User’s Guide

for the

NPP Granule Aggregation and Packaging Utility (nagg)

Version 1.6.0

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HDF NPP Aggregation Tool (nagg)

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# Introduction

This document provides

* A brief introduction to the NPP Granule Aggregation and Packaging Utility (nagg)
* A description of its uses
* Instructions for building and installing it
* nagg command-line syntax
* nagg examples:
  + Changing the number of granules per aggregation (see pages 19-31)
  + Packaging multiple data products (see pages 31-41)
  + Extracting, unpackaging, and replacing products in packaged files (see pages 41- 47)
  + Creating new output files that are formatted like an existing example file (see pages 47-55)

## The NPP Granule Aggregation and Packaging Utility (nagg)

nagg is a tool for aggregating NPP data granules from existing files into new files with a different number of granules per file or different combinations of compatible products than in the original files. The tool was created to provide for individual users the ability to rearrange NPP product data granules from downloaded files into new files with aggregations or packaging that are better suited as input for a particular application. Being able to rearrange granules means users only have to request and download data once.

nagg is needed to address the flexibility of NPP products, especially swath products. A swath is a ribbon of data collected as the satellite orbit sweeps across the Earth. As an orbit is continuous, the swath is continuous, wrapping around the Earth over and over again like a yarn on a ball. In most NASA heritage missions, each swath is snipped into equal size pieces called granules, and one granule is placed in each file. The size of the snipped piece, while usually set for each mission, varies from mission to mission based mostly on the amount of data and therefore the size of the file that can be conveniently manipulated.

For NPP, the concept of a granule is independent of the packaging of the granule in a file, so granules are made relatively small in order to conveniently manipulate them. Suppose an analyst needs to compare MODIS and VIIRS data. With nagg, four VIIRS 86 second granules can be packaged together to make the piece of swath similar in size to the MODIS 5 minute data granule. Some data analysis tools analyze by full orbit, so it is possible to package OMPS data that way. nagg makes it possible for the analyst to package NPP data into files in the way that best suits the tool being used.

## nagg’s Capabilities

The following is a list of nagg’s current and future capabilities:

* Copies data granules from input files to new files with the number of data granules per file specified by the –n command-line option. The number data granules copied can range from 1 to 10,000.
* Copies data granules from input files to new files with the number of seconds of data provided by the granules in each file specified by the –A command-line option. nagg will convert the number of seconds specified to the smallest integer number of data granules that will provide the seconds of data specified.
* Creates output files in the current directory or in a directory specified by the –d command-line option.
* Copies NPP data product granules and corresponding geolocation product granules from separate input files to one output file.
* Copies NPP data product granules and corresponding geolocation product granules from one input file to separate output files.
* Copies data granules from separate input files to new output files containing more than one compatible NPP product. Compatible products share geolocation data, which is optional for inclusion, but if geolocation data is included it will be copied to the output file.
* Copies data granules from one input file containing compatible NPP products to separate output files for each product. Geolocation data may be excluded.
* Copies geolocation granules corresponding to sensor data products to new geolocation files or groups. If geolocation granules are not available or unwanted, the product granules may be aggregated or packaged without geolocation with the -g no command-line option.
* Copies geolocation granules alone to new geolocation files without product granules using the -g <product> option in the absence of a data product designation.
* Copies geolocation granules of either terrain corrected or not terrain corrected geolocation granules for the products that have both forms available.
* nagg always copies existing data granules from input data files to new data files that it creates: no changes are made to input files.
* Compresses data by dataset while it is written to disk.
* Changes the storage layout of the data and the chunk size for chunked storage.
* Writes JPSS data product metadata to the HDF5 file’s userblock. Userblocks can be read by any text editor to see the data. Users can read the metadata to see what information is in the file.

See the “Command-Line Options and Parameters” section on page 12 for more information.

## Compatibility Definitions

nagg versions before 1.5.0 defined “compatible” NPP products as products that have the same geolocation product. Versions of nagg 1.5.0 and above allow aggregation of appropriate NPP data products with either of two geolocation products when the designated geolocation product has an equivalent geolocation product. These pairs of equivalent geolocation products are related by terrain correction. The following terms were defined to facilitate describing the new nagg capability for extended compatibility.

* **Designated geolocation product**

**Definition:** A geolocation product is a *designated* geolocation product for the NPP product if the geolocation product collection short name appears in the column “GEO CSN” in Tables A-2 – A-6 of the *JPSS Common Data Format Control Book – External Volume I*.

* **Equivalent geolocation products**

**Definition:** Two geolocation products and are *equivalent* if the pair () or () can be found in one of the rows of Table 1:

|  |  |
| --- | --- |
| * GPID | * TCPID |
| * GATRO | * GCRIO |
| * GIMGO | * GITCO |
| * GMODO | * GMTCO |
| **Table 1: Geolocation products with the corresponding terrain corrected geolocation product** | |

* **Terrain corrected geolocation product**

**Definition:** A product listed in the second column of Table 1 is called a *terrain corrected* geolocation product.

* **Compatible NPP products**

**Definition:** Two NPP products and are *compatible* if the corresponding designated geolocation products and are the same or equivalent.

* **List of compatible NPP products**

**Definition:** The NPP products list is a *list of compatible products* if any two products on the list are compatible.

## Notes

The following are some notes regarding output file names, fill granules, and bucket boundaries.

* **Output file names** are determined by the products and timestamps of the granules in the file, the creation time of the file, and the –O and –D command-line options. See section 3.4.1 “File Naming Convention for NPP/NPOESS Data Products” in the *JPSS Common Data Format Control Book – External Volume I,* p. 22 for more information.
* **Fill granules** are added whenever there is a gap larger than the size of a granule between two input granules. Fill granules might also be used to match a granule of another product at a given time in a packaged file. Fill granules are not added at the beginning or end of an aggregation, and files that would consist entirely of fill granules are not produced. See section 3.5.6.1 of *JPSS Common Data Format Control Book – External Volume I*, p. 106 for more information.
* The beginning and end of each aggregation of any particular size for each NPP product is predetermined by integer numbers of aggregation of that size since t0 (1/1/1958). Aggregating a series of contiguous input granules the size of an aggregation or smaller may result in either one or two output files depending on whether the series falls within the predetermined **bu****cket boundaries** or straddles a bucket boundary. See *JPSS Common Data Format Control Book – External Volume I*, pp. 131-133 for more information.

For More Information

The nagg tool endeavors to produce files that match what the JPSS System provides as described in the *Joint Polar Satellite System (JPSS) Common Data Format Control Book – External - Volumes I, III, IV, and V*. These documents may be found at <http://jointmission.gsfc.nasa.gov/science/documents.html>.

Comments

Send questions or comments to the HDF Group Help Desk via [help@hdfgroup.org](mailto:help@hdfgroup.org).

# Building, Installing, and Running nagg

The following are some notes about how to build, install, and run nagg.

A copy of the nagg source files can be downloaded from <ftp://ftp.hdfgroup.uiuc.edu/pub/outgoing/JPSS/source/NAGG/>.

nagg is a standalone tool that is run from the command line. The currently available version of the program can be built to work on 32- and 64-bit Linux systems.

The installation process is a file copy operation: copy the file to the directory where you want to keep the program.

In this version of the program, there is no file with configuration settings. To adjust the program’s behavior, add one or more of the options to the command-line statement when the program is executed. The available options are described in the “Command Syntax” section beginning on page 10.

Run the program from the directory where it is kept, or put in the path the directory where the program is stored.

## Building and Testing the Program

Here are some notes that will help you build and test the nagg program.

Before you start:

* Make sure HDF5 version 1.8.5 or later is installed on your system. Source code or binaries can be downloaded from <http://www.hdfgroup.org/HDF5/release/obtain5.html>.
* Install the High-Level library for handling object and region references, hdf5\_hl\_region v.1.1.1; the source code can be found at <ftp://ftp.hdfgroup.uiuc.edu/pub/outgoing/NPOESS/source/>. For installation instructions see the README.txt file in the source distribution.

To build:

Assuming gmake and h5cc (HDF5 C compiler) are in your $PATH, just do

% ./configure --with-hlregion=/path-to-hdf5\_hl\_region-library

% gmake

The default C compiler is set to h5cc. If you want to use a specific h5cc compiler, do

% env CC=$mypath/h5cc ./configure

To build with different compiler flags, use the CFLAGS variable. An example is

% env CFLAGS=-O2 ./configure

This command will set the compiling to "h5cc -O2".

To run tests:

To run tests, use the following:

% gmake check

To install:

To install, use the following:

% gmake install

The nagg install files go to nagg/bin of the build directory by default. If you want to install it somewhere else, for example /usr/local/bin/nagg, use the following:

% gmake prefix=/usr/local install

## Command-line Syntax

The command-line syntax for the nagg tool is described below. See the “Command-Line Options and Parameters” section on page 12 for more information.

****Tool Name:**** nagg

****Syntax****

nagg –h | --version

nagg [--version] [-n *N*] [-t *list* | -l *example*] [-g *criterion*] [-S]

[-A *seconds*] [-d *directory*] [-O *origin*] [-D *domain*] [--debug]

[--filter=*filter*] [--layout=*layout]* [--minimum=*size*] *INPUT*

****Purpose****

To manipulate granules stored in NPP files into more easily processed NPP files.

****Description****

The command-line utility nagg is the utility for grouping NPP granules into aggregate and package files.

Aggregates include time contiguous and gap-filled series of the same type of granules together in the same file. Packages include different, but related type granule aggregates with the same temporal and spatial extent together in the same file.

Input parameter INPUT is a list of one or more NPP files with the granules to aggregate and/or package.

The output of nagg is a file or set of files named according to the NPP file naming convention. Output files are aligned with the bucket boundary. For more information on bucket boundaries, see *JPSS Common Data Format Control Book – External Volume I*, pp. 131-133. Fill granules are generated when there are no data granules available in the input files for "slots" in a bucket. Leading and trailing fill granules are not generated for the first and last output files respectively. Therefore, first and last output files may contain fewer granules than requested.

The default behavior of nagg is to aggregate corresponding designated geolocation product granules. nagg will find these corresponding granules if they are available in the input files listed or stored in external geolocation files. The geolocation granules in input files can be processed whether packaged with data product granules or existing in separate files. For external geolocation files the names of the file(s) can be found from the value(s) of an N\_GEO\_Ref attribute in the input file. The names of the output geolocation file(s) correspond temporally to those of the primary product.

nagg will fail if no input geolocation granule is available. The aggregating of geolocation granules can be overridden with the -g no command-line option which directs nagg to not use or look for geolocation input granules or files and to not produce geolocation output granules or files. For certain geolocation products associated with a designated geolocation product that has an equivalent geolocation product nagg will process either terrain corrected or not terrain corrected geolocation granules as designated with the –g <*product>* option (See *RFC: nagg Extension for Terrain Corrected Geolocation*).

Geolocation file names can be approximate such that only the beginning parts up to the creation date are matched. Suppose the sensor data file defines its geolocation file as: GMTCO\_npp\_d20100906\_t0701368\_e0703013\_b00004\_c20111024161933653314\_noaa\_ops.h5. nagg will accept any file matching the following pattern and will use the one with the latest creation timestamp: GMTCO\_npp\_d20100906\_t0701368\_e0703013\_b00004\_c\*.h5. The -g strict command-line option can be used to tell nagg that the external geolocation file name must exactly match the N\_GEO\_Ref value.

nagg is non-destructive. It will not overwrite existing files.

****Tool Limits****

Some limits for the nagg tool are defined below.

**NAGG\_Granule\_info\_max 10000 Maximum number of granules managed**

**NAGG\_Product\_list\_max 42 Maximum number of products requested**

**NAGG\_outputfiles\_max 42 Maximum number of output files**

See “Appendix 2” in the *NPP Aggregation Tool Components* document for a complete list of size definitions.

Notes

The following are some notes about aggregating and de-aggregating files:

* nagg can de-aggregate files by setting the command-line option -n to 1 and operating on aggregate files.
* nagg can aggregate files by setting the command-line option -n to N and operating on a directory of single granule files.
* nagg can re-aggregate files by setting the command-line option -n to a number different from the number of granules in the input files.

## Command-line Options and Parameters

The command-line options and parameters available with the nagg tool are described below. See the “Command-line Syntax” section above for more information.

-h, --help

**Help**. Using this command-line option will display the command syntax. This can also be used to list valid granule types and packaging groupings.

--version

Displays the version of the nagg tool.

-t *list,* --type=*list*

**Granule Type**. *list* specifies a comma separated list of NPP record type mnemonics. Unless -S is specified, the granule types will be packaged together. Types must be compatible to be packaged together. Use -h to list valid package groupings. If –t is not specified, -g *<product>* must be given to aggregate only the geolocation product granules.

-n *N,* --number=*N*

**Granule Number**. *N* is the number of granules of each product in each aggregate file and must be greater than zero. If this option not specified, the default value of 1 (single granule files) will be used.

-g *criterion*, --geolocation=*criterion*

**Geolocation Criterion**. *criterion* is the criterion used for searching the geolocation granules. Valid values for *criterion* are the following:

|  |  |
| --- | --- |
| no | 0 | Aggregate product files without geolocation input or output |
| yes | 1 | Allow approximate matching of geolocation input file names (default) |
| strict | 2 | Require exact matching of geolocation input file names |
| *<product>* | * With no data product specified: aggregate geolocation product *<product>* only. * With one or more data products: aggregate geolocation product <*product*> with data products. This is provided to allow selection of terrain corrected or not terrain corrected geolocation for products associated with a designated geolocation product that has an equivalent geolocation product (See RFC: nagg Extension for Terrain Corrected Geolocation) |

-l *example, --like=example*

Package like the *example* file in number of granules, type list, and geolocation product only, without geolocation product, or with unpackaged geolocation product. *example* must be an existing NPP file. Options on the command line override the number of granules, type list, and geolocation options from the *example* file.

-A *seconds*

**Aggregation Size**. *seconds* is the number of seconds in each aggregate file. The aggregation’s size is a fixed number of granules per file equal to seconds divided by the period of the granule rounded up to the next integer number of granules. The formula for this is

NumGranules/File = *seconds*/GranulePeriod

where

NumGranules/File is the number of granules in the aggregated file,

*seconds* is the number of seconds that are used to determine the size of the aggregated file, and

GranulePeriod is the number of seconds worth of data held by each granule.

If, for example, *seconds* is set to 60 and GranulePeriod is 31.997 seconds per granule, then the following steps show the calculation:

|  |  |
| --- | --- |
| **Calculation** | **Comments** |
| NumGranules/File = 60 seconds/31.997seconds/granule | This is the setting of this parameter divided by the granule period. |
| NumGranules/File = 1.875 granules | This is the actual value of the calculation. |
| NumGranules/File = 2 granules | This is the value of the calculation rounded up to the next integer. |

-S*,* --simple

**Simple Aggregates**. Simple aggregates are produced. Each type is packaged separately. All granule types including geolocation products are packaged in one file.

-d *directory*, --directory=*directory*

**Output Directory**. Directory where the output files should be placed. The default is the current working directory. The tool will fail if the directory does not exist.

-O *origin*

**Origin Identifier**. The origin identifier is a four-character string in the output file name. Only the first four characters will be used. If fewer than four characters are specified, the origin will be pre-pended with the character “X”. The default is “XXXX”.

-D *domain*

**Domain Identifier**. The domain identifier is a three-character string in the output file name. Only the first three characters will be used. If fewer than three characters are specified, the domain will be pre-pended with the character “X”. The default is “XXX”.

--debug

**Debug Mode**. In debug mode, all of the granules in the input files including those not specified by the –t list are read in, all of the granules are displayed, and the execution is ended without generating the normal output files. Note that this option is intended for tool debugging. Files or output generated should not be used for production purposes: the behavior of debug mode may change from version to version.

--filter=*filter*

**Filter Type**. Use to specify a filter to be used. This option can be used more than once on a command line. Filters will be applied in the order they are listed on the command line. See the HDF5 User Guide at [http://www.hdfgroup.org/HDF5/doc/UG/10\_Datasets.html Section 5.6](http://www.hdfgroup.org/HDF5/doc/UG/10_Datasets.html%20Section%205.6) for detailed information about HDF5 built-in filters.

The value of *filter* is a string of the following format:

*list\_of\_objects* : *name\_of\_filter*[=*filter\_parameters*]

where

*list\_of\_objects* is a comma separated list of object names to which the filter(s) will be applied. If no object names are specified, the filter will be applied to all objects.

*name\_of\_filter* specifies the filter and can be one of the following values:

| ***name\_of\_filter*** | **Comments** |
| --- | --- |
| GZIP | The HDF5 gzip filter (gzip compression) |
| SZIP | The HDF5 Szip filter (Szip compression) |
| SHUF | The HDF5 shuffle filter |
| FLET | The HDF5 checksum filter |
| NBIT | The HDF5 N-bit filter |
| SOFF | The HDF5 scale/offset filter |
| NONE | To remove any filter(s) |

*filter\_parameters* specifies optional filter settings. Possible settings are listed below.

| ***name\_of\_filter*** | ***filter\_parameter*** | **Usage** | **Comments** |
| --- | --- | --- | --- |
| GZIP | *deflation\_level* | GZIP=# | # is a number from 1-9. |
| SZIP | *pixels\_per\_block,coding\_method* | SZIP=#,XX | # is an even number from 2-32, and XX is either EC or NN. |
| SHUF | None |  | There are no parameters for this filter. |
| FLET | None |  | There are no parameters for this filter. |
| NBIT | None |  | There are no parameters for this filter. |
| SOFF | *scale\_factor,scale\_type* | SOFF=#,YY | # is an integer, and YY is either IN or DS. |
| NONE | None |  | There are no parameters for this filter.  \*Coding methods:  EC: Entropy coding  NN: Nearest neighbor  \*\*Scale types  IN: Integer  DS: Floating point  D-scaling |

--layout=*layout*

**Layout Type**. *layout* specifies the type of layout that will be used and will be a string of the following format:

*list\_of\_objects : layout\_type[=layout\_parameters]*

where

*list\_of\_objects* is a comma separated list of object names to which the layout will be applied. If no object names are specified, the layout will be applied to all objects.

*layout\_type* specifies the type of layout that will be applied and can be one of the following values:

| **Value** | **Comments** |
| --- | --- |
| CHUNK | The chunk layout |
| COMPA | The compact layout |
| CONTI | The contiguous layout |

*layout\_parameters* will be present only with the CHUNK layout and specifies the chunk size of each dimension in the following format with no intervening spaces:

*dim\_1 × dim\_2 × ... dim\_n*

Note: If no compression or storage layout property is specified, the properties of the datasets in the input files will be preserved.

--minimum=*size*

**Size Threshold**. Apply filter(s) only to objects whose size in bytes is equal to or greater than *size*. *size* must be an integer greater than one ( 1 ).

*Default:* If no size is specified, a threshold of 1024 bytes is assumed.

*INPUT*

*INPUT* is a list of one or more NPP files and should always be the final option on the command line.

**Exit Status**

|  |  |
| --- | --- |
| 0 | Succeeded. |
| >0 | An error occurred. |

# Examples of nagg Usage

The examples in this chapter demonstrate the use of nagg command-line options in a variety of combinations. The input files for the examples are available in the test/testfiles directory of the nagg source files. The path in the commands will need modification depending on the directory chosen to run nagg.

Each example has a number of sub-sections. The sub-sections that are included vary by the action of the example. All of the examples have the following sub-sections: “Command,” “Command-line Elements,” “Output,” “Data Granules in Input and Output Files,” and “Notes.” The “Command” sub-section shows the command line used in the example. The “Command-line Elements” sub-section describes how each element in the command line effects the results. The “Output” sub-section describes the results of the command line. The “Data Granules in Input and Output Files” sub-section has a table that summarizes how the data granules are arranged in the input and output files. The “Notes” sub-section has items worth paying attention to.

The examples might have other sub-sections that further describe the input files, the output files, or any status messages produced by nagg during processing.

The contents of the input and output files can be viewed with the HDF5 utility h5ls. h5ls can be found in the bin directory of the HDF5 install. The command “h5ls -r <filename>” recursively displays the full group path to every object in the file. For dataset objects, the name is followed by the dataset dimensions in the form {<current dimension>/<maximum dimension>, …}. See the “De-aggregating an Aggregate File” section on page 22 for an example. To see the differences described for the other examples, run “h5ls –r <filename>” or use HDFView or some other utility to examine the file contents.

A granule in the “Notes” sub-sections will often refer to both the sensor data granule and the geolocation granule. See the example in the “Aggregating Single Granule Files” section on page 19: when it says that the first file has only one granule, the statement refers to both the first SATMS product file and also to the first GATMO product file with the corresponding geolocation data.

The table below lists the examples in this chapter.

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| Extracting, de-aggregating, and unpackaging a selected product with geolocation like an example file | 53 |
| Compressing data and changing the file storage layout | 55 |
| Compression with the shuffle and gzip filters | 55 |
| Changing the storage layout and compressing data with Szip | 56 |

## Changing the Number of Granules per Aggregation

### Aggregating Single Granule Files

This example shows how to use nagg to aggregate single granule files.

Command

nagg –n 2 -t SATMS –S test/testfiles/SATMS\_npp\_d20100906\*.h5

Command-line Elements

* The nagg command with -n 2 produces aggregations of two granules each.
* -t SATMS directs nagg to process SATMS product granules.
* nagg with no -g option specified processes SATMS product granules and by default the corresponding geolocation product granules either from the input files specified for the SATMS product or from files matching the file name in the N\_GEO\_Ref attribute in those files. For the default behavior, the creation date, origin, and domain description fields in the geolocation file name are replaced with \* for matching files with the corresponding geolocation products that have the same date, begin time, end time, and orbit number (GATMO\_npp\_d20100906\_t0750210\_e0750524\_b00005\_\*\_ noaa\_ops.h5).
* The -S option puts all products including the geolocation granules in separate files.

Output

The output of this command is three full files with two SATMS product granules each, three full files with two GATMO geolocation product granules each, one partial file with one SATMS granule, and one partial file with one GATMO granule.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 14 | 1 | 14 | 1 |
| Output aggregations | 14 | 2 | 8 (6 full, 2 partial) | 2 |

Notes

Why does the first file have only one granule when the command-line option dictated two granules per file? nagg duplicates the behavior of the JPSS DDS: it calculates predetermined bucket boundaries according to integer multiples of the aggregation size beginning at t0 (12:00 am, 1/1/1958). For a more detailed explanation, see the “Notes” section on page 7 of this document or section 3.5.12 of the *JPSS Common Data Format Control Book - External, Volume I*, page 129. Since the first granule in these input files is in the second of two granules in a bucket, and since nagg does not produce leading or trailing fill granules, the first file has only the one granule. See the “Packaging Compatible Products from Single Granule Input Files and Fill Granule Files” section on page 34 for more information.

The input file string test/testfiles/SATMS\_npp\_d20100906\*.h5 matches seven SATMS files in the test/testfiles directory, and those seven files each have an N\_GEO\_Ref attribute with the name of a GATMO file in the same directory. Unless -g no is supplied in the command line, nagg will aggregate the geolocation granules in those seven files provided that they exist. If all of the geolocation files are missing, nagg will fail. However, the product files can be aggregated without geolocation using the -g no option.

Occasionally the creation time field of the geolocation file names will not match the strings in the product files’ N\_GEO\_Ref attributes. nagg handles this difficulty by using the last created geolocation file that matches the rest of the string. Exact matches can be enforced with the -g strict option.

Input and output files may be examined using h5ls –r as shown on page 23. HDFview and h5dump are other HDF5 tools that may be useful for examining the contents of HDF5 files.

The effect on dataset dimensions in this example is the reverse of that for the example in the “3.2. De-aggregating an Aggregate File” section starting on page 22: granules in this example are being aggregated rather than de-aggregated. With –n 2, the datasets in the /All\_Data group of the output files will have first dimensions that are twice the size of the first dimensions in the input files. This reflects the two hyperslabs from two granules in the complete aggregations.

Input Files (14)

The input files are listed below.

test/testfiles/SATMS\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20100906\_t0750530\_e0751244\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20100906\_t0751250\_e0751564\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20100906\_t0751570\_e0752284\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20100906\_t0752290\_e0753004\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20100906\_t0753010\_e0753324\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20100906\_t0753330\_e0754044\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0750530\_e0751244\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0751250\_e0751564\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0751570\_e0752284\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0752290\_e0753004\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0753010\_e0753324\_b00005\_c20111024161819049592\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20100906\_t0753330\_e0754044\_b00005\_c20111024161819049592\_noaa\_ops.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 1 granules in SATMS\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20120516210214226724\_XXXX\_XXX.h5

Produced 1 granules in GATMO\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20120516210214226724\_XXXX\_XXX.h5

Produced 2 granules in SATMS\_npp\_d20100906\_t0750530\_e0751564\_b00005\_c20120516210214283013\_XXXX\_XXX.h5

Produced 2 granules in GATMO\_npp\_d20100906\_t0750530\_e0751564\_b00005\_c20120516210214283013\_XXXX\_XXX.h5

Produced 2 granules in SATMS\_npp\_d20100906\_t0751570\_e0753004\_b00005\_c20120516210214381909\_XXXX\_XXX.h5

Produced 2 granules in GATMO\_npp\_d20100906\_t0751570\_e0753004\_b00005\_c20120516210214381909\_XXXX\_XXX.h5

Produced 2 granules in SATMS\_npp\_d20100906\_t0753010\_e0754044\_b00005\_c20120516210214481149\_XXXX\_XXX.h5

Produced 2 granules in GATMO\_npp\_d20100906\_t0753010\_e0754044\_b00005\_c20120516210214481149\_XXXX\_XXX.h5

### De-aggregating an Aggregate File

This example shows how to use nagg to de-aggregate an aggregate file.

Command

nagg -t SOMPS –S –O unkn –D dev test/testfiles/SOMPS\_npp\_d20120508\_t0333549

\_e0336247\_b02735\_c201205 22134023064953\_unkn\_xxx.h5

Command-line Elements

* The nagg command without -n <number> produces default aggregations of one granule each.
* -t SOMPS directs nagg to process SOMPS product granules.
* nagg with no -g option specified processes SOMPS product granules and by default the corresponding geolocation product granules either from the input files specified for the SOMPS product or from files matching the file name in the N\_GEO\_Ref attribute in those files. For the default behavior, the creation field in the geolocation file name is replaced with \* for matching (GONPO\_npp\_d20120508\_t0333549\_e0336247\_b02735\_\*\_unkn\_dev.h5).
* The -S option puts all products including the geolocation granules in separate files.
* -O unkn sets the origin field of the output file names to “unkn.” The default if no –O option is provided is “XXXX.”
* -D dev sets the domain description field of the output file names to “dev.” The default without the -D option is “XXX.”

Output

The output of this command is four files with one SOMPS product granule each and four files with one GONPO geolocation product granule each. The part of the output file names beginning with \_c is determined by the creation time of the output file.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 8 | 4 | 2 | 4 |
| Output aggregations | 8 | 1 | 8 | 1 |

Notes

The SOMPS input file has four SOMPS granules (see the “Input File Objects” section below) and a reference to the geolocation file which contains the corresponding geolocation granules. In this case, the four granules in the SOMPS file specified as input for the command plus four granules in the GONPO geolocation file it references result in eight output files: four with one SOMPS granule each and four with the corresponding GONPO granules.

The contents of the input and one output files as displayed by h5ls –r are shown below. The input file has four granules (highlighted in blue and bold), the output file shown has one granule. The other SOMPS output files have the same structure, each with one granule but with different data, and the four GONPO geolocation granules in the GONPO input file are similarly distributed into four output files with a different collection of datasets for the geolocation data. The datasets in the input files have four hyperslabs each, one for each granule. The datasets in the output files each have one of these hyperslabs for the file’s one granule. Consequently, the current dimensions (highlighted in yellow and underlined) for the first dimension of the datasets in the output files are one quarter the size of the same dimension in the input files (also highlighted in yellow and underlined). The time range from t0333549 to e0336247 reflected in the input file names is distributed among the four output files for each product.

Input File Objects

The listing of input file objects with the h5ls -r SOMPS\_npp\_d20120508\_t0333549\_e0336247\_b02735\_c20120522134023064953\_unkn\_xxx.h5 command line is shown below.

/ Group

/All\_Data Group

/All\_Data/OMPS-NP-SDR\_All Group

/All\_Data/OMPS-NP-SDR\_All/BadCal Dataset {4/Inf}

/All\_Data/OMPS-NP-SDR\_All/Bias1 Dataset {4/Inf}

/All\_Data/OMPS-NP-SDR\_All/Cal Dataset {20/Inf, 200/Inf}

/All\_Data/OMPS-NP-SDR\_All/DarkCurrentEarth Dataset {24/Inf, 200/Inf}

…

/Data\_Products Group

/Data\_Products/OMPS-NP-SDR Group

/Data\_Products/OMPS-NP-SDR/OMPS-NP-SDR\_Aggr Dataset {21}

/Data\_Products/OMPS-NP-SDR/**OMPS-NP-SDR\_Gran\_0** Dataset {21/Inf}

/Data\_Products/OMPS-NP-SDR/**OMPS-NP-SDR\_Gran\_1** Dataset {21/Inf}

/Data\_Products/OMPS-NP-SDR/**OMPS-NP-SDR\_Gran\_2** Dataset {21/Inf}

/Data\_Products/OMPS-NP-SDR/**OMPS-NP-SDR\_Gran\_3** Dataset {21/Inf}

Output File Objects

The listing of objects in 1 of 8 output files with the h5ls –r SOMPS\_npp\_d20120508\_t0333549\_e0334324\_b02735\_c20120509170435469674\_XXXX\_XXX.h5 command line is shown below.

/ Group

/All\_Data Group

/All\_Data/OMPS-NP-SDR\_All Group

/All\_Data/OMPS-NP-SDR\_All/BadCal Dataset {1/Inf}

/All\_Data/OMPS-NP-SDR\_All/Bias1 Dataset {1/Inf}

/All\_Data/OMPS-NP-SDR\_All/Cal Dataset {5/Inf, 200/Inf}

/All\_Data/OMPS-NP-SDR\_All/DarkCurrentEarth Dataset {6/Inf, 200/Inf}

…

/Data\_Products Group

/Data\_Products/OMPS-NP-SDR Group

/Data\_Products/OMPS-NP-SDR/OMPS-NP-SDR\_Aggr Dataset {21}

/Data\_Products/OMPS-NP-SDR/**OMPS-NP-SDR\_Gran\_0** Dataset {21/Inf}

Input Data File

The input data file is listed below.

test/testfiles/SOMPS\_npp\_d20120508\_t0333549\_e0336247\_b02735\_c201205 22134023064953\_unkn\_xxx.h5

Input Geolocation File

The input geolocation data file is listed below.

test/testfiles/GONPO\_npp\_d20120508\_t0333549\_e0336247\_b02735\_c201205 22134023064953\_unkn\_dev.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 1 granules in SOMPS\_npp\_d20120508\_t0333549\_e0334324\_b02735\_c20120509174130237345\_unkn\_dev.h5

Produced 1 granules in GONPO\_npp\_d20120508\_t0333549\_e0334324\_b02735\_c20120509174130237345\_unkn\_dev.h5

Produced 1 granules in SOMPS\_npp\_d20120508\_t0334324\_e0335098\_b02735\_c20120509174130259000\_unkn\_dev.h5

Produced 1 granules in GONPO\_npp\_d20120508\_t0334324\_e0335098\_b02735\_c20120509174130259000\_unkn\_dev.h5

Produced 1 granules in SOMPS\_npp\_d20120508\_t0335098\_e0335472\_b02735\_c20120509174130278264\_unkn\_dev.h5

Produced 1 granules in GONPO\_npp\_d20120508\_t0335098\_e0335472\_b02735\_c20120509174130278264\_unkn\_dev.h5

Produced 1 granules in SOMPS\_npp\_d20120508\_t0335473\_e0336247\_b02735\_c20120509174130297695\_unkn\_dev.h5

Produced 1 granules in GONPO\_npp\_d20120508\_t0335473\_e0336247\_b02735\_c20120509174130297695\_unkn\_dev.h5

### Re-aggregating by Number of Data Granules

This example shows how to use nagg to re-aggregate files by changing the number of data granules in each aggregated file from the original aggregated file.

Command

nagg –n 3 -t SATMS –S test/testfiles/SATMS\_npp\_d20100906\*\_XXXX\_XXX.h5

Command-line Elements

* The nagg command with -n 3 produces aggregations of three granules each.
* -t SATMS directs nagg to process SATMS product granules.
* nagg without a -g option behaves the same as “-g yes” and processes the GATMO geolocation product granules corresponding to the SATMS product either from the input files specified for the SATMS product or from files matching the file name in the N\_GEO\_Ref attribute in those files. For the default behavior, the creation field in the geolocation file name is replaced with \* for matching (GATMO\_npp\_d20100906\_t0750210\_e0750524\_b00005\_\*\_ XXXX\_XXX.h5).
* The -S option puts all products including the geolocation granules in separate files.

Output

The output of this command is two full files with three SATMS product granules each, two full files with three GATMO geolocation product granules each, one partial file with one SATMS granule, and one partial file with one GATMO granule.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 14 | 2 | 8 (6 full, 2 partial) | 2 |
| Output aggregations | 14 | 3 | 6 (4 full, 2 partial) | 3 |

Notes

This example uses the output files from the example in the “Aggregating Single Granule Files” section on page 19. As it happens, the granule bucket boundaries for two and three granule aggregations coincide between the first and second granules in this set of granules, so the first file once again has only the last granule since nagg does not produce leading fill granules. For this set of granules, the first granule is the only granule of a partial aggregation.

Input Files (8)

The input files are listed below.

test/testfiles/SATMS\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20120516210214226724\_XXXX\_XXX.h5

test/testfiles/SATMS\_npp\_d20100906\_t0750530\_e0751564\_b00005\_c20120516210214283013\_XXXX\_XXX.h5

test/testfiles/SATMS\_npp\_d20100906\_t0751570\_e0753004\_b00005\_c20120516210214381909\_XXXX\_XXX.h5

test/testfiles/SATMS\_npp\_d20100906\_t0753010\_e0754044\_b00005\_c20120516210214481149\_XXXX\_XXX.h5

test/testfiles/GATMO\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20120516210214226724\_XXXX\_XXX.h5

test/testfiles/GATMO\_npp\_d20100906\_t0750530\_e0751564\_b00005\_c20120516210214283013\_XXXX\_XXX.h5

test/testfiles/GATMO\_npp\_d20100906\_t0751570\_e0753004\_b00005\_c20120516210214381909\_XXXX\_XXX.h5

test/testfiles/GATMO\_npp\_d20100906\_t0753010\_e0754044\_b00005\_c20120516210214481149\_XXXX\_XXX.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 1 granules in SATMS\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20120516210313080299\_XXXX\_XXX.h5

Produced 1 granules in GATMO\_npp\_d20100906\_t0750210\_e0750524\_b00005\_c20120516210313080299\_XXXX\_XXX.h5

Produced 3 granules in SATMS\_npp\_d20100906\_t0750530\_e0752284\_b00005\_c20120516210313138410\_XXXX\_XXX.h5

Produced 3 granules in GATMO\_npp\_d20100906\_t0750530\_e0752284\_b00005\_c20120516210313138410\_XXXX\_XXX.h5

Produced 3 granules in SATMS\_npp\_d20100906\_t0752290\_e0754044\_b00005\_c20120516210313277669\_XXXX\_XXX.h5

Produced 3 granules in GATMO\_npp\_d20100906\_t0752290\_e0754044\_b00005\_c20120516210313277669\_XXXX\_XXX.h5

### Re-aggregating by Number of Seconds of Data

This example shows how to use nagg to re-aggregate data by number of seconds of data rather than by number of data granules.

Command

nagg –A 300 –t REDRO –d npp-out test/testfiles/REDRO\_npp\_d20030125\*.h5

Command-line Elements

* The nagg command with –A 300 for the REDRO product produces aggregations of ten granules each. This is determined by dividing 300 by the 31.997 second granule duration and rounding up to the next integer (10).
* -t REDRO directs nagg to process REDRO product granules.
* nagg without a -g option behaves the same as “-g yes” and processes the GCRIO geolocation product granules corresponding to the REDRO product either from the input files specified for the REDRO product or from files matching the file name in the N\_GEO\_Ref attribute in those files. For the default behavior, the creation field in the geolocation file name is replaced with \* for matching (GCRIO\_npp\_ d20030125\_t0702533\_e0711257\_b00014\_\*\_unkn\_ada.h5).
* Without the -S option the SDR data granules and the corresponding geolocation granules are put in one output file for each aggregation.
* With the –d <directory> command-line option, the output files are created in the specified npp-out directory.

Output

The output of this command is six full files with ten REDRO product granules and ten GCRIO geolocation granules in each file and one partial file with four REDRO product granules and four GCRIO geolocation product granules.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 128 | 16 | 8 | 16 |
| Output aggregations | 128 | 10 | 7 (6 full, 1 partial) | 10 |

Notes

For this set of files, the first granule in the first input file happens to be the first granule in a bucket for a 16 granule aggregation and also for a 10 granule aggregation. The last file is a partial aggregation with only four granules.

Either relative or absolute paths are allowed for the directory specified by –d.

Input Files (8)

The input files are listed below.

test/testfiles/REDRO\_npp\_d20030125\_t0702533\_e0711257\_b00014\_c20111025170507190780\_unkn\_ada.h5

test/testfiles/REDRO\_npp\_d20030125\_t0711279\_e0719577\_b00014\_c20111025170507195067\_unkn\_ada.h5

test/testfiles/REDRO\_npp\_d20030125\_t0719599\_e0728297\_b00014\_c20111025170507197969\_unkn\_ada.h5

test/testfiles/REDRO\_npp\_d20030125\_t0728319\_e0737011\_b00014\_c20111025170507204040\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0702533\_e0711257\_b00014\_c20111025170507184515\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0711279\_e0719577\_b00014\_c20111025170507194756\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0719599\_e0728297\_b00014\_c20111025170507197657\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0728319\_e0737011\_b00014\_c20111025170507201941\_unkn\_ada.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 10 granules in npp-out/GCRIO-REDRO \_npp\_d20030125\_t0702533\_e0708137\_b00993\_c20120712162901513435\_XXXX\_XXX.h5

Produced 10 granules in npp-out/GCRIO-REDRO\_ npp\_d20030125\_t0708159\_e0713337\_b00014\_c20120712162901631182\_XXXX\_XXX.h5

Produced 10 granules in npp-out/GCRIO-REDRO \_npp\_d20030125\_t0713359\_e0718537\_b00014\_c20120712162901795401\_XXXX\_XXX.h5

Produced 10 granules in npp-out/GCRIO-REDRO\_ npp\_d20030125\_t0718559\_e0724137\_b00014\_c20120712162901920678\_XXXX\_XXX.h5

Produced 10 granules in npp-out/GCRIO-REDRO \_npp\_d20030125\_t0724159\_e0729337\_b00014\_c20120712162902111364\_XXXX\_XXX.h5

Produced 10 granules in npp-out/GCRIO-REDRO \_npp\_d20030125\_t0729359\_e0734531\_b00014\_c20120712162902271830\_XXXX\_XXX.h5

Produced 4 granules in npp-out/GCRIO-REDRO \_npp\_d20030125\_t0734531\_e0737011\_b00993\_c20120712162902398737\_XXXX\_XXX.h5

### Aggregating or De-aggregating Geolocation Files

This example shows how to use nagg to aggregate or de-aggregate geolocation files.

Command

nagg –n32 -g GCRIO test/testfiles/GCRIO\_npp\_d20030125\*.h5

Command-line Elements

* The nagg command with the -n 32 command-line option produces aggregations of 32 granules each.
* The -g <product> option is for aggregating or de-aggregating granules of a geolocation product directly without any corresponding sensor date product granules. -t is not used with –g <product>.

Output

The output of this command is three files with 16 or 32 granules of the GCRIO product only.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 79 | 16 | 5 (4 full 1 partial) | 16 |
| Output aggregations | 64 | 32 | 3 (1 full, 2 partial) | 32 |

Notes

The -g <product> command-line option is provided for processing aggregations that contain only geolocation granules.

In this example the total number of granules in the output files is smaller than the total number of granule in the input files. The second input file with the name ending in anyt\_ing.h5 contains duplicates of granules in the first and third input files. nagg selects only one of the duplicates for the output aggregation; the other 15 duplicates are ignored.

Input Files

The input files are listed below.

test/testfiles/GCRIO\_npp\_d20030125\_t0702533\_e0711257\_b00014\_c20111025170507184515\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0705359\_e0713337\_b00014\_c98765432109876543210\_anyt\_ing.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0711279\_e0719577\_b00014\_c20111025170507194756\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0719599\_e0728297\_b00014\_c20111025170507197657\_unkn\_ada.h5

test/testfiles/GCRIO\_npp\_d20030125\_t0728319\_e0737011\_b00014\_c20111025170507201941\_unkn\_ada.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 16 granules in GCRIO\_npp\_d20030125\_t0702533\_e0711257\_b00993\_c20120523155444015673\_XXXX\_XXX.h5

Produced 32 granules in GCRIO\_npp\_d20030125\_t0711279\_e0728297\_b00014\_c20120523155445226530\_XXXX\_XXX.h5

Produced 16 granules in GCRIO\_npp\_d20030125\_t0728319\_e0737011\_b00014\_c20120523155447399983\_XXXX\_XXX.h5

## Packaging Multiple Products

### Packaging Compatible Products from Single Granule Input Files

This example shows how to use nagg to package compatible products from single granule input files.

Command

nagg –n 5 -t SATMS,TATMS test/testfiles/SATMS\_npp\_d2012040[34]\*.h5 test/testfiles/TATMS\_npp\_d2012040[34]\*.h5

Command-line Elements

* The nagg command with -n 5 produces aggregations of five granules each.
* -t SATMS,TATMS indicates to nagg that those two products and their common geolocation granules are to be aggregated.
* nagg with no -g option processes granules for the products specified with -t and by default for the corresponding geolocation product granules either from the input files specified for the -t products or from files matching the file name in the N\_GEO\_Ref attribute in those files. For the default behavior, the creation field in the geolocation file name is replaced with \* for matching (GONPO\_npp\_d20120508\_t0333549\_e0336247\_b02735\_\*\_unkn\_dev.h5).
* Without the -S option, all products including the geolocation granules are put in a single file for each aggregation.

Output

The output of this command is one partial file with four SATMS and four TATMS product granules and four GATMO geolocation product granules and one other partial file with one granule of each product.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 15 | 1 | 15 | 1 |
| Output aggregations | 15 | 5 | 2 partial | 5 |

Notes

The [34]\* wildcards in the –t option in the command line matches all SATMS\_npp\_d20120403… and SATMS\_npp\_d20120404… file names in the input directory; the wildcards also match those with the same file name patterns beginning with TATMS. The corresponding GATMO files are included based on the /N\_GEO\_Ref attributes in the files for both products. For packaged files with multiple products, only one corresponding geolocation granule will be included in the output: all packaged products must have the same corresponding geolocation granules, and duplicate granules are added only once.

The command asked for a five granule aggregation. In this case, five input granules for each product were supplied, but a predetermined aggregation boundary for five granules of these products falls after the first four input granules. Since leading and trailing fill granules are not produced, the aggregation produces two files: the first with four sets of granules and the second with one set of granules.

Examining the contents of the input and output files will show that the first dimension of the datasets in the /All\_Data group of the output file are five times the size of the first dimension of the datasets with the same name in the input files. The output files raw data datasets contain hyperslabs for each of five granules compared to one hyperslab in the input files’ datasets.

Input Files (15)

The input files are listed below.

test/testfiles/SATMS\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155447242391\_noaa\_ops.h5

…

test/testfiles/SATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155457899734\_noaa\_ops.h5

…

test/testfiles/TATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155441643487\_noaa\_ops.h5

…

test/testfiles/GATMO\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155441643487\_noaa\_ops.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 4 granules in SATMS-TATMS-GATMO\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120510175020763627\_XXXX\_XXX.h5

Produced 1 granules in SATMS-TATMS-GATMO\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120510175020886072\_XXXX\_XXX.h5

### Packaging Compatible Products from Single Granule Input Files and Fill Granule Files

This example shows how to use nagg to package compatible products from single granule input files and shows the use of fill granule files.

Command

nagg –n 5 -t SATMS,TATMS test/testfiles/SATMS\_npp\_d2012040[34]\*.h5 test/testfiles/TATMS\_npp\_d20120404\*.h5

Command-line Elements

* The nagg command with -n 5 produces aggregations of five granules each.
* -t SATMS,TATMS indicates to nagg that those two products and their common geolocation data are to be aggregated.
* nagg with no -g option processes granules for the products specified with -t and by default for the corresponding geolocation product granules either from the input files specified for the -t products or from files matching the file name in the N\_GEO\_Ref attribute in those files. For the default behavior, the creation field in the geolocation file name is replaced with \* for matching (GONPO\_npp\_d20120508\_t0333549\_e0336247\_b02735\_\*\_unkn\_dev.h5).
* Without the -S option, all products including the geolocation granules are put in a single file for each aggregation.

Output

The output of this command is one partial file with four SATMS and four TATMS product granules and four GATMO geolocation product granules and one other partial file with one granule of each product.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 13 | 1 | 15 | 1 |
| Output aggregations | 15 | 5 | 2 partial | 5 |

Notes

The [34]\* wildcards in the –t option in the command line matches all SATMS\_npp\_d20120403… and SATMS\_npp\_d20120404… file names in the input directory. Those beginning with TATMS match only TATMS\_ npp\_d20120404… file names. The corresponding GATMO files are included as they are in the previous example (see page 31), and the aggregation boundaries, numbers of granules in output files, and dimensions of raw data datasets are also the same.

The difference in output from the previous example is that with five input SATMS and GATMO granules but only three input TATMS granules, nagg produces two TATMS fill granules to complete the packaging. nagg will also produce fill granules for granules missing from between granules in a temporal aggregation.

These fill granules can be identified by examining the output files to check the N\_Granule\_ID attributes of the granule datasets with HDF5 tools HDFview or h5dump as shown below. h5dump is another HDF5 utility found in the bin directory of the HDF5 install. Using h5dump to view the N\_Granule\_ID of the first SATMS granule and the first TATMS granule shows the difference in N\_Granule\_IDs for a real and a fill granule. The difference is the real granule ID has a 15 character string beginning with “NPP” while the fill granule ID is “N/A”. Fill granules will have the same amount of data as real granules, but the data will be fill values as specified in the *JPSS Common Data Format Control Book*.

Real Granule Command

The following h5dump command line will retrieve a real granule ID.

h5dump -a /Data\_Products/ATMS-SDR/ATMS-SDR\_Gran\_0/N\_Granule\_ID SATMS-TATMS-GATMO\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120529123052142977\_XXXX\_XXX.h5

Real Granule Output

The output from the real granule command is below.

HDF5 "SATMS-TATMS-GATMO\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120529123052142977\_XXXX\_XXX.h5" {

ATTRIBUTE "/Data\_Products/ATMS-SDR/ATMS-SDR\_Gran\_0/N\_Granule\_ID" {

…

DATA {

(0,0): "NPP000141695514"

}

}

Fill Granule Command

The following h5dump command line will retrieve a fill granule ID.

h5dump -a /Data\_Products/ATMS-TDR/ATMS-TDR\_Gran\_0/N\_Granule\_ID SATMS-TATMS-GATMO\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120529123052142977\_XXXX\_XXX.h5

Fill Granule Output

The output from the fill granule command is below.

HDF5 "SATMS-TATMS-GATMO\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120529123052142977\_XXXX\_XXX.h5" {

ATTRIBUTE "/Data\_Products/ATMS-TDR/ATMS-TDR\_Gran\_0/N\_Granule\_ID" {

…

DATA {

(0,0): "N/A"

}

}

}

Input Files (13)

The input files are listed below.

test/testfiles/SATMS\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155447242391\_noaa\_ops.h5

…

test/testfiles/SATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120404\_t0000163\_e0000479\_b02250\_c20120405155457899734\_noaa\_ops.h5

…

test/testfiles/TATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155441643487\_noaa\_ops.h5

…

test/testfiles/GATMO\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155441643487\_noaa\_ops.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 4 granules in SATMS-TATMS-GATMO\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120529123052142977\_XXXX\_XXX.h5

Produced 1 granules in SATMS-TATMS-GATMO\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120529123052282010\_XXXX\_XXX.h5

### Packaging Compatible Products from Single Granule Input Files using Exact Matching of Geolocation Input File Names

This example shows how to use nagg to package compatible products from single granule input files and how to specify the exact matching of geolocation input file names.

Command

nagg –n 5 -t SATMS,TATMS –g strict test/testfiles/SATMS\_npp\_d2012040[34]\*.h5 test/testfiles/TATMS\_npp\_d2012040[34]\*.h5

This is the same command and same set of input files as the example in the “Packaging Compatible Products from Single Granule Input Files” on page 31 except for the –g strict command-line option. Adding –g strict to the command will enforce that geolocation file names must exactly match those in the /N\_GEO\_Ref attribute of the SATMS and TATMS files. Since the name of the GATMO file with the geolocation granule corresponding to the first SATMS or TATMS granule processed, GATMO\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155441643487\_noaa\_ops.h5, has a creation time that does not match that in the attribute, the command fails. With -g yes (the default) instead of -g strict, the creation time, origin, and domain fields are masked when searching for the geolocation file named in the attribute. The -g no option processes the data files without processing the geolocation information.

Command Runtime Output

The status messages produced by the program during processing are listed below.

nagg: \*\*\*ERROR\*\*\* find\_geo\_granules(): Failed to get geolocation granules.

test/testfiles/GATMO\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155447242391\_noaa\_ops.h5 does not exist or otherwise cannot be accessed for reading.

nagg: \*\*\*ERROR\*\*\* nagg\_get\_granules(): Failed to get geolocation granules

nagg: \*\*\*ERROR\*\*\* nagg\_get\_granules(): no granules found for geoproduct.

geoproduct: GATMO

nagg: \*\*\*ERROR\*\*\* Failure encountered in Get Granules.

### Packaging Extended Compatibility Products

This example shows how to use nagg to package data products that were previously considered incompatible, but are now considered compatible because the designated geolocation product of one data product is the terrain corrected equivalent of the designated geolocation product of the other.

Command

nagg -n 4 -t ICSTT,SATMR test/testfiles/ICSTT\*d20130126\* test/testfiles/SATMR\*d20130126\*

Command-line Elements

* -n 4.
* -t ICSST,SATMR
* -g GATRO

Output

The output of this command is 2 files, each with 2 granules of both data products and the geolocation product.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 12 | 1 | 12 | 1 |
| Output aggregations | 2 | 2 | 2 | 4 |

Notes

ICSST and SATMR were considered incompatible products by previous versions of nagg because they had different designated geolocation products. For nagg versions 1.5.0 and above, GCRIO and GATRO are considered equivalent GEO products, and therefore ICSST and SATMR products are considered compatible and may be packaged together. For the input files in this example either geolocation product is available. GCRIO is chosen by default as the terrain corrected version of the two equivalent geolocation products. GATRO could be specified instead with the option –g GATRO.

Neither file is a full aggregation. The bucket boundary falls in the middle of the 4 granules available in the input files.

Input Files

The input files are listed below.

test/testfiles/ICSTT\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130126034916192115\_noaa\_ops.h5

test/testfiles/ICSTT\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130126034948250511\_noaa\_ops.h5

test/testfiles/ICSTT\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130126035020215772\_noaa\_ops.h5

test/testfiles/ICSTT\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130126035052218071\_noaa\_ops.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 2 granules in GCRIO-ICSTT-SATMR\_npp\_d20130126\_t0153459\_e0154477\_b06465\_c20130422181907434187\_XXXX\_XXX.h5

Produced 2 granules in GCRIO-ICSTT-SATMR\_npp\_d20130126\_t0154499\_e0155517\_b06465\_c20130422181907489499\_XXXX\_XXX.h5

## Extracting, Unpackaging, and Replacing Products in Packaged Files

### Replacing Terrain Corrected Geolocation Granules with Equivalent Not Terrain Corrected Geolocation Granules

This example shows how to use nagg to replace the terrain corrected GEO product GCRIO with the not terrain corrected equivalent geolocation product GATRO in a packaged file with four compatible data products. Although the aggregation number matches the number of granules in the original file (4), the output is in two files because there is a bucket boundary in the middle of the original file.

Command

nagg -n 4 -t ICALI,ICALM,ICCCR,SATMR -g GATRO

test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command-line Elements

* -n 4.
* -t ICALI,ICALM,ICCCR,SATMR
* -g GATRO

Output

The output of this command is eight files: four for the ICALI product and four for the geolocation product GCRIO.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 24 | 4 | 2 | 4/1 |
| Output aggregations | 20 | 2 | 2 | 2 |

Notes

The GCRIO geolocation product is one of the three pairs of equivalent geolocation products listed in Table 1 on page 6. For the equivalent products, either may be specified by –g <geoproduct>.

Input File

The input file is listed below.

test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 2 granules in GATRO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0154477\_b06465\_c20130419222048019124\_XXXX\_XXX.h5

Produced 2 granules in GATRO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0154499\_e0155517\_b06465\_c20130419222050404794\_XXXX\_XXX.h5

### Unpackaging and De-aggregating Packaged and Aggregated Input Files

This example shows how to use nagg to unpackage and de-aggregate packaged and aggregated input files.

Command

nagg -t ICALI,ICALM,ICCCR,SATMR -S -g no test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command-line Elements

* The nagg command without the -n <number> command-line option produces default aggregations of one granule each.
* The -S option puts all product granules in separate files.
* -t ICALI,ICALM,ICCCR,SATMR indicates to nagg that granules of those products are to be de-aggregated and unpackaged.
* The -g no option tells nagg to ignore the corresponding geolocation granules, neither trying to find them for input nor to produce geolocation information in output files. This was done for this example because the GMODO geolocation files for VIIRS products are rather large for distributing with the source code. The -g no option may also be useful for using nagg with product files when the geolocation files are unavailable.

Output

The output of this command is 16 files: four for each of the four products (-g no directs nagg not to process the geolocation product GCRIO).

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 20 | 4 | 1 | 4 |
| Output aggregations | 16 | 1 | 16 | 1 |

Notes

Examining the contents of the input and output files will show that the first dimension of the datasets in the All\_Data group of the output file are one quarter the size of the first dimension of the corresponding dataset in the input files. The input file’s raw data datasets contain hyperslabs for each of four granules, and the output files’ datasets contain a hyperslab for only one granule.

Input File

The input file is listed below.

test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 1 granules in ICALI\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130301220927817486\_XXXX\_XXX.h5

Produced 1 granules in ICALM\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130301220927817486\_XXXX\_XXX.h5

Produced 1 granules in ICCCR\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130301220927817486\_XXXX\_XXX.h5

Produced 1 granules in SATMR\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130301220927817486\_XXXX\_XXX.h5

Produced 1 granules in ICALI\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130301220927888192\_XXXX\_XXX.h5

Produced 1 granules in ICALM\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130301220927888192\_XXXX\_XXX.h5

Produced 1 granules in ICCCR\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130301220927888192\_XXXX\_XXX.h5

Produced 1 granules in SATMR\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130301220927888192\_XXXX\_XXX.h5

Produced 1 granules in ICALI\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130301220927956415\_XXXX\_XXX.h5

Produced 1 granules in ICALM\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130301220927956415\_XXXX\_XXX.h5

Produced 1 granules in ICCCR\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130301220927956415\_XXXX\_XXX.h5

Produced 1 granules in SATMR\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130301220927956415\_XXXX\_XXX.h5

Produced 1 granules in ICALI\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130301220928024524\_XXXX\_XXX.h5

Produced 1 granules in ICALM\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130301220928024524\_XXXX\_XXX.h5

Produced 1 granules in ICCCR\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130301220928024524\_XXXX\_XXX.h5

Produced 1 granules in SATMR\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130301220928024524\_XXXX\_XXX.h5

### Extracting a Product from Packaged Files Containing Other Products

This example shows how to use nagg to extract a product from packaged files containing other products.

Command

nagg -n 2 -t ICALM -g no test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command-line Elements

* The nagg command with the -n 4 command-line option produces aggregations of four granules each.
* -t SVM04 indicates to nagg that only granules of the SVM04 product are to be aggregated and packaged in the output file.
* The -g no option tells nagg to ignore the corresponding geolocation granules, neither trying to find them for input nor to produce geolocation information in output files. This was done for this example because the GMODO geolocation files for VIIRS products are rather large for distributing with the source code. The -g no option may also be useful for using nagg with product files when the geolocation files are unavailable.

Output

The output of this command is one file with four granules of the SVM04 product only.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 20 | 4 | 1 | 4 |
| Output aggregations | 4 | 2 | 2 | 2 |

Notes

This example uses the same input file as the example in the “Unpackaging and De-aggregating Packaged and Aggregated Input Files” section on page 42, but only one of the products is listed for the –t option.

nagg copies only the listed product into the 2 output files.

For this example the total number of granules in the output files is smaller than the original because only one of five products is selected for aggregation in the output file.

Input File

The input file is listed below.

test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 2 granules in ICALM\_npp\_d20130126\_t0153459\_e0154477\_b06465\_c20130301221754996608\_XXXX\_XXX.h5

Produced 2 granules in ICALM\_npp\_d20130126\_t0154499\_e0155517\_b06465\_c20130301221755010617\_XXXX\_XXX.h5

## Creating New Output Files Formatted Like an Existing Example File

### Aggregating and Packaging Files Like an Example File

This example shows how to use nagg –l or --like <example file> to aggregate or package granules from input files with a product list and aggregation number like those in the example file. Note that the aggregation number will be the number of granules per product in the file, and if the file is a partial file, the aggregation number will be less than the original aggregation number. Check beginning or ending files to be used as example files to insure the expected aggregation number.

Command

nagg –l test/testfiles/GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 test/testfiles/SATMS\_npp\_d2012040\*.h5 test/testfiles/TATMS\_npp\_d2012040\*.h5

Command-line Elements

* -l example file GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.

Output

The output of this command is three files with 2 or 1 granules of the SATMS, TATMS, and GATMO products.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 15 | 1 | 15 | 1 |
| Output aggregations | 15 | 2 | 3 (2 full, 1 partial) | 2 |

Notes

The example file GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5has 2 granules for each of these products: SATMS, TATMS and the GATMO GEO product. The nagg command with the –l GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 command-line option produces aggregations of 2 granules each with SATMS and TATMS granules found in the input files plus corresponding GEO granules.

The -l <example file> option determines the number of granules per output file and the list of sensor data products to be aggregated/packaged by inspection of the example file. All other properties are determined by other command-line options or nagg defaults. The -A, -n, -g or -t command options will override the corresponding value from the example file.

Input Files

The input files are listed below.

test/testfiles/SATMS\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20120403\_t2359443\_e0000159\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20120404\_t0000163\_e0000479\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20120404\_t0000483\_e0001199\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/SATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155447242391\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120403\_t2359443\_e0000159\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120404\_t0000163\_e0000479\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120404\_t0000483\_e0001199\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/TATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155457899734\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120403\_t2359123\_e2359439\_b02250\_c20120405155441643487\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120403\_t2359443\_e0000159\_b02250\_c20120405155441643487\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120404\_t0000163\_e0000479\_b02250\_c20120405155441643487\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120404\_t0000483\_e0001199\_b02250\_c20120405155441643487\_noaa\_ops.h5

test/testfiles/GATMO\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120405155441643487\_noaa\_ops.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 2 granules in GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120831023912403398\_XXXX\_XXX.h5

Produced 2 granules in GATMO-SATMS-TATMS\_npp\_d20120404\_t0000163\_e0001199\_b02250\_c20120831023912464828\_XXXX\_XXX.h5

Produced 1 granules in GATMO-SATMS-TATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120831023912550539\_XXXX\_XXX.h5

#### Using the –n Override

The -l or –like option in the previous example can be used in combination with -n, -A, -t or -g. When one of these options is also in the command line, it will override the conflicting directive from the –like <example file> option. The following example uses the same example file and input files as in the previous example.

Command

nagg –n 3 --like test/testfiles/GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 test/testfiles/SATMS\_npp\_d2012040\*.h5 test/testfiles/TATMS\_npp\_d2012040\*.h5

Command-line Elements

* -l example file GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5
* -n 3 overrides the aggregation number from the –l option.

Output

The output of this command is two files with 3 or 2 granules of the SATMS, TATMS, and GATMO products.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 15 | 1 | 15 | 1 |
| Output aggregations | 15 | 3 | 2 (1 full, 1 partial) | 3 |

Notes

* With the addition of –n 3 the nagg command with the –l GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 command-line option produces aggregations of 3 granules each with SATMS and TATMS granules found in the input files plus corresponding GEO granules.

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 3 granules in GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000479\_b02250\_c20120831160042219489\_XXXX\_XXX.h5

Produced 2 granules in GATMO-SATMS-TATMS\_npp\_d20120404\_t0000483\_e0001519\_b02250\_c20120831160042440599\_XXXX\_XXX.h5

#### Using the –A Override

The -l or –like option in the previous example can be used in combination with -n, -A, or -t. When one of these options is also in the command line, it will override the conflicting directive from the –like <example file> option. The following examples use the same example file and input files as in the example above.

Suppose 2 minutes of SATMS, TATMS and associated GATMO data were desired instead of the 2 granules in the example file. –A 120 will provide an aggregation of that size, with the products according to the example file.

Command

nagg –A 120 --like test/testfiles/GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 test/testfiles/SATMS\_npp\_d2012040\*.h5 test/testfiles/TATMS\_npp\_d2012040\*.h5

Command-line Elements

* -l example file GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5
* -A 120 overrides the aggregation number from the –l option.

Output

The output of this command is two files with 4 or 1 granules of the SATMS, TATMS, and GATMO products.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 15 | 1 | 15 | 1 |
| Output aggregations | 15 | 4 | 2 (1 full, 1 partial) | 4 |

Notes

* With the addition of –n 120 the nagg command with the –l GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 command-line option produces aggregations of 4 granules each with SATMS and TATMS granules found in the input files plus corresponding GEO granules.

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 4 granules in GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0001199\_b02250\_c20120831161244023811\_XXXX\_XXX.h5

Produced 1 granules in GATMO-SATMS-TATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120831161244313132\_XXXX\_XXX.h5

#### Using the –t Override

The -l or –like option in the previous example can be used in combination with -n, -A, or -t. When one of these options is also in the command line, it will override the conflicting directive from the –like <example file> option. The following examples use the same example file and input files as in the example above.

Overriding the -l option with a –t <product list> option will use the aggregation number from the file, but the –t product list.

Command

nagg –t TATMS --like ../test/testfiles/GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5 ../test/testfiles/SATMS\_npp\_d2012040\*.h5 ../test/testfiles/TATMS\_npp\_d2012040\*.h5

Command-line Elements

* -l example file GATMO-SATMS-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120830155722719166\_unkn\_xxx.h5
* -t TATMS overrides the product list from the –l option.

Output

The output of this command is three files with 2 or 1 granules of the TATMS, and GATMO products.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files (containing full and partial aggregations)** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 10 | 1 | 10 | 1 |
| Output aggregations | 10 | 2 | 3 (2 full, 1 partial) | 2 |

Notes

* This example uses a subset of the products in the example file. It would be possible to use entirely different products if they were also in the input files.
* The GATMO GEO product is associated with both SATMS and TATMS, and therefore will be packaged with both products or with either product alone.

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 2 granules in GATMO-TATMS\_npp\_d20120403\_t2359123\_e0000159\_b02250\_c20120831162351301821\_XXXX\_XXX.h5

Produced 2 granules in GATMO-TATMS\_npp\_d20120404\_t0000163\_e0001199\_b02250\_c20120831162351458586\_XXXX\_XXX.h5

Produced 1 granules in GATMO-TATMS\_npp\_d20120404\_t0001203\_e0001519\_b02250\_c20120831162351559138\_XXXX\_XXX.h5

### Extracting, Deaggregating, and Unpackaging a Selected Product with Geolocation Like an Example File

This example shows how to use nagg with an example file to extract one data product and the corresponding geolocation product from an input file with several products. The aggregation number (1) is also determined from the example file. This particular example file produces unpackaged output because it has an attribute /N\_GEO\_Ref.

Command

nagg –l example\_ICALI\_ext\_GCRIO.h5 ./GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command-line Elements

-l example file example\_ICALI\_ex\_GCRIO.h5.

The file example\_ICALI\_ext\_GCRIO.h5 contains one ICALI granule and an attribute “/N\_GEO\_Ref” whose value is the name of a file with the corresponding geolocation granule. The effect of this command option is equivalent to the options “–t ICALI –n 1 –S”.

Output

The output of this command is eight files: four for the ICALI product and four for the geolocation product GCRIO.

Data Granules in Input and Output Files

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Aggregations** | **Total granules** | **Granules per aggregation for each product** | **Files** | **Hyperslabs in each raw data dataset for a full aggregation** |
| Input aggregations | 20 | 4 | 1 | 4 |
| Output aggregations | 8 | 1 | 8 | 1 |

Notes

This example uses a subset of the products in the example file. The ICALM, ICCCR, SATMR, or GCRIO products could be extracted individually or in any combination with command-line overrides or an appropriate example file.

Input File

The input file is listed below.

test/testfiles/GCRIO-ICALI-ICALM-ICCCR-SATMR\_npp\_d20130126\_t0153459\_e0155517\_b06465\_c20130301214009160670\_unkn\_xxx.h5

Command Runtime Output

The status messages produced by the program during processing are listed below.

Produced 1 granules in ICALI\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130419150802066081\_XXXX\_XXX.h5

Produced 1 granules in GCRIO\_npp\_d20130126\_t0153459\_e0154157\_b06465\_c20130419150802066081\_XXXX\_XXX.h5

Produced 1 granules in ICALI\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130419150802123444\_XXXX\_XXX.h5

Produced 1 granules in GCRIO\_npp\_d20130126\_t0154179\_e0154477\_b06465\_c20130419150802123444\_XXXX\_XXX.h5

Produced 1 granules in ICALI\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130419150802152468\_XXXX\_XXX.h5

Produced 1 granules in GCRIO\_npp\_d20130126\_t0154499\_e0155197\_b06465\_c20130419150802152468\_XXXX\_XXX.h5

Produced 1 granules in ICALI\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130419150802213391\_XXXX\_XXX.h5

Produced 1 granules in GCRIO\_npp\_d20130126\_t0155219\_e0155517\_b06465\_c20130419150802213391\_XXXX\_XXX.h5

## Compressing Data and Changing the File Storage Layout

The three examples in this section illustrate how nagg can be used to compress data and to change the storage layout of the data. Layout and filter options may be used in the same command and may be used multiple times. However, specifying multiple layout options that apply to the same dataset will result in errors, as will specifying a layout that is incompatible with a specified filter. Compression filters require a chunked storage layout, and if not specified or previously applied, a default chunk layout will be created. Applying contiguous or compact storage to a dataset will remove any filters that were previously applied.

The minimum size specified by --minimum or the default minimum size will be applied for the command line layout or filter options that have no list of datasets provided, and are therefore applied to all datasets in the /All\_Data group. When a list of datasets is provided, the layout or filter is applied regardless of the specified or default minimum size.

Application of the COMPACT layout is also not restricted by the minimum size. The COMPACT layout will not be applied to datasets larger than 64K bytes.

### Compression with the shuffle and gzip Filters

This command line will create packaged four granule aggregations of VIIRS-DNB-SDR and VIIRS-DNB-GEO products from files matching the SVDNB\_npp\_d20130727\_t000\*.h5 pattern. All datasets of at least 10240 bytes size will be compressed with the shuffle and gzip filters.

nagg -n4 -tSVDBN --minimum=10240 --filter=SHUF --filter=GZIP=7 SVDNB\_npp\_d20130727\_t0\*.h5

### Changing the Storage Layout and Compressing the Data with Szip

This command line will create the same packaged four granule aggregations as the example above. This command also changes the storage layout for improved performance when subsetting only a part of the swath and applies Szip compression instead of shuffle and gzip. The datasets to which the layout change is to be applied are specified by the list of datasets in --layout=<list of datasets>: CHUNK=768x1016.

nagg -n4 -tSVDBN --layout=/All\_Data/VIIRS-DNB-GEO\_All/Height,/All\_Data/VIIRS-DNB-GEO\_All/Latitude,/All\_Data/VIIRS-DNB-GEO\_All/Longitude,/All\_Data/VIIRS-DNB-GEO\_All/LunarAzimuthAngle,/All\_Data/VIIRS-DNB-GEO\_All/LunarZenithAngle,/All\_Data/VIIRS-DNB-GEO\_All/QF2\_VIIRSSDRGEO,/All\_Data/VIIRS-DNB-GEO\_All/SCAttitude,/All\_Data/VIIRS-DNB-GEO\_All/SCPosition,/All\_Data/VIIRS-DNB-GEO\_All/SCVelocity,/All\_Data/VIIRS-DNB-GEO\_All/SatelliteAzimuthAngle,/All\_Data/VIIRS-DNB-GEO\_All/SatelliteRange,/All\_Data/VIIRS-DNB-GEO\_All/SatelliteZenithAngle,/All\_Data/VIIRS-DNB-GEO\_All/SolarAzimuthAngle,/All\_Data/VIIRS-DNB-GEO\_All/SolarZenithAngle,/All\_Data/VIIRS-DNB-SDR\_All/QF1\_VIIRSDNBSDR,/All\_Data/VIIRS-DNB-SDR\_All/Radiance:CHUNK=768x1016 --minimum=10240 --filter=SZIP=32,NN SVDNB\_npp\_d20130727\_t0\*.h5

### Unexpected Consequences where Datasets have Some Larger Dimensions

This command line will have the same effect as example 2, but with a potential for unexpected consequences. The new layout is exactly ¼ of the original chunk and granule size for all of the datasets listed in the example above. However, there are several other datasets with a different rank; a warning will be issued and the dataset will be created with the original properties of the dataset. Another unexpected consequence encountered is that in the case where the --layout chunk rank matches a dataset but has one or more dimensions that are larger than the original dataset, the larger chunk size will be used and extra storage space allocated, increasing the file size. For these files, the result was a .01% increase in the size of the output file using this command line instead of the command line in the example above, but users should be aware of the possible consequences.

nagg -n4 -tSVDBN --layout=CHUNK=768x1016 --minimum=10240 --filter=SZIP=32,NN GDNBO-SVDNB\_npp\_d20130727\_t0035017\_e0057470\_b09046\_c20130731205748151135\_XXXX\_XXX.h5.

# Revision History

|  |  |
| --- | --- |
| *May 2013* | Version 1.5. Initial version. |
| *January 2014* | Version 1.6. Compression and storage layout capabilities were added. |
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