MINX Document 7
Managing Large Smoke Plume Projects

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MINX Plume Project Utilities - 1

MINX Plume Utilities are designed to help you prepare to retrieve smoke plume heights from MISR data when you have a project that is expected to involve hundreds or thousands of plumes. MISR product files are large, and downloading all the files covering a large project would be tedious. It would also be prohibitively time-consuming to manually search through these files for smoke plumes. (These utilities are unable to find dust or volcanic plumes.)
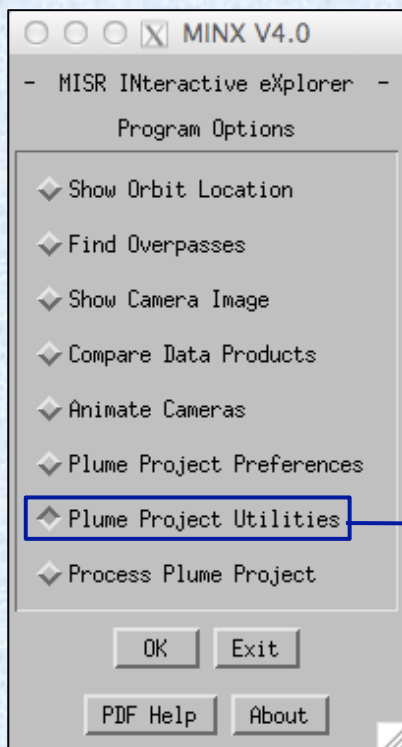
Instead, MINX lets you use MODIS Terra hotspot detections (also referred to here as fire pixels or thermal anomalies) to select MISR orbits and blocks that contain fires, which dramatically reduces MISR downloads. A side benefit is that MINX can incorporate MODIS fire radiative power (FRP) in its retrievals and report it with other smoke plume data.

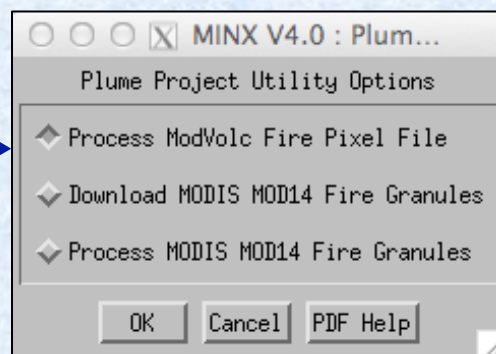MINX Plume Utilities can generate the following data:
- A file listing MISR orbits and blocks to order from the Langley DAAC;
- A file listing the orbits and block ranges of MISR data that contain fire pixels, which you can use to greatly speed the process of loading MISR data into MINX;
- A collection of files, one per MISR orbit, containing the coordinates of fire pixels and FRP (if available) that MINX can load and display over MISR imagery;
- A report containing details of the fire pixels excluded for various reasons;
- A file listing MODIS MOD14 granules to order (see discussion below).

MINX Plume Project Utilities - 2

Before using MINX Plume Utilities, fire pixel data must be downloaded. There are three alternatives (#2 is preferred method) for acquiring and processing MODIS fire pixel data:

○ ○ ○ [X] MINX V4.0

- MISR INteractive eXplorer -
Program Options

◇ Show Orbit Location
◇ Find Overpasses
◇ Show Camera Image
◇ Compare Data Products
◇ Animate Cameras
◇ Plume Project Preferences
◆ Plume Project Utilities
◇ Process Plume Project

OK   Exit

PDF Help   About

1) Download hotspot data summarizing MODIS detections from the ModVolc website hosted by the Hawaii Institute of Geophysics and Planetology. Then process the data in MINX without having to download MODIS granules.
2) Download the file names for all MODIS thermal anomaly granules for your project from the Reverb website. Then download the granules using MINX.
3) Download summary hotspot data from ModVolc. Next use MINX to generate MODIS file names from the ModVolc data. Finally use MINX to download and then to process the MODIS MOD14 granules.

○ ○ ○ [X] MINX V4.0 : Plum...
Plume Project Utility Options

◆ Process ModVolc Fire Pixel File
◇ Download MODIS MOD14 Fire Granules
◇ Process MODIS MOD14 Fire Granules

OK   Cancel   PDF Help

There are advantages and disadvantages to using ModVolc hotspot data:
• they are downloadable as a single ASCII text file with one fire pixel per line of text, and
• they can replace thousands of MODIS granule files at ~300 K bytes per file, but
• they contain only locations - no FRP data, and
• they may not be as comprehensive or reliable as MODIS MOD14 thermal anomaly data.

To access the MINX Plume Utilities, simply select "Plume Project Utilities" from the MINX main menu.

Comparison of fire pixel retrieval using 3 MINX methods for project "Alaska" July 1-30, 2004, latitude = 60° to 70°, longitude = -148° to -138°

	Granules downloaded	Fire pixels found	MISR Orbits
1) Modvolc only	0	4044	68
2) MOD14/Reverb only	321	4508	67
3) Modvolc + Reverb	79	4276	54

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MINX Plume Project Utilities

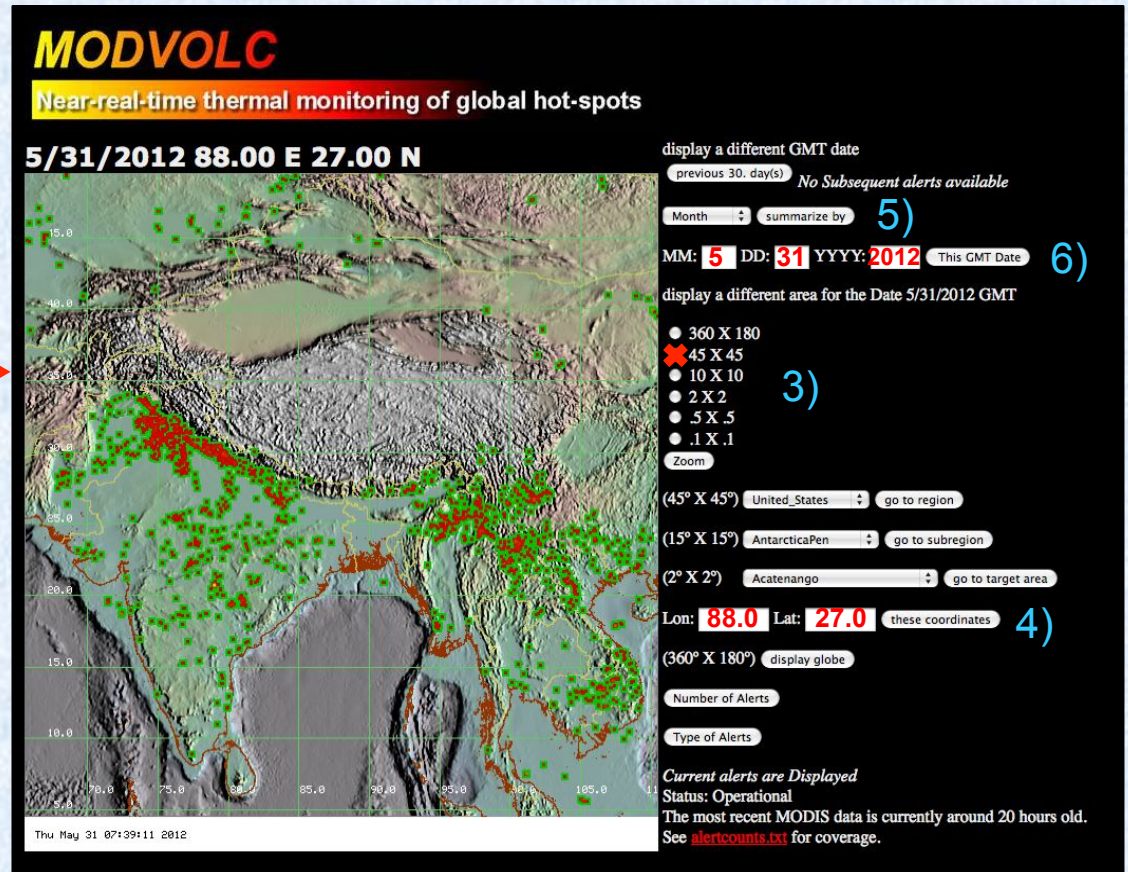**ModVolc Fire Pixels**

MODIS Fire Pixels

ModVolc and MODIS

MINX Process Plume Project

ModVolc Fire Pixels – Download

Before you can select the "Process ModVolc Fire Pixel File" option, you must download MODIS hotspot data. Follow these steps:

1) **Determine your project's geographic and date ranges.**

2) **Go to http://modis.higp.hawaii.edu/ and click "Take me to the hotspots".**

3) **Decide which of the 6 geographic size ranges is best for your project's region. Select it, press "Zoom" and wait for the map to update (you may need to repeat the remaining steps with several regions to fit your data).**

4) **In the "Lon:" and "Lat:" boxes, enter the center longitude and latitude for the region, press "these coordinates" and wait for the update. Alternatively you might select a pre-defined region from the list boxes below "Zoom".**

5) **In the dropdown listbox with value of "Day", select the period of time for which you wish to retrieve data, press "summarize by" and wait for the update.**

6) **In the "MM:", "DD:", and "YYYY:" boxes, enter the ending date for the period you want to retrieve, press "This GMT Date" and wait for the update.**

7) **Click on the red link at the bottom labeled "Text Alert File" (not shown) to go to the page containing ASCII results.**

8) **On your browser's "File" menu, select "Save Page As…" and save the data to a plain text file named "ModVolc_<project>.txt", where <project> is the name of the project you will use in all the MINX utilities. If you selected and downloaded data from multiple regions, concatenate the files into one file with this name. Create a project directory for your project and move the ModVolc file there.**

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ModVolc Fire Pixels – Sample Downloaded File

1 fire pixel per row (first row added for clarity)

UNIX_Time	Sat	Year	Mo	Dy	Hr	Mn	Longitude	Latitude	B21	B22	B6	B31	B32	SatZen	SatAzi	SunZen	SunAzi	Line	Samp	Ratio	Glint
1199115300	T	2007	12	31	05	35	84.432106	28.454927	3.733	−10.000	9.770	7.378	6.996	46.11	−77.86	52.88	165.57	473	1177	−0.357	47.557
1199115300	T	2007	12	31	05	35	85.997452	28.160923	2.304	−10.000	8.387	7.205	6.877	53.27	−76.49	52.31	167.28	468	1247	−0.559	49.777
1199081400	A	2007	12	30	20	10	86.095711	23.684803	1.187	1.145	177.141	7.547	7.210	15.11	−81.76	154.01	94.49	602	844	−0.726	139.289
1199037600	A	2007	12	30	08	00	84.415016	28.459906	9.990	−10.000	14.834	8.953	8.345	44.99	−96.49	56.95	−153.54	1704	188	0.057	86.020
1199026200	T	2007	12	30	04	50	84.778687	28.446533	6.048	−10.000	15.171	10.130	9.543	30.66	97.98	55.98	154.11	1354	340	−0.277	76.064
1198982700	T	2007	12	29	16	45	85.148216	28.227318	0.653	0.691	169.026	6.329	6.171	31.11	−97.40	158.25	−82.51	873	334	−0.799	168.947
1198721700	T	2007	12	26	16	15	86.088821	23.680870	0.855	0.888	169.026	8.061	7.627	32.45	79.70	152.35	−95.52	115	1033	−0.791	119.890
1198549500	T	2007	12	24	16	25	86.392899	23.772381	0.905	0.906	169.026	8.351	7.909	5.07	83.48	155.67	−94.74	1016	734	−0.794	149.991
1198116300	T	2007	12	19	16	05	87.241096	23.560938	0.874	0.875	169.026	7.388	7.082	35.14	79.70	152.75	−95.97	1636	1063	−0.780	116.753
1197870900	A	2007	12	16	19	55	86.090881	23.680214	0.948	0.925	177.143	7.683	7.310	12.20	97.57	155.27	94.41	1728	542	−0.775	168.408
1197339300	T	2007	12	10	16	15	87.243050	23.557714	0.902	0.852	168.883	7.766	7.403	24.40	80.67	155.04	−94.01	37	947	−0.794	130.711
1196994900	T	2007	12	06	16	35	82.755440	24.144701	0.930	0.969	168.883	7.556	7.153	9.23	80.96	156.99	−91.44	1974	780	−0.761	146.717
1196921700	A	2007	12	05	20	15	86.102715	23.686962	0.962	0.956	177.145	7.816	7.394	27.42	−79.53	149.83	94.02	1057	979	−0.771	123.085
1196261400	T	2007	11	28	04	50	87.001198	26.642347	4.124	−10.000	13.424	9.455	8.680	10.46	97.98	50.48	158.87	1418	561	−0.419	56.391
1195917300	T	2007	11	24	05	15	81.619591	29.902927	3.302	−10.000	16.158	8.813	8.410	10.58	97.75	52.60	160.76	919	560	−0.526	58.079
1195784700	T	2007	11	22	16	25	86.392342	23.772024	0.924	0.932	168.883	8.623	8.129	5.48	86.12	158.08	−85.36	899	738	−0.794	152.154
1195711500	A	2007	11	21	20	05	86.097397	23.681507	0.875	0.880	177.014	8.070	7.639	1.60	−94.08	151.09	88.66	122	694	−0.793	149.550
1195539300	A	2007	11	19	20	15	86.103180	23.686689	0.927	0.937	177.016	8.209	7.753	27.31	−80.16	148.05	88.92	1024	978	−0.784	121.628
1194835500	T	2007	11	11	16	45	82.753380	24.148623	0.905	0.924	168.793	8.484	8.018	4.06	−97.12	158.54	−76.12	272	632	−0.793	162.133
1194663300	T	2007	11	09	16	55	82.755974	24.144241	0.968	0.938	168.793	8.520	8.041	29.32	−98.38	161.06	−71.92	1168	354	−0.791	165.558
1194574200	T	2007	11	08	16	10	87.235504	23.556698	0.801	0.918	168.867	8.568	7.987	24.95	79.13	155.56	−79.04	1910	952	−0.794	130.494
1194501000	A	2007	11	07	19	50	86.095741	23.680073	1.052	1.275	177.023	8.452	7.875	24.95	99.06	152.35	79.37	1210	401	−0.721	171.188
1194329100	A	2007	11	05	20	05	86.399284	23.771706	0.979	1.004	177.025	8.763	8.120	4.00	−84.86	149.08	80.86	93	721	−0.780	145.247
1194230100	T	2007	11	04	16	35	82.750717	24.146837	0.990	1.054	168.793	8.514	8.023	9.57	80.90	156.47	−73.63	1864	783	−0.768	146.609
1194230100	T	2007	11	04	16	35	86.391319	23.769669	0.978	0.971	168.793	8.817	8.180	21.37	−99.12	159.68	−70.58	1768	441	−0.788	169.724
1194156900	A	2007	11	03	20	15	82.761208	24.149549	0.969	1.003	177.026	8.410	7.951	1.71	101.93	149.31	78.32	1035	658	−0.776	151.425
1194156900	A	2007	11	03	20	15	86.102310	23.687292	0.924	0.964	177.026	8.520	7.933	27.31	−79.35	146.39	81.30	1028	978	−0.783	120.569
1194058200	T	2007	11	02	16	50	82.754509	24.145805	0.965	1.001	168.793	8.618	8.071	17.68	−98.95	158.82	−68.04	756	481	−0.779	169.071

**"Sat" column refers to satellite name, where T = Terra and A = Aqua. MINX uses only Terra data.
Columns enclosed in red are used by MINX.**

ModVolc Fire Pixels – Process 1
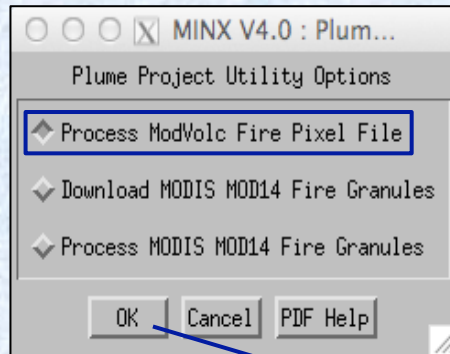
Select "Process ModVolc Fire Pixel File" from the Plume Utilities dialog box to show another dialog box requesting information about your project.

Enter the name to use for the subdirectory where your output fire pixel files will be written.

MINX V4.0 : Plum...

Plume Project Utility Options

- ◆ Process ModVolc Fire Pixel File
- ◆ Download MODIS MOD14 Fire Granules
- ◆ Process MODIS MOD14 Fire Granules

OK   Cancel   PDF Help

Select ModVolc Param...

Only those fire pixels that satisfy all the filtering criteria you provide here will be included in the output files.

Project Name: Alaska-Modvolc1
(no spaces or underscores)

Date range (YYYY-MM-DD)

Begin: 2004-07-01   End: 2004-07-31

MISR block range (1-180)

First Block: 33   Last Block: 48

Minimum number of fire pixels in an orbit required for orbit to be accepted (1-999): 2

Use Fire Pixels from source:
- ◆ ModVolc (nothing more required)
- ◆ Modis (must download Modis data)

(To get fire radiative power, you must select "Modis" and do more processing)

OK   Cancel

Select/Create Dir for Output Fire Pixel Files

Directory
/Users/dlnelson/MODISdata/Alaska_Modvolc1/FirePixels_Modvolc_

Filter
I

Files
[   ]

Directories

Selection
MODISdata/Alaska_Modvolc1/FirePixels_Modvolc_Alaska-Modvolc1/

OK   Filter   Cancel

Next slide

Select File Listing ModVolc Hot Spots

Directory
/Users/dlnelson/MODISdata/Alaska_Modvolc1/

Filter
*.txt

Files
FirePixReport_Modvolc_Ala
MisrOrderList_Modvolc_Ala
MisrProcessList_Modvolc_A
Modvolc_Alaska_10degsquar

Directories
..
Digitize_Output

Selection
Modvolc_Alaska_10degsquare.txt

OK   Filter   Cancel

Select the name of the file that contains fire pixel data you downloaded from the ModVolc website and click "OK".

Use a consistent project name throughout. MINX will replace space and underscore characters with a dash (-).

Enter date range and MISR block range for project. These will be used to filter out fire pixels that don't qualify. Block number is an effective proxy for latitude.

To exclude MISR orbits with a very small number of fire pixels, enter a number larger than 1.

To show fire pixel locations on MISR images but not have access to fire power (FRP), then choose "ModVolc". This is processing alternative **1)** described in slide 4.
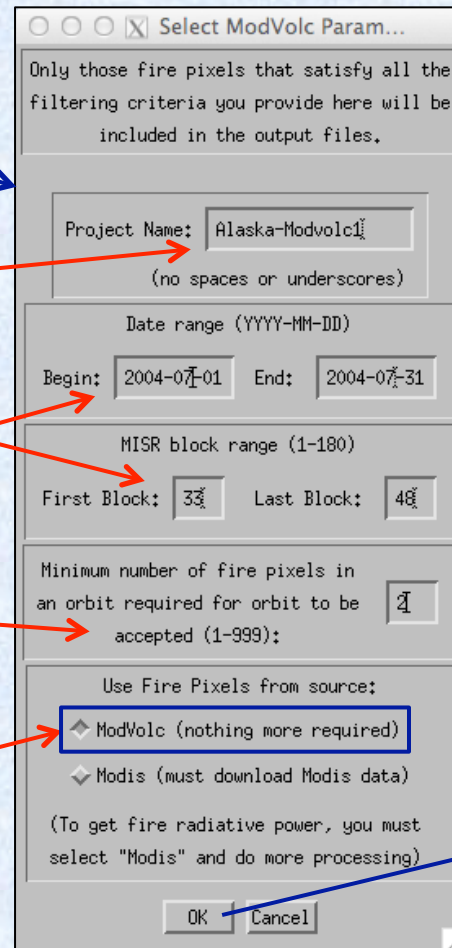
8
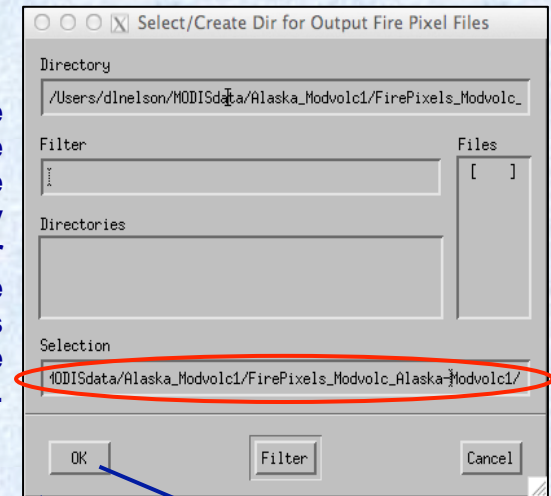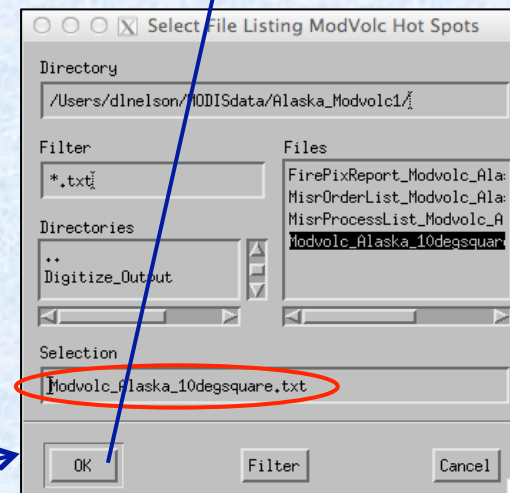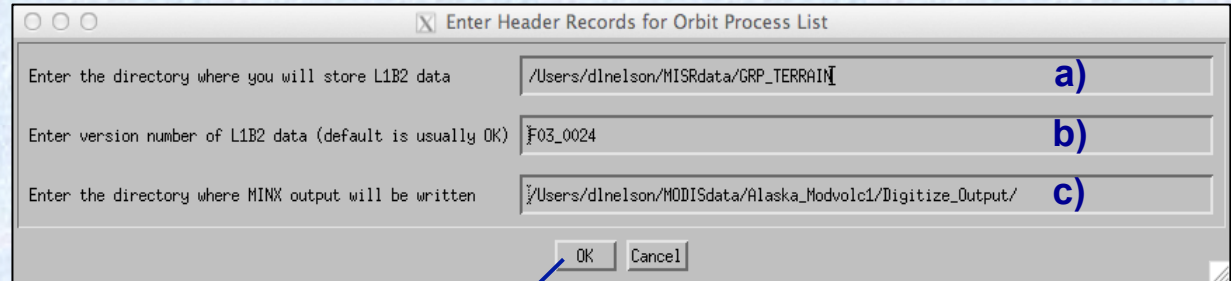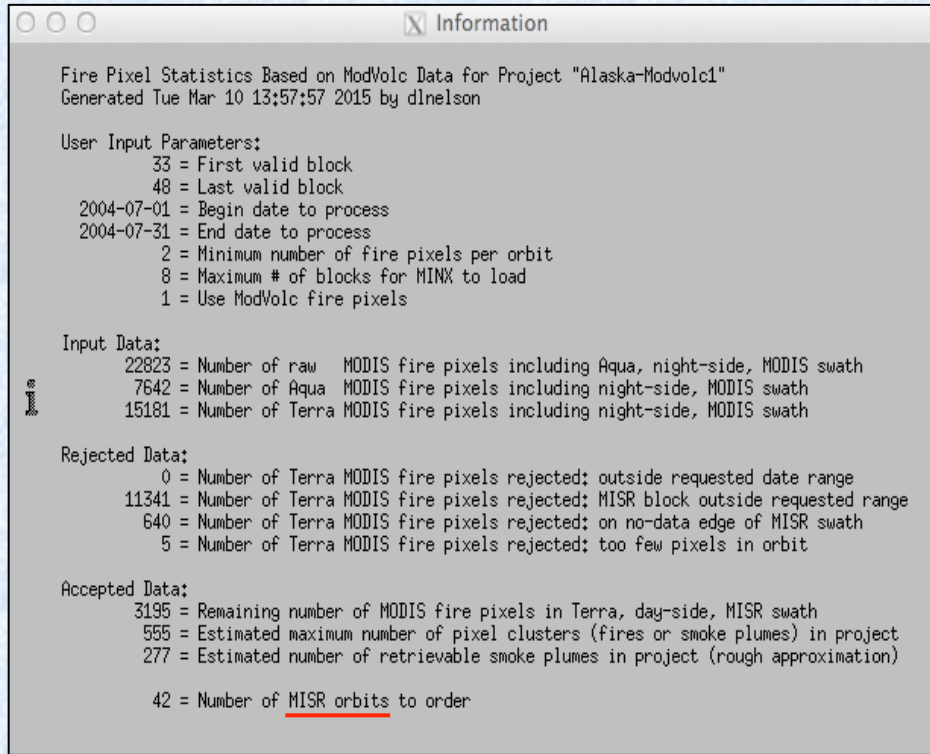
ModVolc Fire Pixels - Process 2

Next enter values for the items requested in this dialog box. These parameters are written into the top of the "MisrProcessList_Modvolc_ <project>.txt" file (you can edit the values later)

Enter Header Records for Orbit Process List

Enter the directory where you will store L1B2 data   /Users/dlnelson/MISRdata/GRP_TERRAIN **a)**

Enter version number of L1B2 data (default is usually OK)   F03_0024 **b)**

Enter the directory where MINX output will be written   /Users/dlnelson/MODISdata/Alaska_Modvolc1/Digitize_Output/ **c)**

OK   Cancel

This processing report is displayed on the screen and is written to your project file.

Information

Fire Pixel Statistics Based on ModVolc Data for Project "Alaska-Modvolc1"
Generated Tue Mar 10 13:57:57 2015 by dlnelson

User Input Parameters:
            33 = First valid block
            48 = Last valid block
    2004-07-01 = Begin date to process
    2004-07-31 = End date to process
             2 = Minimum number of fire pixels per orbit
             8 = Maximum # of blocks for MINX to load
             1 = Use ModVolc fire pixels

Input Data:
         22823 = Number of raw   MODIS fire pixels including Aqua, night-side, MODIS swath
          7642 = Number of Aqua MODIS fire pixels including night-side, MODIS swath
         15181 = Number of Terra MODIS fire pixels including night-side, MODIS swath

Rejected Data:
             0 = Number of Terra MODIS fire pixels rejected: outside requested date range
         11341 = Number of Terra MODIS fire pixels rejected: MISR block outside requested range
           640 = Number of Terra MODIS fire pixels rejected: on no-data edge of MISR swath
             5 = Number of Terra MODIS fire pixels rejected: too few pixels in orbit

Accepted Data:
          3195 = Remaining number of MODIS fire pixels in Terra, day-side, MISR swath
           555 = Estimated maximum number of pixel clusters (fires or smoke plumes) in project
           277 = Estimated number of retrievable smoke plumes in project (rough approximation)

            42 = Number of MISR orbits to order

a) **The full directory name where you expect to store downloaded MISR GRP_TERRAIN (or GRP_ELLIPSOID) files for input to digitizing.**
b) **Version number of GRP_.... Files. The default is the version shown and will be correct until and if MISR reprocesses level 1 data.**
c) **Subdirectory where MINX images, graphs and raw data files from plume digitizing will be saved. MINX will create this subdirectory.**

After clicking OK in these dialog boxes, wait for processing to complete. Then look for these output files in your project directory:

- **MisrOrderList-Modvolc_<project>.txt**
- **MisrProcessList-Modvolc_<project>.txt**
- **FirePixReport-Modvolc_<project>.log**
- **FirePixels-Modvolc_<project> (a directory)**

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ModVolc Fire Pixels – Sample Output Files

Sample orbit order list file:
MisrOrderList_Modvolc_<project>.txt

```
49117,49219,49554,49627,49656,49685,49758,49
787,50384,50457,50486,50559,50588,50661,5079
2,50821,50952
```

List of comma-separated MISR orbits you can cut-and-paste into the MISR "Order and Customization Tool" on the Langley DAAC website. To learn how to order MISR files, see the document "Tools for Ordering and Viewing MISR Data".

Sample orbit process list file:
MisrProcessList_Modvolc_<project>.txt

```
/Users/dlnelson/MISRdata/GRP_TERRAIN
F03_0024
/Users/dlnelson/MINX_Workshops/plumes
 1658    67    69    2000-04-10    05:30:00
 1687    67    69    2000-04-12    05:20:00
 2095    66    69    2000-05-10    05:45:00
 2517    68    70    2000-06-08    05:15:00
 2561    68    70    2000-06-11    05:45:00
 2590    68    70    2000-06-13    05:30:00
 2692    68    70    2000-06-20    05:35:00
 2721    66    68    2000-06-22    05:25:00
 2750    68    70    2000-06-24    05:15:00
 2794    68    70    2000-06-27    05:45:00
 2823    67    70    2000-06-29    05:30:00
 2852    68    70    2000-07-01    05:20:00
 2954    66    70    2000-07-08    05:25:00
 5313    67    69    2000-12-17    05:10:00
 5386    66    68    2000-12-22    05:30:00
```

Rename this file to "PlumeProjOrbitList.txt" and copy it into your Project_Directory (which can be changed using the Preferences dialog box). This file is read when "Process Plume Project" is selected from the MINX main menu, allowing you to choose which MISR orbit(s) to process.

These 3 file types are produced by fire pixel alternative 1). They are all that is required for MISR orbit selection and digitizing preparation.

Sample fire pixel file – one file per orbit:
FirePixels_Modvolc_02852_<project>.txt

```
Fire pixels from ModVolc project : Nepal2000
2852 / 141 / 2000-07-01  : orbit/path/date
 Longitude   Latitude  Blk Samp Line
  degrees     degrees       0-based
  86.63058   26.82733  69 1534   249
  86.64109   26.82565  69 1538   249
  86.45438   26.72519  69 1475   297
  86.46477   26.72354  69 1479   297
  86.47516   26.72189  69 1483   297
  86.49596   26.71858  69 1491   298
  86.51679   26.71527  69 1498   298
  86.52721   26.71361  69 1502   299
  86.46581   26.70623  69 1480   304
  86.51787   26.69807  69 1499   305
  86.52831   26.69643  69 1503   305
  86.46407   26.69711  69 1480   308
  86.47447   26.69547  69 1484   308
  86.51611   26.68893  69 1499   309
  86.52654   26.68729  69 1503   309
  86.45192   26.68962  69 1476   311
  86.47271   26.68635  69 1484   312
  86.48312   26.68472  69 1487   312
  86.50394   26.68144  69 1495   312
  86.51437   26.67980  69 1499   313
```

During processing of plume heights by MINX, this file can be loaded, and each fire pixel location will automatically be posted on the MISR image as a red dot. Because ModVolc data include no fire radiative power, those values cannot be collected and saved during plume digitizing.

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MINX Process Plume Project

MODIS Fire Pixels – Download 1

If you chose the "Process MODIS MOD14 Fire Granules" option in MINX without first processing ModVolc data, you must download MODIS hotspot data for your project by following these steps:

1) **Determine your project's geographic and date ranges.**
2) **Go to website: http://reverb.echo.nasa.gov/reverb.**
3) **Register to download data if you haven't and "Sign In" (optional).**
4) **Pan and zoom the map to center your project area.**
5) **Select "Bounding Box", "Polygon" or other method and outline your project area using the mouse.**
6) **Enter MODIS MOD14 in the "Search Terms" box.**
7) **Check the box by "MODIS/Terra Thermal Anomalies/Fire 5-Min L2 Swath 1km V005".**
8) **Specify your starting and ending dates and times.**
9) **Click the "Search for Granules" button at the bottom and wait for the search to finish.**

You can download a maximum of 2000 granules at a time. If you need to exceed this, you can break the project into several smaller time periods.

MODIS Fire Pixels – Download 2

10) Click "All" in the column of the table header with the cart symbol to select all granules, and wait for the search to complete.

11) Click the "View Items in Cart" button when its ready.

12) When the cart list appears, click the "Download" button at the bottom, **not** the "Order" button.

13) On the "Download Instructions" dialog, select "Data" and "Text File" and click "Save". When it has been downloaded, move the saved file to your project directory. It must have a .txt extension.

MODIS Fire Pixels – Download 3

The MODIS file you downloaded from the Reverb site should look similar to the sample below. If you edit the file, avoid using a text editor that adds unprintable characters.

This Reverb filename = data_url_script_2015-02-26_131832.txt

```
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.0100.005.2015005074307.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.0105.005.2015005074247.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.0110.005.2015005074257.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.0240.005.2015001044708.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.0245.005.2015001044701.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.1130.005.2015001142349.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.1135.005.2015001142348.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.1305.005.2015001143038.hdf
http://e4ftl01.cr.usgs.gov//MODIS_Dailies_C/MOLT/MOD14.005/2015.01.01/MOD14.A2015001.1310.005.2015001142531.hdf
……...
```

When you're ready to pick up your order, select "Plume Project Utilities" on the MINX main menu, then select "Download MODIS MOD14 Fire Granules".
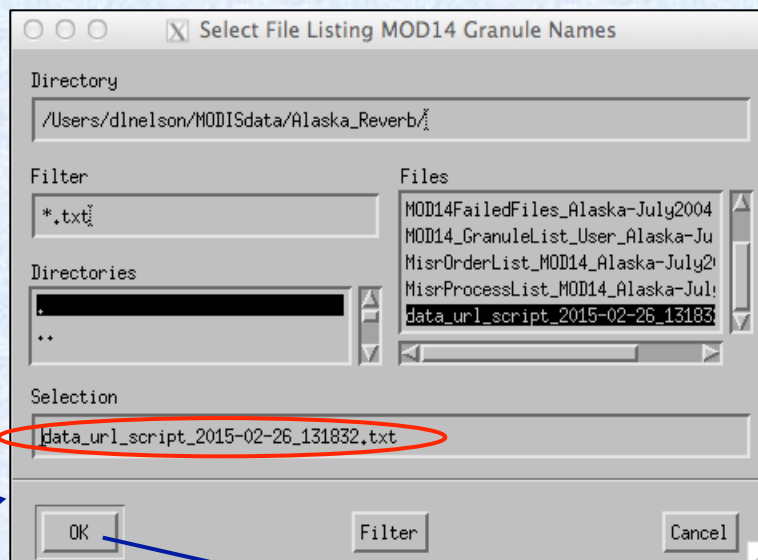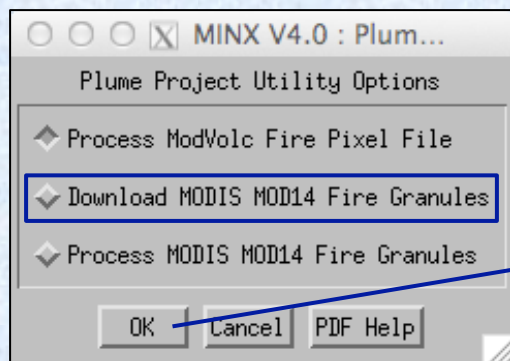

Select the Reverb file containing MOD14 granule names that you downloaded and press "OK" to proceed to the next step.

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MODIS Fire Pixels – Download 4

Enter the name of the directory where you want your MOD14 granules to be stored. This may be a subdirectory of your project directory. Then click "OK" to begin downloading.

This is an example of what your MOD14 granule subdirectory should contain. You are ready to process the MODIS fire pixels.
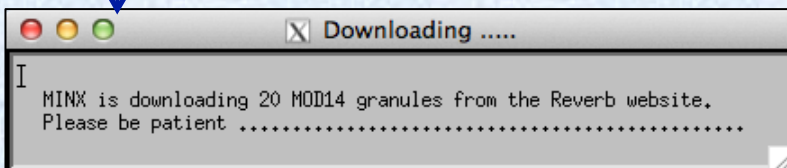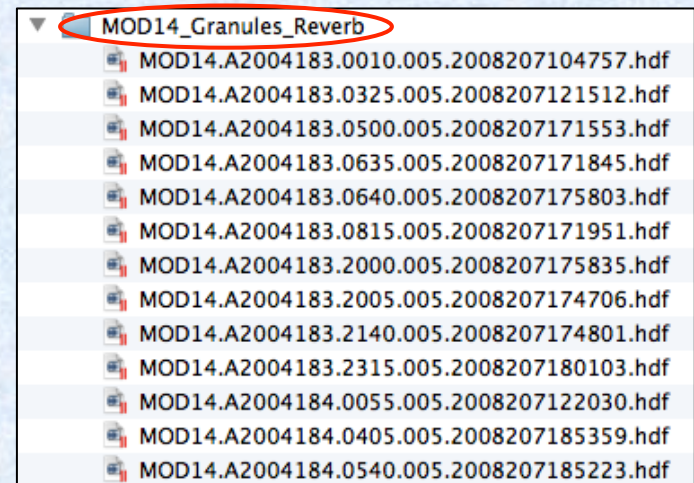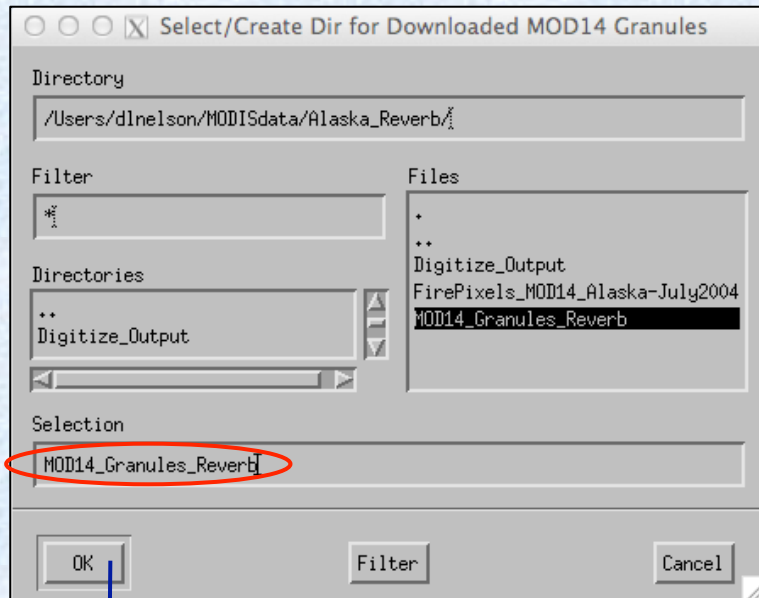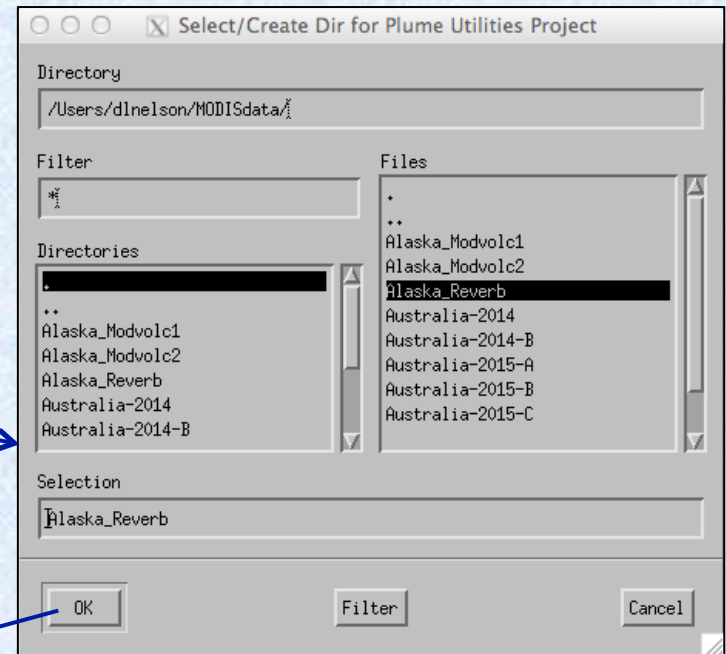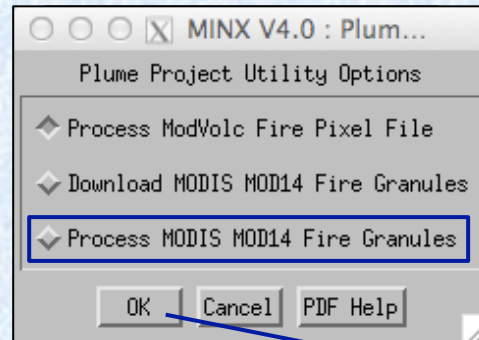

This message is displayed as your MOD14 granules are downloading. When all your MOD14 granules have been received, MINX will return you to the "Plume Utility" dialog box.

Next slide

MODIS Fire Pixels – Process 1

When you're ready to process your MODIS granules, select "Plume Project Utilities" on the MINX main menu, then select "Process MODIS MOD14 Fire Granules".

Select the name of your project directory or another directory where you want your output files to be written.

Select the directory where you stored the MODIS MOD14 fire granules downloaded from the Reverb website.

Next slide

MODIS Fire Pixels – Process 2

Use a consistent project name throughout. MINX will replace space and underscore characters with a dash (-).

Enter the date range and MISR block and path ranges for the project. Fire pixels that don't fall within these ranges will be excluded.

Each block-group will contain no more blocks than the number specified here.

MODIS confidence level can be used to filter out fire pixels.

Fire pixels with FRP values less than this entry in MWatts will be excluded.
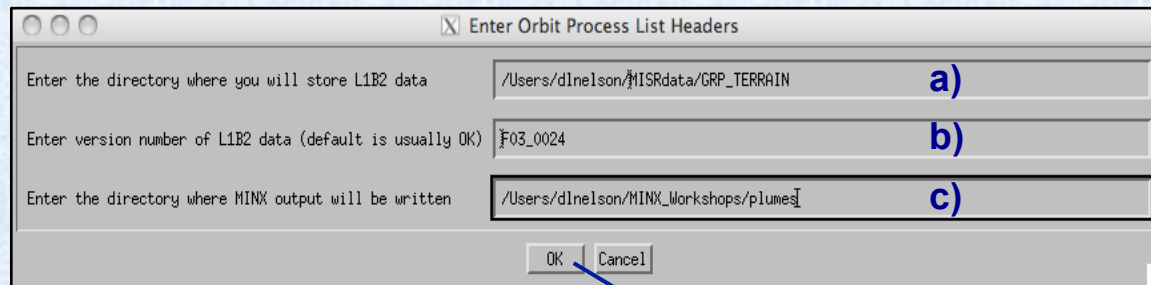
Exclude whole blocks or block-groups by cumulative FRP.

To filter out block-groups with a small number of fire pixels, enter a number larger than 1.

Next slide

- **Block number is a proxy for latitude and path is a proxy for longitude. You can determine the best values for these by testing different paths in the "Show Orbit Location" option on the MINX main menu.**

- **Path numbers increase from east to west. For projects that span MISR paths 1 and 233, path numbers should be entered with the larger path number in the east.**

- **Because MISR data sets are very large, a limited number of blocks can be loaded into MINX at once, depending on your computer. If there are fire pixels on a range of blocks in an orbit, MINX will break the orbit into separate <u>block-groups</u>. These block-groups appear, one to a line, in the output file named : MisrProcessList_Modis_<project>.txt.**
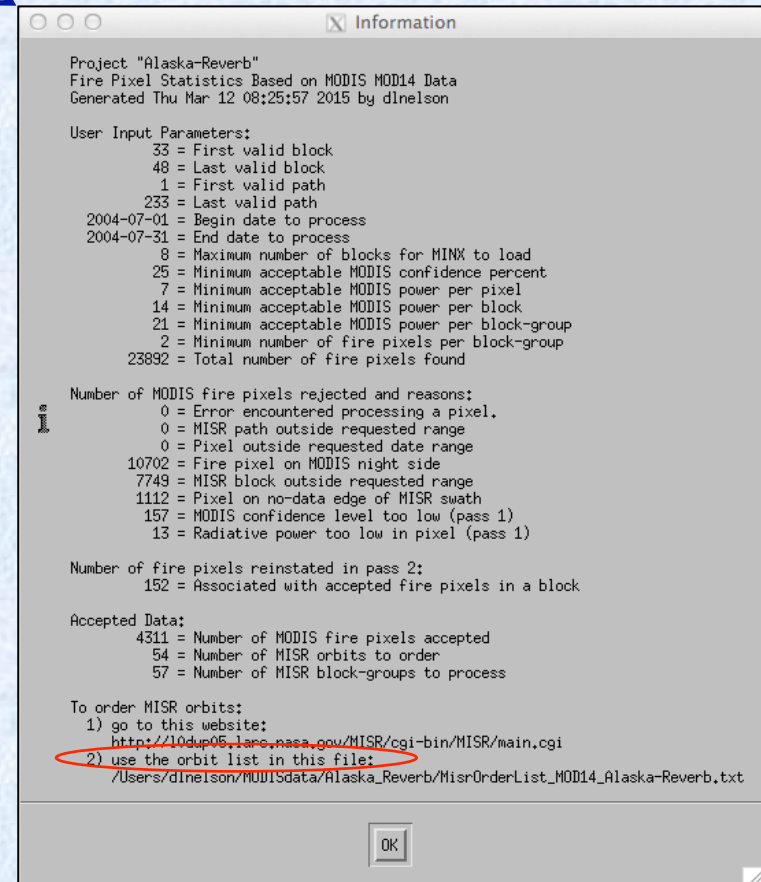
MODIS Fire Pixels –Process 3

The parameters you enter here are written into the top of the file named MisrProcessList-ByModis_<project>.txt (you can edit these values later):

a) The full directory name where you expect to store downloaded MISR GRP_TERRAIN (or GRP_ELLIPSOID) files for input to digitizing.

b) Version number of GRP_.... Files. The default is the version shown and will be correct until and if MISR reprocesses level 1 data.

c) Name of the directory where MINX images, graphs and raw data files from plume digitizing will be saved.

After clicking OK, wait for processing to complete. Then look for your output files in the directory at the bottom of the Information window:

- **MisrOrderList-ByModis_<project>.txt**
- **MisrProcessList-ByModis_<project>.txt**
- **FirePixReport-ByModis_<project>.log**
- **FirePixels-ByModis (directory containing fire pixel files)**

Modis Fire Pixels – Sample Output Files

Sample orbit order list file:
MisrOrderList_MOD14_Alaska-Reverb.txt

```
24138,24152,24166,24167,24181,24195,24196,2
4210,24211,24224,24225,24239,24240,24253,24
254,24269,24283,24284,24285
```

List of comma-separated MISR orbits that can be cut-and-pasted into MISR "Order and Customization Tool" on the Langley DAAC website. To learn how to order MISR files, see the document titled "Tools for Ordering and Viewing MISR Data".

Sample project process list file:
MisrProcessList_MOD14_Alaska-Reverb.txt

```
/Users/dlnelson/MISRdata/GRP_TERRAIN/
F03_0024
/Users/dlnelson/Alaska_Reverb/DigOutput/
24400    35    40    2004-07-19    1195 MWatt
24414    38    43    2004-07-20    1433 MWatt
24415    37    41    2004-07-20    1149 MWatt
24428    37    40    2004-07-21     394 MWatt
24428    47    49    2004-07-21     146 MWatt
24429    35    40    2004-07-21    2089 MWatt
24430    36    38    2004-07-21     112 MWatt
24443    39    42    2004-07-22    3106 MWatt
24444    36    40    2004-07-22     518 MWatt
24457    37    43    2004-07-23   14709 MWatt
24458    35    40    2004-07-23     135 MWatt
24472    39    43    2004-07-24    6421 MWatt
24486    40    43    2004-07-25    6963 MWatt
24486    47    49    2004-07-25      48 MWatt
24487    35    40    2004-07-25     405 MWatt
....
```

Block groups
Same orbit, different blocks

Rename this file to "PlumeProjOrbitList.txt" and copy it into your project directory. The file is automatically read when "Process Plume Project" is selected from the main MINX menu, and you can point-and-click to choose which orbit to process.

These 3 file types are produced by fire pixel alternative 2). They are all that is required for MISR orbit selection and fire pixel detection.

Sample fire pixel file - one is produced per MISR orbit:
FirePixels_MOD14_024137_Alaska-Reverb.txt

```
Fire pixels from MODIS granules on 275m MISR SOM grid for project : Alaska-Reverb
24152 / 62 / 2004-07-02   : orbitnum / pathnum / date
```

Longitude degrees	Latitude degrees	Blk	Samp 0-based	Line	Power MWatt	ReflR2 reflec	BTmpT21 fire(k)	BTmpT31 fire(k)	BBTmpT21 bkgnd(k)	BBTmpT31 bkgnd(k)	Conf %
-137.11847	67.46284	36	485	353	14.9	0.216	319.4	302.0	305.4	300.4	36
-137.26448	67.47224	36	462	356	257.7	0.287	398.2	308.4	303.4	297.7	100
-137.24139	67.46922	36	466	356	167.1	0.231	380.1	307.0	303.8	297.7	100
-137.12599	67.45409	36	485	357	35.6	0.177	333.9	304.2	306.0	300.4	86
-137.10318	67.45108	36	489	357	20.1	0.244	323.0	301.0	304.8	300.0	71
-137.22636	67.45750	36	470	360	18.6	0.237	322.1	301.2	305.2	299.2	57
-137.15669	67.44837	36	481	361	26.9	0.178	329.9	303.5	308.3	300.8	70
-137.13359	67.44534	36	485	361	38.0	0.221	336.1	304.3	307.4	300.9	87
-137.21107	67.44576	36	474	364	37.4	0.241	335.6	304.6	307.3	300.2	80
-137.16446	67.43964	36	481	364	66.1	0.237	349.4	302.5	306.5	300.2	95
-137.14117	67.43658	36	485	364	31.9	0.235	331.4	301.5	305.5	300.3	84
-137.75073	67.43003	36	395	395	30.3	0.231	328.2	298.2	302.3	297.0	76
-137.72632	67.42692	36	399	395	25.4	0.224	324.7	297.9	302.1	296.2	63
-137.75830	67.42121	36	395	399	36.6	0.168	333.4	301.6	304.7	298.5	80
-137.57010	67.39713	36	426	399	566.0	0.286	435.7	322.4	307.4	298.5	100
-137.54663	67.39411	36	430	400	117.4	0.244	367.5	306.4	307.3	299.9	100
-137.52339	67.39111	36	434	400	11.6	0.253	316.7	300.2	305.7	300.3	47
-137.64708	67.39725	36	414	403	201.3	0.208	388.3	309.3	309.8	299.4	100
-137.62399	67.39429	36	418	403	308.0	0.191	406.8	316.5	311.2	300.1	100
-137.60095	67.39133	36	422	403	324.3	0.189	409.2	316.9	311.4	300.6	100
-137.57770	67.38834	36	426	403	267.9	0.179	400.7	313.5	311.2	301.3	100
-137.55438	67.38535	36	430	403	301.5	0.191	405.8	315.2	310.1	301.7	100
...											

When you later use either the "Process Plume Project" or "Animate Cameras" option on the MINX main menu to retrieve plume heights, this file can be loaded using the "Task Menu" -> "Select Digitizing Tool" -> "Load MODIS Fire Pixels". Each fire pixel location will be posted automatically on the MISR image as a red dot. Because fire pixel data from MODIS granules include fire radiative power, power values at locations inside a digitized plume will be collected and saved during plume processing.
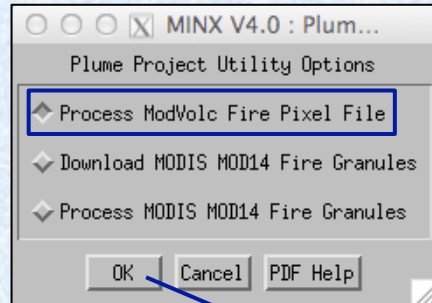
Contents

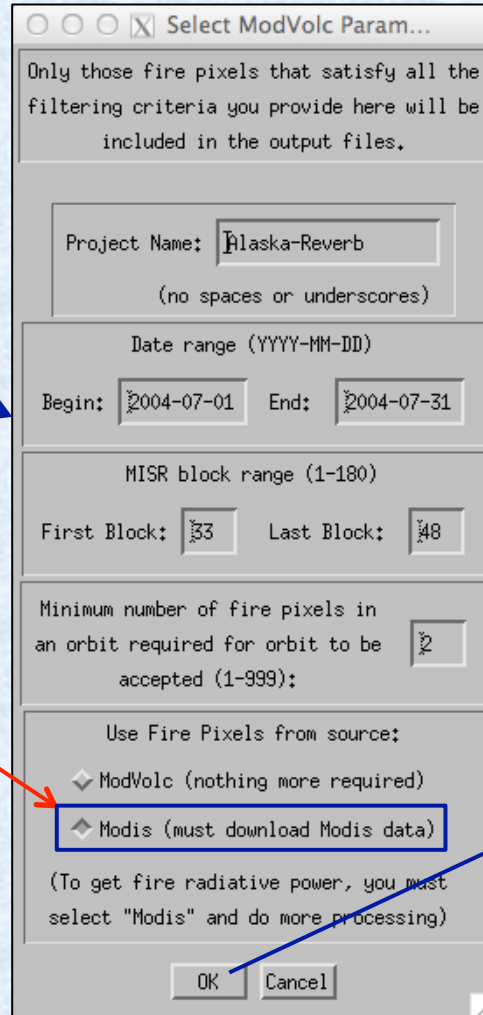**MINX Plume Project Utilities**

ModVolc Fire Pixels

MODIS Fire Pixels

ModVolc and MODIS

MINX Process Plume Project

ModVolc / MODIS Fire Pixels – Download 1

Alternative **3)** described on slide 4 uses ModVolc fire pixels to create a list of MODIS MOD14 granule names rather than requiring you to visit the Reverb website to select them.

Processing begins the same as in alternative **1)**. First download ModVolc fire pixels for your project. Then select "Process ModVolc Fire Pixel File" from the "Plume Utilities" dialog box. (See slides 6 – 8).

In the "Use Fire Pixels from source:" box, you must check the "Modis" button rather than the "ModVolc" button.
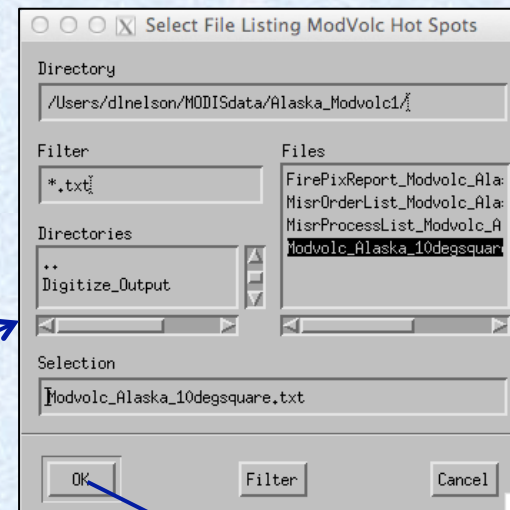
Just as in alternative 1), select the name of the file that contains fire pixel data you downloaded from the ModVolc website and click "OK".
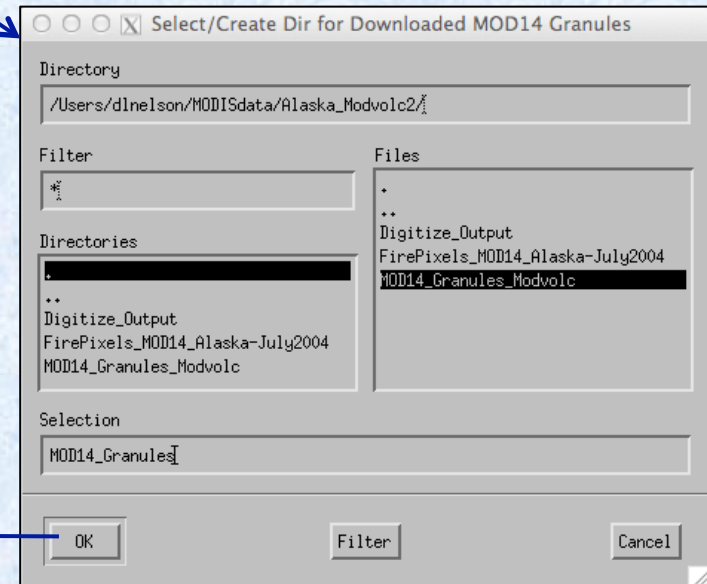
Next slide

MODIS Fire Pixels – Process 3
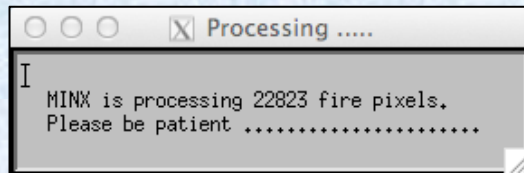
When MINX finishes processing the ModVolc fire pixels and creating the list of MOD14 granules to download, you will be shown a Question dialog.
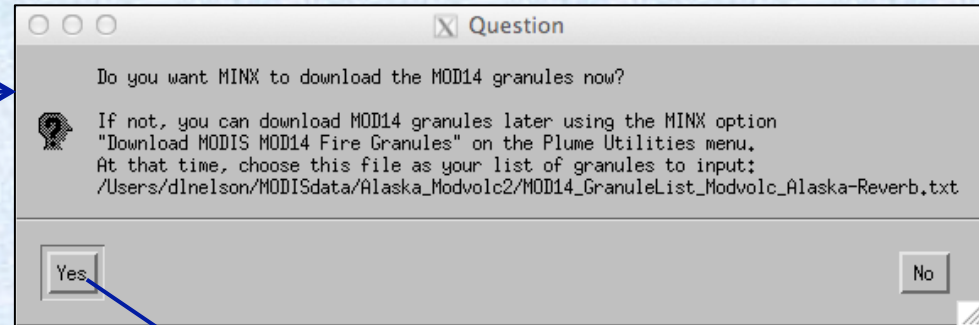
Click "Yes" in the Question dialog to display another dialog box where you specify the directory where MOD14 granules will be downloaded.

When you click "OK" in this dialog, MINX will immediately begin downloading the MOD14 granules to the directory you specified to receive them.

To complete the processing and generate files needed for plume digitizing, follow the instructions on slides 16 – 18.

Select the directory where MODIS granules will be downloaded.

Contents

**MINX Plume Project Utilities**

ModVolc Fire Pixels

MODIS Fire Pixels

ModVolc and MODIS
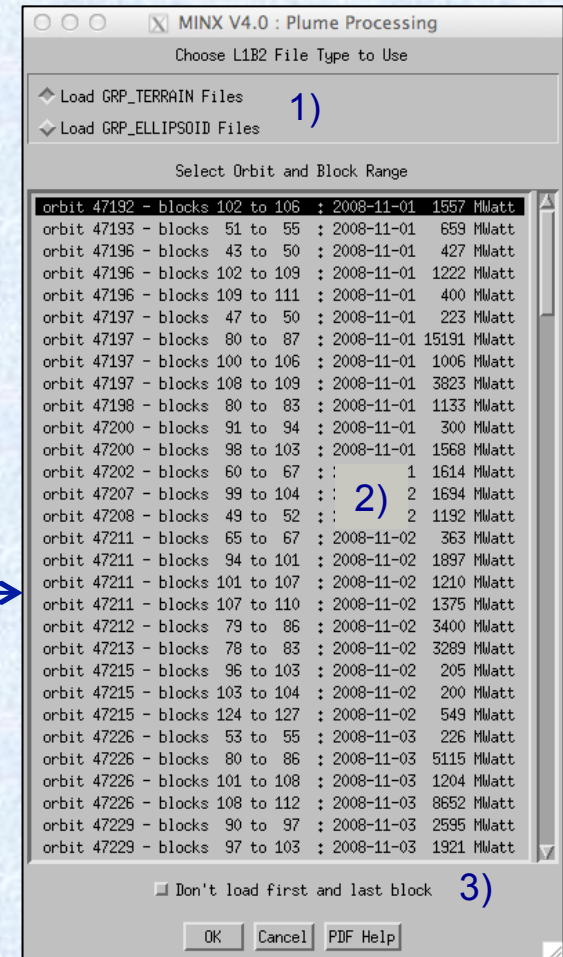
MINX Process Plume Project

Process Plume Project - 1

This option speeds the completion of a plume digitizing project comprising many orbits by allowing a user to select orbits from a list and bypass multiple MINX dialog boxes. But the end result is identical to the result obtained by choosing the "Animate Cameras" option.
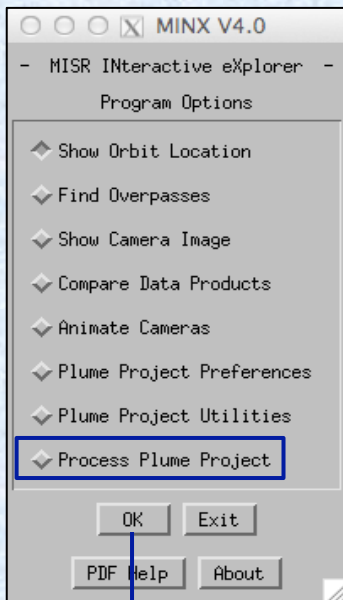
- Click "OK" and MINX finds and reads a file whose name must be "PlumeProjOrbitList.txt" which resides in the Plume Project Directory you selected in the "Plume Project Preferences" option of the main menu.

- The file can be created automatically by the Plume Project Utilities or it can be hand-coded to contain a list of frequently used orbits/blocks (see next slide).

- If the file is not present or cannot be read, MINX will prompt the user with the format to use to create the file.

1) **Select the type of level 1 radiance imagery you want to load. <u>Always</u> use Terrain-referenced data if the plume is over land – if over water, then it's OK to use Ellipsoid-referenced data.**

2) **Highlight an entry from this list - when you click "OK", nine MISR camera images for the selected orbit and block range will immediately be loaded and displayed without showing any other file selection dialogs.**

3) **Checking "Don't load first and last block" instructs MINX to load the block range for the selected orbit minus the first and last blocks. This is useful for reducing load time when you want to quickly inspect a scene.**

Process Plume Project - 2

- File PlumeProjOrbitList.txt can be created automatically by the Plume Project Utilities option. See slides 10 and 19 above.

- If you create the file with a text editor, it must contain 3 lines of header plus a list of orbits to choose for processing. Do not create this file with an editor that inserts invisible formatting characters.

- The header lines are useful when you have multiple projects and want the input and output locations for each to be different and remain fixed. The header lines must be:

  1) One or two directory names where GRP_TERRAIN and GRP_ELLIPSOID files are located. Use two names in the order above if you need to use both files types AND if they are stored in different locations. Separate the names by at least one space character or tab.

  2) Version string for GRP_TERRAIN and/or GRP_ELLIPSOID files (F03_0024 as of 4/2015).

  3) Directory where MINX output data and images will be written.

- Each successive line contains information for one orbit in the following order in free format with items separated by space characters or tabs:

    OrbitNumber BeginBlock EndBlock Comments

- The comments field may contain spaces and is optional. Blank lines may be included in the orbit list.

```
1) /Users/dlnelson/MISRdata/GRP_TERRAIN  /Users/dlnelson/MISRdata/GRP_ELLIPSOID
2) F03_0024
3) /Users/dlnelson/MINX_output
   58978 105 107   southern Argentina isolated tiny cloud
   24298  37  37   Alaska smoke plume
   40123 104 104   Africa storm cloud
    5384 112 112   Australia smoke plume w/ red background
   43484  76  79   Bodele dust plume 2
   38671 150 152   Antarctic snow storm

   15204  60  63   Etna eruption over Mediterranean — use ellipsoid
   32555  42  43   Augustine ash plume
   61064 122 124   Puyehue eruption
```

Sample hand-coded PlumeProjOrbitList.txt file

References

Giglio, L.; MODIS Collection 5 Active Fire Product User's Guide Version 2.4. http://www.fao.org/fileadmin/templates/gfims/docs/MODIS_Fire_Users_Guide_2.4.pdf, February 2010.

Wright, R.; Flynn, L.P.; Garbeil, H; Harris, A.J.L.; Pilger, E. MODVOLC: Near-real-time thermal monitoring of global volcanism. Journal of Volcanology and Geothermal Research, July 2004, 135, Issues 1–2, 29–49.