***WXSIMPRO***

 **Multi-site controller program for the WXSIM Weather Simulator System**

 **Version 2.1**

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**Introduction**

WXSIMPRO enables automated sequential running of WXSIM and WXSIMATE for multiple forecast sites. This will work only for sites specifically enabled for this purpose. This controller program offers several advantages over trying to run multiple WXSIM sites in different folders or on different computers. One advantage is that WXSIMPRO communicates with wxsim.exe (the main forecasting program), wxsimate.exe (the data gathering program for WXSIM), and wret.exe (a data retrieval, display, and analysis program for WXSIM’s forecasts), opening and closing them in an efficient sequence, either on command or on a schedule. Also, WXSIMPRO allows quick global or site-specific changes to parameters in WXSIM and WXSIMATE. WXSIMPRO provides options for handling situations such as bad or missing data, up to and including skipping a forecast entirely. Finally, WXSIMPRO packages the output of the various sites’ forecasts in separate, site-specific files as well as a large text file containing all the forecasts, and provides a way (along with another program, called IfanView, by Irfan Skiljan) to convert bitmap graphics to the much more compact PNG format .

WXSIMPRO operates only with custom data modified slightly (by the author) to permit use with it; otherwise WXSIM and WXSIMATE will inform the user that the site is not set up for such use, and the run will be aborted. On boot-up WXSIMPRO lists these sites in the 'Available Sites' box. Those sites with a '+' to the left have been chosen for inclusion in the next forecast run; ones with a '-' will be left out. You can change this inclusion status by first selecting a site and then clicking either the 'Include in run' or 'Omit from run' buttons.

**Making and saving changes in WXSIM, WXSIMATE, and WRET**

When you select a site in the list it will appear in red as the 'Selected site' near the bottom of the form. You then have the option to customize settings for that particular site in WXSIM, WXSIMATE, and WRET using the 'Open WXSIM as selected site' , 'Open WXSIMATE as selected site' , and 'Open WRET as selected site' buttons, and . This will start the chosen program with that site. You can then change any settings you like - such as what data to include in the WXSIMATE for data file construction, what to import in WXSIM, length of forecast, types of data to output, what types of output or where to save various text and graphics in WRET, and any other settings the programs have.

An especially important thing to check is the state of the Auto Run form in WXSIM. You should make sure the actions you want taken are checked. It is NOT necessary to check scheduled run times in WXSIM itself (and in fact it may be better to leave these all unchecked). However - you will need to click the 'Use above settings' button to get these settings to register. If you do not want WXSIM left in the auto run state (other than with WXSIMPRO - which temporarily forces WXSIM into auto run anyway) just open Auto Run again and click 'Disable auto run'. Note that for WXSIMATE to function under WXSIMPRO’s instruction, it must (unlike the case with WXSIM) have the Scheduler (under ‘Schedule’) activated, or ‘ON’. It is not necessary for any times to be checked in those boxes (in WXSIMATE’s Scheduler); so, as with WXSIM, you can just leave them unchecked.

Once you exit WXSIM (using File/Exit) or WXSIMATE or WRET (using Close) - having opened them from WXSIMPRO as described above – you must either save the changes, or explicitly NOT save them, using the buttons provided. NOTE: if you want to use Diurnal Breeze (usually sea breeze) in WXSIM, you must reactivate it with its ‘Yes’ button before exiting WXSIM, as it generally will have turned itself off because of date changes.

If you do save the settings, you can save all the changes you made for the specific site, or save the generic types of changes made for ALL sites (this choice made using the ‘radio’ buttons provided). For a list of which settings fit in this ‘generic’ category, see the Appendix at the end of this document.

**Making forecasts**

Once you have chosen the desired forecast sites from the list and have established the settings for each in both programs (you might use the same choices for all sites) you are ready to start a forecast run. You may do this either by clicking the Run immediately button or by choosing the hours and minutes for scheduled runs. If you want to do the latter be sure to click the 'Activate scheduler' button.

The first task the program will do is to start WXSIMATE for the 'home' site (which has zero as and identifier - such as in the files c0.txt and w0.txt). All checked data types will be downloaded. Some of downloaded files - such as METAR and RAOB data - are common to all sites and will be downloaded only once. Others - such as GFS and FOUS data - are unique to each site and will be downloaded separately. Next WXSIMATE will open for the first site in the current list and will download any additional needed data and then cull and append to form a file. WXSIM will then open and run a forecast for the first site. This cycle will repeat until all chosen sites are done. Forecast data - in four different formats - will be saved for each site. The names of these files consist of 'latest' followed by the first three letters of the site's name. For example here are the forecast files that will be saved for Dallas/Ft. Worth:

latestDal.wxf

latestDal.txt

latestDal.csv

latestdailyDal.csv

plaintextDal.txt

lastretDal.txt (if you have ‘Graphic’ checked on WXSIM’s Output form for that site)

If you have chosen to archive the forecasts in WXSIM (check box on output form) you will also get time stamped forecasts with names like:

f07123108Dal.wxf

f07123108Dal.txt

f07123108Dal.csv

f07123108dailyDal.csv

The files 'plaintext.txt' and 'summary.txt' for all the sites are combined into a file called 'textall.txt'. This can be viewed by clicking 'Show Text of Forecast' and subsequently printed if desired.

If you have WXSIMATE set to archive data files (by checking the box on the scheduler form in that program) you will also get files like

d07123109Dal.txt

Note that archiving forecasts and data files for multiple sites on a regular basis will eventually consume a great deal of disk space - so do this only if you have reason to.

A great way to organize data output is to create a separate folder (perhaps under c:\wxsim) for each site, and specify that folder for output in WXSIM - for saving the .wxf, for example - and/or in WRET, for saving lastretxxx.txt files (where xxx stands for the first three letters of the site name) and similarly named plots of meteograms or soundings.

**Special conditions for forecasts**

WXSIMPRO offers several options (on the right side of the form) for controlling whether, and how, forecasts are made. The first of these is a check box which (if checked) causes the WXSIM forecast to be skipped entirely if GFS data (which is really essential for a good forecast run) is not found by WXSIMATE (perhaps due to an internet or server problem). In practice, this is quite rare, but the option can be useful for preventing publication of such an occasional inaccurate forecast.

Next is a check box labeled ‘local (home) station (if expected for site)’. If this is checked, and WXSIMATE fails to find sufficient local station data (assuming this is checked for import on WXSIM’s Auto Run form), the forecast will be skipped. Insufficient data could mean no data at all, such as a missing log file or a bad internet link, but it could also mean there is data, but the last values are over 1.5 hours old. In many cases, though, checking this box is not necessary, as WXSIM itself will try back-up methods if the local statin data is not available. First, if you have selected either METAR or SYNOP as surface data types for import in WXSIM, the data for the ‘home’ METAR or SYNOP station will be used to initialize the program. If this isn’t found, WXSIM will default to interpolating GFS data for the boot-up time. Usually, these backup methods will produce a forecast almost indistinguishable from one using home station data, at least after the first day or so of the forecast. If, though, the station has a very distinctive microclimate and the home METAR or SYNOP site is not nearby or representative, it may be best to check this box.

The ‘Maximum time to wait for WXSIMATE’ figure is a back-up for the internal error-handling routines already present in WXSIMATE. These routines include multiple attempts to contact internet sites, and in some cases, trying other sites if the first ones are not responding. Rarely, though, WXSIMATE might still get ‘stuck’, leaving WXSIMPRO and WXSIM waiting for it. The time limit you put in the box is the longest you are willing to wait before simply closing down WXSIMATE and moving on to the next site. This should generally be at least 5 minutes to give WXSIMATE a good chance to do its job. (NOTE: as of this writing, this feature has not been widely tested, and there could be some circumstances in which WXSIMATE might remain ‘stuck’, but again this backup should be rarely needed anyway).

The ‘Boot WXSIM with whole hour if initializing with GFS’ box allows you to instruct WXSIM - IF it finds neither METAR/SYNOP data for the home site, nor local station surface data – to round the program boot-up time (usually some minutes past an hour) to round back to the “top” of the last hour. This is not necessary for forecast purposes, but may be helpful when using WXSIM output in third-party scripts for displaying data. Also, it may give some advantage in that most surface data used for advection tends to be within a few minutes of the hour.

Finally, ‘Use default water temps’ instructs WXSIM to use its own climatological normal values for sea surface temperature, which is meaningful if you are using Diurnal Breeze (the sea breeze option of that) or supplemental maritime effect. Actually, it is generally better to use hand-entered actual current values for water temperature, but keeping up with these changing values on a daily or even weekly basis can be a chore, especially if you have multiple coastal sites. If you do not check the box, you either have to regularly maintain this information in WXSIM for each site, or expect warning messages to appear as the climatological normals start to differ from the entered value because of changing seasons. Fortunately, WXSIM’s normals are usually very close (i.e. within 2 Celsius degrees) of actual values, so there is very little harm done to the forecast by checking this box.

**Other features**

Near the bottom of the form is an option to ‘Convert BMP to PNG using IrfanView, a nice (and free, though its author appreciates donations) graphics program which has the advantage, in the present context, of being able to run from a DOS command line. If you check this box, and supply the correct path on your computer to IrfanView, that program will create and run a small DOS batch file to tell IrfanView to create PNG versions of all the larger BMP (bitmap) graphics produced by wret.exe at the end of a run, assuming you are using the ‘Graphic’ option in WXSIM (check box on the Output form). The target folder for the PNG files is, by default, the one specified for that site, but you can specify an alternate one (for PNG’s only) in the box at lower right. These PNG files are much more compact and quicker to upload to web sites than the bitmap versions. You can find IrfanView at [www.irfanview.com](http://www.irfanview.com).

Finally, at the bottom of WXSIMPRO’s form, is an option to run and optional DOS batch file. This can be any such file of your making. A typical use would be a batch file with instructions to place files in folders or upload them to the internet. This instruction is executed at the end of a forecast run, if you check the box and enter in the box a valid path to a functional batch file you have created. Instructions for creating batch files can easily be found online.

It is possible to use WXSIM’s ‘learning’ routine with WXSIMPRO. To develop correction factors for a specific site, open WRET as that site, do the Auto Select run, accept the proposed values, and then exit. Then, in WXSIMPRO, save the data with the ‘Selected site only’ radio button chosen. You should then get a message box asking you if you want to save those correction factor settings. Reply ‘Yes’ … BUT make sure you have really just created new correction factors for that site; otherwise it will save old ones (possibly from some other site) as your selected site.

**Some technical details**

WXSIMPRO has two main initialization files: wxpinit.txt and runlist.txt. The first of these has basic information about settings on WXSIMPRO’s form. The second has 1’s or 0’s to tell which of your sites is marked for inclusion in a run (with a ‘+’ sign in the list box). These are saved on proper exit, using the Close button, from WXSIMPRO.

There are a number of small files, with names like c0.txt, c1.txt, c2.txt, etc., which are copies of custinit.txt (WXSIM’s initialization file), unique to each site (c0.txt is actually a copy of c1.txt, but with a slightly different purpose). Similarly, w0.txt, w1.txt, w2.txt, etc. are site-specific versions of WXSIMATE’s initialization file, wxsmini.txt. These copies are saved as custinit.txt and wxsmini.txt temporarily during a run to communicate the different values to WXSIM. Likewise, snowrec0.txt, snowrec1.txt, etc. are site-specific records of snow cover during the last forecast, so that if you are using the option to ‘remember’ snow cover in WXSIM, this will also be site-specific. Finally, cor0.txt, cor1.txt, etc. contain site-specific correction factors for use in the learning routine (in professional mode of WXSIM).

There are many more very small files, some created by WXSIMPRO, some by WXSIM, and some by WXSIMATE, which allow the programs to communicate with each other. Many of these consist of a single digit, often 1 or 0. Be careful not to delete or alter any of these files, as that can cause serious miscommunication and errors.

**Changes from version 2.0**

Version 2.1 adds the ability to save changes in WRET for the selected site. This means that not only can you have different choices of output in lastretxxx.txt files, but also you can (in WRET) specify a folder in which to save the data. This may be very useful in organizing data, especially for use in various scripts or for uploading data to web sites.

Also, the target folder for PNG files was made optional, so that if it is left blank (and you still have the box checked to produce PNG’s), the PNG’s will be written into the same folder specified in WRET for that forecast site.

**Appendix – more details on making and changing settings in WXSIM or WXSIMATE**

If all you need to change is the status of Daylight Saving Time - you can do this instantly

across all three programs (WXSIM/WXSIMATE/WRET) using the Start ro End buttons in the lower

right part of the form. Changes in wret.exe can be made by clicking Retrieve Forecasts and

then making the changes and exiting the program using Close.

You can change settings in either WXSIM or WXSIMATE by choosing a site and then clicking on the

button to open WXSIM or WXSIMATE as the selected site. You can then go into those programs (one

at a time) and make whatever changes you like. Then - exit WXSIM using File/Exit - or WXSIMATE

using Close.

You will then have the opportunity to save your settings - using the 'Save (WXSIM or WXSIMATE)

settings for' button (the active program will be identified on the button). If you don't want

to save the changes - click 'Don't save'. If you do want to save the settings - there are two

options: (1) you can save all the settings for the selected site only - or (2) you can save all

the settings for the selected site AND save any generic settings for all sites marked with a '+'.

You must decide which sites to mark this way before opening WXSIM or WXSIMATE.

The settings regarded as generic are all settings EXCEPT as detailed below:

Items held unique to station in WXSIM:

Saved file archive folder (accessible in WXSIM under File/Save or on the Output form at the end of a forecast)

Choice of METAR, SYNOP, or GFS as home surface site default data type

METAR code

 Site name

 Refinements (main data entry form) - all data is saved in associations with these items:

 Recent Precip

 Snow/Ice Cover

 Diurnal Breeze

 Stop AM Rain

 Import/Import Local Data

 Minimum sun altitude for current clouds or haze

Start/Auto Run

 Use soil calculations (pro mode only)

 Soil Data

 All items

 Preferences/Specials Settings

 Tab 1 items:

 All snow/freezing level settings

 Initialize with previously forecast snow cover

 Forest effect for snow cover

 Tab 2 items:

 Island/peninsula far-shore distance

 Use supplemental maritime effect

 Allow enhanced nocturnal decoupling

 Sea breeze strength

 Tab 3 items:

 None

 Tab 4 items:

 Strength multiplier for supplemental maritime effect

 Strength multiplier for enhanced nocturnal decoupling

 Use learned bias corrections

 Offset, for Station temperature bias relative to desired forecast

 Range factor, for Station temperature bias relative to desired forecast

 Upslope orographic enhancement

 Downslope orographic diminishment

 Lake effect enhancement

 Default tab number upon opening form

Items held unique to station in WXSIMATE:

 Registration code

 Local station data directory

..Include this saved file (check box)

 Include this saved file (path in text box)

 Download this month only (if http)

 All data on 'Soil data setup and display' (accessed via 'Soil' button)

 Under Customize:

 Local station source

 Wind correction factor

 Under Schedule:

 Import internet data

 Import local data

 Path for archiving internet data

Items held unique to station in WRET:

..On main form

....Directory for saving text and plots

....Dep

....Rng

..Under Compare to Actuals

....Local station directory

....Choice of weather station type