

## Scikit Data Access

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## Chapter 2

# Hierarchical Index

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## Chapter 3

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## Chapter 5

# Namespace Documentation

### 5.1 groundwater\_example Namespace Reference

#### Variables

- [fullIDF](#)
- [fullIDW](#) = fullIDF.output()
- [meta\\_data](#) = WDF.getStationMetadata()
- [dataIt](#) = fullIDW.getIterator()
- [label\\_1](#)
- [data\\_1](#)
- [label\\_2](#)
- [data\\_2](#)
- [color](#)

#### 5.1.1 Variable Documentation

##### 5.1.1.1 [color](#)

`groundwater_example.color`

##### 5.1.1.2 [data\\_1](#)

`groundwater_example.data_1`

#### 5.1.1.3 data\_2

```
groundwater_example.data_2
```

#### 5.1.1.4 dataIt

```
groundwater_example.dataIt = fullDW.getIterator()
```

#### 5.1.1.5 fullDF

```
groundwater_example.fullDF
```

#### Initial value:

```
1 = WDF([AutoParam(35), AutoParam(38), AutoParam(-119), AutoParam(-118)],
2      '2007-01-01', '2016-12-31', cutoff=0.0)
```

#### 5.1.1.6 fullDW

```
groundwater_example.fullDW = fullDF.output()
```

#### 5.1.1.7 label\_1

```
groundwater_example.label_1
```

#### 5.1.1.8 label\_2

```
groundwater_example.label_2
```

## 5.1.1.9 meta\_data

```
groundwater_example.meta_data = WDF.getStationMetadata()
```

## 5.2 skdaccess Namespace Reference

### Namespaces

- [astro](#)
- [bin](#)
- [framework](#)
- [geo](#)
- [utilities](#)

## 5.3 skdaccess.astro Namespace Reference

### Namespaces

- [kepler](#)

## 5.4 skdaccess.astro.kepler Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.5 skdaccess.astro.kepler.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for Kepler light curve data.*

## 5.6 skdaccess.bin Namespace Reference

### Namespaces

- [skdaccess](#)

## 5.7 skdaccess.bin.skdaccess Namespace Reference

### Functions

- def [skdaccess\\_script](#) ()  
*This function defines a script for downloading data.*

### 5.7.1 Function Documentation

#### 5.7.1.1 skdaccess\_script()

```
def skdaccess.bin.skdaccess.skdaccess_script ( )
```

This function defines a script for downloading data.

## 5.8 skdaccess.framework Namespace Reference

### Namespaces

- [data\\_class](#)
- [param\\_class](#)

## 5.9 skdaccess.framework.data\_class Namespace Reference

### Classes

- class [DataFetcherBase](#)  
*Base class for all data fetchers.*
- class [DataFetcherCache](#)  
*Data fetcher base class for downloading data and caching results on hard disk.*
- class [DataFetcherLocal](#)
- class [DataFetcherStorage](#)  
*Data fetcher base class for use when entire data set is downloaded.*
- class [DataFetcherStream](#)  
*Data fetcher base class for downloading data into memory.*
- class [DataWrapperBase](#)  
*Base class for wrapping data for use in DiscoveryPipeline.*
- class [ImageWrapper](#)  
*Wrapper for image data.*
- class [SeriesDictionaryWrapper](#)  
*Data wrapper for series data using a dictionary of data frames.*
- class [SeriesWrapper](#)  
*Data wrapper for series data using a data panel.*
- class [TableWrapper](#)  
*Data wrapper for table data using an ordered dictionary.*



## 5.10 skdaccess.framework.param\_class Namespace Reference

### Classes

- class [AutoList](#)  
*Specifies a list for returning selections of lists, as opposed to a single element.*
- class [AutoListCycle](#)  
*An Autolist that cycles through different lists.*
- class [AutoListPermute](#)  
*A perturber that permutes a list.*
- class [AutoListRemove](#)  
*Removes a different single element from the initial list at each perturb call.*
- class [AutoListSubset](#)  
*An [AutoList](#) perturber that creates random subsets of a list.*
- class [AutoParam](#)  
*Defines a tunable parameter class inherited by specific subclasses.*
- class [AutoParamList](#)  
*A tunable parameter with a specified list of choices that can be randomly selected via perturb.*
- class [AutoParamListCycle](#)  
*Cycles through a list of paramters.*
- class [AutoParamMinMax](#)  
*A tunable parameter with min and max ranges, perturbs to a random value in range.*

## 5.11 skdaccess.geo Namespace Reference

### Namespaces

- [gldas](#)
- [grace](#)
- [groundwater](#)
- [mahali](#)
- [modis](#)
- [pbo](#)

## 5.12 skdaccess.geo.gldas Namespace Reference

### Namespaces

- [data\\_fetcher](#)

### 5.13 skdaccess.geo.gldas.data\_fetcher Namespace Reference

#### Classes

- class [DataFetcher](#)  
*Data Fetcher for GLDAS data.*

### 5.14 skdaccess.geo.grace Namespace Reference

#### Namespaces

- [data\\_fetcher](#)

### 5.15 skdaccess.geo.grace.data\_fetcher Namespace Reference

#### Classes

- class [DataFetcher](#)  
*Data Fetcher for GRACE data.*

### 5.16 skdaccess.geo.groundwater Namespace Reference

#### Namespaces

- [data\\_fetcher](#)

### 5.17 skdaccess.geo.groundwater.data\_fetcher Namespace Reference

#### Classes

- class [DataFetcher](#)  
*Generates Data Wrappers of groundwater measurements taken in the US.*

### 5.18 skdaccess.geo.mahali Namespace Reference

#### Namespaces

- [data\\_fetcher](#)
- [data\\_wrapper](#)

## 5.19 skdaccess.geo.mahali.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for Mahali Data.*

## 5.20 skdaccess.geo.mahali.data\_wrapper Namespace Reference

### Classes

- class [DataWrapper](#)  
*Data wrapper for Mahali data.*

## 5.21 skdaccess.geo.modis Namespace Reference

### Namespaces

- [cache](#)
- [stream](#)

## 5.22 skdaccess.geo.modis.cache Namespace Reference

### Namespaces

- [cloud\\_mask](#)
- [cloud\\_opacity](#)
- [data\\_fetcher](#)
- [reflectance](#)

## 5.23 skdaccess.geo.modis.cache.cloud\_mask Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.24 `skdaccess.geo.modis.cache.cloud_mask.data_fetcher` Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for MODIS Cloud Mask.*

## 5.25 `skdaccess.geo.modis.cache.cloud_opacity` Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.26 `skdaccess.geo.modis.cache.cloud_opacity.data_fetcher` Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for MODIS Cloud Opacity.*

## 5.27 `skdaccess.geo.modis.cache.data_fetcher` Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for MODIS data.*

## 5.28 `skdaccess.geo.modis.cache.reflectance` Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.29 `skdaccess.geo.modis.cache.reflectance.data_fetcher` Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data fetcher for the modis surface reflectance product ('09', 1 km resolution)*

## 5.30 skdaccess.geo.modis.stream Namespace Reference

### Namespaces

- [cloud\\_mask](#)
- [cloud\\_opacity](#)
- [data\\_fetcher](#)
- [reflectance](#)

## 5.31 skdaccess.geo.modis.stream.cloud\_mask Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.32 skdaccess.geo.modis.stream.cloud\_mask.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for MODIS Cloud Mask.*

## 5.33 skdaccess.geo.modis.stream.cloud\_opacity Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.34 skdaccess.geo.modis.stream.cloud\_opacity.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for MODIS Cloud Opacity.*

## 5.35 skdaccess.geo.modis.stream.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data Fetcher for MODIS data.*

## 5.36 skdaccess.geo.modis.stream.reflectance Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.37 skdaccess.geo.modis.stream.reflectance.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data fetcher for the modis surface reflectance product ('09', 1 km resolution)*

## 5.38 skdaccess.geo.pbo Namespace Reference

### Namespaces

- [data\\_fetcher](#)

## 5.39 skdaccess.geo.pbo.data\_fetcher Namespace Reference

### Classes

- class [DataFetcher](#)  
*Data fetcher for PBO GPS data.*

## 5.40 skdaccess.utilities Namespace Reference

### Namespaces

- [grace\\_util](#)
- [gw\\_util](#)
- [kepler\\_util](#)
- [map\\_util](#)
- [modis\\_util](#)
- [pbo\\_util](#)

## 5.41 skdaccess.utilities.grace\_util Namespace Reference

### Functions

- def [average\\_dates](#) (dates, round\_nearest\_day=False)  
*Compute the average of a pandas series of timestamps.*
- def [dateMismatch](#) (dates, days=10)  
*Check if dates are not within a certain number of days of each other.*
- def [compute\\_ewd](#) (grace\_data, scale\_factor, round\_nearest\_day=False)  
*Compute scale corrected equivalent water depth.*
- def [read\\_grace\\_data](#) (filename, lat\_name, lon\_name, data\_name, time=None)  
*This function reads in netcdf data provided by GRACE Tellus.*

### 5.41.1 Function Documentation

#### 5.41.1.1 [average\\_dates\(\)](#)

```
def skdaccess.utilities.grace_util.average_dates (
    dates,
    round_nearest_day = False )
```

Compute the average of a pandas series of timestamps.

#### Parameters

<i>dates</i>	List of pandas datetime objects
<i>round_nearest_day</i>	Round to the nearest day

#### Returns

Average of dates

#### 5.41.1.2 [compute\\_ewd\(\)](#)

```
def skdaccess.utilities.grace_util.compute_ewd (
    grace_data,
    scale_factor,
    round_nearest_day = False )
```

Compute scale corrected equivalent water depth.

Equivalent water depth by averaging results from GFZ, CSR, and JPL, and then applying the scale factor

**Parameters**

<i>grace_data</i>	Data frame containing grace data
<i>scale_factor</i>	Scale factor to apply
<i>round_nearest_day</i>	Round dates to nearest day

**Returns**

Equivalent water depth determined by applying the scale factor to the average GFZ, JPL and CSR.

**5.41.1.3 dateMismatch()**

```
def skdaccess.utilities.grace_util.dateMismatch (
    dates,
    days = 10 )
```

Check if dates are not within a certain number of days of each other.

**Parameters**

<i>dates</i>	Iterable container of pandas timestamps
<i>days</i>	Number of days

**Returns**

true if they are not with 10 days, false otherwise

**5.41.1.4 read\_grace\_data()**

```
def skdaccess.utilities.grace_util.read_grace_data (
    filename,
    lat_name,
    lon_name,
    data_name,
    time = None )
```

This function reads in netcdf data provided by GRACE Tellus.

**Parameters**

<i>filename</i>	Name of file to read in
<i>lat_name</i>	Name of latitude data
<i>lon_name</i>	Name of longitude data
<i>data_name</i>	Name of data product
<i>time</i>	Name of time data



## 5.42 skdaccess.utilities.gw\_util Namespace Reference

### Functions

- def [combine\\_water\\_heights](#) (in\_data)  
*Combine median and average water heights.*

#### 5.42.1 Function Documentation

##### 5.42.1.1 combine\_water\_heights()

```
def skdaccess.utilities.gw_util.combine_water_heights (  
    in_data )
```

Combine median and average water heights.

Create a column of water heights in input data frame using Median Water Depth by default, but fills in missing data using average values

#### Parameters

<i>in_data</i>	Input water heights data
----------------	--------------------------

## 5.43 skdaccess.utilities.kepler\_util Namespace Reference

### Functions

- def [normalize](#) (in\_data, column='PDCSAP\_FLUX', group\_column='QUARTER')  
*This function normalizes PDCSAP\_FLUX data by quarter by dividing the flux by the median for the quarter.*

#### 5.43.1 Function Documentation

##### 5.43.1.1 normalize()

```
def skdaccess.utilities.kepler_util.normalize (  
    in_data,  
    column = 'PDCSAP_FLUX',  
    group_column = 'QUARTER' )
```

This function normalizes PDCSAP\_FLUX data by quarter by dividing the flux by the median for the quarter.

## Parameters

<i>in_data</i>	Data to be normalized
<i>column</i>	Name of column to be normalized
<i>group_column</i>	Name of column used to group data

## 5.44 skdaccess.utilities.map\_util Namespace Reference

### Classes

- class [Planet](#)  
*A class for storing variables about a planetary body.*

### Functions

- def [sanitize\\_latlon](#) (lat\_lon\_tuple, ppd=1, start\_from\_90N=False)  
*Wraps around latitude & longitudes, including interpretation of points past the poles.*
- def [trim\\_map](#) (array, ppd, nswe, lat\_npole=90, lon\_offset=0)  
*Returns a copy of a map/array trimmed to the given N, S, W, E extents.*
- def [calc\\_slopes](#) (topo\_array, ppd, planet, scaled=True, nswe="global", lon\_offset=0, lat\_npole=90)  
*Calculate a slope map from a topographic dataset.*
- def [wgs84\\_distance](#) (point1, point2, planet=[Planet](#)("wgs84"), miles=False)  
*Vincenty distance adapted from public domain vincenty package.*
- def [global\\_coords](#) (x\_in, y\_in, coeffs)  
*Transform pixel coordinates into global coords using affine transformation coefficients.*
- def [gps2pixel](#) (gpsmethod, gps\_coord, init\_guess)  
*Function for finding the pixel coordinate associated with a gps coordinate.*

### 5.44.1 Function Documentation

#### 5.44.1.1 [calc\\_slopes\(\)](#)

```
def skdaccess.utilities.map_util.calc_slopes (
    topo_array,
    ppd,
    planet,
    scaled = True,
    nswe = "global",
    lon_offset = 0,
    lat_npole = 90 )
```

Calculate a slope map from a topographic dataset.

For now, this tool assumes a global topographic dataset; in the future, it will be expanded to work on regional datasets as well

## Parameters

<i>topo_array</i>	a global topographic dataset, in numpy array form
<i>ppd</i>	the pixels-per-degree of the topo array
<i>planet</i>	The planetary body in question
<i>scaled</i>	whether values should be scaled by latitude
<i>nswe</i>	the (NW,SE) corners of the area-of-interest
<i>lon_offset</i>	the longitude of the prime meridian in the same system as the given N, S, W, E values
<i>lat_npole</i>	the latitude of the N Pole in the same system as the given N, S, W, E values

## 5.44.1.2 global\_coords()

```
def skdaccess.utilities.map_util.global_coords (
    x_in,
    y_in,
    coeffs )
```

Transform pixel coordinates into global coords using affine transformation coefficients.

## Parameters

<i>x_in</i>	X pixel coordinates
<i>y_in</i>	Y pixel coordinates
<i>coeffs</i>	Affine transformation coefficients

## Returns

global coordinates

## 5.44.1.3 gps2pixel()

```
def skdaccess.utilities.map_util.gps2pixel (
    gpsmethod,
    gps_coord,
    init_guess )
```

Function for finding the pixel coordinate associated with a gps coordinate.

## Parameters

<i>gpsmethod</i>	GPS coordinate mapping function
<i>gps_coord</i>	GPS coordinate to match, as (lat,lon)
<i>init_guess</i>	Initial guess for the pixel coordinate (optional)

**Returns**

Integer pixel coordinate nearest to lat,lon coordinate point

**5.44.1.4 sanitize\_latlon()**

```
def skdaccess.utilities.map_util.sanitize_latlon (
    lat_lon_tuple,
    ppd = 1,
    start_from_90N = False )
```

Wraps around latitude & longitudes, including interpretation of points past the poles.

**Parameters**

<i>lat_lon_tuple</i>	(lat, lon), in either degrees or pixels
<i>ppd</i>	pixels-per-degree
<i>start_from_90N</i>	consider 90N to be 0 latitude

**Returns**

Latitude and Longitude after they have been sanitized

**5.44.1.5 trim\_map()**

```
def skdaccess.utilities.map_util.trim_map (
    array,
    ppd,
    nswe,
    lat_npole = 90,
    lon_offset = 0 )
```

Returns a copy of a map/array trimmed to the given N, S, W, E extents.

**Parameters**

<i>array</i>	the input array to be trimmed
<i>ppd</i>	the pixels-per-degree of the array
<i>nswe</i>	a 1x4 array of the desired [N, S, W, E] edges
<i>lat_npole</i>	the latitude of the N Pole in the same system as the given N, S, W, E values
<i>lon_offset</i>	the longitude of the prime meridian in the same system as the given N, S, W, E values

**Returns**

trimmed\_map: the input data trimmed to the desired edges

**5.44.1.6 wgs84\_distance()**

```
def skdaccess.utilities.map_util.wgs84_distance (
    point1,
    point2,
    planet = Planet("wgs84"),
    miles = False )
```

Vincenty distance adapted from public domain vincenty package.

Adapted from <https://github.com/maurycyp/vincenty>

```
Vincenty's formula (inverse method) to calculate the distance (in
kilometers or miles) between two points on the surface of a spheroid
>>> wgs84_distance((0.0, 0.0), (0.0, 0.0)) # coincident points
0.0
>>> wgs84_distance((0.0, 0.0), (0.0, 1.0))
111.319491
>>> wgs84_distance((0.0, 0.0), (1.0, 0.0))
110.574389
>>> wgs84_distance((0.0, 0.0), (0.5, 179.5)) # slow convergence
19936.288579
>>> wgs84_distance((0.0, 0.0), (0.5, 179.7)) # failure to converge
>>> boston = (42.3541165, -71.0693514)
>>> newyork = (40.7791472, -73.9680804)
>>> wgs84_distance(boston, newyork)
298.396057
>>> wgs84_distance(boston, newyork, miles=True)
185.414657
```

**Parameters**

<i>point1</i>	(lat1, lon1)
<i>point2</i>	(lat2, lon2)
<i>planet</i>	<a href="#">Planet</a> to perform the computation on
<i>miles</i>	Convert result to miles (default kilometers)

**Returns**

distance between point1 and point2

**5.45 skdaccess.utilities.modis\_util Namespace Reference****Classes**

- class [LatLon](#)

*Calculates Lat/Lon position from y,x pixel coordinate.*

## Functions

- def [getImageType](#) (in\_data)  
*Determine what type of modis data is being processed.*
- def [calibrateModis](#) (data, metadata)  
*This function calibrates input modis data.*
- def [gps2pixel](#) (gpsmethod, gps\_coord, bounds)  
*Function for finding the pixel coordinate associated with a gps coordinate.*
- def [rescale](#) (in\_array, max\_val=0.9, min\_val=-0.01)  
*This function rescales an image to fall between 0 and 1.*
- def [checkBit](#) (data, bit)  
*Get the bit value from a bit flag.*
- def [createGrid](#) (data, y\_start, y\_end, x\_start, x\_end, y\_grid, x\_grid, dtype, grid\_fill=np.nan)  
*Subsets image data into a smaller image.*
- def [getFileIDs](#) (modis\_identifier, start\_date, end\_date, lat, lon, daynightboth)  
*Retrieve file IDs for images matching search parameters.*
- def [getFileURLs](#) (file\_ids)  
*Retrieve the ftp location for a list of file IDs.*
- def [getModisData](#) (dataset, variable\_name)  
*Loads modis data.*
- def [readMODISData](#) (modis\_list, variables, grid, grid\_fill, use\_long\_name, platform, product\_id)  
*Retrieve a list of modis data.*

## 5.45.1 Function Documentation

### 5.45.1.1 [calibrateModis\(\)](#)

```
def skdaccess.utilities.modis_util.calibrateModis (
    data,
    metadata )
```

This function calibrates input modis data.

#### Parameters

<i>data</i>	Input modis data
<i>metadata</i>	Metadata associated with modis input data

**Returns**

calibrated modis data

**5.45.1.2 checkBit()**

```
def skdaccess.utilities.modis_util.checkBit (
    data,
    bit )
```

Get the bit value from a bit flag.

**Parameters**

<i>data</i>	Integer bit flag
<i>bit</i>	Which bit to select (start indexing at 0)

**Returns**

value of chosen bit in bit flag

**5.45.1.3 createGrid()**

```
def skdaccess.utilities.modis_util.createGrid (
    data,
    y_start,
    y_end,
    x_start,
    x_end,
    y_grid,
    x_grid,
    dtype,
    grid_fill = np.nan )
```

Subsets image data into a smaller image.

Takes care to make sure the resulting subsection has the expected size by filling in missing data

**Parameters**

<i>data</i>	Input data
<i>y_start</i>	Starting pixel for y
<i>y_end</i>	Ending pixel for y
<i>x_start</i>	Starting pixel x

**Parameters**

<i>x_end</i>	Ending pixel for x
<i>y_grid</i>	Grid size for y
<i>x_grid</i>	Grid size for x
<i>dtype</i>	The dtype of the new grid data
<i>grid↔ _fill</i>	Fill value to use when there is no data

**Returns**

image subsection, fraction of valid data

**5.45.1.4 getFileIDs()**

```
def skdaccess.utilities.modis_util.getFileIDs (
    modis_identifier,
    start_date,
    end_date,
    lat,
    lon,
    daynightboth )
```

Retrieve file IDs for images matching search parameters.

**Parameters**

<i>modis_identifier</i>	Product identifier (e.g. MOD09)
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>lat</i>	Latitude
<i>lon</i>	Longitude
<i>daynightboth</i>	Get daytime images ('D'), nighttime images ('N') or both ('B')

**Returns**

list of file IDs

**5.45.1.5 getFileURLs()**

```
def skdaccess.utilities.modis_util.getFileURLs (
    file_ids )
```



Retrieve the ftp location for a list of file IDs.

**Parameters**

<i>file_ids</i>	List of file IDs
-----------------	------------------

**Returns**

List of ftp locations

**5.45.1.6 getImageType()**

```
def skdaccess.utilities.modis_util.getImageType (  
    in_data )
```

Determine what type of modis data is being processed.

There are 3 array shapes we deal with:

```
mode 1 -> (y, x, z)  
mode 2 -> (y, x)  
mode 3 -> (z, y ,x)
```

where z axis represents different data products and y and x correspond to the y and x image coordinates from the modis instrument

**Parameters**

<i>in_data</i>	Input modis data
----------------	------------------

**Returns**

type of modis data

**5.45.1.7 getModisData()**

```
def skdaccess.utilities.modis_util.getModisData (  
    dataset,  
    variable_name )
```

Loads modis data.

## Parameters

<i>dataset</i>	netCDF4 dataset
<i>variable_name</i>	Name of variable to extract from dataset

## Returns

(modis\_data, metadata)

## 5.45.1.8 gps2pixel()

```
def skdaccess.utilities.modis_util.gps2pixel (
    gpsmethod,
    gps_coord,
    bounds )
```

Function for finding the pixel coordinate associated with a gps coordinate.

## Parameters

<i>gpsmethod</i>	GPS coordinate mapping function from above
<i>gps_coord</i>	GPS coordinate to match, as (lat,lon)
<i>bounds</i>	Pixel bounds to search within ((y_low,y_high),(x_low,x_high))

## Returns

Nearest integer pixel value

## 5.45.1.9 readMODISData()

```
def skdaccess.utilities.modis_util.readMODISData (
    modis_list,
    variables,
    grid,
    grid_fill,
    use_long_name,
    platform,
    product_id )
```

Retrieve a list of modis data.

## Parameters

<i>modis_list</i>	List of MODIS data to load
<i>variables</i>	List of variables in the MODIS data to load
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)
<i>grid_fill</i>	Fill value to use when creating gridded data
<i>use_long_name</i>	Use long names for metadata instead of variable name
<i>platform</i>	Which satellite to use, either MOD or MYD.
<i>product_id</i>	Product string (e.g. '06_L2')

5.45.1.10 `rescale()`

```
def skdaccess.utilities.modis_util.rescale (
    in_array,
    max_val = 0.9,
    min_val = -0.01 )
```

This function rescales an image to fall between 0 and 1.

## Parameters

<i>in_array</i>	Data to be rescaled
<i>max_val</i>	Values greater than or equal to max_val will become 1
<i>min_val</i>	Values less than or equal to min_val will become 0

## Returns

scaled data

5.46 `skdaccess.utilities.pbo_util` Namespace Reference

## Functions

- def [getStationCoords](#) (pbo\_info, station\_list)  
*Get the station coordinates for a list of stations.*
- def [getLatLonRange](#) (pbo\_info, station\_list)  
*Retrive the range of latitude and longitude occupied by a set of stations.*
- def [getROIstations](#) (geo\_point, radiusParam, data, header)  
*This function returns the 4ID station codes for the stations in a region.*
- def [stab\\_sys](#) (data\_iterator, metadata, stab\_min\_NE=.0005, stab\_min\_U=.005, sigsc=2, errProp=1)  
*Stabilize GPS data to a region.*
- def [propagateErrors](#) (R, sc, stationCovs)

*Propagate GPS errors.*

- def `nostab_sys` (allH, allD, timerng, indx=1, mdyratio=.7)

*Do not apply stabilization and simply returns stations after checking for sufficient amount of data.*

- def `removeAntennaOffset` (antenna\_offsets, data, window\_start=pd.to\_timedelta('4D'), window\_end=pd.to\_timedelta('4D'), min\_diff=0.005, debug=False)

*Remove offsets caused by changes in antennas.*

## 5.46.1 Function Documentation

### 5.46.1.1 getLatLonRange()

```
def skdaccess.utilities.pbo_util.getLatLonRange (
    pbo_info,
    station_list )
```

Retrive the range of latitude and longitude occupied by a set of stations.

#### Parameters

<i>pbo_info</i>	PBO Metadata
<i>station_list</i>	List of stations

#### Returns

list containg two tuples, lat\_range and lon\_range

### 5.46.1.2 getROIstations()

```
def skdaccess.utilities.pbo_util.getROIstations (
    geo_point,
    radiusParam,
    data,
    header )
```

This function returns the 4ID station codes for the stations in a region.

The region of interest is defined by the geographic coordinate and a window size

#### Parameters

<i>geo_point</i>	The geographic (lat,lon) coordinate of interest
<i>radiusParam</i>	An overloaded radius of interest [km] or latitude and longitude window [deg] around the geo_point
<i>data</i>	Stabilized (or unstabilized) data generated from the data fetcher or out of stab_sys
<i>header</i>	Header dictionary with stations metadata keyed by their 4ID code. This is output with the data.

**Returns**

`station_list`, list of site 4ID codes in the specified geographic region

**5.46.1.3 getStationCoords()**

```
def skdaccess.utilities.pbo_util.getStationCoords (
    pbo_info,
    station_list )
```

Get the station coordinates for a list of stations.

**Parameters**

<i>pbo_info</i>	PBO Metadata
<i>station_list</i>	List of stations

**Returns**

list of tuples containing lat, lon coordinates of stations

**5.46.1.4 nostab\_sys()**

```
def skdaccess.utilities.pbo_util.nostab_sys (
    allH,
    allD,
    timerng,
    indx = 1,
    mdyratio = .7 )
```

Do not apply stabilization and simply returns stations after checking for sufficient amount of data.

**Parameters**

<i>allH</i>	a dictionary of all of the headers of all sites loaded from the data directory
<i>allD</i>	a dictionary of all of the panda format data of all of the corresponding sites
<i>timerng</i>	an array with two string elements, describing the starting and ending dates
<i>indx</i>	a list of site 4ID's indicating stations in the relevant geographic location, or 1 for all sites
<i>mdyratio</i>	optional parameter for the minimum required ratio of data to determine if a site is kept for further analysis

**Returns**

smSet, a reduced size dictionary of the data (in meters) for the sites in the specified geographic region and smHdr, a reduced size dictionary of the headers for the sites in the region

**5.46.1.5 propagateErrors()**

```
def skdaccess.utilities.pbo_util.propagateErrors (
    R,
    sc,
    stationCovs )
```

Propagate GPS errors.

By writing out the  $R \cdot E \cdot R.T$  equations... to calculate the new covariance matrix without needing to form the matrix first as an intermediate step. Modifies covariance matrix in place

**Parameters**

<i>R</i>	Rotation matrix
<i>sc</i>	Scaling value
<i>stationCovs</i>	Station Covariances

**5.46.1.6 removeAntennaOffset()**

```
def skdaccess.utilities.pbo_util.removeAntennaOffset (
    antenna_offsets,
    data,
    window_start = pd.to_timedelta('4D'),
    window_end = pd.to_timedelta('4D'),
    min_diff = 0.005,
    debug = False )
```

Remove offsets caused by changes in antennas.

**Parameters**

<i>antenna_offsets</i>	Pandas series of dates describing when the antenna changes were made
<i>data</i>	Input GPS data
<i>window_start</i>	Starting time before and after event to use for calculating offset
<i>window_end</i>	Ending time before and after event to use before calculating offset
<i>min_diff</i>	Minimum difference before and after offset to for applying correction
<i>debug</i>	Enable debug output

**Returns**

GPS data with the offsets removed

**5.46.1.7 stab\_sys()**

```
def skdaccess.utilities.pbo_util.stab_sys (
    data_iterator,
    metadata,
    stab_min_NE = .0005,
    stab_min_U = .005,
    sigsc = 2,
    errProp = 1 )
```

Stabilize GPS data to a region.

The `stab_sys` function is a Python implementation of the Helmert 7-parameter transformation, used to correct for common mode error. This builds on Prof Herring's `stab_sys` function in his `tscon` Fortran code. It uses a SVD approach to estimating the rotation matrix gathered from 'Computing Helmert Transformations' by G.A. Watson as well as its references. Note that units should be in meters, that is in the format from the level 2 processed UNAVCO pos files

**Parameters**

<i>data_iterator</i>	Expects an iterator that returns label, pandas dataframe
<i>metadata</i>	Metadata that contains 'refXYZ' and 'refNEU'
<i>stab_min_NE</i>	Optional minimum horizontal covariance parameter
<i>stab_min_U</i>	Optional minimum vertical covariance parameter
<i>sigsc</i>	Optional scaling factor for determining cutoff bounds for non stable sites
<i>errProp</i>	Propagate errors through the transformation

**Returns**

`smSet`, a reduced size dictionary of the data (in mm) for the sites in the specified geographic region, `smHdr`, a reduced size dictionary of the headers for the sites in the region



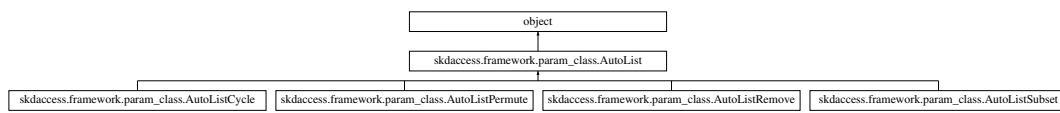
## Chapter 6

# Class Documentation

### 6.1 skdaccess.framework.param\_class.AutoList Class Reference

Specifies a list for returning selections of lists, as opposed to a single element.

Inheritance diagram for skdaccess.framework.param\_class.AutoList:



#### Public Member Functions

- def `__init__` (self, `val_list`)  
*Construct a `AutoList` object.*
- def `val` (self)  
*Retrieves current list of parameters.*
- def `perturb` (self)  
*This class doesn't change the list when being perturbed.*
- def `reset` (self)  
*Reset current list to initial list.*
- def `getAllOptions` (self)  
*Get all possible options.*
- def `__str__` (self)  
*String representation of class.*
- def `__len__` (self)  
*Retrieves the length of parameters contained in the list.*
- def `__getitem__` (self, ii)  
*Retrieves item from list.*
- def `__setitem__` (self, ii, `val`)  
*Set a value in the list.*
- def `__call__` (self)  
*Retrieve current list.*

## Public Attributes

- [val\\_init](#)
- [val\\_list](#)

### 6.1.1 Detailed Description

Specifies a list for returning selections of lists, as opposed to a single element.

### 6.1.2 Constructor & Destructor Documentation

#### 6.1.2.1 `__init__()`

```
def skdaccess.framework.param_class.AutoList.__init__ (
    self,
    val_list )
```

Construct a [AutoList](#) object.

#### Parameters

<i>val_list</i>	List of parameters
-----------------	--------------------

### 6.1.3 Member Function Documentation

#### 6.1.3.1 `__call__()`

```
def skdaccess.framework.param_class.AutoList.__call__ (
    self )
```

Retrieve current list.

#### Returns

Current list

### 6.1.3.2 `__getitem__()`

```
def skdaccess.framework.param_class.AutoList.__getitem__ (
    self,
    ii )
```

Retrieves item from list.

#### Parameters

<i>ii</i>	Index of item to be retrieved
-----------	-------------------------------

#### Returns

Item at index *ii*

### 6.1.3.3 `__len__()`

```
def skdaccess.framework.param_class.AutoList.__len__ (
    self )
```

Retrieves the length of parameters contained in the list.

#### Returns

Number of elements in the list

### 6.1.3.4 `__setitem__()`

```
def skdaccess.framework.param_class.AutoList.__setitem__ (
    self,
    ii,
    val )
```

Set a value in the list.

#### Parameters

<i>ii</i>	Index of list to be set
<i>val</i>	Input value

#### 6.1.3.5 `__str__()`

```
def skdaccess.framework.param_class.AutoList.__str__ (
    self )
```

String representation of class.

##### Returns

String containing all parameters in list

#### 6.1.3.6 `getAllOptions()`

```
def skdaccess.framework.param_class.AutoList.getAllOptions (
    self )
```

Get all possible options.

##### Returns

List that contains every option that could possibly be selected

#### 6.1.3.7 `perturb()`

```
def skdaccess.framework.param_class.AutoList.perturb (
    self )
```

This class doesn't change the list when being perturbed.

#### 6.1.3.8 `reset()`

```
def skdaccess.framework.param_class.AutoList.reset (
    self )
```

Reset current list to initial list.

### 6.1.3.9 val()

```
def skdaccess.framework.param_class.AutoList.val (
    self )
```

Retrieves current list of parameters.

#### Returns

List of current parameters

## 6.1.4 Member Data Documentation

### 6.1.4.1 val\_init

```
skdaccess.framework.param_class.AutoList.val_init
```

### 6.1.4.2 val\_list

```
skdaccess.framework.param_class.AutoList.val_list
```

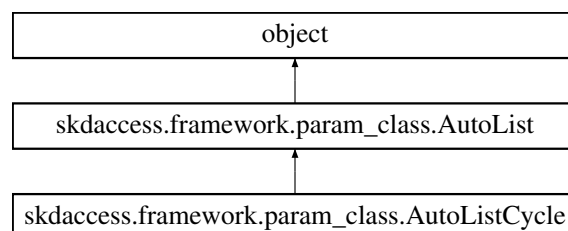
The documentation for this class was generated from the following file:

- framework/[param\\_class.py](#)

## 6.2 skdaccess.framework.param\_class.AutoListCycle Class Reference

An Autolist that cycles through different lists.

Inheritance diagram for skdaccess.framework.param\_class.AutoListCycle:



## Public Member Functions

- def `__init__` (self, `list_val_list`)  
*Construct a `AutoList_Cycle` object.*
- def `perturb` (self)  
*Select next list from list of lists.*
- def `reset` (self)  
*Resets to the first list in the list of lists.*
- def `getAllOptions` (self)  
*Get elements that could possibly be called.*
- def `val` (self)  
*Retrieves current list of parameters.*
- def `__str__` (self)  
*String representation of class.*
- def `__len__` (self)  
*Retrieves the length of parameters contained in the list.*
- def `__getitem__` (self, ii)  
*Retrieves item from list.*
- def `__setitem__` (self, ii, `val`)  
*Set a value in the list.*
- def `__call__` (self)  
*Retrieve current list.*

## Public Attributes

- `list_val_list`
- `val_list`
- `index`
- `val_init`

### 6.2.1 Detailed Description

An Autolist that cycles through different lists.

### 6.2.2 Constructor & Destructor Documentation

#### 6.2.2.1 `__init__()`

```
def skdaccess.framework.param_class.AutoListCycle.__init__ (
    self,
    list_val_list )
```

Construct a `AutoList_Cycle` object.

**Parameters**

<i>list_val_list</i>	List of different lists to cycle through
----------------------	--

**6.2.3 Member Function Documentation****6.2.3.1 \_\_call\_\_()**

```
def skdaccess.framework.param_class.AutoList.__call__ (
    self ) [inherited]
```

Retrieve current list.

**Returns**

Current list

**6.2.3.2 \_\_getitem\_\_()**

```
def skdaccess.framework.param_class.AutoList.__getitem__ (
    self,
    ii ) [inherited]
```

Retrieves item from list.

**Parameters**

<i>ii</i>	Index of item to be retrieved
-----------	-------------------------------

**Returns**

Item at index ii

**6.2.3.3 \_\_len\_\_()**

```
def skdaccess.framework.param_class.AutoList.__len__ (
    self ) [inherited]
```

Retrieves the length of parameters contained in the list.

**Returns**

Number of elements in the list

**6.2.3.4 \_\_setitem\_\_()**

```
def skdaccess.framework.param_class.AutoList.__setitem__ (
    self,
    ii,
    val ) [inherited]
```

Set a value in the list.

**Parameters**

<i>ii</i>	Index of list to be set
<i>val</i>	Input value

**6.2.3.5 \_\_str\_\_()**

```
def skdaccess.framework.param_class.AutoList.__str__ (
    self ) [inherited]
```

String representation of class.

**Returns**

String containing all parmaters in list

**6.2.3.6 getAllOptions()**

```
def skdaccess.framework.param_class.AutoListCycle.getAllOptions (
    self )
```

Get elements that could possibly be called.

**Returns**

List of all possible elements



### 6.2.3.7 perturb()

```
def skdaccess.framework.param_class.AutoListCycle.perturb (
    self )
```

Select next list from list of lists.

### 6.2.3.8 reset()

```
def skdaccess.framework.param_class.AutoListCycle.reset (
    self )
```

Resets to the first list in the list of lists.

### 6.2.3.9 val()

```
def skdaccess.framework.param_class.AutoList.val (
    self ) [inherited]
```

Retrieves current list of parameters.

#### Returns

List of current parameters

## 6.2.4 Member Data Documentation

### 6.2.4.1 index

```
skdaccess.framework.param_class.AutoListCycle.index
```

### 6.2.4.2 list\_val\_list

```
skdaccess.framework.param_class.AutoListCycle.list_val_list
```

#### 6.2.4.3 val\_init

`skdaccess.framework.param_class.AutoList.val_init` [inherited]

#### 6.2.4.4 val\_list

`skdaccess.framework.param_class.AutoListCycle.val_list`

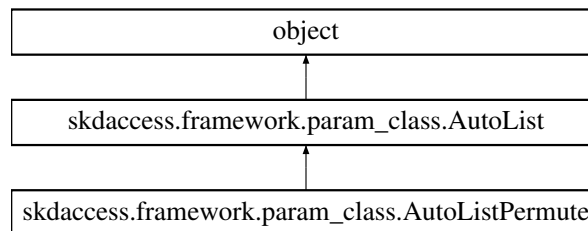
The documentation for this class was generated from the following file:

- [framework/param\\_class.py](#)

## 6.3 skdaccess.framework.param\_class.AutoListPermute Class Reference

A perturber that permutes a list.

Inheritance diagram for `skdaccess.framework.param_class.AutoListPermute`:



### Public Member Functions

- `def perturb (self)`  
*Randomly permutes the initial list.*
- `def val (self)`  
*Retrieves current list of parameters.*
- `def reset (self)`  
*Reset current list to initial list.*
- `def getAllOptions (self)`  
*Get all possible options.*
- `def __str__ (self)`  
*String representation of class.*
- `def __len__ (self)`  
*Retrieves the length of parameters contained in the list.*
- `def __getitem__ (self, ii)`  
*Retrieves item from list.*
- `def __setitem__ (self, ii, val)`  
*Set a value in the list.*
- `def __call__ (self)`  
*Retrieve current list.*

## Public Attributes

- [val\\_init](#)
- [val\\_list](#)

### 6.3.1 Detailed Description

A perturber that permutes a list.

### 6.3.2 Member Function Documentation

#### 6.3.2.1 `__call__()`

```
def skdaccess.framework.param_class.AutoList.__call__ (
    self ) [inherited]
```

Retrieve current list.

#### Returns

Current list

#### 6.3.2.2 `__getitem__()`

```
def skdaccess.framework.param_class.AutoList.__getitem__ (
    self,
    ii ) [inherited]
```

Retrieves item from list.

#### Parameters

<i>ii</i>	Index of item to be retrieved
-----------	-------------------------------

#### Returns

Item at index ii

#### 6.3.2.3 `__len__()`

```
def skdaccess.framework.param_class.AutoList.__len__ (
    self ) [inherited]
```

Retrieves the length of parameters contained in the list.

##### Returns

Number of elements in the list

#### 6.3.2.4 `__setitem__()`

```
def skdaccess.framework.param_class.AutoList.__setitem__ (
    self,
    ii,
    val ) [inherited]
```

Set a value in the list.

##### Parameters

<i>ii</i>	Index of list to be set
<i>val</i>	Input value

#### 6.3.2.5 `__str__()`

```
def skdaccess.framework.param_class.AutoList.__str__ (
    self ) [inherited]
```

String representation of class.

##### Returns

String containing all parmaters in list

#### 6.3.2.6 getAllOptions()

```
def skdaccess.framework.param_class.AutoList.getAllOptions (
    self ) [inherited]
```

Get all possible options.

##### Returns

List that contains every option that could possibly be selected

#### 6.3.2.7 perturb()

```
def skdaccess.framework.param_class.AutoListPermute.perturb (
    self )
```

Randomly permutes the initial list.

#### 6.3.2.8 reset()

```
def skdaccess.framework.param_class.AutoList.reset (
    self ) [inherited]
```

Reset current list to initial list.

#### 6.3.2.9 val()

```
def skdaccess.framework.param_class.AutoList.val (
    self ) [inherited]
```

Retrieves current list of parameters.

##### Returns

List of current parameters

### 6.3.3 Member Data Documentation

### 6.3.3.1 val\_init

`skdaccess.framework.param_class.AutoList.val_init` [inherited]

### 6.3.3.2 val\_list

`skdaccess.framework.param_class.AutoList.val_list` [inherited]

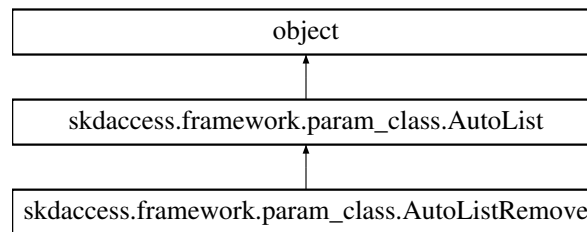
The documentation for this class was generated from the following file:

- [framework/param\\_class.py](#)

## 6.4 skdaccess.framework.param\_class.AutoListRemove Class Reference

Removes a different single element from the initial list at each perturb call.

Inheritance diagram for `skdaccess.framework.param_class.AutoListRemove`:



### Public Member Functions

- `def __init__(self, val_list)`  
*Construct a AutoList\_Cycle object.*
- `def perturb(self)`  
*Systematically change which item is absent from the list.*
- `def reset(self)`  
*Reset the list to its initial value.*
- `def val(self)`  
*Retrieves current list of parameters.*
- `def getAllOptions(self)`  
*Get all possible options.*
- `def __str__(self)`  
*String representation of class.*
- `def __len__(self)`  
*Retrieves the length of parameters contained in the list.*
- `def __getitem__(self, ii)`  
*Retrieves item from list.*
- `def __setitem__(self, ii, val)`  
*Set a value in the list.*
- `def __call__(self)`  
*Retrieve current list.*

## Public Attributes

- `n`
- `val_list`
- `val_init`

### 6.4.1 Detailed Description

Removes a different single element from the initial list at each perturb call.

### 6.4.2 Constructor & Destructor Documentation

#### 6.4.2.1 `__init__()`

```
def skdaccess.framework.param_class.AutoListRemove.__init__ (
    self,
    val_list )
```

Construct a AutoList\_Cycle object.

#### Parameters

<code>val_list</code>	Initial list of parameters.
-----------------------	-----------------------------

### 6.4.3 Member Function Documentation

#### 6.4.3.1 `__call__()`

```
def skdaccess.framework.param_class.AutoList.__call__ (
    self ) [inherited]
```

Retrieve current list.

#### Returns

Current list

#### 6.4.3.2 `__getitem__()`

```
def skdaccess.framework.param_class.AutoList.__getitem__ (
    self,
    ii ) [inherited]
```

Retrieves item from list.

##### Parameters

<i>ii</i>	Index of item to be retrieved
-----------	-------------------------------

##### Returns

Item at index *ii*

#### 6.4.3.3 `__len__()`

```
def skdaccess.framework.param_class.AutoList.__len__ (
    self ) [inherited]
```

Retrieves the length of parameters contained in the list.

##### Returns

Number of elements in the list

#### 6.4.3.4 `__setitem__()`

```
def skdaccess.framework.param_class.AutoList.__setitem__ (
    self,
    ii,
    val ) [inherited]
```

Set a value in the list.

##### Parameters

<i>ii</i>	Index of list to be set
<i>val</i>	Input value



#### 6.4.3.5 `__str__()`

```
def skdaccess.framework.param_class.AutoList.__str__ (
    self ) [inherited]
```

String representation of class.

##### Returns

String containing all parameters in list

#### 6.4.3.6 `getAllOptions()`

```
def skdaccess.framework.param_class.AutoList.getAllOptions (
    self ) [inherited]
```

Get all possible options.

##### Returns

List that contains every option that could possibly be selected

#### 6.4.3.7 `perturb()`

```
def skdaccess.framework.param_class.AutoListRemove.perturb (
    self )
```

Systematically change which item is absent from the list.

#### 6.4.3.8 `reset()`

```
def skdaccess.framework.param_class.AutoListRemove.reset (
    self )
```

Reset the list to its initial value.

#### 6.4.3.9 val()

```
def skdaccess.framework.param_class.AutoList.val (
    self ) [inherited]
```

Retrieves current list of parameters.

#### Returns

List of current parameters

### 6.4.4 Member Data Documentation

#### 6.4.4.1 n

```
skdaccess.framework.param_class.AutoListRemove.n
```

#### 6.4.4.2 val\_init

```
skdaccess.framework.param_class.AutoList.val_init [inherited]
```

#### 6.4.4.3 val\_list

```
skdaccess.framework.param_class.AutoListRemove.val_list
```

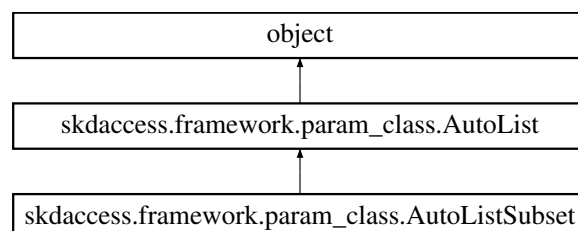
The documentation for this class was generated from the following file:

- [framework/param\\_class.py](#)

## 6.5 skdaccess.framework.param\_class.AutoListSubset Class Reference

An [AutoList](#) perturber that creates random subsets of a list.

Inheritance diagram for skdaccess.framework.param\_class.AutoListSubset:



## Public Member Functions

- def [perturb](#) (self)  
*Perturb the list by selecting a random subset of the initial list.*
- def [val](#) (self)  
*Retrieves current list of parameters.*
- def [reset](#) (self)  
*Reset current list to initial list.*
- def [getAllOptions](#) (self)  
*Get all possible options.*
- def [\\_\\_str\\_\\_](#) (self)  
*String representation of class.*
- def [\\_\\_len\\_\\_](#) (self)  
*Retrieves the length of parameters contained in the list.*
- def [\\_\\_getitem\\_\\_](#) (self, ii)  
*Retrieves item from list.*
- def [\\_\\_setitem\\_\\_](#) (self, ii, [val](#))  
*Set a value in the list.*
- def [\\_\\_call\\_\\_](#) (self)  
*Retrieve current list.*

## Public Attributes

- [val\\_list](#)
- [val\\_init](#)

### 6.5.1 Detailed Description

An [AutoList](#) perturber that creates random subsets of a list.

List can be empty

### 6.5.2 Member Function Documentation

#### 6.5.2.1 [\\_\\_call\\_\\_](#)()

```
def skdaccess.framework.param_class.AutoList.__call__ (
    self ) [inherited]
```

Retrieve current list.

#### Returns

Current list

### 6.5.2.2 `__getitem__()`

```
def skdaccess.framework.param_class.AutoList.__getitem__ (
    self,
    ii ) [inherited]
```

Retrieves item from list.

#### Parameters

<i>ii</i>	Index of item to be retrieved
-----------	-------------------------------

#### Returns

Item at index ii

### 6.5.2.3 `__len__()`

```
def skdaccess.framework.param_class.AutoList.__len__ (
    self ) [inherited]
```

Retrieves the length of parameters contained in the list.

#### Returns

Number of elements in the list

### 6.5.2.4 `__setitem__()`

```
def skdaccess.framework.param_class.AutoList.__setitem__ (
    self,
    ii,
    val ) [inherited]
```

Set a value in the list.

#### Parameters

<i>ii</i>	Index of list to be set
<i>val</i>	Input value

#### 6.5.2.5 `__str__()`

```
def skdaccess.framework.param_class.AutoList.__str__ (
    self ) [inherited]
```

String representation of class.

##### Returns

String containing all parameters in list

#### 6.5.2.6 `getAllOptions()`

```
def skdaccess.framework.param_class.AutoList.getAllOptions (
    self ) [inherited]
```

Get all possible options.

##### Returns

List that contains every option that could possibly be selected

#### 6.5.2.7 `perturb()`

```
def skdaccess.framework.param_class.AutoListSubset.perturb (
    self )
```

Perturb the list by selecting a random subset of the initial list.

#### 6.5.2.8 `reset()`

```
def skdaccess.framework.param_class.AutoList.reset (
    self ) [inherited]
```

Reset current list to initial list.

### 6.5.2.9 val()

```
def skdaccess.framework.param_class.AutoList.val (
    self ) [inherited]
```

Retrieves current list of parameters.

#### Returns

List of current parameters

## 6.5.3 Member Data Documentation

### 6.5.3.1 val\_init

```
skdaccess.framework.param_class.AutoList.val_init [inherited]
```

### 6.5.3.2 val\_list

```
skdaccess.framework.param_class.AutoListSubset.val_list
```

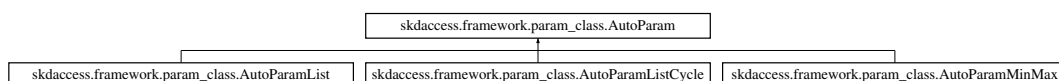
The documentation for this class was generated from the following file:

- [framework/param\\_class.py](#)

## 6.6 skdaccess.framework.param\_class.AutoParam Class Reference

Defines a tunable parameter class inherited by specific subclasses.

Inheritance diagram for skdaccess.framework.param\_class.AutoParam:



## Public Member Functions

- def `__init__` (self, `val_init`)  
*Initialize an [AutoParam](#) object.*
- def `perturb` (self)  
*Perturb paramter.*
- def `reset` (self)  
*Reset value to initial value.*
- def `__str__` (self)  
*String representation of class.*
- def `__call__` (self)  
*Retrieves current value of the parameter.*

## Public Attributes

- `val`
- `val_init`

### 6.6.1 Detailed Description

Defines a tunable parameter class inherited by specific subclasses.

[AutoParam](#) class and subclass work on a single value. functions perturb value and reset to initial value

### 6.6.2 Constructor & Destructor Documentation

#### 6.6.2.1 `__init__()`

```
def skdaccess.framework.param_class.AutoParam.__init__ (
    self,
    val_init )
```

Initialize an [AutoParam](#) object.

#### Parameters

<code>val_init</code>	Value for parameter
-----------------------	---------------------

### 6.6.3 Member Function Documentation

#### 6.6.3.1 `__call__()`

```
def skdaccess.framework.param_class.AutoParam.__call__ (
    self )
```

Retrieves current value of the parameter.

##### Returns

Current value of the parameter

#### 6.6.3.2 `__str__()`

```
def skdaccess.framework.param_class.AutoParam.__str__ (
    self )
```

String representation of class.

##### Returns

String of current value

#### 6.6.3.3 `perturb()`

```
def skdaccess.framework.param_class.AutoParam.perturb (
    self )
```

Perturb paramter.

This class doesn't change the value.

#### 6.6.3.4 `reset()`

```
def skdaccess.framework.param_class.AutoParam.reset (
    self )
```

Reset value to initial value.



## 6.6.4 Member Data Documentation

### 6.6.4.1 val

`skdaccess.framework.param_class.AutoParam.val`

### 6.6.4.2 val\_init

`skdaccess.framework.param_class.AutoParam.val_init`

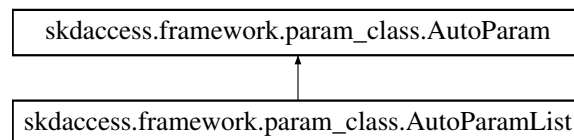
The documentation for this class was generated from the following file:

- [framework/param\\_class.py](#)

## 6.7 skdaccess.framework.param\_class.AutoParamList Class Reference

A tunable parameter with a specified list of choices that can be randomly selected via perturb.

Inheritance diagram for `skdaccess.framework.param_class.AutoParamList`:



### Public Member Functions

- `def __init__(self, val_init, val_list)`  
*Construct an [AutoParamList](#) object.*
- `def perturb(self)`  
*Randomly select a value from `val_list`.*
- `def reset(self)`  
*Reset the list to the default value.*
- `def __str__(self)`  
*String representation of class.*
- `def __call__(self)`  
*Retrieves current value of the parameter.*

## Public Attributes

- [val](#)
- [val\\_init](#)
- [val\\_list](#)

### 6.7.1 Detailed Description

A tunable parameter with a specified list of choices that can be randomly selected via perturb.

### 6.7.2 Constructor & Destructor Documentation

#### 6.7.2.1 `__init__()`

```
def skdaccess.framework.param_class.AutoParamList.__init__ (
    self,
    val_init,
    val_list )
```

Construct an [AutoParamList](#) object.

#### Parameters

<i>val_init</i>	initial value for the parameter
<i>val_list</i>	List of possible variants for the parameter

### 6.7.3 Member Function Documentation

#### 6.7.3.1 `__call__()`

```
def skdaccess.framework.param_class.AutoParam.__call__ (
    self ) [inherited]
```

Retrieves current value of the parameter.

#### Returns

Current value of the parameter

### 6.7.3.2 \_\_str\_\_()

```
def skdaccess.framework.param_class.AutoParam.__str__ (
    self ) [inherited]
```

String representation of class.

#### Returns

String of current value

### 6.7.3.3 perturb()

```
def skdaccess.framework.param_class.AutoParamList.perturb (
    self )
```

Randomly select a value from val\_list.

### 6.7.3.4 reset()

```
def skdaccess.framework.param_class.AutoParamList.reset (
    self )
```

Reset the list to the default value.

## 6.7.4 Member Data Documentation

### 6.7.4.1 val

```
skdaccess.framework.param_class.AutoParamList.val
```

### 6.7.4.2 val\_init

```
skdaccess.framework.param_class.AutoParamList.val_init
```

### 6.7.4.3 val\_list

`skdaccess.framework.param_class.AutoParamList.val_list`

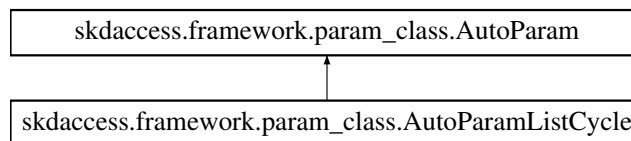
The documentation for this class was generated from the following file:

- [framework/param\\_class.py](#)

## 6.8 skdaccess.framework.param\_class.AutoParamListCycle Class Reference

Cycles through a list of paramters.

Inheritance diagram for `skdaccess.framework.param_class.AutoParamListCycle`:



### Public Member Functions

- `def __init__(self, val_list)`  
*Construct an [AutoParamListCycle](#).*
- `def perturb(self)`  
*Select the next value from the list of parameters.*
- `def reset(self)`  
*Reset the list to the default values.*
- `def __str__(self)`  
*String representation of class.*
- `def __call__(self)`  
*Retrieves current value of the parameter.*

### Public Attributes

- `val`
- `val_list`
- `current_index`
- `val_init`

### 6.8.1 Detailed Description

Cycles through a list of paramters.

## 6.8.2 Constructor & Destructor Documentation

### 6.8.2.1 \_\_init\_\_()

```
def skdaccess.framework.param_class.AutoParamListCycle.__init__ (
    self,
    val_list )
```

Construct an [AutoParamListCycle](#).

#### Parameters

<i>val_list</i>	List of possible variants for the parameter
-----------------	---

## 6.8.3 Member Function Documentation

### 6.8.3.1 \_\_call\_\_()

```
def skdaccess.framework.param_class.AutoParam.__call__ (
    self ) [inherited]
```

Retrieves current value of the parameter.

#### Returns

Current value of the parameter

### 6.8.3.2 \_\_str\_\_()

```
def skdaccess.framework.param_class.AutoParam.__str__ (
    self ) [inherited]
```

String representation of class.

#### Returns

String of current value

#### 6.8.3.3 perturb()

```
def skdaccess.framework.param_class.AutoParamListCycle.perturb (
    self )
```

Select the next value from the list of parameters.

#### 6.8.3.4 reset()

```
def skdaccess.framework.param_class.AutoParamListCycle.reset (
    self )
```

Reset the list to the default values.

### 6.8.4 Member Data Documentation

#### 6.8.4.1 current\_index

```
skdaccess.framework.param_class.AutoParamListCycle.current_index
```

#### 6.8.4.2 val

```
skdaccess.framework.param_class.AutoParamListCycle.val
```

#### 6.8.4.3 val\_init

```
skdaccess.framework.param_class.AutoParam.val_init [inherited]
```

#### 6.8.4.4 val\_list

```
skdaccess.framework.param_class.AutoParamListCycle.val_list
```

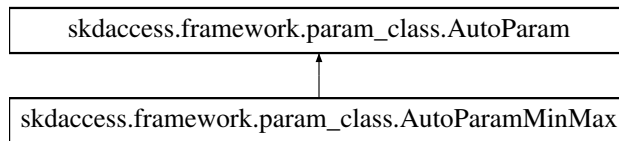
The documentation for this class was generated from the following file:

- framework/[param\\_class.py](#)

## 6.9 skdaccess.framework.param\_class.AutoParamMinMax Class Reference

A tunable parameter with min and max ranges, perturbs to a random value in range.

Inheritance diagram for skdaccess.framework.param\_class.AutoParamMinMax:



### Public Member Functions

- def `__init__` (self, `val_init`, `val_min`, `val_max`, `decimals`=0, `extreme`=0)  
*Construct `AutoParamMinMax` object.*
- def `perturb` (self)  
*Perturb the parameter by choosing a random value between `val_min` and `val_max`.*
- def `reset` (self)  
*Reset to initial value.*
- def `__str__` (self)  
*String representation of class.*
- def `__call__` (self)  
*Retrieves current value of the parameter.*

### Public Attributes

- `val`
- `val_init`
- `val_min`
- `val_max`
- `n`
- `n_max`
- `decimals`

#### 6.9.1 Detailed Description

A tunable parameter with min and max ranges, perturbs to a random value in range.

It can optionally choose either the min or the max after `n` perturbs

#### 6.9.2 Constructor & Destructor Documentation

### 6.9.2.1 `__init__()`

```
def skdaccess.framework.param_class.AutoParamMinMax.__init__ (
    self,
    val_init,
    val_min,
    val_max,
    decimals = 0,
    extreme = 0 )
```

Construct [AutoParamMinMax](#) object.

#### Parameters

<i>val_init</i>	Initial value for parameter
<i>val_min</i>	Minimum value for param
<i>val_max</i>	Maximum value for parameter
<i>decimals</i>	Number of decimals to include in the random number
<i>extreme</i>	Either the maximum or minimum is chosen every extreme number of iterations. Using a value of one will be an extreme value every time. Using a value of zero will always choose a random value.

## 6.9.3 Member Function Documentation

### 6.9.3.1 `__call__()`

```
def skdaccess.framework.param_class.AutoParam.__call__ (
    self ) [inherited]
```

Retrieves current value of the parameter.

#### Returns

Current value of the parameter

### 6.9.3.2 `__str__()`

```
def skdaccess.framework.param_class.AutoParam.__str__ (
    self ) [inherited]
```

String representation of class.

#### Returns

String of current value



### 6.9.3.3 perturb()

```
def skdaccess.framework.param_class.AutoParamMinMax.perturb (
    self )
```

Perturb the parameter by choosing a random value between val\_min and val\_max.

Will choose a random number with precision specified by decimals. Will optionally pick the min or the max value after a specified number of perturb calls

### 6.9.3.4 reset()

```
def skdaccess.framework.param_class.AutoParamMinMax.reset (
    self )
```

Reset to initial value.

## 6.9.4 Member Data Documentation

### 6.9.4.1 decimals

```
skdaccess.framework.param_class.AutoParamMinMax.decimals
```

### 6.9.4.2 n

```
skdaccess.framework.param_class.AutoParamMinMax.n
```

### 6.9.4.3 n\_max

```
skdaccess.framework.param_class.AutoParamMinMax.n_max
```

### 6.9.4.4 val

```
skdaccess.framework.param_class.AutoParamMinMax.val
```

#### 6.9.4.5 val\_init

```
skdaccess.framework.param_class.AutoParamMinMax.val_init
```

#### 6.9.4.6 val\_max

```
skdaccess.framework.param_class.AutoParamMinMax.val_max
```

#### 6.9.4.7 val\_min

```
skdaccess.framework.param_class.AutoParamMinMax.val_min
```

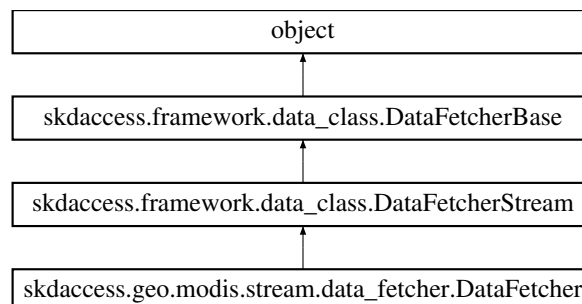
The documentation for this class was generated from the following file:

- framework/[param\\_class.py](#)

## 6.10 skdaccess.geo.modis.stream.DataFetcher Class Reference

Data Fetcher for MODIS data.

Inheritance diagram for skdaccess.geo.modis.stream.DataFetcher:



## Public Member Functions

- `def __init__ (self, ap_paramList, modis_platform, modis_id, variable_list, start_date, end_date, daynightboth='D', grid=None, grid_fill=np.nan, use_long_name=False)`  
*Construct Data Fetcher object.*
- `def output (self)`  
*Generate data wrapper.*
- `def retrieveOnlineData (self, data_specification)`  
*Abstract class for downloading data into memory.*
- `def multirun_enabled (self)`  
*Returns whether or not this data fetcher is multirun enabled.*
- `def perturb (self)`  
*Perturb parameters.*
- `def reset (self)`  
*Set all parameters to initial value.*
- `def __str__ (self)`  
*Generate string description.*
- `def getMetadata (self)`  
*Return metadata about Data Fetcher.*
- `def getConfig ()`  
*Retrieve skdaccess configuration.*
- `def writeConfig (conf)`  
*Write config to disk.*

## Public Attributes

- `modis_id`
- `variable_list`
- `start_date`
- `end_date`
- `daynightboth`
- `grid`
- `grid_fill`
- `use_long_name`
- `modis_platform`
- `modis_identifier`
- `ap_paramList`

### 6.10.1 Detailed Description

Data Fetcher for MODIS data.

### 6.10.2 Constructor & Destructor Documentation

### 6.10.2.1 `__init__()`

```
def skdaccess.geo.modis.stream.DataFetcher.__init__ (
    self,
    ap_paramList,
    modis_platform,
    modis_id,
    variable_list,
    start_date,
    end_date,
    daynightboth = 'D',
    grid = None,
    grid_fill = np.nan,
    use_long_name = False )
```

Construct Data Fetcher object.

#### Parameters

<i>ap_paramList[lat]</i>	Search latitude
<i>ap_paramList[lon]</i>	Search longitude
<i>modis_platform</i>	Platform (Either "Terra" or "Aqua")
<i>modis_id</i>	Product string (e.g. '06_L2')
<i>variable_list</i>	List of variables to fetch
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>daynightboth</i>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)
<i>grid_fill</i>	Fill value to use when creating gridded data
<i>use_long_name</i>	Use long names for metadata instead of variable name

## 6.10.3 Member Function Documentation

### 6.10.3.1 `__str__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

### 6.10.3.2 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

#### Returns

configParser.ConfigParser object of configuration

### 6.10.3.3 getMetadata()

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

#### Returns

metadata of object.

### 6.10.3.4 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherStream.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

#### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

### 6.10.3.5 output()

```
def skdaccess.geo.modis.stream.DataFetcher.output (
    self )
```

Generate data wrapper.

#### Returns

data wrapper of MODIS data

#### 6.10.3.6 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.10.3.7 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.10.3.8 retrieveOnlineData()

```
def skdaccess.framework.data_class.DataFetcherStream.retrieveOnlineData (
    self,
    data_specification ) [inherited]
```

Abstract class for downloading data into memory.

##### Parameters

<i>data_specification</i>	Data to be retrieved
---------------------------	----------------------

##### Returns

Retrieved data

#### 6.10.3.9 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

##### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.10.4 Member Data Documentation

### 6.10.4.1 ap\_paramList

skdaccess.framework.data\_class.DataFetcherBase.ap\_paramList [inherited]

### 6.10.4.2 daynightboth

skdaccess.geo.modis.stream.DataFetcher.daynightboth

### 6.10.4.3 end\_date

skdaccess.geo.modis.stream.DataFetcher.end\_date

### 6.10.4.4 grid

skdaccess.geo.modis.stream.DataFetcher.grid

### 6.10.4.5 grid\_fill

skdaccess.geo.modis.stream.DataFetcher.grid\_fill

### 6.10.4.6 modis\_id

skdaccess.geo.modis.stream.DataFetcher.modis\_id

#### 6.10.4.7 modis\_identifier

`skdaccess.geo.modis.stream.DataFetcher.modis_identifier`

#### 6.10.4.8 modis\_platform

`skdaccess.geo.modis.stream.DataFetcher.modis_platform`

#### 6.10.4.9 start\_date

`skdaccess.geo.modis.stream.DataFetcher.start_date`

#### 6.10.4.10 use\_long\_name

`skdaccess.geo.modis.stream.DataFetcher.use_long_name`

#### 6.10.4.11 variable\_list

`skdaccess.geo.modis.stream.DataFetcher.variable_list`

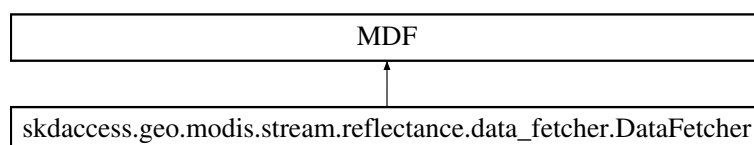
The documentation for this class was generated from the following file:

- `geo/modis/stream/data_fetcher.py`

## 6.11 skdaccess.geo.modis.stream.reflectance.DataFetcher Class Reference

Data fetcher for the modis surface reflectance product ('09', 1 km resolution)

Inheritance diagram for `skdaccess.geo.modis.stream.reflectance.DataFetcher`:





## Public Member Functions

- `def __init__(self, ap_paramList, start_date, end_date, modis_platform='Terra', daynightboth='D', grid=None, bands=[1])`

*Construct Data Fetcher for MODIS 1km surface reflectance.*

### 6.11.1 Detailed Description

Data fetcher for the modis surface reflectance product ('09', 1 km resolution)

### 6.11.2 Constructor & Destructor Documentation

#### 6.11.2.1 \_\_init\_\_()

```
def skdaccess.geo.modis.stream.reflectance.DataFetcher.__init__(
    self,
    ap_paramList,
    start_date,
    end_date,
    modis_platform = 'Terra',
    daynightboth = 'D',
    grid = None,
    bands = [1])
```

Construct Data Fetcher for MODIS 1km surface reflectance.

#### Parameters

<code>ap_paramList[lat]</code>	Search latitude
<code>ap_paramList[lon]</code>	Search longitude
<code>start_date</code>	Starting date
<code>end_date</code>	Ending date
<code>modis_platform</code>	Platform (Either "Terra" or "Aqua")
<code>daynightboth</code>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<code>grid</code>	Further divide each image into a multiple grids of size (y,x)
<code>bands</code>	List of modis bands to retrieve

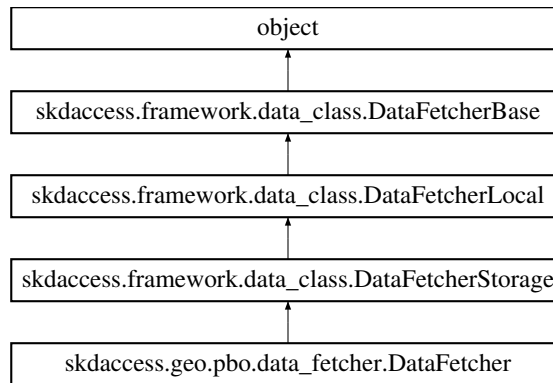
The documentation for this class was generated from the following file:

- `geo/modis/stream/reflectance/data_fetcher.py`

## 6.12 skdaccess.geo.pbo.DataFetcher Class Reference

Data fetcher for PBO GPS data.

Inheritance diagram for skdaccess.geo.pbo.DataFetcher:



### Public Member Functions

- def `__init__` (self, start\_time, end\_time, [ap\\_paramList](#), mdyratio=.5, [default\\_columns](#)=['dN', dE, dU, [default\\_↔error\\_columns](#)=['Sn', Se, Su])  
Initialize a *DataFetcher*.
- def `setStationList` (self, [station\\_list](#))  
Set the list of stations to use.
- def `getInfo` (self)  
Get information about the stations and *geo\_point*.
- def `output` (self)  
Generate PBO Data Wrapper.
- def `__str__` (self)  
print the parameter values
- def `getStationMetadata` ()  
Read in the metadata and convert to dictionary.
- def `getAntennaLogs` ()  
Get antenna logs.
- def `downloadFullDataset` (cls, out\_file='pbo\_data.h5', use\_file=None)  
Download and parse data from the Plate Boundary Observatory.
- def `multirun_enabled` (self)  
Returns whether or not this data fetcher is multirun enabled.
- def `getDataLocation` (data\_name)  
Get the location of data set.
- def `setDataLocation` (data\_name, location, key='data\_location')  
Set the location of a data set.
- def `perturb` (self)  
Perturb parameters.
- def `reset` (self)

- *Set all parameters to initial value.*
- def [getMetadata](#) (self)  
*Return metadata about Data Fetcher.*
- def [getConfig](#) ()  
*Retrieve skdaccess configuration.*
- def [writeConfig](#) (conf)  
*Write config to disk.*

## Public Attributes

- [station\\_list](#)
- [default\\_columns](#)
- [default\\_error\\_columns](#)
- [antenna\\_info](#)
- [meta\\_data](#)
- [ap\\_paramList](#)

### 6.12.1 Detailed Description

Data fetcher for PBO GPS data.

### 6.12.2 Constructor & Destructor Documentation

#### 6.12.2.1 `__init__()`

```
def skdaccess.geo.pbo.DataFetcher.__init__ (
    self,
    start_time,
    end_time,
    ap_paramList,
    mdyratio = .5,
    default_columns = ['dN',
    dE,
    dU,
    default_error_columns = ['Sn',
    Se,
    Su )
```

Initialize a [DataFetcher](#).

#### Parameters

<i>start_time</i>	String of starting date in the form of "2005-01-01"
<i>end_time</i>	String of ending date in the form of "2014-12-31"
<i>ap_paramList[lat_range]</i>	AutoList, Latitude range used to select stabilization sites
<i>ap_paramList[lon_range]</i>	AutoList, Longitude range used to select stabilization sites
<i>mdyratio</i>	Only keep stations that have mdyratio of data in the specified time range
<i>default_columns</i>	Default columns to process

### 6.12.3 Member Function Documentation

#### 6.12.3.1 `__str__()`

```
def skdaccess.geo.pbo.DataFetcher.__str__ (
    self )
```

print the parameter values

##### Returns

String representation of Data Fetcher

#### 6.12.3.2 `downloadFullDataset()`

```
def skdaccess.geo.pbo.DataFetcher.downloadFullDataset (
    cls,
    out_file = 'pbo_data.h5',
    use_file = None )
```

Download and parse data from the Plate Boundary Observatory.

##### Parameters

<i>out_file</i>	Output filename for parsed data
<i>use_file</i>	Use already downloaded data. If None, data will be downloaded.

##### Returns

Absolute path of parsed data

#### 6.12.3.3 `getAntennaLogs()`

```
def skdaccess.geo.pbo.DataFetcher.getAntennaLogs ( )
```

Get antenna logs.

##### Returns

dictionary of data frames containing antenna logs

#### 6.12.3.4 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

##### Returns

configParser.ConfigParser object of configuration

#### 6.12.3.5 getDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

##### Parameters

<i>data_name</i>	Name of data set
------------------	------------------

##### Returns

string of data location, None if not found

#### 6.12.3.6 getInfo()

```
def skdaccess.geo.pbo.DataFetcher.getInfo (
    self )
```

Get information about the stations and geo\_point.

##### Returns

tuple containing station list and geo\_point

#### 6.12.3.7 getMetadata()

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

##### Returns

metadata of object.

#### 6.12.3.8 getStationMetadata()

```
def skdaccess.geo.pbo.DataFetcher.getStationMetadata ( )
```

Read in the metadata and convert to dictionary.

##### Returns

dictionary of PBO metadata

#### 6.12.3.9 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherStorage.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

##### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

#### 6.12.3.10 output()

```
def skdaccess.geo.pbo.DataFetcher.output (
    self )
```

Generate PBO Data Wrapper.

##### Returns

PBO Data Wrapper

#### 6.12.3.11 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.12.3.12 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.12.3.13 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

##### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

#### 6.12.3.14 setStationList()

```
def skdaccess.geo.pbo.DataFetcher.setStationList (
    self,
    station_list )
```

Set the list of stations to use.

##### Parameters

<i>station_list</i>	List of stations to fetch
---------------------	---------------------------

#### 6.12.3.15 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

##### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

### 6.12.4 Member Data Documentation

#### 6.12.4.1 antenna\_info

```
skdaccess.geo.pbo.DataFetcher.antenna_info
```

#### 6.12.4.2 ap\_paramList

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList [inherited]
```

#### 6.12.4.3 default\_columns

```
skdaccess.geo.pbo.DataFetcher.default_columns
```

#### 6.12.4.4 default\_error\_columns

```
skdaccess.geo.pbo.DataFetcher.default_error_columns
```



## 6.12.4.5 meta\_data

```
skdaccess.geo.pbo.DataFetcher.meta_data
```

## 6.12.4.6 station\_list

```
skdaccess.geo.pbo.DataFetcher.station_list
```

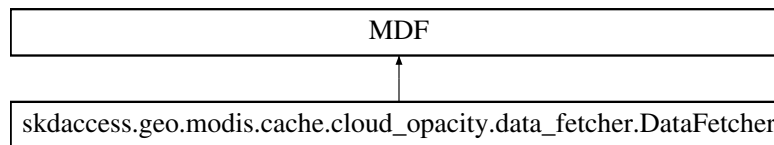
The documentation for this class was generated from the following file:

- [geo/pbo/data\\_fetcher.py](#)

## 6.13 skdaccess.geo.modis.cache.cloud\_opacity.DataFetcher Class Reference

Data Fetcher for MODIS Cloud Opacity.

Inheritance diagram for skdaccess.geo.modis.cache.cloud\_opacity.DataFetcher:



## Public Member Functions

- `def __init__(self, ap_paramList, start_date, end_date, modis_platform='Terra', daynightboth='D', grid=None)`  
Construct Data Fetcher object for MODIS cloud Opacity data.

## 6.13.1 Detailed Description

Data Fetcher for MODIS Cloud Opacity.

## 6.13.2 Constructor &amp; Destructor Documentation

## 6.13.2.1 \_\_init\_\_()

```
def skdaccess.geo.modis.cache.cloud_opacity.DataFetcher.__init__(
    self,
    ap_paramList,
    start_date,
    end_date,
    modis_platform = 'Terra',
    daynightboth = 'D',
    grid = None )
```

Construct Data Fetcher object for MODIS cloud Opacity data.

## Parameters

<i>ap_paramList[lat]</i>	Search latitude
<i>ap_paramList[lon]</i>	Search longitude
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>modis_platform</i>	Platform (Either "Terra" or "Aqua")
<i>daynightboth</i>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)

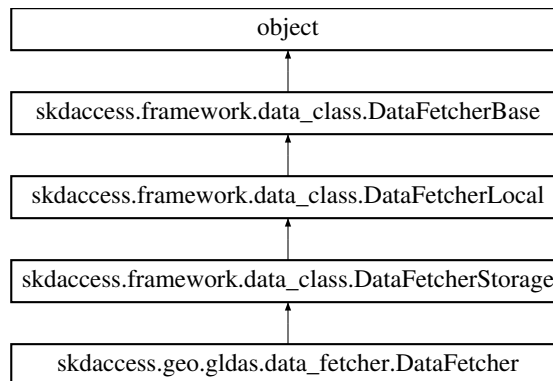
The documentation for this class was generated from the following file:

- [geo/modis/cache/cloud\\_opacity/data\\_fetcher.py](#)

## 6.14 skdaccess.geo.gldas.DataFetcher Class Reference

Data Fetcher for GLDAS data.

Inheritance diagram for skdaccess.geo.gldas.DataFetcher:



### Public Member Functions

- `def __init__(self, ap_paramList, start_date=None, end_date=None, resample=False)`  
Construct a GLDAS Data Fetcher.
- `def output(self)`  
Create data wrapper of GLDAS data for specified geoint.
- `def downloadFullDataset(cls, out_file=None, use_file=None)`  
Download GLDAS data.
- `def __str__(self)`  
String representation of data fetcher.
- `def multirun_enabled(self)`  
Returns whether or not this data fetcher is multirun enabled.

- def [getDataLocation](#) (data\_name)  
*Get the location of data set.*
- def [setDataLocation](#) (data\_name, location, key='data\_location')  
*Set the location of a data set.*
- def [perturb](#) (self)  
*Perturb parameters.*
- def [reset](#) (self)  
*Set all parameters to initial value.*
- def [getMetadata](#) (self)  
*Return metadata about Data Fetcher.*
- def [getConfig](#) ()  
*Retrieve skdaccess configuration.*
- def [writeConfig](#) (conf)  
*Write config to disk.*

## Public Attributes

- [start\\_date](#)
- [end\\_date](#)
- [resample](#)
- [ap\\_paramList](#)

### 6.14.1 Detailed Description

Data Fetcher for GLDAS data.

### 6.14.2 Constructor & Destructor Documentation

#### 6.14.2.1 `__init__()`

```
def skdaccess.geo.gldas.DataFetcher.__init__ (
    self,
    ap_paramList,
    start_date = None,
    end_date = None,
    resample = False )
```

Construct a GLDAS Data Fetcher.

#### Parameters

<i>ap_paramList</i> [ <i>geo_point</i> ]	Autolist of Geographic location tuples
<i>start_date</i>	Beginning date
<i>end_date</i>	Ending date
<i>resample</i>	Resample the data to daily resolution, leaving NaN's in days without data (Default True)

### 6.14.3 Member Function Documentation

#### 6.14.3.1 `__str__()`

```
def skdaccess.geo.gldas.DataFetcher.__str__ (
    self )
```

String representation of data fetcher.

##### Returns

String listing the name and geopoint of data fetcher

#### 6.14.3.2 `downloadFullDataset()`

```
def skdaccess.geo.gldas.DataFetcher.downloadFullDataset (
    cls,
    out_file = None,
    use_file = None )
```

Download GLDAS data.

##### Parameters

<i>out_file</i>	Output filename for parsed data
<i>use_file</i>	Directory of downloaded data. If None, data will be downloaded.

##### Returns

Absolute path of parsed data

#### 6.14.3.3 `getConfig()`

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

##### Returns

`configParser.ConfigParser` object of configuration

#### 6.14.3.4 getDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

##### Parameters

<i>data_name</i>	Name of data set
------------------	------------------

##### Returns

string of data location, None if not found

#### 6.14.3.5 getMetadata()

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

##### Returns

metadata of object.

#### 6.14.3.6 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherStorage.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

##### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

#### 6.14.3.7 output()

```
def skdaccess.geo.gldas.DataFetcher.output (
    self )
```

Create data wrapper of GLDAS data for specified geopoint.

##### Returns

GLDAS Data Wrapper

#### 6.14.3.8 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.14.3.9 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.14.3.10 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

##### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

#### 6.14.3.11 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

##### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

### 6.14.4 Member Data Documentation

#### 6.14.4.1 ap\_paramList

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList [inherited]
```

#### 6.14.4.2 end\_date

```
skdaccess.geo.gldas.DataFetcher.end_date
```

#### 6.14.4.3 resample

```
skdaccess.geo.gldas.DataFetcher.resample
```

#### 6.14.4.4 start\_date

```
skdaccess.geo.gldas.DataFetcher.start_date
```

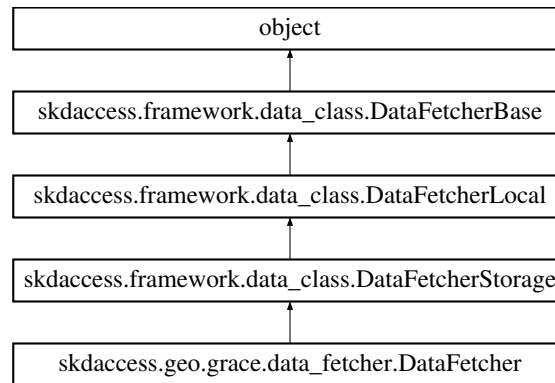
The documentation for this class was generated from the following file:

- [geo/gldas/data\\_fetcher.py](#)

## 6.15 skdaccess.geo.grace.DataFetcher Class Reference

Data Fetcher for GRACE data.

Inheritance diagram for skdaccess.geo.grace.DataFetcher:



### Public Member Functions

- def `__init__` (self, `ap_paramList`, `start_date`=None, `end_date`=None)  
Construct a Grace Data Fetcher.
- def `output` (self)  
Create data wrapper of grace data for specified geopoints.
- def `__str__` (self)  
String representation of data fetcher.
- def `downloadFullDataset` (cls, `out_file`='grace.h5', `use_file`=None)  
Download and parse data from the Gravity Recovery and Climate Experiment.
- def `multirun_enabled` (self)  
Returns whether or not this data fetcher is multirun enabled.
- def `getDataLocation` (data\_name)  
Get the location of data set.
- def `setDataLocation` (data\_name, location, key='data\_location')  
Set the location of a data set.
- def `perturb` (self)  
Perturb parameters.
- def `reset` (self)  
Set all parameters to initial value.
- def `getMetadata` (self)  
Return metadata about Data Fetcher.
- def `getConfig` ()  
Retrieve skdaccess configuration.
- def `writeConfig` (conf)  
Write config to disk.



## Public Attributes

- [start\\_date](#)
- [end\\_date](#)
- [ap\\_paramList](#)

### 6.15.1 Detailed Description

Data Fetcher for GRACE data.

### 6.15.2 Constructor & Destructor Documentation

#### 6.15.2.1 `__init__()`

```
def skdaccess.geo.grace.DataFetcher.__init__ (
    self,
    ap_paramList,
    start_date = None,
    end_date = None )
```

Construct a Grace Data Fetcher.

#### Parameters

<i>ap_paramList[geo_point]</i>	AutoList of geographic location tuples (lat,lon)
<i>start_date</i>	Beginning date
<i>end_date</i>	Ending date

### 6.15.3 Member Function Documentation

#### 6.15.3.1 `__str__()`

```
def skdaccess.geo.grace.DataFetcher.__str__ (
    self )
```

String representation of data fetcher.

#### Returns

String listing the name and geopoint of data fetcher

### 6.15.3.2 downloadFullDataset()

```
def skdaccess.geo.grace.DataFetcher.downloadFullDataset (
    cls,
    out_file = 'grace.h5',
    use_file = None )
```

Download and parse data from the Gravity Recovery and Climate Experiment.

#### Parameters

<i>out_file</i>	Output filename for parsed data
<i>use_file</i>	Directory of already downloaded data. If None, data will be downloaded.

#### Returns

Absolute path of parsed data

### 6.15.3.3 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

#### Returns

configParser.ConfigParser object of configuration

### 6.15.3.4 getDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

#### Parameters

<i>data_name</i>	Name of data set
------------------	------------------

**Returns**

string of data location, None if not found

**6.15.3.5 getMetadata()**

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

**Returns**

metadata of object.

**6.15.3.6 multirun\_enabled()**

```
def skdaccess.framework.data_class.DataFetcherStorage.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

**Returns**

Boolean indicating whether or not this data fetcher is multirun enabled

**6.15.3.7 output()**

```
def skdaccess.geo.grace.DataFetcher.output (
    self )
```

Create data wrapper of grace data for specified geopoints.

**Returns**

Grace Data Wrapper

#### 6.15.3.8 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.15.3.9 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.15.3.10 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

##### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

#### 6.15.3.11 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

##### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

### 6.15.4 Member Data Documentation

#### 6.15.4.1 ap\_paramList

`skdaccess.framework.data_class.DataFetcherBase.ap_paramList` [inherited]

#### 6.15.4.2 end\_date

`skdaccess.geo.grace.DataFetcher.end_date`

#### 6.15.4.3 start\_date

`skdaccess.geo.grace.DataFetcher.start_date`

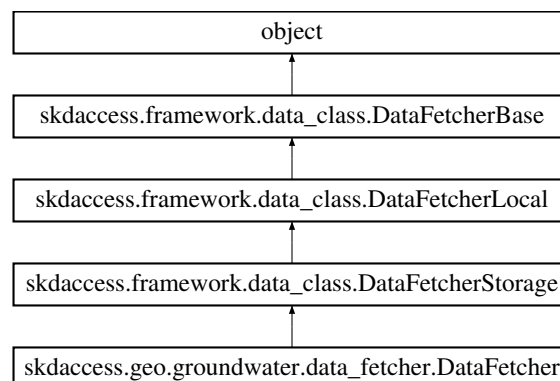
The documentation for this class was generated from the following file:

- [geo/grace/data\\_fetcher.py](#)

## 6.16 skdaccess.geo.groundwater.DataFetcher Class Reference

Generates Data Wrappers of groundwater measurements taken in the US.

Inheritance diagram for `skdaccess.geo.groundwater.DataFetcher`:



## Public Member Functions

- `def __init__ (self, ap_paramList=[], start_date=None, end_date=None, cutoff=0.75)`  
*Construct a Groundwater Data Fetcher.*
- `def output (self)`  
*Fetch Groundwater Data Wrapper.*
- `def __str__ (self)`  
*String representation of data fetcher.*
- `def getStationMetadata ()`  
*Retrieve metadata on groundwater wells.*
- `def downloadFullDataset (cls, out_file='gw.h5', use_file=None)`  
*Download and parse US groundwater data provided by USGS.*
- `def multirun_enabled (self)`  
*Returns whether or not this data fetcher is multirun enabled.*
- `def getDataLocation (data_name)`  
*Get the location of data set.*
- `def setDataLocation (data_name, location, key='data_location')`  
*Set the location of a data set.*
- `def perturb (self)`  
*Perturb parameters.*
- `def reset (self)`  
*Set all parameters to initial value.*
- `def getMetadata (self)`  
*Return metadata about Data Fetcher.*
- `def getConfig ()`  
*Retrieve skdaccess configuration.*
- `def writeConfig (conf)`  
*Write config to disk.*

## Public Attributes

- `start_date`
- `end_date`
- `ap_paramList`
- `cutoff`

### 6.16.1 Detailed Description

Generates Data Wrappers of groundwater measurements taken in the US.

### 6.16.2 Constructor & Destructor Documentation

6.16.2.1 `__init__()`

```
def skdaccess.geo.groundwater.DataFetcher.__init__ (
    self,
    ap_paramList = [],
    start_date = None,
    end_date = None,
    cutoff = 0.75 )
```

Construct a Groundwater Data Fetcher.

**Parameters**

<code>ap_paramList[LowerLat]</code>	Autoparam Lower latitude
<code>ap_paramList[UpperLat]</code>	Autoparam Upper latitude
<code>ap_paramList[LeftLon]</code>	Autoparam Left longitude
<code>ap_paramList[RightLon]</code>	Autoparam Right longitude
<code>start_date</code>	Starting date (default: None)
<code>end_date</code>	Ending date (default: None)
<code>cutoff</code>	Required amount of data for each station

## 6.16.3 Member Function Documentation

6.16.3.1 `__str__()`

```
def skdaccess.geo.groundwater.DataFetcher.__str__ (
    self )
```

String representation of data fetcher.

**Returns**

string describing data fetcher

6.16.3.2 `downloadFullDataset()`

```
def skdaccess.geo.groundwater.DataFetcher.downloadFullDataset (
    cls,
    out_file = 'gw.h5',
    use_file = None )
```

Download and parse US groundwater data provided by USGS.

**Parameters**

<i>out_file</i>	Output filename for parsed data
<i>use_file</i>	Specify the directory where the data is. If None, the function will download the data

**Returns**

Absolute path of parsed data

**6.16.3.3 getConfig()**

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

**Returns**

configParser.ConfigParser object of configuration

**6.16.3.4 getDataLocation()**

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

**Parameters**

<i>data_name</i>	Name of data set
------------------	------------------

**Returns**

string of data location, None if not found

**6.16.3.5 getMetadata()**

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.



**Returns**

metadata of object.

**6.16.3.6 getStationMetadata()**

```
def skdaccess.geo.groundwater.DataFetcher.getStationMetadata ( )
```

Retrieve metadata on groundwater wells.

**Returns**

pandas dataframe with groundwater well information

**6.16.3.7 multirun\_enabled()**

```
def skdaccess.framework.data_class.DataFetcherStorage.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

**Returns**

Boolean indicating whether or not this data fetcher is multirun enabled

**6.16.3.8 output()**

```
def skdaccess.geo.groundwater.DataFetcher.output (
    self )
```

Fetch Groundwater Data Wrapper.

**Returns**

Groundwater Data Wrapper

### 6.16.3.9 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

### 6.16.3.10 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

### 6.16.3.11 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

#### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

### 6.16.3.12 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

#### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.16.4 Member Data Documentation

### 6.16.4.1 ap\_paramList

`skdaccess.geo.groundwater.DataFetcher.ap_paramList`

### 6.16.4.2 cutoff

`skdaccess.geo.groundwater.DataFetcher.cutoff`

### 6.16.4.3 end\_date

`skdaccess.geo.groundwater.DataFetcher.end_date`

### 6.16.4.4 start\_date

`skdaccess.geo.groundwater.DataFetcher.start_date`

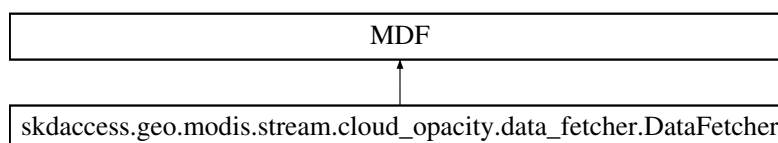
The documentation for this class was generated from the following file:

- [geo/groundwater/data\\_fetcher.py](#)

## 6.17 skdaccess.geo.modis.stream.cloud\_opacity.DataFetcher Class Reference

Data Fetcher for MODIS Cloud Opacity.

Inheritance diagram for `skdaccess.geo.modis.stream.cloud_opacity.DataFetcher`:



## Public Member Functions

- `def __init__(self, ap_paramList, start_date, end_date, modis_platform='Terra', daynightboth='D', grid=None)`  
Construct Data Fetcher object for MODIS cloud Opacity data.

### 6.17.1 Detailed Description

Data Fetcher for MODIS Cloud Opacity.

### 6.17.2 Constructor & Destructor Documentation

#### 6.17.2.1 \_\_init\_\_()

```
def skdaccess.geo.modis.stream.cloud_opacity.DataFetcher.__init__(
    self,
    ap_paramList,
    start_date,
    end_date,
    modis_platform = 'Terra',
    daynightboth = 'D',
    grid = None )
```

Construct Data Fetcher object for MODIS cloud Opacity data.

#### Parameters

<i>ap_paramList[lat]</i>	Search latitude
<i>ap_paramList[lon]</i>	Search longitude
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>modis_platform</i>	Platform (Either "Terra" or "Aqua")
<i>daynightboth</i>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)

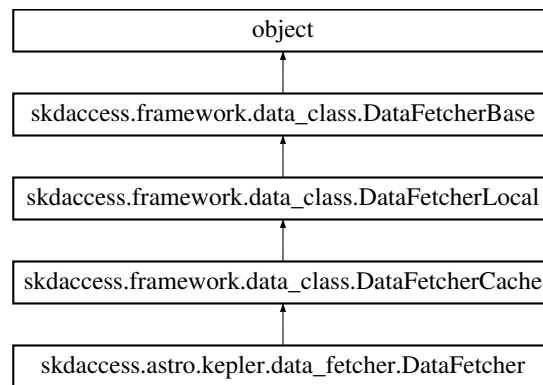
The documentation for this class was generated from the following file:

- `geo/modis/stream/cloud_opacity/data_fetcher.py`

## 6.18 skdaccess.astro.kepler.DataFetcher Class Reference

Data Fetcher for Kepler light curve data.

Inheritance diagram for skdaccess.astro.kepler.DataFetcher:



## Public Member Functions

- def `__init__` (self, `ap_paramList`, `quarter_list`=None)  
*Initialize Kepler Data Fetcher.*
- def `downloadKeplerData` (self, `kid_list`)  
*Download and parse Kepler data for a list of kepler id's.*
- def `cacheData` (self, `data_specification`)  
*Cache Kepler data locally.*
- def `output` (self)  
*Output kepler data wrapper.*
- def `multirun_enabled` (self)  
*Returns whether or not this data fetcher is multirun enabled.*
- def `getDataLocation` (`data_name`)  
*Get the location of data set.*
- def `setDataLocation` (`data_name`, `location`, `key`='data\_location')  
*Set the location of a data set.*
- def `perturb` (self)  
*Perturb parameters.*
- def `reset` (self)  
*Set all parameters to initial value.*
- def `__str__` (self)  
*Generate string description.*
- def `getMetadata` (self)  
*Return metadata about Data Fetcher.*
- def `getConfig` ()  
*Retrieve skdaccess configuration.*
- def `writeConfig` (conf)  
*Write config to disk.*

## Public Attributes

- `quarter_list`
- `ap_paramList`

### 6.18.1 Detailed Description

Data Fetcher for Kepler light curve data.

### 6.18.2 Constructor & Destructor Documentation

#### 6.18.2.1 `__init__()`

```
def skdaccess.astro.kepler.DataFetcher.__init__ (
    self,
    ap_paramList,
    quarter_list = None )
```

Initialize Kepler Data Fetcher.

##### Parameters

<i>ap_paramList[kepler_id_list]</i>	List of kepler id's
<i>quarter_list</i>	List of quarters (0-17) (default: all quarters)

### 6.18.3 Member Function Documentation

#### 6.18.3.1 `__str__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

#### 6.18.3.2 `cacheData()`

```
def skdaccess.astro.kepler.DataFetcher.cacheData (
    self,
    data_specification )
```

Cache Kepler data locally.

## Parameters

<i>data_specification</i>	List of kepler IDs
---------------------------	--------------------

## 6.18.3.3 downloadKeplerData()

```
def skdaccess.astro.kepler.DataFetcher.downloadKeplerData (
    self,
    kid_list )
```

Download and parse Kepler data for a list of kepler id's.

## Parameters

<i>kid_list</i>	List of Kepler ID's to download
-----------------	---------------------------------

## Returns

dictionary of kepler data

## 6.18.3.4 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

## Returns

configParser.ConfigParser object of configuration

## 6.18.3.5 getDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

**Parameters**

<i>data_name</i>	Name of data set
------------------	------------------

**Returns**

string of data location, None if not found

**6.18.3.6 getMetadata()**

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

**Returns**

metadata of object.

**6.18.3.7 multirun\_enabled()**

```
def skdaccess.framework.data_class.DataFetcherCache.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

**Returns**

Boolean indicating whether or not this data fetcher is multirun enabled

**6.18.3.8 output()**

```
def skdaccess.astro.kepler.DataFetcher.output (
    self )
```

Output kepler data wrapper.

**Returns**

DataWrapper



### 6.18.3.9 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

### 6.18.3.10 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

### 6.18.3.11 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

#### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

### 6.18.3.12 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

#### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.18.4 Member Data Documentation

### 6.18.4.1 `ap_paramList`

`skdaccess.framework.data_class.DataFetcherBase.ap_paramList` [inherited]

### 6.18.4.2 `quarter_list`

`skdaccess.astro.kepler.DataFetcher.quarter_list`

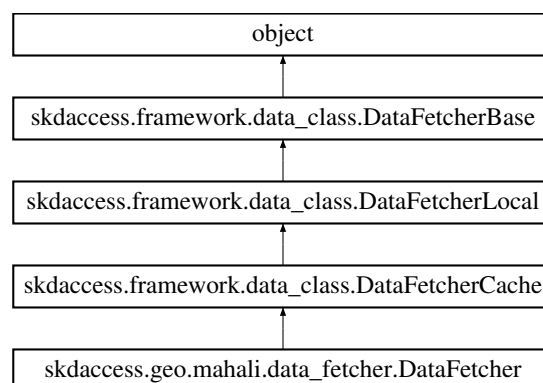
The documentation for this class was generated from the following file:

- [astro/kepler/data\\_fetcher.py](#)

## 6.19 `skdaccess.geo.mahali.DataFetcher` Class Reference

Data Fetcher for Mahali Data.

Inheritance diagram for `skdaccess.geo.mahali.DataFetcher`:



## Public Member Functions

- def `__init__` (self, `ap_paramList`=[], `start_date`=None, `end_date`=None)  
*Initialize Mahali Data Fetcher.*
- def `cacheData` (self)  
*Downloads all needed data.*
- def `output` (self)  
*Generate data wrapper for Mahali data.*
- def `cacheData` (self, `data_specification`)  
*Download and store specified data to local disk.*
- def `multirun_enabled` (self)  
*Returns whether or not this data fetcher is multirun enabled.*
- def `getDataLocation` (`data_name`)  
*Get the location of data set.*
- def `setDataLocation` (`data_name`, `location`, `key`='data\_location')  
*Set the location of a data set.*
- def `perturb` (self)  
*Perturb parameters.*
- def `reset` (self)  
*Set all parameters to initial value.*
- def `__str__` (self)  
*Generate string description.*
- def `getMetadata` (self)  
*Return metadata about Data Fetcher.*
- def `getConfig` ()  
*Retrieve skdaccess configuration.*
- def `writeConfig` (`conf`)  
*Write config to disk.*

## Public Attributes

- `start_date`
- `end_date`
- `date_range`
- `ap_paramList`

### 6.19.1 Detailed Description

Data Fetcher for Mahali Data.

### 6.19.2 Constructor & Destructor Documentation

### 6.19.2.1 `__init__()`

```
def skdaccess.geo.mahali.DataFetcher.__init__ (
    self,
    ap_paramList = [],
    start_date = None,
    end_date = None )
```

Initialize Mahali Data Fetcher.

#### Parameters

<i>ap_paramList[stations]</i>	Autolist of stations (Defaults to all stations)
<i>start_date</i>	Starting date for seelcting data (Defaults to beginning of available data)
<i>end_date</i>	Ending date for selecting data (Defaults to end of available data)

## 6.19.3 Member Function Documentation

### 6.19.3.1 `__str__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

### 6.19.3.2 `cacheData()` [1/2]

```
def skdaccess.geo.mahali.DataFetcher.cacheData (
    self )
```

Downloads all needed data.

Called by [output\(\)](#).

### 6.19.3.3 `cacheData()` [2/2]

```
def skdaccess.framework.data_class.DataFetcherCache.cacheData (
    self,
    data_specification ) [inherited]
```

Download and store specified data to local disk.

**Parameters**

<i>data_specification</i>	Specification of data to be retrieved
---------------------------	---------------------------------------

**6.19.3.4 getConfig()**

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

**Returns**

configParser.ConfigParser object of configuration

**6.19.3.5 getDataLocation()**

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

**Parameters**

<i>data_name</i>	Name of data set
------------------	------------------

**Returns**

string of data location, None if not found

**6.19.3.6 getMetadata()**

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

**Returns**

metadata of object.

#### 6.19.3.7 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherCache.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

##### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

#### 6.19.3.8 output()

```
def skdaccess.geo.mahali.DataFetcher.output (
    self )
```

Generate data wrapper for Mahali data.

##### Returns

Mahali data wrapper

#### 6.19.3.9 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.19.3.10 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.19.3.11 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

## Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

## 6.19.3.12 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (  
    conf ) [inherited]
```

Write config to disk.

## Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.19.4 Member Data Documentation

## 6.19.4.1 ap\_paramList

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList [inherited]
```

## 6.19.4.2 date\_range

```
skdaccess.geo.mahali.DataFetcher.date_range
```

## 6.19.4.3 end\_date

```
skdaccess.geo.mahali.DataFetcher.end_date
```

#### 6.19.4.4 start\_date

`skdaccess.geo.mahali.DataFetcher.start_date`

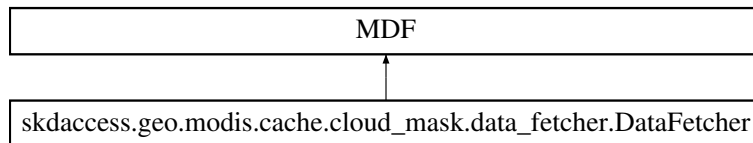
The documentation for this class was generated from the following file:

- [geo/mahali/data\\_fetcher.py](#)

## 6.20 skdaccess.geo.modis.cache.cloud\_mask.DataFetcher Class Reference

Data Fetcher for MODIS Cloud Mask.

Inheritance diagram for `skdaccess.geo.modis.cache.cloud_mask.DataFetcher`:



### Public Member Functions

- `def __init__(self, ap_paramList, start_date, end_date, modis_platform='Terra', daynightboth='D', grid=None)`  
*Construct Data Fetcher for MODIS cloud mask data.*

#### 6.20.1 Detailed Description

Data Fetcher for MODIS Cloud Mask.

#### 6.20.2 Constructor & Destructor Documentation

##### 6.20.2.1 \_\_init\_\_()

```

def skdaccess.geo.modis.cache.cloud_mask.DataFetcher.__init__(
    self,
    ap_paramList,
    start_date,
    end_date,
    modis_platform = 'Terra',
    daynightboth = 'D',
    grid = None )
  
```

Construct Data Fetcher for MODIS cloud mask data.



## Parameters

<i>ap_paramList[lat]</i>	Search latitude
<i>ap_paramList[lon]</i>	Search longitude
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>modis_platform</i>	Platform (Either "Terra" or "Aqua")
<i>daynightboth</i>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)

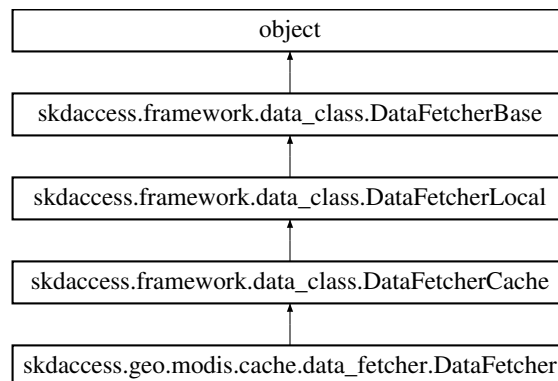
The documentation for this class was generated from the following file:

- [geo/modis/cache/cloud\\_mask/data\\_fetcher.py](#)

## 6.21 skdaccess.geo.modis.cache.DataFetcher Class Reference

Data Fetcher for MODIS data.

Inheritance diagram for skdaccess.geo.modis.cache.DataFetcher:



### Public Member Functions

- `def __init__(self, ap_paramList, modis_platform, modis_id, variable_list, start_date, end_date, daynightboth='D', grid=None, grid_fill=np.nan, use_long_name=False)`  
Construct Data Fetcher object.
- `def find_data(self, fileid_list)`  
Finds files previously downloaded files associated with fileids.
- `def cacheData(self, data_specification)`  
Download MODIS data.
- `def output(self)`  
Generate data wrapper.
- `def multirun_enabled(self)`

- Returns whether or not this data fetcher is multirun enabled.*
- def [getDataLocation](#) (data\_name)  
*Get the location of data set.*
- def [setDataLocation](#) (data\_name, location, key='data\_location')  
*Set the location of a data set.*
- def [perturb](#) (self)  
*Perturb parameters.*
- def [reset](#) (self)  
*Set all parameters to initial value.*
- def [\\_\\_str\\_\\_](#) (self)  
*Generate string description.*
- def [getMetadata](#) (self)  
*Return metadata about Data Fetcher.*
- def [getConfig](#) ()  
*Retrieve skdaccess configuration.*
- def [writeConfig](#) (conf)  
*Write config to disk.*

## Public Attributes

- [modis\\_id](#)
- [variable\\_list](#)
- [start\\_date](#)
- [end\\_date](#)
- [daynightboth](#)
- [grid](#)
- [grid\\_fill](#)
- [use\\_long\\_name](#)
- [modis\\_platform](#)
- [modis\\_identifier](#)
- [ap\\_paramList](#)

### 6.21.1 Detailed Description

Data Fetcher for MODIS data.

### 6.21.2 Constructor & Destructor Documentation

6.21.2.1 `__init__()`

```
def skdaccess.geo.modis.cache.DataFetcher.__init__ (
    self,
    ap_paramList,
    modis_platform,
    modis_id,
    variable_list,
    start_date,
    end_date,
    daynightboth = 'D',
    grid = None,
    grid_fill = np.nan,
    use_long_name = False )
```

Construct Data Fetcher object.

## Parameters

<i>ap_paramList[lat]</i>	Search latitude
<i>ap_paramList[lon]</i>	Search longitude
<i>modis_platform</i>	Platform (Either "Terra" or "Aqua")
<i>modis_id</i>	Product string (e.g. '06_L2')
<i>variable_list</i>	List of variables to fetch
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>daynightboth</i>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)
<i>grid_fill</i>	Fill value to use when creating gridded data
<i>use_long_name</i>	Use long names for metadata instead of variable name

## 6.21.3 Member Function Documentation

6.21.3.1 `__str__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

#### 6.21.3.2 cacheData()

```
def skdaccess.geo.modis.cache.DataFetcher.cacheData (
    self,
    data_specification )
```

Download MODIS data.

##### Parameters

<i>data_specification</i>	List of file IDs to cache
---------------------------	---------------------------

#### 6.21.3.3 find\_data()

```
def skdaccess.geo.modis.cache.DataFetcher.find_data (
    self,
    fileid_list )
```

Finds files previously downloaded files associated with fileids.

##### Parameters

<i>fileid_list</i>	List of file id's
--------------------	-------------------

##### Returns

Pandas series of file locaitons indexed by file id

#### 6.21.3.4 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

##### Returns

configParser.ConfigParser object of configuration

#### 6.21.3.5 getDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

**Parameters**

<i>data_name</i>	Name of data set
------------------	------------------

**Returns**

string of data location, None if not found

**6.21.3.6 getMetadata()**

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

**Returns**

metadata of object.

**6.21.3.7 multirun\_enabled()**

```
def skdaccess.framework.data_class.DataFetcherCache.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

**Returns**

Boolean indicating whether or not this data fetcher is multirun enabled

**6.21.3.8 output()**

```
def skdaccess.geo.modis.cache.DataFetcher.output (
    self )
```

Generate data wrapper.

**Returns**

data wrapper of MODIS data

**6.21.3.9 perturb()**

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

**6.21.3.10 reset()**

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

**6.21.3.11 setDataLocation()**

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

**Parameters**

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

**6.21.3.12 writeConfig()**

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

**Parameters**

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.21.4 Member Data Documentation

### 6.21.4.1 ap\_paramList

skdaccess.framework.data\_class.DataFetcherBase.ap\_paramList [inherited]

### 6.21.4.2 daynightboth

skdaccess.geo.modis.cache.DataFetcher.daynightboth

### 6.21.4.3 end\_date

skdaccess.geo.modis.cache.DataFetcher.end\_date

### 6.21.4.4 grid

skdaccess.geo.modis.cache.DataFetcher.grid

### 6.21.4.5 grid\_fill

skdaccess.geo.modis.cache.DataFetcher.grid\_fill

### 6.21.4.6 modis\_id

skdaccess.geo.modis.cache.DataFetcher.modis\_id

#### 6.21.4.7 modis\_identifier

```
skdaccess.geo.modis.cache.DataFetcher.modis_identifier
```

#### 6.21.4.8 modis\_platform

```
skdaccess.geo.modis.cache.DataFetcher.modis_platform
```

#### 6.21.4.9 start\_date

```
skdaccess.geo.modis.cache.DataFetcher.start_date
```

#### 6.21.4.10 use\_long\_name

```
skdaccess.geo.modis.cache.DataFetcher.use_long_name
```

#### 6.21.4.11 variable\_list

```
skdaccess.geo.modis.cache.DataFetcher.variable_list
```

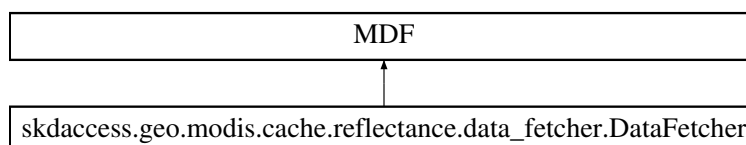
The documentation for this class was generated from the following file:

- [geo/modis/cache/data\\_fetcher.py](#)

## 6.22 skdaccess.geo.modis.cache.reflectance.DataFetcher Class Reference

Data fetcher for the modis surface reflectance product ('09', 1 km resolution)

Inheritance diagram for skdaccess.geo.modis.cache.reflectance.DataFetcher:





## Public Member Functions

- `def __init__(self, ap_paramList, start_date, end_date, modis_platform='Terra', daynightboth='D', grid=None, bands=[1])`

*Construct Data Fetcher for MODIS 1km surface reflectance.*

### 6.22.1 Detailed Description

Data fetcher for the modis surface reflectance product ('09', 1 km resolution)

### 6.22.2 Constructor & Destructor Documentation

#### 6.22.2.1 \_\_init\_\_()

```
def skdaccess.geo.modis.cache.reflectance.DataFetcher.__init__(
    self,
    ap_paramList,
    start_date,
    end_date,
    modis_platform = 'Terra',
    daynightboth = 'D',
    grid = None,
    bands = [1])
```

Construct Data Fetcher for MODIS 1km surface reflectance.

#### Parameters

<i>ap_paramList[lat]</i>	Search latitude
<i>ap_paramList[lon]</i>	Search longitude
<i>start_date</i>	Starting date
<i>end_date</i>	Ending date
<i>modis_platform</i>	Platform (Either "Terra" or "Aqua")
<i>daynightboth</i>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<i>grid</i>	Further divide each image into a multiple grids of size (y,x)
<i>bands</i>	List of modis bands to retrieve

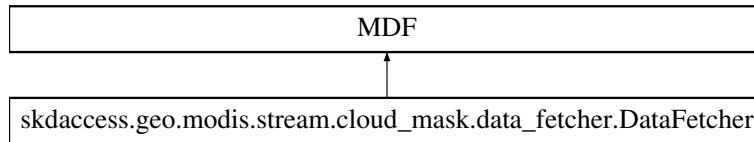
The documentation for this class was generated from the following file:

- `geo/modis/cache/reflectance/data_fetcher.py`

## 6.23 skdaccess.geo.modis.stream.cloud\_mask.DataFetcher Class Reference

Data Fetcher for MODIS Cloud Mask.

Inheritance diagram for skdaccess.geo.modis.stream.cloud\_mask.DataFetcher:



### Public Member Functions

- `def __init__(self, ap_paramList, start_date, end_date, modis_platform='Terra', daynightboth='D', grid=None)`  
Construct Data Fetcher for MODIS cloud mask data.

### 6.23.1 Detailed Description

Data Fetcher for MODIS Cloud Mask.

### 6.23.2 Constructor & Destructor Documentation

#### 6.23.2.1 \_\_init\_\_()

```

def skdaccess.geo.modis.stream.cloud_mask.DataFetcher.__init__(
    self,
    ap_paramList,
    start_date,
    end_date,
    modis_platform = 'Terra',
    daynightboth = 'D',
    grid = None )
  
```

Construct Data Fetcher for MODIS cloud mask data.

#### Parameters

<code>ap_paramList[lat]</code>	Search latitude
<code>ap_paramList[lon]</code>	Search longitude
<code>start_date</code>	Starting date
<code>end_date</code>	Ending date
<code>modis_platform</code>	Platform (Either "Terra" or "Aqua")
<code>daynightboth</code>	Use daytime data ('D'), nighttime data ('N') or both ('B')
<code>grid</code>	Further divide each image into a multiple grids of size (y,x)

- `geo/modis/stream/cloud_mask/data_fetcher.py`

Base class for all data fetchers.

[illegible]

- `def __init__ (self, ap_paramList=[])`  
*Initialize data fetcher with parameter list.*
- `def output (self)`  
*Output data wrapper.*
- `def perturb (self)`  
*Perturb parameters.*
- `def reset (self)`  
*Set all parameters to initial value.*
- `def __str__ (self)`  
*Generate string description.*
- `def getMetadata (self)`  
*Return metadata about Data Fetcher.*
- `def getConfig ()`  
*Retrieve skdaccess configuration.*
- `def writeConfig (conf)`  
*Write config to disk.*
- `def multirun_enabled (self)`  
*Returns whether or not this data fetcher is multirun enabled.*

- ap\_paramList

Base class for all data fetchers.

## 6.24.2 Constructor & Destructor Documentation

### 6.24.2.1 `__init__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__init__ (
    self,
    ap_paramList = [] )
```

Initialize data fetcher with parameter list.

#### Parameters

<code>ap_paramList</code>	List of parameters
---------------------------	--------------------

## 6.24.3 Member Function Documentation

### 6.24.3.1 `__str__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self )
```

Generate string description.

### 6.24.3.2 `getConfig()`

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( )
```

Retrieve skdaccess configuration.

#### Returns

`configParser.ConfigParser` object of configuration

### 6.24.3.3 getMetadata()

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self )
```

Return metadata about Data Fetcher.

#### Returns

metadata of object.

### 6.24.3.4 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherBase.multirun_enabled (
    self )
```

Returns whether or not this data fetcher is multirun enabled.

#### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

### 6.24.3.5 output()

```
def skdaccess.framework.data_class.DataFetcherBase.output (
    self )
```

Output data wrapper.

#### Returns

Datawrapper

### 6.24.3.6 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self )
```

Perturb parameters.

#### 6.24.3.7 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self )
```

Set all parameters to initial value.

#### 6.24.3.8 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf )
```

Write config to disk.

##### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

### 6.24.4 Member Data Documentation

#### 6.24.4.1 ap\_paramList

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList
```

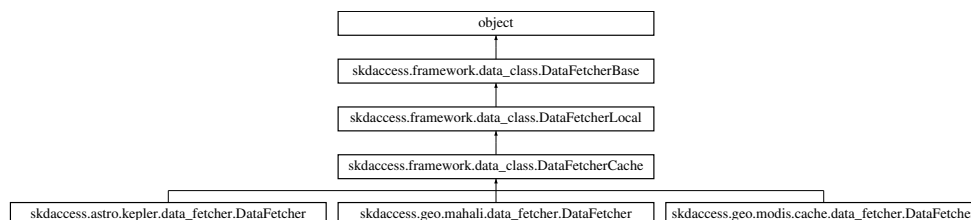
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.25 skdaccess.framework.data\_class.DataFetcherCache Class Reference

Data fetcher base class for downloading data and caching results on hard disk.

Inheritance diagram for skdaccess.framework.data\_class.DataFetcherCache:



## Public Member Functions

- def [cacheData](#) (self, data\_specification)  
*Download and store specified data to local disk.*
- def [multirun\\_enabled](#) (self)  
*Returns whether or not this data fetcher is multirun enabled.*
- def [getDataLocation](#) (data\_name)  
*Get the location of data set.*
- def [setDataLocation](#) (data\_name, location, key='data\_location')  
*Set the location of a data set.*
- def [output](#) (self)  
*Output data wrapper.*
- def [perturb](#) (self)  
*Perturb parameters.*
- def [reset](#) (self)  
*Set all parameters to initial value.*
- def [\\_\\_str\\_\\_](#) (self)  
*Generate string description.*
- def [getMetadata](#) (self)  
*Return metadata about Data Fetcher.*
- def [getConfig](#) ()  
*Retrieve skdaccess configuration.*
- def [writeConfig](#) (conf)  
*Write config to disk.*

## Public Attributes

- [ap\\_paramList](#)

### 6.25.1 Detailed Description

Data fetcher base class for downloading data and caching results on hard disk.

### 6.25.2 Member Function Documentation

#### 6.25.2.1 [\\_\\_str\\_\\_\(\)](#)

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

#### 6.25.2.2 `cacheData()`

```
def skdaccess.framework.data_class.DataFetcherCache.cacheData (
    self,
    data_specification )
```

Download and store specified data to local disk.

##### Parameters

<i>data_specification</i>	Specification of data to be retrieved
---------------------------	---------------------------------------

#### 6.25.2.3 `getConfig()`

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

##### Returns

configParser.ConfigParser object of configuration

#### 6.25.2.4 `getDataLocation()`

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

##### Parameters

<i>data_name</i>	Name of data set
------------------	------------------

##### Returns

string of data location, None if not found



#### 6.25.2.5 getMetadata()

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

##### Returns

metadata of object.

#### 6.25.2.6 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherCache.multirun_enabled (
    self )
```

Returns whether or not this data fetcher is multirun enabled.

##### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

#### 6.25.2.7 output()

```
def skdaccess.framework.data_class.DataFetcherBase.output (
    self ) [inherited]
```

Output data wrapper.

##### Returns

Datawrapper

#### 6.25.2.8 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

### 6.25.2.9 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

### 6.25.2.10 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

#### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

### 6.25.2.11 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

#### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.25.3 Member Data Documentation

### 6.25.3.1 ap\_paramList

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList [inherited]
```

- framework/[data\\_class.py](#)

Inheritance diagram for `skdaccess.framework.data_class.DataFetcherLocal`:



- def `getDataLocation` (data\_name)  
*Get the location of data set.*
- def `setDataLocation` (data\_name, location, key='data\_location')  
*Set the location of a data set.*
- def `output` (self)  
*Output data wrapper.*
- def `perturb` (self)  
*Perturb parameters.*
- def `reset` (self)  
*Set all parameters to initial value.*
- def `__str__` (self)  
*Generate string description.*
- def `getMetadata` (self)  
*Return metadata about Data Fetcher.*
- def `getConfig` ()  
*Retrieve skdaccess configuration.*
- def `writeConfig` (conf)  
*Write config to disk.*
- def `multirun_enabled` (self)  
*Returns whether or not this data fetcher is multirun enabled.*

- ap\_paramList

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#### 6.26.1.1 `__str__()`

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

#### 6.26.1.2 `getConfig()`

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

##### Returns

configParser.ConfigParser object of configuration

#### 6.26.1.3 `getDataLocation()`

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name )
```

Get the location of data set.

##### Parameters

<i>data_name</i>	Name of data set
------------------	------------------

##### Returns

string of data location, None if not found

#### 6.26.1.4 `getMetadata()`

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

##### Returns

metadata of object.

#### 6.26.1.5 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherBase.multirun_enabled (
    self ) [inherited]
```

Returns whether or not this data fetcher is multirun enabled.

##### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

#### 6.26.1.6 output()

```
def skdaccess.framework.data_class.DataFetcherBase.output (
    self ) [inherited]
```

Output data wrapper.

##### Returns

Datawrapper

#### 6.26.1.7 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.26.1.8 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.26.1.9 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' )
```

Set the location of a data set.

## Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

## 6.26.1.10 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

## Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

## 6.26.2 Member Data Documentation

## 6.26.2.1 ap\_paramList

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList [inherited]
```

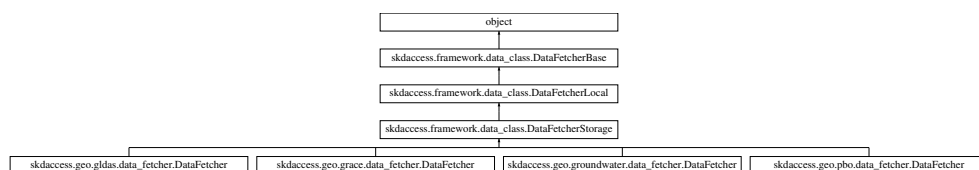
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.27 skdaccess.framework.data\_class.DataFetcherStorage Class Reference

Data fetcher base class for use when entire data set is downloaded.

Inheritance diagram for skdaccess.framework.data\_class.DataFetcherStorage:



## Public Member Functions

- def [downloadFullDataset](#) (cls, out\_file, use\_file=None)  
*Abstract function used to download full data set.*
- def [multirun\\_enabled](#) (self)  
*Returns whether or not this data fetcher is multirun enabled.*
- def [getDataLocation](#) (data\_name)  
*Get the location of data set.*
- def [setDataLocation](#) (data\_name, location, key='data\_location')  
*Set the location of a data set.*
- def [output](#) (self)  
*Output data wrapper.*
- def [perturb](#) (self)  
*Perturb parameters.*
- def [reset](#) (self)  
*Set all parameters to initial value.*
- def [\\_\\_str\\_\\_](#) (self)  
*Generate string description.*
- def [getMetadata](#) (self)  
*Return metadata about Data Fetcher.*
- def [getConfig](#) ()  
*Retrieve skdaccess configuration.*
- def [writeConfig](#) (conf)  
*Write config to disk.*

## Public Attributes

- [ap\\_paramList](#)

### 6.27.1 Detailed Description

Data fetcher base class for use when entire data set is downloaded.

### 6.27.2 Member Function Documentation

#### 6.27.2.1 [\\_\\_str\\_\\_\(\)](#)

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

### 6.27.2.2 downloadFullDataset()

```
def skdaccess.framework.data_class.DataFetcherStorage.downloadFullDataset (
    cls,
    out_file,
    use_file = None )
```

Abstract function used to download full data set.

#### Parameters

<i>out_file</i>	output file name
<i>use_file</i>	Use previously downloaded data

#### Returns

Absolute path of parsed data

### 6.27.2.3 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

#### Returns

configParser.ConfigParser object of configuration

### 6.27.2.4 getDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.getDataLocation (
    data_name ) [inherited]
```

Get the location of data set.

#### Parameters

<i>data_name</i>	Name of data set
------------------	------------------



**Returns**

string of data location, None if not found

**6.27.2.5 getMetadata()**

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

**Returns**

metadata of object.

**6.27.2.6 multirun\_enabled()**

```
def skdaccess.framework.data_class.DataFetcherStorage.multirun_enabled (
    self )
```

Returns whether or not this data fetcher is multirun enabled.

**Returns**

Boolean indicating whether or not this data fetcher is multirun enabled

**6.27.2.7 output()**

```
def skdaccess.framework.data_class.DataFetcherBase.output (
    self ) [inherited]
```

Output data wrapper.

**Returns**

Datawrapper

#### 6.27.2.8 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.27.2.9 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.27.2.10 setDataLocation()

```
def skdaccess.framework.data_class.DataFetcherLocal.setDataLocation (
    data_name,
    location,
    key = 'data_location' ) [inherited]
```

Set the location of a data set.

##### Parameters

<i>data_name</i>	Name of data set
<i>location</i>	Location of data set
<i>key</i>	Key of configuration option

#### 6.27.2.11 writeConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

##### Parameters

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

### 6.27.3 Member Data Documentation

#### 6.27.3.1 ap\_paramList

skdaccess.framework.data\_class.DataFetcherBase.ap\_paramList [inherited]

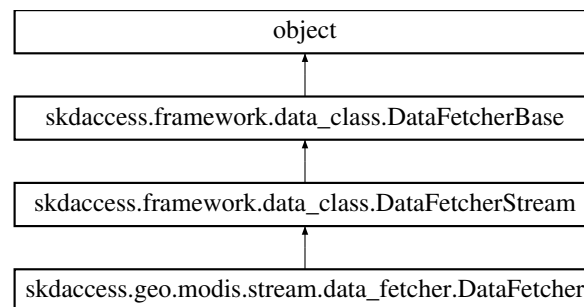
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.28 skdaccess.framework.data\_class.DataFetcherStream Class Reference

Data fetcher base class for downloading data into memory.

Inheritance diagram for skdaccess.framework.data\_class.DataFetcherStream:



### Public Member Functions

- def [retrieveOnlineData](#) (self, data\_specification)  
*Abstract class for downloading data into memory.*
- def [multirun\\_enabled](#) (self)  
*Returns whether or not this data fetcher is multirun enabled.*
- def [output](#) (self)  
*Output data wrapper.*
- def [perturb](#) (self)  
*Perturb parameters.*
- def [reset](#) (self)  
*Set all parameters to initial value.*
- def [\\_\\_str\\_\\_](#) (self)  
*Generate string description.*
- def [getMetadata](#) (self)  
*Return metadata about Data Fetcher.*
- def [getConfig](#) ()  
*Retrieve skdaccess configuration.*
- def [writeConfig](#) (conf)  
*Write config to disk.*

## Public Attributes

- [ap\\_paramList](#)

### 6.28.1 Detailed Description

Data fetcher base class for downloading data into memory.

### 6.28.2 Member Function Documentation

#### 6.28.2.1 \_\_str\_\_()

```
def skdaccess.framework.data_class.DataFetcherBase.__str__ (
    self ) [inherited]
```

Generate string description.

#### 6.28.2.2 getConfig()

```
def skdaccess.framework.data_class.DataFetcherBase.getConfig ( ) [inherited]
```

Retrieve skdaccess configuration.

#### Returns

configParser.ConfigParser object of configuration

#### 6.28.2.3 getMetadata()

```
def skdaccess.framework.data_class.DataFetcherBase.getMetadata (
    self ) [inherited]
```

Return metadata about Data Fetcher.

#### Returns

metadata of object.

#### 6.28.2.4 multirun\_enabled()

```
def skdaccess.framework.data_class.DataFetcherStream.multirun_enabled (
    self )
```

Returns whether or not this data fetcher is multirun enabled.

##### Returns

Boolean indicating whether or not this data fetcher is multirun enabled

#### 6.28.2.5 output()

```
def skdaccess.framework.data_class.DataFetcherBase.output (
    self ) [inherited]
```

Output data wrapper.

##### Returns

Datawrapper

#### 6.28.2.6 perturb()

```
def skdaccess.framework.data_class.DataFetcherBase.perturb (
    self ) [inherited]
```

Perturb parameters.

#### 6.28.2.7 reset()

```
def skdaccess.framework.data_class.DataFetcherBase.reset (
    self ) [inherited]
```

Set all parameters to initial value.

#### 6.28.2.8 retrieveOnlineData()

```
def skdaccess.framework.data_class.DataFetcherStream.retrieveOnlineData (
    self,
    data_specification )
```

Abstract class for downloading data into memory.

**Parameters**

<i>data_specification</i>	Data to be retrieved
---------------------------	----------------------

**Returns**

Retrieved data

**6.28.2.9 writeConfig()**

```
def skdaccess.framework.data_class.DataFetcherBase.writeConfig (
    conf ) [inherited]
```

Write config to disk.

**Parameters**

<i>conf</i>	configparser.ConfigParser object
-------------	----------------------------------

**6.28.3 Member Data Documentation****6.28.3.1 ap\_paramList**

```
skdaccess.framework.data_class.DataFetcherBase.ap_paramList [inherited]
```

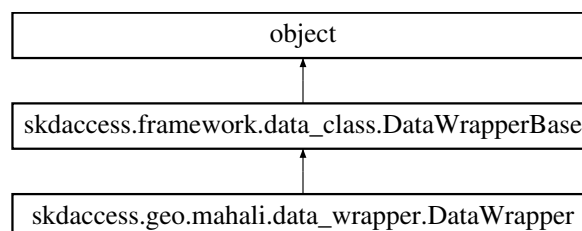
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

**6.29 skdaccess.geo.mahali.data\_wrapper.DataWrapper Class Reference**

Data wrapper for Mahali data.

Inheritance diagram for skdaccess.geo.mahali.data\_wrapper.DataWrapper:



## Public Member Functions

- def [getIterator](#) (self)  
*Get iterator to Mahali data.*
- def [update](#) (self, obj)  
*Updated wrapped data.*
- def [get](#) (self)  
*Retrieve stored data.*
- def [getResults](#) (self)  
*Retrieve accumulated results, if any.*
- def [addResult](#) (self, rkey, rres)  
*Add a result to the data wrapper.*
- def [reset](#) (self)  
*Reset data back to original state.*
- def [info](#) (self, key=None)  
*Get information about data wrapper.*

## Public Attributes

- [data](#)
- [results](#)
- [constants](#)
- [run\\_id](#)
- [meta\\_data](#)

### 6.29.1 Detailed Description

Data wrapper for Mahali data.

### 6.29.2 Member Function Documentation

#### 6.29.2.1 addResult()

```
def skdaccess.framework.data_class.DataWrapperBase.addResult (
    self,
    rkey,
    rres ) [inherited]
```

Add a result to the data wrapper.

**Parameters**

<i>rkey</i>	Result key
<i>rres</i>	Result

**6.29.2.2 get()**

```
def skdaccess.framework.data_class.DataWrapperBase.get (
    self ) [inherited]
```

Retrieve stored data.

**Returns**

Stored data

**6.29.2.3 getIterator()**

```
def skdaccess.geo.mahali.data_wrapper.DataWrapper.getIterator (
    self )
```

Get iterator to Mahali data.

**Returns**

Iterator yielding (site,date,nav,obs)

**6.29.2.4 getResults()**

```
def skdaccess.framework.data_class.DataWrapperBase.getResults (
    self ) [inherited]
```

Retrieve accumulated results, if any.

**Returns**

store results



#### 6.29.2.5 info()

```
def skdaccess.framework.data_class.DataWrapperBase.info (
    self,
    key = None ) [inherited]
```

Get information about data wrapper.

##### Returns

The stored metadata

#### 6.29.2.6 reset()

```
def skdaccess.framework.data_class.DataWrapperBase.reset (
    self ) [inherited]
```

Reset data back to original state.

#### 6.29.2.7 update()

```
def skdaccess.framework.data_class.DataWrapperBase.update (
    self,
    obj ) [inherited]
```

Updated wrapped data.

##### Parameters

<i>obj</i>	New data for wrapper
------------	----------------------

### 6.29.3 Member Data Documentation

#### 6.29.3.1 constants

```
skdaccess.framework.data_class.DataWrapperBase.constants [inherited]
```

### 6.29.3.2 data

`skdaccess.framework.data_class.DataWrapperBase.data` [inherited]

### 6.29.3.3 meta\_data

`skdaccess.framework.data_class.DataWrapperBase.meta_data` [inherited]

### 6.29.3.4 results

`skdaccess.framework.data_class.DataWrapperBase.results` [inherited]

### 6.29.3.5 run\_id

`skdaccess.framework.data_class.DataWrapperBase.run_id` [inherited]

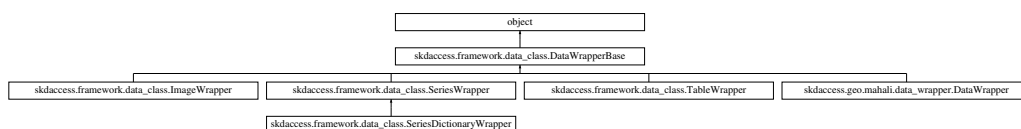
The documentation for this class was generated from the following file:

- [geo/mahali/data\\_wrapper.py](#)

## 6.30 skdaccess.framework.data\_class.DataWrapperBase Class Reference

Base class for wrapping data for use in DiscoveryPipeline.

Inheritance diagram for `skdaccess.framework.data_class.DataWrapperBase`:



## Public Member Functions

- `def __init__ (self, obj_wrap, run_id=-1, meta_data=None)`  
*Construct wrapper from input data.*
- `def update (self, obj)`  
*Updated wrapped data.*
- `def get (self)`  
*Retrieve stored data.*
- `def getResults (self)`  
*Retrieve accumulated results, if any.*
- `def addResult (self, rkey, rres)`  
*Add a result to the data wrapper.*
- `def reset (self)`  
*Reset data back to original state.*
- `def info (self, key=None)`  
*Get information about data wrapper.*
- `def getIterator (self)`  
*Get an iterator to the data.*

## Public Attributes

- `data`
- `results`
- `constants`
- `run_id`
- `meta_data`

### 6.30.1 Detailed Description

Base class for wrapping data for use in DiscoveryPipeline.

### 6.30.2 Constructor & Destructor Documentation

#### 6.30.2.1 \_\_init\_\_()

```
def skdaccess.framework.data_class.DataWrapperBase.__init__ (
    self,
    obj_wrap,
    run_id = -1,
    meta_data = None )
```

Construct wrapper from input data.

**Parameters**

<i>obj_wrap</i>	Data to be wrapped
<i>run_id</i>	ID of the run
<i>meta_data</i>	Metadata to store with data

**6.30.3 Member Function Documentation****6.30.3.1 addResult()**

```
def skdaccess.framework.data_class.DataWrapperBase.addResult (
    self,
    rkey,
    rres )
```

Add a result to the data wrapper.

**Parameters**

<i>rkey</i>	Result key
<i>rres</i>	Result

**6.30.3.2 get()**

```
def skdaccess.framework.data_class.DataWrapperBase.get (
    self )
```

Retrieve stored data.

**Returns**

Stored data

**6.30.3.3 getIterator()**

```
def skdaccess.framework.data_class.DataWrapperBase.getIterator (
    self )
```

Get an iterator to the data.

**Returns**

iterator to data

#### 6.30.3.4 `getResults()`

```
def skdaccess.framework.data_class.DataWrapperBase.getResults (
    self )
```

Retrieve accumulated results, if any.

##### Returns

store results

#### 6.30.3.5 `info()`

```
def skdaccess.framework.data_class.DataWrapperBase.info (
    self,
    key = None )
```

Get information about data wrapper.

##### Returns

The stored metadata

#### 6.30.3.6 `reset()`

```
def skdaccess.framework.data_class.DataWrapperBase.reset (
    self )
```

Reset data back to original state.

#### 6.30.3.7 `update()`

```
def skdaccess.framework.data_class.DataWrapperBase.update (
    self,
    obj )
```

Updated wrapped data.

**Parameters**

<i>obj</i>	New data for wrapper
------------	----------------------

**6.30.4 Member Data Documentation****6.30.4.1 constants**

`skdaccess.framework.data_class.DataWrapperBase.constants`

**6.30.4.2 data**

`skdaccess.framework.data_class.DataWrapperBase.data`

**6.30.4.3 meta\_data**

`skdaccess.framework.data_class.DataWrapperBase.meta_data`

**6.30.4.4 results**

`skdaccess.framework.data_class.DataWrapperBase.results`

**6.30.4.5 run\_id**

`skdaccess.framework.data_class.DataWrapperBase.run_id`

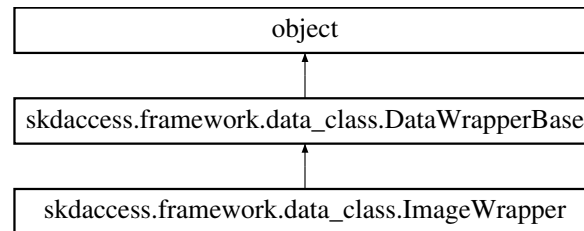
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.31 skdaccess.framework.data\_class.ImageWrapper Class Reference

Wrapper for image data.

Inheritance diagram for skdaccess.framework.data\_class.ImageWrapper:



### Public Member Functions

- def [getIterator](#) (self)  
*Get an iterator to the data.*
- def [updateData](#) (self, label, new\_data)  
*Change image.*
- def [deleteData](#) (self, label)  
*Delete image.*
- def [update](#) (self, obj)  
*Updated wrapped data.*
- def [get](#) (self)  
*Retrieve stored data.*
- def [getResults](#) (self)  
*Retrieve accumulated results, if any.*
- def [addResult](#) (self, rkey, rres)  
*Add a result to the data wrapper.*
- def [reset](#) (self)  
*Reset data back to original state.*
- def [info](#) (self, key=None)  
*Get information about data wrapper.*

### Public Attributes

- [data](#)
- [results](#)
- [constants](#)
- [run\\_id](#)
- [meta\\_data](#)

#### 6.31.1 Detailed Description

Wrapper for image data.

## 6.31.2 Member Function Documentation

### 6.31.2.1 addResult()

```
def skdaccess.framework.data_class.DataWrapperBase.addResult (
    self,
    rkey,
    rres ) [inherited]
```

Add a result to the data wrapper.

#### Parameters

<i>rkey</i>	Result key
<i>rres</i>	Result

### 6.31.2.2 deleteData()

```
def skdaccess.framework.data_class.ImageWrapper.deleteData (
    self,
    label )
```

Delete image.

#### Parameters

<i>label</i>	Delete image with label
--------------	-------------------------

### 6.31.2.3 get()

```
def skdaccess.framework.data_class.DataWrapperBase.get (
    self ) [inherited]
```

Retrieve stored data.

#### Returns

Stored data



#### 6.31.2.4 getIterator()

```
def skdaccess.framework.data_class.ImageWrapper.getIterator (
    self )
```

Get an iterator to the data.

##### Returns

Iterator yielding (label, image\_data)

#### 6.31.2.5 getResults()

```
def skdaccess.framework.data_class.DataWrapperBase.getResults (
    self ) [inherited]
```

Retrieve accumulated results, if any.

##### Returns

store results

#### 6.31.2.6 info()

```
def skdaccess.framework.data_class.DataWrapperBase.info (
    self,
    key = None ) [inherited]
```

Get information about data wrapper.

##### Returns

The stored metadata

#### 6.31.2.7 reset()

```
def skdaccess.framework.data_class.DataWrapperBase.reset (
    self ) [inherited]
```

Reset data back to original state.

#### 6.31.2.8 update()

```
def skdaccess.framework.data_class.DataWrapperBase.update (
    self,
    obj ) [inherited]
```

Updated wrapped data.

**Parameters**

<i>obj</i>	New data for wrapper
------------	----------------------

**6.31.2.9 updateData()**

```
def skdaccess.framework.data_class.ImageWrapper.updateData (
    self,
    label,
    new_data )
```

Change image.

**Parameters**

<i>label</i>	Label of data to be changed
<i>new_data</i>	New data to replace old data

**6.31.3 Member Data Documentation****6.31.3.1 constants**

```
skdaccess.framework.data_class.DataWrapperBase.constants [inherited]
```

**6.31.3.2 data**

```
skdaccess.framework.data_class.DataWrapperBase.data [inherited]
```

**6.31.3.3 meta\_data**

```
skdaccess.framework.data_class.DataWrapperBase.meta_data [inherited]
```

#### 6.31.3.4 results

`skdaccess.framework.data_class.DataWrapperBase.results` [inherited]

#### 6.31.3.5 run\_id

`skdaccess.framework.data_class.DataWrapperBase.run_id` [inherited]

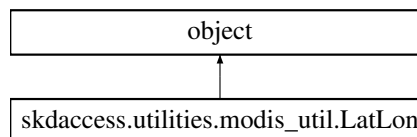
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.32 skdaccess.utilities.modis\_util.LatLon Class Reference

Calculates Lat/Lon position from y,x pixel coordinate.

Inheritance diagram for `skdaccess.utilities.modis_util.LatLon`:



### Public Member Functions

- `def __init__(self, metadata, x\_offset=0, y\_offset=0)`  
*Initialize getLatLon object.*
- `def \_\_call\_\_(self, y, x)`  
*Convert pixel coordinates to lat/lon.*

### Public Attributes

- [x\\_offset](#)
- [y\\_offset](#)
- [lat\\_data](#)
- [lon\\_data](#)
- [alat](#)
- [alon](#)

### 6.32.1 Detailed Description

Calculates Lat/Lon position from y,x pixel coordinate.

### 6.32.2 Constructor & Destructor Documentation

#### 6.32.2.1 `__init__()`

```
def skdaccess.utilities.modis_util.LatLon.__init__ (
    self,
    metadata,
    x_offset = 0,
    y_offset = 0 )
```

Initialize getLatLon object.

##### Parameters

<i>metadata</i>	Image metadata
<i>x_offset</i>	Pixel offset (used when gridding data)
<i>y_offset</i>	Pixel offset (used when gridding data)

### 6.32.3 Member Function Documentation

#### 6.32.3.1 `__call__()`

```
def skdaccess.utilities.modis_util.LatLon.__call__ (
    self,
    y,
    x )
```

Convert pixel coordinates to lat/lon.

##### Parameters

<i>y</i>	y coordinate
<i>x</i>	x coordinate

**Returns**

(lat, lon)

**6.32.4 Member Data Documentation****6.32.4.1 alat**

`skdaccess.utilities.modis_util.LatLon.alat`

**6.32.4.2 alon**

`skdaccess.utilities.modis_util.LatLon.alon`

**6.32.4.3 lat\_data**

`skdaccess.utilities.modis_util.LatLon.lat_data`

**6.32.4.4 lon\_data**

`skdaccess.utilities.modis_util.LatLon.lon_data`

**6.32.4.5 x\_offset**

`skdaccess.utilities.modis_util.LatLon.x_offset`

**6.32.4.6 y\_offset**

`skdaccess.utilities.modis_util.LatLon.y_offset`

The documentation for this class was generated from the following file:

- [utilities/modis\\_util.py](#)

## 6.33 skdaccess.utilities.map\_util.Planet Class Reference

A class for storing variables about a planetary body.

### Public Member Functions

- `def __init__ (self, name)`  
*Initialize [Planet](#) object.*
- `def get\_lateraldist\_array (self, ppd)`  
*Retrieve the lateral distance array.*
- `def get\_lateraldist (self, lats, ppd)`  
*Get the lateral distance in meters for an input of lats.*
- `def get\_medialdist (self, lats, ppd)`  
*Get the medial distance at specific latitudes.*

### Public Attributes

- [a](#)
- [b](#)
- [e\\_sq](#)
- [equator\\_1deg](#)
- [avg\\_radius](#)

### 6.33.1 Detailed Description

A class for storing variables about a planetary body.

### 6.33.2 Constructor & Destructor Documentation

#### 6.33.2.1 `__init__()`

```
def skdaccess.utilities.map_util.Planet.__init__ (
    self,
    name )
```

Initialize [Planet](#) object.

#### Parameters

<i>name</i>	The name of the planetary body choice of ('earth', 'wgs84', 'grs80', or 'moon'). 'wgs84' and 'earth' provide the same planet.
-------------	---

### 6.33.3 Member Function Documentation

#### 6.33.3.1 get\_lateraldist()

```
def skdaccess.utilities.map_util.Planet.get_lateraldist (
    self,
    lats,
    ppd )
```

Get the lateral distance in meters for an input of lats.

##### Parameters

<i>lats</i>	Either a scalar or an array of latitudes
<i>ppd</i>	Pixels per degree of latitude

##### Returns

Lateral distance at each latitude in meters

#### 6.33.3.2 get\_lateraldist\_array()

```
def skdaccess.utilities.map_util.Planet.get_lateraldist_array (
    self,
    ppd )
```

Retrieve the lateral distance array.

Get an array of the lateral size of 1/ppd of a degree of longitude at every 1/ppd of a degree of latitude. Results given in meters.

Example input of ppd = 1 for the body "Earth" results in an array 180 cells long with lateraldist\_array[90] = 111 (m).

##### Parameters

<i>ppd</i>	the number of pixels-per-degree-of-latitude; the resulting array will therefore be (180*ppd) cells tall
------------	---

##### Returns

lateraldist\_array: an array of the size (in meters) of 1 degree of longitude at each 1/ppd-th of a degree of latitude

### 6.33.3.3 `get_medialdist()`

```
def skdaccess.utilities.map_util.Planet.get_medialdist (
    self,
    lats,
    ppd )
```

Get the medial distance at specific latitudes.

#### Parameters

<i>lats</i>	Either a scalar or an array of latitudes
<i>ppd</i>	Pixels per degree of latitude

#### Returns

Medial distance at each latitude in meters

## 6.33.4 Member Data Documentation

### 6.33.4.1 `a`

```
skdaccess.utilities.map_util.Planet.a
```

### 6.33.4.2 `avg_radius`

```
skdaccess.utilities.map_util.Planet.avg_radius
```

### 6.33.4.3 `b`

```
skdaccess.utilities.map_util.Planet.b
```

### 6.33.4.4 `e_sq`

```
skdaccess.utilities.map_util.Planet.e_sq
```



## 6.33.4.5 equator\_1deg

```
skdaccess.utilities.map_util.Planet.equator_1deg
```

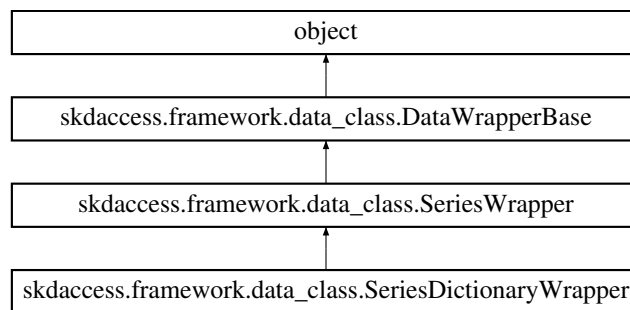
The documentation for this class was generated from the following file:

- [utilities/map\\_util.py](#)

## 6.34 skdaccess.framework.data\_class.SeriesDictionaryWrapper Class Reference

Data wrapper for series data using a dictionary of data frames.

Inheritance diagram for skdaccess.framework.data\_class.SeriesDictionaryWrapper:



## Public Member Functions

- def [getIterator](#) (self)  
*Get an iterator to the data.*
- def [getIndices](#) (self)  
*Get the indices of the data.*
- def [getLength](#) (self)  
*Get total number of series that the iterate will loop over.*
- def [update](#) (self, obj)  
*Updated wrapped data.*
- def [get](#) (self)  
*Retrieve stored data.*
- def [getResults](#) (self)  
*Retrieve accumulated results, if any.*
- def [addResult](#) (self, rkey, rres)  
*Add a result to the data wrapper.*
- def [reset](#) (self)  
*Reset data back to original state.*
- def [info](#) (self, key=None)  
*Get information about data wrapper.*

## Public Attributes

- [data\\_names](#)
- [error\\_names](#)
- [data](#)
- [results](#)
- [constants](#)
- [run\\_id](#)
- [meta\\_data](#)

### 6.34.1 Detailed Description

Data wrapper for series data using a dictionary of data frames.

### 6.34.2 Member Function Documentation

#### 6.34.2.1 `addResult()`

```
def skdaccess.framework.data_class.DataWrapperBase.addResult (
    self,
    rkey,
    rres ) [inherited]
```

Add a result to the data wrapper.

#### Parameters

<i>rkey</i>	Result key
<i>rres</i>	Result

#### 6.34.2.2 `get()`

```
def skdaccess.framework.data_class.DataWrapperBase.get (
    self ) [inherited]
```

Retrieve stored data.

#### Returns

Stored data

#### 6.34.2.3 getIndices()

```
def skdaccess.framework.data_class.SeriesDictionaryWrapper.getIndices (
    self )
```

Get the indices of the data.

##### Returns

index of data

#### 6.34.2.4 getIterator()

```
def skdaccess.framework.data_class.SeriesDictionaryWrapper.getIterator (
    self )
```

Get an iterator to the data.

##### Returns

Iterator (label, data, errors) that will cycle over data and error names

#### 6.34.2.5 getLength()

```
def skdaccess.framework.data_class.SeriesDictionaryWrapper.getLength (
    self )
```

Get total number of series that the iterate will loop over.

##### Returns

Number of series iterator will traverse over

#### 6.34.2.6 getResults()

```
def skdaccess.framework.data_class.DataWrapperBase.getResults (
    self ) [inherited]
```

Retrieve accumulated results, if any.

##### Returns

store results

#### 6.34.2.7 info()

```
def skdaccess.framework.data_class.DataWrapperBase.info (
    self,
    key = None ) [inherited]
```

Get information about data wrapper.

##### Returns

The stored metadata

#### 6.34.2.8 reset()

```
def skdaccess.framework.data_class.DataWrapperBase.reset (
    self ) [inherited]
```

Reset data back to original state.

#### 6.34.2.9 update()

```
def skdaccess.framework.data_class.DataWrapperBase.update (
    self,
    obj ) [inherited]
```

Updated wrapped data.

##### Parameters

<i>obj</i>	New data for wrapper
------------	----------------------

### 6.34.3 Member Data Documentation

#### 6.34.3.1 constants

```
skdaccess.framework.data_class.DataWrapperBase.constants [inherited]
```

#### 6.34.3.2 data

`skdaccess.framework.data_class.DataWrapperBase.data` [inherited]

#### 6.34.3.3 data\_names

`skdaccess.framework.data_class.SeriesWrapper.data_names` [inherited]

#### 6.34.3.4 error\_names

`skdaccess.framework.data_class.SeriesWrapper.error_names` [inherited]

#### 6.34.3.5 meta\_data

`skdaccess.framework.data_class.DataWrapperBase.meta_data` [inherited]

#### 6.34.3.6 results

`skdaccess.framework.data_class.DataWrapperBase.results` [inherited]

#### 6.34.3.7 run\_id

`skdaccess.framework.data_class.DataWrapperBase.run_id` [inherited]

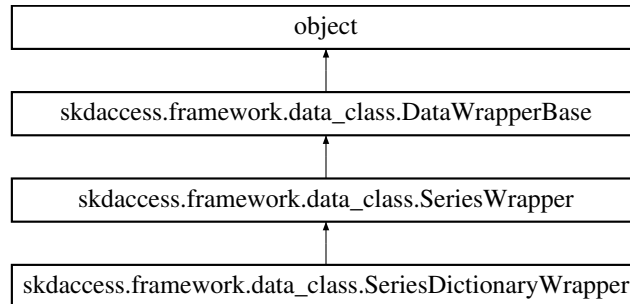
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.35 skdaccess.framework.data\_class.SeriesWrapper Class Reference

Data wrapper for series data using a data panel.

Inheritance diagram for skdaccess.framework.data\_class.SeriesWrapper:



### Public Member Functions

- `def __init__ (self, obj_wrap, data_names, error_names=None, meta_data=None, run_id=-1)`  
*Initialize Series Wrapper.*
- `def getIterator (self)`  
*Get an iterator to the data.*
- `def getIndices (self)`  
*Get the indices of the data.*
- `def getLength (self)`  
*Get total number of series that the iterate will loop over.*
- `def update (self, obj)`  
*Updated wrapped data.*
- `def get (self)`  
*Retrieve stored data.*
- `def getResult (self)`  
*Retrieve accumulated results, if any.*
- `def addResult (self, rkey, rres)`  
*Add a result to the data wrapper.*
- `def reset (self)`  
*Reset data back to original state.*
- `def info (self, key=None)`  
*Get information about data wrapper.*

### Public Attributes

- `data_names`
- `error_names`
- `data`
- `results`
- `constants`
- `run_id`
- `meta_data`

### 6.35.1 Detailed Description

Data wrapper for series data using a data panel.

### 6.35.2 Constructor & Destructor Documentation

#### 6.35.2.1 \_\_init\_\_()

```
def skdaccess.framework.data_class.SeriesWrapper.__init__ (
    self,
    obj_wrap,
    data_names,
    error_names = None,
    meta_data = None,
    run_id = -1 )
```

Initialize Series Wrapper.

#### Parameters

<i>obj_wrap</i>	Pandas data panel to wrap
<i>data_names</i>	List of data column names
<i>error_names</i>	List of error column names
<i>meta_data</i>	Metadata
<i>run_id</i>	ID of run

### 6.35.3 Member Function Documentation

#### 6.35.3.1 addResult()

```
def skdaccess.framework.data_class.DataWrapperBase.addResult (
    self,
    rkey,
    rres ) [inherited]
```

Add a result to the data wrapper.

#### Parameters

<i>rkey</i>	Result key
<i>rres</i>	Result

### 6.35.3.2 `get()`

```
def skdaccess.framework.data_class.DataWrapperBase.get (
    self ) [inherited]
```

Retrieve stored data.

#### Returns

Stored data

### 6.35.3.3 `getIndices()`

```
def skdaccess.framework.data_class.SeriesWrapper.getIndices (
    self )
```

Get the indices of the data.

#### Returns

index of data

### 6.35.3.4 `getIterator()`

```
def skdaccess.framework.data_class.SeriesWrapper.getIterator (
    self )
```

Get an iterator to the data.

#### Returns

Iterator (label, data, errors) that will cycle over data and error names



#### 6.35.3.5 getLength()

```
def skdaccess.framework.data_class.SeriesWrapper.getLength (
    self )
```

Get total number of series that the iterate will loop over.

##### Returns

Number of series iterator will traverse over

#### 6.35.3.6 getResults()

```
def skdaccess.framework.data_class.DataWrapperBase.getResults (
    self ) [inherited]
```

Retrieve accumulated results, if any.

##### Returns

store results

#### 6.35.3.7 info()

```
def skdaccess.framework.data_class.DataWrapperBase.info (
    self,
    key = None ) [inherited]
```

Get information about data wrapper.

##### Returns

The stored metadata

#### 6.35.3.8 reset()

```
def skdaccess.framework.data_class.DataWrapperBase.reset (
    self ) [inherited]
```

Reset data back to original state.

#### 6.35.3.9 update()

```
def skdaccess.framework.data_class.DataWrapperBase.update (
    self,
    obj ) [inherited]
```

Updated wrapped data.

**Parameters**

<i>obj</i>	New data for wrapper
------------	----------------------

**6.35.4 Member Data Documentation****6.35.4.1 constants**

`skdaccess.framework.data_class.DataWrapperBase.constants` [inherited]

**6.35.4.2 data**

`skdaccess.framework.data_class.DataWrapperBase.data` [inherited]

**6.35.4.3 data\_names**

`skdaccess.framework.data_class.SeriesWrapper.data_names`

**6.35.4.4 error\_names**

`skdaccess.framework.data_class.SeriesWrapper.error_names`

**6.35.4.5 meta\_data**

`skdaccess.framework.data_class.DataWrapperBase.meta_data` [inherited]

## 6.35.4.6 results

```
skdaccess.framework.data_class.DataWrapperBase.results [inherited]
```

## 6.35.4.7 run\_id

```
skdaccess.framework.data_class.DataWrapperBase.run_id [inherited]
```

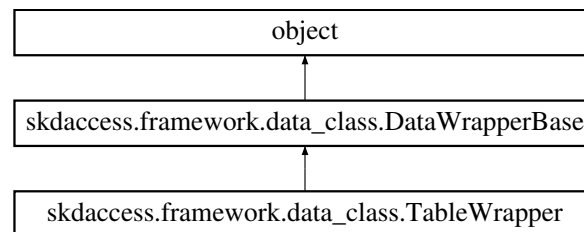
The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)

## 6.36 skdaccess.framework.data\_class.TableWrapper Class Reference

Data wrapper for table data using an ordered dictionary.

Inheritance diagram for skdaccess.framework.data\_class.TableWrapper:



## Public Member Functions

- def `__init__` (self, obj\_wrap, [run\\_id](#)=-1, [meta\\_data](#)=None, [default\\_columns](#)=None, [default\\_error\\_columns](#)=None)  
*Construct object from input data.*
- def [getIterator](#) (self)  
*Iterator access to data.*
- def [getLength](#) (self)  
*Get number of data frames.*
- def [updateData](#) (self, label, index, column\_names, new\_data)  
*Update wrapped data.*
- def [addColumn](#) (self, label, column\_names, new\_data)  
*Add new column to data.*
- def [getDefaultColumns](#) (self)  
*Get the default columns of data.*
- def [getDefaultErrorColumns](#) (self)  
*Get the default error columns of data.*

- def `removeFrames` (self, label\_list)  
*Remove Data Frames from wrapper.*
- def `updateFrames` (self, label\_list, frame\_list)  
*Update data frames.*
- def `update` (self, obj)  
*Updated wrapped data.*
- def `get` (self)  
*Retrieve stored data.*
- def `getResults` (self)  
*Retrieve accumulated results, if any.*
- def `addResult` (self, rkey, rres)  
*Add a result to the data wrapper.*
- def `reset` (self)  
*Reset data back to original state.*
- def `info` (self, key=None)  
*Get information about data wrapper.*

## Public Attributes

- `default_columns`
- `default_error_columns`
- `data`
- `results`
- `constants`
- `run_id`
- `meta_data`

## 6.36.1 Detailed Description

Data wrapper for table data using an ordered dictionary.

## 6.36.2 Constructor & Destructor Documentation

### 6.36.2.1 `__init__()`

```
def skdaccess.framework.data_class.TableWrapper.__init__ (
    self,
    obj_wrap,
    run_id = -1,
    meta_data = None,
    default_columns = None,
    default_error_columns = None )
```

Construct object from input data.

## Parameters

<i>obj_wrap</i>	Data to be wrapped
<i>run_id</i>	ID of the run
<i>meta_data</i>	Metadata to store with data
<i>default_columns</i>	Default columns for pipeline items
<i>default_error_columns</i>	Default error columns for pipeline items

### 6.36.3 Member Function Documentation

#### 6.36.3.1 addColumn()

```
def skdaccess.framework.data_class.TableWrapper.addColumn (
    self,
    label,
    column_names,
    new_data )
```

Add new column to data.

## Parameters

<i>label</i>	Data label
<i>column_names</i>	Names of columns to update
<i>new_data</i>	New data to add

#### 6.36.3.2 addResult()

```
def skdaccess.framework.data_class.DataWrapperBase.addResult (
    self,
    rkey,
    rres ) [inherited]
```

Add a result to the data wrapper.

## Parameters

<i>rkey</i>	Result key
<i>rres</i>	Result

### 6.36.3.3 `get()`

```
def skdaccess.framework.data_class.DataWrapperBase.get (
    self ) [inherited]
```

Retrieve stored data.

#### Returns

Stored data

### 6.36.3.4 `getDefaultColumns()`

```
def skdaccess.framework.data_class.TableWrapper.getDefaultColumns (
    self )
```

Get the default columns of data.

#### Returns

List of default columns

### 6.36.3.5 `getDefaultErrorColumns()`

```
def skdaccess.framework.data_class.TableWrapper.getDefaultErrorColumns (
    self )
```

Get the default error columns of data.

#### Returns

List of default error columns

#### 6.36.3.6 getIterator()

```
def skdaccess.framework.data_class.TableWrapper.getIterator (
    self )
```

Iterator access to data.

##### Returns

iterator to (label, data frame) from Dictionary

#### 6.36.3.7 getLength()

```
def skdaccess.framework.data_class.TableWrapper.getLength (
    self )
```

Get number of data frames.

##### Returns

Number of data frames

#### 6.36.3.8 getResults()

```
def skdaccess.framework.data_class.DataWrapperBase.getResults (
    self ) [inherited]
```

Retrieve accumulated results, if any.

##### Returns

store results

#### 6.36.3.9 info()

```
def skdaccess.framework.data_class.DataWrapperBase.info (
    self,
    key = None ) [inherited]
```

Get information about data wrapper.

##### Returns

The stored metadata

#### 6.36.3.10 removeFrames()

```
def skdaccess.framework.data_class.TableWrapper.removeFrames (
    self,
    label_list )
```

Remove Data Frames from wrapper.



## Parameters

<i>label_list</i>	List of labels to remove
-------------------	--------------------------

## 6.36.3.11 reset()

```
def skdaccess.framework.data_class.DataWrapperBase.reset (
    self ) [inherited]
```

Reset data back to original state.

## 6.36.3.12 update()

```
def skdaccess.framework.data_class.DataWrapperBase.update (
    self,
    obj ) [inherited]
```

Updated wrapped data.

## Parameters

<i>obj</i>	New data for wrapper
------------	----------------------

## 6.36.3.13 updateData()

```
def skdaccess.framework.data_class.TableWrapper.updateData (
    self,
    label,
    index,
    column_names,
    new_data )
```

Update wrapped data.

## Parameters

<i>label</i>	Data label
<i>index</i>	Index of data to update
<i>column_names</i>	Names of columns to update
<i>new_data</i>	Data to replace the old data

#### 6.36.3.14 updateFrames()

```
def skdaccess.framework.data_class.TableWrapper.updateFrames (
    self,
    label_list,
    frame_list )
```

Update data frames.

##### Parameters

<i>label_list</i>	List of labels to update
<i>frame_list</i>	List of updated frames

### 6.36.4 Member Data Documentation

#### 6.36.4.1 constants

```
skdaccess.framework.data_class.DataWrapperBase.constants [inherited]
```

#### 6.36.4.2 data

```
skdaccess.framework.data_class.DataWrapperBase.data [inherited]
```

#### 6.36.4.3 default\_columns

```
skdaccess.framework.data_class.TableWrapper.default_columns
```

#### 6.36.4.4 default\_error\_columns

```
skdaccess.framework.data_class.TableWrapper.default_error_columns
```

#### 6.36.4.5 meta\_data

`skdaccess.framework.data_class.DataWrapperBase.meta_data` [inherited]

#### 6.36.4.6 results

`skdaccess.framework.data_class.DataWrapperBase.results` [inherited]

#### 6.36.4.7 run\_id

`skdaccess.framework.data_class.DataWrapperBase.run_id` [inherited]

The documentation for this class was generated from the following file:

- framework/[data\\_class.py](#)



## Chapter 7

# File Documentation

### 7.1 astro/kepler/data\_fetcher.py File Reference

#### Classes

- class [skdaccess.astro.kepler.DataFetcher](#)  
*Data Fetcher for Kepler light curve data.*

#### Namespaces

- [skdaccess.astro.kepler.data\\_fetcher](#)

### 7.2 geo/gldas/data\_fetcher.py File Reference

#### Classes

- class [skdaccess.geo.gldas.DataFetcher](#)  
*Data Fetcher for GLDAS data.*

#### Namespaces

- [skdaccess.geo.gldas.data\\_fetcher](#)

### 7.3 geo/grace/data\_fetcher.py File Reference

#### Classes

- class [skdaccess.geo.grace.DataFetcher](#)  
*Data Fetcher for GRACE data.*

## Namespaces

- [skdaccess.geo.grace.data\\_fetcher](#)

## 7.4 geo/groundwater/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.groundwater.DataFetcher](#)  
*Generates Data Wrappers of groundwater measurements taken in the US.*

## Namespaces

- [skdaccess.geo.groundwater.data\\_fetcher](#)

## 7.5 geo/mahali/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.mahali.DataFetcher](#)  
*Data Fetcher for Mahali Data.*

## Namespaces

- [skdaccess.geo.mahali.data\\_fetcher](#)

## 7.6 geo/modis/cache/cloud\_mask/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.cache.cloud\\_mask.DataFetcher](#)  
*Data Fetcher for MODIS Cloud Mask.*

## Namespaces

- [skdaccess.geo.modis.cache.cloud\\_mask.data\\_fetcher](#)

## 7.7 geo/modis/cache/cloud\_opacity/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.cache.cloud\\_opacity.DataFetcher](#)  
*Data Fetcher for MODIS Cloud Opacity.*

### Namespaces

- [skdaccess.geo.modis.cache.cloud\\_opacity.data\\_fetcher](#)

## 7.8 geo/modis/cache/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.cache.DataFetcher](#)  
*Data Fetcher for MODIS data.*

### Namespaces

- [skdaccess.geo.modis.cache.data\\_fetcher](#)

## 7.9 geo/modis/cache/reflectance/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.cache.reflectance.DataFetcher](#)  
*Data fetcher for the modis surface reflectance product ('09', 1 km resolution)*

### Namespaces

- [skdaccess.geo.modis.cache.reflectance.data\\_fetcher](#)

## 7.10 geo/modis/stream/cloud\_mask/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.stream.cloud\\_mask.DataFetcher](#)  
*Data Fetcher for MODIS Cloud Mask.*

## Namespaces

- [skdaccess.geo.modis.stream.cloud\\_mask.data\\_fetcher](#)

## 7.11 geo/modis/stream/cloud\_opacity/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.stream.cloud\\_opacity.DataFetcher](#)  
*Data Fetcher for MODIS Cloud Opacity.*

## Namespaces

- [skdaccess.geo.modis.stream.cloud\\_opacity.data\\_fetcher](#)

## 7.12 geo/modis/stream/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.stream.DataFetcher](#)  
*Data Fetcher for MODIS data.*

## Namespaces

- [skdaccess.geo.modis.stream.data\\_fetcher](#)

## 7.13 geo/modis/stream/reflectance/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.modis.stream.reflectance.DataFetcher](#)  
*Data fetcher for the modis surface reflectance product ('09', 1 km resolution)*

## Namespaces

- [skdaccess.geo.modis.stream.reflectance.data\\_fetcher](#)



## 7.14 geo/pbo/data\_fetcher.py File Reference

### Classes

- class [skdaccess.geo.pbo.DataFetcher](#)  
*Data fetcher for PBO GPS data.*

### Namespaces

- [skdaccess.geo.pbo.data\\_fetcher](#)

## 7.15 bin/skdaccess.py File Reference

### Namespaces

- [skdaccess.bin.skdaccess](#)

### Functions

- def [skdaccess.bin.skdaccess.skdaccess\\_script\(\)](#)  
*This function defines a script for downloading data.*

## 7.16 examples/groundwater\_example.py File Reference

### Namespaces

- [groundwater\\_example](#)

### Variables

- [groundwater\\_example.fullIDF](#)
- [groundwater\\_example.fullIDW](#) = [fullIDF.output\(\)](#)
- [groundwater\\_example.meta\\_data](#) = [WDF.getStationMetadata\(\)](#)
- [groundwater\\_example.dataIt](#) = [fullIDW.getIterator\(\)](#)
- [groundwater\\_example.label\\_1](#)
- [groundwater\\_example.data\\_1](#)
- [groundwater\\_example.label\\_2](#)
- [groundwater\\_example.data\\_2](#)
- [groundwater\\_example.color](#)

## 7.17 framework/data\_class.py File Reference

### Classes

- class [skdaccess.framework.data\\_class.DataFetcherBase](#)  
*Base class for all data fetchers.*
- class [skdaccess.framework.data\\_class.DataFetcherLocal](#)
- class [skdaccess.framework.data\\_class.DataFetcherStorage](#)  
*Data fetcher base class for use when entire data set is downloaded.*
- class [skdaccess.framework.data\\_class.DataFetcherStream](#)  
*Data fetcher base class for downloading data into memory.*
- class [skdaccess.framework.data\\_class.DataFetcherCache](#)  
*Data fetcher base class for downloading data and caching results on hard disk.*
- class [skdaccess.framework.data\\_class.DataWrapperBase](#)  
*Base class for wrapping data for use in DiscoveryPipeline.*
- class [skdaccess.framework.data\\_class.SeriesWrapper](#)  
*Data wrapper for series data using a data panel.*
- class [skdaccess.framework.data\\_class.SeriesDictionaryWrapper](#)  
*Data wrapper for series data using a dictionary of data frames.*
- class [skdaccess.framework.data\\_class.TableWrapper](#)  
*Data wrapper for table data using an ordered dictionary.*
- class [skdaccess.framework.data\\_class.ImageWrapper](#)  
*Wrapper for image data.*

### Namespaces

- [skdaccess.framework.data\\_class](#)

## 7.18 framework/param\_class.py File Reference

### Classes

- class [skdaccess.framework.param\\_class.AutoParam](#)  
*Defines a tunable parameter class inherited by specific subclasses.*
- class [skdaccess.framework.param\\_class.AutoParamMinMax](#)  
*A tunable parameter with min and max ranges, perturbs to a random value in range.*
- class [skdaccess.framework.param\\_class.AutoParamList](#)  
*A tunable parameter with a specified list of choices that can be randomly selected via perturb.*
- class [skdaccess.framework.param\\_class.AutoParamListCycle](#)  
*Cycles through a list of paramters.*
- class [skdaccess.framework.param\\_class.AutoList](#)  
*Specifies a list for returning selections of lists, as opposed to a single element.*
- class [skdaccess.framework.param\\_class.AutoListSubset](#)  
*An [AutoList](#) perturber that creates random subsets of a list.*
- class [skdaccess.framework.param\\_class.AutoListPermute](#)  
*A perturber that permutes a list.*
- class [skdaccess.framework.param\\_class.AutoListRemove](#)  
*Removes a different single element from the initial list at each perturb call.*
- class [skdaccess.framework.param\\_class.AutoListCycle](#)  
*An Autolist that cycles through different lists.*

## Namespaces

- [skdaccess.framework.param\\_class](#)

## 7.19 geo/mahali/data\_wrapper.py File Reference

### Classes

- class [skdaccess.geo.mahali.data\\_wrapper.DataWrapper](#)  
*Data wrapper for Mahali data.*

## Namespaces

- [skdaccess.geo.mahali.data\\_wrapper](#)

## 7.20 utilities/grace\_util.py File Reference

### Namespaces

- [skdaccess.utilities.grace\\_util](#)

### Functions

- def [skdaccess.utilities.grace\\_util.average\\_dates](#) (dates, round\_nearest\_day=False)  
*Compute the average of a pandas series of timestamps.*
- def [skdaccess.utilities.grace\\_util.dateMismatch](#) (dates, days=10)  
*Check if dates are not within a certain number of days of each other.*
- def [skdaccess.utilities.grace\\_util.compute\\_ewd](#) (grace\_data, scale\_factor, round\_nearest\_day=False)  
*Compute scale corrected equivalent water depth.*
- def [skdaccess.utilities.grace\\_util.read\\_grace\\_data](#) (filename, lat\_name, lon\_name, data\_name, time=None)  
*This function reads in netcdf data provided by GRACE Tellus.*

## 7.21 utilities/gw\_util.py File Reference

### Namespaces

- [skdaccess.utilities.gw\\_util](#)

## Functions

- def [skdaccess.utilities.gw\\_util.combine\\_water\\_heights](#) (in\_data)  
*Combine median and average water heights.*

## 7.22 utilities/kepler\_util.py File Reference

### Namespaces

- [skdaccess.utilities.kepler\\_util](#)

### Functions

- def [skdaccess.utilities.kepler\\_util.normalize](#) (in\_data, column='PDCSAP\_FLUX', group\_column='QUARTER')  
*This function normalizes PDCSAP\_FLUX data by quarter by dividing the flux by the median for the quarter.*

## 7.23 utilities/map\_util.py File Reference

### Classes

- class [skdaccess.utilities.map\\_util.Planet](#)  
*A class for storing variables about a planetary body.*

### Namespaces

- [skdaccess.utilities.map\\_util](#)

### Functions

- def [skdaccess.utilities.map\\_util.sanitize\\_latlon](#) (lat\_lon\_tuple, ppd=1, start\_from\_90N=False)  
*Wraps around latitude & longitudes, including interpretation of points past the poles.*
- def [skdaccess.utilities.map\\_util.trim\\_map](#) (array, ppd, nswe, lat\_npole=90, lon\_offset=0)  
*Returns a copy of a map/array trimmed to the given N, S, W, E extents.*
- def [skdaccess.utilities.map\\_util.calc\\_slopes](#) (topo\_array, ppd, planet, scaled=True, nswe="global", lon\_offset=0, lat\_npole=90)  
*Calculate a slope map from a topographic dataset.*
- def [skdaccess.utilities.map\\_util.wgs84\\_distance](#) (point1, point2, planet=Planet("wgs84"), miles=False)  
*Vincenty distance adapted from public domain vincenty package.*
- def [skdaccess.utilities.map\\_util.global\\_coords](#) (x\_in, y\_in, coeffs)  
*Transform pixel coordinates into global coords using affine transformation coefficients.*
- def [skdaccess.utilities.map\\_util.gps2pixel](#) (gpsmethod, gps\_coord, init\_guess)  
*Function for finding the pixel coordinate associated with a gps coordinate.*

## 7.24 utilities/modis\_util.py File Reference

### Classes

- class [skdaccess.utilities.modis\\_util.LatLon](#)  
*Calculates Lat/Lon position from y,x pixel coordinate.*

### Namespaces

- [skdaccess.utilities.modis\\_util](#)

### Functions

- def [skdaccess.utilities.modis\\_util.getImageType](#) (in\_data)  
*Determine what type of modis data is being processed.*
- def [skdaccess.utilities.modis\\_util.calibrateModis](#) (data, metadata)  
*This function calibrates input modis data.*
- def [skdaccess.utilities.modis\\_util.gps2pixel](#) (gpsmethod, gps\_coord, bounds)  
*Function for finding the pixel coordinate associated with a gps coordinate.*
- def [skdaccess.utilities.modis\\_util.rescale](#) (in\_array, max\_val=0.9, min\_val=-0.01)  
*This function rescales an image to fall between 0 and 1.*
- def [skdaccess.utilities.modis\\_util.checkBit](#) (data, bit)  
*Get the bit value from a bit flag.*
- def [skdaccess.utilities.modis\\_util.createGrid](#) (data, y\_start, y\_end, x\_start, x\_end, y\_grid, x\_grid, dtype, grid\_fill=np.nan)  
*Subsets image data into a smaller image.*
- def [skdaccess.utilities.modis\\_util.getFileIDs](#) (modis\_identifier, start\_date, end\_date, lat, lon, daynightboth)  
*Retrieve file IDs for images matching search parameters.*
- def [skdaccess.utilities.modis\\_util.getFileURLs](#) (file\_ids)  
*Retrieve the ftp location for a list of file IDs.*
- def [skdaccess.utilities.modis\\_util.getModisData](#) (dataset, variable\_name)  
*Loads modis data.*
- def [skdaccess.utilities.modis\\_util.readMODISData](#) (modis\_list, variables, grid, grid\_fill, use\_long\_name, platform, product\_id)  
*Retrieve a list of modis data.*

## 7.25 utilities/pbo\_util.py File Reference

### Namespaces

- [skdaccess.utilities.pbo\\_util](#)

## Functions

- def [skdaccess.utilities.pbo\\_util.getStationCoords](#) (pbo\_info, station\_list)  
*Get the station coordinates for a list of stations.*
- def [skdaccess.utilities.pbo\\_util.getLatLonRange](#) (pbo\_info, station\_list)  
*Retrive the range of latitude and longitude occupied by a set of stations.*
- def [skdaccess.utilities.pbo\\_util.getROIstations](#) (geo\_point, radiusParam, data, header)  
*This function returns the 4ID station codes for the stations in a region.*
- def [skdaccess.utilities.pbo\\_util.stab\\_sys](#) (data\_iterator, metadata, stab\_min\_NE=.0005, stab\_min\_U=.005, sigsc=2, errProp=1)  
*Stabilize GPS data to a region.*
- def [skdaccess.utilities.pbo\\_util.propagateErrors](#) (R, sc, stationCovs)  
*Propagate GPS errors.*
- def [skdaccess.utilities.pbo\\_util.nostab\\_sys](#) (allH, allD, timerng, indx=1, mdyratio=.7)  
*Do not apply stabilization and simply returns stations after checking for sufficient amount of data.*
- def [skdaccess.utilities.pbo\\_util.removeAntennaOffset](#) (antenna\_offsets, data, window\_start=pd.to\_timedelta('4D'), window\_end=pd.to\_timedelta('4D'), min\_diff=0.005, debug=False)  
*Remove offsets caused by changes in antennas.*

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