Plume Utilities

David Nelson, Ralph Kahn, Michael Tosca, Sebastian Val

Columbus Technologies and Services, Inc.

Raytheon Company

Jet Propulsion Laboratory, NASA

California Institute of Technology

Contents

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.)

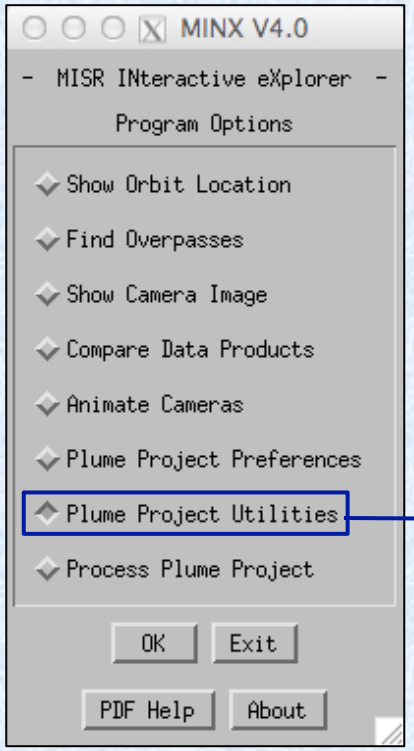
Instead, MINX lets you use MODIS Terra hotspot detections (also referred to here as fire pixels or thermal anomalies) to select MISR orbits and blocks that contain fires, which dramatically reduces MISR downloads. A side benefit is that MINX can incorporate MODIS fire radiative power (FRP) in its retrievals and report it with other smoke plume data.

MINX Plume Utilities can generate the following data:

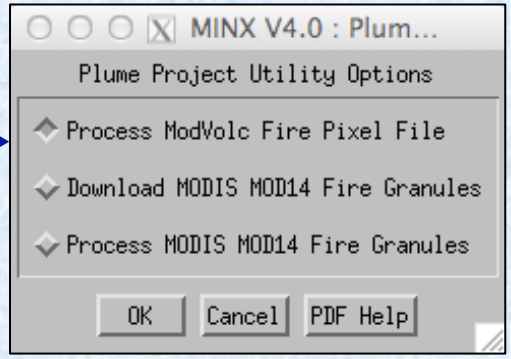
- **A file listing MISR orbits and blocks to order from the Langley DAAC;**
- **A file listing the orbits and block ranges of MISR data that contain fire pixels, which you can use to greatly speed the process of loading MISR data into MINX;**
- **A collection of files, one per MISR orbit, containing 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:



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.**



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.

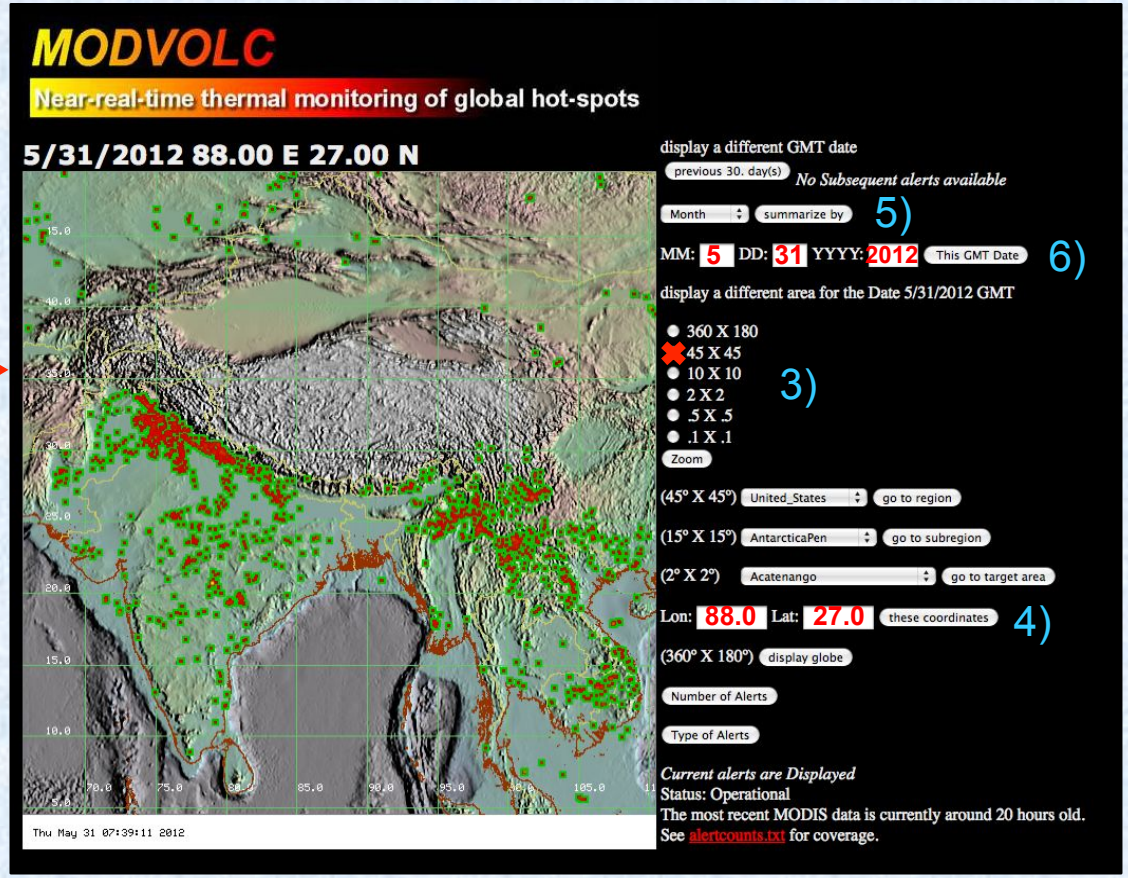
Comparison of fire pixel retrieval using 3 MINX methods for project "Alaska"
July 1-30, 2004, latitude = 60° to 70°, longitude = -148° to -138°

	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

Contents

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.

ModVolc Fire Pixels – Sample Downloaded File

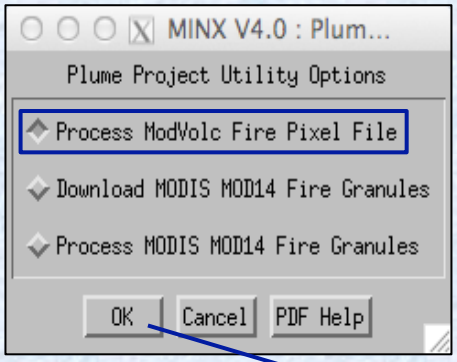
1 fire pixel per row (first row added for clarity)

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	5.09	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

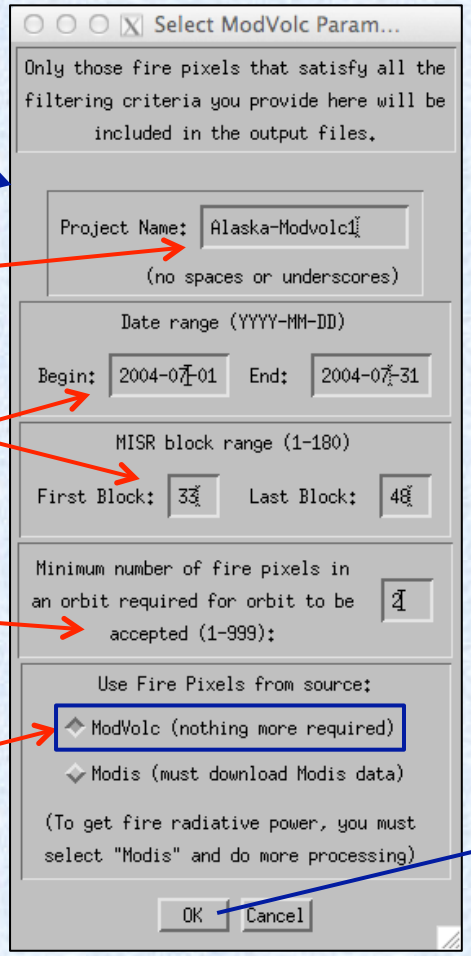
"Sat" column refers to satellite name, where T = Terra and A = Aqua. MINX uses only Terra data.

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.



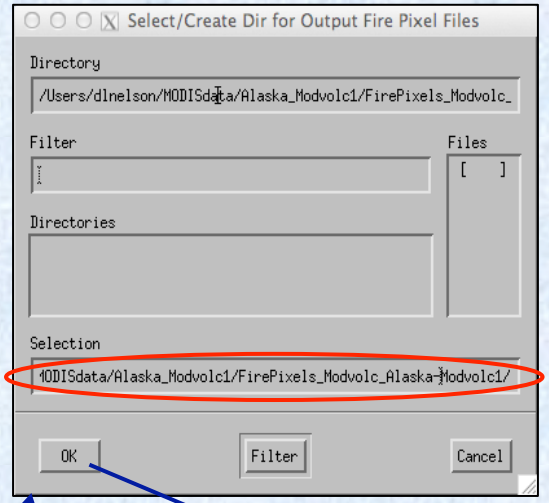
Use a consistent project name throughout. MINX will replace space and underscore characters with a dash (-).

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.

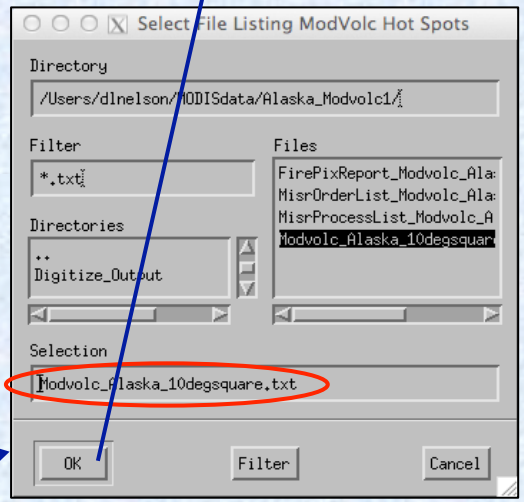
To exclude MISR orbits with a very small number of fire pixels, enter a number larger than 1.

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.

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



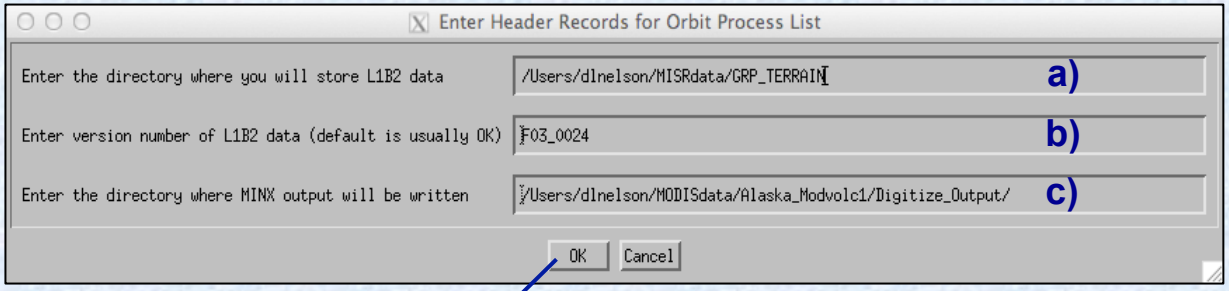
Next slide



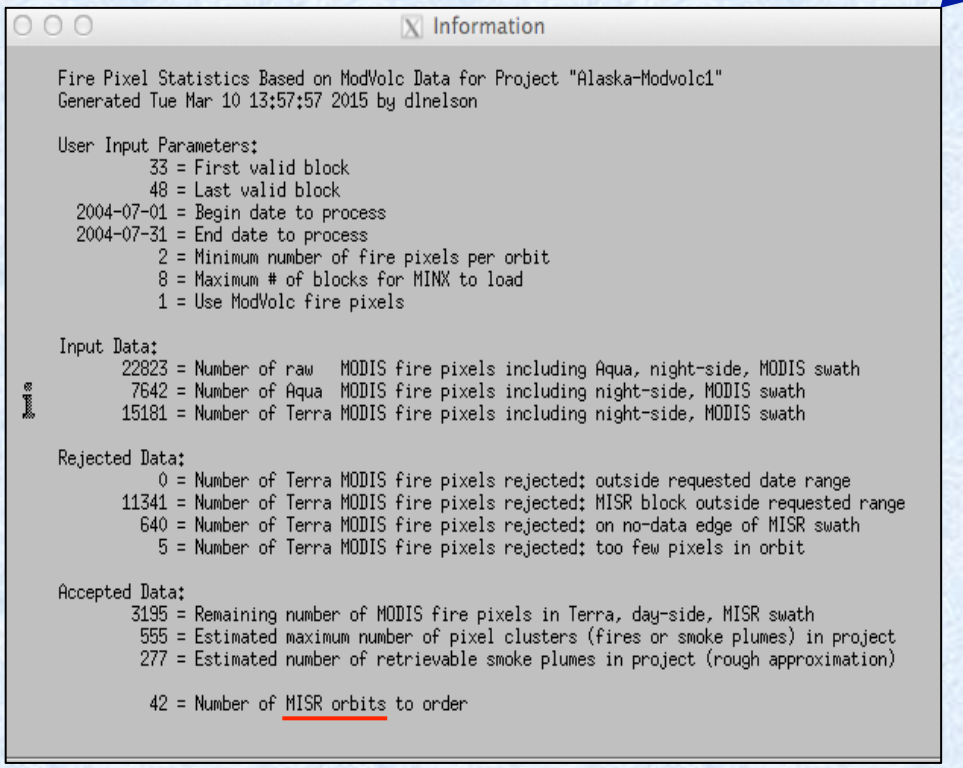
Select the name of the file that contains fire pixel data you downloaded from the ModVolc website and click "OK".

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)



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



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 MISR has reprocessed 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)**

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.

Contents

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.

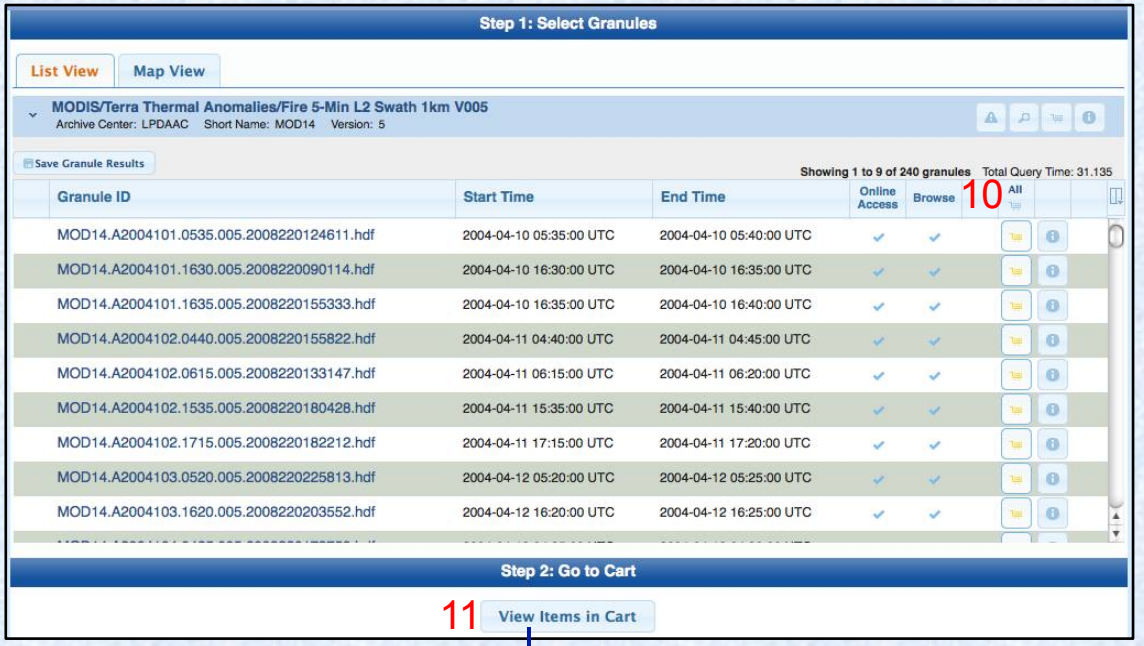
MODIS Fire Pixels – Download 2

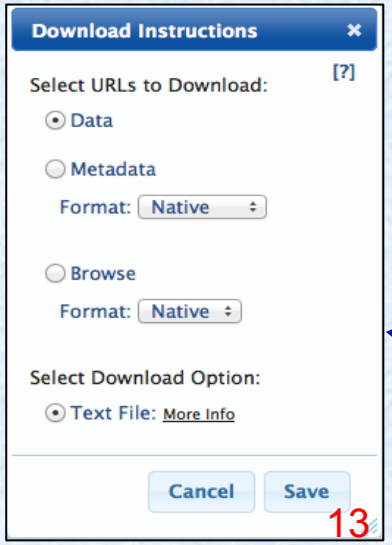
10) Click “All” in the column of the table header with the cart symbol to select all granules, and wait for the search to complete.

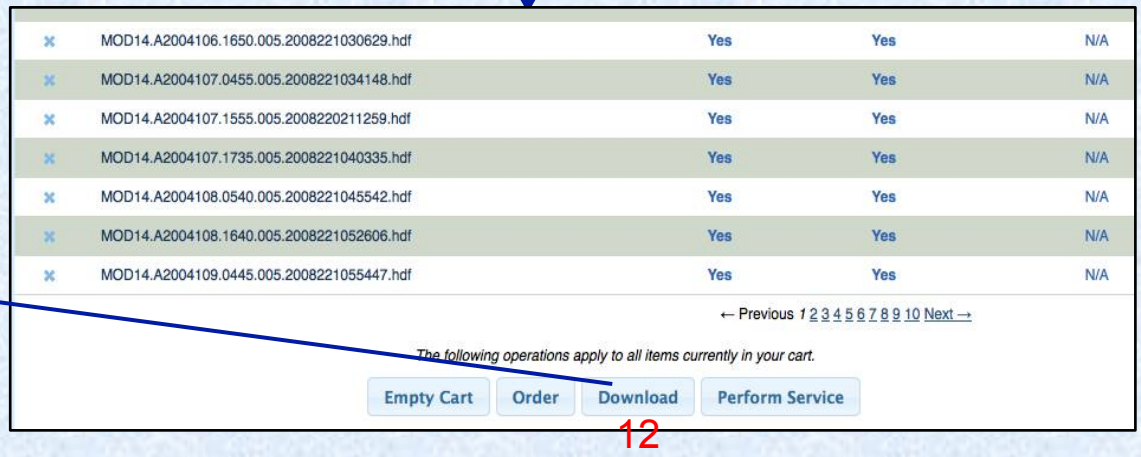
11) Click the “View Items in Cart” button when its ready.

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.







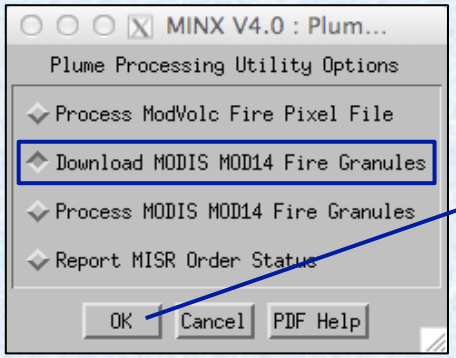
MODIS Fire Pixels – Download 3

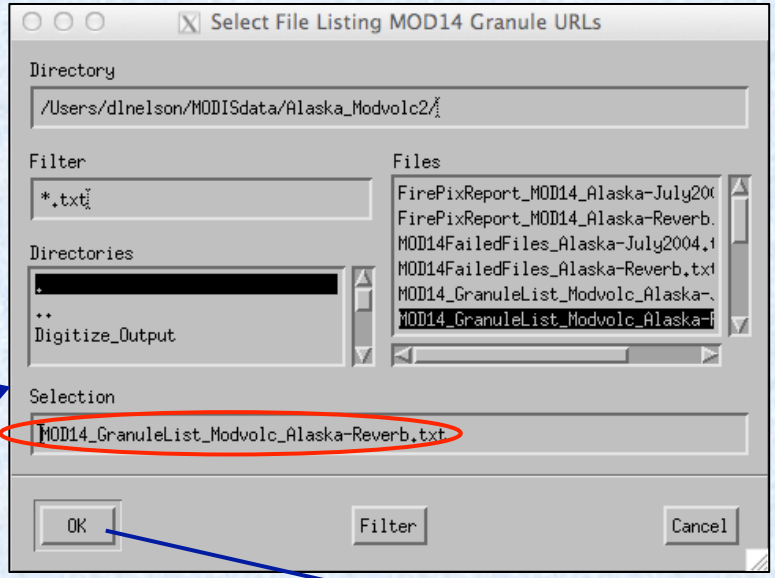
The MODIS file you downloaded from the Reverb site should look similar to the sample below. If you edit the file, avoid using a text editor that adds unprintable characters.

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 Utilities" on the MINX main menu, then select "Download MODIS MOD14 Fire Granules".



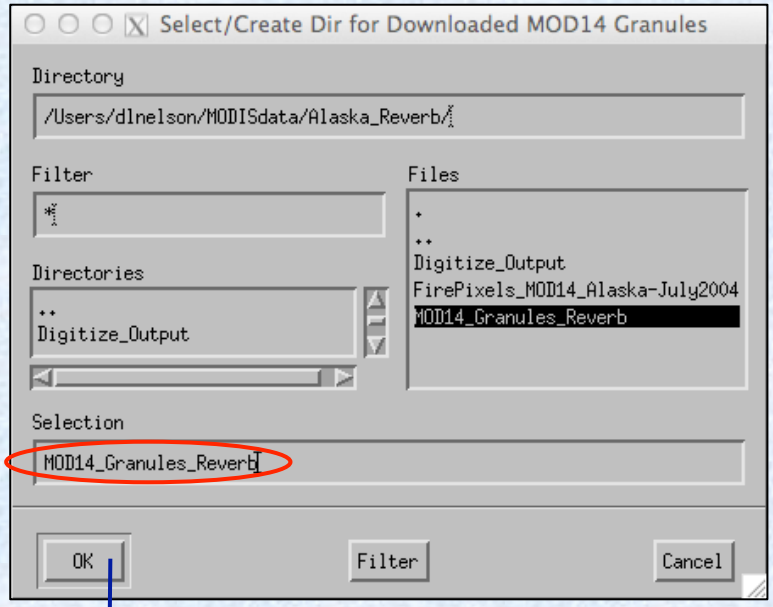


Select the Reverb file you downloaded containing MOD14 granule URL names and press "OK" to proceed to the next step.

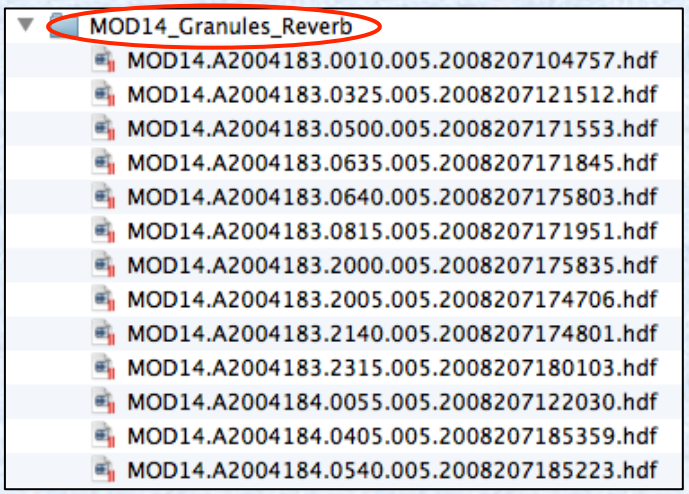
Next slide

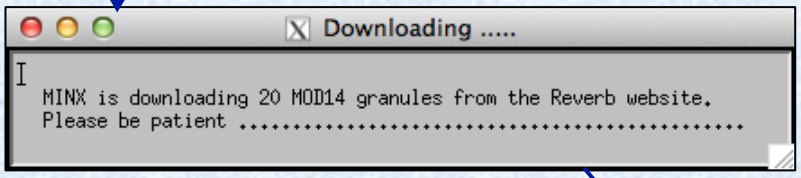
MODIS Fire Pixels – Download 4

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.



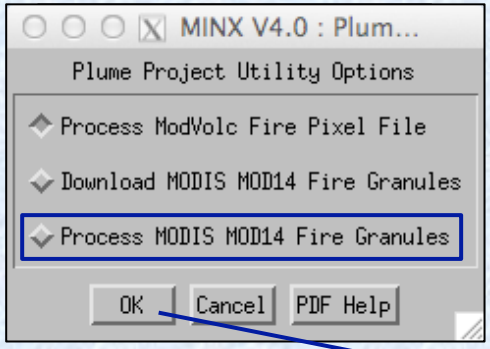


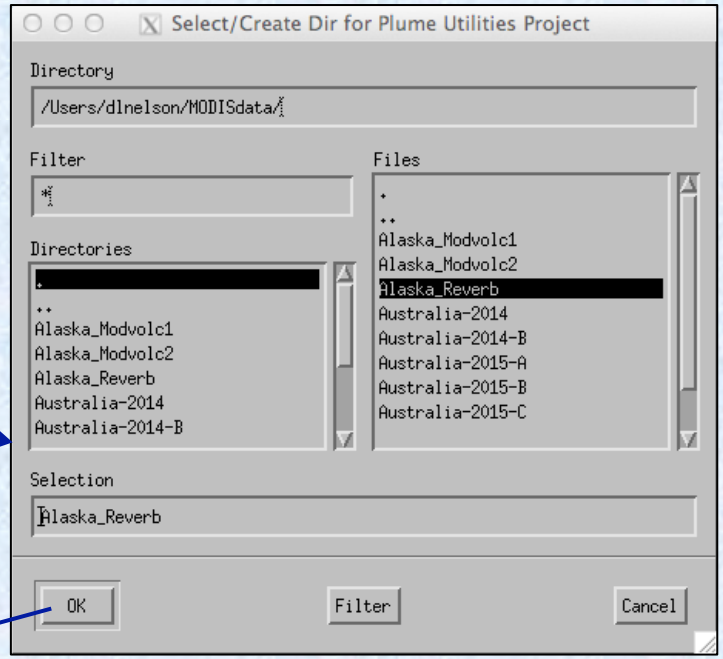
This message is displayed as your MOD14 granules are downloading. When all your MOD14 granules have been received, MINX will return you to the "Plume Utility" dialog box.

Next slide

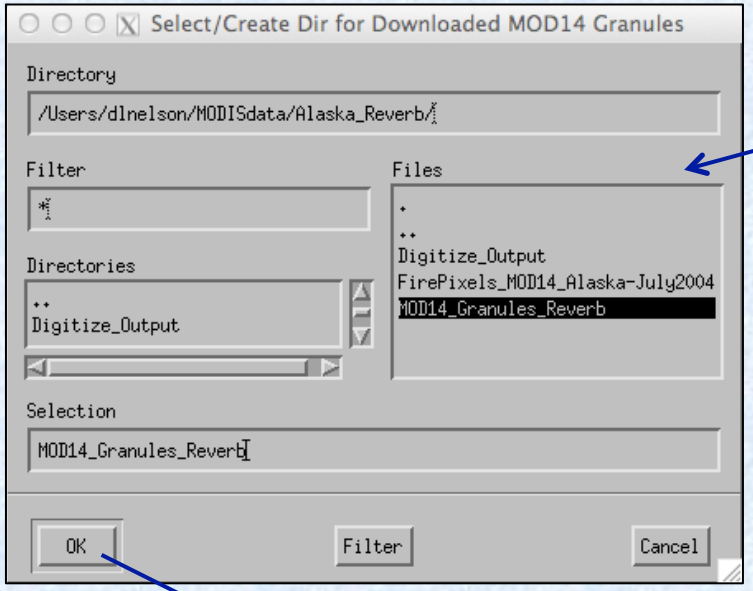
MODIS Fire Pixels – Process 1

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.



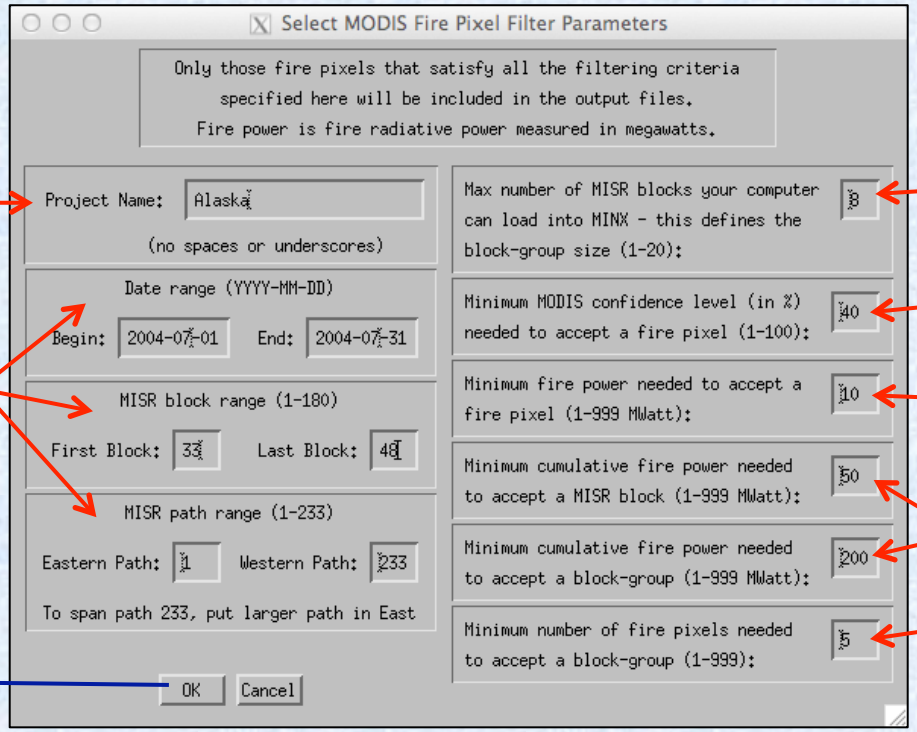
Select the directory where you stored the MODIS MOD14 fire granules downloaded from the Reverb website.

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.



Next slide

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

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

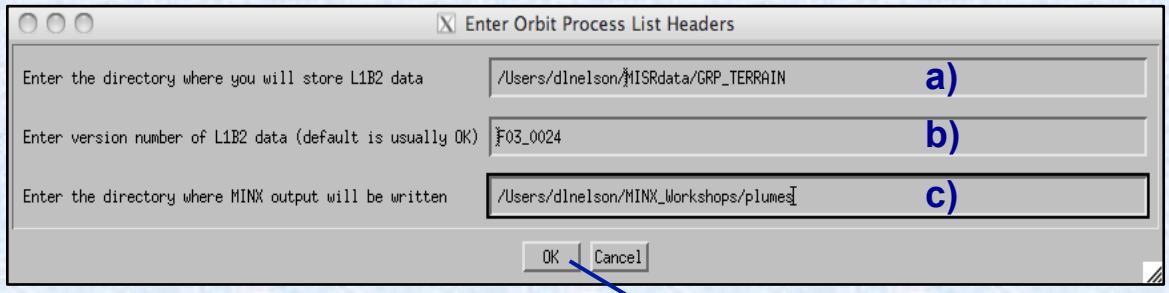
Fire pixels with FRP values less than this entry in MWatts will be excluded.

Exclude whole blocks or block-groups by FRP.

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

- **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 block-groups. These block-groups appear, one to a line, in the output file named : MisrProcessList_Modis_<project>.txt.**

MODIS Fire Pixels –Process 2



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

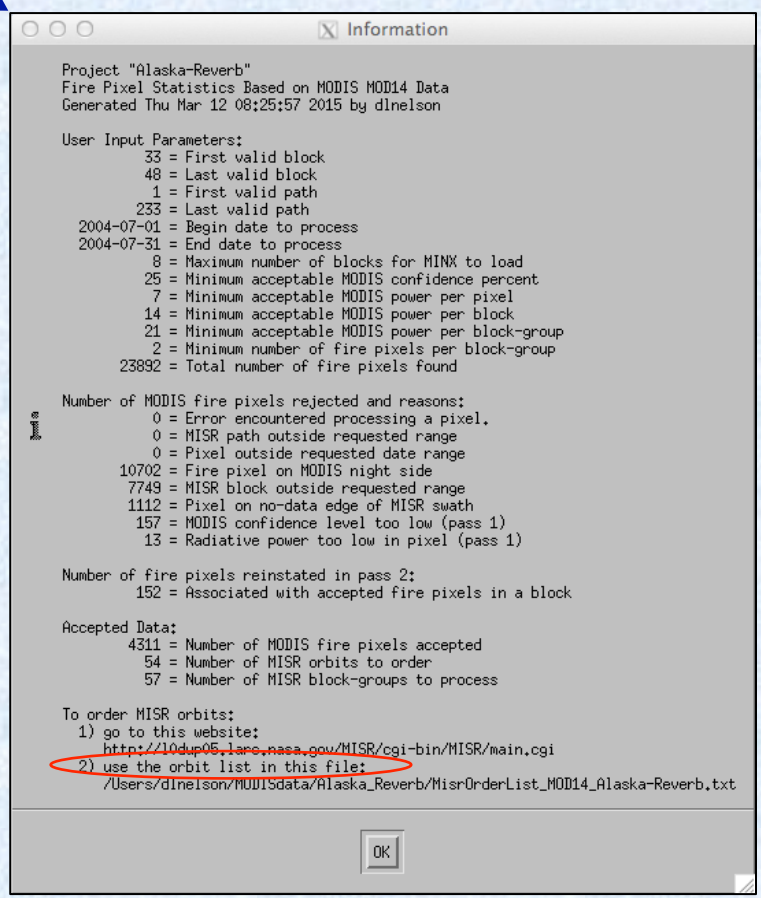
a) The full directory name where you expect to store downloaded MISR GRP_TERRAIN (or GRP_ELLIPSOID) files for input to digitizing.

b) Version number of GRP_.... Files. The default is the version shown and will be correct until MISR has reprocessed 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.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.

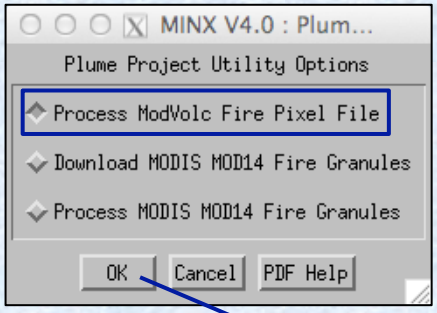
Sample fire pixel file - one is produced per MISR orbit:
FirePixels_MOD14_024137_Alaska-Reverb.txt

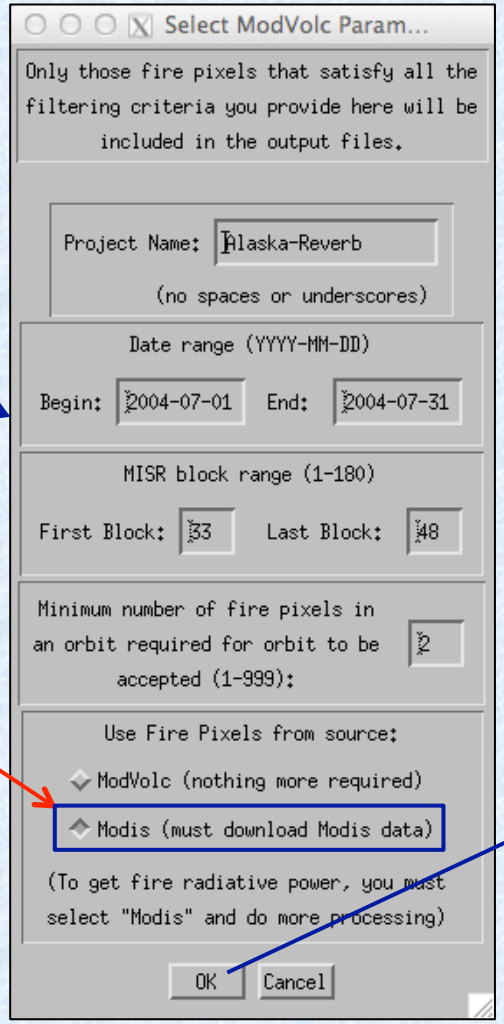
```
Fire pixels from MODIS granules on 275m MISR SOM grid for project : Alaska-Reverb
24152 / 62 / 2004-07-02  : orbitnum / pathnum / date
 Longitude  Latitude Blk Samp Line  Power  ReflR2 BTmpT21 BTmpT31 BBTmpT21 BBTmpT31 Conf
  degrees    degrees      0-based   MWatt  reflec fire(k) fire(k) bkgnd(k) bkgnd(k)  %
-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
...
```

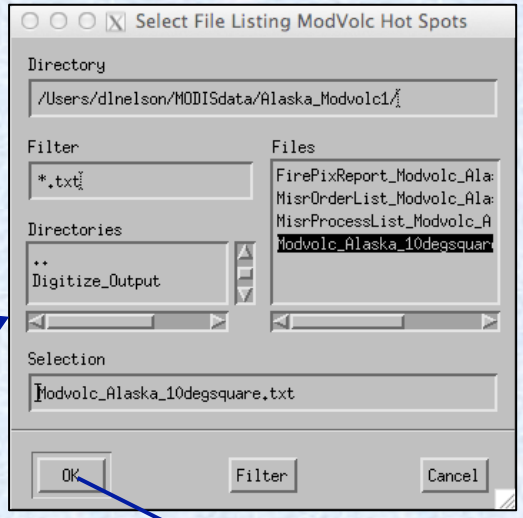
When you later use either the "Process Plume Project" or "Animate Cameras" option on the MINX main menu to retrieve plume heights, this file can be loaded using the "Task Menu" -> "Select Digitizing Tool" -> "Load MODIS Fire Pixels". Each fire pixel location will be posted automatically on the MISR image 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

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.

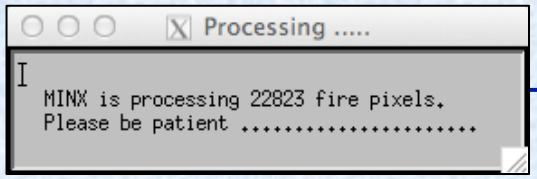
Processing begins the same as in alternative 1). First download ModVolc fire pixels for your project. Then select "Process ModVolc Fire Pixel File" from the "Plume Utilities" dialog box. (See slides 6 – 8).

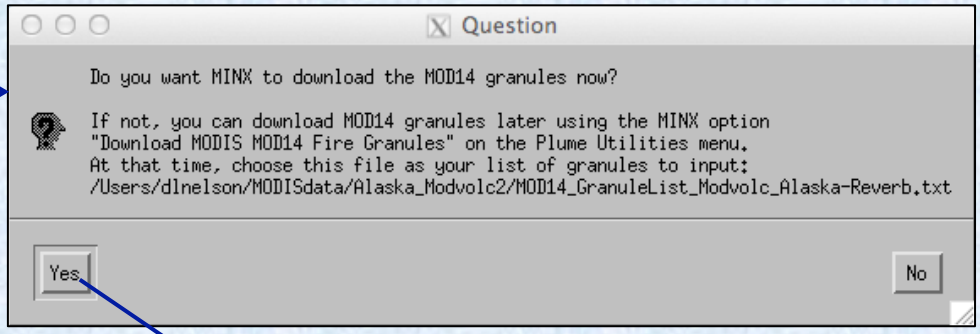
In the "Use Fire Pixels from source:" box, you must check the "Modis" button rather than the "ModVolc" button.

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

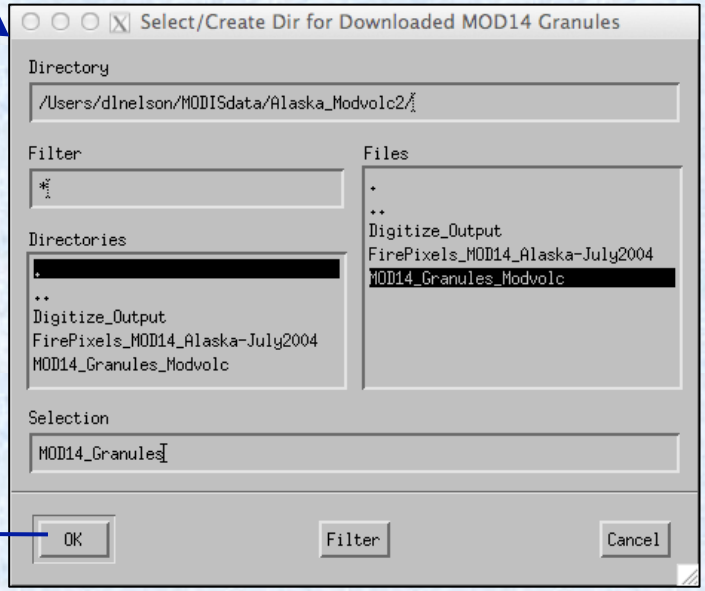


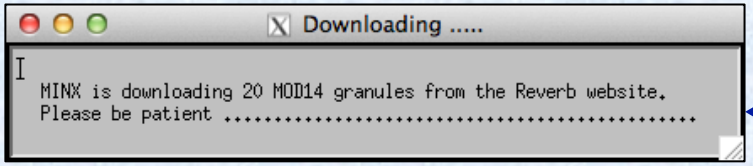


When MINX finishes processing the ModVolc fire pixels and creating the list of MOD14 granules to download, you will be shown a Question dialog.

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.





Select the directory where MODIS granules will be downloaded.

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