Python-Powered GIS Products at the Midwestern Regional Climate Center

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MRCC Midwestern Regional Climate Center

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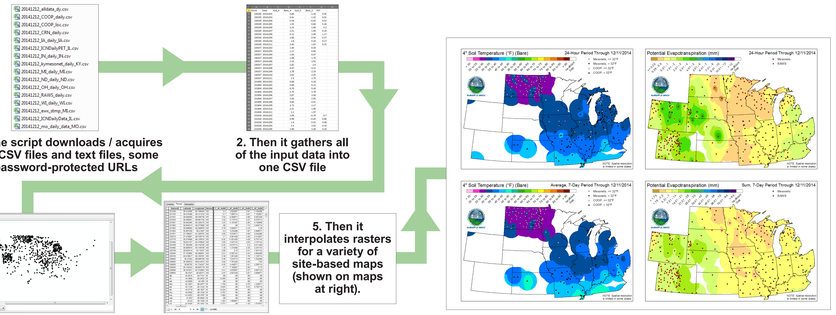
INTRODUCTION

Over the last few years, many new GIS-based products have been created using Python at the Midwestern Regional Climate Center (MRCC). Many of these products have to be created on a daily or hourly basis, hence the need for automation. The Python scripts written to create these products take advantage of ESRI's ArcPy module and its geoprocessing and mapping capabilities. MRCC GIS Specialist Zoe Zaloudek shows how these python scripts take climate data in formats such as CSV, textfile, and JSON objects, make GIS data out of these inputs, and then create a wide variety of static and dynamic maps.

Visit the MRCC website:

REGIONAL MESONETS AND PARTNERS PROJECT (REMAPP) WEBSITE

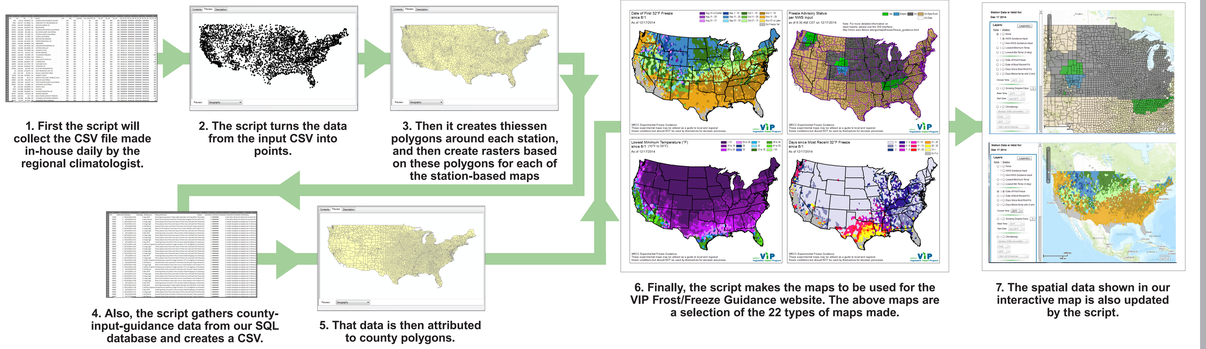
http://mrcc.isws.illinois.edu/cliwatch/mesonets/soilTemp.html



1. First the script downloads / acquires various CSV files and text files, some via password-protected URLs
2. Then it gathers all of the input data into one CSV file
3. Next, it goes through all the input data and attributes it to a set of site points that have already been made.
4. Attribute table for the points. The script figures out the most recent day's values in addition to calculating averages.
5. Then it interpolates rasters for a variety of site-based maps (shown on maps at right).
6. Finally, the script creates a variety of maps, including 4-inch bare ground Soil Temperature and Potential Evapotranspiration.

VIP FROST/FREEZE GUIDANCE WEBSITE

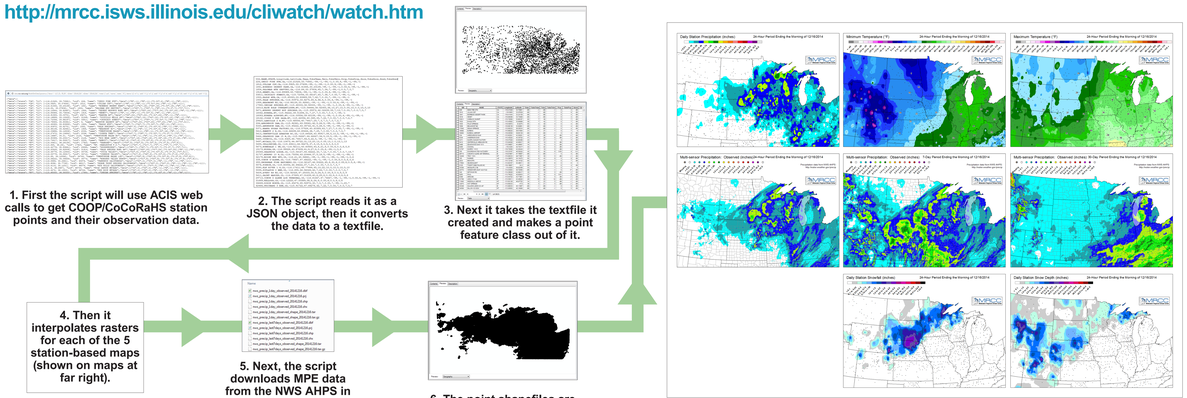
http://mrcc.isws.illinois.edu/VIP/indexFFG.html



1. First the script will collect the CSV file made in-house daily by the regional climatologist.
2. The script turns the data from the input CSV into points.
3. Then it creates thiessen polygons around each station, and then create rasters based on these polygons for each of the station-based maps
4. Also, the script gathers county-input-guidance data from our SQL database and creates a CSV.
5. That data is then attributed to county polygons.
6. Finally, the script makes the maps to be used for the VIP Frost/Freeze Guidance website. The above maps are a selection of the 22 types of maps made.
7. The spatial data shown in our interactive map is also updated by the script.

CLIMATE WATCH WEBSITE

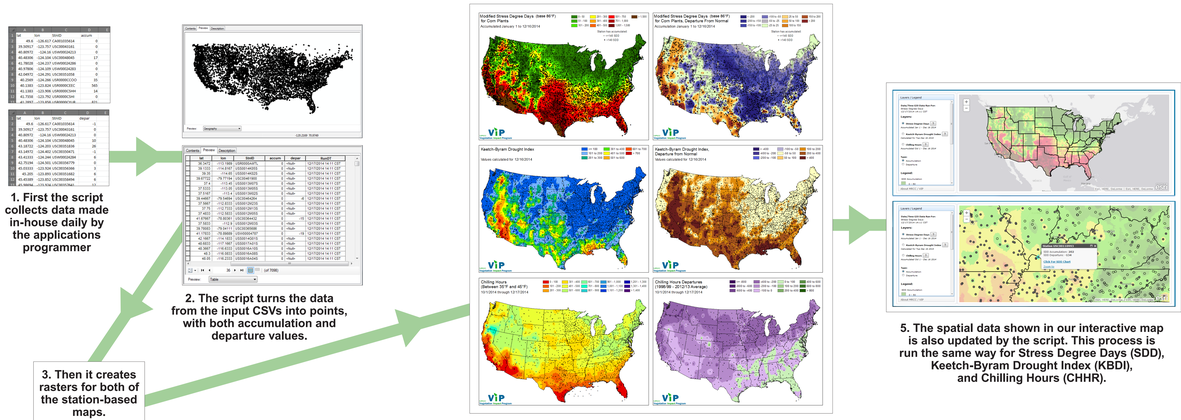
http://mrcc.isws.illinois.edu/cliwatch/watch.htm



1. First the script will use ACIS web calls to get COOP/CoCoRaHS station points and their observation data.
2. The script reads it as a JSON object, then it converts the data to a textfile.
3. Next it takes the textfile it created and makes a point feature class out of it.
4. Then it interpolates rasters for each of the 5 station-based maps (shown on maps at far right).
5. Next, the script downloads MPE data from the NWS AHPS in .gz format, then unpacks these files to get point shapefiles.
6. The point shapefiles are clipped to the necessary extent.
7. Finally, the script makes the 8 maps to be used for the Climate Watch website.

VIP — OTHER PRODUCTS WEBSITE

http://mrcc.isws.illinois.edu/VIP/indexOtherProds.html



1. First the script collects data made in-house daily by the applications programmer
2. The script turns the data from the input CSVs into points, with both accumulation and departure values.
3. Then it creates rasters for both of the station-based maps.
4. Next it creates the static maps for the website.
5. The spatial data shown in our interactive map is also updated by the script. This process is run the same way for Stress Degree Days (SDD), Keetch-Byram Drought Index (KBDI), and Chilling Hours (CHHR).