

# USING THE METFETCH TOOL

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Part of the RASCAL Instructor-led Training

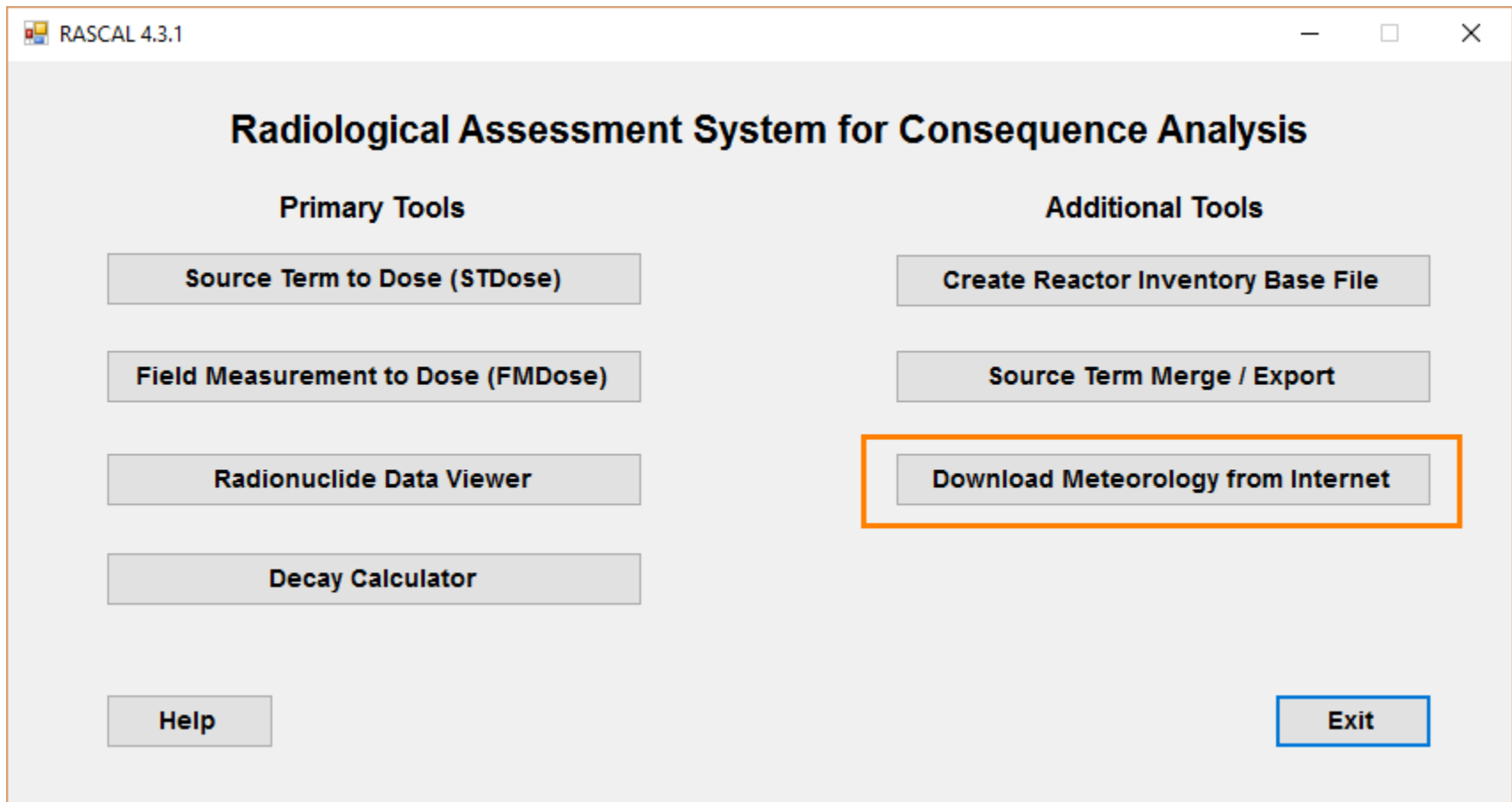
## IN THE PAST, ALL THE METEOROLOGICAL DATA RETRIEVAL AND ENTRY INTO RASCAL HAD TO BE DONE MANUALLY.

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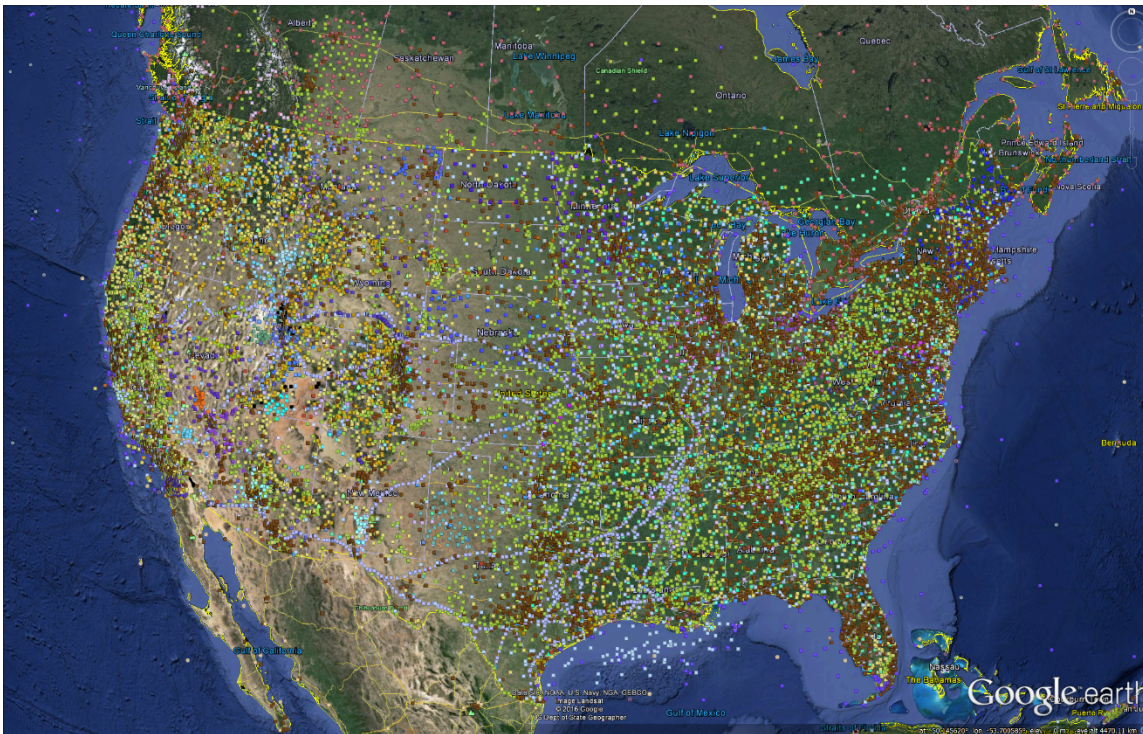
This meant:

- Identifying surrounding weather stations if the site was not in RASCAL
- Finding a source for the weather data, e.g. ERDS, NWS website
- Capturing the data for observations and forecasts; copying the numbers or printing
- Entering that data item by item into the RASCAL meteorological data processing program
- Periodically repeating the full process

**TO PARTIALLY AUTOMATE THIS PROCEDURE RASCAL HAS A TOOL  
TO *DOWNLOAD METEOROLOGY FROM INTERNET* (METFETCH).**



# THERE ARE LITERALLY THOUSANDS OF SOURCES FOR OBSERVED WEATHER DATA ONLINE.

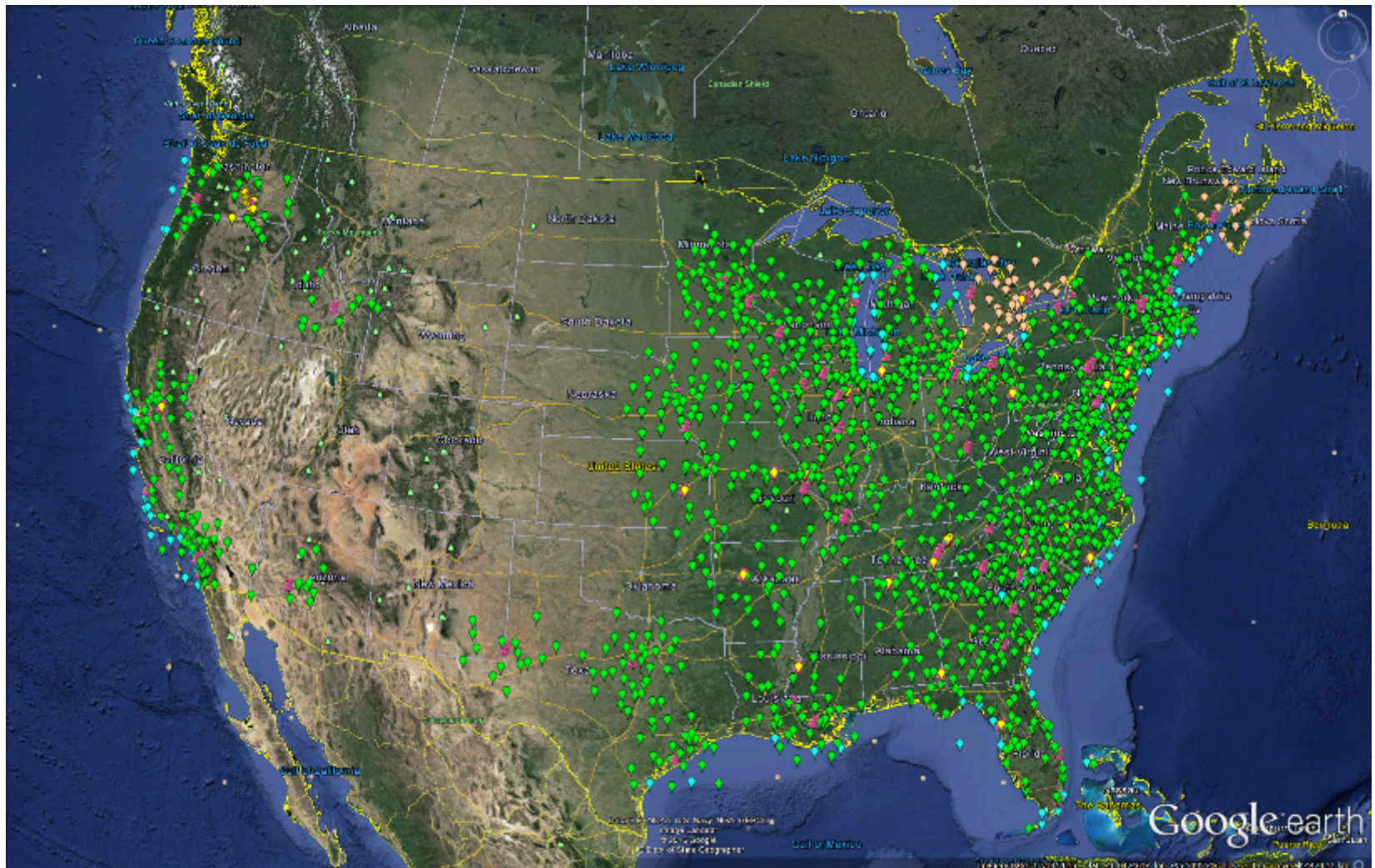


We started with all the stations that are available from the MesoWest data source of observations.

MesoWest contains observations for a wide range of places besides NWS sites; national labs, highways, oil rigs, and so on. Not all the data has the same quality and availability.



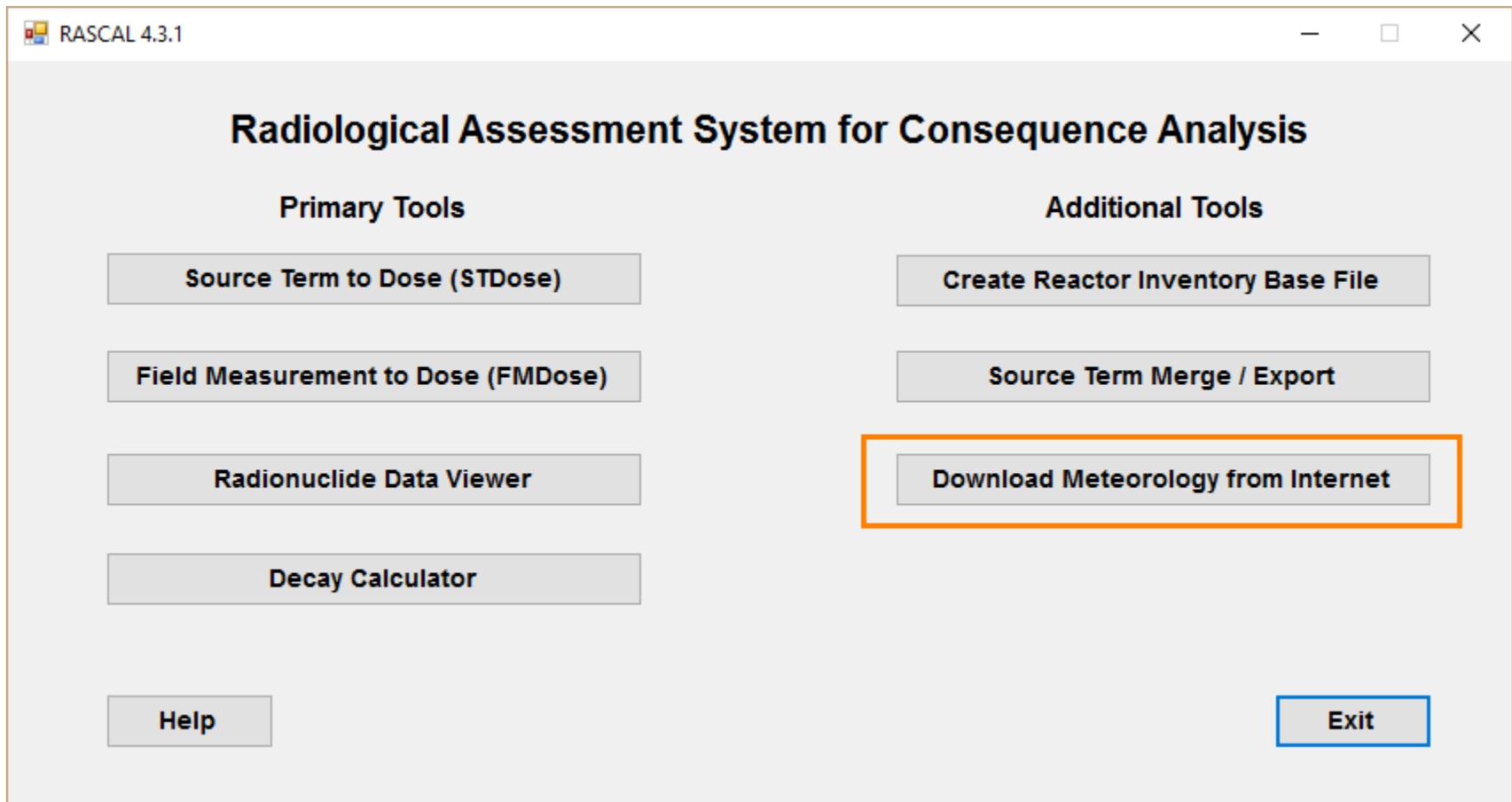
**FROM THE MESOWEST STATIONS, UP TO 40 WERE SELECTED FROM THE FIRST ORDER STATIONS AROUND ALL THE SITES IN THE RASCAL FACILITY DATABASE.**



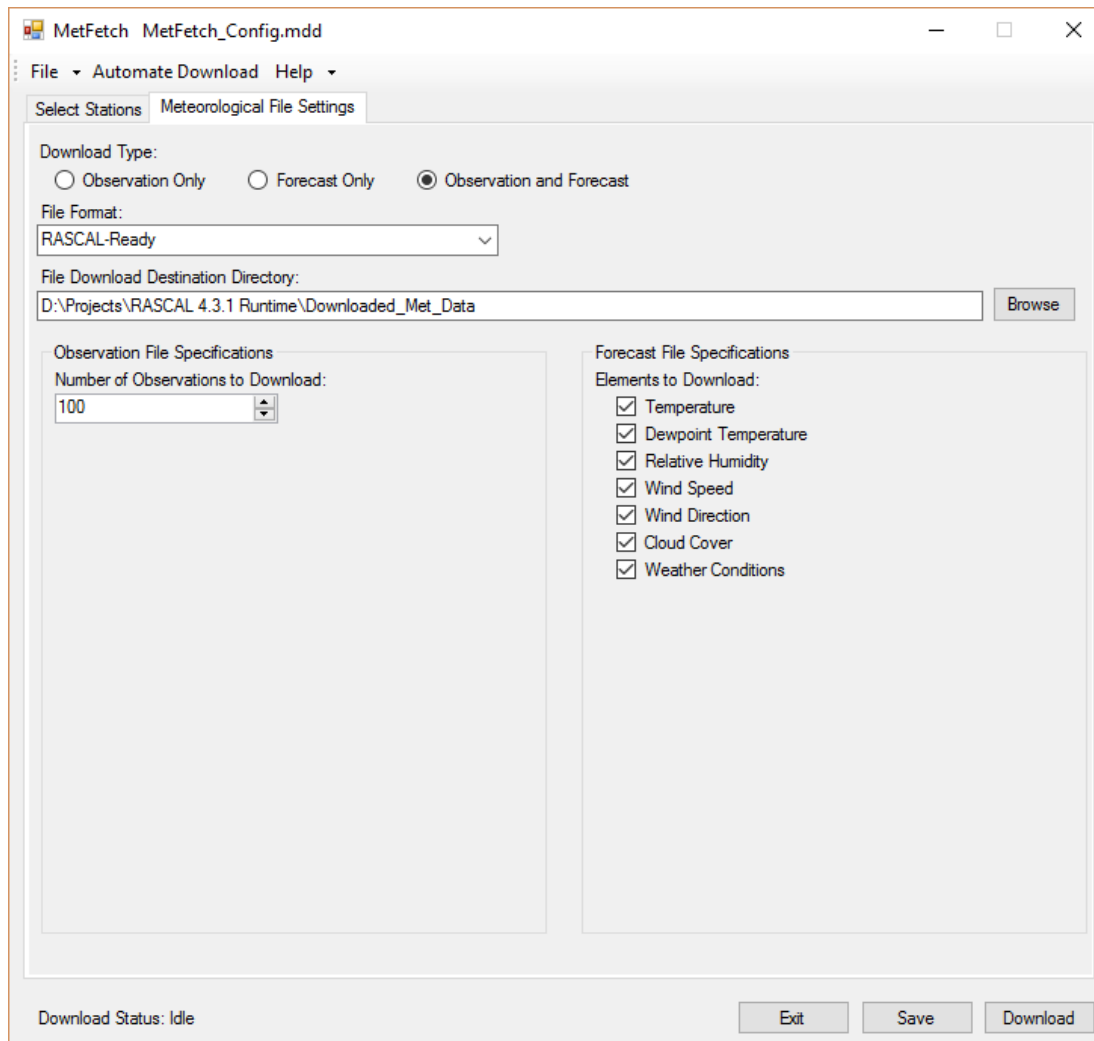




# RASCAL HAS A SEPARATE TOOL TO HANDLE THE DOWNLOAD OF WEATHER DATA FROM THE INTERNET.



# THE FIRST TIME YOU START UP METFETCH, CHECK ALL THE SETTINGS.



Those settings shown here are those recommended for routine use of the MetFetch tool with the RASCAL STDose model.



# BEGIN BY USING THE BROWSE SITE BUTTON TO SEE A LIST OF ALL THE FACILITIES IN THE RASCAL DATABASE

The screenshot shows the 'MetFetch MetFetch\_Config.mdd' window. It has a menu bar with 'File', 'Automate Download', and 'Help'. Below the menu is a tabbed interface with 'Select Stations' and 'Meteorological File Settings'. The 'Select Stations' tab is active, showing search criteria and two lists of stations.

**Select Stations** **Meteorological File Settings**

**Search Criteria**

Station Database File Path:

Site Location:

Site Latitude:  degrees

Station Type:

- ☐ Preferred Stations for RASCAL
- ☒ National Weather Service (NWS) Stations Only
- ☐ All Available Stations

Site Longitude:  degrees

Search Radius:

**Stations Available for Download:**

| ID | Type | State | Distance | Direction |
|----|------|-------|----------|-----------|
|----|------|-------|----------|-----------|

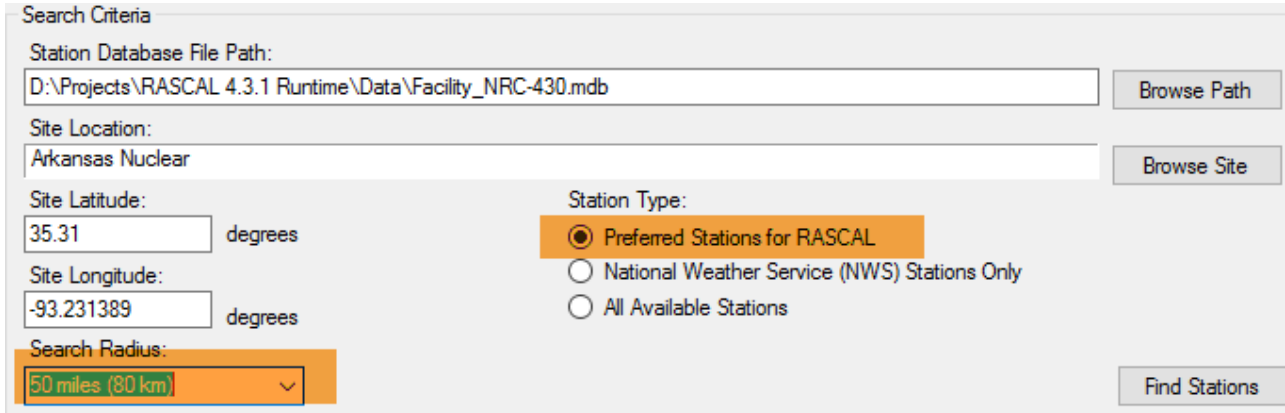
**Stations Download List:**

| ID | Type | State | Distance | Direction |
|----|------|-------|----------|-----------|
|----|------|-------|----------|-----------|

Select the desired site.

That will load the site latitude and longitude.

## NEXT, SET THE STATION TYPE AND THE SEARCH RADIUS



The screenshot shows the 'Search Criteria' dialog box in the RASCAL software. It contains the following fields and options:

- Station Database File Path:** A text box containing 'D:\Projects\RASCAL 4.3.1 Runtime\Data\Facility\_NRC-430.mdb' and a 'Browse Path' button.
- Site Location:** A text box containing 'Arkansas Nuclear' and a 'Browse Site' button.
- Site Latitude:** A text box containing '35.31' followed by 'degrees'.
- Site Longitude:** A text box containing '-93.231389' followed by 'degrees'.
- Search Radius:** A dropdown menu currently showing '50 miles (80 km)'.
- Station Type:** A group box containing three radio button options:
  - ☒ Preferred Stations for RASCAL (This option is highlighted with an orange background)
  - ☐ National Weather Service (NWS) Stations Only
  - ☐ All Available Stations
- Find Stations:** A button located at the bottom right of the dialog.

Station type should always be set to Preferred Stations for RASCAL. That will include NWS stations and the site.

For our example, we reduce the radius to 50 miles to limit how many stations are found around the site.

# CLICK THE FIND STATIONS BUTTON

Search Radius:  
50 miles (80 km) ▼

**Find Stations**

Stations Available for Download:

| ID                            | Type | State | Distance     | Direction |
|-------------------------------|------|-------|--------------|-----------|
| <input type="checkbox"/> ARKA | NRC  | AR    | 000(miles) : | N         |
| <input type="checkbox"/> KCCA | NWS  | AR    | 048(miles) : | ENE       |
| <input type="checkbox"/> KRUE | NWS  | AR    | 009(miles) : | ESE       |

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Remove Selected Unselect All Select All

Stations Download List:

| ID | Type | State | Distance | Direction |
|----|------|-------|----------|-----------|
|----|------|-------|----------|-----------|

Remove Selected Unselect All Select All

Set a checkmark for each station and then click the arrow to move them to the Stations Download List.

Stations Available for Download:

| ID                                       | Type | State | Distance     | Direction |
|--|------|-------|--------------|-----------|
| <input checked="" type="checkbox"/> ARKA | NRC  | AR    | 000(miles) : | N         |
| <input checked="" type="checkbox"/> KCCA | NWS  | AR    | 048(miles) : | ENE       |
| <input checked="" type="checkbox"/> KRUE | NWS  | AR    | 009(miles) : | ESE       |

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Stations Download List:

| ID | Type | State | Distance | Direction |
|----|------|-------|----------|-----------|
|----|------|-------|----------|-----------|

# FINALLY, CLICK THE DOWNLOAD BUTTON

Stations Available for Download:

| ID | Type | State | Distance | Direction |
|----|------|-------|----------|-----------|
|----|------|-------|----------|-----------|

Stations Download List:

| ID                            | Type | State | Distance    | Direction |
|-------------------------------|------|-------|-------------|-----------|
| <input type="checkbox"/> ARKA | NRC  | AR    | 000 (miles) | N         |
| <input type="checkbox"/> KCCA | NWS  | AR    | 048 (miles) | ENE       |
| <input type="checkbox"/> KRUE | NWS  | AR    | 009 (miles) | ESE       |

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Remove Selected

Unselect All

Select All

Remove Selected

Unselect All

Select All

Download Status: Idle

Exit

Save

Download



## WHAT HAPPENS DURING THE DOWNLOAD?

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- A warning will be displayed that MetFetch cannot download observations for the site station.
  - That is normal – NPP sites do not provide their met data to NWS
  - It is a reminder to you to manually get site observations
- Observations are downloaded for the other stations
- Forecasts are downloaded from the nearest point to each of the stations

## WHAT DO I DO AFTER THE DOWNLOAD?



- The Download status: Idle indicates the process is complete.
- You can leave the program open as you may come back to it later to get updated observations and forecasts.
- The data has been downloaded to a location on your computer where the RASCAL STDose model can find it. But you need to go and retrieve it.

## NEXT STEP IS TO GET THE DOWNLOADED DATA INTO THE STDose MODEL

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- Open a saved case or start running an STDose scenario that uses the same site as downloaded in MetFetch
- For our example, let's take a look at Cooper and some BWR specifics.

# CLICK THE ENTER DATA BUTTON

**Meteorological Data Processor**

File Stations Help

Location:

Latitude:

Longitude:

**Enter Data**

Process Data

Return

Available meteorological stations

| Station ID | Distance (miles) | Bearing (deg) |
|------------|------------------|---------------|
| ARKA       | 0.0              | 0.            |
| KFLP       | 77.3             | 27.8          |
| KCCA       | 48.1             | 65.6          |
| KBVX       | 93.4             | 71.7          |
| KSRC       | 84.6             | 94.6          |
| KM19       | 117.6            | 78.9          |
| KRUE       | 8.6              | 114.4         |
| KLRF       | 67.0             | 113.9         |
| KSGT       | 106.6            | 117.4         |
| KLIT       | 69.4             | 125.5         |
| KPBF       | 107.9            | 136.6         |
| KCDH       | 120.0            | 167.1         |
| KHOT       | 58.0             | 172.4         |

Only stations within 124 miles are shown.

Observation Summary

Station Summary

View Dataset

Export Dataset



## NOTE THE GREEN HIGHLIGHTING OF THE STATION IDs.

That indicates that there is downloaded weather data available for that station.

What it does not indicate is when that data was downloaded. That can be checked in the next step.

Meteorological Processor - Data Entry

Enter data for: Arkansas Nuclear

Retrieve Downloaded Data Change units or methods

| Station ID | Type | Date       | Time (24 h) | Wind Direct from (deg) | Speed (mph) | Stability Class | Precipitation | Air * Temp (deg F) | Air * Pressure (mb) | Dew Pt * (deg F) |
|------------|------|------------|-------------|------------------------|-------------|-----------------|---------------|--------------------|---------------------|------------------|
| ARKA       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KFLP       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KCCA       | Obs  | 2016/02/08 | 00:00       |                        |             |                 |               |                    |                     |                  |
| KBVX       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KSRC       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KM19       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KBUK       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KLRP       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KSGT       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KLIT       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KPBF       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KCDH       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KHDT       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KADF       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KMWT       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KMEZ       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KDEQ       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KRKR       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KISV       |      |            |             |                        |             |                 |               |                    |                     |                  |

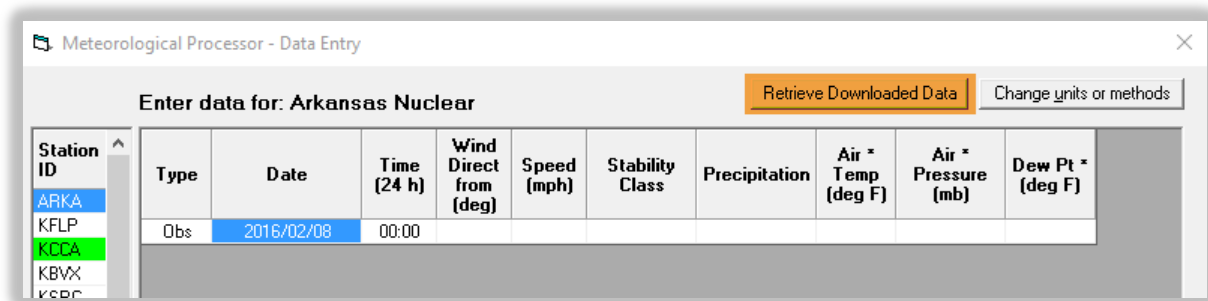
**\* Note:**

For UFG releases, air temperature, air pressure, and a measure of moisture are required.

For all other releases, air pressure and moisture are not required. However, air temperature is required if the precipitation type is snow.

Add record Sort records Delete record Delete all Print OK Cancel Help

## WITH THE SITE SELECTED IN THE STATION ID LIST, CLICK THE RETRIEVE DOWNLOADED DATA BUTTON



The screenshot shows a software window titled "Meteorological Processor - Data Entry". Inside, there's a header area with the text "Enter data for: Arkansas Nuclear" and two buttons: "Retrieve Downloaded Data" (highlighted in orange) and "Change units or methods". Below this is a table with columns for "Station ID", "Type", "Date", "Time (24 h)", "Wind Direct from (deg)", "Speed (mph)", "Stability Class", "Precipitation", "Air \* Temp (deg F)", "Air \* Pressure (mb)", and "Dew Pt \* (deg F)". The "Station ID" list on the left includes ARKA, KFLP, KCCA (highlighted in green), KBVX, and KSPC. The "Type" column has a value of "Obs", and the "Date" column has a value of "2016/02/08".

| Station ID | Type | Date       | Time (24 h) | Wind Direct from (deg) | Speed (mph) | Stability Class | Precipitation | Air * Temp (deg F) | Air * Pressure (mb) | Dew Pt * (deg F) |
|------------|------|------------|-------------|------------------------|-------------|-----------------|---------------|--------------------|---------------------|------------------|
| ARKA       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KFLP       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KCCA       | Obs  | 2016/02/08 | 00:00       |                        |             |                 |               |                    |                     |                  |
| KBVX       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KSPC       |      |            |             |                        |             |                 |               |                    |                     |                  |

Note: the site ID is actually colored green also. However, since it is currently selected the blue color hides the green.

# THE RETRIEVE SCREEN SHOWS A FOLDER WITH FORECAST DATA FOR THE SITE BUT NO FOLDER FOR OBSERVED DATA.

Retrieve Downloaded Meteorological Data

Highlight folder name to be retrieved or select None

| Observation Folder Name | First record | Last record | # recs |
|-------------------------|--------------|-------------|--------|
| None                    |              |             |        |

| Forecast Folder Name    | First record     | Last Record      | # recs |
|-------------------------|------------------|------------------|--------|
| None                    |                  |                  |        |
| Forecasts_2016-02-08-15 | 02/08/2016 15:00 | 02/14/2016 18:00 | 34     |

☐ Release point is on Daylight Savings Time

Help Cancel Retrieve

That is correct as remember we mentioned earlier that MetFetch does not have access to observations made at the site.

## TO COMPLETE THE RETRIEVAL OF THE DATA FOR THE SITE:

Retrieve Downloaded Meteorological Data

Highlight folder name to be retrieved or select None

| Observation Folder Name | First record | Last record | # recs |
|-------------------------|--------------|-------------|--------|
| None                    |              |             |        |

| Forecast Folder Name    | First record     | Last Record      | # recs |
|-------------------------|------------------|------------------|--------|
| None                    |                  |                  |        |
| Forecasts_2016-02-08-15 | 02/08/2016 15:00 | 02/14/2016 18:00 | 34     |

☐ Release point is on Daylight Savings Time

Help Cancel Retrieve

Click to select the available forecast data folder.

Leave the DST box unchecked; does not apply this time of year.

Click the Retrieve button.



# THE FORECAST DATA THAT WAS DOWNLOADED IS LOADED INTO THE GRID FOR THE SITE

Meteorological Processor - Data Entry

Enter data for: Arkansas Nuclear

Retrieve Downloaded Data Change units or methods

| Station ID | Type | Date       | Time (24 h) | Wind Direct from (deg) | Speed (mph) | Stability Class | Precipitation | Air * Temp (deg F) | Air * Pressure (mb) | Dew Pt * (deg F) |
|------------|------|------------|-------------|------------------------|-------------|-----------------|---------------|--------------------|---------------------|------------------|
| ARKA       |      |            |             |                        |             |                 |               |                    |                     |                  |
| KFLP       | Obs  | 2016/02/08 | 00:00       |                        |             |                 |               |                    |                     |                  |
| KCCA       | Fcst | 2016/02/08 | 15:00       | 300                    | 23.0        | Unknown         | No Precip     | 45                 |                     | 19               |
| KBVX       | Fcst | 2016/02/08 | 18:00       | 310                    | 15.0        | Unknown         | No Precip     | 40                 |                     | 17               |
| KSRC       | Fcst | 2016/02/08 | 21:00       | 310                    | 11.5        | Unknown         | No Precip     | 35                 |                     | 18               |
| KM19       | Fcst | 2016/02/09 | 00:00       | 310                    | 11.5        | Unknown         | No Precip     | 31                 |                     | 18               |
| KRUE       | Fcst | 2016/02/09 | 03:00       | 310                    | 10.4        | Unknown         | No Precip     | 29                 |                     | 18               |
| KLRF       | Fcst | 2016/02/09 | 06:00       | 300                    | 10.4        | Unknown         | No Precip     | 27                 |                     | 17               |
| KSGT       | Fcst | 2016/02/09 | 09:00       | 310                    | 13.8        | Unknown         | No Precip     | 30                 |                     | 17               |
| KLIT       | Fcst | 2016/02/09 | 12:00       | 300                    | 15.0        | Unknown         | No Precip     | 40                 |                     | 17               |
| KPBF       | Fcst | 2016/02/09 | 15:00       | 300                    | 16.1        | Unknown         | No Precip     | 45                 |                     | 17               |
| KCDH       | Fcst | 2016/02/09 | 18:00       | 310                    | 10.4        | Unknown         | No Precip     | 41                 |                     | 17               |
| KHOT       | Fcst | 2016/02/09 | 21:00       | 310                    | 8.1         | Unknown         | No Precip     | 34                 |                     | 18               |
| KADF       | Fcst | 2016/02/10 | 00:00       | 310                    | 6.9         | Unknown         | No Precip     | 31                 |                     | 18               |
| KMWT       | Fcst | 2016/02/10 | 03:00       | 310                    | 5.8         | Unknown         | No Precip     | 28                 |                     | 18               |
| KMEZ       | Fcst | 2016/02/10 | 06:00       | 310                    | 5.8         | Unknown         | No Precip     | 28                 |                     | 18               |
| KDEQ       | Fcst | 2016/02/10 | 09:00       | 310                    | 6.9         | Unknown         | No Precip     | 33                 |                     | 17               |
| KRKR       | Fcst | 2016/02/10 | 12:00       | 310                    | 6.9         | Unknown         | No Precip     | 41                 |                     | 16               |
| KISV       | Fcst | 2016/02/10 | 15:00       | 310                    | 6.9         | Unknown         | No Precip     | 45                 |                     | 16               |

\* Note:  
For UFG releases, air temperature, air pressure, and a measure of moisture are required.  
For all other releases, air pressure and moisture are not required. However, air temperature is required if the precipitation type is snow.

Add record  
Sort records  
Delete record  
Delete all

OK  
Cancel  
Print  
Help

Note, you still need to enter the observations manually.

See that stability class is Unknown. That is correct as stability is not forecast by NWS. That is OK, RASCAL will estimate it when needed.

# REPEAT THE PROCESS FOR OTHER DOWNLOADED STATIONS

Meteorological Processor - Data Entry

Enter data for: Clinton Memorial Airfield

Retrieve Downloaded Data Change units or methods

| Station ID | Type | Date       | Time (24 h) | Wind Direct from (deg) | Speed (mph) | Stability Class | Precipitation |
|------------|------|------------|-------------|------------------------|-------------|-----------------|---------------|
| KFLP       | Obs  | 2016/02/07 | 05:15       | 0                      | 0.0         | Unknown         | No Precip     |
| KCCA       | Obs  | 2016/02/07 | 05:35       | 0                      | 0.0         | Unknown         | No Precip     |
| KBVX       | Obs  | 2016/02/07 | 05:55       | 0                      | 0.0         | Unknown         | No Precip     |
| KSRC       | Obs  | 2016/02/07 | 06:15       | 0                      | 0.0         | Unknown         | No Precip     |
| KM19       | Obs  | 2016/02/07 | 06:35       | 0                      | 0.0         | Unknown         | No Precip     |
| KRUE       | Obs  | 2016/02/07 | 06:55       | 0                      | 0.0         | Unknown         | No Precip     |
| KLRF       | Obs  | 2016/02/07 | 07:15       | 0                      | 0.0         | Unknown         | No Precip     |
| KSGT       | Obs  | 2016/02/07 | 07:35       | 0                      | 0.0         | Unknown         | No Precip     |
| KLIT       | Obs  | 2016/02/07 | 07:55       | 0                      | 0.0         | Unknown         | No Precip     |
| KPBF       | Obs  | 2016/02/07 | 08:15       | 0                      | 0.0         | Unknown         | No Precip     |
| KCDH       | Obs  | 2016/02/07 | 08:35       | 0                      | 0.0         | Unknown         | No Precip     |
| KHOT       | Obs  | 2016/02/07 | 08:55       | 0                      | 0.0         | Unknown         | No Precip     |
| KADF       | Obs  | 2016/02/07 | 09:15       | 0                      | 0.0         | Unknown         | No Precip     |
| KMWT       | Obs  | 2016/02/07 | 09:35       | 0                      | 0.0         | Unknown         | No Precip     |
| KMEZ       | Obs  | 2016/02/07 | 09:55       | 0                      | 0.0         | Unknown         | No Precip     |
| KDEQ       | Obs  | 2016/02/07 | 10:15       | 0                      | 0.0         | Unknown         | No Precip     |
| KRRR       | Obs  | 2016/02/07 | 10:35       | 0                      | 0.0         | Unknown         | No Precip     |
| KISV       | Obs  | 2016/02/07 | 10:55       | 0                      | 0.0         | Unknown         | No Precip     |

Add record Sort records Delete record Delete all OK Cancel Print Help

## Note

You will have to select folders for both observations and forecasts.

Always pick the most recent folder

## AFTER RETRIEVING DATA FOR ALL STATIONS

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- Click OK to return to the main screen
- Note that all now we have a significant number of records for all stations.
- Click the Process Data button to create a dataset usable by the STDose ATD models.

## CONCLUSIONS

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- MetFetch makes it much easier to get both observed and forecast data for multiple sites.
- Since it is automated it reduces errors
- The entire download and retrieve process would be repeated at intervals
  - NWS makes observations every hour
  - Forecast are updated every 6-12 hours

## FINAL WORD ON METFETCH

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- At this time it works only for U.S. sites
- We are working to expand the tool to be able to get observations and forecasts for anywhere in the world.