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# IHEWAdataanalysis Documentation

*Release unknown*

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This is the documentation of **IHEWAdatanalysis**.

**IHEWAdatanalysis** is a tool to write report by using templates. This project is fully developed by Water Accounting team at IHE-Delft.



## INSTALLATION

### 1.1 Install from pip

IHEWAdatanalysis Python package is hosted on [Python Package Index \(PyPI\)](#).

Install from pip.

```
$ pip install IHEWAdatanalysis
```

### 1.2 Install from source code

Download source code from [Github](#).

```
$ git clone https://github.com/wateraccounting/IHEWAdatanalysis.git  
$ cd IHEWAdatanalysis
```

Install from source code.

```
$ python setup.py install
```

### 1.3 Uninstall IHEWAdatanalysis

```
$ pip uninstall IHEWAdatanalysis
```





## DOCKER

Set “System -> Base Memory” to max capacity in Virtual Machine.

Set “Shared Folders” in Virtual Machine.

- Folder Path: D:\IHEWAdatanalysis
- Folder Name: d/IHEWAdatanalysis
- Auto-mount: Yes
- Make Permanent: Yes

Download source code from [Github](#).

```
$ git clone https://github.com/wateraccounting/IHEWAdatanalysis.git
$ cd IHEWAdatanalysis
```

Restart Docker Virtual Machine image.

```
$ docker-machine restart
```

Pull the IHEWAdatanalysis image.

```
$ docker pull wateraccounting/ihewadatanalysis
```

Or build from source code.

```
$ docker build -t wateraccounting/ihewadatanalysis .
```

Check images.

```
$ docker images
```

Check ip address.

```
$ docker-machine env
export DOCKER_HOST="tcp://192.168.99.100:2376"
```

Run the image with Jupyter Notebook. To access Jupyter <http://192.168.99.100:8888/>

```
$ docker run -it --name ihewadatanalysis -p 8888:8888 -v /d/IHEWAdatanalysis:/
->notebooks wateraccounting/ihewadatanalysis
```

Check running image (container), in the new cmd window.

```
$ docker container list
```

Access to running image, in the new cmd window.

```
$ docker exec -it ihewadataanalysis bash
$ cd /notebooks/
$ python3 setup.py install
$ python3 ./examples/ex_CFSR_GRIB.py
```

Clean running cache.

```
$ docker system prune -f && docker volume prune -f && docker container prune -f
```

Remove image.

```
$ docker rmi wateraccounting/ihewadataanalysis
```

Examples can be found at [examples](#).

```
import os
import IHEWAdataanalysis

path = os.getcwd()
config = 'config.yml'
file_config = os.path.join(path, config)

if os.path.exists(file_config):
    IHEWAdataanalysis.Report(workspace=path,
                             config=config)
```

)



## DEVELOPMENT

In the PyCharm, change “Project Structure -> Source Folders” to “src”

Download source code from [Github](#).

```
$ git clone https://github.com/wateraccounting/IHEWAdataanalysis.git
$ cd IHEWAdataanalysis
```

From the root of the project

```
$ python setup.py --version
```

Format scripts by PEP8

```
$ autopep8 --in-place --aggressive src/IHEWAdataanalysis/base/base.py
```

Flake8, pre-commit

```
$ pre-commit install

$ pre-commit run --all-files
[INFO] Initializing environment for git://github.com/pre-commit/pre-commit-hooks.
[INFO] Initializing environment for https://github.com/pre-commit/mirrors-isort.
[INFO] Installing environment for git://github.com/pre-commit/pre-commit-hooks.
[INFO] Once installed this environment will be reused.
[INFO] This may take a few minutes...
[INFO] Installing environment for https://github.com/pre-commit/mirrors-isort.
[INFO] Once installed this environment will be reused.
[INFO] This may take a few minutes...
```

Unit test

```
$ python setup.py test
```

Read the Docs

```
$ python setup.py doctest

$ python setup.py docs
```

Upload to PyPI

1. In IDE, **commit** the changes “v0.0.1”
2. In IDE, **Version Control -> Log**, select this commit
3. In IDE, add version tag, select **VCS -> Git -> tag**

4. In IDE, **Tag window** -> **Tag Name**, type “**v0.0.1**”
5. In cmd, build package, type `python setup.py sdist bdist_wheel`
6. In cmd, validate build, type `twine check dist/IHEWAdataanalysis-0.0.1*`
7. In cmd, upload build, type `twine upload dist/IHEWAdataanalysis-0.0.1*`
8. In IDE, **push** the commit, with Tag label: “*HEAD*”, “*master*”, “*v0.0.1*”
9. In Github, select **Release** to “create a new release” or “Draft a new release”
10. In Github, **Tag version**, type “**v0.0.1**”
11. In Github, @ **Target**, select this commit
12. In Github, **Publish release**

## TEMPLATES

Details can be found at [Templates](#).





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- Be friendly and patient
- Be welcoming
- Be considerate
- Be respectful
- Be careful in the words that you choose
- When we disagree, try to understand why



## CONTENTS

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## 7.3 Contributing

Welcome to the IHE WaterAccounting Report Tool (IHEWAdataanalysis) project. Here's how we work.

### 7.3.1 Code of Conduct

First of all: the IHEWAdataanalysis project has a code of conduct. Please read the `CODE_OF_CONDUCT.txt` file, it's important to all of us.

### 7.3.2 Rights

The GNU General Public License v3.0 license (see `LICENSE.rst`) applies to all contributions.

### 7.3.3 Issue Conventions

The IHEWAdataanalysis issue tracker is for actionable issues.

Questions about installation, distribution, and usage should be taken to the project's [#issue](https://wateraccounting.slack.com). Opened issues which fall into one of these three categories may be perfunctorily closed.

Questions about development of IHEWAdataanalysis, brainstorming, requests for comment, and not-yet-actionable proposals are welcome in the project's [#idea](https://wateraccounting.slack.com).

IHEWAdataanalysis is a relatively new project and highly active. We have bugs, both known and unknown.

Please search existing issues, open and closed, before creating a new one.

IHEWAdataanalysis employs Geospatial modules, so bug reports very often hinge on the following details:

- Operating system type and version (Windows? Ubuntu 12.04? 14.04?)
- The version and source of GDAL (UbuntuGIS? Homebrew?)

### 7.3.4 Dataset Objects

Our term for the kind of object that allows read and write access to raster data is *dataset object*. A dataset object might be an instance of *DatasetReader* or *DatasetWriter*. The canonical way to create a dataset object is by using the `IHEWAdataanalysis.GIS.OpenAsArray()` function.

This is analogous to Python's use of [file object](#).

### 7.3.5 Git Conventions

We use a variant of centralized workflow described in the [Git Book](#). We have no 1.0 release for IHEWAdataanalysis yet and we are tagging and releasing from the master branch. Our post-1.0 workflow is to be decided.

Work on features in a new branch of the mapbox/IHEWAdataanalysis repo or in a branch on a fork. Create a [GitHub pull request](#) when the changes are ready for review. We recommend creating a pull request as early as possible to give other developers a heads up and to provide an opportunity for valuable early feedback.

### 7.3.6 Code Conventions

IHEWAdatanalysis supports Python 2 and Python 3 in the same code base, which is aided by an internal compatibility module named `compat.py`. It functions similarly to the more widely known `six` but we only use a small portion of the features so it eliminates a dependency.

We strongly prefer code adhering to [PEP8](#).

Tests are mandatory for new features. We use [pytest](#).

We aspire to 100% coverage for Python modules [Coveralls](#).

### 7.3.7 Development Environment

Developing IHEWAdatanalysis requires Python 2.7 or any final release after and including 3.4. We prefer developing with the most recent version of Python but recognize this is not possible for all contributors. See the Windows install instructions in the [readme](#) for more information about building on Windows.

#### 7.3.7.1 Initial Setup

First, clone IHEWAdatanalysis's `git` repo:

```
$ git clone https://github.com/wateraccounting/ihewadatanalysis.git
```

Development should occur within a [virtual environment](#) to better isolate development work from custom environments.

In some cases installing a library with an accompanying executable inside a virtual environment causes the shell to initially look outside the environment for the executable. If this occurs try deactivating and reactivating the environment.

#### 7.3.7.2 Installing GDAL

The GDAL library and its headers are required to build IHEWAdatanalysis. We do not have currently have guidance for any platforms other than Linux and OS X.

On Linux, GDAL and its headers should be available through your distro's package manager. For Ubuntu the commands are:

```
$ sudo add-apt-repository ppa:ubuntugis/ppa
$ sudo apt-get update
$ sudo apt-get install gdal-bin libgdal-dev
```

On OS X, Homebrew is a reliable way to get GDAL.

```
$ brew install gdal
```

### 7.3.7.3 Python build requirements

Provision a virtualenv with IHEWAdataanalysis's build requirements. IHEWAdataanalysis's `setup.py` script will not run unless Cython and Numpy are installed, so do this first from the IHEWAdataanalysis repo directory.

Linux users may need to install some additional Numpy dependencies:

```
$ sudo apt-get install libatlas-dev libatlas-base-dev gfortran
```

then:

```
$ pip install -U pip
$ pip install -r requirements-dev.txt
```

### 7.3.7.4 Installing IHEWAdataanalysis

Installing IHEWAdataanalysis in editable mode while developing is very convenient but only affects the Python files.

```
$ python setup.py install
```

### 7.3.7.5 Uninstalling IHEWAdataanalysis

```
$ pip uninstall IHEWAdataanalysis
```

### 7.3.7.6 Running the tests

IHEWAdataanalysis's tests live in `python setup.py test` and generally match the main package layout.

To run the entire suite and the code coverage report:

```
$ python setup.py test
```

## 7.4 Changelog

### 7.4.1 Version 0.0.1

- Template of CHANGELOG.RST!
- Feature A added
- FIX: nasty bug #1729 fixed

## 7.5 Templates

Table 1: Product Detail, Account

id	product	account
1	ALEXI	IHEWA

## 7.6 IHEWAdataanalysis

### 7.6.1 IHEWAdataanalysis package

#### 7.6.1.1 Subpackages

**IHEWAdataanalysis.prepare package**

**Submodules**

**IHEWAdataanalysis.prepare.GSFC\_functions module**

**IHEWAdataanalysis.prepare.GSFC\_txt2csv module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_download module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_stats module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_stats\_EWH module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_stats\_EWH\_to\_dS module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_tif2cutline module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_tif2cutline\_dS module**

**IHEWAdataanalysis.prepare.IHEWAcollect\_tif2nc module**

**Module contents**

**IHEWAdataanalysis.scripts package**

**Submodules**

**IHEWAdataanalysis.scripts.main module**

Main command group for WaterAccounting Data Analysis's CLI.



## IHEWAdataanalysis.scripts.skeleton module

This is a skeleton file that can serve as a starting point for a Python console script. To run this script uncomment the following lines in the [options.entry\_points] section in setup.cfg:

```
console_scripts = fibonacci = IHEWAdataanalysis.skeleton:run
```

Then run `python setup.py install` which will install the command `fibonacci` inside your current environment. Besides console scripts, the header (i.e. until `_logger...`) of this file can also be used as template for Python modules.

---

**Note:** This skeleton file can be safely removed if not needed!

---

```
IHEWAdataanalysis.scripts.skeleton.fib(n)
```

Fibonacci example function

**Parameters** `n` (*int*) – integer

**Returns** n-th Fibonacci number

**Return type** *int*

```
IHEWAdataanalysis.scripts.skeleton.main(args)
```

Main entry point allowing external calls

**Parameters** `args` (*[str]*) – command line parameter list

```
IHEWAdataanalysis.scripts.skeleton.parse_args(args)
```

Parse command line parameters

**Parameters** `args` (*[str]*) – command line parameters as list of strings

**Returns** command line parameters namespace

**Return type** *argparse.Namespace*

```
IHEWAdataanalysis.scripts.skeleton.run()
```

Entry point for console\_scripts

```
IHEWAdataanalysis.scripts.skeleton.setup_logging(loglevel)
```

Setup basic logging

**Parameters** `loglevel` (*int*) – minimum loglevel for emitting messages

## Module contents

IHEWAdataanalysis script modules

## IHEWAdataanalysis.templates package

### Subpackages

### IHEWAdataanalysis.templates.IHE package

### Submodules

## IHEWAdataanalysis.templates.IHE.ADB module

### Module contents

IHEWAdataanalysis: IHE Template

### Module contents

IHEWAdataanalysis template modules

## IHEWAdataanalysis.utils package

### Submodules

#### IHEWAdataanalysis.utils.indicators module

#### IHEWAdataanalysis.utils.topo module

#### IHEWAdataanalysis.utils.util module

### utils

Utilities for IHEWAdataanalysis template modules.

### Examples:

```
from IHEWAdataanalysis.templates.util import Plot
```

```
class IHEWAdataanalysis.utils.util.Plot
    Bases: object
```

### Module contents

IHEWAdataanalysis: IHE Template

### 7.6.1.2 Submodules

#### 7.6.1.3 IHEWAdataanalysis.analysis module

### Download

Before use this module, create `accounts.yml` file. And edit account information in the file.

```
class IHEWAdataanalysis.analysis.Analysis(workspace="", config="", **kwargs)
    Bases: IHEWAdataanalysis.analysis.Base
```

Download class

After initialise the class, data downloading will automatically start.

### Parameters

- **workspace** (*str*) – Directory to config.yml.

- **config** (*str*) – Configuration yaml file name.
- **kwargs** (*dict*) – Other arguments.

**static get\_config** (*self*)

**class** IHEWAdatanalysis.analysis.**Base**

Bases: `object`

This Base class

Load base.yml file.

**Parameters**

- **product** (*str*) – Product name of data products.
- **is\_print** (*bool*) – Is to print status message.

#### 7.6.1.4 IHEWAdatanalysis.exception module

##### Exception

<https://julien.danjou.info/python-exceptions-guide/>

**exception** IHEWAdatanalysis.exception.**IHEClassInitError** (*mod, msg=None*)

Bases: `Exception`

IHEClassInitError Class

**Parameters**

- **mod** (*str*) – Module name.
- **msg** (*bool*) – Extra message.

**exception** IHEWAdatanalysis.exception.**IHEFileError** (*file, msg=None*)

Bases: `Exception`

IHEFileError Class

**Parameters**

- **file** (*str*) – File name.
- **msg** (*bool*) – Extra message.

**exception** IHEWAdatanalysis.exception.**IHEKeyError** (*key, val, msg=None*)

Bases: `Exception`

IHEKeyError Class

**Parameters**

- **key** (*str*) – Key name.
- **val** (*list*) – Key name list.
- **msg** (*bool*) – Extra message.

**exception** IHEWAdatanalysis.exception.**IHEStringError** (*vname, msg=None*)

Bases: `Exception`

IHEStringError Class

**Parameters**

- **vname** (*str*) – Variable name.

- **msg** (*bool*) – Extra message.

**exception** IHEWAdatanalysis.exception.IHETypeError (*vname, rtype, vdata, msg=None*)  
Bases: *Exception*

IHETypeError Class

#### Parameters

- **vname** (*str*) – Variable name.
- **rtype** (*str*) – Required type.
- **vdata** (*float*) – Variable value.
- **msg** (*bool*) – Extra message.

### 7.6.1.5 Module contents

IHEWAdatanalysis: IHE Water Accounting Data Analysis Tools

**class** IHEWAdatanalysis.**Analysis** (*workspace="", config="", \*\*kwargs*)  
Bases: *IHEWAdatanalysis.analysis.Base*

Download class

After initialise the class, data downloading will automatically start.

#### Parameters

- **workspace** (*str*) – Directory to config.yml.
- **config** (*str*) – Configuration yaml file name.
- **kwargs** (*dict*) – Other arguments.

**static** **get\_config** (*self*)

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- `modindex`
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