



OPERA

Observational Products for End-Users from
Remote Sensing Analysis

Fifth OPERA Workshop

September 11, 2025

OPERA Toolbox for ArcGIS pro

Dinuke Munasinghe

The University of Alabama

OPERA Toolbox for ArcGIS pro

Dinuke Munasinghe

The University of Alabama

©2025 All Rights Reserved

This workshop is open to US and non-US participants. The material presented has been cleared for unlimited release.

No ITAR information is to be presented.

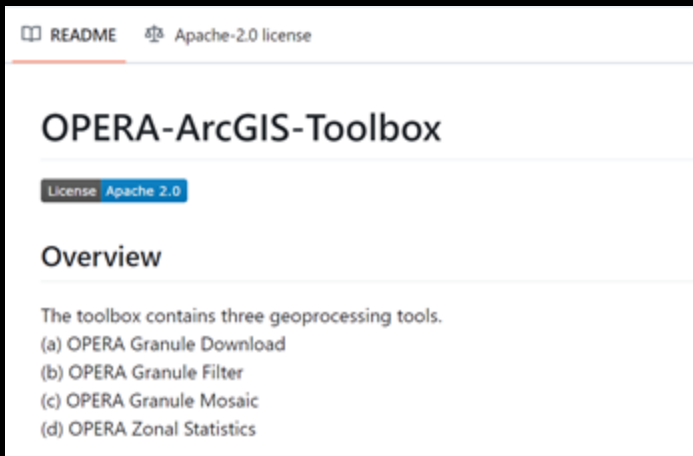
National Aeronautics and
Space Administration



- **Toolbox Overview**
- **Tool 1: OPERA Granule Download**
- **Tool 2: OPERA Granule Filter**
- **Tool 3: OPERA Granule Mosaic**
- **Tool 4: OPERA Zonal Statistics**
- **Get in touch with us!**

Toolbox Overview

National Aeronautics and
Space Administration



Toolbox structure



Scan QR to access the toolbox on GitHub!

OPERA Products can be downloaded at:

<https://search.earthdata.nasa.gov/search?portal=snwq&q=%22OPERA%22>

Documentation for the Toolbox can be found at:

<https://github.com/OPERA-Cal-Val/OPERA-ArcGIS-Toolbox>

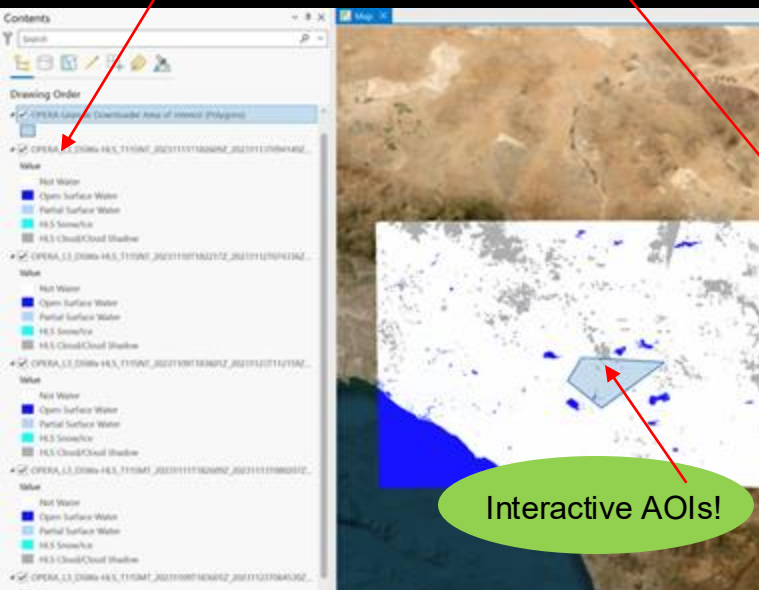
Tool 1: OPERA Granule Download

National Aeronautics and
Space Administration



Function: Downloads OPERA DSWx-HLS, DSWx-HLS, DIST-ALERT-HLS, DIST-ANN-HLS and RTC-S1 products from NASA Data repositories.

Metadata-enhanced granules automatically added to Contents Pane for easy interpretation.



Granule download based on user-defined data range.

Geoprocessing OPERA Granule Downloader

Parameters Environments

Start Date

End Date

Area of Interest

Output Folder Location

OPERA Product

Cloud Cover Threshold (Integer)

Username

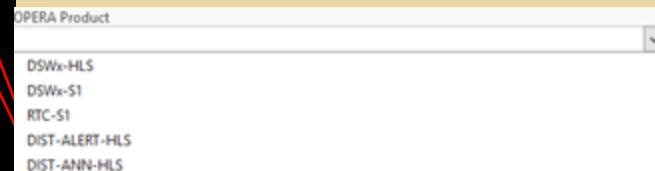
Password

☐ Visualize OPERA Granules

Run

Downloads enabled based on optional cloud cover threshold!

Tool support for 3 OPERA product suites!



Interactive AOIs!

Earth Data Login Credentials

Tool 2: OPERA Granule Filter

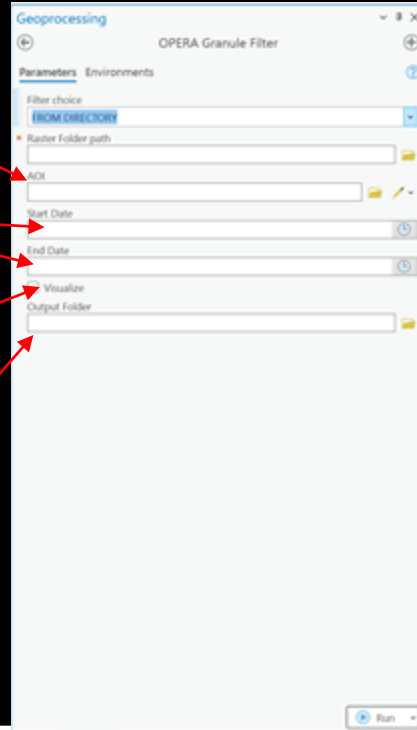
Function: Filters stacks of OPERA DSWx-HLS, DSWx-HLS, DIST-ALERT-HLS, DIST-ANN-HLS and RTC-S1 products from Directories/ArcGIS Pro Contents pane and creates new granule collections.

Pre-existing shapefile or AOIs drawn interactively.

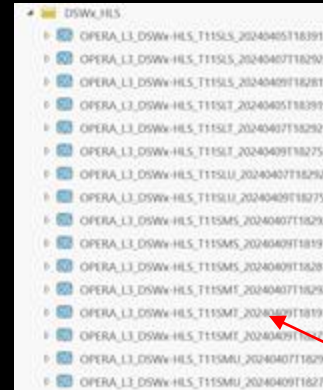
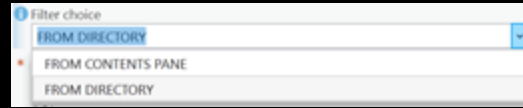
Filtering granules based on user-defined date range

If directory-based filtering: option to visualize filtered granules in contents pane.

Destination of filtered/sorted granules



Tool supports filtering of granules located in one directory/or granules in contents pane (i.e., drag and drop granules from contents pane that need to be sorted into one directory.)



Filtered granules

Original stack of granules

Tool 3: OPERA Granule Mosaic

National Aeronautics and
Space Administration



Function: Mosaics OPERA DSWx-HLS and DSWx-S1 products based on priority Land Cover classes.

DSWx-HLS granules to be
used in mosaic from Directory

Land cover prioritization based on
user needs (e.g., Maximum surface
water area).

Known mask HLS issue: Sediment-
laden or white (i.e. turbulent)
Surface Water may be misclassified
as Snow/Ice. User is given the
option to convert HLS Snow/Ice to
Open Surface water.

Geoprocessing

OPERA Granule Mosaic

Parameters Environments

Input Granules

Land Cover Priority

Convert Snow/Ice to Open Surface Water

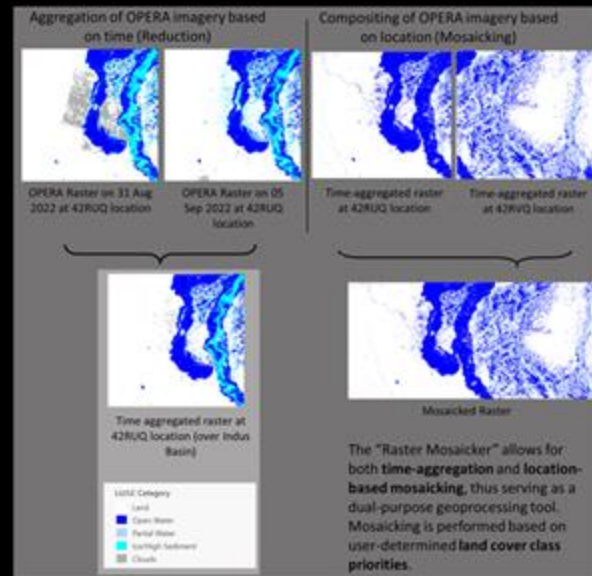
Output Mosaic Dataset

Spatial Reference of Output Mosaic Dataset

Land Cover Priority

- OPEN SURFACE WATER
- PARTIAL SURFACE WATER
- NOF WATER
- HLS CLOUD/CLOUD SHADOW
- HLS SNOW/ICE

Run



Prioritization of 'OPEN SURFACE WATER'
during mosaic creation for the Indus River
Flood of 2022.

Tool 4: OPERA Zonal Statistics



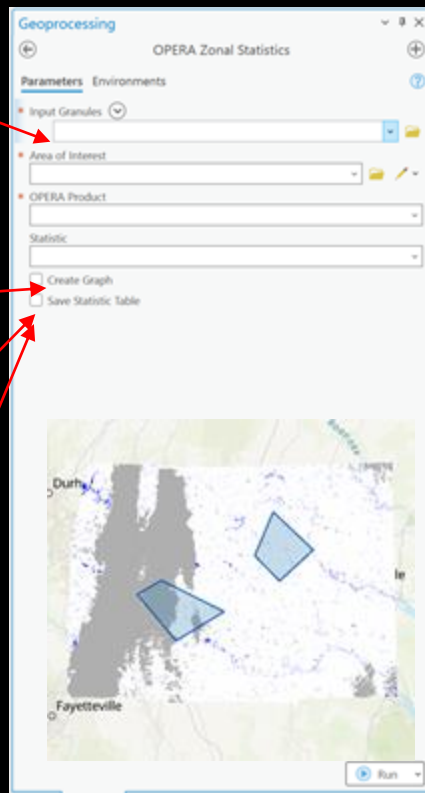
Function: Calculates Time Series Area Statistics for DSWx-HLS, DSWx-S1, DIST-ALERT-HLS and DIST-ANN-HLS products.

OPERA granules to be used either from directory or contents pane



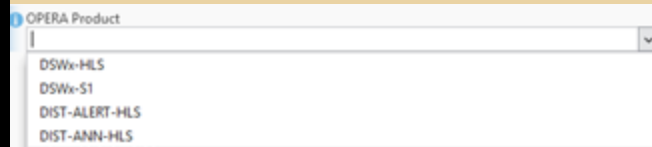
OPERA_DSWx-HLS_Area_...0240227T103846Z						
Field: Selection: Rows:						
OID	LABEL	NW	OSW	PSW	HLSSI	HLSCSL
1	FID_0	298.076	0.9009	0.3942	0.0306	247.3
2	FID_1	421.884	1.8999	1.9242	0.0387	0.666

	A	B	C	D	E	F
1	LABEL	NW	OSW	PSW	HLSSI	HLSCSL
2	FID_0	298.076	0.9009	0.3942	0.0306	247.3
3	FID_1	421.884	1.8999	1.9242	0.0387	0.666
4						

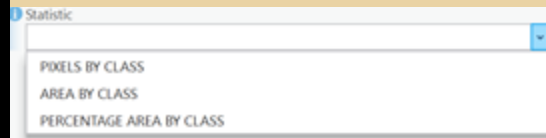


Pre-existing shapefile or AOIs drawn interactively.

Tool support for 4 OPERA products!



Tool support for 3 types of statistics!



Get in touch with us!



We want you to be part of our testing group! Please use our tools and let us know how we can improve.

opera.sep@jpl.nasa.gov

OPERA Products can be downloaded at:

<https://search.earthdata.nasa.gov/search?portal=snwg&q=%22OPERA%22>

Documentation for the Toolbox can be found at:

<https://github.com/OPERA-CalVal/OPERA-ArcGIS-Toolbox>

Acknowledgement:

Al Handwerger, Renato Frasson, Matthew Bonnema, Steven Chan, David Bekaert