

Chapter 14

The SeaDAS Ship Track Function

Introduction

The SeaDAS Ship Track function provides the capability of over-plotting on a display window, external ASCII data contained in a text file. This ‘track’ data may not be cruise data, however the function’s option to connect points works well for ship track applications. The data values can be viewed and output as text, or three types of x,y plots can be created:

- track data and corresponding image data points vs. station number
- image data values lying beneath the input data track vs. image pixel number along the track
- a scatter plot of track data vs. underlying image data

Goal

The goal of this chapter is to demonstrate all the features of the Ship Track function using an example in which a sample text file containing *in situ* data is imported into SeaDAS. The data will be overlaid on a satellite image, three plots will be created, and the data will be output as text. Each of these steps is detailed in separate exercises:

- Importing ASCII formatted *in situ* data into SeaDAS
- Displaying the loaded *in situ* data on an image of a loaded satellite data product
- Displaying coincident along-track *in situ* and satellite data
- Displaying all of the along-track satellite data
- Displaying a scatter plot of *in situ* vs. satellite data
- Viewing and outputting coincident satellite and *in situ* data
- Viewing and outputting all of the along-track satellite data

14.1 Importing ASCII Formatted *in situ* Data Into SeaDAS

The first step for working with *in situ* data in SeaDAS is to load the data using the Ship Track function. The Ship Track function is accessed from the image display window via **Functions⇒Ship Track**. Steps to import the data are as follows:

- Load and display the chl_oc2 product in the MODIS Aqua A2002275181510.L2 file.
- Spawn the Ship Track window from the image display window via **Functions**⇒**Ship Track**.
- Use the Select button to choose the BIOCAMP0203_chl.dat *in situ* data file.
- Identify the columns for latitude, longitude, and parameter (Figure 14.1, Boxes A—C).
- Identify any header rows to ignore (Figure 14.1, Box D).
- Identify the number of rows to be read (Figure 14.1, Box E).
- Ingest the file into SeaDAS using the Load button. (Note: this only loads the data and does not yet overlay it on the displayed image)

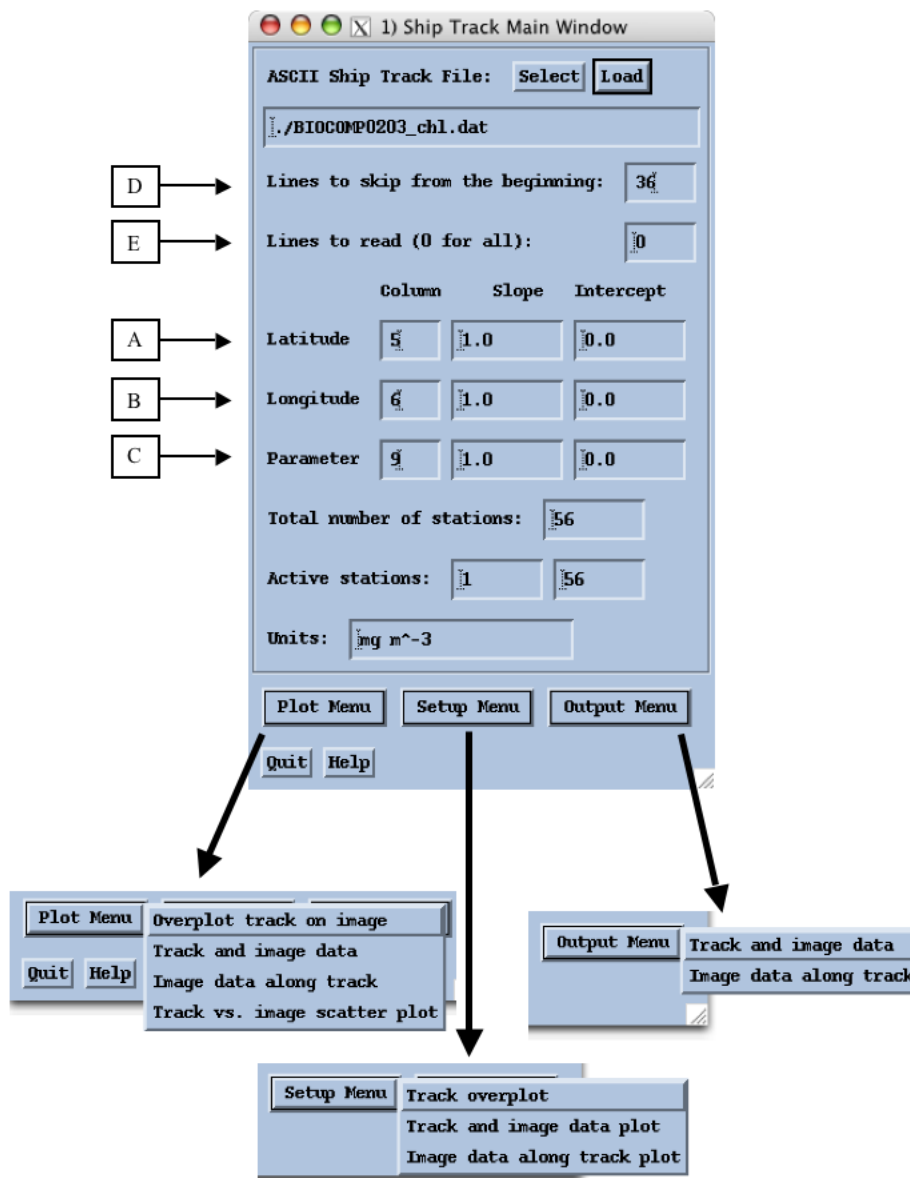


Figure 14.1: The Ship Track Function Main Window

The Ship Track function only accepts data as an external text file. This file must contain ASCII data formatted in any number of columns, but three of these columns must be latitude, longitude, and a geophysical data product. The columns may be in any order, since they can be specified within the Ship Track GUI (Figure 14.1, Boxes A—C). The file may contain other columns, but only one geophysical product can be loaded at a time (Figure 14.1, Box C).

The *in situ* data file may also contain information presented above or below the rows of data values of interest. For example, the data matrix within a standard SeaBASS file is preceded by a series of metadata headers. Such headers must be identified using the “Lines to skip from the beginning” text box (Figure 14.1, Box D). Footers must also be disregarded using the “Lines to read” text box (Figure 14.1, Box E). For example, a 35 line file with 10 header rows, 20 data rows, and 5 footer rows would have values of 10 and 20 in Boxes D and E of Figure 14.1, respectively. In Box E, a value of 0 is used to read all (non-header) rows.

The “Total number of stations” and “Active stations” text boxes will be filled after the file is loaded. Also, the geophysical data product’s units may be specified using the “Units” text box.

14.2 Displaying the Data Stations on the Satellite Image

Now that the image has been displayed and the *in situ* data has been loaded into SeaDAS, the data can be overlaid on the displayed image and output to a file as follows:

- a. Select **Plot Menu**⇒**Overplot track on image**.
(The track will now be displayed as a graphic on top of the image.)
- b. Select **Setup Menu**⇒**Track overplot**.
- c. Customize the symbol shape, color, and size.
- d. Choose whether or not to connect the symbols.
- e. Shift the symbols in the X (horizontal) or Y (vertical) direction.
- f. From the image display window, select **Functions**⇒**Output**⇒**Display (or, Graphics)**.

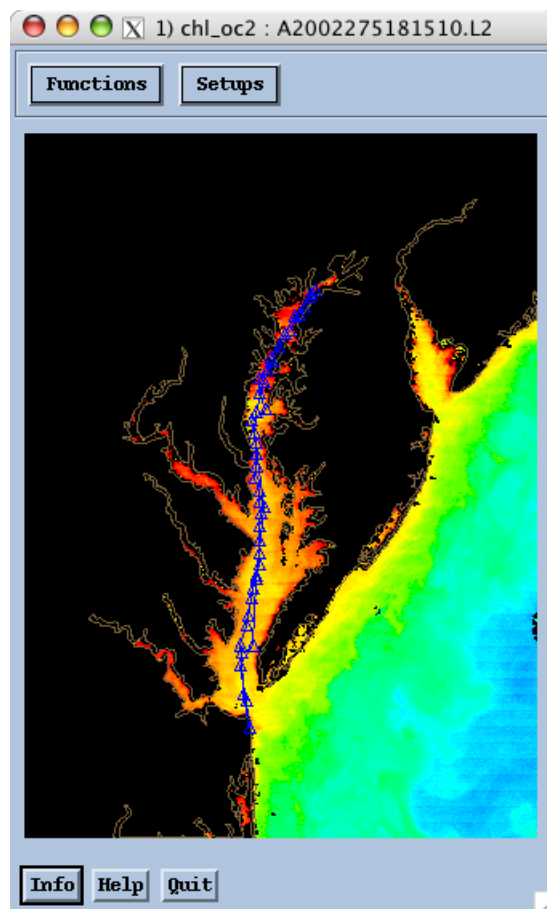


Figure 14.2: Overplotting a Track

14.3 Displaying Coincident Along-Track *in situ* and Satellite Data

One Ship Track function feature allows for the *in situ* data and the corresponding image data to be plotted on a graph for comparison. For each *in situ* station, only the image data value of the **nearest** satellite pixel is considered as shown in Figure 14.3. Steps to create this plot-type are:

- a. Select *Plot Menu*⇒*Track and image data*.
- b. Select *Setup Menu*⇒*Track and image data plot*.
- c. Customize the symbol shape, color, and size.
- d. Choose whether or not to connect the symbols.
- e. Customize the plot titles and X- and Y-axis labels.
- f. Define the Y-axis (*in situ* data) units.
- g. Define the Y-axis data range.
- h. Customize plot titles, X- and Y-axis labels, Y-axis units, Y-axis data range.
- i. Apply a slope and intercept to the satellite data.
- j. Choose to combine the satellite and *in situ* data into a single plot (default is separate plots)
- k. From the plot window, select *Output* (PNG or PostScript).

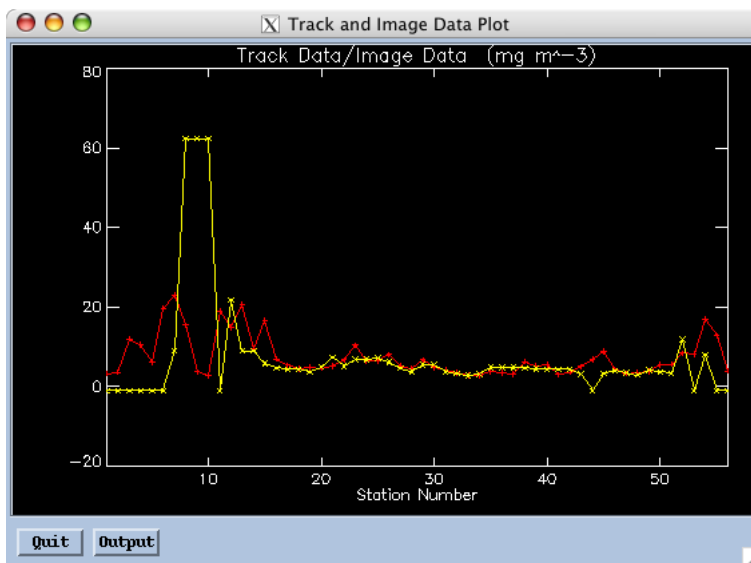


Figure 14.3: Track and Image Data Plot

14.4 Displaying the Along-Track Satellite Data

Another type of graph offered by the Ship Track function is a plot of the image data values lying beneath the input data track that is created by connecting the *in situ* data points. For this plot (Figure 14.4) **all** the satellite image data along the *in situ* ship track are included. To create this plot-type do the following:

- a. Select *Plot Menu*⇒*Image data along track*.
- b. Select *Setup Menu*⇒*Image data along track plot*.
- c. Customize the symbol shape, color, and size.
- d. Choose whether or not to connect the symbols.
- e. Customize the plot title and X- and Y- axis labels.
- f. Define the Y-axis (satellite data) units.
- g. Define the Y-axis data range.
- h. From the plot window, select *Output* (PNG or PostScript).

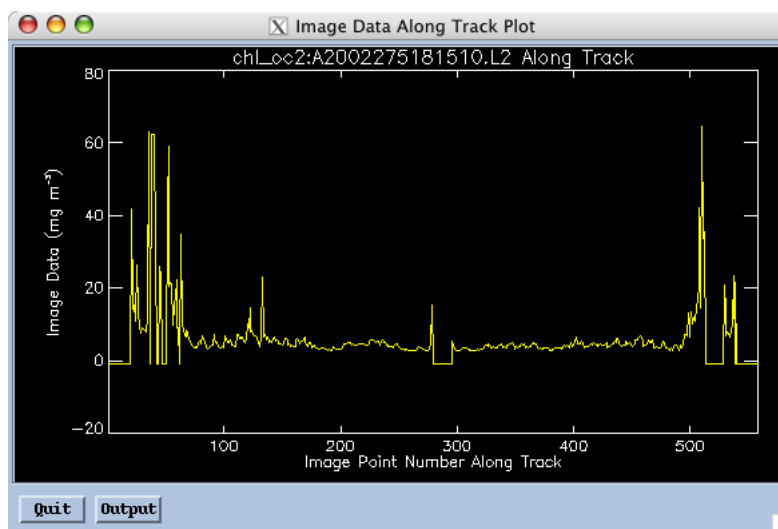


Figure 14.4: Image Data Along Track Plot

14.5 Displaying a Scatter Plot of *in situ* vs. Satellite Data

The final plot-type available (Figure 14.5) is a scatter plot of individual track data points vs. the underlying image data. For each *in situ* station, only the data value from the nearest satellite pixel is considered. To create a scatter plot:

- a. Select *Plot Menu*⇒*Track vs. image scatter plot*. (This figure cannot currently be customized.)
- b. From the plot window, select *Output* (PNG or PostScript).

14.6 Viewing/Outputting Coincident Satellite and *in situ* Data

The Ship Track function also provides two options for viewing and outputting data values and statistics as ASCII text. For the following option, *in situ* values and the corresponding data values from **only the nearest** satellite pixels are retrieved. Please refer to Figure 14.6. Steps to view/output coincident data:

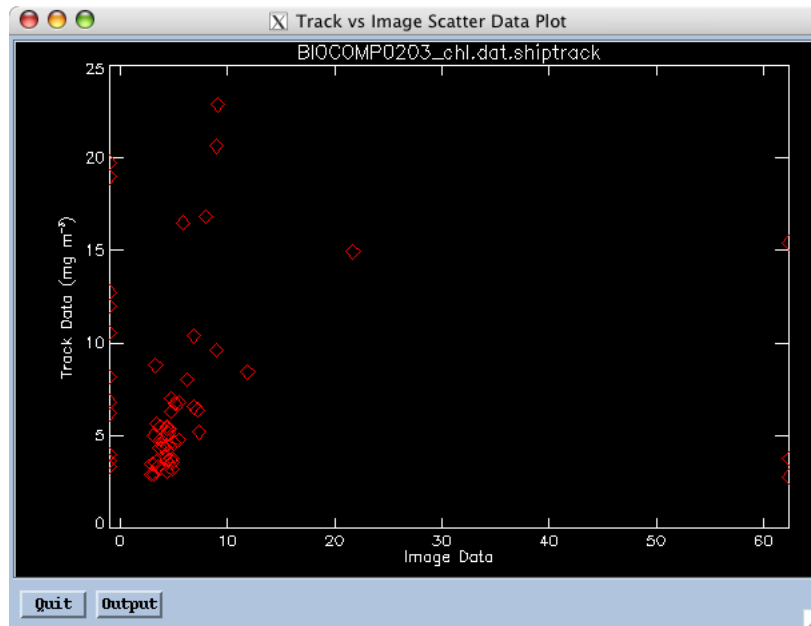
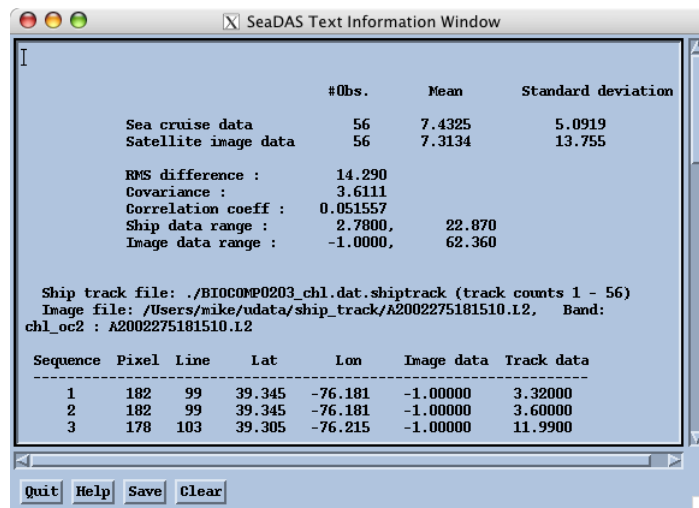


Figure 14.5: Track vs. Image Scatter Plot

- a. Select **Output Menu** ⇒ **Track and image data**.
- b. From the resultant GUI, select **Save** (file will be ASCII text).

The result is a data matrix with 1 row per *in situ* station and the following columns:

1. Station number
2. Satellite pixel number
3. Satellite line number
4. Latitude
5. Longitude
6. Satellite data value
7. *in situ* data value



A number of bulk statistical parameters for the full along-track series are also presented.

Figure 14.6: Track and Image Text Window

14.7 Viewing/Outputting All of the Along-Track Satellite Data

For the following data viewing and output feature, **all** satellite data along the *in situ* track are retrieved. Please refer to Figure 14.7. Steps to view/output all of the along-track data:

- a. Select **Output Menu**⇒**Image data along track**.
- b. From the resultant GUI, select **Save** (file will be ASCII text).

The result is a data matrix with 1 row per satellite observation and the following columns:

1. Sequential pixel number along the entire track
2. Sequential pixel number along the current track segment
3. Satellite pixel number
4. Satellite line number
5. Latitude
6. Longitude
7. Satellite data value
8. Distance along track in kilometers

A number of bulk statistical parameters for the full along-track series are also presented.

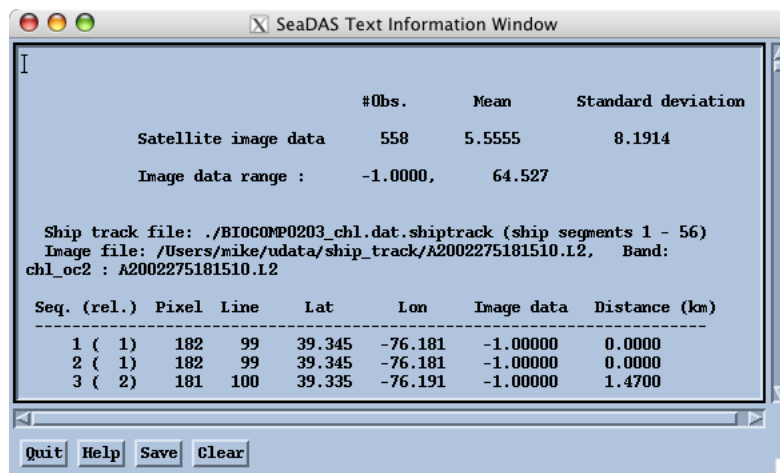


Figure 14.7: Image Data Along Track Text Window