Using the MetFetch Tool

Part of the RASCAL Instructor-led Training

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

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.



There are data sets containing 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.

Observations and forecasts are available for about 2,500 station locations and include primary NWS and FAA stations in the U.S.

OBSERVATIONS ARE FROM WEATHER STATIONS, FORECASTS ARE FROM THE CLOSEST FORECAST MODEL POINT TO THE STATION.



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

🦗 RASCAL 4.3.4	- 🗆 ×
Radiological Assessment Sy	stem for Consequence Analysis
Primary Tools	Additional Tools
Source Term to Dose (STDose)	Create Reactory Inventory Base File
Field Measurement to Dose (FMDose)	Source Term Merge / Export
Radionuclide Data Viewer	Download Meteorology from Internet
Decay Calculator	
Help	Exit

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

💀 MetFetch MetFetch_Config.mdd		—		×
File 🝷 Automate Download Help 👻				
Select Stations Meteorological File Settings				
Download Type: Observation Only Forecast Only File Format: RASCAL-Ready	Observation and Forecast			
File Download Destination Directory: C:\NRC\RASCAL43\Downloaded_Met_Data			Browse	
Station Database File Path: C:\NRC\RASCAL43\Data\Facility_NRC-430.mdb			Browse	
Observation File Specifications Number of Observations to Download: 100	Forecast File Specifications Data Resolution Standard Resolution High Resolution			
Download Status: Observations	Exit	Save	Downloa	ıd

Those setting 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

Site Loca Clinton Site Latitu 40.17194	ude: Site Lo 14 degrees -88.834	ngitude: \$167	degrees	Search Ra 125 miles (idius: (200 km)	_[Browse S Find Statio	iite ons
ations Ava	🖳 Select Site Location					-		tion
	Site Name	Site Code	City	State	country	Latitude	Longitu	
	Default						·	
	Advanced Medical Systems	ADMS	Cleveland	<u></u>	USA	41.555	-81.561	
	AREVA Richland	SIEM	Richland	WA	USA	46.3488	-119.29	
	Arkansas Nuclear	ARKA	Russell	AR	USA	35.31	-93.231	
	Barakah (12)	BK12	Al Ruwais	<not sp<="" td=""><td>UAE</td><td>23.96725</td><td>52.234(</td><td></td></not>	UAE	23.96725	52.234(
	Barakah (3 4)	BK34	Al Ruwais	<not sp<="" td=""><td>UAE</td><td>23.9662</td><td>52.228</td><td></td></not>	UAE	23.9662	52.228	
	Beaver Valley	BEAV	Shippin	PA	USA	40.6219	-80.433	
	Big Rock Point	BIGR	Charlev	MI	USA	45.3591	-85.194	
	Braidwood	RRAI	Braidwo	11	ASU	41 2436	-88 228 —	
				(ок		Cancel	

Select the desired site.

That will load the site latitude and longitude.

NEXT, SET THE STATION TYPE AND THE SEARCH RADIUS

🔜 MetFetch M	letFetch_Config.mo	dd				—		\times
File - Autom	ate Download He	lp ≁						
Select Stations	Meteorological File	Settings						
Search Criteri Site Location Arkansas Nu	a n: uclear					Browse S	iite	
Site Latitude 35.31	degrees	Site Longitude: -93.231389	degrees	Search Radius: 125 miles (200 km) 10 miles (16 km)		Find Statio	ons	
Stations Availab ID	ole for Download: State Distance	Direction		25 miles (16 km) 50 miles (80 km) 100 miles (160 km) 125 miles (200 km)	nce	Din	ection	

Reducing the search radius is needed only in the U.S. for areas where there are many sources of observed weather data.

CLICK THE FIND STATIONS BUTTON



The left panel will be populated with the station IDs for all stations found within the selected search radius of the site.

This is the list of stations where data is *available*.

SELECT FROM THE AVAILABLE STATIONS



Toggle checkmark to select.

Use >> button to move station(s) from left pane to the right (download) pane.

FINALLY, CLICK THE DOWNLOAD BUTTON

📙 MetFetch 🛛 MetFetch	h_Config.mdd		×
File 👻 Automate Dov	wnload Help 👻		
Select Stations Meteo	prological File Settings		
Search Criteria Site Location: Arkansas Nuclear			Browse Site
Site Latitude:	Site Longitude:		Search Radius:
35.31	degrees -93.231389	degrees	100 miles (160 km)
Stations Available for De ID State	lownload: Distance Direction		Stations Download List: ID State Distance Direction
KFLP AR KCCA AR KCCA AR KSRC AR KIRF AR KADF AR KMEZ AR KMEZ AR KIKR OK KJSV OK	078(miles) : NNE 048(miles) : ENE 094(miles) : ENE 085(miles) : ESE 084(miles) : SS 076(miles) : SW 081(miles) : WSW 089(miles) : W	>> <<	ARKA AR 000(miles) : N KRUE AR 009(miles) : ESE KLIT AR 069(miles) : SE KHOT AR 058(miles) : S KMWT AR 056(miles) : SSW
Remove Selected	Unselect All Select All]	Remove Selected Unselect All Select All Exit Save Download

WHAT HAPPENS DURING THE DOWNLOAD?

- 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?

Remove Selected	Unselect All Select All	Remove Selected	Unselect All Select All
Download Status: Idle		Exit	Save 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

- 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



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.

5. Meteorol	ogical Pro	cessor - Data Entry	r								×
	Enter d	ata for: Arkans	as Nuc	lear			Retriev	e Download	ded Data (Change <u>u</u> nits (or methods
Station ^ ID ARKA	Туре	Date	Time (24 h)	Wind Direct from (deg)	Speed (mph)	Stability Class	Precipitation	Air* Temp (deg F)	Air * Pressure (mb)	Dew Pt * (deg F)	
KFLP KCCA KBVX KSRC KM19 KLRF KSGT KLIT KPBF KCDH KHOT KADF KMWT KADF KMWT KMEZ KDEQ KRKR KJSV	Obs	2016/02/08	00:00								
* Note: For UF6 releas required. For all other rel temperature is	es, air temp eases, air p equired if t	erature, air pressure, pressure and moisture he precipitation type	and a mea are not re is snow.	asure of mo quired. Ho	oisture are wever, air		Add record Sort record Delete reco Delete a	rd st Dro	<u>P</u> rint		OK Cancel <u>H</u> elp

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

S. Meteorolo	ogical Pro	cessor - Data Entry	,								×
	Enter d	ata for: Arkans	as Nuc	lear			Retriev	e Download	ded Data	Change <u>u</u> nits o	or methods
Station ^ ID ARKA	Туре	Date	Time (24 h)	Wind Direct from (deg)	Speed (mph)	Stability Class	Precipitation	Air* Temp (deg F)	Air * Pressure (mb)	Dew Pt * (deg F)	
KFLP	Obs	2016/02/08	00:00								
KCCA 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.

Observation Folder Name	First record	Last record	# re	C\$
Forecast Folder Name	First record	Last Record	tt re	<u></u>
Forecast Folder Name None	First record	Last Record	# re	C\$
Forecast Folder Name None Forecasts_2016-02-08-15	First record	Last Record 02/14/2016 18:00	# re 34	CS
Forecast Folder Name None Forecasts_2016-02-08-15	First record 02/08/2016 15:00	Last Record 02/14/2016 18:00	# re 34	CS
Forecast Folder Name None Forecasts_2016-02-08-15	First record 02/08/2016 15:00	Last Record 02/14/2016 18:00	# re 34	C\$
Forecast Folder Name None Forecasts_2016-02-08-15	First record 02/08/2016 15:00	Last Record 02/14/2016 18:00	# re 34	CS
Forecast Folder Name None Forecasts_2016-02-08-15	First record 02/08/2016 15:00	02/14/2016 18:00	# re 34	CS

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:

5. Retrieve Downloaded Meteorol	logical Data		-		×
Highlight folder name to be retrieved	d 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	
	<mark>────────────────────────────────────</mark>	elease point is on Dayli	ght Sa	vings Tim Retrieve	e

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

ARKA	Туре	Date	Time (24 h)	Wind Direct from (deg)	Speed (mph)	Stability Class	Precipitation	Air* Temp (deg F)	Air * Pressure (mb)	Dew Pt * (deg F)	
KFLP	Obs	2016/02/08	00:00								
KCCA	Fost	2016/02/08	15:00	300	23.0	Unknown	No Precip	45		19	
.BVX	Fost	2016/02/08	18:00	310	15.0	Unknown	No Precip	40		17	
SRC	Fost	2016/02/08	21:00	310	11.5	Unknown	No Precip	35		18	
(M19	Fost	2016/02/09	00:00	310	11.5	Unknown	No Precip	31		18	
RUE	Fost	2016/02/09	03:00	310	10.4	Unknown	No Precip	29		18	
LRF	Fost	2016/02/09	06:00	300	10.4	Unknown	No Precip	27		17	
SGT	Fost	2016/02/09	09:00	310	13.8	Unknown	No Precip	30		17	
LIT	Fost	2016/02/09	12:00	300	15.0	Unknown	No Precip	40		17	
PBF	Fost	2016/02/09	15:00	300	16.1	Unknown	No Precip	45		17	
CDH	Fost	2016/02/09	18:00	310	10.4	Unknown	No Precip	41		17	
нот	Fost	2016/02/09	21:00	310	8.1	Unknown	No Precip	34		18	
ADF	Fost	2016/02/10	00:00	310	6.9	Unknown	No Precip	31		18	
(MWT	Fost	2016/02/10	03:00	310	5.8	Unknown	No Precip	28		18	
IMEZ	Fost	2016/02/10	06:00	310	5.8	Unknown	No Precip	28		18	
(DEQ	Fost	2016/02/10	09:00	310	6.9	Unknown	No Precip	33		17	
KRKR	Fost	2016/02/10	12:00	310	6.9	Unknown	No Precip	41		16	
(JSV 🔭	E.a.	2010/02/10	15.00	210	C 0	1 II	Mill Design	10		10	

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

		(24 rij	from (deg)	(mph)	Class	Precipitation		
Obs	2016/02/07	05:15	0	0.0	Unknown	No Precip		
Obs	2016/02/07	05:35	0	0.0	Unknown	No Precip		
Obs	2016/02/07	05:55	0	0.0	Unknown	No Precip		
Obs	2016/02/07	06:15	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	06:35	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	06:55	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	07:15	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	07:35	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	07:55	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	08:15	0	0.0	Unknown	No Precip		
ОЬз	2016/02/07	08:35	0	0.0	Unknown	No Precip		
Оbs	2016/02/07	08:55	0	0.0	Unknown	No Precip		
Оbs	2016/02/07	09:15	0	0.0	Unknown	No Precip		
Obs	2016/02/07	09:35	0	0.0	Unknown	No Precip		
Оbs	2016/02/07	09:55	0	0.0	Unknown	No Precip		
Оbs	2016/02/07	10:15	0	0.0	Unknown	No Precip		
Obs	2016/02/07	10:35	0	0.0	Unknown	No Precip		
	Ubs Obs Obs Obs Obs Obs Obs Obs Obs Obs O	Ubs 2016/02/07 Obs 2016/02/07	Dbs 2016/02/07 05:15 Dbs 2016/02/07 05:35 Dbs 2016/02/07 06:15 Dbs 2016/02/07 07:15 Dbs 2016/02/07 07:35 Dbs 2016/02/07 08:15 Dbs 2016/02/07 09:15 Dbs 2016/02/07 09:35 Dbs 2016/02/07 09:35 Dbs 2016/02/07 10:15 Dbs 2016/02/07 10:35 Dbs 2016/02/07 10:35 Dbs 2016/02/07 10:55	Ubs 2016/02/07 Ubs 15 0 Obs 2016/02/07 05:35 0 Obs 2016/02/07 05:35 0 Obs 2016/02/07 06:15 0 Obs 2016/02/07 06:35 0 Obs 2016/02/07 06:55 0 Obs 2016/02/07 06:55 0 Obs 2016/02/07 07:15 0 Obs 2016/02/07 07:35 0 Obs 2016/02/07 07:35 0 Obs 2016/02/07 08:15 0 Obs 2016/02/07 08:35 0 Obs 2016/02/07 08:35 0 Obs 2016/02/07 08:35 0 Obs 2016/02/07 09:35 0 Obs 2016/02/07 09:35 0 Obs 2016/02/07 10:15 0 Obs 2016/02/07 10:35 0 Obs 2016	Ubs 2016/02/07 Ub:15 U U.U Obs 2016/02/07 05:35 0 0.0 Obs 2016/02/07 05:55 0 0.0 Obs 2016/02/07 06:15 0 0.0 Obs 2016/02/07 06:15 0 0.0 Obs 2016/02/07 06:35 0 0.0 Obs 2016/02/07 07:15 0 0.0 Obs 2016/02/07 07:35 0 0.0 Obs 2016/02/07 07:35 0 0.0 Obs 2016/02/07 07:35 0 0.0 Obs 2016/02/07 08:35 0 0.0 Obs 2016/02/07 08:35 0 0.0 Obs 2016/02/07 09:35 0 0.0 Obs 2016/02/07 09:35 0 0.0 Obs 2016/02/07 10:55 0 0.0 Obs 2016/02/07 10:55 <th>Ubs 2016/02/07 Ub:15 U U.U Unknown Obs 2016/02/07 05:35 0 0.0 Unknown Obs 2016/02/07 05:55 0 0.0 Unknown Obs 2016/02/07 06:15 0 0.0 Unknown Obs 2016/02/07 06:15 0 0.0 Unknown Obs 2016/02/07 06:35 0 0.0 Unknown Obs 2016/02/07 06:35 0 0.0 Unknown Obs 2016/02/07 07:15 0 0.0 Unknown Obs 2016/02/07 07:35 0 0.0 Unknown Obs 2016/02/07 08:35 0 0.0 Unknown Obs 2016/02/07 08:35 0 0.0 Unknown Obs 2016/02/07 08:35 0 0.0 Unknown Obs 2016/02/07 09:35 0 0.0 Unknown</th> <th>Ubs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:15 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:35 0 0.0 Unknown No Precip Obs</th> <th>Ubs 2016/02/07 Ubs Unknown No Precip Obs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 05:55 0 0.0 Unknown No Precip Obs 2016/02/07 06:15 0 0.0 Unknown No Precip Obs 2016/02/07 06:15 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:55 0 0.0 Unknown No Precip Obs 2016/02/07 07:15 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:</th>	Ubs 2016/02/07 Ub:15 U U.U Unknown Obs 2016/02/07 05:35 0 0.0 Unknown Obs 2016/02/07 05:55 0 0.0 Unknown Obs 2016/02/07 06:15 0 0.0 Unknown Obs 2016/02/07 06:15 0 0.0 Unknown Obs 2016/02/07 06:35 0 0.0 Unknown Obs 2016/02/07 06:35 0 0.0 Unknown Obs 2016/02/07 07:15 0 0.0 Unknown Obs 2016/02/07 07:35 0 0.0 Unknown Obs 2016/02/07 08:35 0 0.0 Unknown Obs 2016/02/07 08:35 0 0.0 Unknown Obs 2016/02/07 08:35 0 0.0 Unknown Obs 2016/02/07 09:35 0 0.0 Unknown	Ubs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:15 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:35 0 0.0 Unknown No Precip Obs	Ubs 2016/02/07 Ubs Unknown No Precip Obs 2016/02/07 05:35 0 0.0 Unknown No Precip Obs 2016/02/07 05:55 0 0.0 Unknown No Precip Obs 2016/02/07 06:15 0 0.0 Unknown No Precip Obs 2016/02/07 06:15 0 0.0 Unknown No Precip Obs 2016/02/07 06:35 0 0.0 Unknown No Precip Obs 2016/02/07 06:55 0 0.0 Unknown No Precip Obs 2016/02/07 07:15 0 0.0 Unknown No Precip Obs 2016/02/07 07:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:35 0 0.0 Unknown No Precip Obs 2016/02/07 08:

Note

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

Always pick the most recent folder

AFTER RETRIEVING DATA FOR ALL STATIONS

- 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

- 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

- At this time it works best for U.S. sites where it has access to many observation stations and the U.S. digital forecast data.
- RASCAL 4.3.3 added access to Aviation Weather for the world but coverage is less.
- Future version of RASCAL may provide ways for countries to automatically retrieve their data.