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BASINS Technical Note 10

Using the BASINS Meteorological Database (Version 2006)

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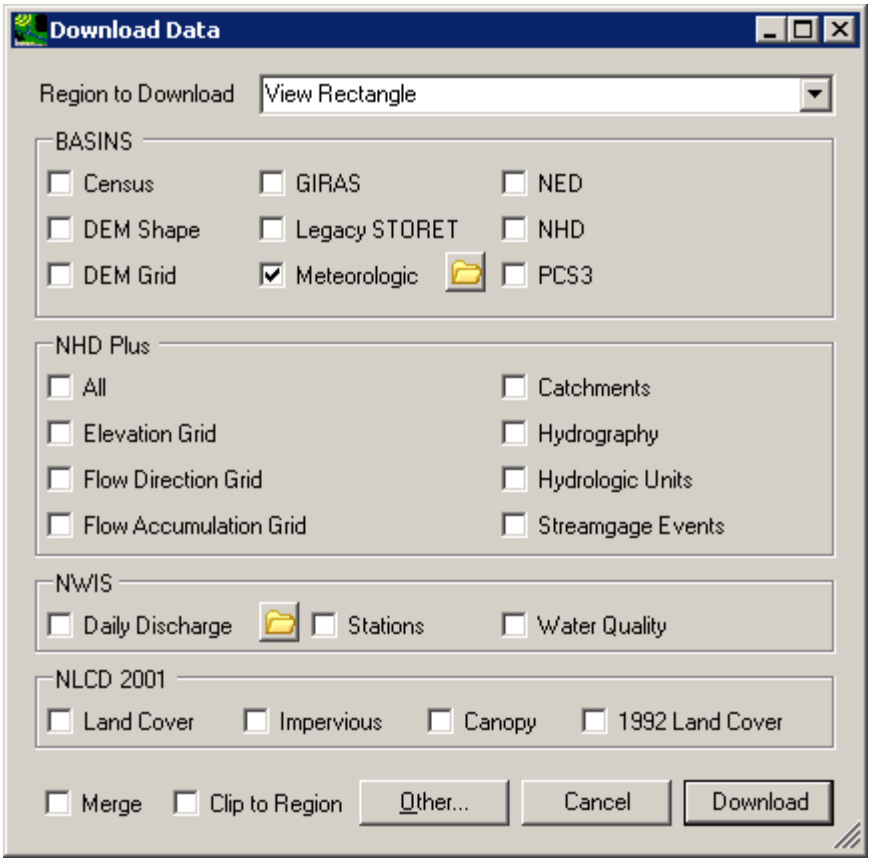
INTRODUCTION

Downloading of data from the updated BASINS Meteorological database is now available. The updated database contains data at over 16,000 stations, though not all stations are still active and most of them contain only a subset of all the meteorological constituents used in BASINS. For those stations that are current, data have been updated through the year 2006.

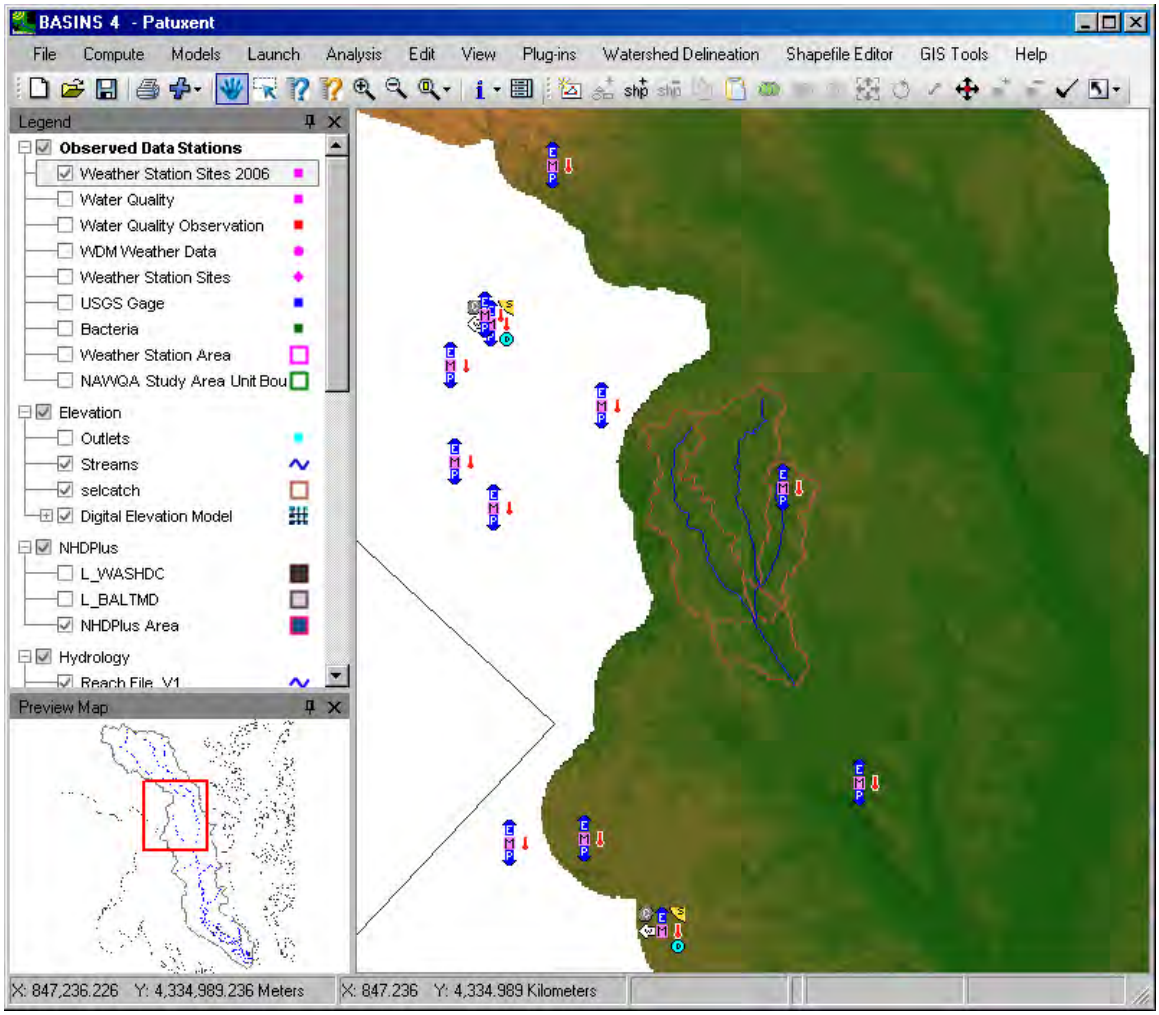
DOWNLOADING METEOROLOGICAL DATA

The updated data are downloaded through the File:Download Data menu option by choosing the **Meteorologic** checkbox in the BASINS group.



This feature uses two plugins, both of which are available under the D4EM Data Download option of the Plugins menu. The two plugins are “BASINS” and “Main” and are loaded automatically.

The area currently viewed is used to select a subset of stations for which data are then downloaded. The area for selecting stations can alternately be set to the extent of a GIS layer using the **Region to Download** pull-down list.



After downloading is complete, a new GIS layer ("Weather Station Sites 2006") is added showing the location of the stations. This layer is stored as a shape file (met.shp) in the BASINS project directory.

All stations within the current view are downloaded and merged into a single project WDM file. Each station's datasets are organized using a similar data set numbering scheme to the original BASINS met database (i.e. 1, 11, 21,… PREC; 3, 13, 23,… ATEM; and so on). The resulting WDM file is by default stored in the BASINS project directory (e.g. \BASINS\Data\Project Name\met\met.wdm). This default location can be changed using the folder button next to the Meteorologic checkbox in the Download Data form. The new WDM file is automatically added to the current project.

DATABASE CONTENT CHANGES

Besides a dramatic increase in the number of available meteorological stations, there are some key differences between the original database and the updated:

1. The Pan Evaporation (EVAP) dataset has been removed – The original database contained both this computed Pan Evaporation dataset and a computed Potential Evapotranspiration (PEVT) dataset. Besides frequently causing end-user confusion, it was strongly suggested by modeling experts that the PEVT dataset is more appropriate as an input to the HSPF model.
2. Many stations do not contain the full suite of seven meteorological constituents – Whereas the original database contained only stations with all eight potentially-needed constituents, the updated database has greatly expanded the number of available stations, many of which contain a subset of the seven meteorological constituents used in BASINS. Details of how BASINS components have been updated to handle this issue are provided below.
3. Some stations contain multiple precipitation records - Using the more than 2000 active observed hourly stations (and more than 3500 with 10+ years of record), the daily observed precipitation values were disaggregated to an hourly time interval. This resulted in some stations having both an observed and a disaggregated precipitation record. When only one form of hourly precipitation exists, it has been assigned a data-set number ending in 1 (e.g. 1, 11, etc.). When both forms of hourly precipitation data exist, the observed data set is assigned a number ending in 1 and the disaggregated data set is assigned a number ending in 0 (e.g. 10, 20, etc.)

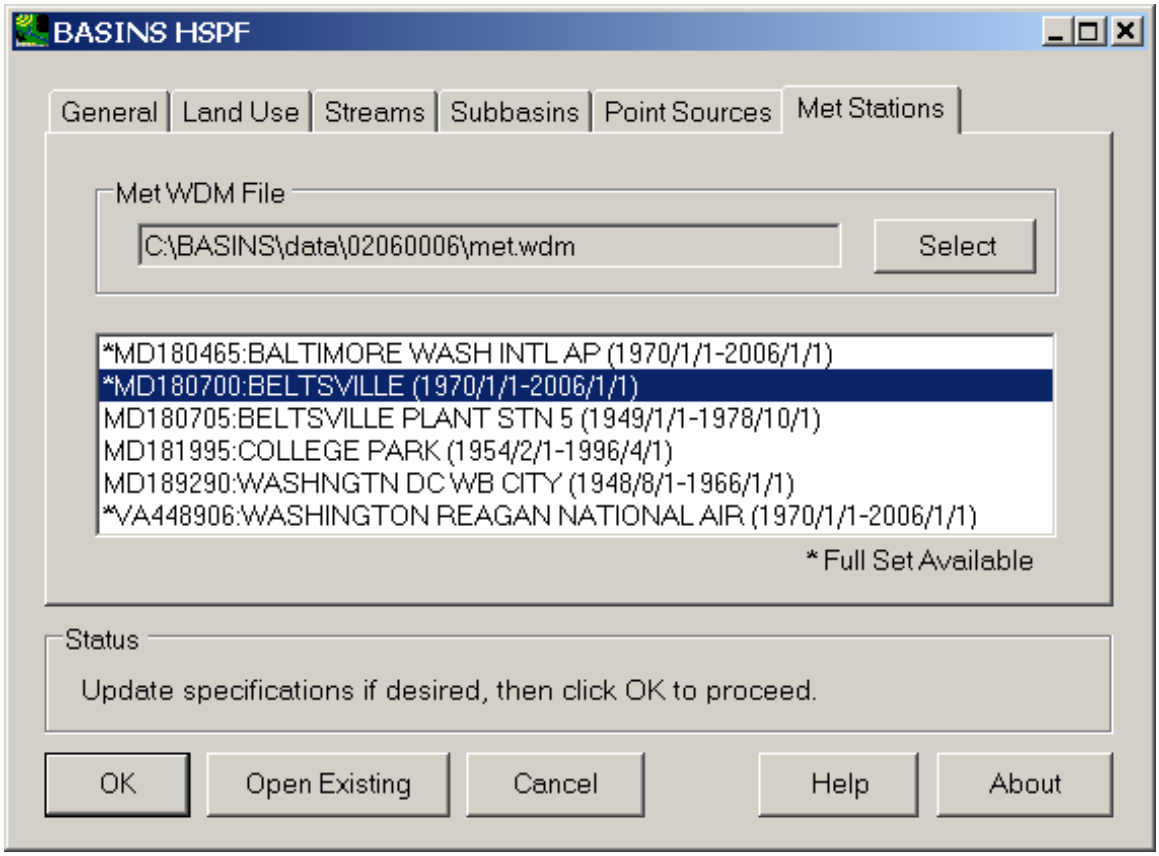
BASINS components have been updated to reflect these changes. The BASINS GIS interface has been updated to display a suite of distinct icons to graphically represent which constituents are available at each station.

With each station marked by the letter M, the seven available constituents are represented at the following positions in relation to the station center:

- - Precipitation (PREC) – due South
- - Wind speed (WIND) – due West
- - Cloud Cover (CLOU) – North West
- - Potential Evapotranspiration (PEVT) – due North
- - Solar Radiation (SOLR) – North East
- - Air Temperature (ATEM) – due East
- - Dewpoint Temperature (DEWP) – South East

BASINS provides a variety of tools for exploring the meteorological data. The Analysis menu provides standard display capabilities such as listing and graphing along with a synoptic analysis feature for exploring events. The Compute menu provides a wide array of timeseries generation methods, including the meteorological computation and disaggregation features previously found in the WDMUtil program.

The BASINS model setup plug-in for HSPF has been updated to effectively use stations that do not contain all seven constituents. The interface includes a list of all stations with at least PREC and PEVT datasets (the minimum constituents needed by HSPF). Stations in this list marked with a "*" are those that contain the full suite of meteorological inputs.



If a station is selected that does not have the full suite, WinHSPF allows the user to specify where to get other needed constituents. For details on the model setup plug-in and WinHSPF working with the meteorological database, see the BASINS User's Manual.

ANCILLIARY DATA

Additional datasets may be available for downloaded stations, but are not merged into the project's met.wdm file. These may be found in the individual station WDM files (e.g. GA090451.WDM) in \BASINS\cache\clsBasins\met. These data were involved in the

development of the revised database and are provided as an additional reference. They are organized on the WDM files by data-set number in one of the three categories:

- 1000 series – These data are original observed daily or hourly data that were used in the development of the final hourly datasets.
- 1100 series – These data are computed daily or hourly data that were used in the development of the final hourly datasets.
- 2000 series – These data are from the BASINS 3.1 meteorological database.

TROUBLESHOOTING

The Download Data feature uses two plug-ins called “BASINS” and “Main”. If they are not automatically loaded, they can be loaded manually through the Plugins:D4EM Data Download menu option.

Log files showing details of the meteorological database development are available through EPA. These files provide records of potentially suspect values, how data correction was performed, and how daily precipitation data were disaggregated to hourly.