

National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

The Aerosol Measurement and Processing System (AMAPS)

Amy Braverman¹, Olga Kalashnikova¹, Gerald Manion³, Susan Paradise¹,
Joyce Penner², Zhangfan Xing¹, Li Xu², and Brian Wilson¹

¹ Jet Propulsion Laboratory, California Institute of Technology, ² University of Michigan,
³Raytheon Corporation



Introduction



National Aeronautics and
Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Modern aerosol data sets are:

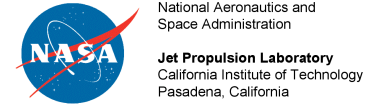
- massive
- distributed
- heterogeneous
- virtual
- complex

Traditional methods to manipulate and analyze them do not leverage modern computational infrastructure or modern data analysis.

For model evaluation, diagnosis, and scoring, it is useful to compare distributions, not just moments. NASA (and other) Level 2 data products can be brought to bear to provide those distribution.



What is AMAPS?

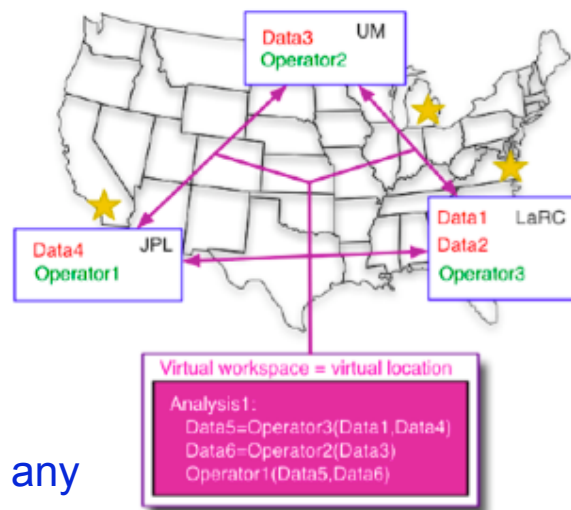


AMAPS is a grid-enabled, distributed computing and analysis environment for aerosol research.

The “grid” enables argument passing over the web (including code and data).

Creates a virtual workspace not tied to any single physical location.

AMAPS Distributed Science Network:



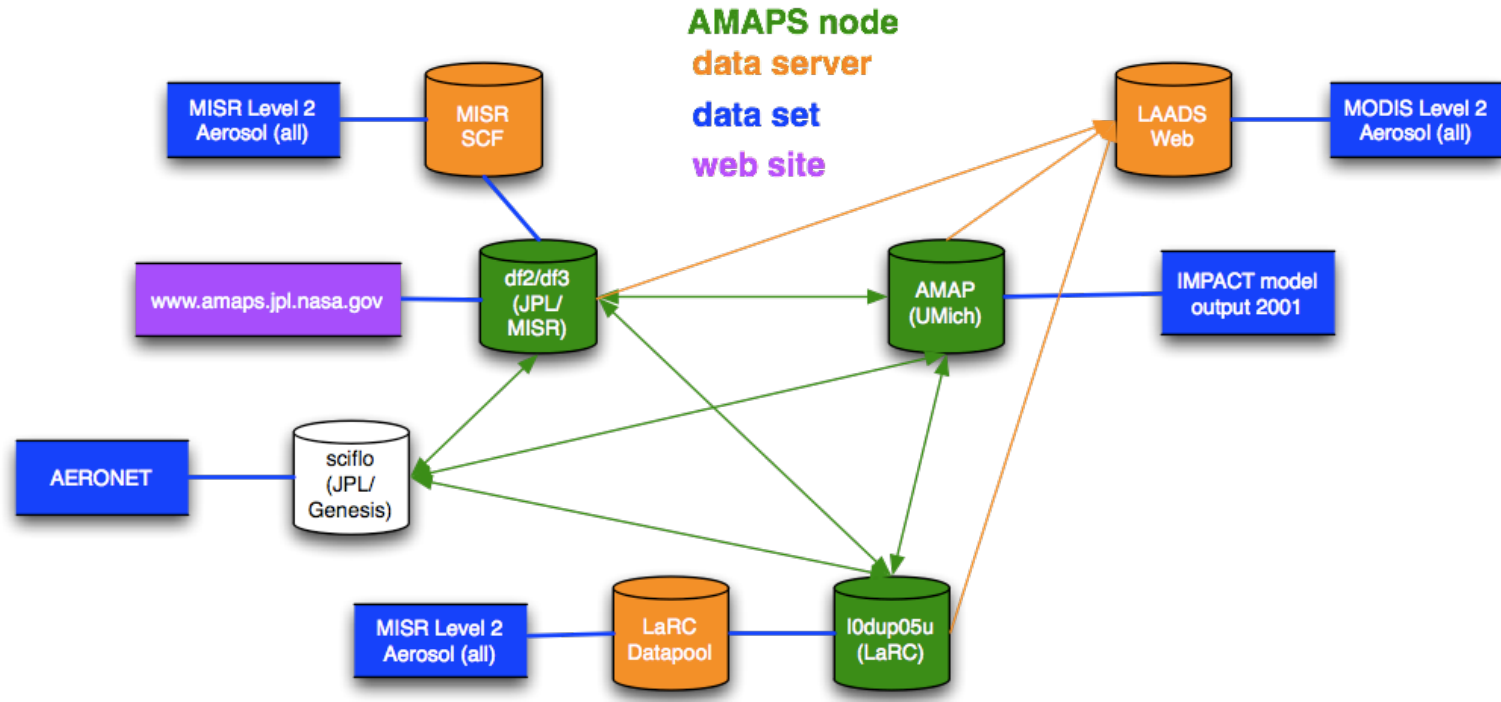
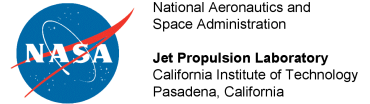
Web service = remotely callable, installed function. No need to pass code to remote computer.

AMAPS project goals:

- Infrastructure for accessing Level 2 aerosol data sets
- New analysis methods to exploit distributed data and grid capabilities
- Demonstration science analysis



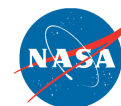
AMAPS Infrastructure



- **4 AMAPS nodes:** df3 (JPL), df2 (backup at JPL), amap (UM), ldup (LaRC), all equipped with the “SciFlo bundle” including the “amaps package”.



Using AMAPS through the website



National Aeronautics and Space Administration
Jet Propulsion Laboratory
 California Institute of Technology
 Pasadena, California

MisrSubsetter

Subset a list of MISR granules by lat/lon region and variable list, yielding a list of netCDF files containing the space and parameter subset.

Sciflo Inputs

datasetName:

level:

startTime:

endTime:

latMin:

latMax:

lonMin:

lonMax:

misrGridName:

misrVariables:

misrVersion:

label:

Work Unit Status/Color Legend: waiting, ready, staging, working, finalizing, done, cached, exception, cancelled, paused

Status of this sciflo is: done

Execution time: 33.677

Work Unit Monitoring

index	procid	type	dependencies	status	execution time	results
1	MisrGranuleInfo	soap		done	3.924	granuleInfo: xml
2	SelectUrls	python function		done	0.055	misrGranules: list [download]
3	MisrSubset	python function		done	17.260	misrSubsetDataFiles: list [download]

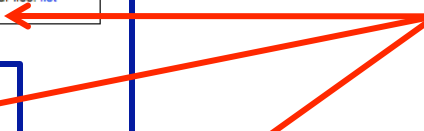
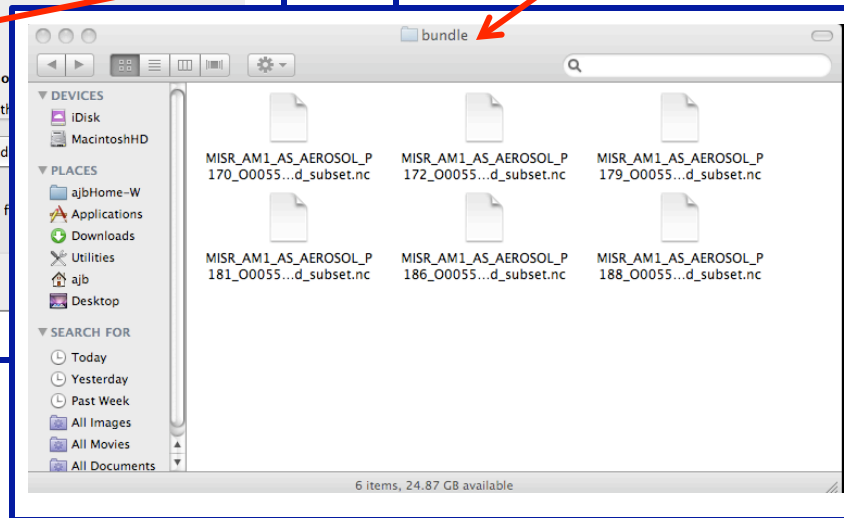
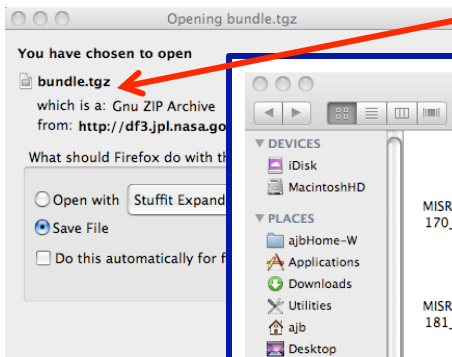
Work Unit Status/Color Legend: waiting, ready, staging, working, finalizing, done, cached, exception, cancelled, paused

Execution log: [log](#)

Sciflo Outputs

tag	value
misrGranuleInfo	str [download]
misrUrls	list [download]
misrSubsetDataFiles	str [download]
misrSubsetDataFilesXml	list [download]

Annotated sciflo: [xml](#)





Using AMAPS from a (python) program



National Aeronautics and Space Administration
Jet Propulsion Laboratory
 California Institute of Technology
 Pasadena, California

```
from amaps.general import getOverflights
from amaps.misr import getMisrDatum,getMisrData
from amaps.modis import getModisDatum,getModisData
from amaps.aeronet import getAeronetData
from amaps.plot import timeSeriesPlot
```

```
def timeSeriesMisrModisAeronetAot(lat,lon,spatialTolerance,
    regionExtent,avg,
    startTime,endTime,
    aeroLevel,title):
    # Get MISR/MODIS/Aeronet time series for all observations at a specific
    # location within the given time range. Plot and save to .png file.
```

--- more code ---

```
obsUrls = getOverflights(lat,lon,spatialTolerance,
    startTime,endTime,'df3','MISR','AS_AEROSOL')
```

--more code --

Main Program

```
title = 'La_Jolla_July_2001'
startTime = '2001-07-01 00:00:00'
endTime = '2001-08-01 00:00:00'
```

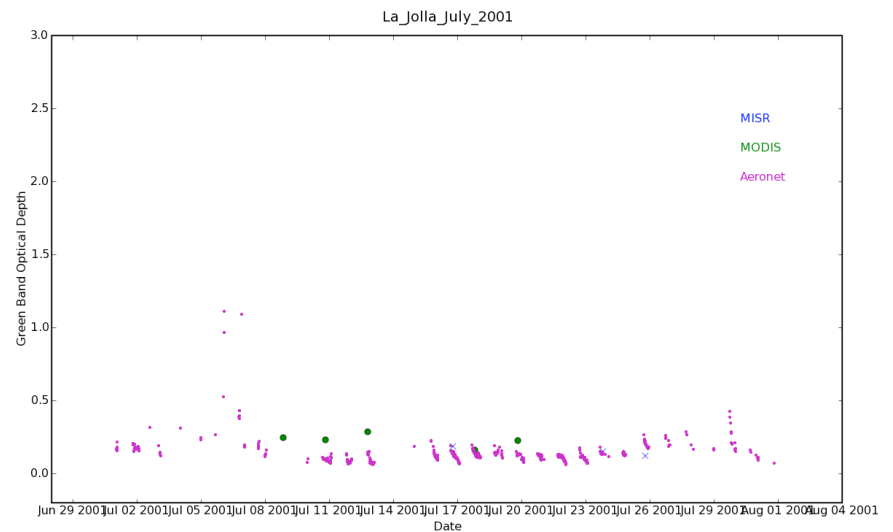
```
lat = 32.87
lon = -117.25
```

```
spatialTolerance = 0.0 # degrees
regionExtent = 1 # number of regions to average (regionExtent x regionExtent
    # Only used when spatialTolerance == 0.0
```

```
avg = False
```

```
aeroLevel = "1.5"
```

```
timeSeriesMisrModisAeronetAot(lat,lon,spatialTolerance,
    regionExtent,avg,
    startTime,endTime,
    aeroLevel,title)
```



A list of character strings:
 Urls of files containing data satisfying
 query.



More Information



National Aeronautics and
Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

- To use AMAPS, you need a linux box and the SciFlo-AMAPS software bundle.
- AMAPS web page: <http://amaps.jpl.nasa.gov>
- AMAPS is funded by NASA's ACCESS program for the period March 2007 through February 2009.
- Langley DAAC has expressed interest/intent to host AMAPS after February 2009.
- We would like to have a node at Goddard for MODIS. (Need a server with online access to file system, and SciFlo-AMAPS software.)
- Contact: Amy.Braverman@jpl.nasa.gov and/or Susan.Paradise@jpl.nasa.gov.