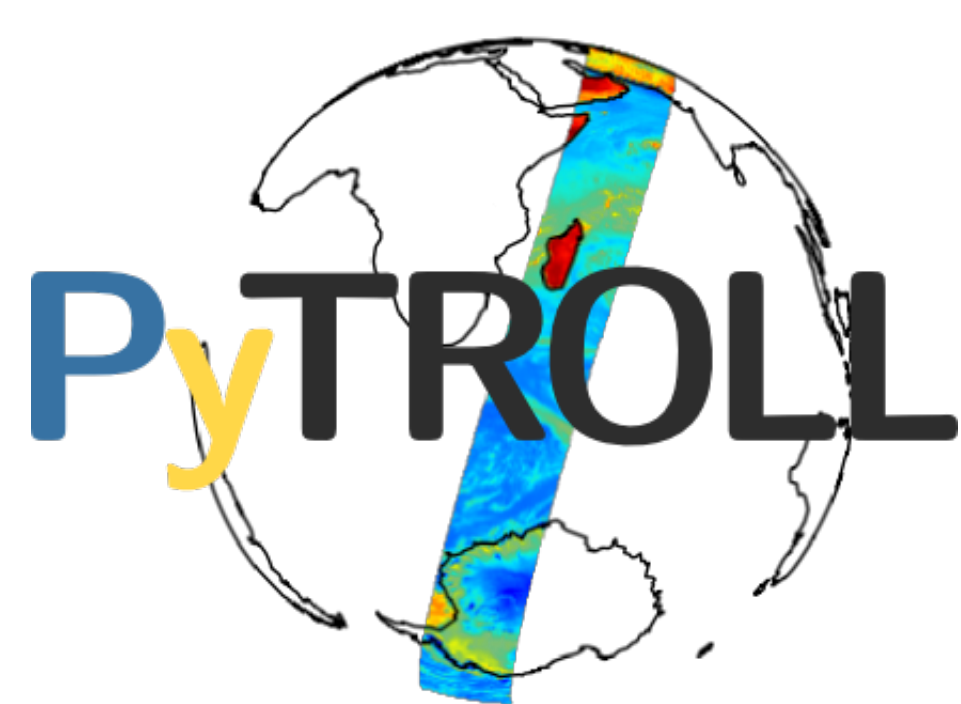




Pytroll: A Python Framework for Weather Satellite Data

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SMHI

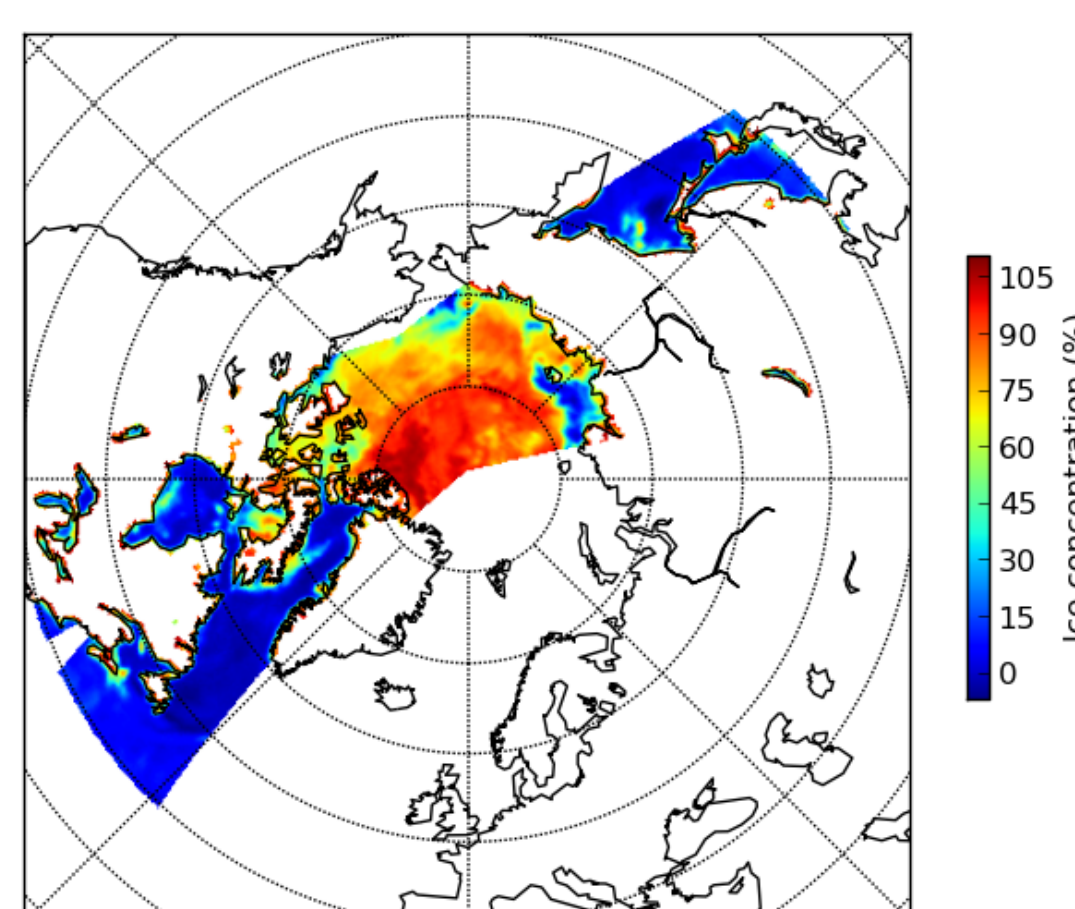
With a growing community of enthusiastic users, and a floor of more than 15 independent free and open source modules, Pytroll is becoming a major actor on the weather satellite data processing scene. It is used to read, process and write both polar orbiting and geostationary satellite data, both in scientific and 24/7 operation contexts. Here, we present a selection of pytroll modules that are of particular relevance for Direct Readout purposes: orbital and astronomical computations with pyorbital, pass scheduling with pytroll-schedule, real-time polar weather satellite data exchange with trollcast, data resampling with pyresample, tiepoint extrapolation with python-geotiepoints, and manipulation of sensor spectral responses with pyspectral.

Pyresample

Fast Resampling of Swath/Grids

- Nearest Neighbour (KD-Tree)
- Elliptical Weighted average (EWA)
- Gradient Search

GPU optimization in progress



Python Geotiepoints

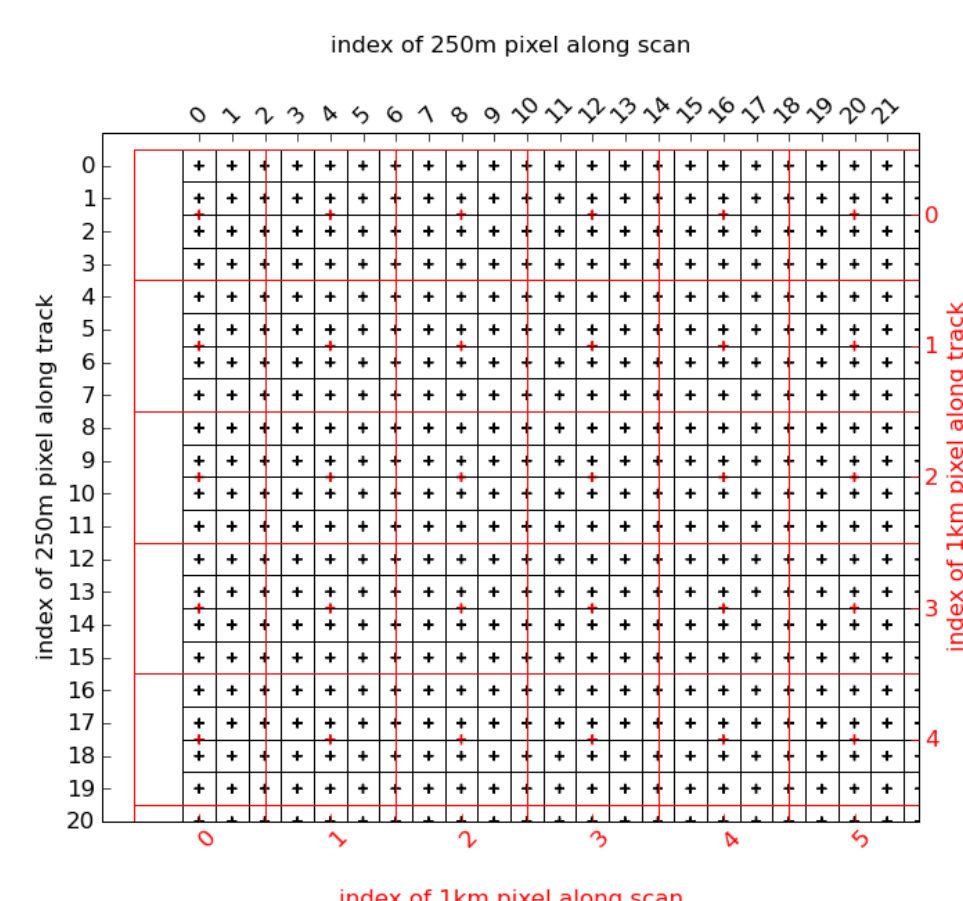
Navigation interpolation

Angles interpolation

MODIS, AVHRR

Uses splines

Extrapolation



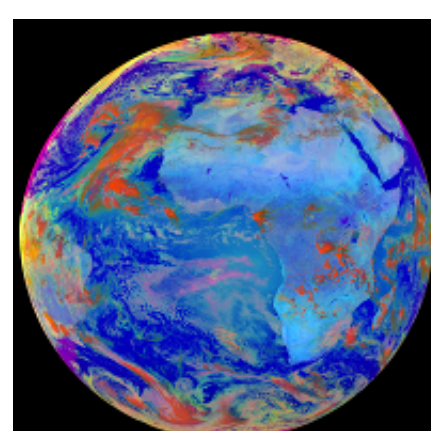
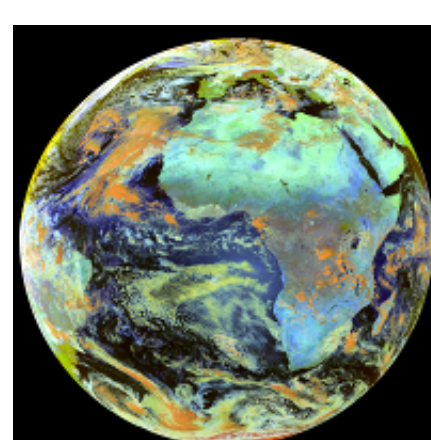
Pyspectral

Read spectral responses

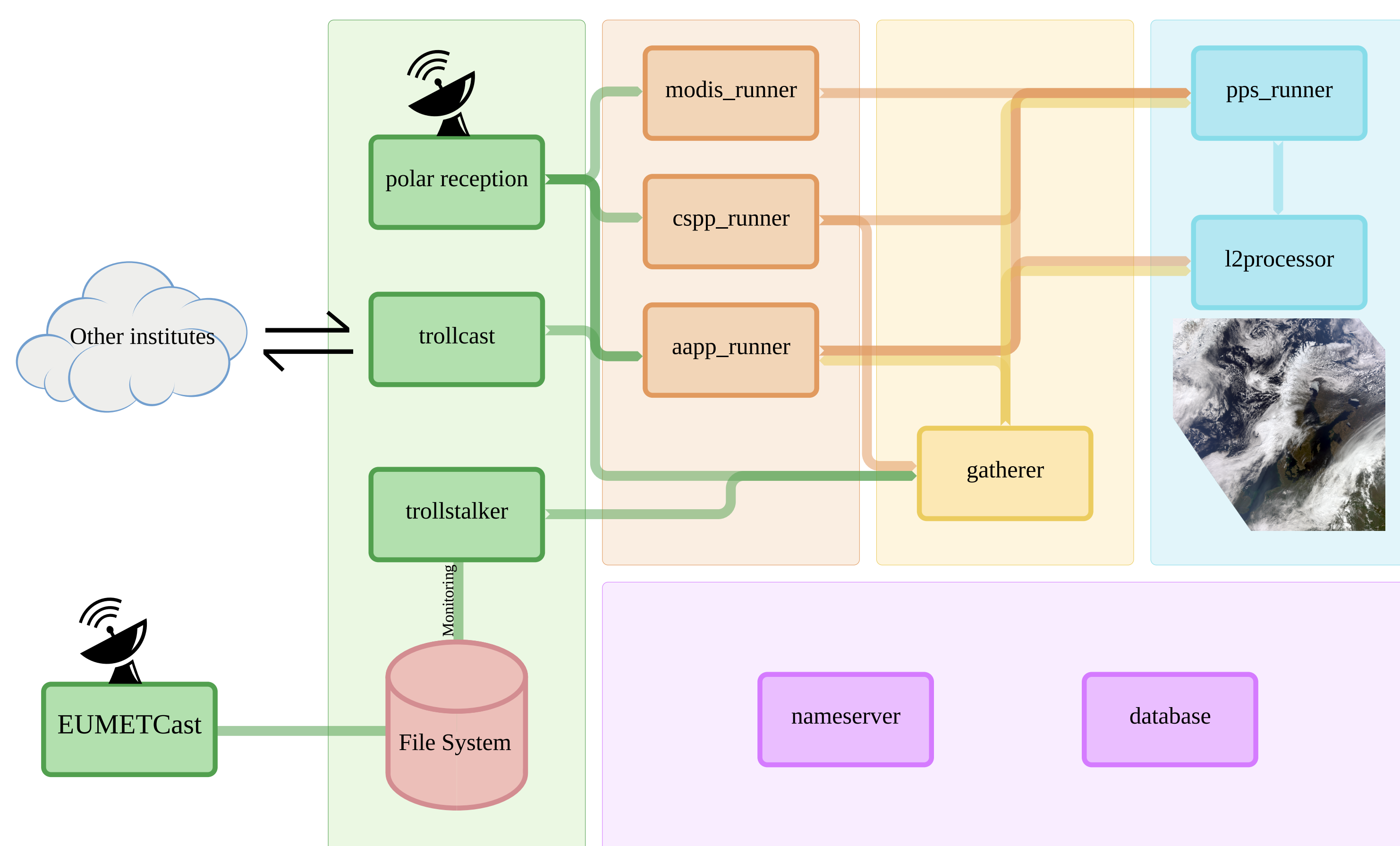
Solar irradiance spectra

Emissive/Reflective separation

VIIRS, MODIS, AVHRR, SEVIRI



Trollduction/Posttroll

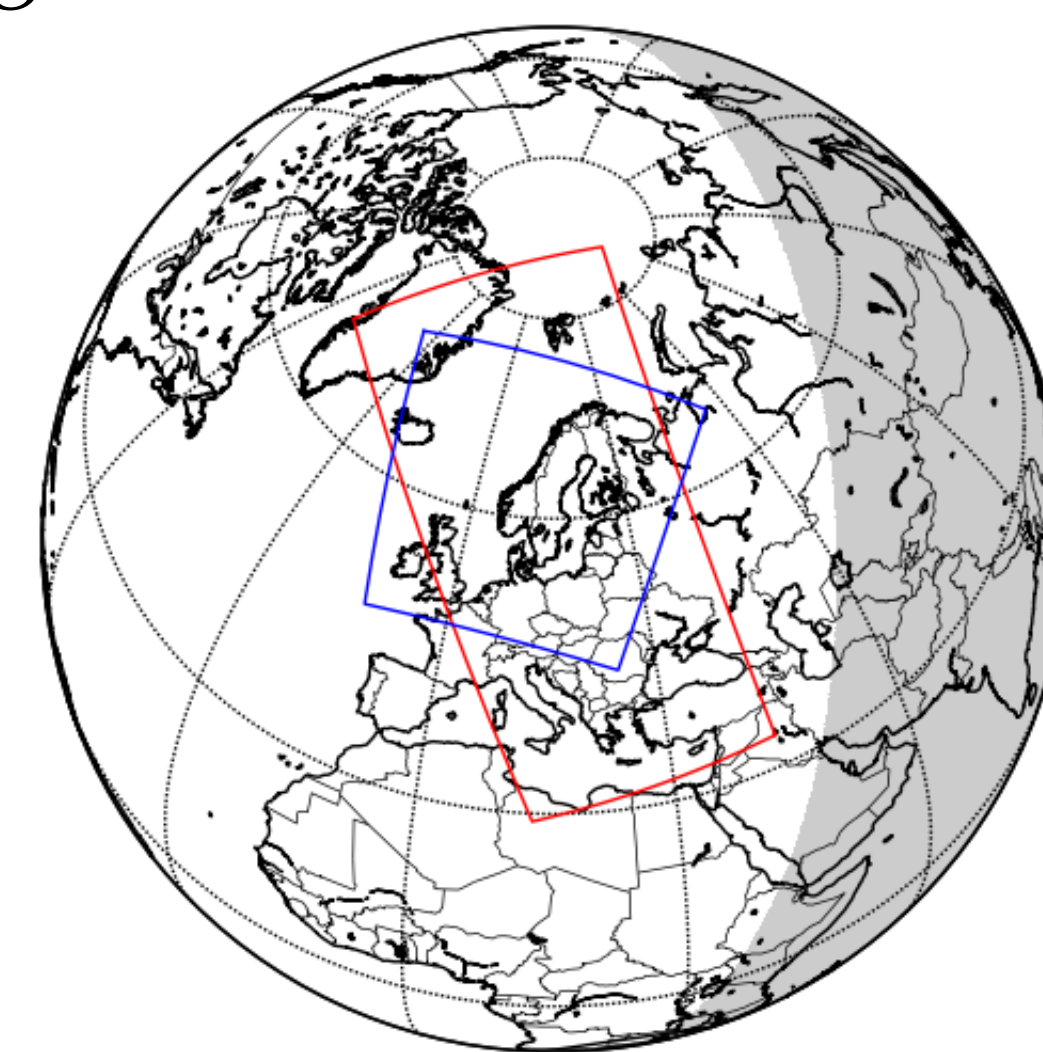


Pytroll-Schedule

Selection of passes

- by area of interest
- combining successive passes
- multiple antennas
- satellite scores
- day/night factor

noaa18	2016-06-09	08:34:12	08:46:44
npp	2016-06-09	08:40:19	08:52:43
noaa19	2016-06-09	09:00:51	09:12:11
noaa15	2016-06-09	09:05:43	09:16:13
metop-a	2016-06-09	09:18:31	09:26:16
terra	2016-06-09	10:00:04	10:14:08
metop-b	2016-06-09	10:03:00	10:18:04
aqua	2016-06-09	10:12:04	10:25:09
noaa18	2016-06-09	10:14:02	10:23:58
npp	2016-06-09	10:18:04	10:33:03
noaa19	2016-06-09	10:38:22	10:52:38
noaa15	2016-06-09	10:44:00	10:52:47
metop-a	2016-06-09	10:59:51	11:05:13
terra	2016-06-09	11:38:02	11:50:59
metop-b	2016-06-09	11:43:13	11:55:54
aqua	2016-06-09	11:49:03	12:03:06



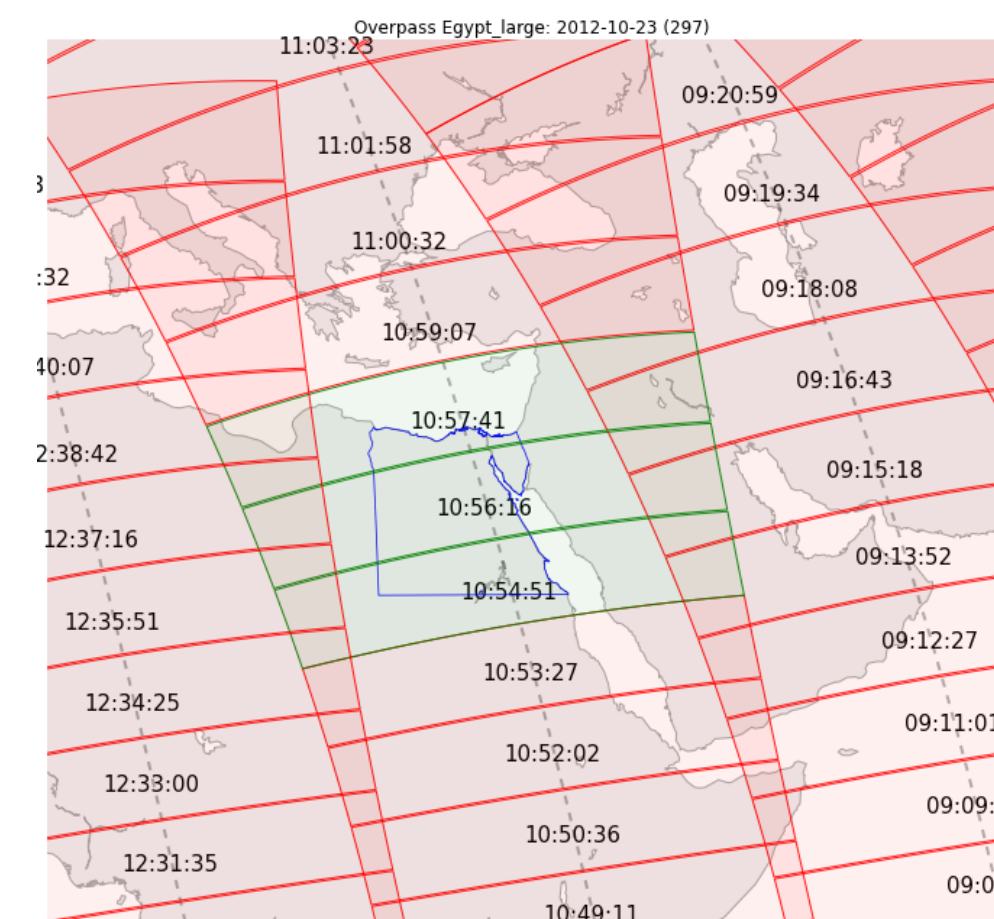
Pyorbital

Orbital computation

- Satellite position and velocity
- Observer angles

Astronomical computations

- Sun angles
- Moon phase and angles
- Sidereal time



Trollcast

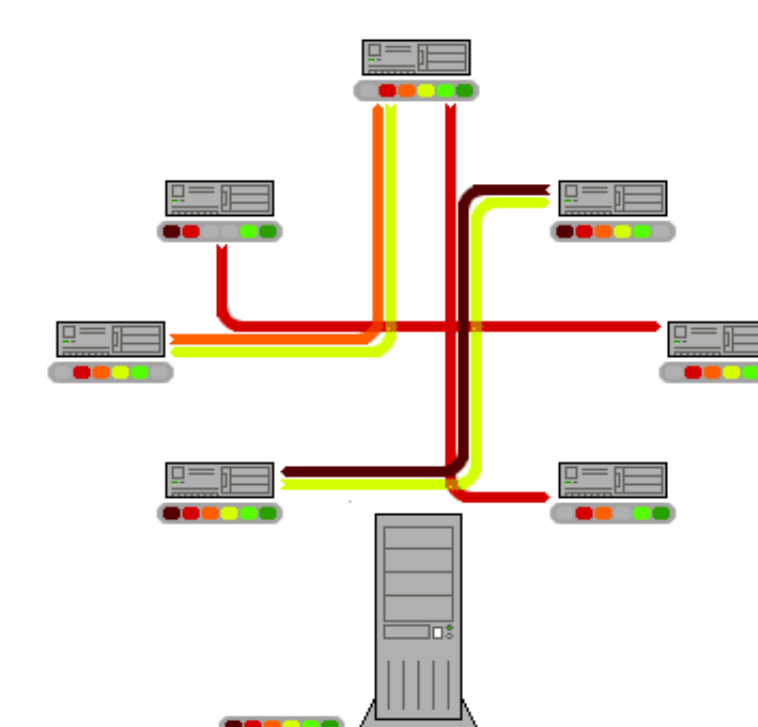
Polar satellite data exchange

Bittorrent based

Raw data

HRPT

CADU WIP



Other packages

Mpop/SatPy - High level interface to data

Trollimage - Colorspaces and images

Posttroll - Networking

Pytroll-file-utils - Moving files around

Trollsift - Parsing filenames

PyGAC - Reading and calibrating GAC

Pykdtree - Fast KDTree implementation

Python BUFR - Reader for BUFR files

Workshop
Friday PM !