

Installation and Requirements for Xanthos (Version 1.0)

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Installing Required Packages

Xanthos is written in Python 2.7 (version 2.7.11 is used in testing) with dependencies (packages). The user is required to install all the packages as follows:

- NumPy (version 1.11) <http://www.numpy.org/>
- SciPy (version 0.18) <https://www.scipy.org/>
- Matplotlib (version 1.5) <https://matplotlib.org/>
- pandas (version 0.19) <http://pandas.pydata.org/>
- netCDF4 (version 1.2.4) <http://unidata.github.io/netcdf4-python/>
- ConfigObj (version 5.0.6) <http://www.voidspace.org.uk/python/configobj.html>

Lower version for each of the package is not recommended. Higher versions of the packages should be compatible.

It is strongly recommended that all the listed dependencies can be obtained by using the Python's tool for installing packages called [pip](https://pypi.python.org/pypi/pip) (<https://pypi.python.org/pypi/pip>). The basics of how to install Python packages are described at <https://packaging.python.org/tutorials/installing-packages/>. A simple example of installing a needed packages with the latest version is:

```
pip install numpy
```

To install a certain version of the package:

```
pip install numpy==1.11
```

To install all the packages:

```
pip install numpy scipy matplotlib pandas configobj netCDF4
```

The installation of [scipy](#), may require [numpy+mkl](#) (numpy with Intel Math Kernal Library). Thus, the user needs to install [numpy+mkl](#) from a wheel file again after the installation of all the other packages. The wheel file of [numpy+mkl](#) can be downloaded from the site

<http://www.lfd.uci.edu/~gohlke/pythonlibs/> for Windows. Then use `pip` to install the wheel package, for example:

```
pip install numpy-1.13.1+mkl-cp27-cp27m-win32.whl
```

Note that, the installation of `netCDF4` module has dependences and requires the installation of other packages and libraries (`hdf5`, `cython`, netCDF-4 C library, etc.), which is detailed at <http://unidata.github.io/netcdf4-python/>.

For use with the conda package manager for a fresh Python 2.7 environment, the user can use the following command to install required packages:

```
conda install numpy scipy matplotlib pandas configobj netCDF4
```

To install a certain version of the package:

```
conda install numpy==1.11
```

The user can execute “test_enviroment.py” to examine if the required packages are installed in Python environment.

System Requirements

Xanthos has been tested on Linux (64-bit), Windows 7 and Mac OS X Yosemite.

The core modules are designed to process large data sets. Thus, enough memory (the testing machine has a 32GB memory) capacity is required to run the model and memory capacity also determines how fast the model can run according to the large size of the data sets.

Download and Run Xanthos

Xanthos can be downloaded from <https://github.com/JGCRI/xanthos>.

It contains all the needed source codes, inputs, outputs of example cases, configuration files of example cases, and license information.

How to run a case?

Step 1 Create a configuration file

The user needs to create a configuration file (*.ini) for a model simulation of historical or future mode. The INI format is described at https://en.wikipedia.org/wiki/INI_file#Format.

The example configuration files are: “config_hist.ini” and “config_futu.ini”. The user needs to define the controlling parameters, select the simulation options and indicate the input files.

Step 2 test.py

At line 19 in “test.py”, the user needs to change the name of the configuration file for the desired case. A model simulation can be executed with a simple single command:

```
python test.py
```