

File Description

The time-space subsampler file is written in NetCDF (Network Common Data Form) format (<https://www.unidata.ucar.edu/software/netcdf/>). Each file contains a layer named "BinaryViewMask", which contains a 100-day global viewing binary mask for the given hypothetical sensor provided on a geographic coordinate system grid. The orbital configuration of the hypothetical sensor is presented in the file name and the metadata of the NetCDF file.

The subsampler file is named, e.g.: Orbit_(a)_SW(b)km_Inc(c)deg_Alt(d)km_Res(e)deg.nc (e.g., "Orbit_ascending_SW0120km_Inc92deg_Alt0498km_Res0p01deg.nc")

Code ID	Description	Value Range
(a)	Indicating the orbit is ascending/descending/both	ascending/descending/ascdesc
(b)	The swath width in [km]	0-9999
(c)	The inclination angle in [deg]	0-99
(d)	The altitude of the satellite in [km]	0-9999
(e)	The resolution of the mask. The options of the resolution include 0.01 and 0.05 [deg]	0p01/0p05

For example, in the file "Orbit_ascending_SW0120km_Inc92deg_Alt0498km_Res0p01deg.nc", the binary mask includes only ascending orbits with a swath width 120km. The satellite inclination angle is 92 degree, altitude is 498km. The resolution is 0.01 degree.

Data Descriptors

1) Dimensions

The dataset is written in 3 dimensions, the spatial coordinates "Latitude" and "Longitude", and the time axis "DayNumber". The data type of the dimensions is "float", which refers to 32-bit floating point.

2) Dataset

The space-time subsampler is written in the 3-Dimensional dataset "BinaryViewMask" in "byte" (8-bit) data type. In the data, viewed area is marked as "1", and not viewed area is marked as "0".

Metadata

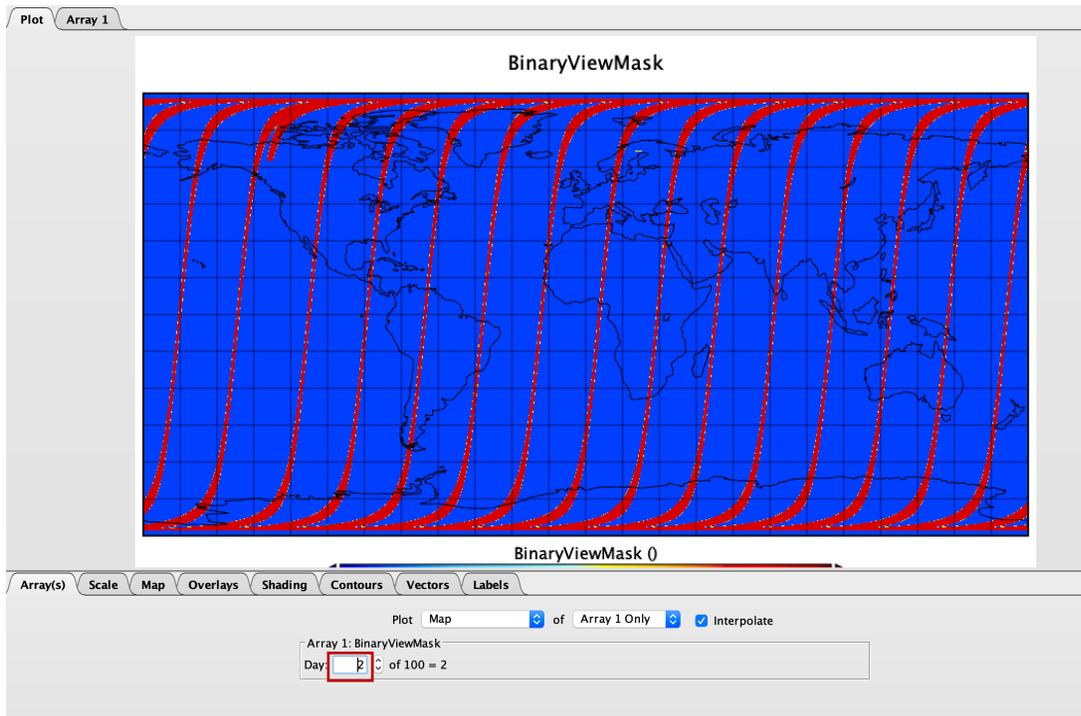
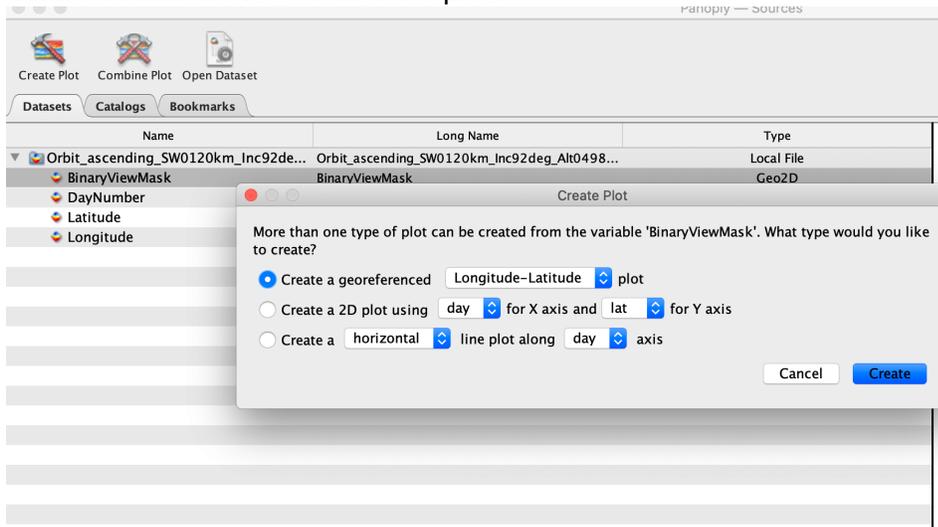
There are five global attributes in the NetCDF file. Among them, "orbit_altitude", "Resolution", and "inclination_angle" describe the orbital configuration, which are identical with the descriptors in the filename. "Repeat_Cycle" indicates the minimum period without viewing in the binary mask. "Point_of_Contact" provides the contact method to the data author.

Viewing the Data

1) Panoply (<https://www.giss.nasa.gov/tools/panoply/>)

NASA Panoply is an application for plotting the geo-referenced and other arrays from NetCDF format file.

To view the binary mask, use Panoply to open the file and double click the “BinaryViewMask” dataset. Then use it to create the plot.



By changing the number in red block, the tool could show the mask of different date.

2) Matlab code

A simple script is provided to help the user to use the file.

```
%% description
% Objectivities: plot the binary viewing mask
% Author: Lizhao Wang, lzwang@umd.edu
```

```

%% read the file
input_dir = './';
filename = 'Orbit_descending_SW1450km_Inc98deg_Alt0714km_Res0p05deg.nc';
fullname = [input_dir, '/', filename];
%read dimensions
lat1D = ncread(fullname, 'Latitude');
lon1D = ncread(fullname, 'Longitude');
daynum = ncread(fullname, 'DayNumber');
%generate geographic coordinates
[Lon2D, Lat2D] = meshgrid(lon1D, lat1D);
%define the start, stride, and count for reading the binary mask
for idx = 1:numel(daynum)%loop the daynumber
    dn = daynum(idx);
    start = [1,1, dn];% reading the dn-th day of the data
    stride = [1,1,1];
    count = [Inf, Inf, 1];% only read 1 day

    viewingMask = ncread(fullname, 'BinaryViewMask', start, count, stride);

    %% plot the viewing mask
    figure(1);clf
    worldmap('world');%define the display region
        geoshow(Lat2D, Lon2D, viewingMask, 'DisplayType', 'texturemap');
    hold on;
    %show the coastline
    load coastlines
    plotm(coastlat, coastlon, 'k-', 'LineWidth', 0.7);
    cbh = colorbar;
    cbh.Ticks = [ 0 1];
    title({'Binary Viewing Mask', ' ["1 viewing", "0 not viewing"]', ['Date: the
', num2str(dn, '%03d'), ' Day']});
end

```

