UMassAmherst

ISCE Docker Tools: Automated Radiometric Terrain Correction and image co-registration of UAVSAR MLC data

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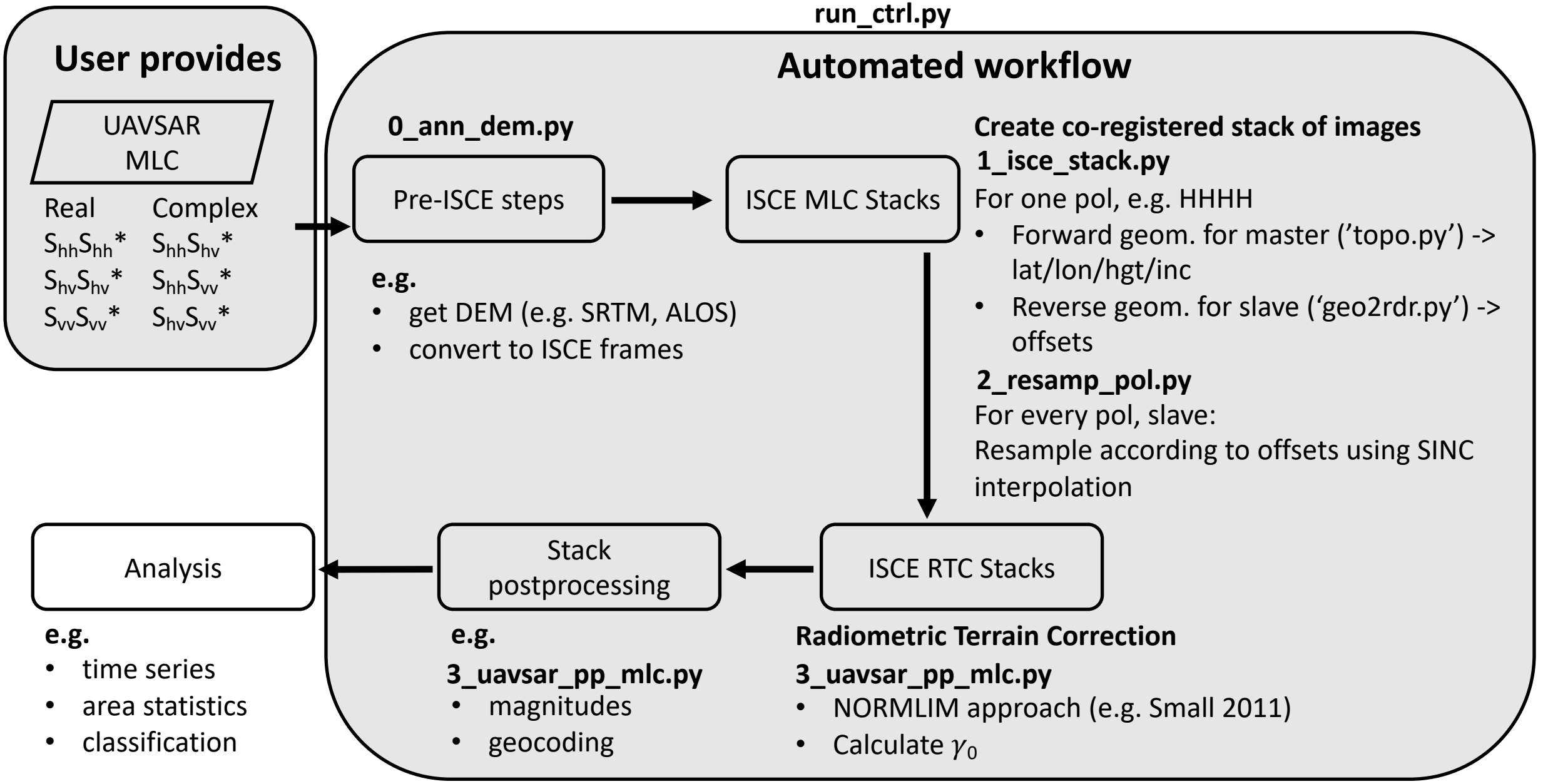
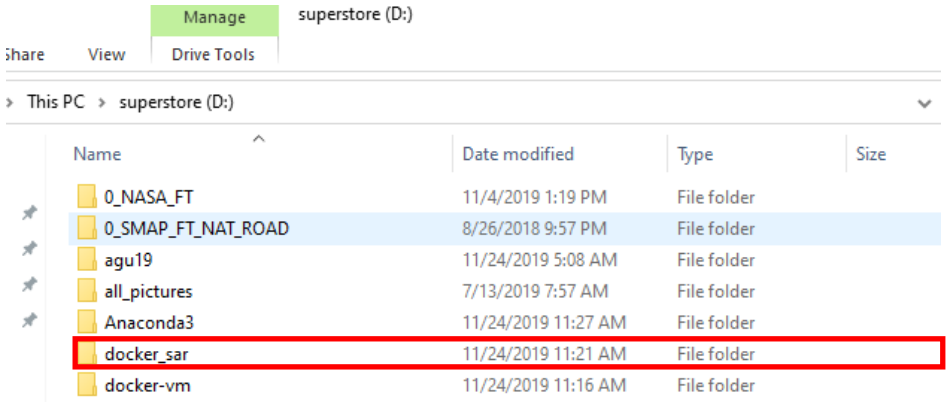
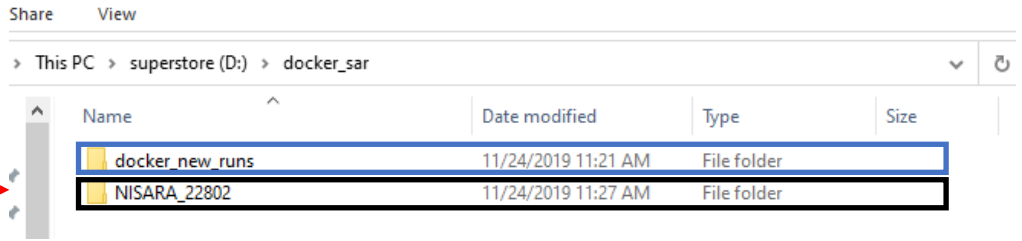

run_ctrl.py
User provides
UAVSAR MLC
Real
$S_{hh}S_{hh}^*$
$S_{hv}S_{hv}^*$
$S_{vv}S_{vv}^*$
Complex
$S_{hh}S_{hv}^*$
$S_{hh}S_{vv}^*$
$S_{hv}S_{vv}^*$
Automated workflow
0_ann_dem.py
Pre-ISCE steps
e.g.
• get DEM (e.g. SRTM, ALOS)
• convert to ISCE frames
ISCE MLC Stacks
Create co-registered stack of images
1_isce_stack.py
For one pol, e.g. HHHH
• Forward geom. for master ('topo.py') -> lat/lon/hgt/inc
• Reverse geom. for slave ('geo2rdr.py') -> offsets
2_resamp_pol.py
For every pol, slave:
Resample according to offsets using SINC interpolation
ISCE RTC Stacks
Radiometric Terrain Correction
3_uavsar_pp_mlc.py
• NORMLIM approach (e.g. Small 2011)
• Calculate γ_0
Stack postprocessing
e.g.
3_uavsar_pp_mlc.py
• magnitudes
• geocoding
Analysis
e.g.
• time series
• area statistics
• classification

Directory Structure

On my system, <localdir> = D:\docker_sar

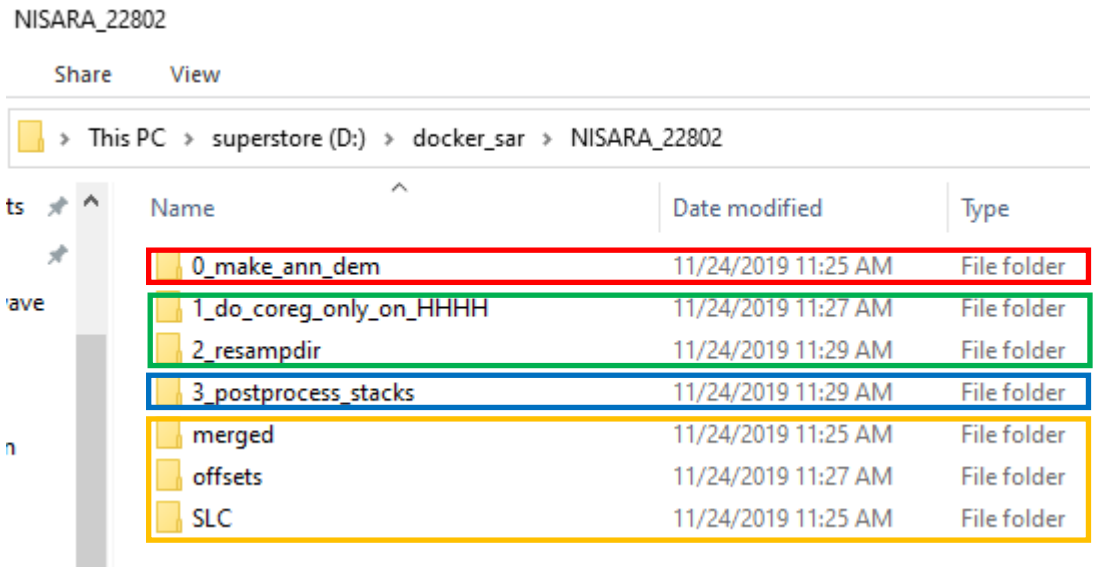


This folder has/needs
- all the .py scripts
- all the uavsar mlc .zip files (one flightline at a time)



This folder has
- all the data pertaining to flightline 22802
- this includes the uavsar mlc .zip files that were processed

Directory Structure



This folder has results from 0_ann_dem.py scrip
- the digital elevation model
- the source UAVSAR _mlc.zip files
- a log of what was already processed “processed.txt”

These folders only store data temporarily and contain their respective .py scripts.
- Don’t delete them or the script won’t work

These folders are organized in line with the ISCE stack processor

‘merged’ has the outputs of ‘topo.py’
- incidence angles, simamp, lat, lon

‘offsets’
- has the pixel offset in range/azimuth per slave image
- needed for making the stack

‘SLC’
- has a copy of the HHHH pol mlc file (renamed .slc)
- the .slc + ‘data’ file = unpacked ISCE image

This folder has the postprocessed data generated by the 3_uavsar_pp_mlc.py script
- each flightline/date has its own folder
- each has six postprocessed mlc files
- each has the original .ann with new col/row # appended
- Optionally, if geocode = 1 it has GTiffs, UTM coordinate
- Optionally, if complexmag = 1, complex valued -> real valued