

PyCPT Installation Guide - Windows

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This guide assumes you're working on Windows 10 Insider build 17063 (a Late 2017/ Early 2018 Windows 10 Update) or later, so you have access to 'curl' and 'tar'.

It also assumes you have a somewhat recent version of Python installed. If you don't have Python, please go here: <https://www.python.org/downloads/> to download an appropriate version for your operating system. You should be able to type 'python' into command prompt and have a python interpreter come up!

Install Script Guide

It is really best if you use the install script, available here:

https://github.com/kjhall01/pycpt_install/blob/master/install.py

Note that this script WILL make changes to your computer in an automated way, so if you don't consent to that, skip ahead to the manual install guide!

- 1) Go to that link, and download the script to your computer.
- 2) Go to the start menu and type 'command prompt' into the search bar- a command prompt app should come up. Not Powershell, to be clear- command prompt.
- 3) Right click on Command Prompt and then click on 'Run as Administrator' in the menu that appears. Enter the Administrator password for your computer.
- 4) Navigate to the folder that contains the freshly downloaded **install.py**. A quick intro to Windows Command Prompt commands:
 - 1) A 'directory' is the same thing as a 'folder' in your 'my computer' or 'file explorer'.
 - 2) When you first open command prompt, you will be located in a certain folder. Type '**cd**' and hit enter to determine which one. it should give you a path like **C:\Users\[Your Username]** or something like that.
 - 3) Type '**dir**' and hit enter to get a list of the files and subdirectories in your current directory.
 - 4) Type '**cd [name of directory containing install.py]**' and hit enter to go into that directory. If the directory isn't listed when you typed '**dir**' please do a '**cd ..**' to go to the directory above your current one and look there using '**dir**'.
- 5) Once you're in the directory that contains your downloaded **install.py**, (confirm using '**dir**' like above - it should be listed), type '**python install.py**' and hit enter to run the script.
- 6) The script should run, and print out a lot of messages about fetching, downloading and installing various things for you. It does the same things that the manual install guide below does.

- 7) Check that everything installed successfully - the script should make it pretty clear when something fails.
- 8) The ultimate test- Try running PyCPT. Exit your current Command Prompt window by hitting the 'x' button- this is necessary to reset some environment variables, so don't skip it!! - and then open a new Command Prompt window.
- 9) In your new Command Prompt window, run your freshly-downloaded pycpt by typing '**jupyter notebook pycpt_seasonal.ipynb**' and hitting enter- a web browser should open with a PyCPT notebook running!
- 10) Make sure to update the '**cptdir**', '**work**', and '**workdir**' variables in the notebook as appropriate!

Manual Install Guide

Strap in Folks!

- 1) First, download and install **7zip**, which will allow you to open compressed CPT files. Get it from here: <https://www.7-zip.org/download.html> You want the most recent version, and the filetype '**.exe**' for either 32 or 64 bit machine- whichever is appropriate for your computer.
- 2) Once 7zip is downloaded, run the '**.exe**' file by double clicking on it- it should walk you through installing 7zip. Once you're done, you should be able to type '**7z**' into command prompt and have it show you usage options. You may have to restart Command Prompt once to get this to work.
- 3) Next, you need to install **MinGW**, **MinGW-Make**, and an accompanying fortran compiler. Go here: http://www.mingw.org/wiki/getting_started (this is the link to the actual download: <https://osdn.net/projects/mingw/downloads/68260/mingw-get-setup.exe>) they have very detailed instructions for installing using the Graphical User Interface (GUI) Installer.
- 4) Run the downloaded file- a box should pop up- click 'Install' and then when it stops doing stuff, hit 'continue'. Another, larger box should pop up. In this larger box, there should be several check boxes, all unchecked.
- 5) You mark the following for installation by clicking on the un-checked box next to them and hitting 'mark for installation' in the menu that pops up:

- > mingw-developer-toolkit-bin
- > mingw32-base-bin
- > mingw32-gcc-fortran-bin
- > msys-base-bin

Its probably best if you just mark them all, but these are the only 'necessary' ones.

- 6) When they are all marked for download, go to the 'Installation' menu in the top left of the Installer Window and click 'Apply Changes', and then click 'Apply Changes' again in the box that comes up.

- 7) When that's done, you should be able to type '**mingw32-make**' into Command Prompt and see a list of options! Again, you may have to restart command prompt.
- 8) Next, you will download and install CPT version 16.5.8. Navigate to this website: <https://iri.columbia.edu/~simon/CPT/> and click on the **CPT.16.5.8.tar.gz** link to download it.
- 9) Open Command Prompt and navigate to where ever your downloaded file is. There, run '**7z e CPT.16.5.8.tar.gz -y**'. to unzip the files into a .tar file.
- 10) Next, run '**7z x CPT.16.5.8.tar -y -o C:\Users\[Your Username]\CPT1658**' to unload all the files into C:\Users\[Your Username]\CPT1658\.
- 11) Move into that directory with '**cd C:\Users\[Your Username]\CPT1658**'
- 12) To compile CPT, first type '**cd lapack\lapack**' and hit enter to enter the lapack\lapack subdirectory.
- 13) There, type '**mingw32-make**'. A LOT of stuff will be printed out- lets hope there aren't any errors. This may take 5-10 minutes.
- 14) When that command finishes, type '**cd ../..**' to return to the main CPT directory.
- 15) There, again type '**mingw32-make**' to compile CPT. This may again take some time, and print out a TON of stuff.
- 16) When that finishes, hopefully without errors, your PyCPT notebook's **cpmdir** variable will need to be set to **C:/Users/[Your Username]/CPT1658/CPT/16.5.8/**
- 17) Next, were going to install a version of Python called **Miniconda**. Go to this website: <https://docs.conda.io/en/latest/miniconda.html> and download the Python3.8 version of Miniconda for your operating system (windows).
- 18) Run the installer, its pretty self explanatory. When it asks you to '**add Miniconda3 to PATH variable**' and '**Register Miniconda3 as my default python3.8**' select both and hit install.
- 19) When that's done, you should be able to write '**conda**' in the Command Prompt window and have it give you usage options. You may need to restart command prompt again to make this happen.
- 20) Next, We're going to install PyCPT's dependencies. Type the following into Command Prompt:

```
-> 'conda install -y -q xarray'  
-> 'conda install -y -q jupyter'  
-> 'conda install -y -q -c conda-forge cartopy'  
-> 'conda install -y -q -c conda-forge netCDF4'
```

If these finish without errors, youre good. If netCDF4 gives you trouble, you can later go into '**pycpt_functions_seasonal.py**' and comment out any lines like '**import netCDF4 as ns**' or '**ns.Dataset('abcdedf')**' in order to make PyCPT work without it. Note this will disable netCDF4 loading.

- 21) Finally, download PyCPT. Go to https://github.com/nachiketaacharya/PyCPT_Seasonal to download the latest versions of **pycpt_functions_seasonal.py** and **pycpt_seasonal.ipynb**.

22) When you have downloaded them, navigate to the folder where you saved them in Command Prompt and type '**jupyter notebook pycpt_seasonal.ipynb**'. update the cptdir, work, and workdir variables as appropriate, and then hit the button that looks like the 'skip' button on an iPod to run the notebook! Make sure to update the rest of the variables to run the notebook for your location of interest & models of interest!

Congratulations on making it through this whole guide, and best of luck running PyCPT!