

## ADVANCED INQUIRIES IN ALBEDO: PART 2

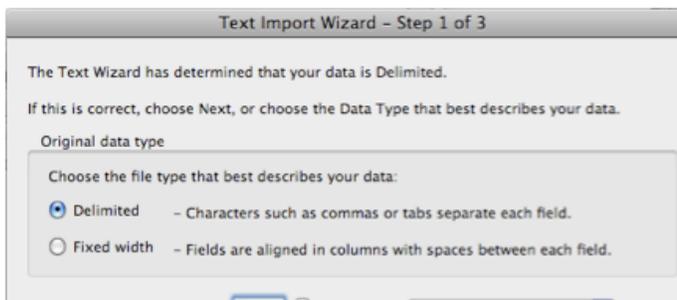
### EXCEL DATA PROCESSING INSTRUCTIONS

Once you have downloaded a MODIS subset, there are a few steps you must take before you begin analyzing the data. Directions for processing the data are below. *\*\*Disclaimer: Depending on your version of Excel, these instructions may not completely apply. If this is the case, use them as a general guide along with resources available on the web through google searches.\*\**

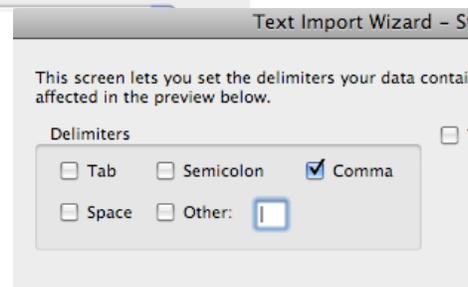
#### **Part I: MODIS Land Product ASCII Data Processing:**

1. In order to open an ASCII file in Excel, follow these steps:

- Open Excel, go to Data→ (Mac only: Get External Data→) Import Text File.
- In the Open window, navigate to wherever the .asc file is on your computer.
- Change from ‘.txt’ or ‘Text Files’ to ‘All Files’ in the drop down bar of the folder directory
- Highlight your data file and click ‘Get Data.’
- A window will pop up, make sure ‘Delimited’ is selected under file type, then click ‘Next.’



- Under the Delimiters section, click the box next to ‘Comma’ and click Finish. (If another box pops up, click ‘Okay’).

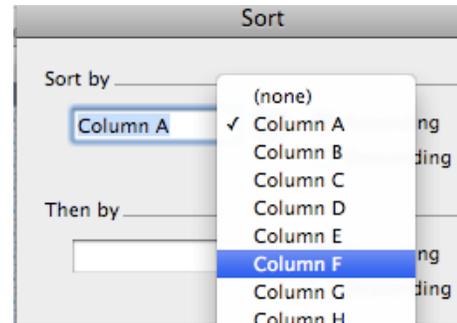


- Your data should now appear in the excel sheet. Save the file (File→Save As) on your computer in a place you can locate again.

2. You will notice that this data file does not come with column names. The first 6 columns are information about the data (in order): A Unique Row ID, MODIS Product Code, Acquisition Date, Coordinates of Center Pixel, MODIS Processing Date, and the Data Type. The following columns contain the data for each pixel in the area that you selected (this will be only one column if you selected a spatial coverage of 0 km; otherwise, there will be multiple columns, with the center column being the pixel at your location of interest).

3. In order to analyze the data for one data type, you will need to sort the data by column F, or the Data Type. First choose the data type you are interested in investigating (for example, NDVI, or shortwave\_black albedo). Then follow these steps to sort your data:

- Highlight **ALL** of the data (this is very important!)
- Go to Data→Sort
- In the Sort window, choose ‘Column F’ in the first box.
- Click ‘OK’



4. To avoid confusion, we suggest that before you start analyzing, you copy the data specific to the data type you are interested in to another Sheet in the document.

- Scroll through the document to find the data type (under Column F) you are interested in.
- Highlight only the rows that have that data type.
- Then go to File→Copy, then click open a new sheet tab at the bottom of the screen (the tab with a ‘+’ on it) and paste the data there.

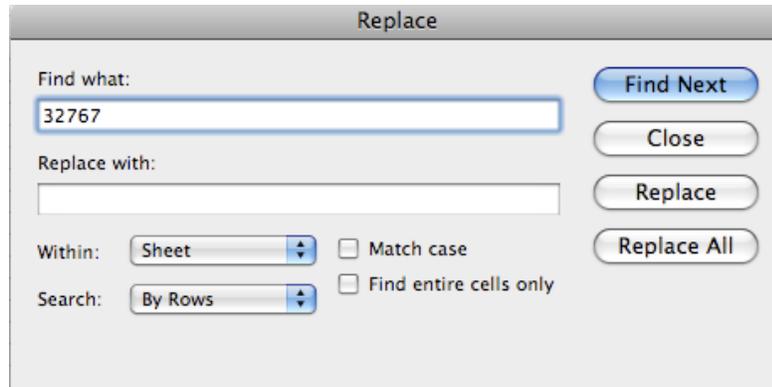
5. In order for Excel to recognize the date, you will have to remove the ‘A’ and reformat the date. To do this:

- Highlight Column D (the Coordinates column) and go to Insert→Column. This will insert a column after the Date column (See Figure- Step 1).
- Now highlight the Date column (Column C), and go to Data→Text to Columns
- In the Text to Columns window, make sure ‘Delimited’ is selected under file type, then click ‘Next’
- Under the Delimiters section, click ‘Other’ and type the capital letter ‘A’ into the box
- Click ‘Next’ and then click ‘Finish’
- The ‘A’ should now have disappeared and Column C should be empty (See Figure- Step 2).
- To change the date into a format Excel recognizes, in Column C, Row 1 type (or copy and paste) the following formula: `=DATE(LEFT(D1,4),1,RIGHT(D1,3))` and hit return.
- Double click in the bottom right corner of the cell, and all of Column C should contain the correct date (See Figure- Step 3).

Step 1			Step 2			Step 3		
C	D	E	C	D	E	C	D	E
A2000049		Lat43.100982		2000049	Lat43.100982	<code>=DATE(LEFT(D1,4),1,RIGHT(D1,3))</code>	2/26/00	2000057 Lat43.100982
A2000057		Lat43.100982		2000057	Lat43.100982		3/5/00	2000065 Lat43.100982
A2000065		Lat43.100982		2000065	Lat43.100982		3/13/00	2000073 Lat43.100982
A2000073		Lat43.100982		2000073	Lat43.100982		3/21/00	2000081 Lat43.100982
A2000081		Lat43.100982		2000081	Lat43.100982		3/29/00	2000089 Lat43.100982
A2000089		Lat43.100982		2000089	Lat43.100982		4/6/00	2000097 Lat43.100982
A2000097		Lat43.100982		2000097	Lat43.100982		4/14/00	2000105 Lat43.100982
A2000105		Lat43.100982		2000105	Lat43.100982		4/22/00	2000113 Lat43.100982
A2000113		Lat43.100982		2000113	Lat43.100982		4/30/00	2000121 Lat43.100982
A2000121		Lat43.100982		2000121	Lat43.100982		5/8/00	2000129 Lat43.100982
A2000129		Lat43.100982		2000129	Lat43.100982		5/16/00	2000137 Lat43.100982
A2000137		Lat43.100982		2000137	Lat43.100982		5/24/00	2000145 Lat43.100982
A2000145		Lat43.100982		2000145	Lat43.100982			

6. Depending on what data product you have selected, there is one more processing step before you can start the analysis.

- If you have downloaded data on **vegetation indices**, keep in mind that the data is not yet scaled (the actual NDVI is the data value\*0.0001).
- The **albedo** data is scaled, but NA values (pixels where there is no data) are set to '32767'. These values need to be changed to blank cells. To do this, go to Edit→Replace. In the 'Find What' box, type in '32767' and leave the 'Replace With' box empty. Click 'Replace All.'

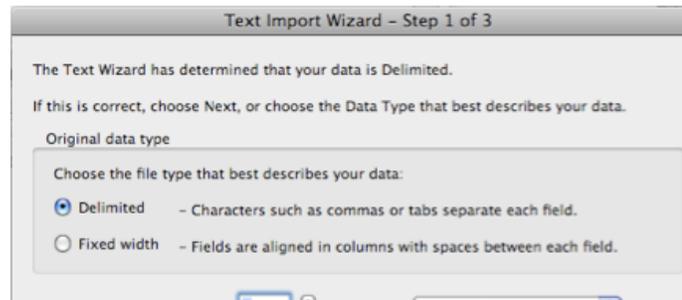


7. Good work! Your data is now ready for analysis! (For a few extra general Excel tips see the last page of this document)

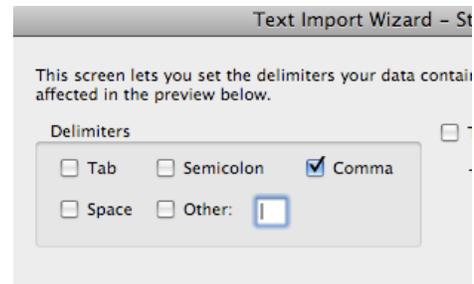
## Part II: MODIS Land Product Summary Statistics Data Processing:

1. In order to open your ASCII file in Excel, follow these steps:

- Open Excel. Then go to Data→ (Mac only: *Get External Data*→) Import Text File.
- In the Open window, navigate to wherever the .asc file is on your computer.
- Change from '.txt' or 'Text Files' to 'All Files' in the drop down bar of the folder directory (on a Mac, this is under 'Enabled')
- Highlight your data file and click 'Get Data.'
- A window will pop up, make sure 'Delimited' is selected under file type, then click 'Next.'



- Under the Delimiters section, unclick click the box next to 'Tab', and click on the box next to 'Comma.' Click Finish. (If another box pops up, just click 'Okay').



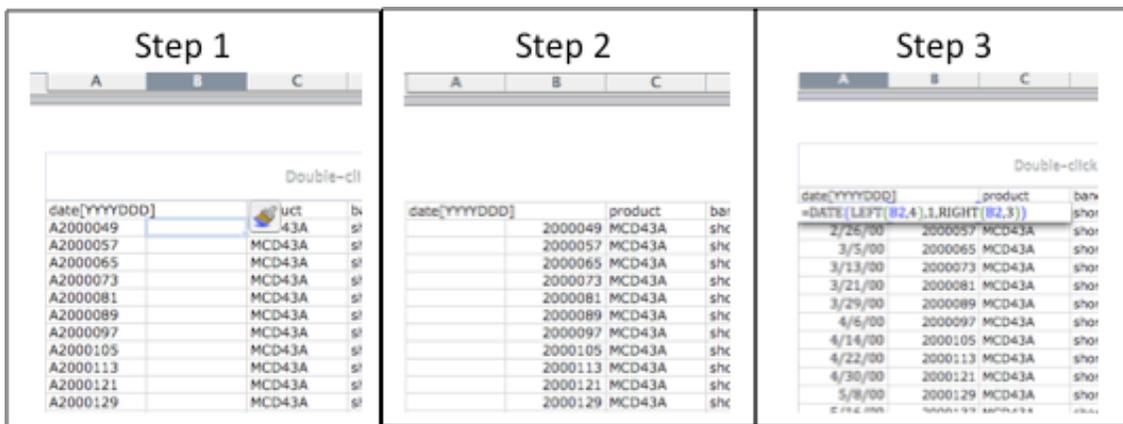
- Your data should now appear in the Excel sheet. Save the file (File→Save As) on your computer in a place you can locate again.

2. To avoid confusion, we suggest that before you start analyzing, you copy the data specific to the data type you are interested in to another Sheet in the document.

- Scroll through the document to find the data type (under the 'band' column) you are interested in.
- Highlight only the rows that have that data type (including the row with column names, but *not* including the row that says 'Statistics for Pixels Passing Quality Filter').
- Go to File→Copy, then click open a new sheet tab at the bottom of the screen (the tab with a '+' on it) and paste the data there.

3. In order for Excel to recognize the date, you will have to remove the 'A' from the date, and reformat the date. To do this:

- Highlight Column B (the product column) and go to Insert→Column. This will insert a column after the date column (see Figure- Step 1).
- Now highlight the Date column (Column A), and go to Data→Text to Columns
- In the Text to Columns window, make sure ‘Delimited’ is selected under file type, then click ‘Next’
- Under the Delimiters section, click ‘Other’ and type the capital letter ‘A’ into the box
- Click ‘Next’ and then click ‘Finish’
- The ‘A’ should now have disappeared and Column A should be empty (see Figure- Step 2).
- To change the date into a format Excel recognizes, in Column C, Row 1 type (or copy and paste) the following formula: =DATE(LEFT(B2,4),1,RIGHT(B2,3)) and hit return.
- Double click in the bottom right corner of the cell, and all of Column A should contain the correct date (see Figure- Step 3).



4. Good work! Your data is now ready for analysis! (For a few extra general Excel tips see the last page of this document)

## Using the Data in Excel: Suggestions and Tips

### 1. Make a Header Column

Highlight row 1 in your data table. Go to Insert → Rows. A new row will appear at the top of your Excel sheet. Enter appropriate column names.

### 1. Keep the header row (row #1) visible as you scroll through the data:

If you have column names in Column A, highlight the cell at Column A, Row 2. From the menu, choose Window → Freeze Panes. Anything visible in the window above and to the left of that cell will remain visible as you scroll down the worksheet.

### 2. Making Averages

In an empty cell, either below or to the right of your data, type ‘=AVERAGE(’, highlight the column of data over the period you are interested in, then type ‘)’. Hit return and the average value will appear in the cell. For example,

=AVERAGE(L2:L10)

### 3. Finding Minimum and Maximum values.

Use the same instructions as in #2, but using the formulas:

=MAX() or =MIN()

Highlight the data range you are interested in. Hit return and the cell will display the minimum or maximum value of that data.

### 4. Creating Month and Year columns

Click on the column *after* the DATE column and go to Insert → Columns. In row 2 of the new blank column, type =MONTH() or =YEAR() and highlight the DATE *only from that row*. Hit return. Drag from the right corner of the cell down to the bottom of the worksheet to fill in the rest of the column with the month or year. Don’t forget to add in a header name in that column in row 1.

### 5. Making and Using Pivot Tables

Pivot tables are an easy way to extract, organize, and summarize your data in Excel. They are useful, for example, in finding the average albedo by month for a year, or the average NDVI each year for the entire period.

To make a pivot table, first select the data range you are interested in by highlighting all the rows in that range. Next, go to the Insert ribbon and click the Pivot Table button. Specify the target location by selecting ‘New Worksheet.’ To fill in the pivot table, drag the variables (your column names) into the Pivot Table Field list panel, or the labeled areas of the pivot table. Put variables like Albedo or NDVI in the ‘Values’ or ‘Data Fields’ box, and variables like DATE or MONTH into the ‘Row Labels, or ‘Column Labels box. Click on the ‘Formula’ button in Options section of the Pivot Table ribbon to change what statistical formula is used (average, sum, etc.).

For a more detailed screencast tutorial, see <http://www.youtube.com/watch?v=7zHLnUCtfUk>

*Note:* If you have a different version of Excel, you may need to get into the PivotTable Wizard by going to View → Toolbars → PivotTable. Under ‘PivotTable’ click ‘Wizard.’