sarmap
your information gateway

What's New in SARscape® 6.3.0

March 2026

New features

What's New in SARscape® 6.3.0 (1/3)

The newest release introduces several algorithmic improvements and new features.
The **new features** involve the following tools:

ENVI SARscape Workflow GUI	**New GUI for workflows, new interactive tools**
Help	**New structure fully integrated within the ENVI help content**
Import Data	**AIRSAT01**
	AIRSAT02
	AIRSAT08-HS01
	ALOS PALSAR-3
	BIOMASS
	Capella (TIFF + JSON)
	ICEYE (Cloud Optimised GeoTIFF + JSON, slant plane geometry in HDF5)
	NISAR (RSGC and GSLC format)
	Synspective (STRIX GRD and GRD-SR)

What's New in SARscape® 6.3.0 (2/3)

The newest release introduces several algorithmic improvements and new features.
The **new features** involve the following tools:

Basic/Workflows	**Ship Detection**
	Oil Spill Classification
	Inverse-SAR Detection and Refocusing
	Radar Cross Section
Basic/Feature Characteristics	**RGIQE-RNIIRS**
Basic/Oil Spill	**Oil Spill Classification**
Basic/Moving Target Detection	**Inverse-SAR Detection**
	Inverse-SAR Refocusing
Basic	**Oil Tank Detection**
Basic/Height Estimation	**3D Point Estimation**
	Height Estimation

What's New in SARscape® 6.3.0 (3/3)

The newest release introduces several algorithmic improvements and new features.
The **new features** involve the following tools:

Interferometry/Displacement Modeling	**New multitemporal displacement modeling**
	New and improved damping options (*Linear inversion*)
	Improved uncertainty analysis and plot *(Non-linear inversion)*
Preferences/Preferences specific	**New sections: Feature extraction, Stereo-Radargrammetry, Displacement Amplitude Tracking**
	Umbra preferences

New SAR missions! The «Golden Era» of SAR?

Institutional

PALSAR-3

Biomass

NISAR

Commercial

Iceye: new Dwells mode

Capella: new formats

AIRSAT

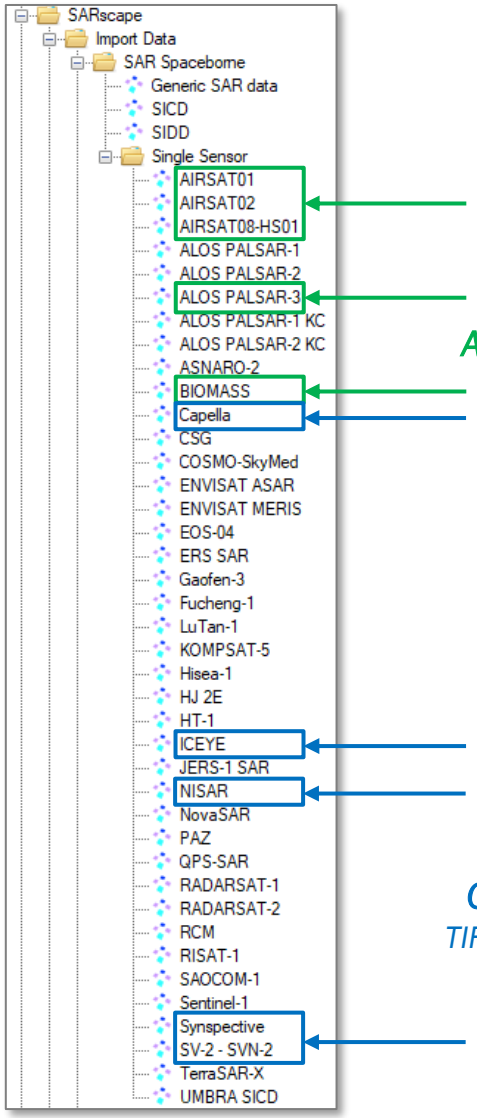
SV-2

Synspective

...

The responsibility for the success is also on us all, providing applications and tools based on these data...!

SAR Spaceborne



Five new sensors

AIRSAT01 *AIRSAT02* *AIRSAT08-HS01* *ALOS PALSAR-3* *BIOMASS*

New acquisition modes

Capella
TIFF + JSON

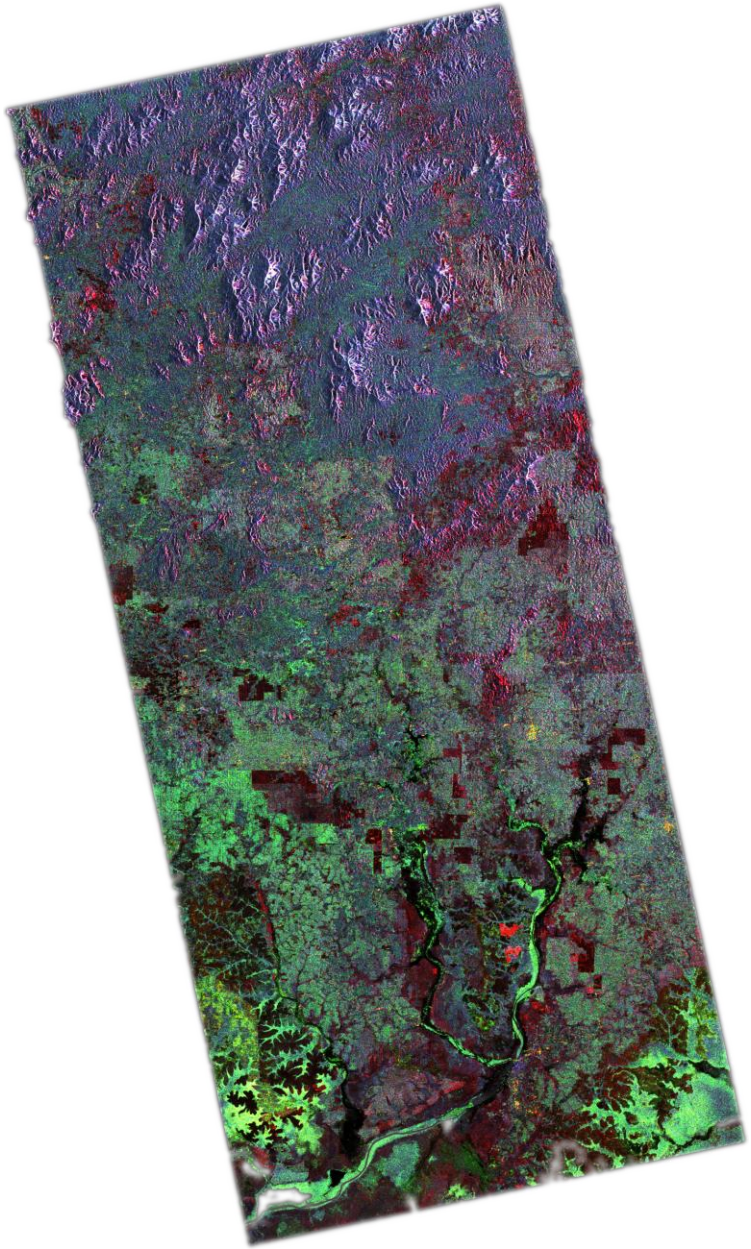
ICEYE
Cloud Optimised GeoTIFF + JSON and slant plane geometry in HDF5

NISAR
RSGC (slant range SLC) and GSLC format (geocoded SLC)

Synspective
STRIX GRD (ground range) and GRD-SR (ground range super resolution) in tiff format

SV-2 – SVN-2
StripMap and Sliding Spotlight modes

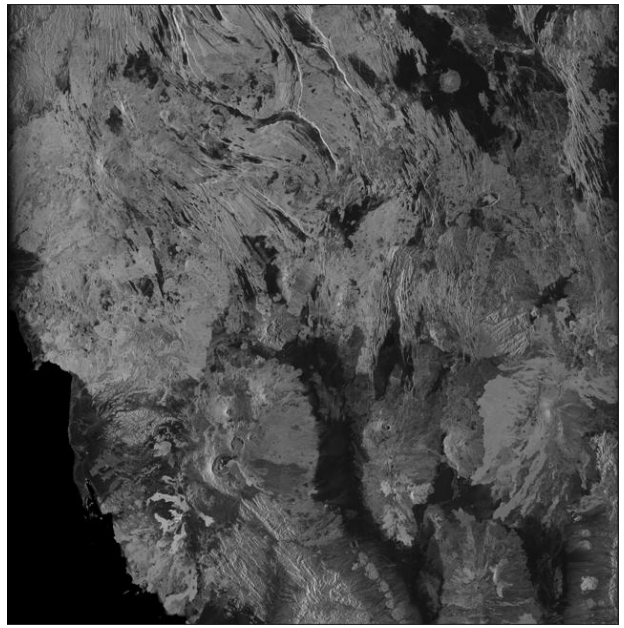
BIOMASS



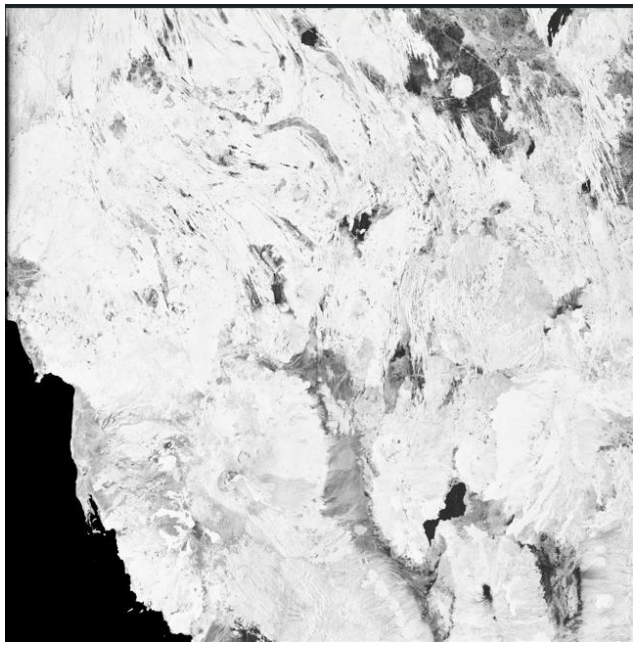
Pauli decomposition of a full-pol BIOMASS image over Borneo, where red, green and blue correspond to:

- R: even-bounce (HH-VV)
- G: dihedral rotated 45 degree (HV+VH)
- B: odd-bounce (HH+VV)

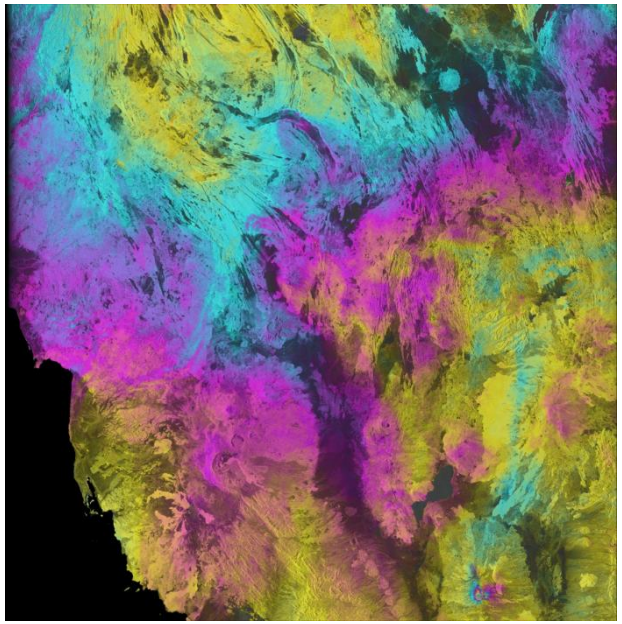
NISAR RSLC



Power



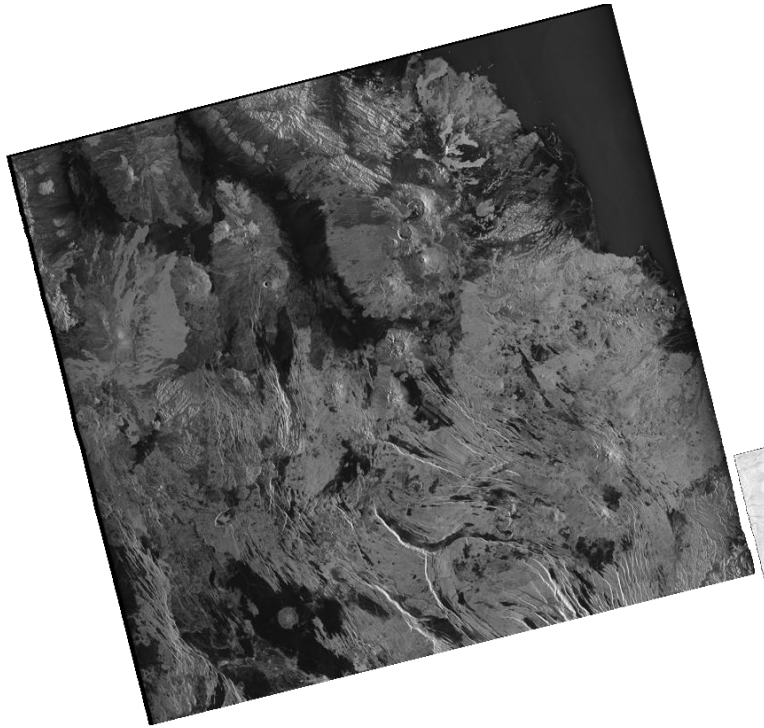
Coherence



Interferometric Phase

Based on real data over
East Africa

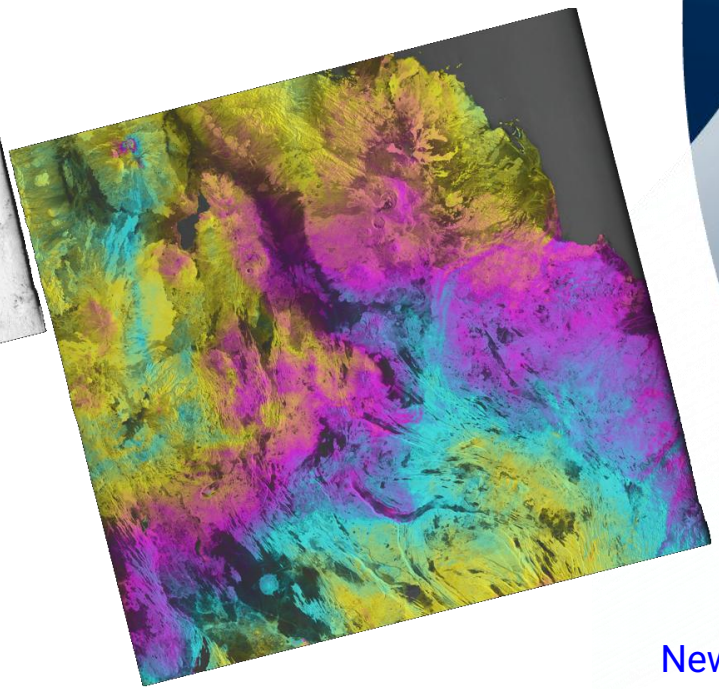
NISAR GSLC



Power

Coherence

Interferometric Phase



Based on real data over
East Africa

NISAR SLC

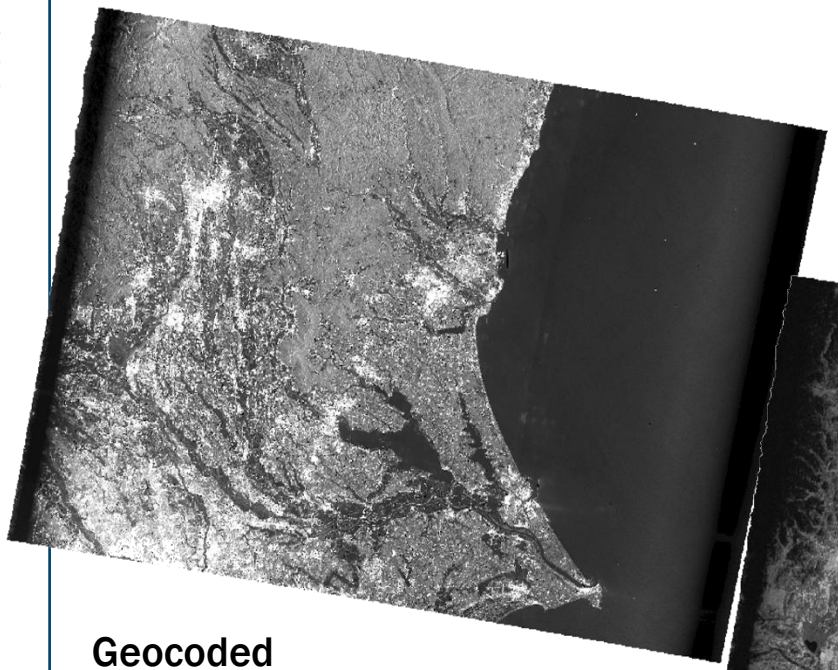
NISAR GSLC compatibility with SARscape functions:

Tool
Coherence estimation
CCD workflow
Multilooking
Geocoding (It applies a carto transformation and resampling)
Interferometry (Up to Phase to Displacement)
Remove Residual Phase Frequency
Sample selection (Sample Selection Geographic Data)
Polarimetric Signature
Polarimetric Features
Polarimetric Synthesis
Pauli Decomposition
Krogager Decomposition
Polarimetric Entropy Alpha Anisotropy Decomposition

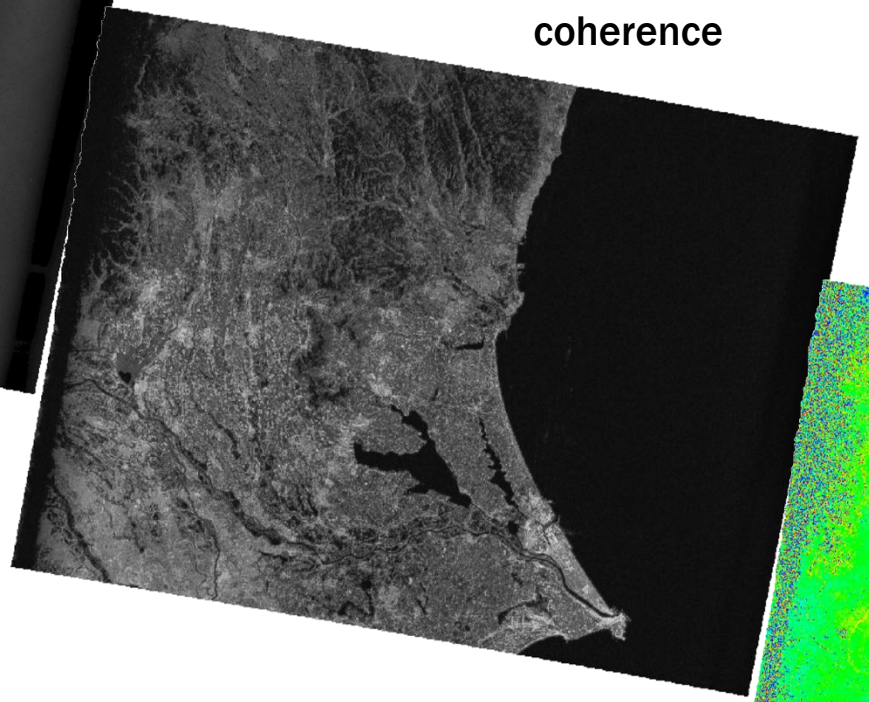
Tool
Polarimetric Entropy Alpha Anisotropy Classification
Dual-Polarimetric Entropy Alpha Anisotropy Decomposition
Single Image Filtering
De Grandi Spatio-Temporal Filtering
Adaptive Non-Local SAR Filtering
Gamma APM
Gamma Map
Gamma DE Map
Wishart Gamma Map
Wishart Gamma DE Map
EDPSVI

NISAR RSLC data are compatible with all SARscape tools.

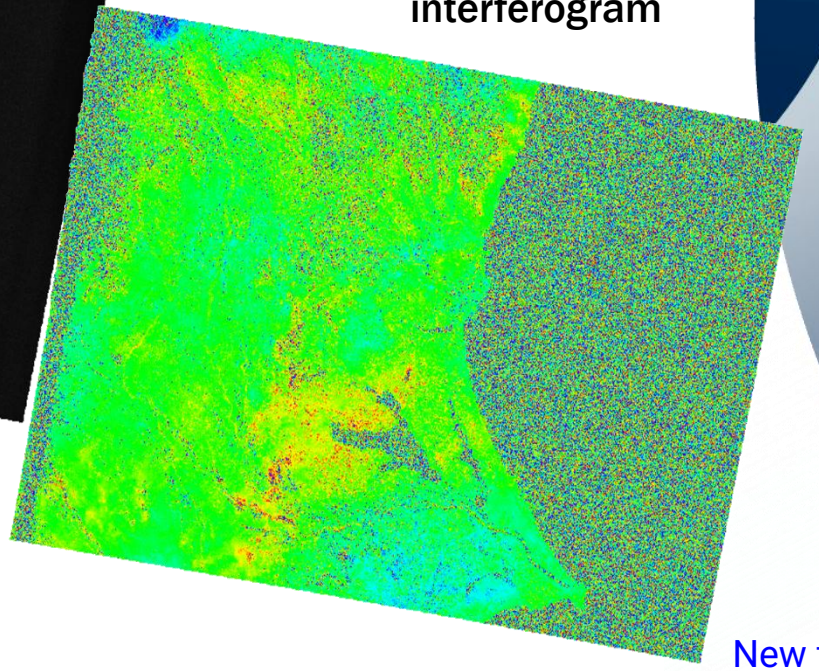
PALSAR-3



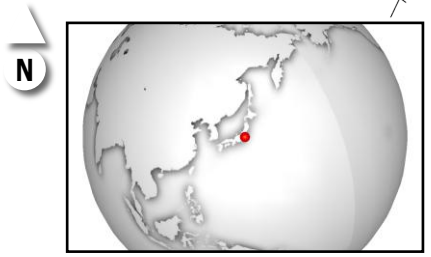
Geocoded amplitude



Geocoded coherence



Geocoded interferogram



Date: 2025 May 02 - 02:42

Based on the data kindly made available by Jaxa, ScanSAR at this time

New Basic Workflows

Amplitude Classifier

New workflow for classifying changes between two images based on amplitude. Images with up to a few degrees of angular separation are accepted. *Found in Basic/Workflows/*

Ship Detection

New workflow for *Ship Detection* over water bodies from SAR image is available. Optional AIS Matching is also available in this workflow – matching to ship position and voyage trajectory information provided by the Automatic Identification System. *Found in Basic/Workflows/*

Oil Spill Classification

New workflow for Oil Spill Classification that highlights oil spills over water bodies is introduced. *Found in Basic/Workflows/*

Inverse-SAR Detection and Refocusing

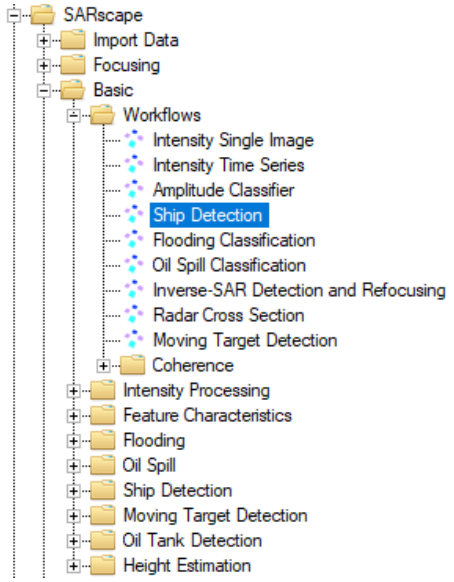
New workflow for Inverse-SAR Detection and Inverse-SAR Refocusing for moving targets in a single SAR image so displayed as unfocused lines in SAR SLC images. It also refocuses detected target in a SAR image that is moving in the azimuth direction. *Found in Basic/Workflows/*

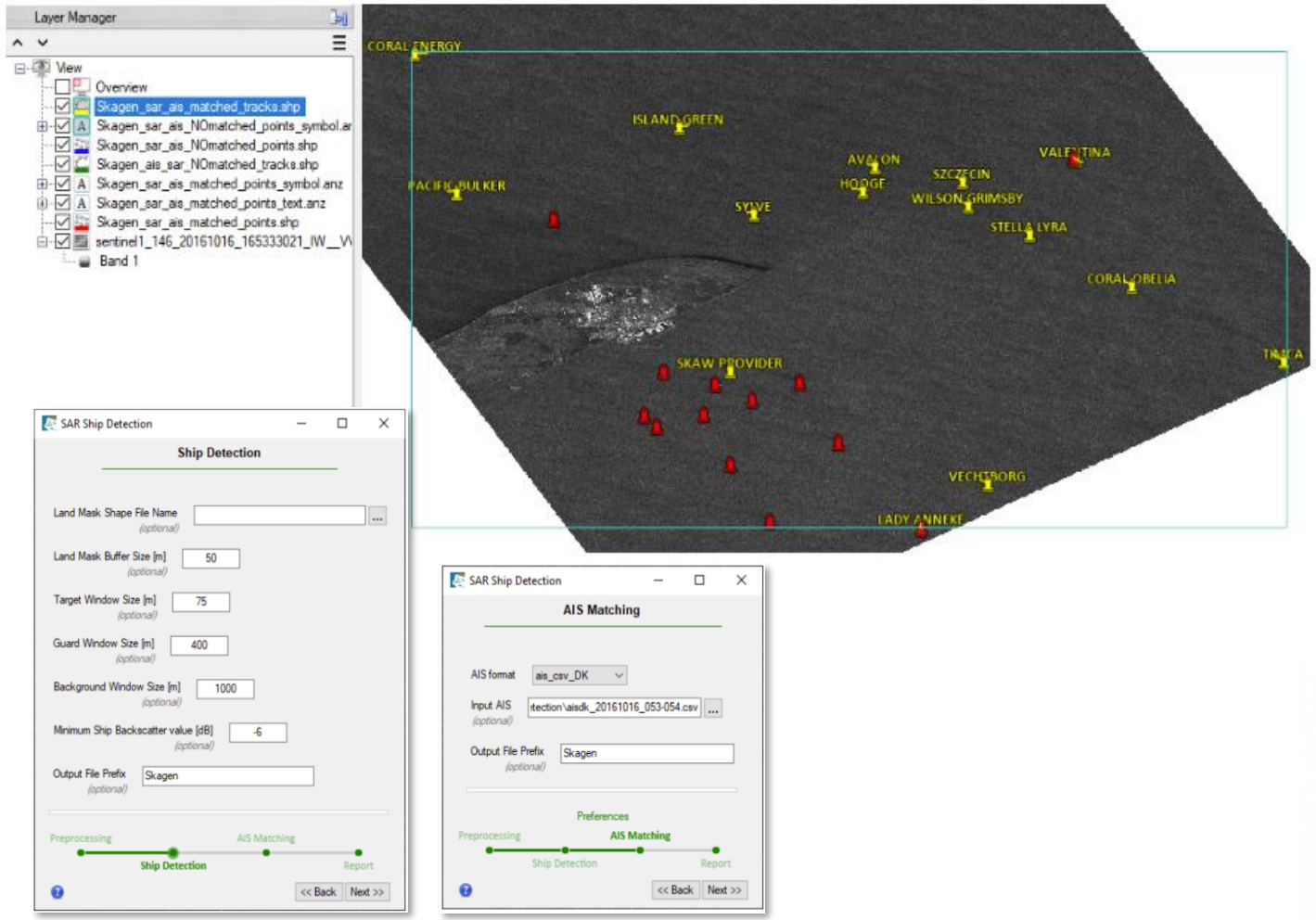
Radar Cross Section

New workflow for Radar Cross Section which indicates the level of detectability of an object by a radar is added. *Found in Basic/Workflows/*

Ship Detection

A streamlined, user friendly workflow for ship detection was implemented. This tool perform automatic ship detection with optional Automatic Identification System (AIS) labeling.

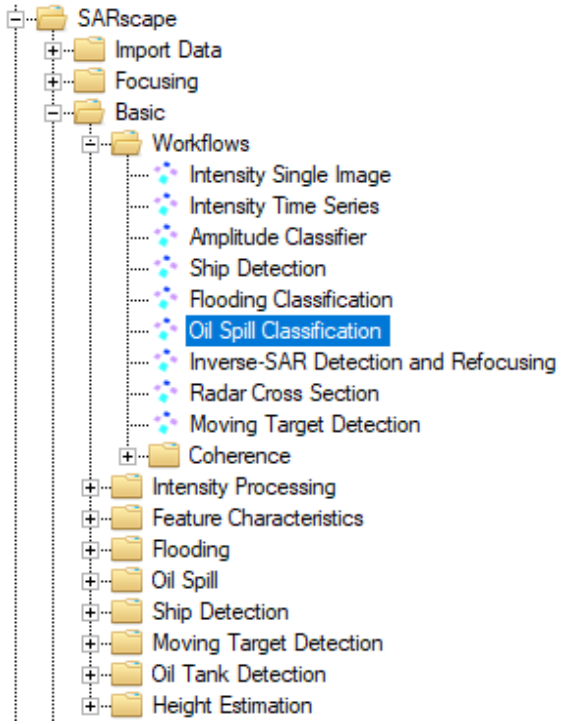




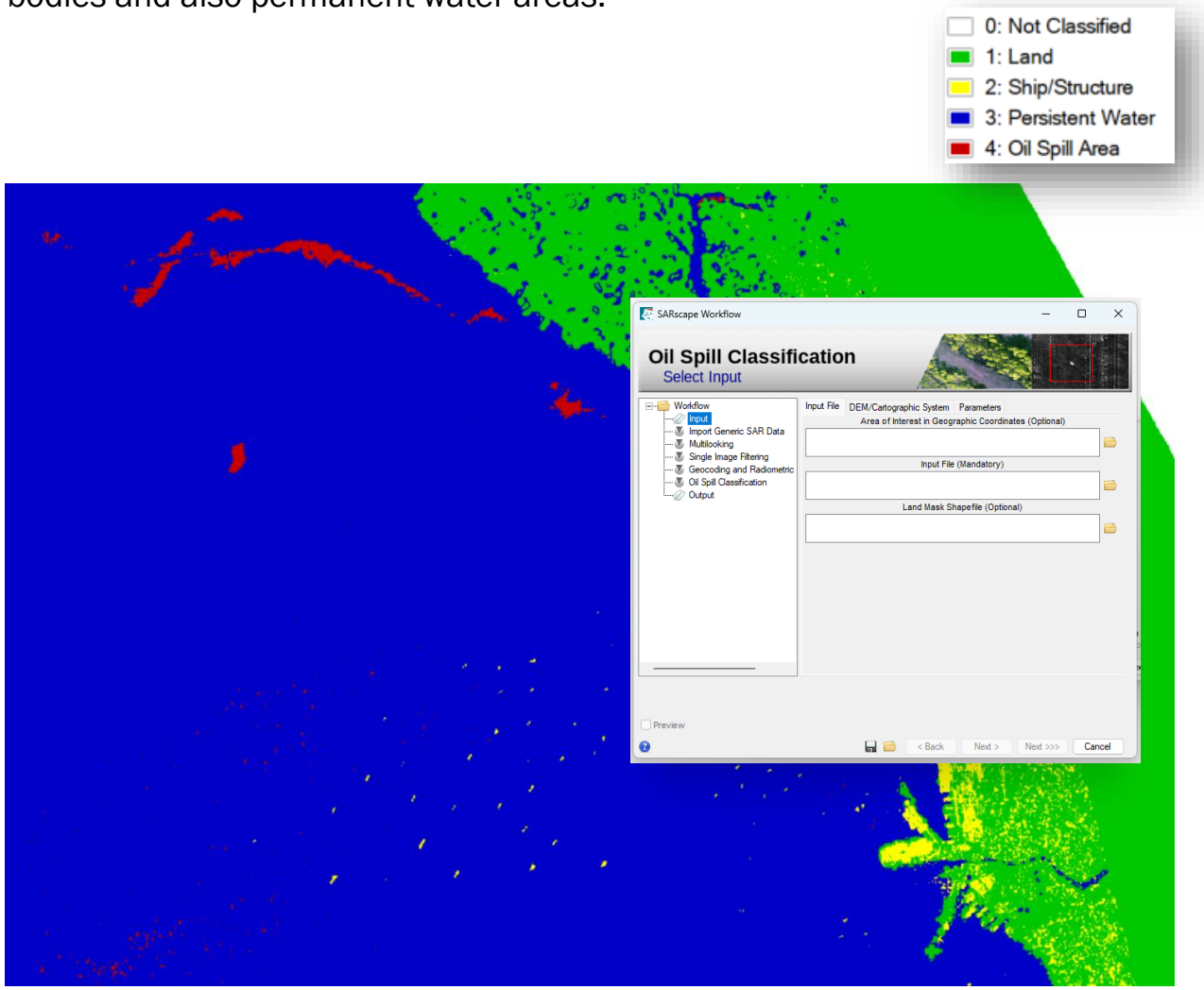
Both workflow and step by step tools are available.

/SARscape/Basic/Workflows
/SARscape/Basic/Ship Detection

Oil Spill Classification



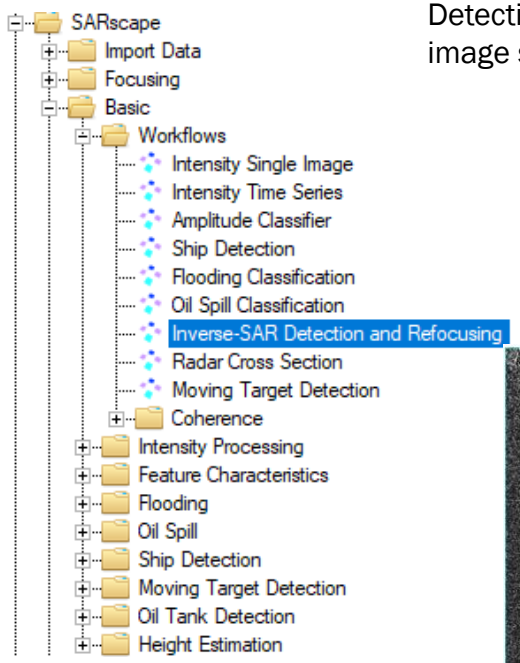
New workflow to identify and highlight oil spills over water bodies and also permanent water areas.



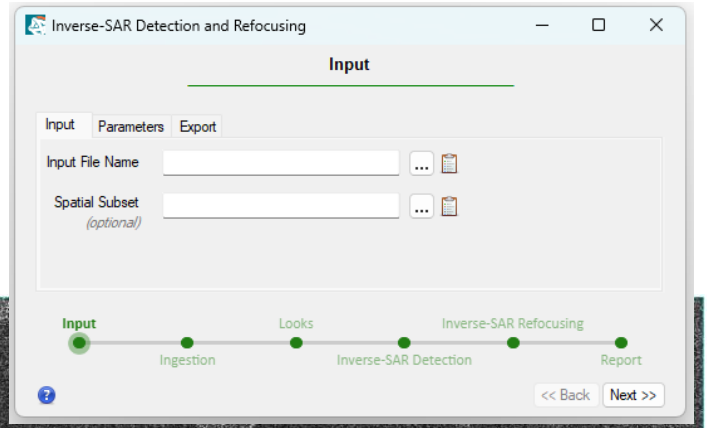
Both oil spill workflow and single tool are available.

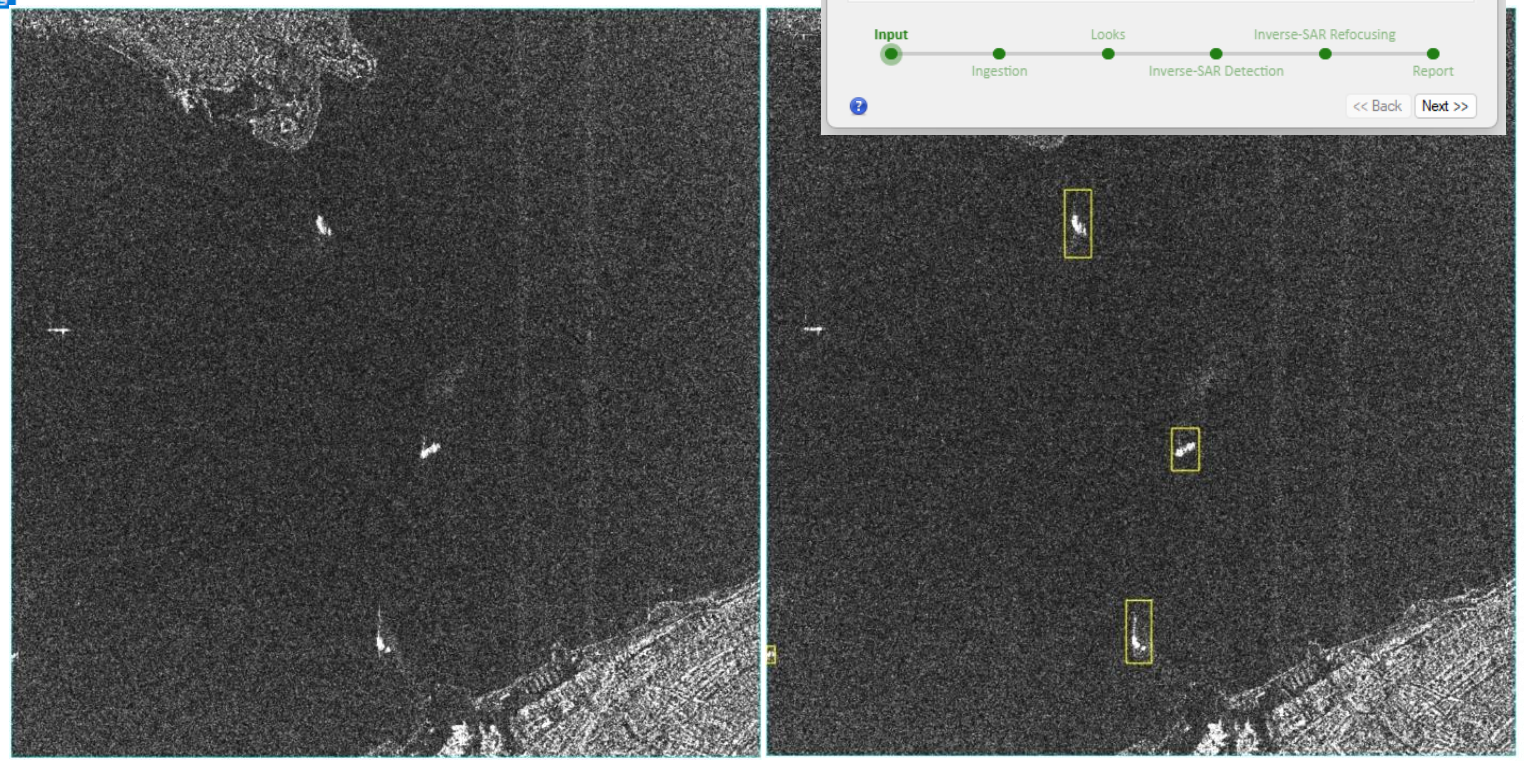
/SARscape/Basic/Workflows
/SARscape/Basic/Oil Spill

Inverse-SAR Detection and Refocusing



Detection and refocusing of moving targets (in the azimuth direction) in a single SAR image so displayed as unfocused lines in SAR SLC images.





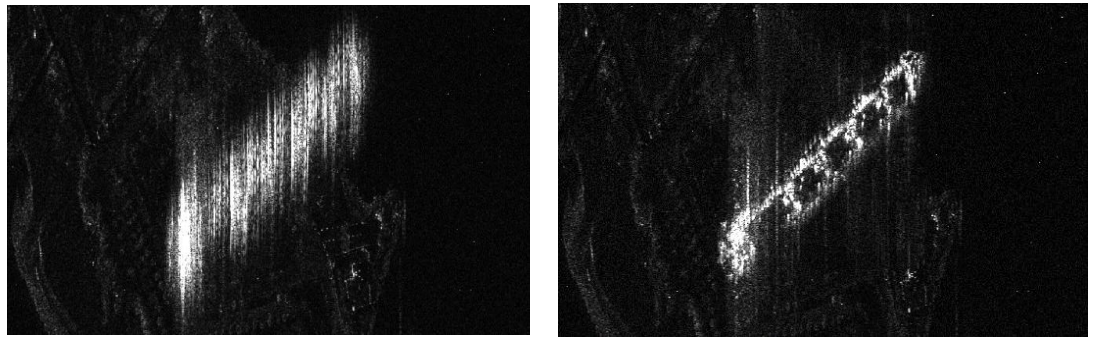
Data courtesy
Capella Space

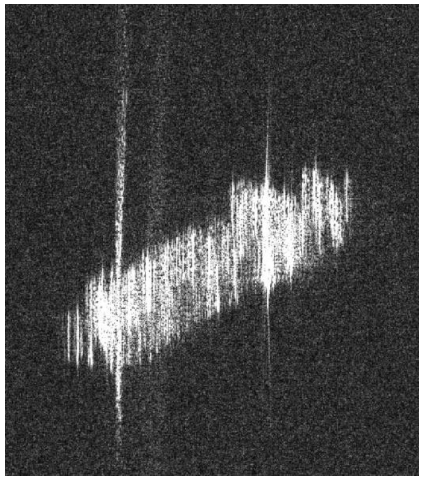
Both workflow and step by step tools are available.

/SARscape/Basic/Workflows/
/Basic/Moving Target Detection/

Inverse-SAR Detection and Refocusing

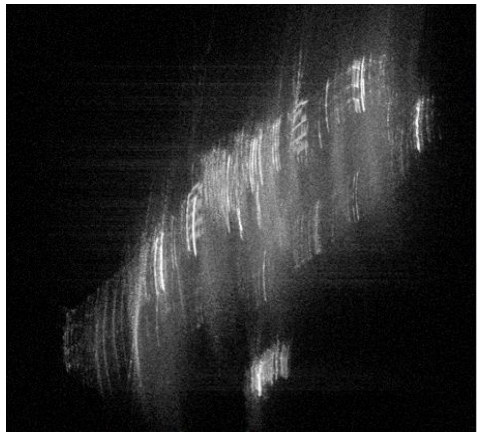
Refocused moving Bulk carrier in the Suez channel. Estimated velocity: 7 knots

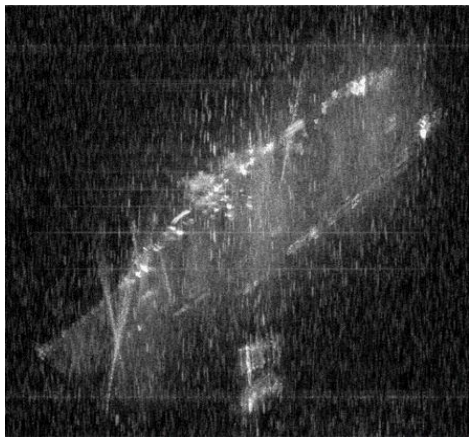




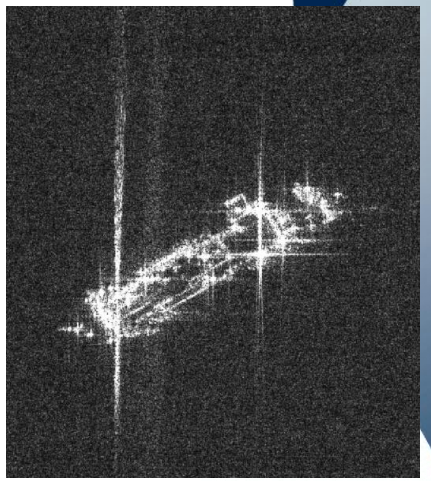
Before refocusing

Defocused Shandong Aircraft Carrier close to Hainan island. Estimated velocity: 3 knots





After refocusing

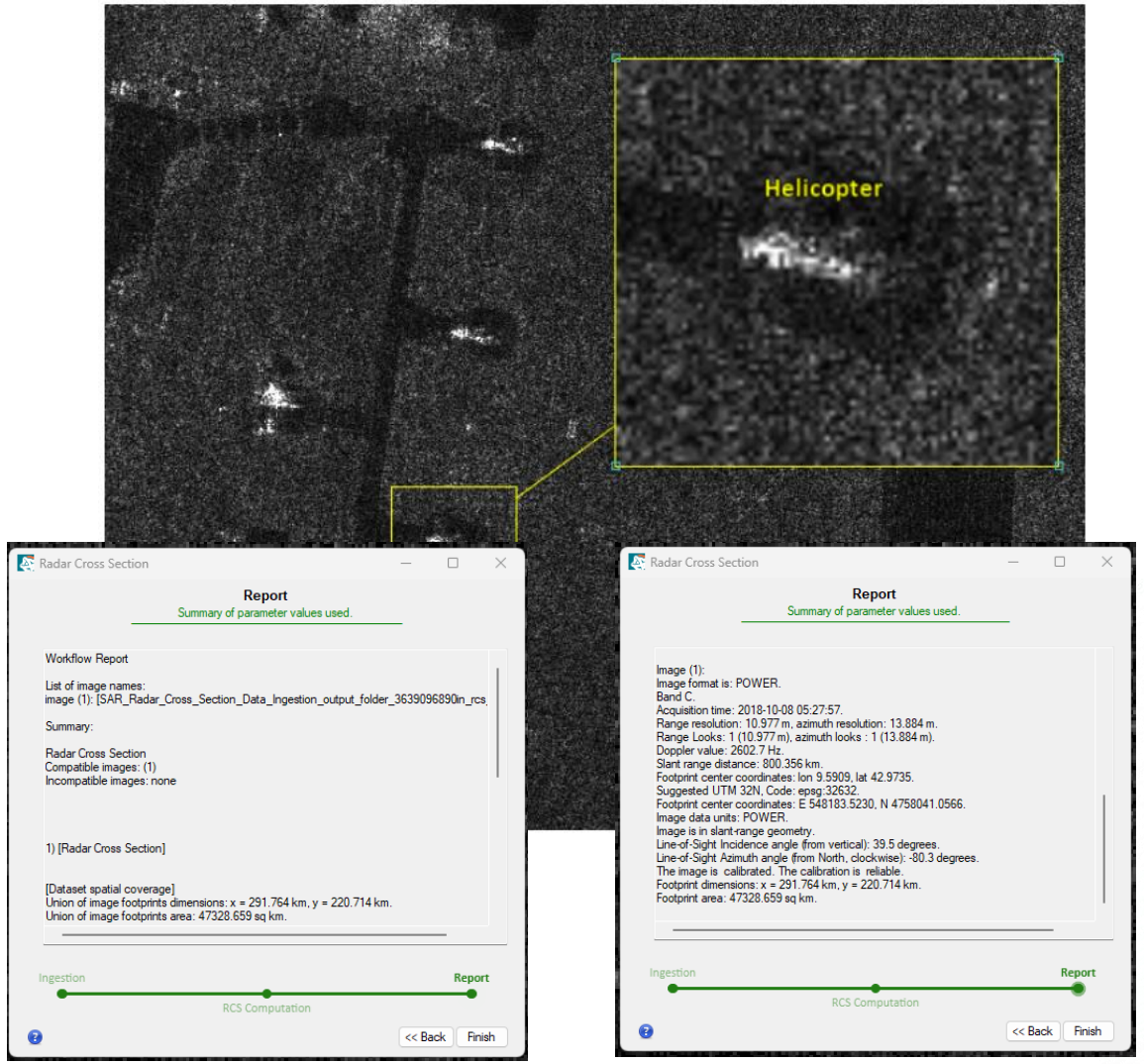


Radar Cross Section

This tool allows extracting Radar Cross Section (RCS) of targets. RCS is a measure which indicates the level of detectability of an object by a radar.

- SARscape
  - Import Data
  - Focusing
  - Basic
    - Workflows
      - Intensity Single Image
      - Intensity Time Series
      - Amplitude Classifier
      - Ship Detection
      - Flooding Classification
      - Oil Spill Classification
      - Inverse-SAR Detection and Refocusing
      - Radar Cross Section
      - Moving Target Detection
      - Coherence
    - Intensity Processing
    - Feature Characteristics
    - Flooding
    - Oil Spill
    - Ship Detection
    - Moving Target Detection
    - Oil Tank Detection
    - Height Estimation

Capella Acquisition of an Air Base in Russia



New Basic Tools

RGIQE-RNIIRS

New tool for rating the quality of SAR image according to the Radar Generalized Image Quality Equation (RGIQE) and the Radar National Imagery Interpretability Rating Scale (RNIIRS). *Found in Basic/Feature Characteristics/*

Oil Tank Detection

New tool for Oil Tank Detection and feature parameter extraction that uses Artificial Intelligence (AI) is included. *Found in Basic/*

3D Point Estimation

New interactive tool for reconstruction of the 3D coordinates of a point from two overlapping SAR stereo-images. *Found in Basic/Height Estimation/*

Height Estimation

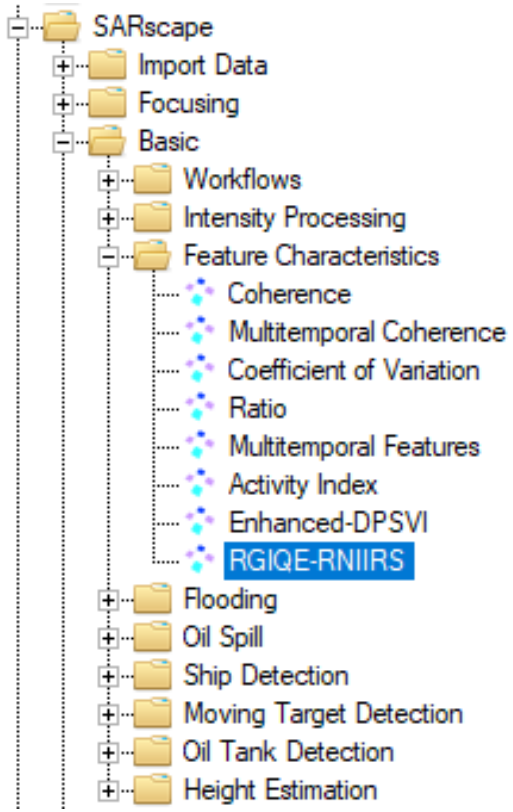
New interactive tool for estimation of object's height from layover and shadow features on a single SAR image. *Found in Basic/Height Estimation/*

New Interferometry Tools

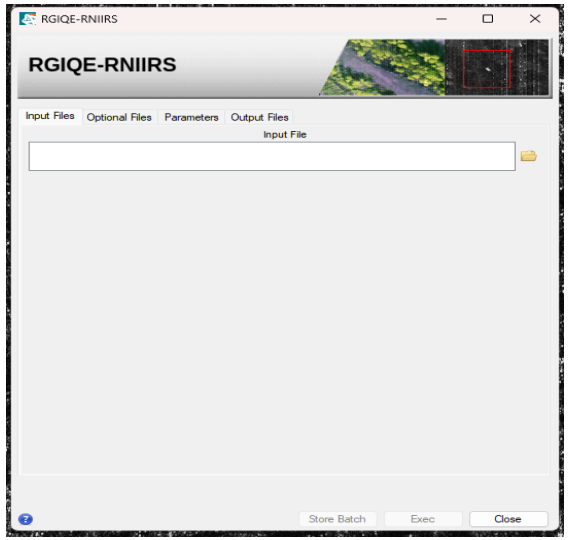
Displacement Modeling

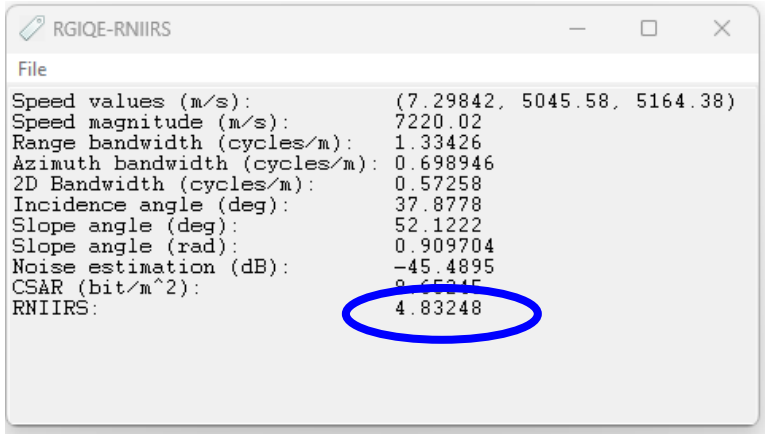
Improved inversion algorithm accounting for multitemporal data. *Found in Interferometry/*

Radar National Imagery Interpretability Rating Scale (RNIIRS) and Radar Generalized Image Quality Equation (RGIQE)



New interactive tool to rate the quality of SAR images

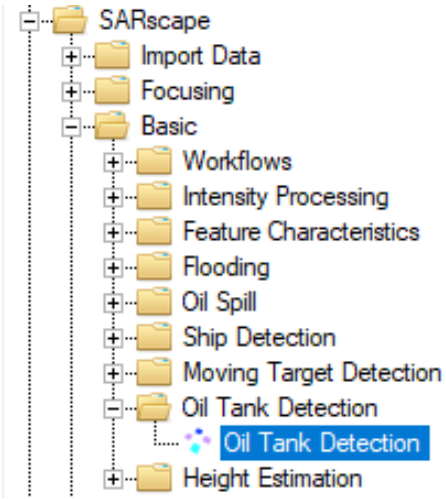




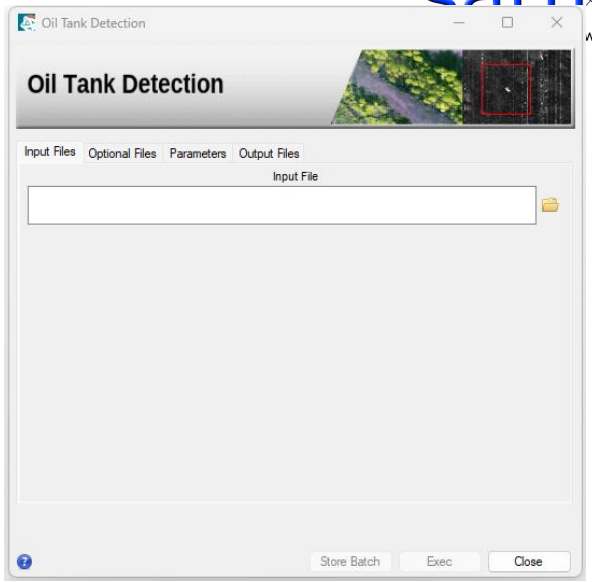
RNIIRS Rating	Representative Radar NIIRS criteria (examples)
0	Interpretability is precluded by obscuration, degradation, or very poor resolution.
1	Detect transportation lines (road or rail) without distinguishing between them, detect port facilities by the presence of piers/warehouses.
2	Detect large bombers/transports, identify large phased-array radars by type, detect military installations from building/site patterns.
3	Detect medium-sized aircraft, detect vehicles/equipment at fixed missile sites, identify a medium railroad classification yard.
4	Distinguish large rotary-wing from medium fixed-wing aircraft, detect individual vehicles in a row at a known motor pool, detect rail/road bridges.
5	Count medium helicopters, distinguish river-crossing equipment from medium/heavy armored vehicles by size/shape, detect the break between railcars.
6	Distinguish variable-geometry from fixed-wing fighters, distinguish small support vehicles from tanks, detect cargo on a railroad flatcar or in a gondola.
7	Identify small fighter aircraft by type, detect a missile on the launcher in an SA-2 launch revetment, detect road/street lamps in built-up areas.
8	Distinguish helicopter models (e.g., HIND vs HIP), distinguish radar variants based on antenna/dish configuration, identify dome/vent patterns on rail tank cars.
9	Detect major modifications to large aircraft (pods/fairings/winglets), identify antenna shape classes, identify trucks by cab/engine configuration.

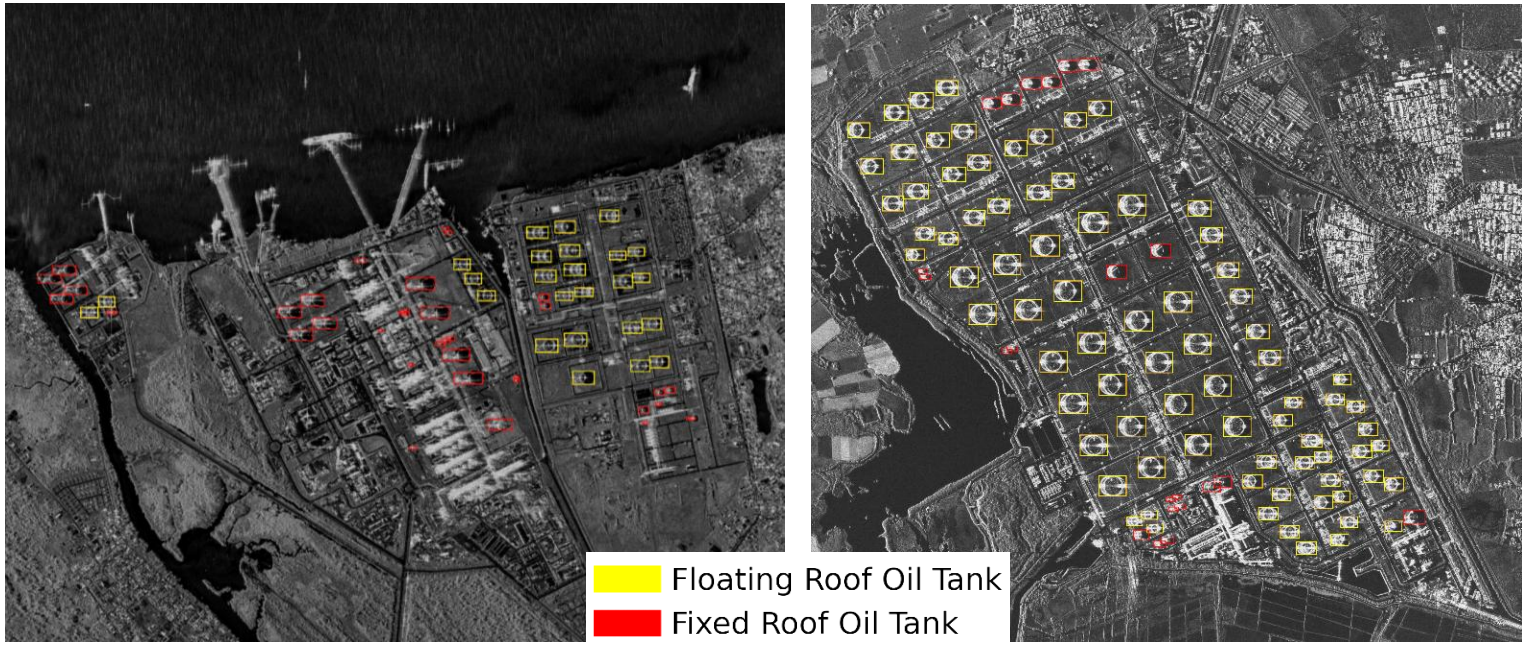
W. Schwartzkopf, J. Brown, G. Farquharson, C. Stringham, M. Duersch and J. Heemskerk, "Radar Generalized Image Quality Equation Applied to Capella Open Dataset," *2022 IEEE Radar Conference (RadarConf22)*, 2022, pp. 1-5.

Oil Tank Detection



New tool to perform AI-driven cylindrical oil tank detection

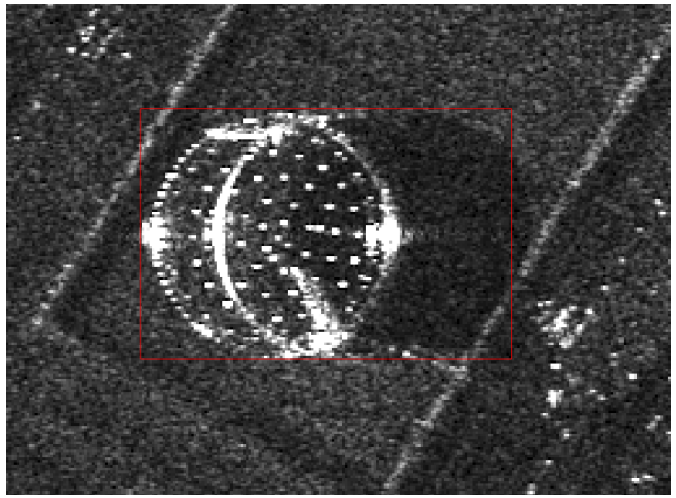




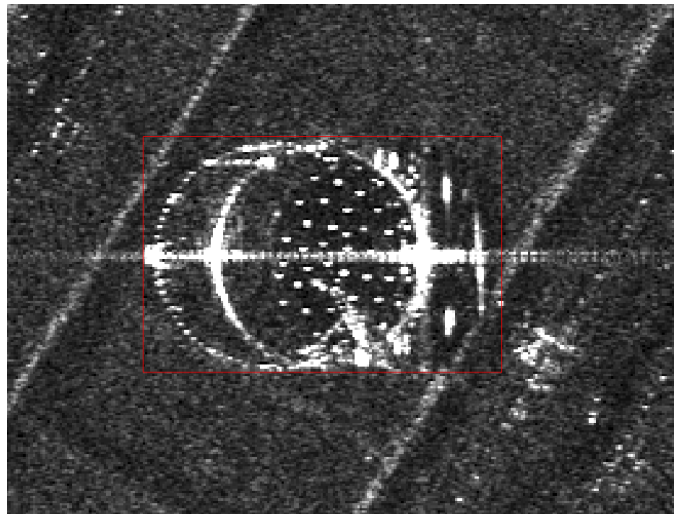
Data courtesy
Capella Space

Oil tank monitoring

Floating-roof Oil Tank



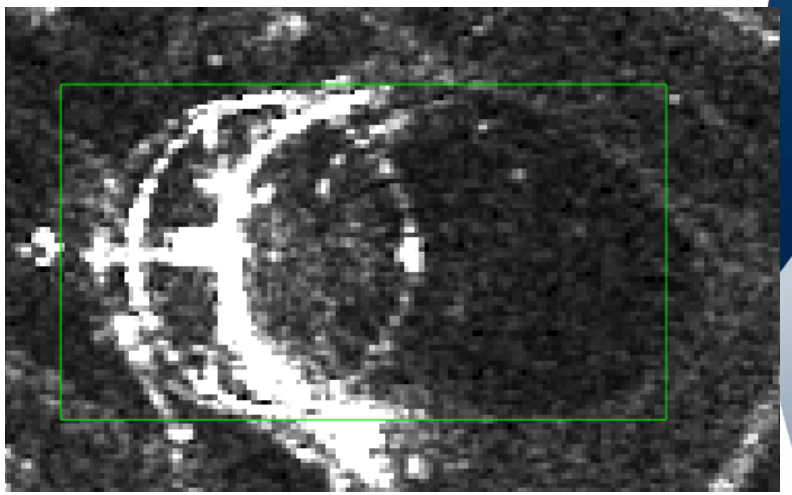
Total Height = 16.229m,
Roof Height = 11.128m



Total Height = 13.096m,
Roof Height =8.297m

Estimate of the height of the tank for fixed-roof tanks or the oil level for floating-roof tanks

Fixed-roof Oil Tank

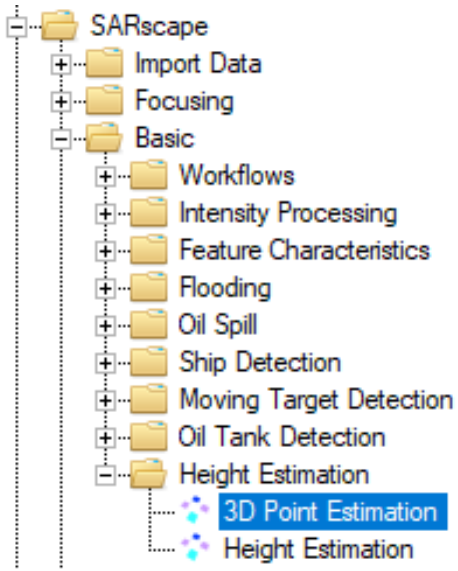


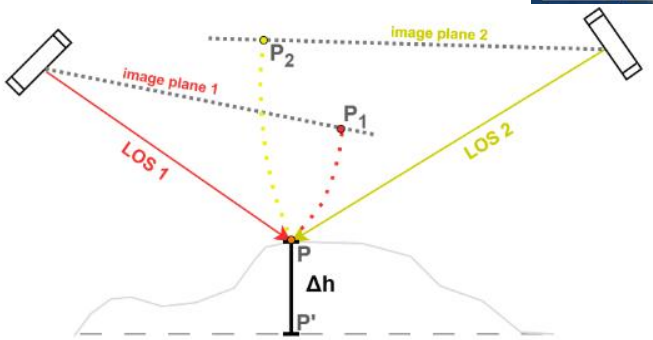
Total Height = 15.619m

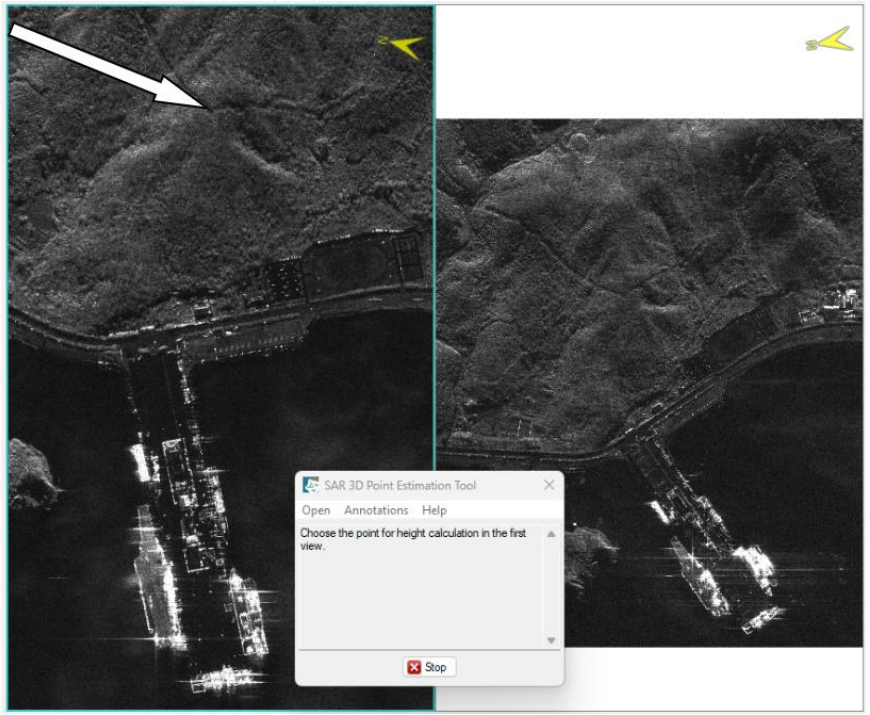
Data courtesy
Capella Space

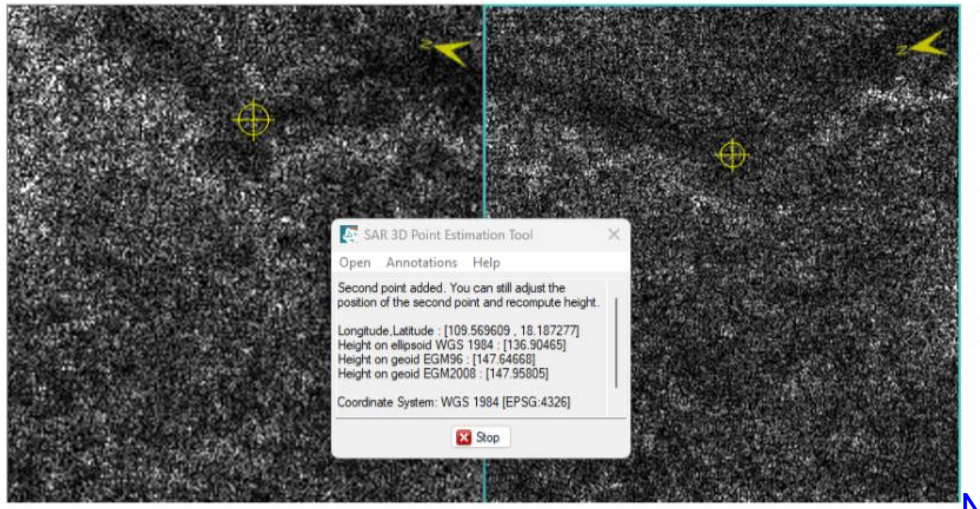
3D Point Estimation

This tool calculates the height and horizontal position of a point using two radar images of the same location.



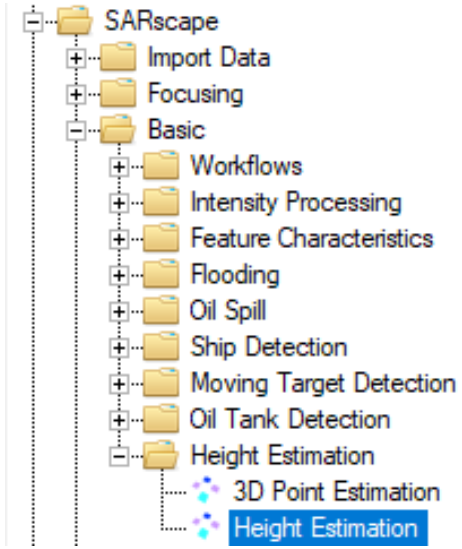


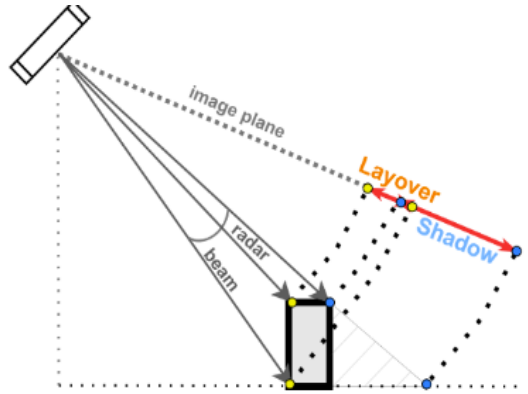


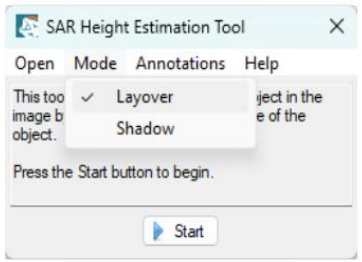


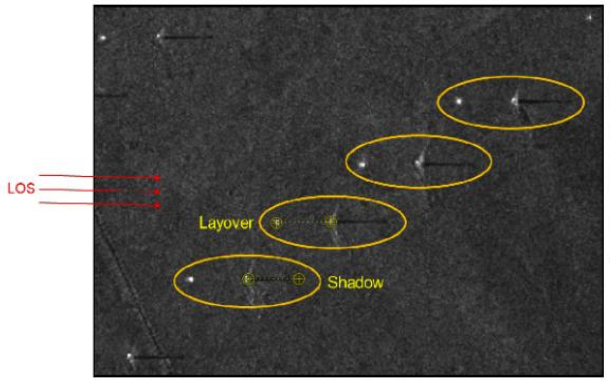
Height Estimation

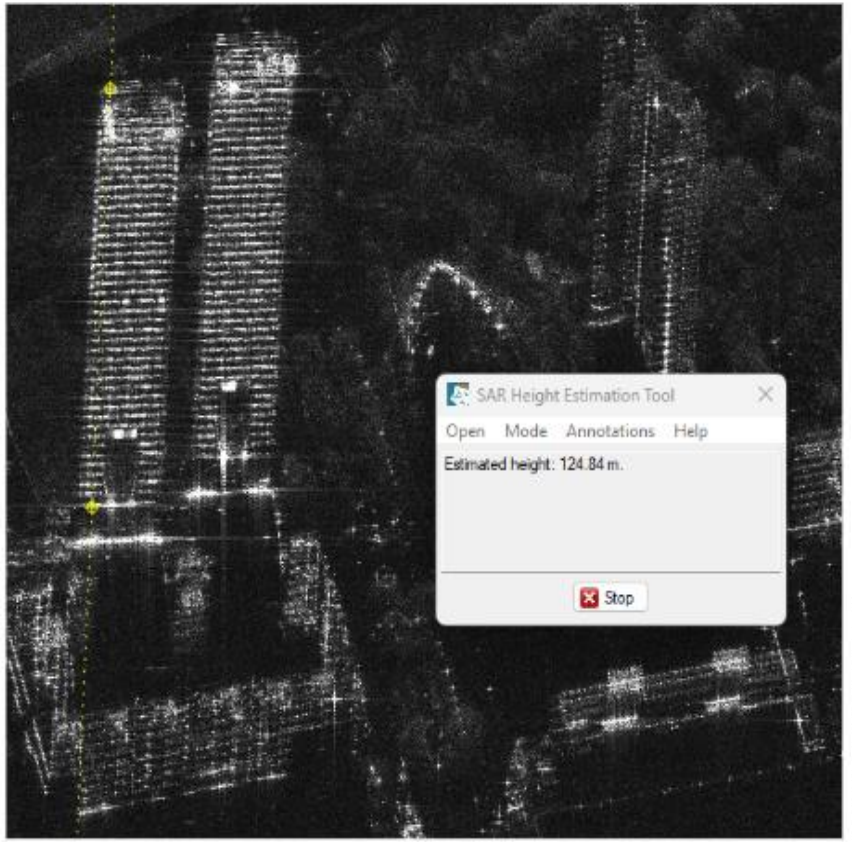
This tool estimates the height of a vertical object in a single image by interactively locating the top and the base of the object of interest.





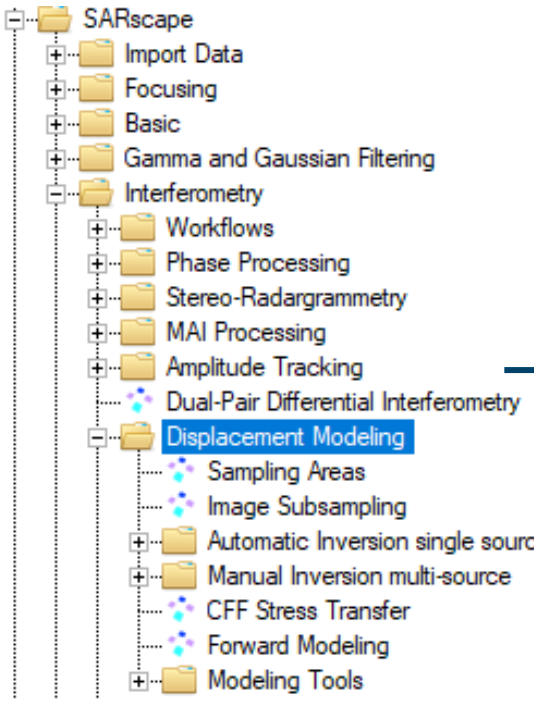






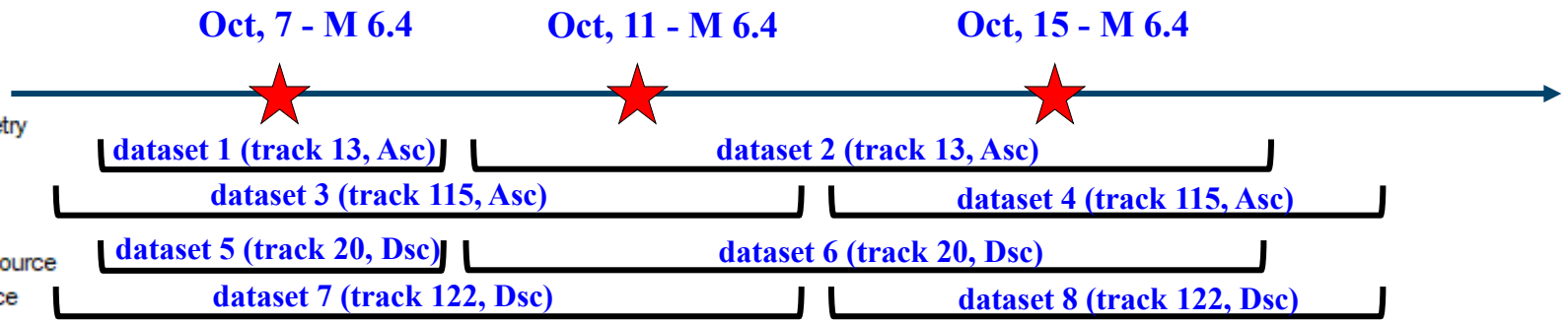
Skyscraper height estimation using an Umbra acquisition over Buenos Aires.

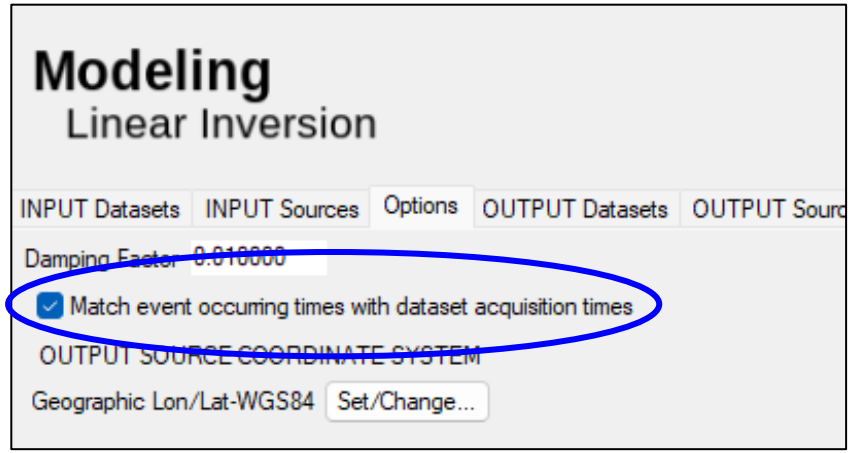
Multitemporal modeling



This tool allows the geophysical modelling of a sequence of seismic events (or volcanic eruptions or nuclear explosions)

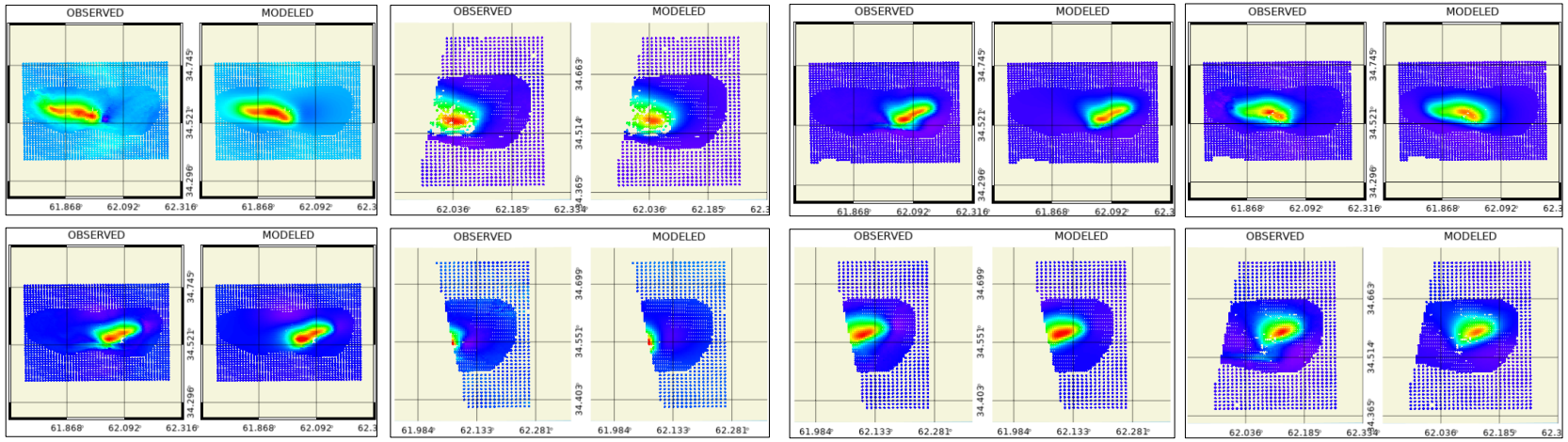
Test case: the 2023 Afghanistan sequences

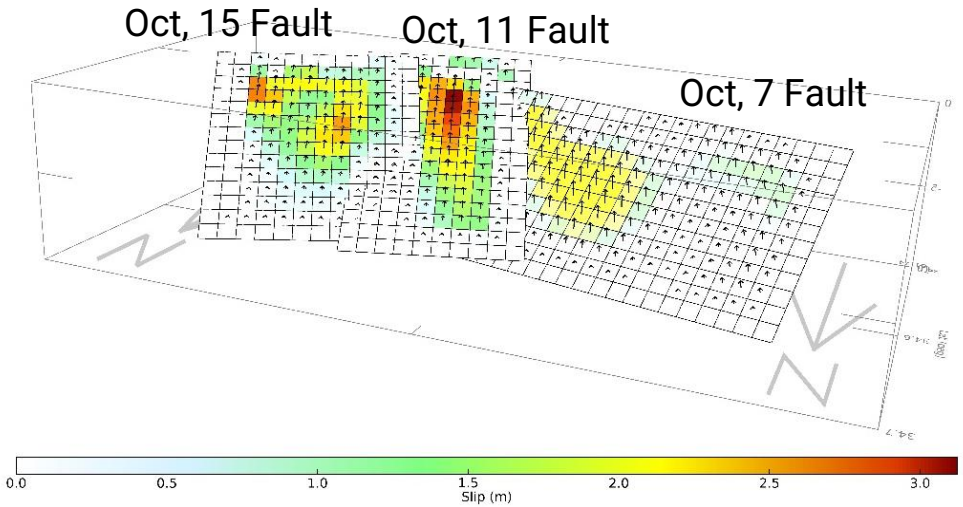




With the *match event occurring times with dataset occurring times* option (for Non-Linear and Linear inversions) the algorithm, in the simultaneous joint inversion, ensures that only the sources of events that occurred within the specific time interval contribute to the modeling of each individual dataset

Multitemporal modeling





Joint inversion of 8 InSAR datasets with 3 sources: this new option makes it possible to correctly reconstruct the contributions of each seismic source by fully exploiting the informational content of the data in a single inversion.

Improvements

Import Data

Generic SAR data

Added possibility to use Area of Interest (AOI) file in projection different from GCS_WGS_1984. This possibility is added in all workflows which include Import Generic SAR Data. *Found in Import Data/*SAR Spaceborne/

SICD

Import SICD adds Squint Angle. *Found in Import Data/SAR Spaceborne/*

AIS

New option for importing predefined AIS format (*CSV DK, CSV NOAA*) or *Custom CSV format*. Simplification of the CSV format is introduced. *Found in Import Data/Other Format/AIS/*

Sentinel-1 MultiDownload

New option to *Hide the console* is added. It supports new ESA Copenicus Data Space API. *Found in Import Data/Download/*

Basic Module: Workflows

Flooding Classification

The parameters *High Scattering Point Threshold (dB)* and *Skip Refinement Step* are included.

Additional option for using shapefile with a *Land Mask* is included in the *Flooding Classification* step with an option for setting a buffer around the mask. A *Majority filter* is also included for smoothening the result. *Found in Basic/Workflows/*

Moving Target Detection

The following parameters have been added *Generate Datacube, Number of Split Spectrum, Intensity of the split*. *Found in Basic/Workflows/*

Coherence & Amplitude Classifier

The old *Coherence Change Detection (CCD) Workflow* is combined with the old workflows for

- *Interferometric Land Use RBG colour composite (ILU-RGB)*,
- *Multitemporal Coherence RBG colour composite (MTC RGB),*
- *Coherent temporal changes using the coefficient of variation, intensity and coherence (COV-PWR-CC),*

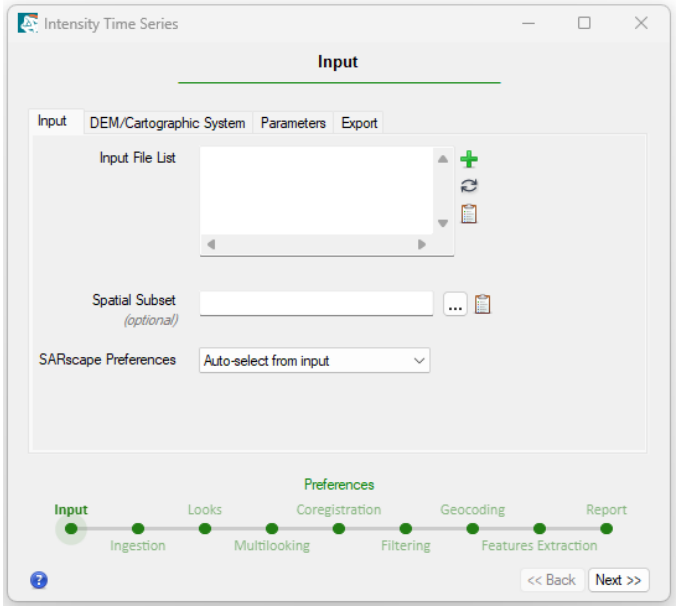
in a new workflow named *Coherence & Amplitude Classifier*. The new workflow has an option to choose ILU and/or MTC output, as well as an amplitude pair RGB output.

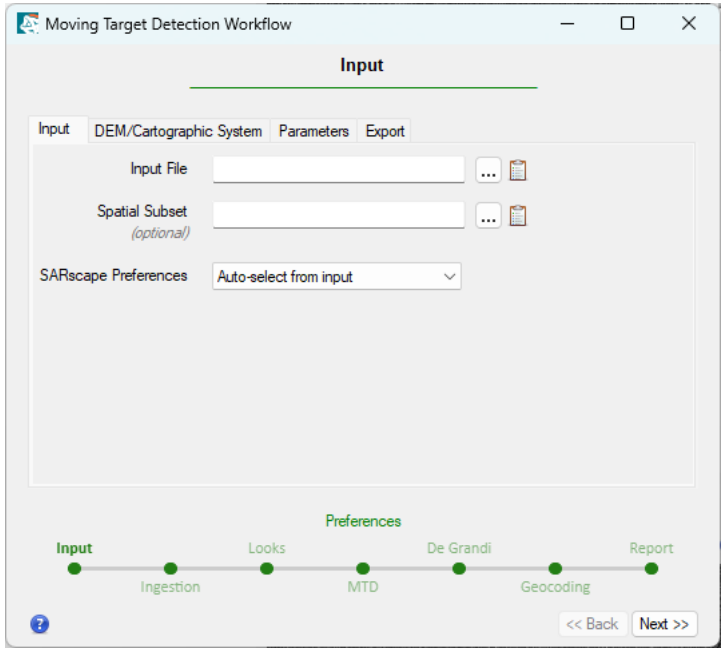
Found in Basic/Workflows/Coherence/

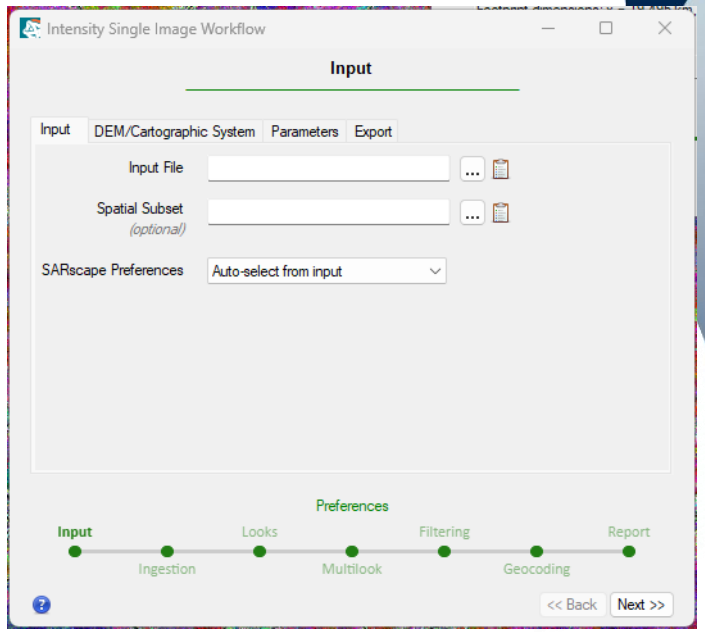
New more user-friendly graphic interface for workflows

Updated streamlined and more user-friendly workflows graphic interface with direct access to the list of predefined SARscape preferences for chosen type of data is introduced.

(Intensity Single Image, Intensity Time Series, Amplitude Classifier, Ship Detection, Inverse-SAR Detection and Refocusing, Radar Cross Section and Moving Target Detection)

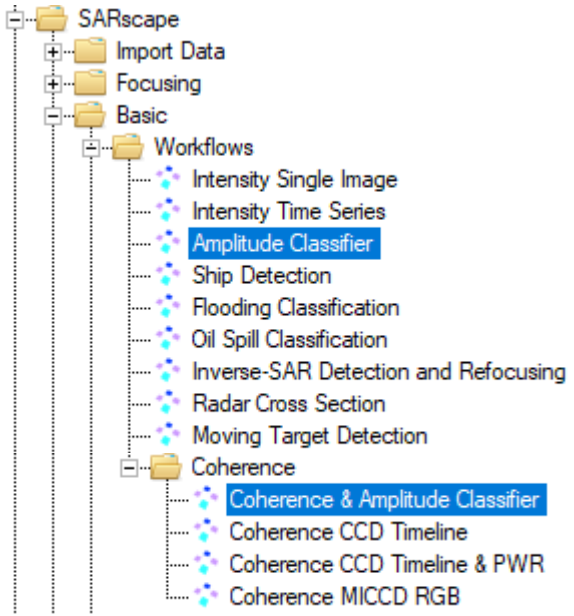


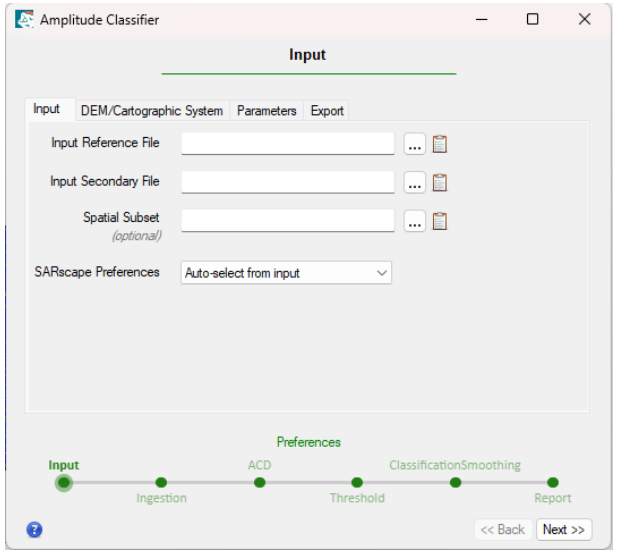


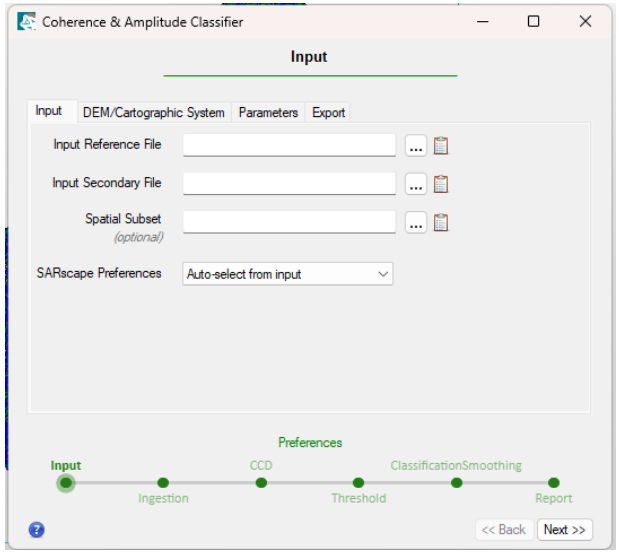


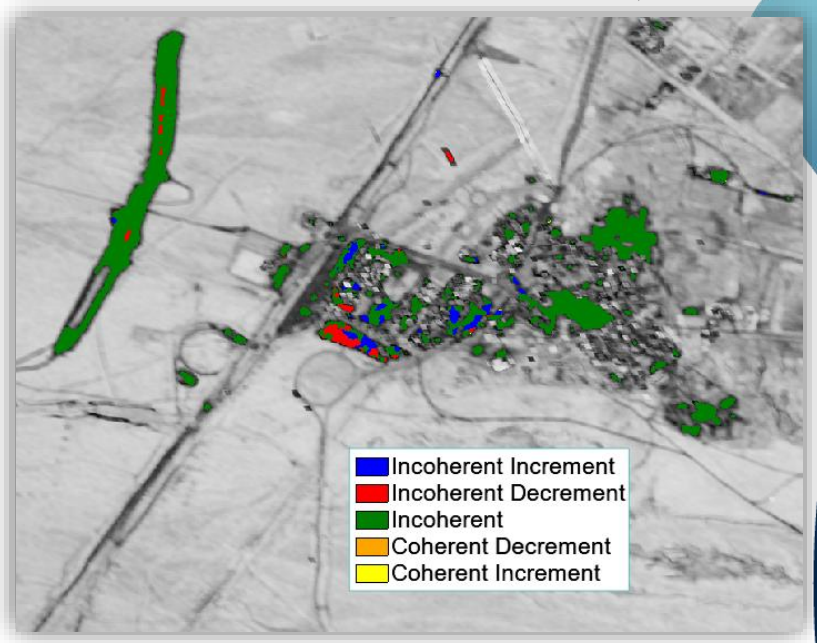
Coherence and Amplitude Classifier

This two workflows identify changes between two SAR images based on amplitude and interferometric phase incoherent changes.

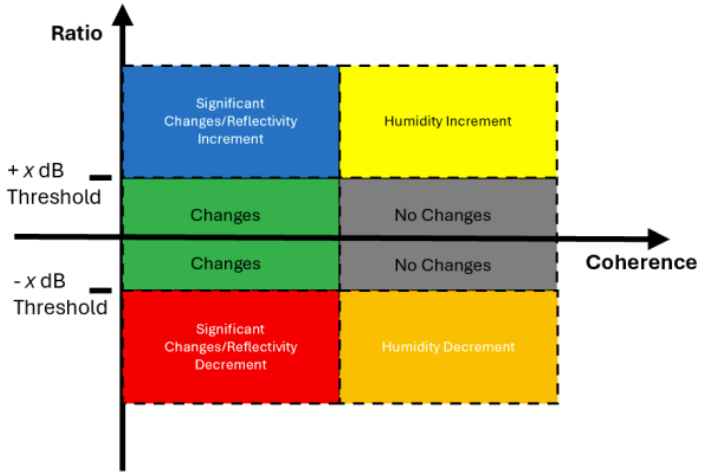








CCD + ACD image of a town in Iran. Data courtesy of Umbra Space.



Basic Module

Multilooking

New parameter for *Multilook statistics* is added to calculate *Mean, Min, Max, Mode, Median, and standard deviation*. *Found in Basic/Intensity Processing/*

Geocoding and Radiometric Calibration

The algorithm is improved to use *cos(LIA)* to compute *Gamma 0*. The *ENVI RASTER SERIES dB* has been added as additional output. *Found in Basic/Intensity Processing/Geocoding/*

Layover and Shadow Mask Generation

Support PFA geometry. *Found in Basic/Intensity Processing/Geocoding/*

Multitemporal Coherence

Additional parameter is added – *Generate Amplitude Time Series*. *Found in Basic/Feature Characteristics/*

Activity Index

Updated names of parameters and output files (e.g. *Minimum dB Threshold* to *Minimum occupation thr. in dB*). Changed function – instead of creating separate shapefile for each AOI and save the indexes in the dbf (one value for index per AOI), now it saves one shapefile for each index and save the list of values for the list of AOI). *Found in Basic/Feature Characteristics/*

Basic Module

Flooding Classification

Additional option for using shapefile with a *Land Mask* is included with an option for setting a buffer around the mask. Automatically uses coastline file from *OpenStreetMap* in case external Land Mask shapefile is not provided. A *majority filter* is also included for smoothening the result, as well as *Parameters Selection (Automatic-select from input or Manual)*. The following parameter has been renamed from *High Scattering Point (dB)* to *High Scattering Point Threshold (dB). Filtered classified* file as an optional output is added.

Found in Basic/Flooding/

Flooding Classification Refinement

Parameters Selection (Automatic-select from input or Manual) is included. *Found in Basic/Flooding/*

Ship Detection

New *Optional files* for the Ship Detection processing are added, namely *DEM* and *Slant Range Reference file* to reproject in slant range geometry the products. The *Land Mask Shape file list* is moved from *Input Files* to *Optional files*. The tool automatically uses coastline file from *OpenStreetMap* in case external Land Mask shapefile is not provided.

Found in Basic/Ship Detection/

SAR AIS Matching

Optional files are added to the tool – *DEM File* and *Slant Range Reference File*. New naming convention for the output files is introduced.

Found in Basic/Ship Detection/

Moving Target Detection

The following parameters have been added: *Generate Datacube* and *Number of Split Spectrum. Found in Basic/Moving Target Detection/*

Interferometry Module

Coherence & Amplitude Classifier

The old *Coherence Change Detection (CCD) Workflow* is combined with the old workflows for

- *Interferometric Land Use RBG colour composite (ILU-RGB)*,
- *Multitemporal Coherence RBG colour composite (MTC RGB),*

in a new style of workflow *named Coherence & Amplitude Classifier*. The new workflow has an option to choose ILU and/or MTC output, as well as an amplitude pair RGB output.

Found in Interferometry/Workflows/Coherence/

Interferogram Generation

Support for interferometric processing of NISAR GSLC data from slant range or geocoded SLC for displacement products.

Found in Interferometry/Phase Processing/

Interferometry Module

Conversion to Displacement and Geocoding

Significantly improved processing time. Supports PFA geometry of the data. Supports geocoded SLC data format.

Found in Interferometry/Phase Processing/, Interferometry/Amplitude Tracking/ and Interferometry/MAI Processing/

Conversion to Height and Geocoding

Significantly improved algorithm and processing time. Stereo Radargrammetry tool now supports stereo data obtained from different azimuth angles and estimates azimuth shift.

Found in Interferometry/Phase Processing/ and Interferometry/Stereo Radargrammetry/

Stereo Matching Process

New functionality is added to handle crossed track and cross platforms/sensors. The following output can be optionally generated – *Azimuth Shift*.

Found in Interferometry/Stereo Radargrammetry/

Interferometry Module

Displacement Modeling

Seismic sources can be now initialized from three focal mechanism catalogues (USGS, GCMT and INGV). *Found in Interferometry/*

Non-Linear inversion

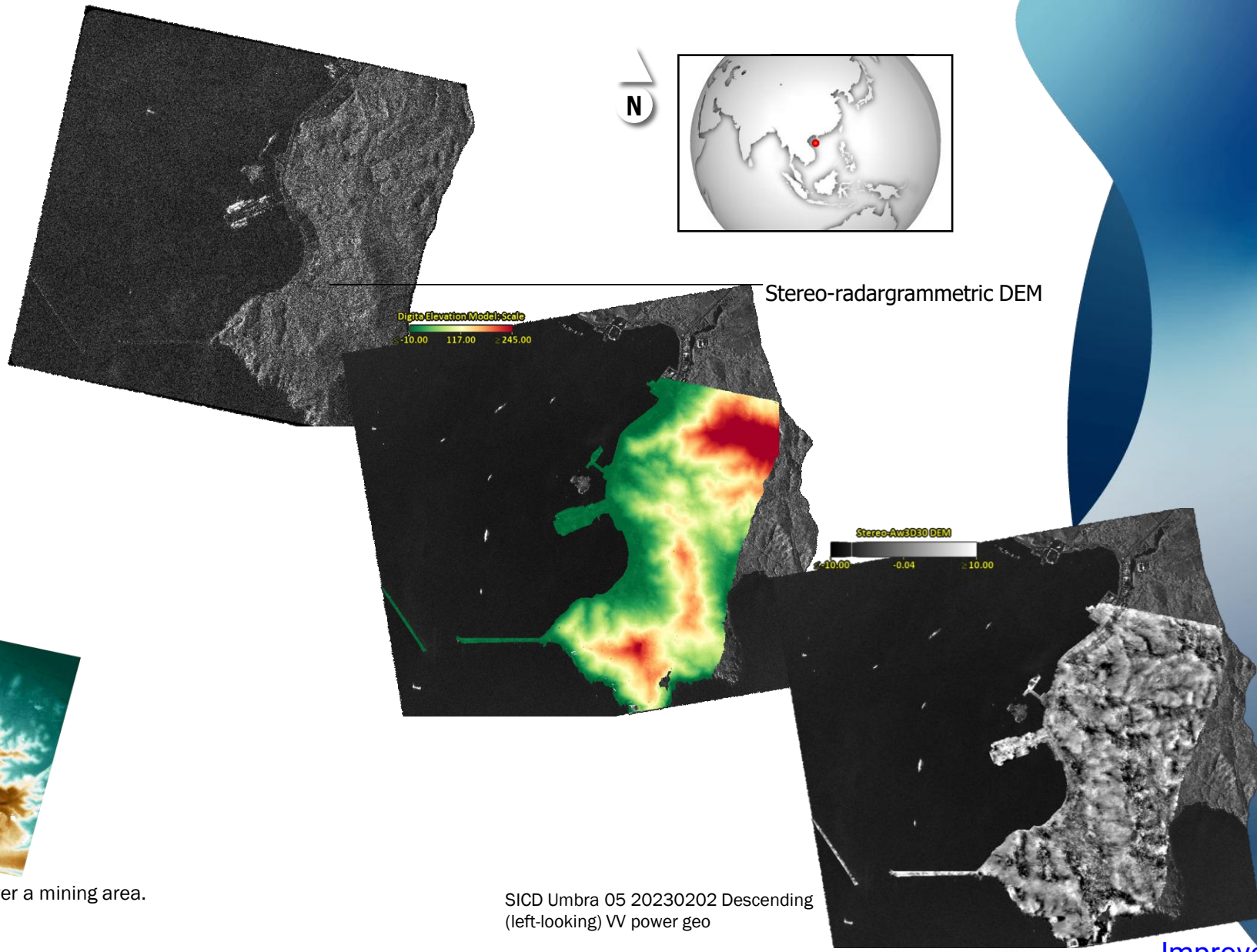
Improved layout for the scatter plot and trade-offs representation. *Found in Interferometry/Displacement Modeling/*

Linear inversion

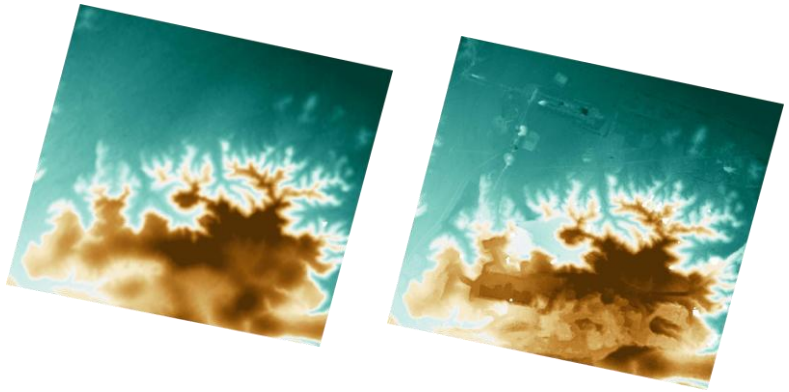
Additional damping options: possibility of forcing to zero the edges of slip/opening distributions; possibility of refining a specific damping for each inverted source. *Found in Interferometry/Displacement Modeling/*

Stereo Digital Elevation Model

- SARscape
  - Import Data
  - Focusing
  - Basic
  - Gamma and Gaussian Filtering
  - Interferometry
    - Workflows
    - Phase Processing
    - Stereo-Radargrammetry
      - 1 - Stereo Matching Process
      - 2 - Shift Refinement and Re-flattening
      - 3 - Shift to Height Conversion and Geocoding
    - MAI Processing
    - Amplitude Tracking
    - Dual-Pair Differential Interferometry
    - Displacement Modeling
    - Clustered Processes
    - Interferometric Tools



Stereo-radargrammetric DEM



Comparison between coarse DEM and high-precision DSM over a mining area.

SICD Umbra 05 20230202 Descending (left-looking) VV power geo

General Tools

Generate Color Composite

New operation type for *Dual Amplitude Change Detection (DACD)* is added.

Found in General Tools/Data Export/

Generate Ground Control Points

The tool *Generate Ground Control Points* is substituted by two tools:

- *Generate Geometry Ground Control Points*: used in general processing steps such as *Manual Orbital Correction, Geocoding, Interferogram Generation*, and others, to correct SAR data in slant range geometry with respect to a reference geocoded SAR image or a DEM. This tool compensates for orbit inaccuracies, such as biases in slant range distance and/or azimuth start time.
- *Generate Refinement Ground Control Points*: used in refinement processing steps within interferometric workflows, such as interferometry with manual GCP refinement, the *Refinement and Re-Flattening* step in phase processing, *Stereo-Radargrammetry, MAI processing*, and others. In this case, the input and reference images must be in the same geometry (either both in slant range or both in ground range). This tool removes residual phase or shift trends (e.g., due to orbital state vector inaccuracies or offsets introduced during processing, such as unwrapping errors or atmospheric bias trends that can be modeled with a polynomial) before conversion into 3D height or displacement.

Found in General Tools/

Extra

SARscape 6.3.0 includes the bug fixing provided in all the patch released for SARscape 6.1.0 and the last bug fixing not included in former patches.