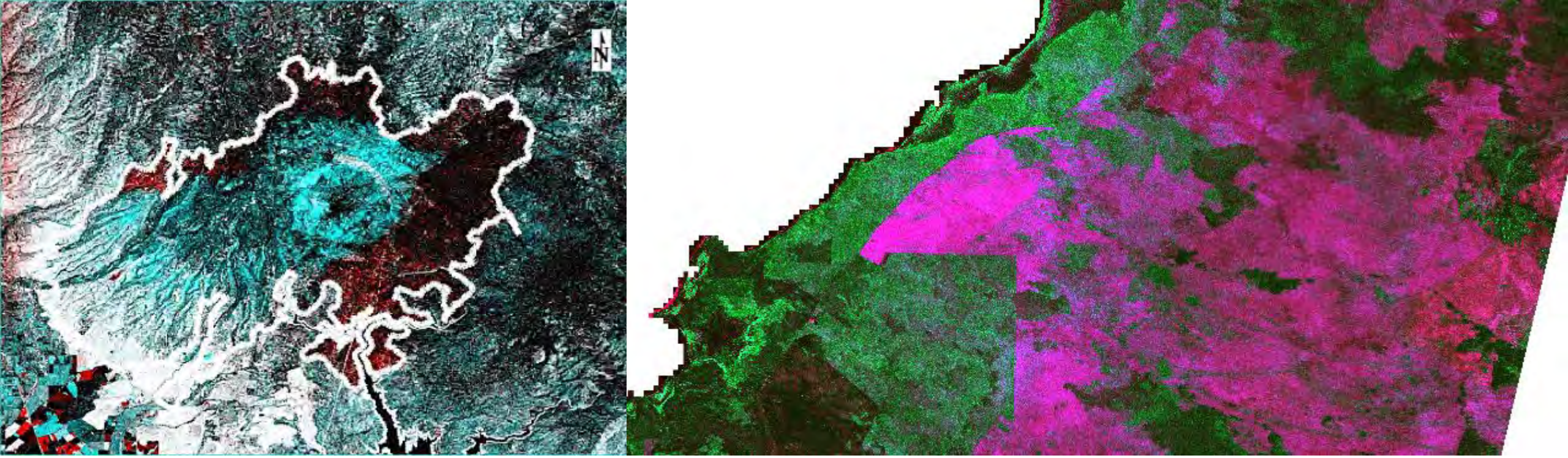

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EXPLORING ENVI® SARSCAPE: LYTTON FIRE

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Solutions Engineer

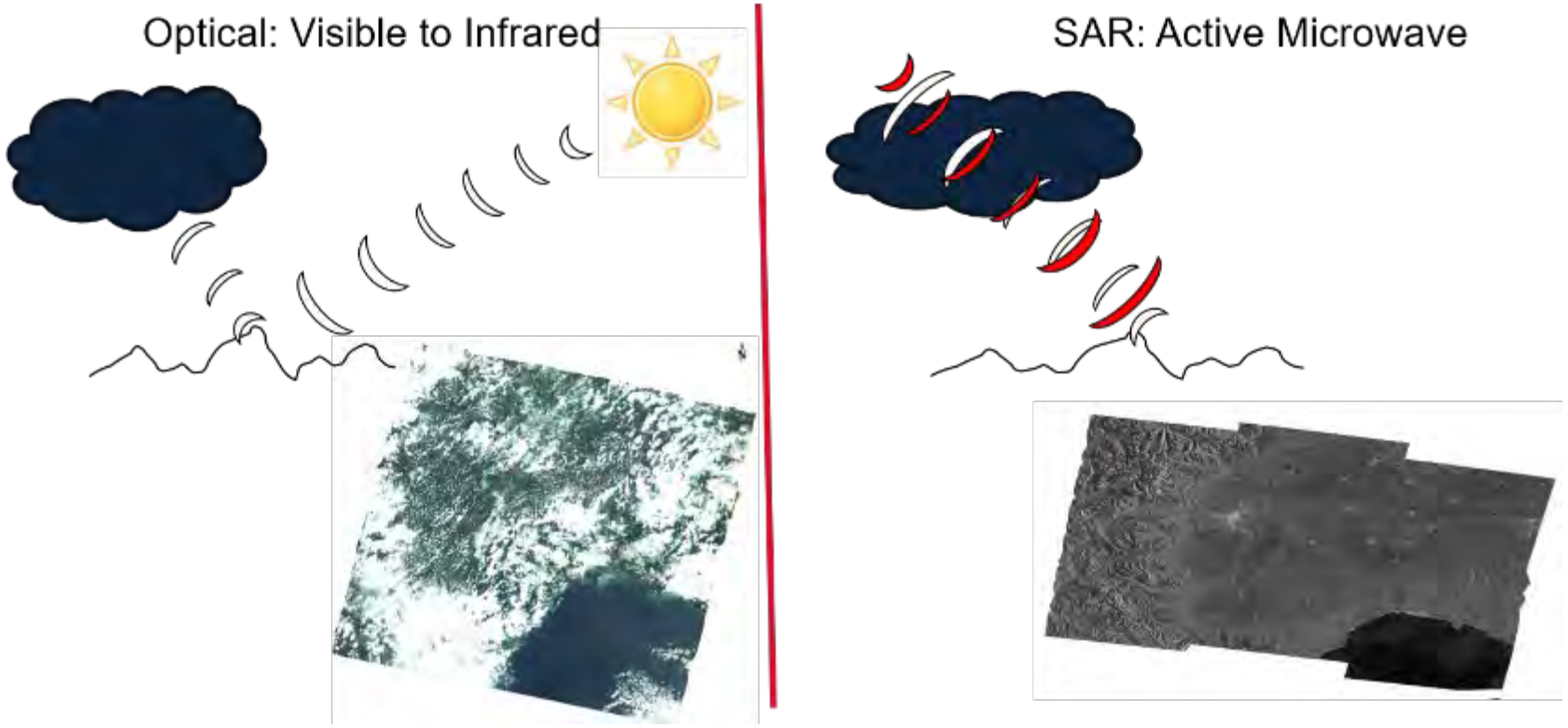
Lytton Fire Overview

- The Lytton Creek Wildfire began June 20, 2021
- The city of Lytton was destroyed by this fire, which was energized by the 2021 Western North America Heatwave.
- Over 51,336 hectares have burned as of August 5th, 2021, and the fire is ongoing.

View of the Lytton Wildfire, THE CANADIAN PRESS/Darryl Dyck

Synthetic Aperture Radar for Fire

- Synthetic Aperture Radar (SAR) is an active imaging system, it is able to see through smoke and clouds to view changes on the earth's surface. With this we can track the fire burn areas while the fire is occurring, even with covering smoke.

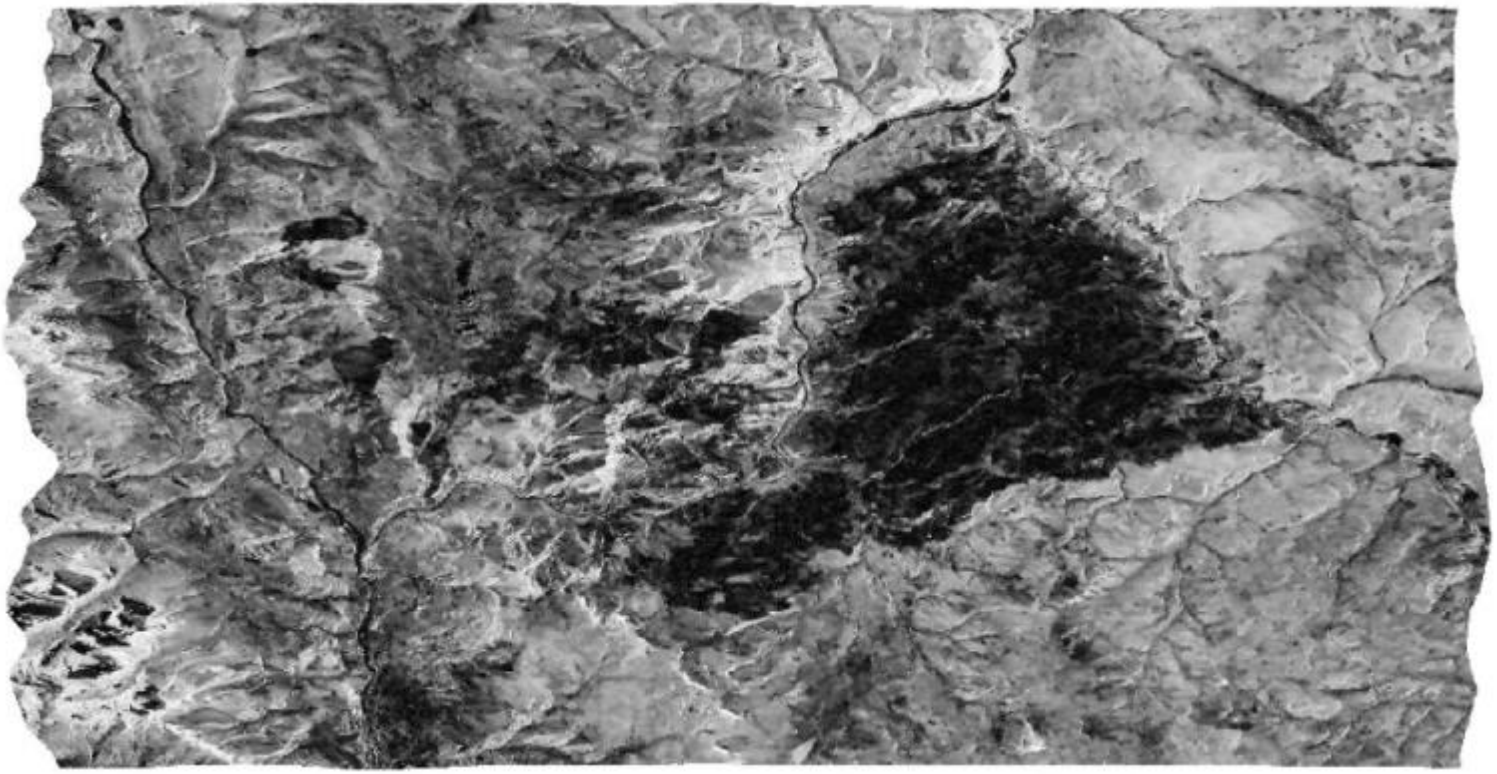


Coherence Change Detection over Wildfires

- SAR collects both intensity and phase, allowing us to track minor surface changes that you can not see with remote sensing data otherwise. In particular, phase can easily pick out areas that were once urban or vegetated that a major change has occurred in.
- Coherence Change Detection is a technique that uses both the intensity and phase to track changes between images.

CCD

- Coherence Change Detection Timeline tracks changes from scene to scene. There are six Sentinel-1 scenes from June 6th to August 7th.

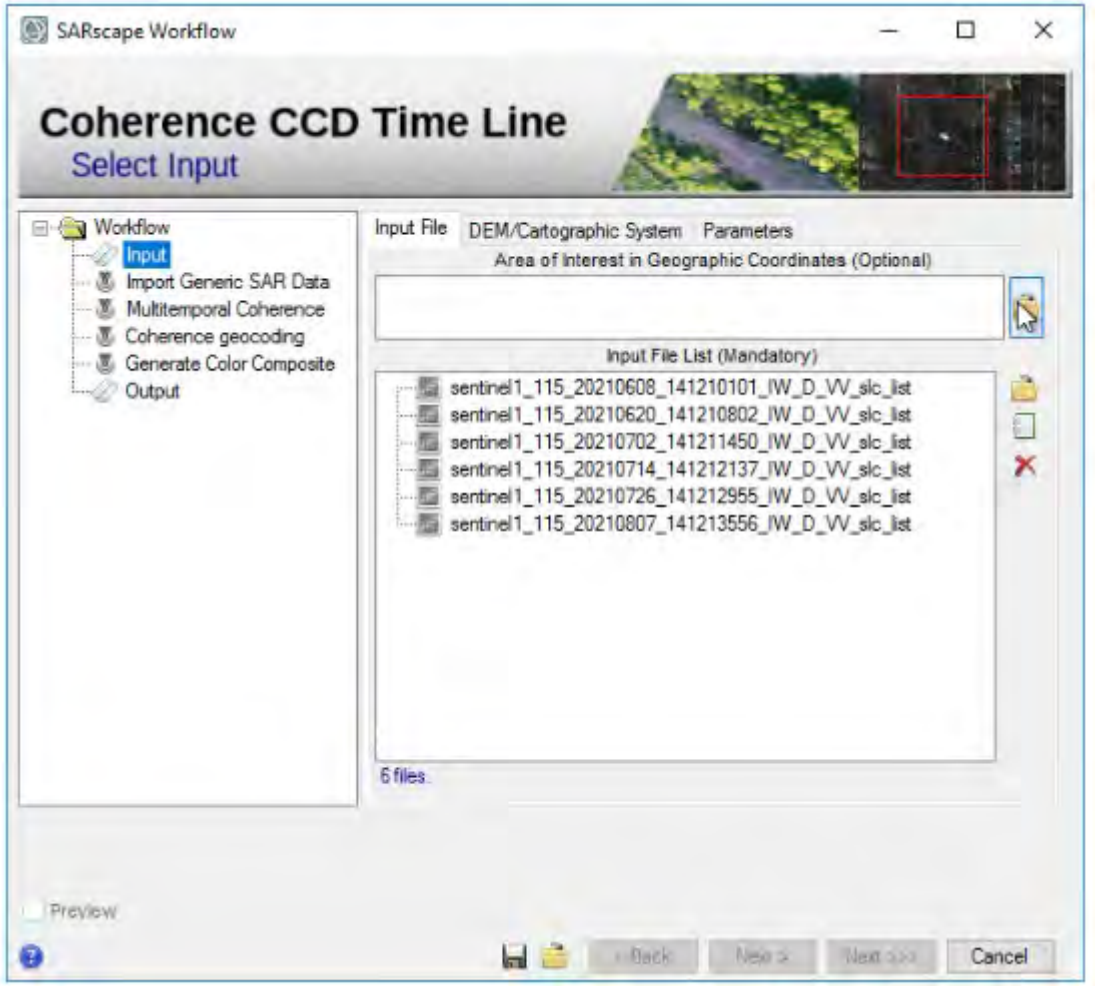


Sentinel-1 Coherence Change Detection between July 14th and July 26th

CCD Steps

- **Input**
- Import Generic SAR Data
- Multitemporal Coherence
- Coherence Geocoding
- Generate Color Composite
- Output

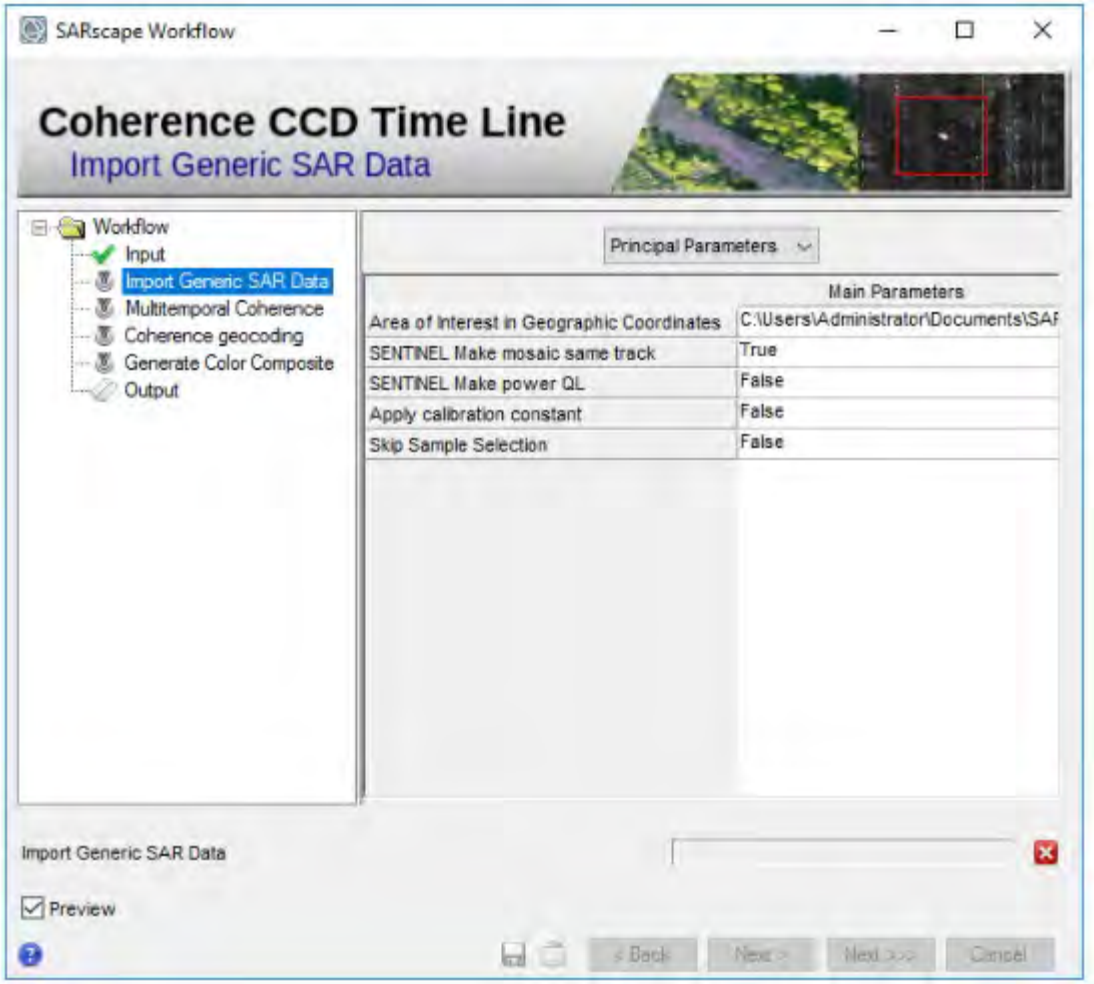
Input – this step is where you input your data, an SHP, KML, or KMZ to focus on an area as an AOI, and a DEM for processing.



CCD Steps

- Input
- **Import Generic SAR Data**
- Multitemporal Coherence
- Coherence Geocoding
- Generate Color Composite
- Output

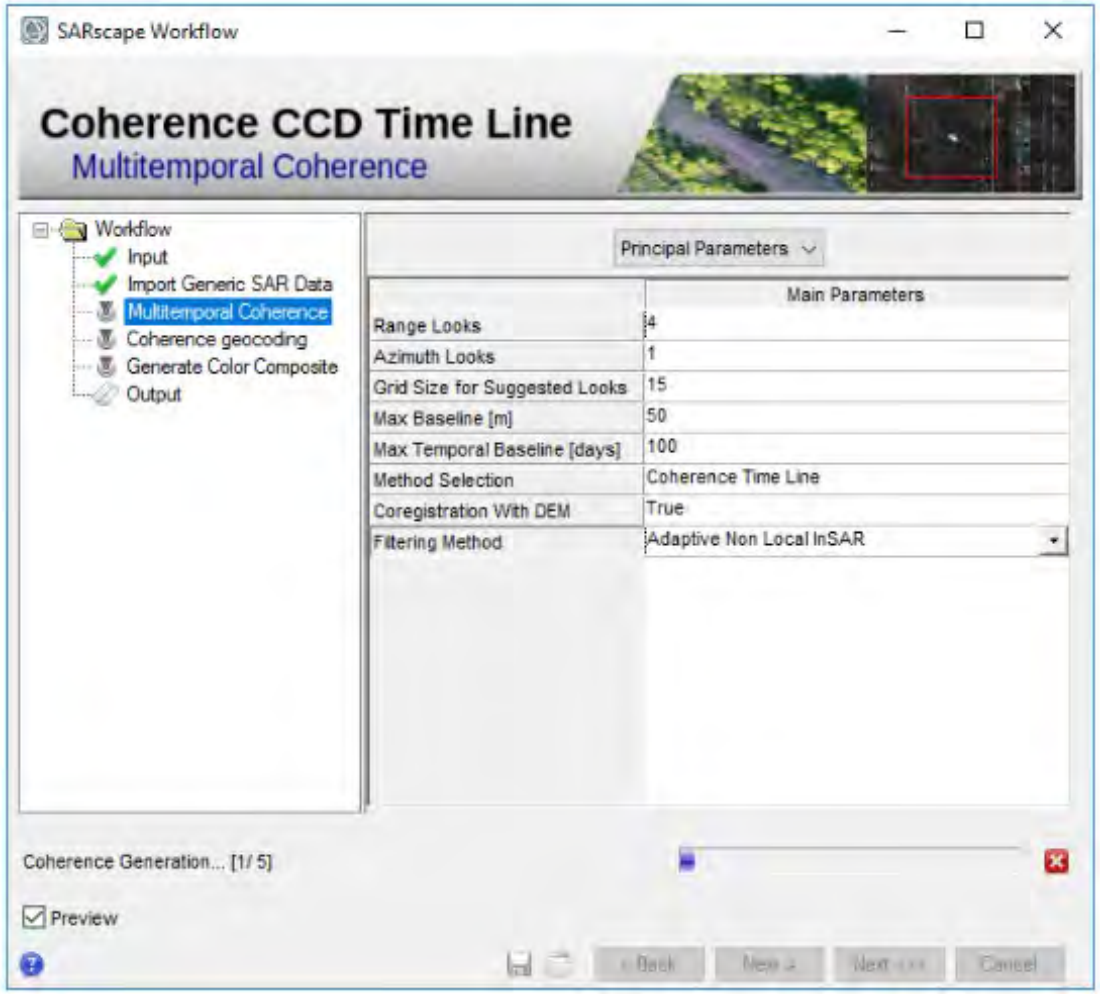
Import – if your data is raw, or not cut down to a smaller region, this step will import your data for you and cut it during the process itself.



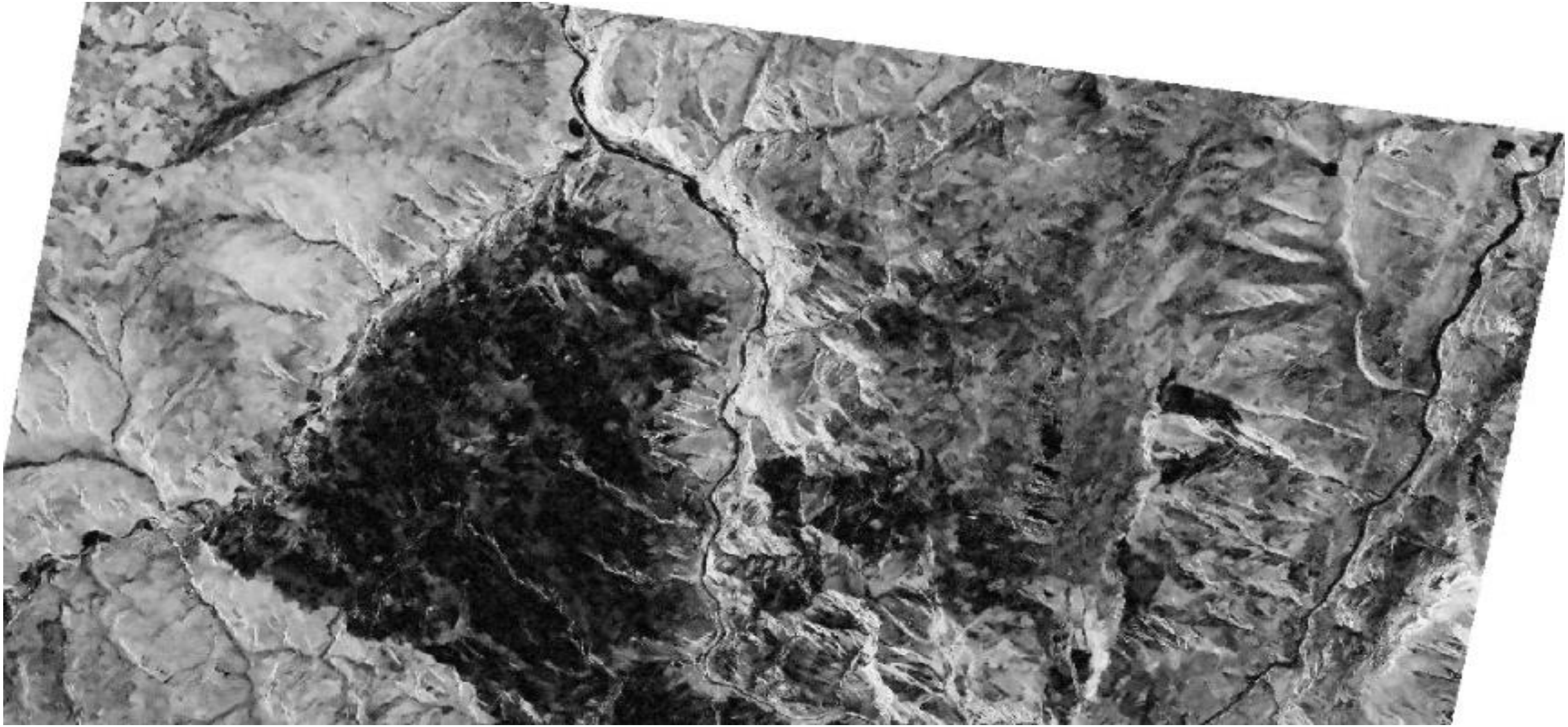
CCD Steps

- Input
- Import Generic SAR Data
- **Multitemporal Coherence**
- Coherence Geocoding
- Generate Color Composite
- Output

Multitemporal Coherence – does the processing of the coherence between scenes. You can preview your data but it is not yet geocoded.



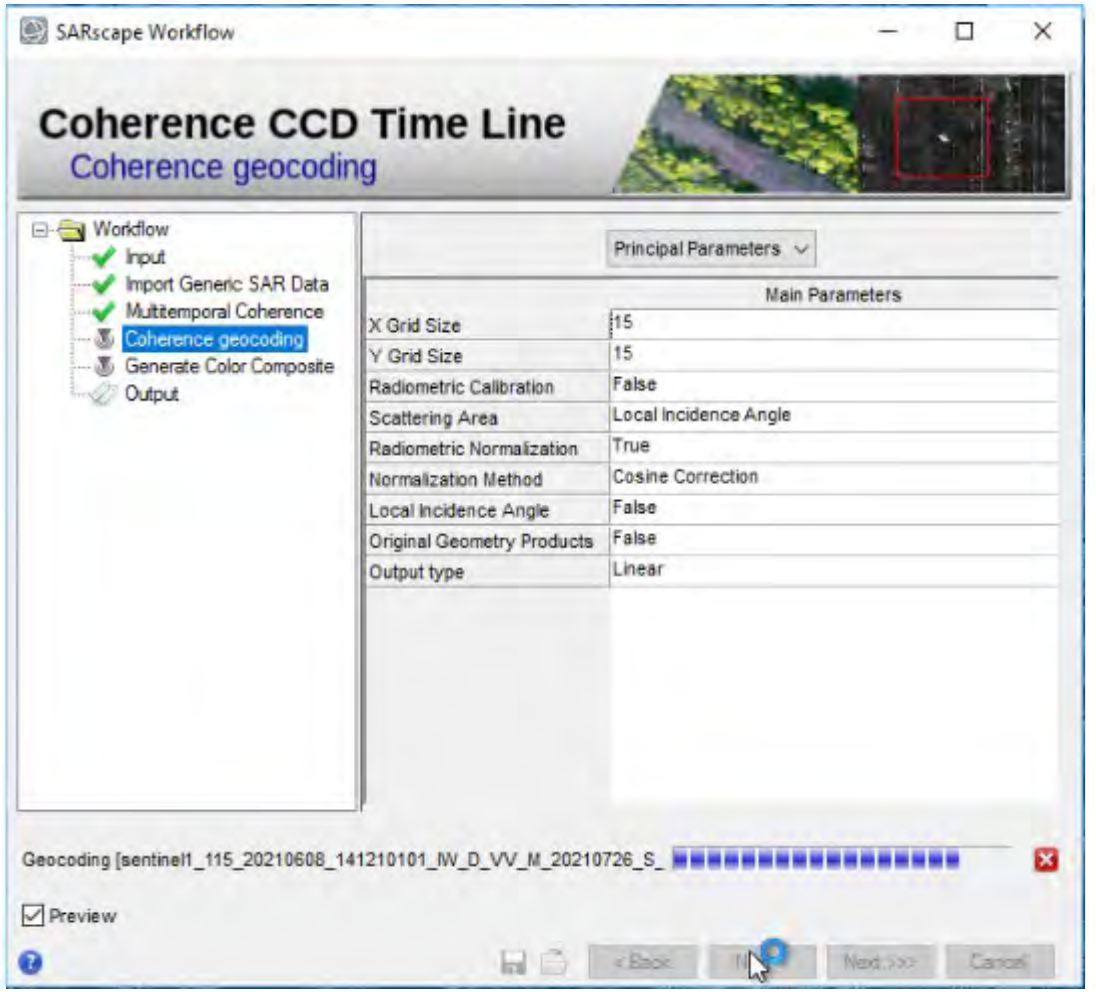
CCD Multitemporal Coherence Output



CCD Steps

- Input
- Import Generic SAR Data
- Multitemporal Coherence
- **Coherence Geocoding**
- Generate Color Composite
- Output

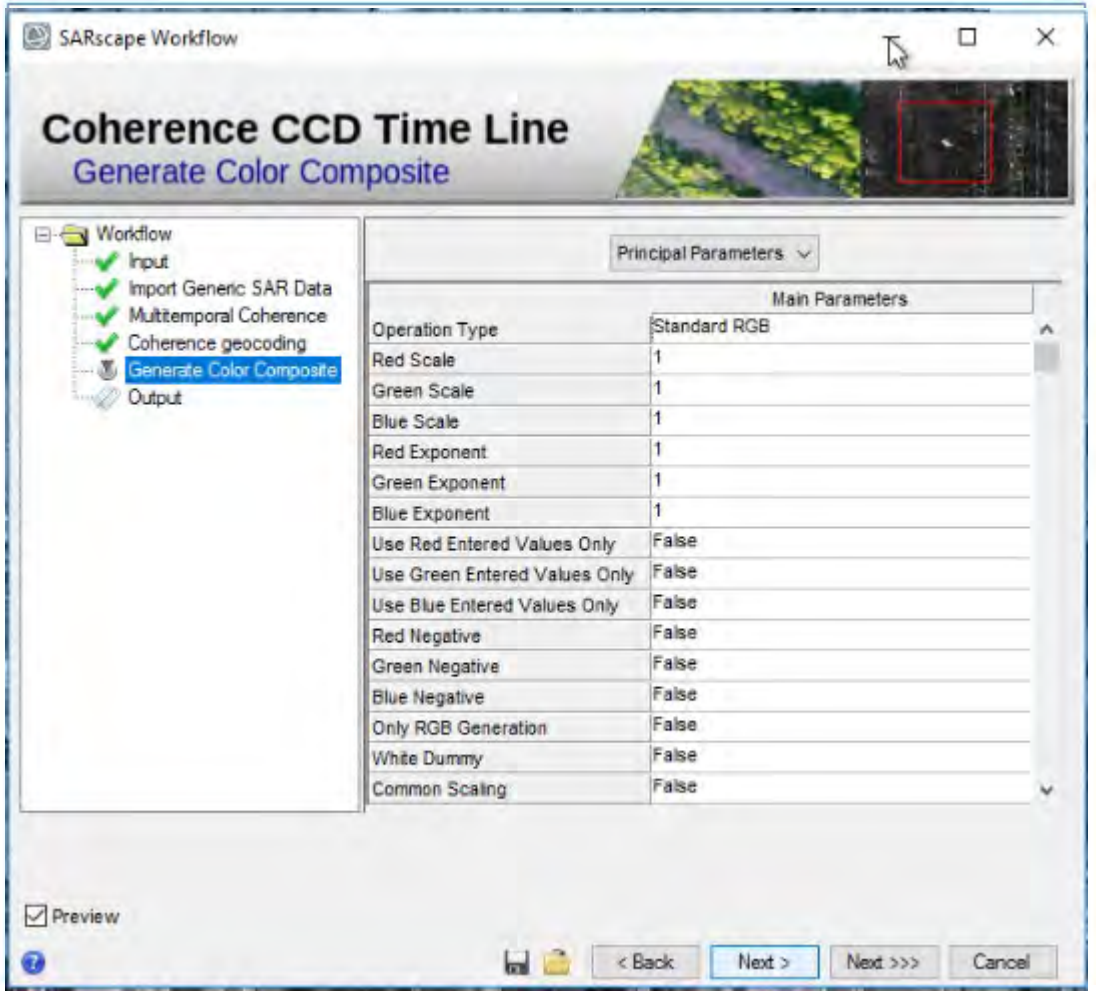
Coherence Geocoding – Our output data is geocoded, aka put into proper ground coordinates.



CCD Steps

- Input
- Import Generic SAR Data
- Multitemporal Coherence
- Coherence Geocoding
- **Generate Color Composite**
- **Output**

Color composite/output – change parameters of how your output looks, and then generate your output product



CCD Output

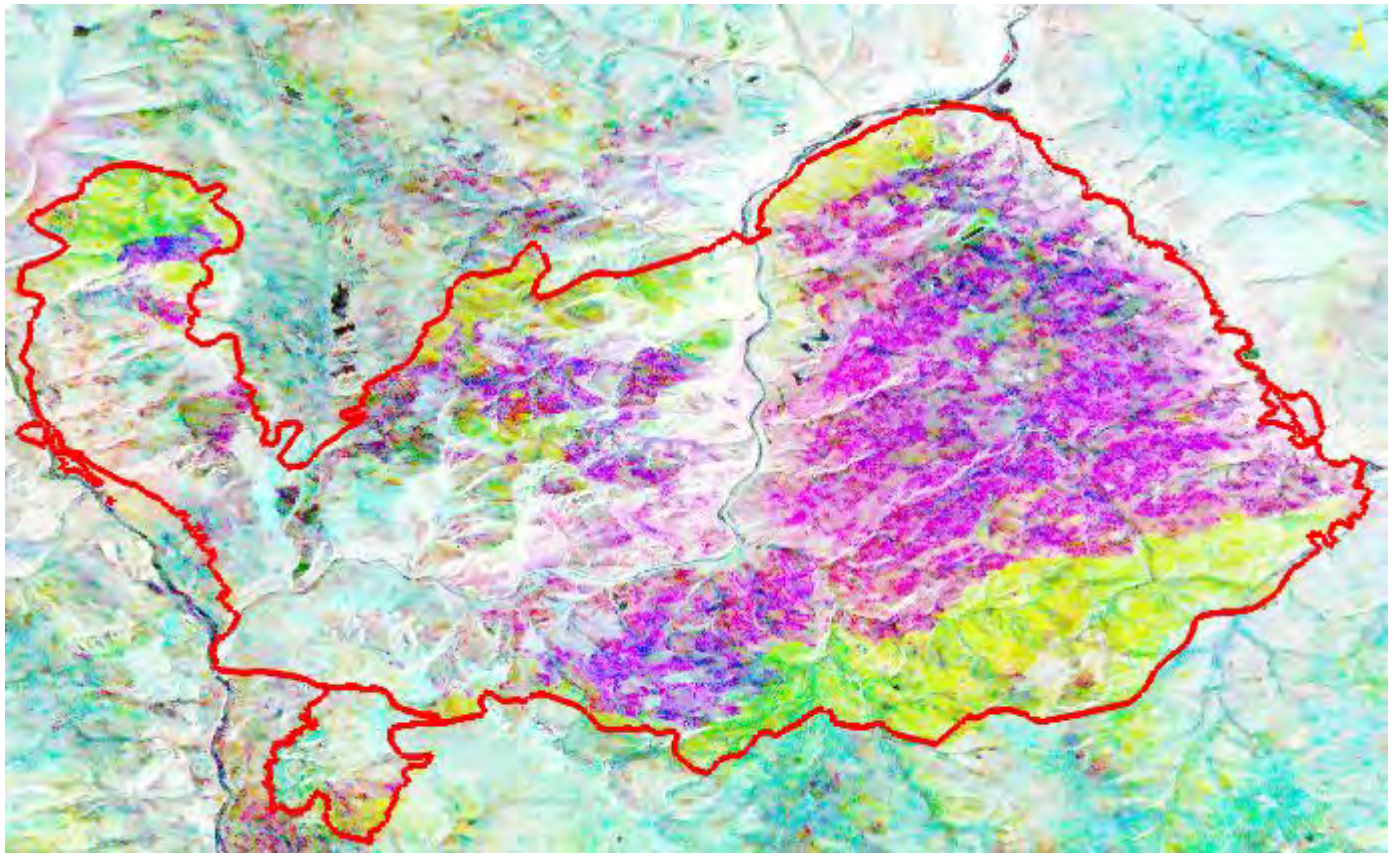
RGB image created from three CCD scenes

Red: July 26th to August 8th

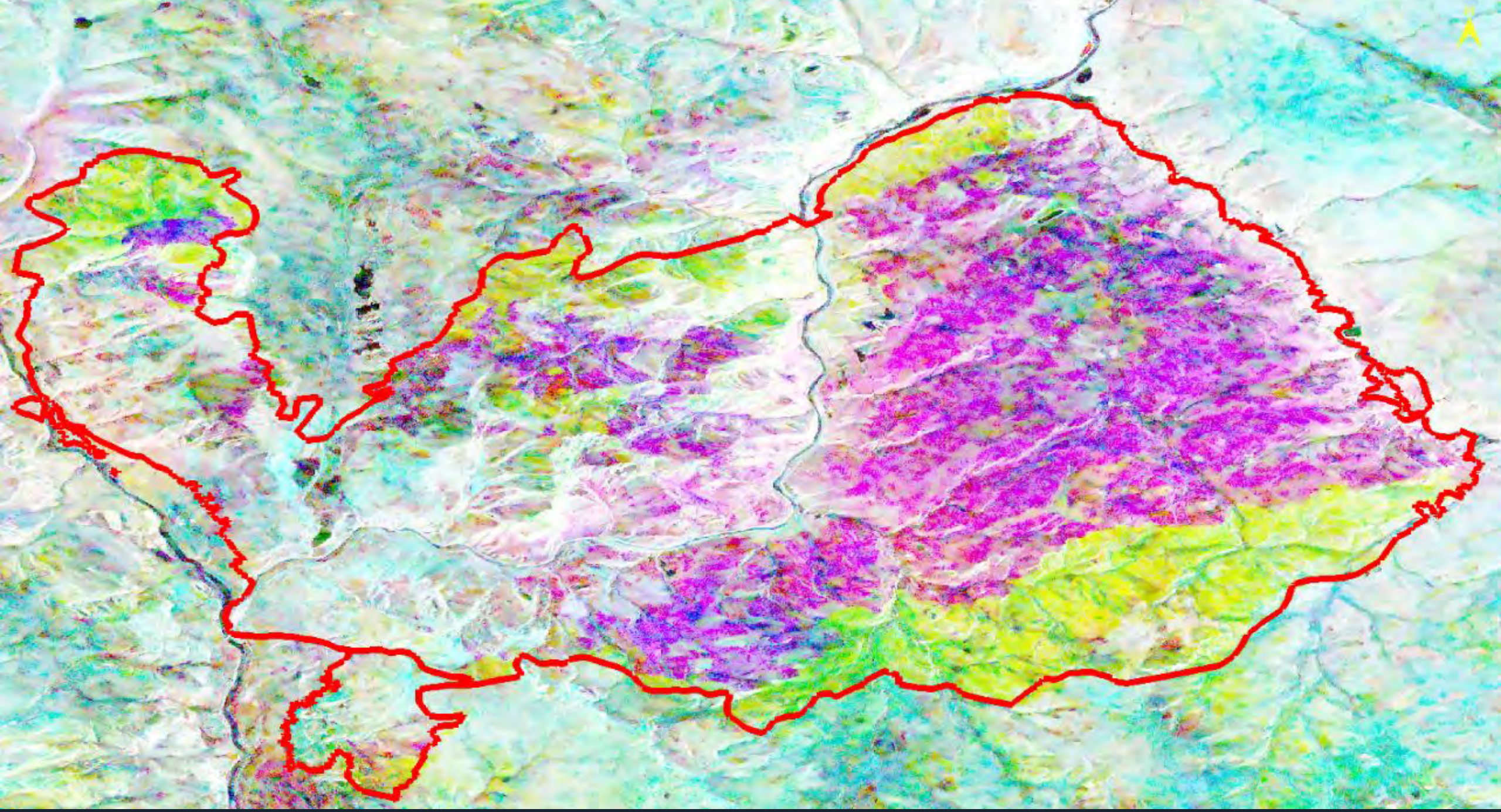
Green: July 14th to July 26th

Blue: June 8th to June 20th

The colors shown highlight the time period in which the fire burned through those specific regions.



Boundary from BC Wildfire Service Data Catalogue

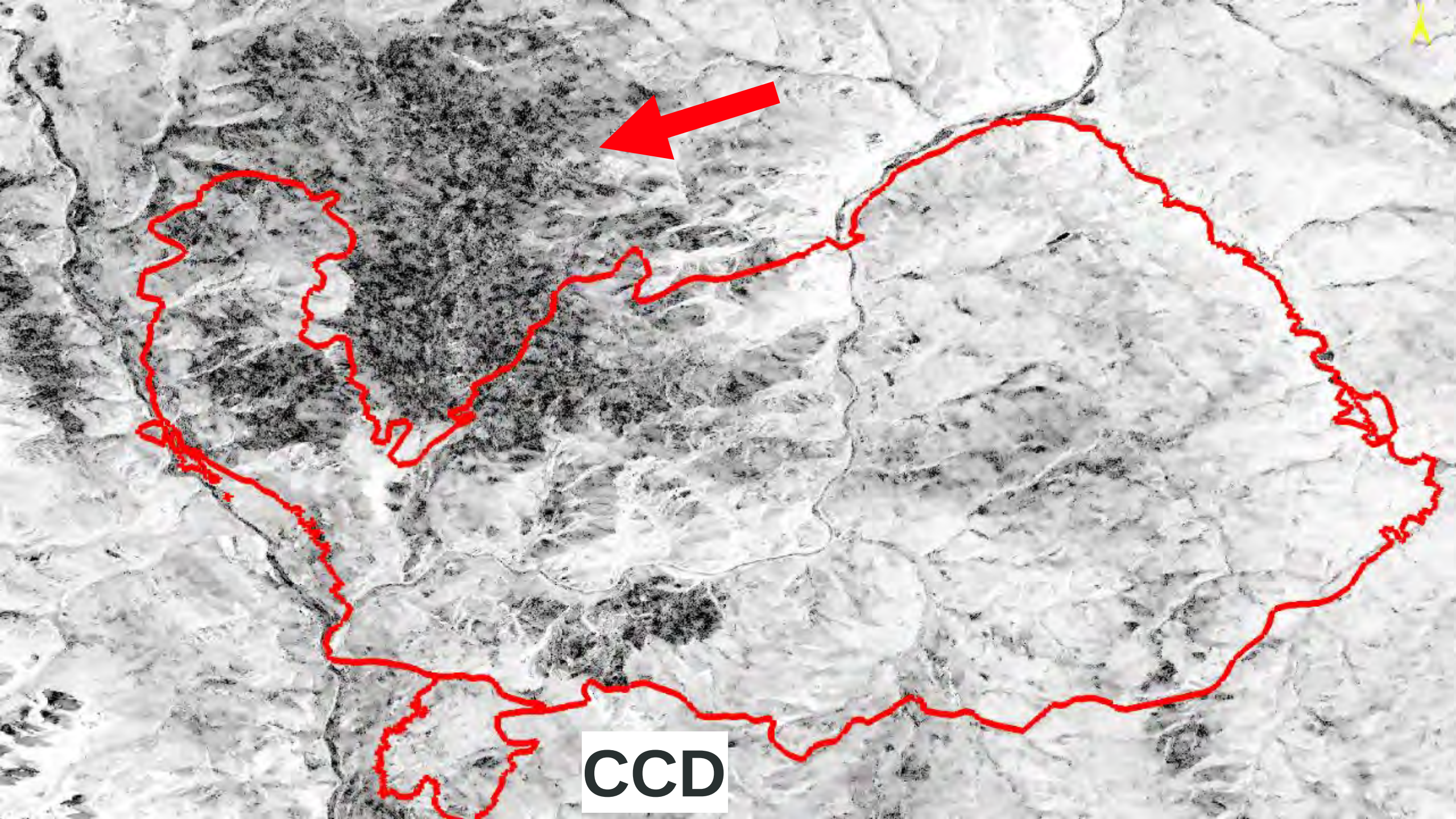


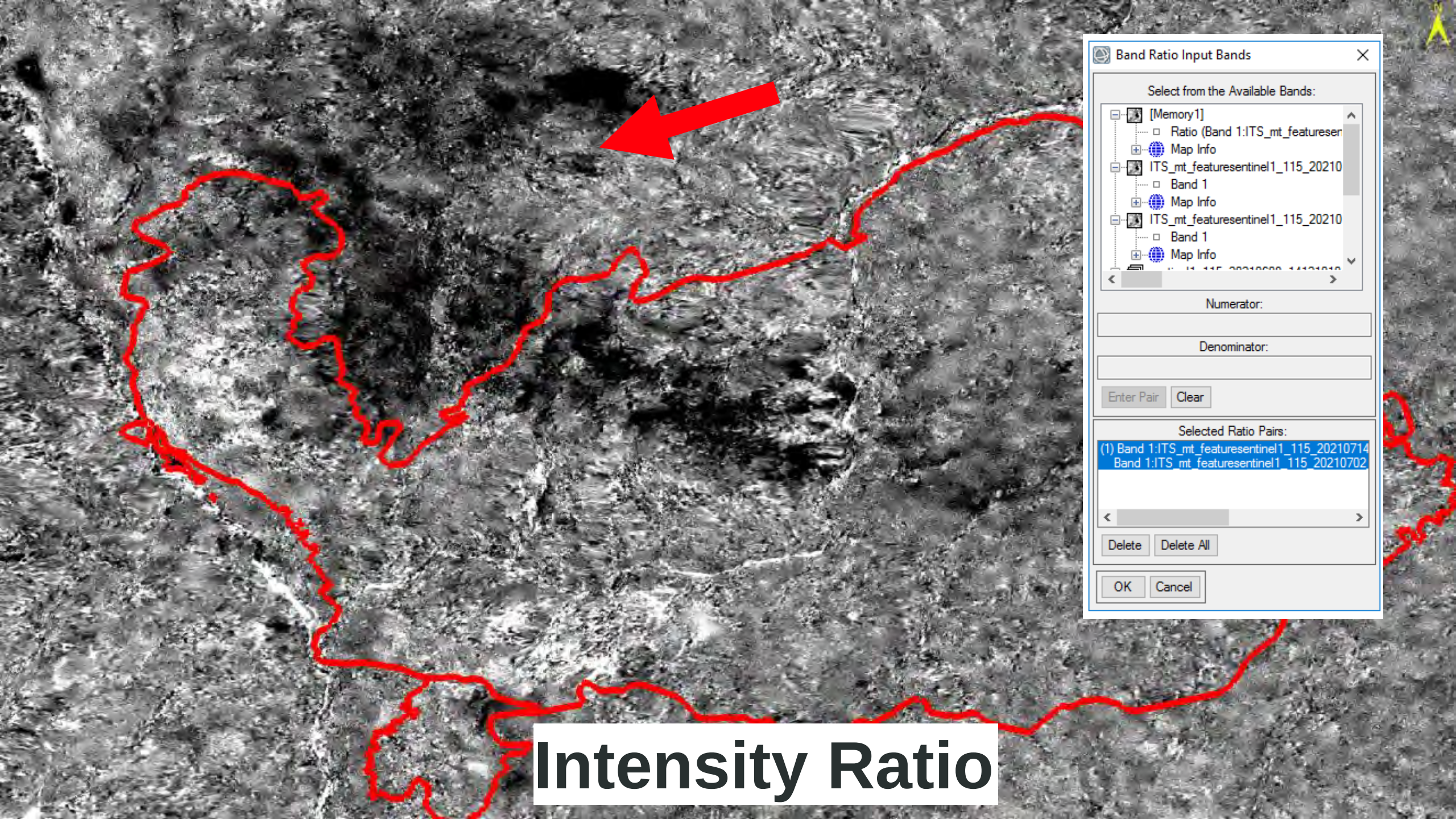
Something interesting

The CCD and intensity output products in between July 2nd and July 14th shows changes caused by the fire, but also some outside the fire area.

A possible cause of this is a Cumulonimbus flammagenitus, or pyrocumulonimbus cloud. These are turbulent cloud structures created by fires that can have thunder, lighting, hail, and even create fire tornados.

June 30, 2021, NASA EO


CCD


Band Ratio Input Bands
Select from the Available Bands:
[Memory1]
Ratio (Band 1:ITS_mt_featureser
Map Info
ITS_mt_featuresentinel1_115_20210
Band 1
Map Info
ITS_mt_featuresentinel1_115_20210
Band 1
Map Info
Numerator:
Denominator:
Enter Pair
Clear
Selected Ratio Pairs:
(1) Band 1:ITS_mt_featuresentinel1_115_20210714
Band 1:ITS_mt_featuresentinel1_115_20210702
Delete
Delete All
OK
Cancel
Intensity Ratio

Thank you!

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