the location coordinates.

7. Enter in "0.0" for both *X* and *Y*, then click **OK** to close the *Specify Location* dialog.

The spectral data is now imported 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 in Section 2, steps 9–10.

CMS-Wave ENG files can also be imported on specific nodes by using the **Import Spectra** button in the *Spectral Energy* dialog using process outlined for STWAVE ENG files in Section 2.

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. Click **Open** to bring up the *Open* dialog.
2. Select "CMSWaveNest.nst" and click **Open** to exit the *Open* dialog.
3. Select "CMSWaveNest – NEST" to make it active.
4. **Frame** the project.

"CMSWaveNest – NEST" should contain three nodes, representing the three nesting points in the file (Figure 3).

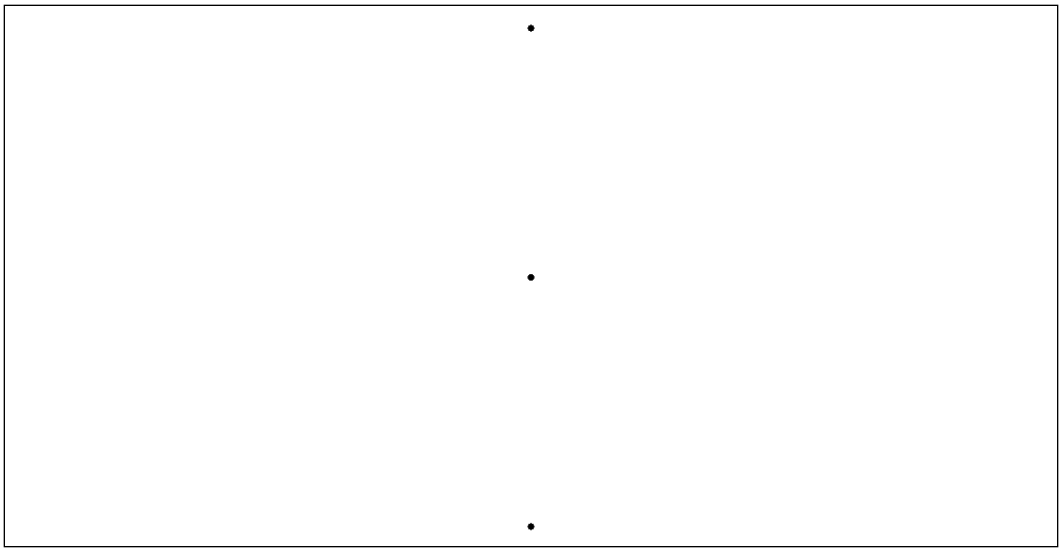

Figure 3 Three nodes in the CMSWaveNest coverage

5. As before, the data can be viewed by double-clicking on one of the nodes using the **Select Feature P**oint tool.

The data can be viewed in the same way as the STWAVE Nesting Files data in Section 3

6. When finished, click **Done** to exit the *Spectral Energy* dialog.

6 Directional Wave Spectrum Files

Directional Wave Spectrum (DWS) 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** to bring up the *New Coverage* dialog.
2. In the *Coverage Type* section, select *Generic* | **Spectral**.
3. Click **OK** to close the *New Coverage* dialog.
4. Select the new "Spectral(2)" coverage to make it active.
5. Using the **Create Feature Point** tool, create a feature point. The location of the point is not important.
6. Using the **Select Feature Point** tool, double-click on the feature point to open the *Spectral Energy* dialog.
7. In the *Spectral Manager* section, click **Import Spectra** to bring up the *Import Spectra* dialog.
8. In the *Select Spectral Energy File* section, select "Directional Spectrum File (*.dws)" from the *File type* drop-down
9. Click on the **File Selector** button to bring up an *Open* dialog.
10. Select "DWS.dws" and click **Open** to exit the *Open* dialog.
11. Click **Import** to close the *Import Spectra* dialog and bring up the *Open Files* dialog.

12. Click **OK** to close the *Open Files* dialog and bring up the *Time Settings* dialog.
13. When warned that a reference time must be specified, click **OK**.
14. Accept the default *Reference time* in the *Time Settings* section and click **OK** to close the *Time Settings* dialog and open the *Time Increment* dialog.

Each dataset in the DWS file will be offset by a specified number of hours from the reference time.

15. In the *Increment* section, enter "1.0" and click **OK** to close the *Time Increment* dialog.

The datasets should now be listed on the left and displayed on the right when selected, and will appear similar to those in previous sections.

16. Click **Done** to exit the *Spectral Energy* dialog.

7 Coastal Data Information Program

Spectral data from the Coastal Data Information Program (CDIP) can be downloaded from the internet[1] and then imported into SMS. For this tutorial, spectral data for Hanalei, Hawaii from October 2–4, 2013 will be used.

1. Select the new "Spectral(2)" coverage to make it active.
2. Using the **Create Feature Point** tool, create another feature point. The location is not important.
3. Using the **Select Feature Point** tool to bring up the *Spectral Energy* dialog.
4. In the *Spectral Manager* section, click **Import Spectra** to bring up the *Import Spectra* dialog.
5. In the *Select Spectral Energy File* section, select "Coastal Data Information Program CDIP (*.cdip)" from the *File type* drop-down.
6. Click the **File Selector** button to bring up the *Open* dialog.
7. Browse to the *Data Files\202 Hanalei Hawaii* folder and select "sp202p101_201310020000-201310042359.cdip".
8. Click **Open** to exit the *Open* dialog.
9. Click **Import** to close the *Import Spectra* dialog and bring up the *Open Files* dialog.
10. Click **OK** to close the *Open Files* dialog and bring up the *Times to Import* dialog.
11. 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.
12. Click **OK** to close the *Times to Import* dialog.

The datasets will be listed on the left and can be viewed on the right when time steps are selected (Figure 4).

13. When done viewing the spectral energy data, click **Done** to exit the *Spectral Energy* dialog.

[1] See https://cdip.ucsd.edu/.

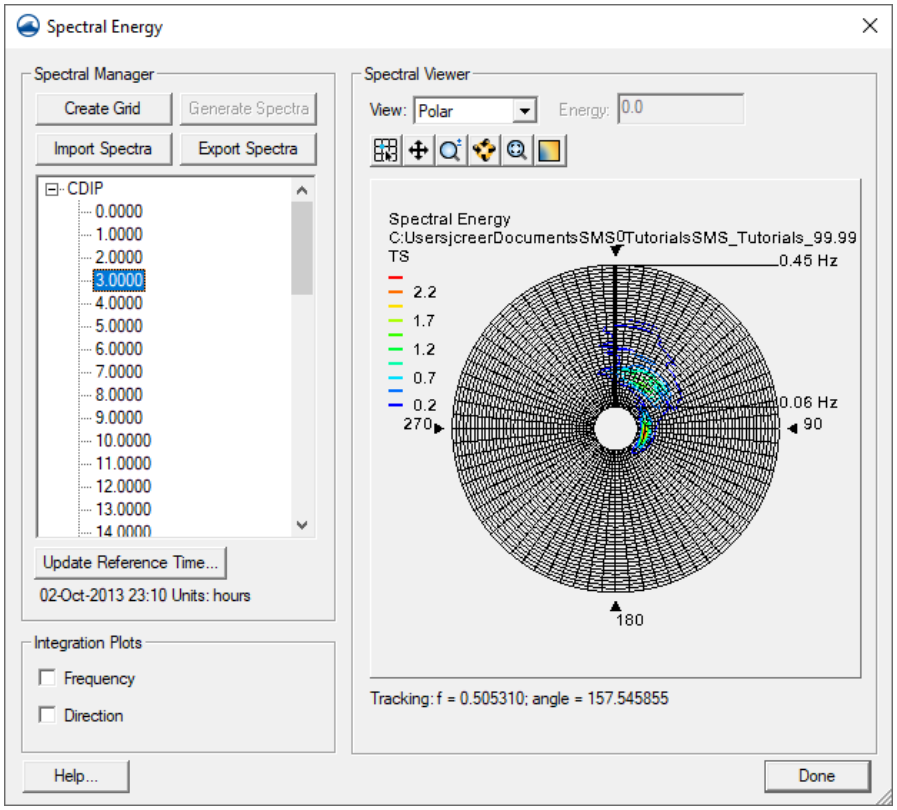

Figure 4 Spectral Energy dialog showing CDIP data from Hanalei, Hawaii

8 Conclusion

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