



**CyberWater**

## **GenericModelAgentToolkits Specification**

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## SUBPACKAGES

## 1.1 AgentTools.GenericModelAgent package

### 1.1.1 Submodules

### 1.1.2 AgentTools.GenericModelAgent.AreaWiseParamGenerator module

```
class AgentTools.GenericModelAgent.AreaWiseParamGenerator.AreaWiseParamGenerator(*args,
                                                                                     **kwargs)
```

AreaWiseParamGenerator Organizes the parameter files required for the execution of the model. The user is responsible for the contents and format of the files provided. This module only receives the files as parameters and places them in a file with a name set by the user. By default, this module places the parameter files in a folder named 'Parameters'.

#### Input Ports

- **WD\_Path:** This is the working folder provided by the MainGenerator module.
- **Parameter\_Folder\_Name:** Name of the parameter folder that will be created. The default value is Parameter.
- **File\_In\_x :** Path of the x-th parameter file, (x=00,01,02,...15).

#### Output Ports

- **Ready:** Starting flag for RunModuleAgent. The value is either *True* or *False*.

```
compute()
```

The main function of AreaWiseParamGenerator module is to organize the parameter files required for the execution of the model.

```
classmethod get_documentation(docstring, module=None)
```

This function is to get the documentation of AreaWiseParamGenerator module

#### Parameters

- **docstring** – A string used to document a AreaWiseParamGenerator module
- **module** – AreaWiseParamGenerator module

**Returns** A invoked function from package DocumentUtil to get documentation of Area-WiseParamGenerator module

```
AgentTools.GenericModelAgent.AreaWiseParamGenerator.initialize(*args, **keywords)
```

This function is to initialize the AreaWiseParamGenerator module

### 1.1.3 AgentTools.GenericModelAgent.ForcingDataFileGenerator module

```
class AgentTools.GenericModelAgent.ForcingDataFileGenerator.ForcingDataFileGenerator(*args,  
                                                                                       **kwargs)
```

ForcingDataFileGenerator Organizes the forcing data brought by the MainGenerator. The user should be aware of the expected format of the forcing data for their model. By default, this module creates forcing data in a folder names 'Forcing'. Such forcing data is always created as timeseries where different columns hold different variables, ie:

```
(Precipitation_t0 | Temperature_t0 | Wind_t0, etc)  
(Precipitation_t1 | Temperature_t1 | Wind_t1, etc)  
(Precipitation_t2 | Temperature_t2 | Wind_t2, etc)  
(Precipitation_t3 | Temperature_t3 | Wind_t3, etc)
```

and the data is divided in different files, where each one represents a single cell of the forcing inputs. So, a 2 by 2 (2x2) model will generate 4 files, each one with the full timeseries of the forcing data.

#### Input Ports

- **WD\_Path:** This is the working folder provided by the MainGenerator module.
- **DataSet\_Class:** This is the dataset information provided by the MainGenerator module.
- **Forcing\_Folder\_Name:** [Optional] Name of the subfolder where the forcing info will be stored. The default value is *Forcing*.
- **Forcing\_File\_Prefix:** [Optional] Prefix for the name of the forcing files. The default value is *data*.
- **Date\_Label\_Format:** [Optional] Format taken for the dates of the first column.(i.e 05/16/1997-05:30:00 can be expressed as %m/%d/%YYYY-%H:%M:%S ), The default value is *None*, which means the files will not have dates. For more information about python date formats go to <https://strftime.org/>
- **Subrange:** [Optional] Subset of the dataset by giving the boundary limitation including x\_min, x\_max, y\_min, y\_max.
- **Mask\_File:** [Optional] Mask file for generating specific forcing data files, there are two types of mask files, which are inclusive and exclusive. In the mask file, it records the latitude and longitude of the cell each line, and for inclusive mask file, the ForcingDataFileGenerator module will only yield the forcing data files of the certain cell given in mask file. and in reverse, the exclusive mask file provided to create the forcing data files of the cells which is excluded in the mask file. The format of the mask file, should be `latitude,longitude` each line, and user can make comment freely in any other line.

#### Output Ports

- **Ready:** Starting flag for RunModuleAgent. The value is either *True* or *False*.

```
change_forcing_name(folder, file_name)
```

This function is to change the name of files in the given folder

#### Parameters

- **folder** (*str*) – The path of the folder
- **file\_name** (*str*) – The prefix of the file needed adding or the new file name needed changing

**check\_dimensions**(*dataset\_class*, *check\_space=True*, *check\_time=True*)

This Function is to check the detected dimension of the dataset

**Parameters**

- **dataset\_class** (*str*) – The name of the integrated dataset
- **check\_space** (*bool*) – The parameter on whether the space variable exists, default value is True
- **check\_time** (*bool*) – The parameter on whether the time variable exists, default value is True

**check\_dimensions\_var**(*dataset\_name*, *input\_name*, *check\_space=True*, *check\_time=True*)

This Function is to initialize and update detected dimensions

**Parameters**

- **dataset\_name** (*str*) – The name of the integrated dataset
- **input\_name** – The id of the integrated dataset
- **check\_space** (*bool*) – The parameter on whether the space variable exists, default value is True
- **check\_time** (*bool*) – The parameter on whether the time variable exists, default value is True

**check\_mask**(*lat*, *lon*)

This Function is to check whether the targeted cell is included in the mask

**Parameters**

- **lat** (*float*) – The latitude of the targeted cell
- **lon** (*float*) – The longitude of the targeted cell

**Returns** return the result of a boolean value on whether the targeted cell is included in the mask

**Return type** *bool*

**check\_subrange**(*lat*, *lon*)

This Function is to check whether the targeted cell is included in the sub-range

**Parameters**

- **lat** (*float*) – The latitude of the targeted cell
- **lon** (*float*) – The longitude of the targeted cell

**Returns** return the result of a boolean value on whether the targeted cell is included in the sub-range

**Return type** *bool*

**compute**()

The main function of ForcingDataFileGenerator module is to organize the forcing data brought by the MainGenerator module

**exact\_rounding**(*number*, *decimals*)

This Function is to return a floating point number that is a rounded version of the specified number, with the specified number of decimals

**Parameters**

- **number** (*float*) – The number to be rounded

- **decimals** (*int*) – The number of decimals to use when rounding the number.

**Returns** The rounded number

**Return type** *float*

**classmethod** `get_documentation(docstring, module=None)`

This function is to get the documentation of ForcingDataFileGenerator module

**Parameters**

- **docstring** – A string used to document a ForcingDataFileGenerator module
- **module** – ForcingDataFileGenerator module

**Returns** A invoked function from package DocumentUtil to get documentation of ForcingDataFileGenerator module

**get\_time\_series**(*dataset\_name, time\_ini, time\_end, row, col, empty\_value=None*)

This Function is to obtain the time-series of the targeted dataset

**Parameters**

- **dataset\_name** (*str*) – The name of the integrated dataset
- **time\_ini** (*datetime*) – The initial time of the dataset
- **time\_end** (*datetime*) – The ending time of the dataset
- **row** (*int*) – The row number of the dataset
- **col** (*int*) – The column number of the dataset
- **empty\_value** (*str*) – The value to replace when the element in dataset is NAN, the default value is None

**Returns** The list of the time-series of the dataset

**Return type** *dict*

**initialize\_dimensions**()

This Function is to initialize the detected dimensions

**prepare\_forcing**(*forcing\_dir\_prefix, inputs, date\_format*)

This Function is to prepare forcing dataset

**Parameters**

- **forcing\_dir\_prefix** (*str*) – The prefix of the forcing data directory
- **inputs** (*str*) – The names of the integrated forcing dataset
- **date\_format** (*str*) – The format taken for the dates of the first column

**save\_forcing**(*filename, user\_inputs, row, col, date\_format*)

This function is to build a unique file with all the forcing information of a cell

**Parameters**

- **filename** (*str*) – The name of the file
- **user\_inputs** (*str*) – The names of the integrated forcing dataset
- **row** (*int*) – The row index of the 2D-forcing dataset
- **col** (*int*) – The column index of the 2D-forcing dataset
- **date\_format** (*str*) – The format taken for the dates of the first column



`AgentTools.GenericModelAgent.ForcingDataFileGenerator.initialize(*args, **keywords)`  
 This function is to initialize the ForcingDataFileGenerator module

#### 1.1.4 AgentTools.GenericModelAgent.InitialStateFileGenerator module

`class AgentTools.GenericModelAgent.InitialStateFileGenerator.InitialStateFileGenerator(*args, **kwargs)`

InitialStateFileGenerator is an optional module to organizes the initial state data of a generic simulation. The initial state files are not always required for the execution of some models.

##### Input Ports

- **WD\_Path:** This is the working folder provided by the MainGenerator module.
- **Init\_State\_Folder\_Name:** Name of the initial state folder that will be created. If left empty, the state files will be saved in the working directory.
- **File\_In\_x:** Path of the x-th initial state file, (x=0,1,2,...,9).

##### Output Ports

- **Ready:** Starting flag for RunModuleAgent. The value is either *True* or *False*.

##### compute()

The main function of InitialStateFileGenerator module is to organize the initial state data of a generic simulation.

`classmethod get_documentation(docstring, module=None)`

This function is to get the documentation of InitialStateFileGenerator module

##### Parameters

- **docstring** – A string used to document a InitialStateFileGenerator module
- **module** – InitialStateFileGenerator module

**Returns** A invoked function from package DocumentUtil to get documentation of InitialStateFileGenerator module

`AgentTools.GenericModelAgent.InitialStateFileGenerator.initialize(*args, **keywords)`  
 This function is to initialize the InitialStateFileGenerator module

#### 1.1.5 AgentTools.GenericModelAgent.MainGenerator module

`class AgentTools.GenericModelAgent.MainGenerator.MainGenerator(*args, **kwargs)`

The MainGenerator module is the first component of the Generic Model Agent tools. This component is responsible for setting up the folder where the simulation will be performed. It receives all the forcing datasets as inputs. The order at which they are added matters, since the final forcing files will display the data in the same order: first Dataset\_01, then Dataset\_02, and so on. The purpose of the Generic Model Agent tools is to enable the integration of new Models into the CyberWater environment. Therefore, users are expected to be highly knowledgeable about the details of their own models if they want to perform an integration with the Generic tools.

##### Input Ports

- **01\_Path:** Path of the folder where the files of the simulation will be created.
- **02\_GPF:** Path of the main configuration (global parameter) file for the simulation.
- **03\_Override?:** Flag on whether to override the original working directory, The value is either *True* or *False*.

- **04\_Ready:** Ready signal from precedent-connected modules, The value is either *True* or *False*,
- **Dataset\_x:** Dataset of the x-th forcing variable, (x=01,02,03,...,15).

#### Output Ports

- **WD\_Path:** Folder where the execution will be performed.
- **DataSet\_Class:** The information of the forcing datasets.

#### `compute()`

The main function of MainGenerator module is to retrieve the inputs from GUI, and setup the folder where the simulation will be performed. It receives all the forcing datasets and integrates them in an overall dataset as output.

#### `classmethod get_documentation(docstring, module=None)`

This function is to get the documentation of MainGenerator module param docstring: A string used to document a MainGenerator module

**Parameters** `module` – MainGenerator module

**Returns** A invoked function from package DocumentUtil to get documentation of Main-Generator module

#### `remove_existing_folder(files_dir)`

This function is to remove an existing folder

**Parameters** `files_dir` (*string*) – The path of the folder

#### `AgentTools.GenericModelAgent.MainGenerator.initialize(*args, **keywords)`

This function is to initialize the MainGenerator module

### 1.1.6 AgentTools.GenericModelAgent.RunModuleAgent module

#### `class AgentTools.GenericModelAgent.RunModuleAgent.RunModuleAgent(*args, **kwargs)`

RunModuleAgent responsible for the execution of a Model offered as executable. The model execution requires that the user manually prepares the files required.

#### Input Ports

**01\_Output\_Name** The list of the name of the output dataset

**02\_File\_Position** The list of the position (column index) in the result files (e.g. model results files) for the corresponding output dataset.

#### **03\_Model\_executable**

- **exe:** executable file with the execution parameters excluding the arguments.
- **arg:** arguments required for the execution.

#### **04\_Results\_format**

- **Result\_File\_Prefix/Name:** Either the prefix of all the cells generated by the model. Or the name of the time-series generated.
- **Result\_File\_Separator:** Separation character in the output files.
- **Result\_Folder:** The name of the folder saving the result data. The default value is *results*
- **Point\_output?:** Check if the output is a single time-series in contrast of a distributed result in multiple files, once per cell. The default value is *False*.

- **Header\_lines:** Number of lines at the top of the resulting files that need to be ignored.

#### 05\_Final\_state\_options [Optional]

- **final\_state\_name:** The name of the final state file.
- **save\_path:** The saving path of the final state file.

**Ready\_List** Connect the output of ForcingDataFileGenerator, AreaWiseParamGenerator and InitialStateFileGenerator if it exists.

**WD\_Path** WD\_Path output port of the MainGenerator. This is the directory where the simulation files are saved.

**DataSet\_Class** DataSet\_Class output port of the MainGenerator.

#### Output Ports

- **Outputx:** Output dataset x. (x=01,02,03,...,20)

#### `compute()`

The main function of RunModuleAgent module is to execute a model offered as executable and prepare the files required for execution

#### `extract_exe_and_arg(exe_config)`

This Function is to extract the parameters on the executable program path and arguments from GUI input panel

**Parameters** `final_state_options (list)` – The list of entries on the executable program path and arguments configured by user on GUI

**Returns** The list of the value extracted from each entry on the executable program path and arguments

**Return type** `list`

#### `extract_final_state_options(final_state_options)`

This Function is to extract the parameters on the final state options from GUI input panel

**Parameters** `final_state_options (list)` – The list of entries on the final state options configured by user on GUI

**Returns** The list of the value extracted from each entry on final state options

**Return type** `list`

#### `extract_results_format(results_format)`

This Function is to extract the parameters on the format of results from GUI input panel

**Parameters** `results_format (list)` – The list of entries on the format of results configured by user on GUI

**Returns** The list of the value extracted from each entry on the format of results

**Return type** `list`

#### `classmethod get_documentation(docstring, module=None)`

This function is to get the documentation of RunModuleAgent module

**Parameters**

- **docstring** – A string used to document a RunModuleAgent module
- **module** – RunModuleAgent module

**Returns** A invoked function from package DocumentUtil to get documentation of RunModuleAgent module

`AgentTools.GenericModelAgent.RunModuleAgent.initialize(*args, **keywords)`

This function is to initialize the RunModuleAgent module

## 1.2 AgentTools.HPC package

### 1.2.1 Submodules

### 1.2.2 AgentTools.HPC.HPC module

`class AgentTools.HPC.HPC.HPC(*args, **kwargs)`

HPC module is responsible for the execution of a Model on a remote high-performance computing platform.

#### Input Ports

##### (1) Platform Selection

- **SSH Platform:** Platform for SSH connection, including 6 slurm-based platforms: bigred3, bridges2, bridges2-shared, stampede2, google cloud, and jetstream, and 4 bash-based platforms: sievert, rain, thunder, and lightning.
- **Gateway Platform:** Platform for gateway connection, including bigred3, bridges2, bridges2-shared and carbonate.
- **Customized:** Customized based-based platform for user to connect, user can choose to save their customized platform, so that this server option will be displayed in the list of SSH Platform next time.

##### (2) Credential

- **Username:** Username for high performance computing platform.
- **Password:** Password for high performance computing platform.

##### (3) Project Configuration

- **Project Name:** The name of project created in high-performance computing platform.
- **Email:** User will receive a notification email when job done.
- **Estimated Runtime:** The duration of the task in the platform which user want to apply for, and the default value is 5 minus.
- **Argument:** Argument required for the model execution. e.g., -g vic\_global\_file\_val
- **Result File Prefix:** The prefix of all the cells generated by the model.
- **Point Output:** (True/False). Check if the output is a single time-series in contrast of a distributed result in multiple files, once per cell. Default = False.
- **Result File Separator:** Separation character in the output files. Default = ‘ ‘
- **Header Lines:** Number of lines at the top of the resulting files that need to be ignored. Default = 0

#### (4) Model Source

- **Executable Program:** The file path of the executable program of computation model, e.g., vicNl.exe.
- **Source Code:** The directory path of the source code of computation model, if there is no available executable program running in the high-performance computing platform. The output executable name set in MakeFile should be same as the folder name of source code, e.g., vicNl

#### (5) Output Datasets

- **Output Name:** Name of the output dataset x. (x=01,02,03,...,20)
- **File Pos:** Column index in the result files for the dataset x. (x=01,02,03,...,20)

**Ready\_List** Connect the output of ForcingDataFileGenerator, AreaWiseParamGenerator and InitialStateFileGenerator if it exists.

**WD\_Path** WD\_Path output port of the MainGenerator. This is the directory where the simulation files are saved.

**DataSet\_Class** DataSet\_Class output port of the MainGenerator.

#### Output Ports

- **Outputx:** Output dataset x. (x=01,02,03,...,20)

**compute()**

The main function of HPC module is to execute a model on a remote high-performance computing platform

**classmethod get\_documentation(docstring, module=None)**

This function is to get the documentation of HPC module

#### Parameters

- **docstring** – A string used to document a HPC module
- **module** – HPC module

**Returns** A invoked function from package DocumentUtil to get documentation of HPC module

## 1.3 AgentTools.util package

### 1.3.1 Submodules

### 1.3.2 AgentTools.util.DocumentUtil module

**class AgentTools.util.DocumentUtil.DocumentUtil**

DocumentUtil class is a utility class for the modules in Generic Model Agent Toolkits to get the corresponding documentation.

**static get\_documentation(module\_name)**

This function is to get the documentation of the current module

**Parameters** **module\_name** (*str*) – The name of the current module

**Returns** The documentation of the current module

Return type `str`

### 1.3.3 AgentTools.util.OutputUtil module

**class** AgentTools.util.OutputUtil.OutputUtil

OutputUtil class is a utility class to provide relative methods on calculation and saving the forcing dataset for RunModuleAgent and HPC module.

**static** `check_dimensions`(*user\_inputs*, *dd*, *check\_space=True*, *check\_time=True*)

This Function is to check the detected dimension of the dataset

**Parameters**

- **user\_inputs** (*str*) – The name of the integrated dataset
- **dd** (*dict*) – The detected dimensions
- **check\_space** (*bool*) – The parameter on whether the space variable exists, default value is *True*.
- **check\_time** (*bool*) – The parameter on whether the time variable exists, default value is *True*.

**Returns** The detected dimensions

Return type `dict`

**static** `check_dimensions_var`(*dataset\_name*, *input\_name*, *dd*, *check\_space=True*, *check\_time=True*)

This Function is to initialize and update detected dimensions

**Parameters**

- **dataset\_name** (*str*) – The name of the input integrated dataset
- **input\_name** – The id of the integrated dataset
- **check\_space** (*bool*) – The parameter on whether the space variable exists, default value is *True*
- **check\_time** (*bool*) – The parameter on whether the time variable exists, default value is *True*

**Returns** The detected dimensions

Return type `dict`

**static** `create_dataset`(*dataset\_name*, *variable\_name*, *left*, *right*, *top*, *bottom*, *side*, *base*, *timeini*, *timeend*, *initialize\_ts*, *step*, *value*, *save=False*)

This function is to create the responding dataset in the form of *msmDataset* with the parameters given

**Parameters**

- **dataset\_name** (*str*) – The name of dataset to be created
- **variable\_name** (*str*) – The name of the variable of the dataset
- **left** (*float*) – The left boundary value in the space range of the dataset
- **right** (*float*) – The right boundary value in the space range of the dataset
- **top** (*float*) – The top boundary value in the space range of the dataset
- **bottom** (*float*) – The bottom boundary value in the space range of the dataset

- **side** (*int*) – The vertical resolution of the dataset
- **base** (*int*) – The horizontal resolution of the dataset
- **timeini** (*datetime*) – The initial time in the time range of the dataset
- **timeend** (*datetime*) – The ending time in the time range of the dataset
- **step** (*datetime*) – The time step of the dataset
- **value** (*list*) – The result value in the dataset
- **save** (*bool*) – Flag on whether to save the dataset The default value is *False*

**static exact\_rounding**(*number, decimals*)

This Function is to return a floating point number that is a rounded version of the specified number, with the specified number of decimals

**Parameters**

- **number** (*float*) – The number to be rounded
- **decimals** (*int*) – The number of decimals to use when rounding the number.

**Returns** The rounded number

**Return type** *float*

**static get\_time\_series**(*dataset\_name, time\_ini, time\_end, row, col, empty\_value=None*)

This Function is to obtain the time-series of the targeted dataset

**Parameters**

- **dataset\_name** (*str*) – The name of the integrated dataset
- **time\_ini** (*datetime*) – The initial time of the dataset
- **time\_end** (*datetime*) – The ending time of the dataset
- **row** (*int*) – The row number of the dataset
- **col** (*int*) – The column number of the dataset
- **empty\_value** (*str*) – The value to replace when the element in dataset is empty, the default value is *None*

**Returns** The list of the time-series of the dataset

**Return type** *dict*

**static point\_distance**(*x1, x2, y1, y2*)

This Function is to calculate the distance between two points (x1,y1) and (x2,y2)

**Parameters**

- **x1** (*float*) – The x coordinate of the point (x1,y1)
- **x2** (*float*) – The x coordinate of the point (x2,y2)
- **y1** (*float*) – The y coordinate of the point (x1,y1)
- **y2** (*float*) – The y coordinate of the point (x2,y2)

**Returns** The distance between two points (x1,y1) and (x2,y2)

**Return type** *float*

**static process\_output\_file**(*dataset\_name, row, col, filename, empty\_value, file\_key, pos, timeini, timeend, timestep, number\_of\_header\_lines*)

This Function is to process input dataset and create corresponding output result file

**Parameters**

- **dataset\_name** (*str*) – The name of the dataset
- **row** (*int*) – The row number of the input integrated dataset
- **col** (*int*) – The column number of the dataset
- **filename** (*str*) – The name of the result file
- **empty\_value** (*str*) – The value to replace when the element in dataset is empty
- **file\_key** (*str*) – The name of the output dataset
- **pos** (*int*) – The position (column index) of the output dataset in the result file
- **timeini** (*datetime*) – The initial time of the dataset
- **timeend** (*datetime*) – The ending time of the dataset
- **timestep** (*timedelta*) – The time step of the dataset
- **number\_of\_header\_lines** (*int*) – The number of header lines in the result file

**static process\_results\_line**(*line, empty\_value, file\_key, pos, timestep\_datetime*)

This Function is to process and extract the result data in each header field in each line of the result file

**Parameters**

- **line** (*str*) – The line being processed in the result file
- **empty\_value** (*str*) – The value to replace when the element in dataset is empty
- **file\_key** (*str*) – The name of the output dataset
- **pos** (*int*) – The position (column index) of the output dataset in the result file
- **timestep\_datetime** (*datetime*) – The current timestamp for the current line in the result file

**Returns** The current timestamp for the current line in the result file and the corresponding value in the given position of the current line in the result file

**Return type** (*datetime, float*)

**static save\_dataset**(*dataset\_name*)

This Function is to save dataset in database and refreshes in cache

**Parameters** **dataset\_name** (*str*) – The name of the input integrated dataset

**static save\_output**(*output\_folder, file\_key, var\_name, dataset\_name, pos, file\_prefix, point\_output, separator, number\_of\_header\_lines, dd*)

This Function is to create a dataset and save the result in the dataset as the output.

**Parameters**

- **output\_folder** (*str*) – The path of the folder for output
- **file\_key** (*str*) – The name of the output dataset
- **var\_name** (*str*) – The name of the variable of the dataset
- **dataset\_name** (*str*) – The name of the input integrated dataset
- **pos** (*int*) – The position (column index) in the result files for the output dataset
- **file\_prefix** (*str*) – The prefix of the result file



- **point\_output** (*bool*) – The boolean value represented whether the output dataset is a single-time-series in a single file, in contrast of a distributed result in multiple files, once per cell. The default value is False.
- **separator** (*str*) – The delimiter in the result file to separate each data filed in result file
- **number\_of\_header\_lines** (*int*) – The number of the header in the result file to skip
- **dd** (*dict*) – The detected dimensions

**Returns** The created output dataset

**Return type** *dict*

```
static save_outputs(output_folder, desired_outputs, position_list, file_prefix, input_identification, point_output, separator, number_of_header_lines, module_name, ret, dd)
```

This Function is to save the output datasets

**Parameters**

- **output\_folder** (*str*) – The path of the folder for output
- **desired\_outputs** (*list*) – The list of the names of output datasets
- **position\_list** (*list*) – The list of the positions (column indices) in the result files for the output datasets
- **file\_prefix** (*str*) – The prefix of the file
- **input\_identification** (*str*) – The id of the input dataset

:param point\_output: The boolean value represented whether the output dataset is a single-time-series in a single file, in contrast of a distributed result in multiple files, once per cell. The default value is False. :type point\_output: bool :param separator: The delimiter in the result file to separate each data filed in result file :type separator: str :param number\_of\_header\_lines: The number of the header in the result file to skip :type number\_of\_header\_lines: int :param module\_name: The name of the current module :type module\_name: str :param ret: The list of the name of output result datasets :type ret: list :param dd: The detected dimensions :type dd: dict :return: The integrated result dataset and the list of the name of output result datasets :rtype: (dict,list)

```
static search_file_with_closest_lat_lon(estimated_lat, estimated_lon, directory, filename_pattern, min_resolution)
```

This function takes an estimation of a latitude and longitude coordinates of a specific cell (in a distributed output scenario), together with a directory where a list of cells are saved, and returns the name of the file with the closest coordinates to the given ones. If the resulting coordinate gives a difference superior to the current resolution, it throws an error.

**Parameters**

- **estimated\_lat** (*float*) – The estimation of a latitude
- **estimated\_lon** (*float*) – The estimation of a longitude
- **directory** (*str*) – The path of directory having a list of cells
- **filename\_pattern** (*str*) – The prefix of the file
- **min\_resolution** (*int*) – The minimum of resolution

**Returns** The name of the file with the closest coordinates to the given ones

Return type `str`

`static set_time_series_to_dataset(dataset_name, timeseries_dict, row, col)`

This function is to set the time series for the current dataset

### Parameters

- `dataset_name` (`str`) – The name of the targeted dataset
- `timeseries_dict` (`dict`) – The time-series dictionary to be set for the targeted dataset
- `row` (`int`) – The row number of the dataset
- `col` (`int`) – The column number of the dataset

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