RS show and tell

20221129 WildFireSat KE team meeting

Ash Richardson & Predictive Services Unit

Show and tell

- Sentinel2 classification: old rule
  - Battleship Mtn(2022) BC
- Sentinel2 classification: new rule!
  - Battleship Mtn (2022) BC
  - V11746 (2022) BC
  - Херсо́н, Україна May 2022
  - Watson Lake (2022) YT
    - Why we can't use the Sentinel-2 cloud mask
    - MODIS/ VIIRS C1,C2
- L-band SAR application

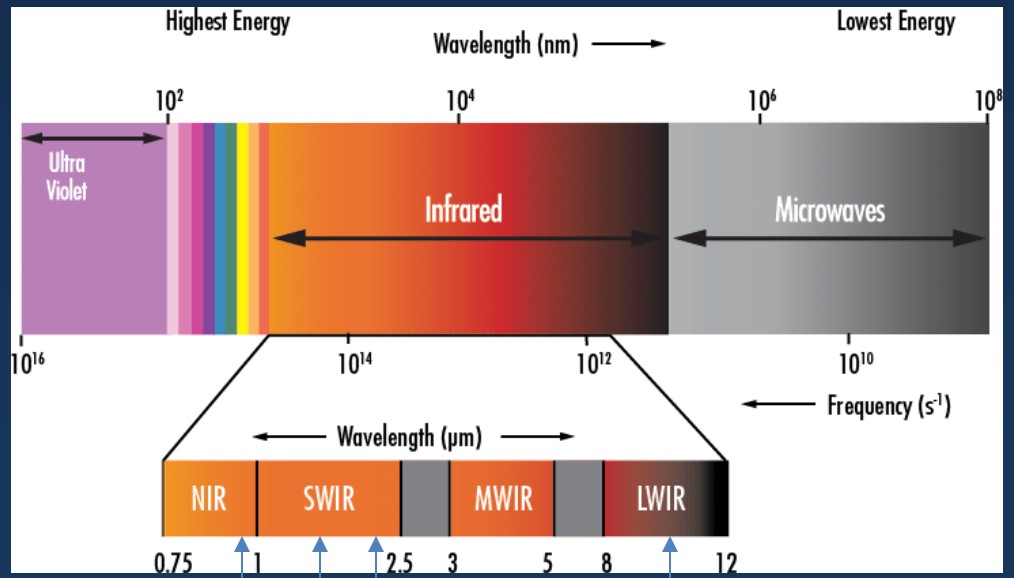
Thanks: Mike Smith for YT Fire Polygon!

1. Band selection: False color coding (right)

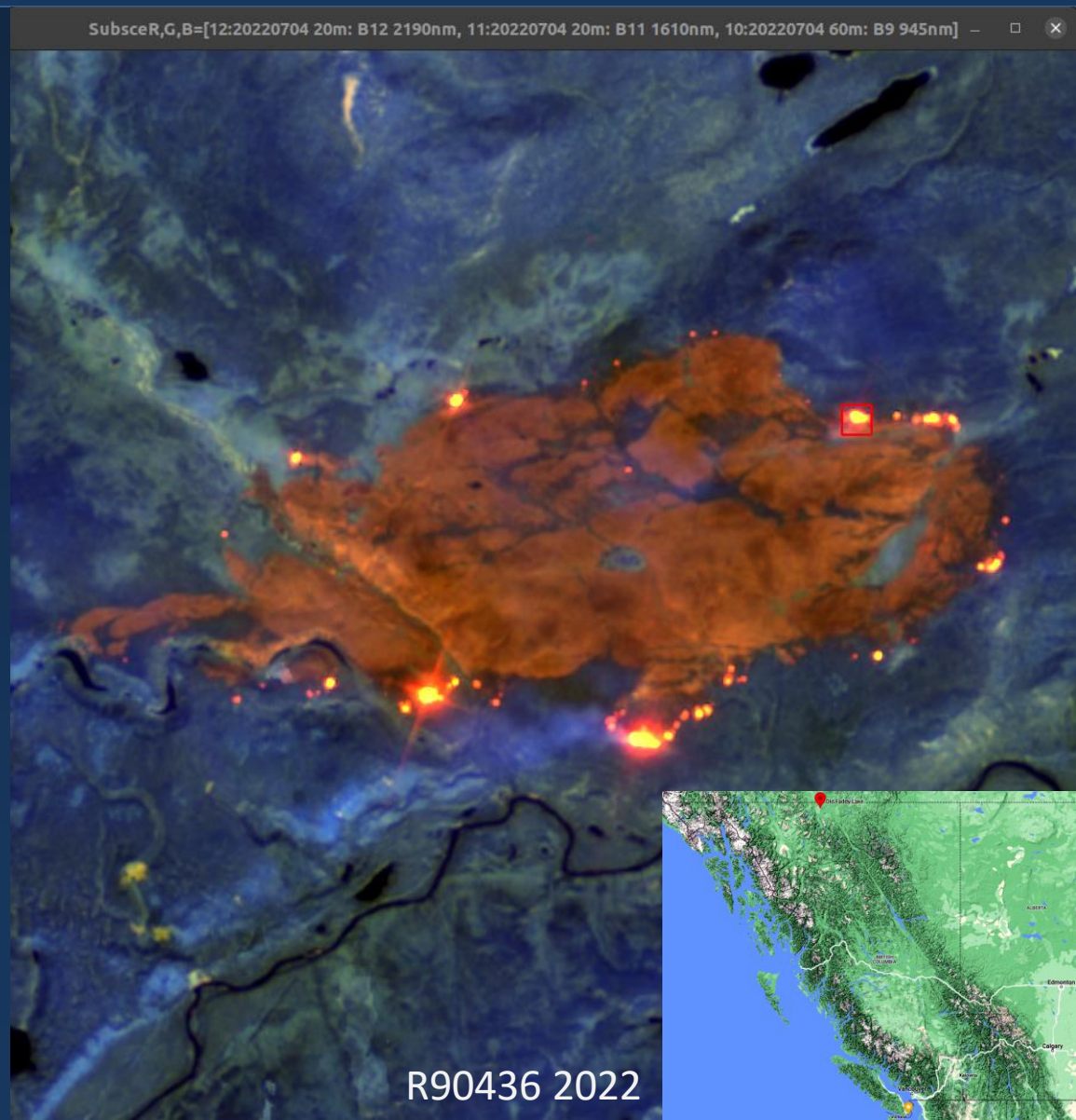
- Color encoding to generate map at right:
  - Red: "B12" 2190 nm = 2.2 µm
  - Green: "B11" 1610 nm = 1.6 µm
  - Blue: "B9" 945 nm = 0.95 µm

I.e. The B12, B11 and B9 are respectively plotted as Red, Green and Blue on the screen

  - Vegetation is blue
  - Hotspots are red
  - Burned areas are orange



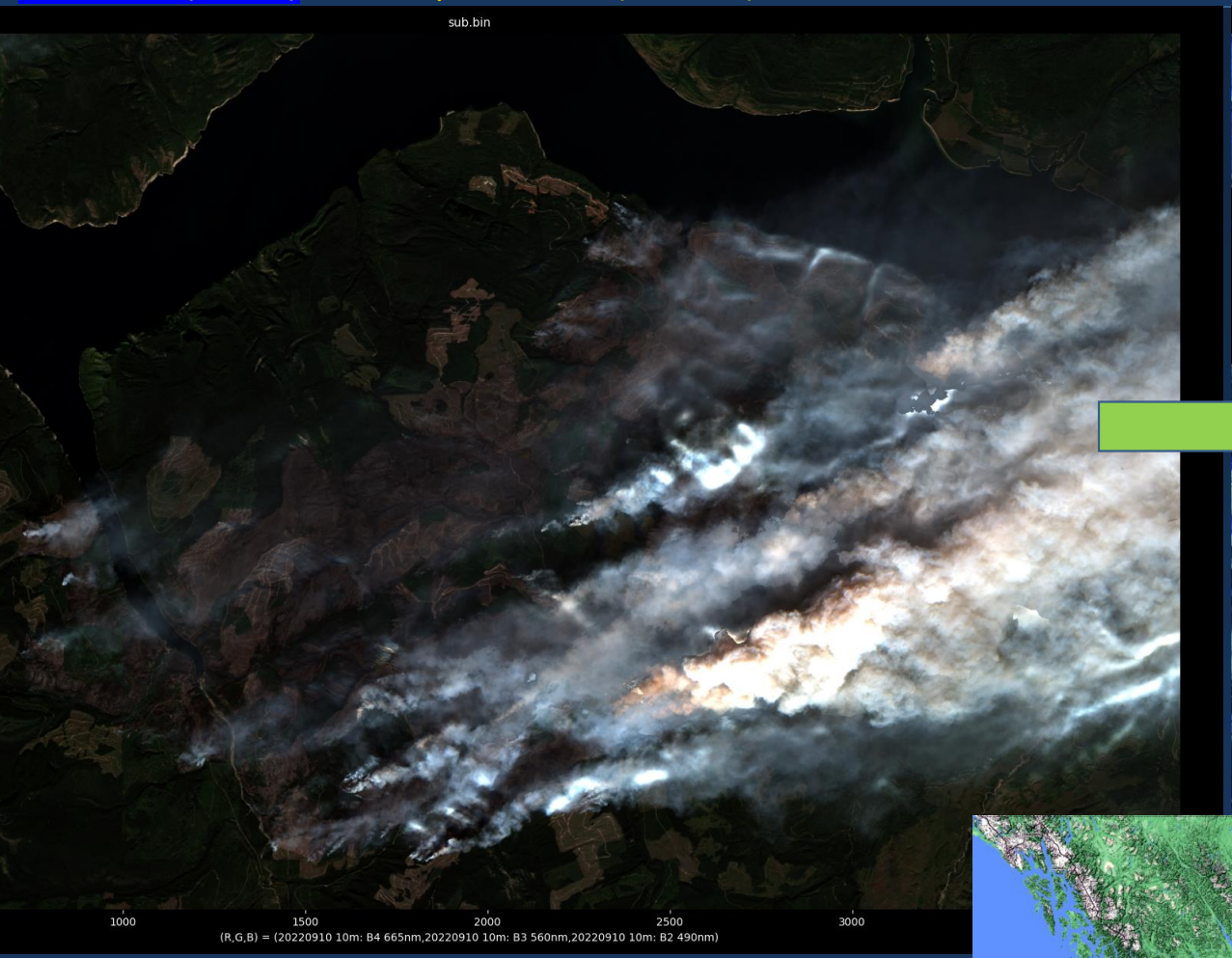
"Somewhere between visible and thermal"



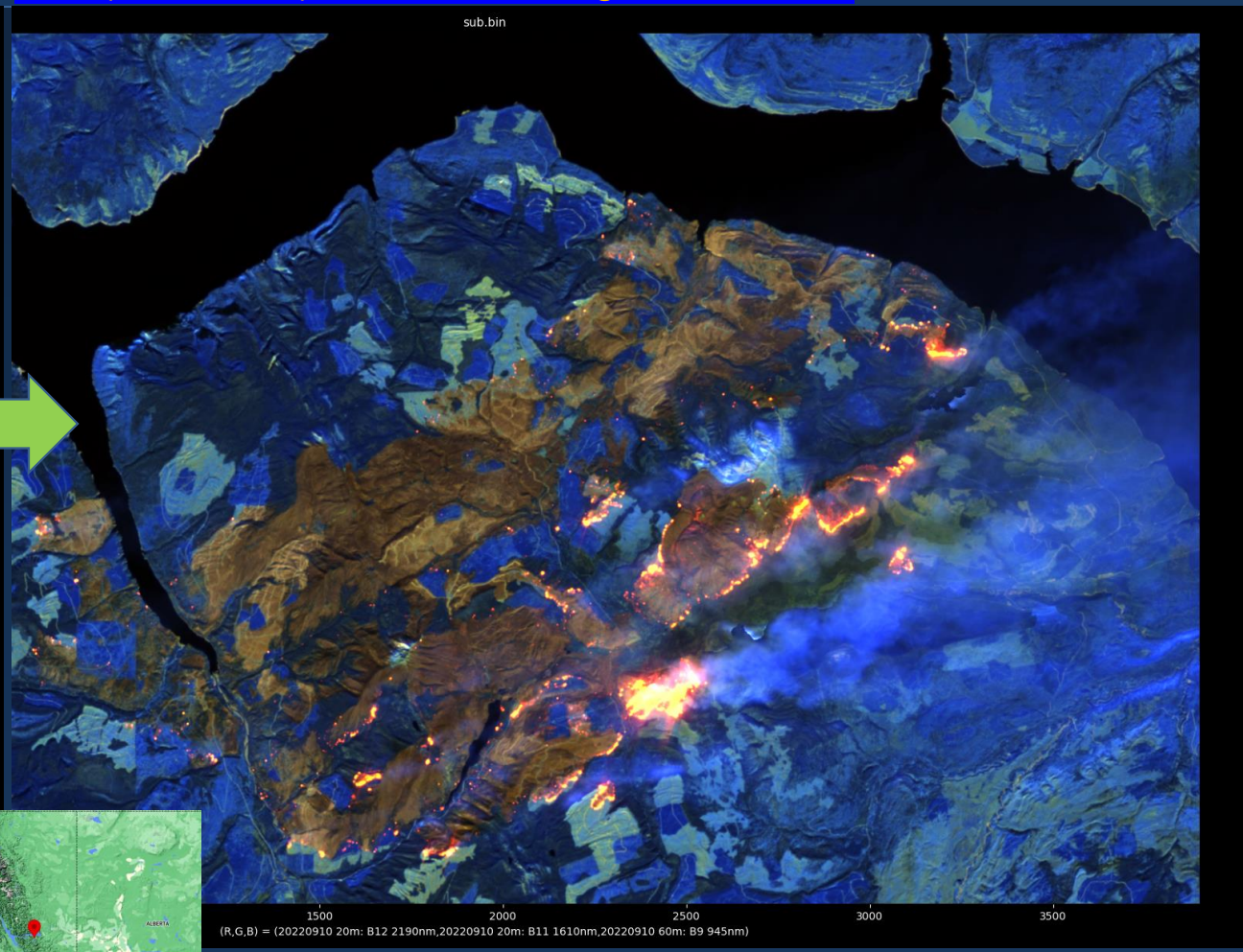
1) Sentinel2 data: Why use only longest-waves?

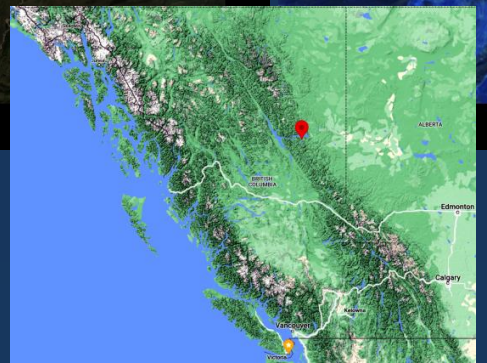
BC Wildfire Service

RGB = RGB (visible) Battleship mountain (G72150) 20220910



RGB= (B12, B11, B9) shortwave IR. 3 longest-wave bands!





Battleship mountain (G72150) 20220910

2) Threshold

https://github.com/bcgov/bcws-psu-research/blob/master/cpp/sentinel2_active.cpp
https://github.com/bcgov/wps-research/blob/master/cpp/raster_dominant.cpp

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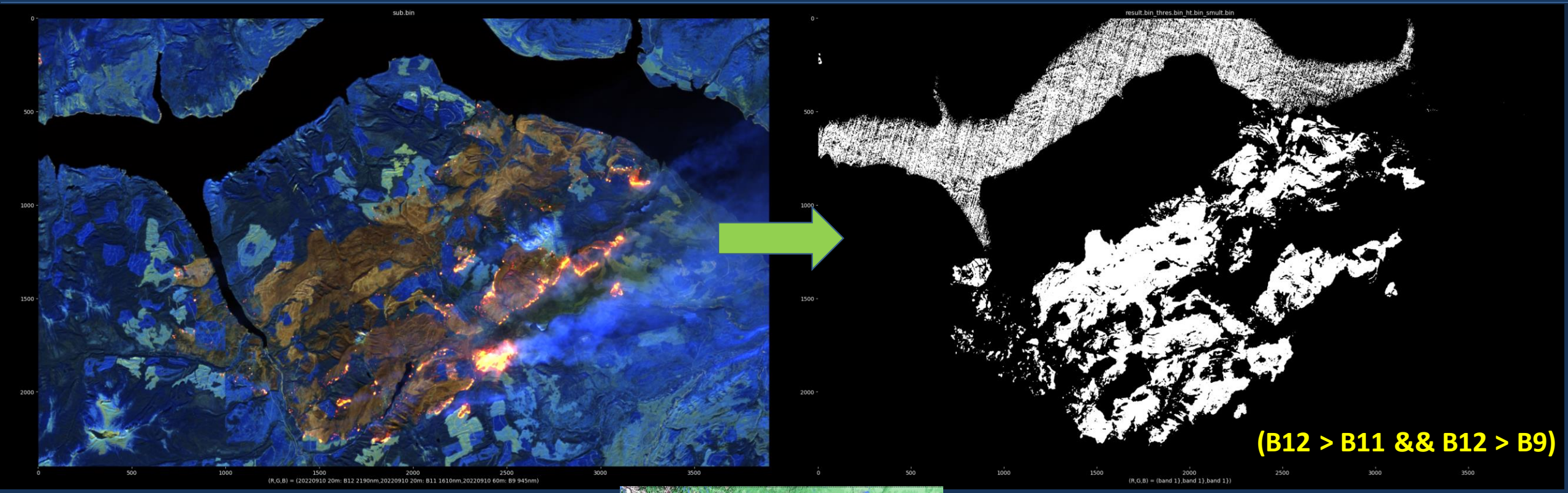
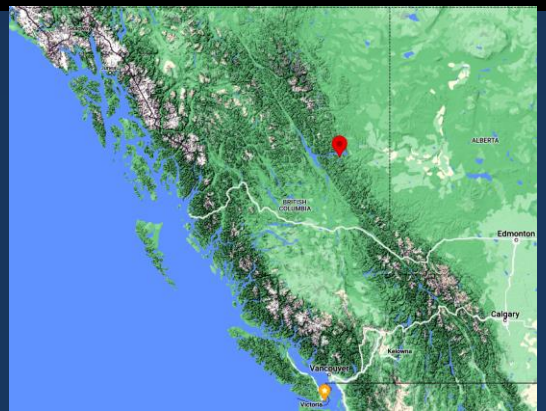
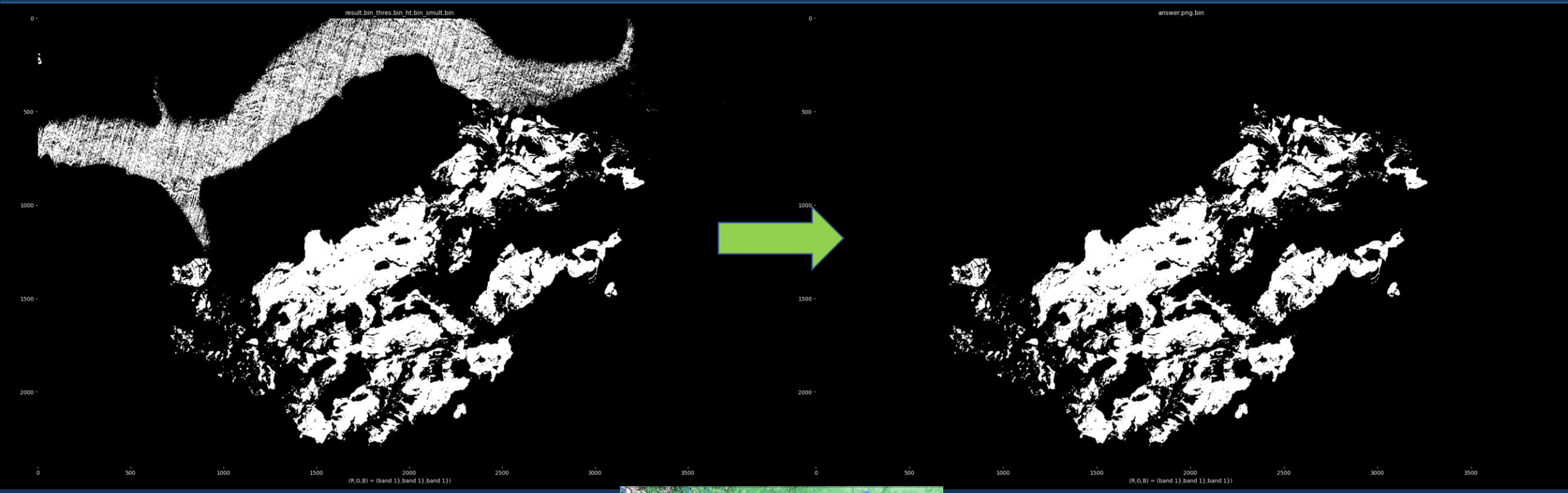


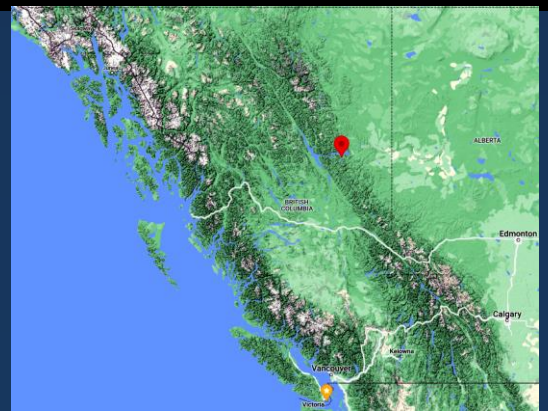


- Find image areas that are "more red"
- False positives incl. Reflection off water
- In-house private cloud app uses GEE land-cover to exclude water

Battleship mountain (G72150) 20220910

3) Scrub

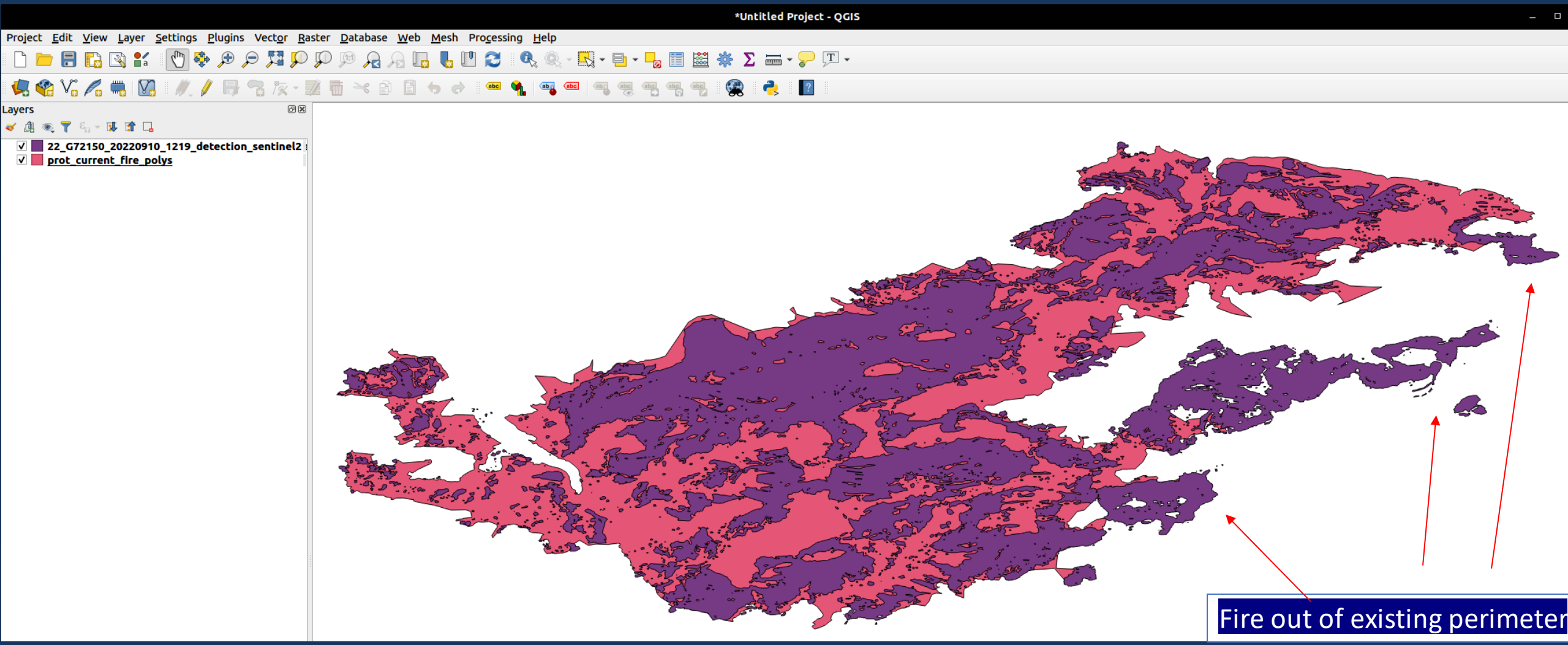




- Remove water areas etc.
- GIMP used for manual scrubbing
- Weather, illumination or other image quality issues could necessitate more scrubbing
  - Or more AI

Battleship mountain (G72150) 20220910

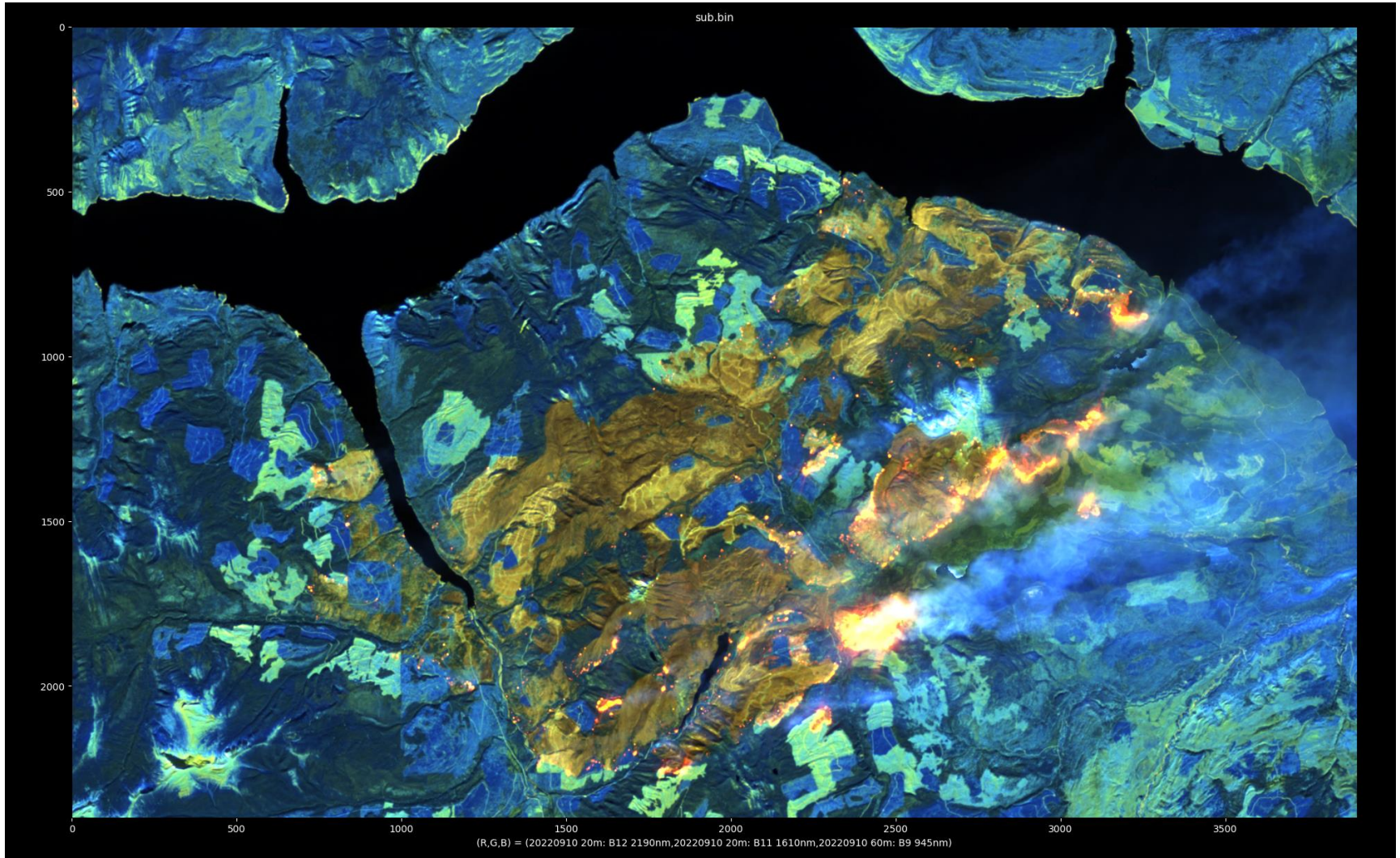
4. Polygon: compare w existing data!



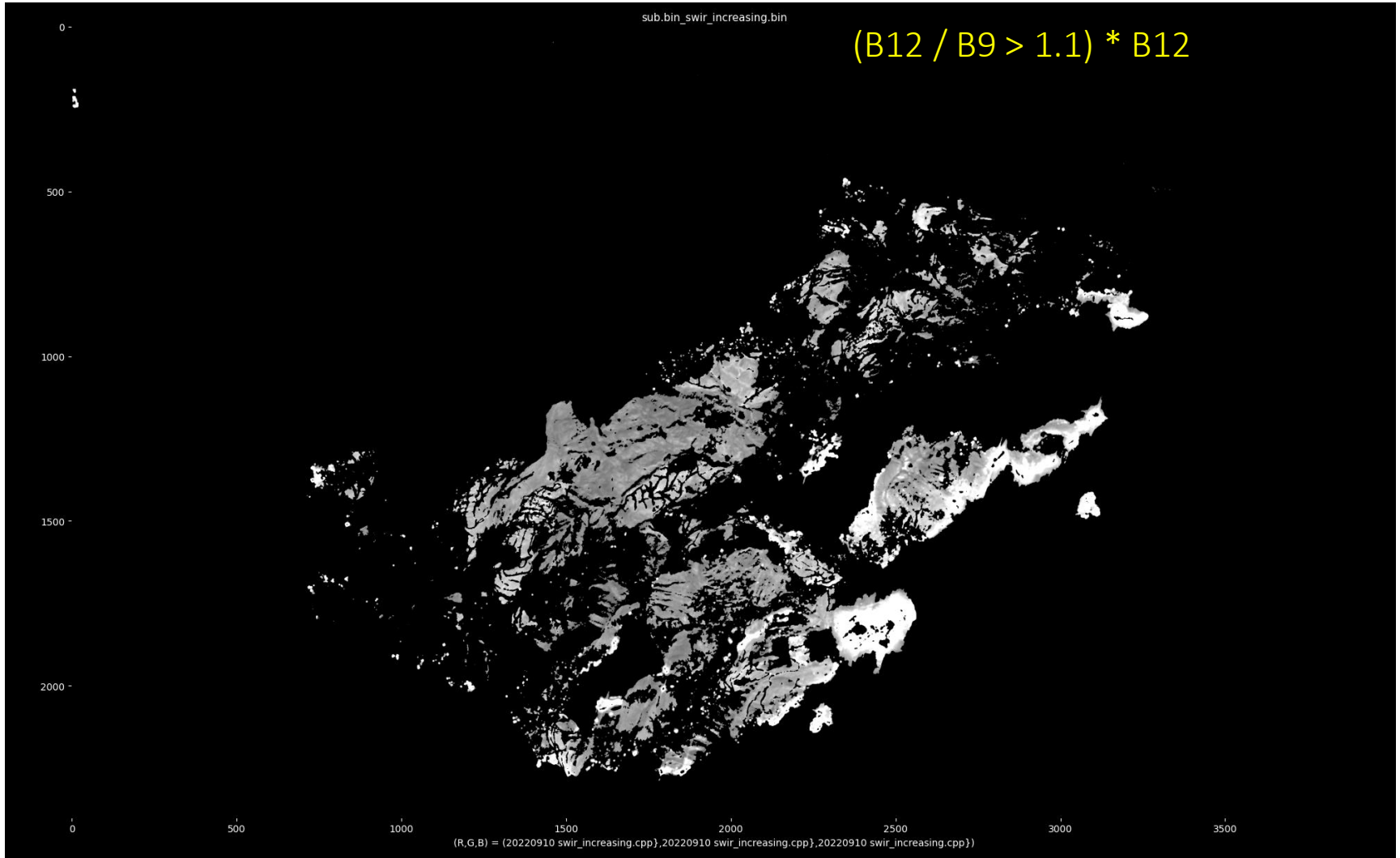
Battleship mountain (G72150) 20220910 Poly data 2022091021 (9-10pm)

Note: 12 Sep 2022 poly to boots on ground in 4h24m from image capture (approx noon)
This was from using Landsat-9 data and spectrally interpolating it to Sentinel2 bands (at 30m

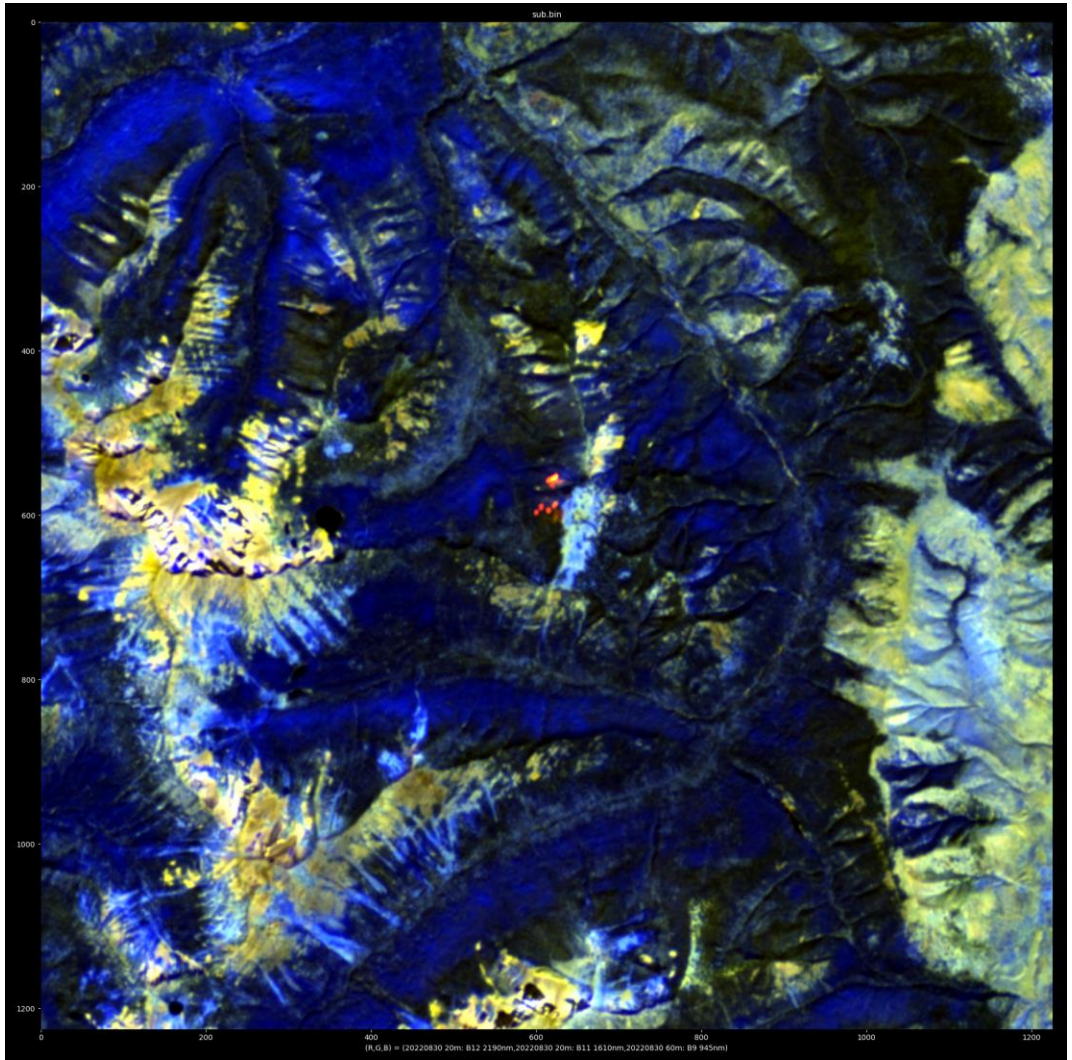
New rule: S2 rgb=b(12, 11, 9)



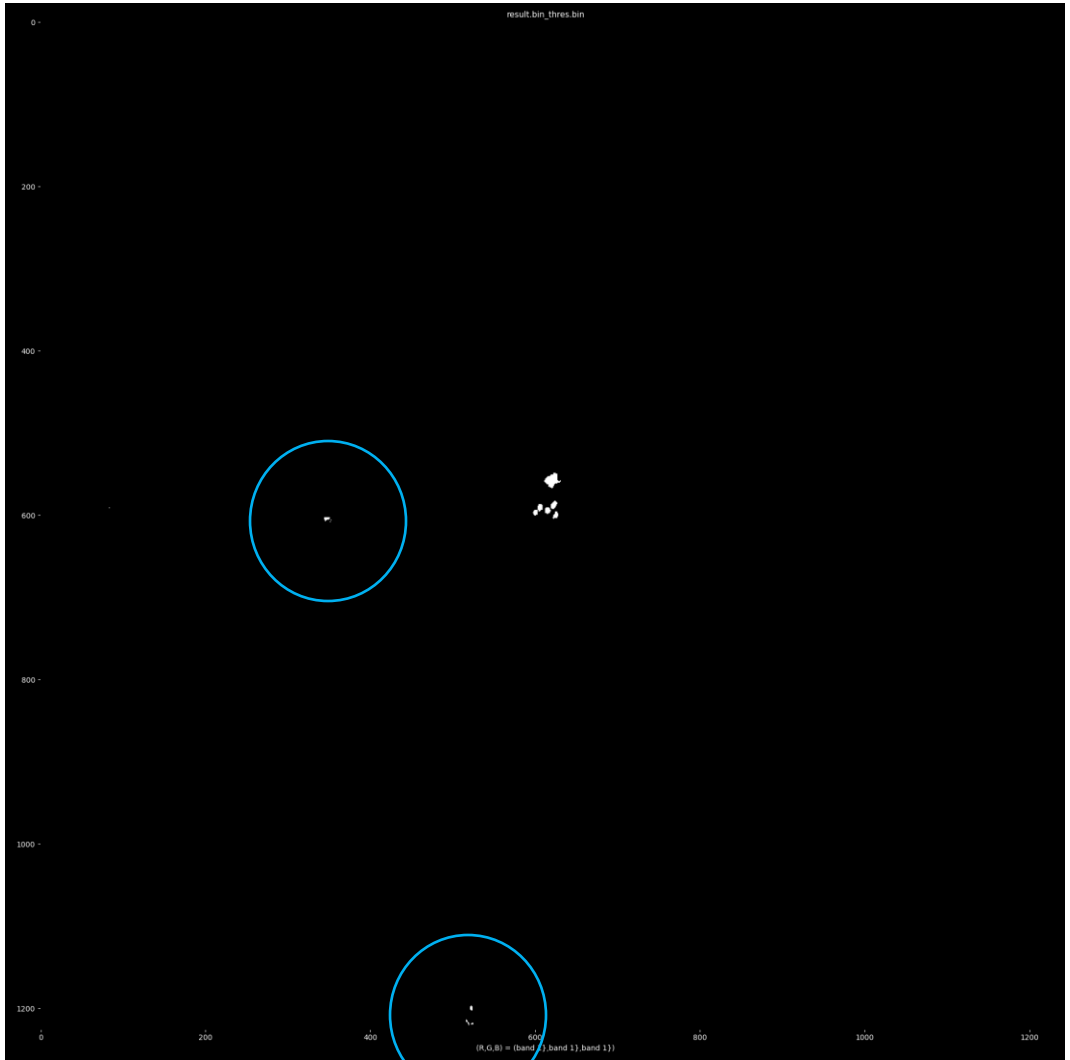
New rule: S2 rgb=b(12, 11, 9)



20220830 V11746

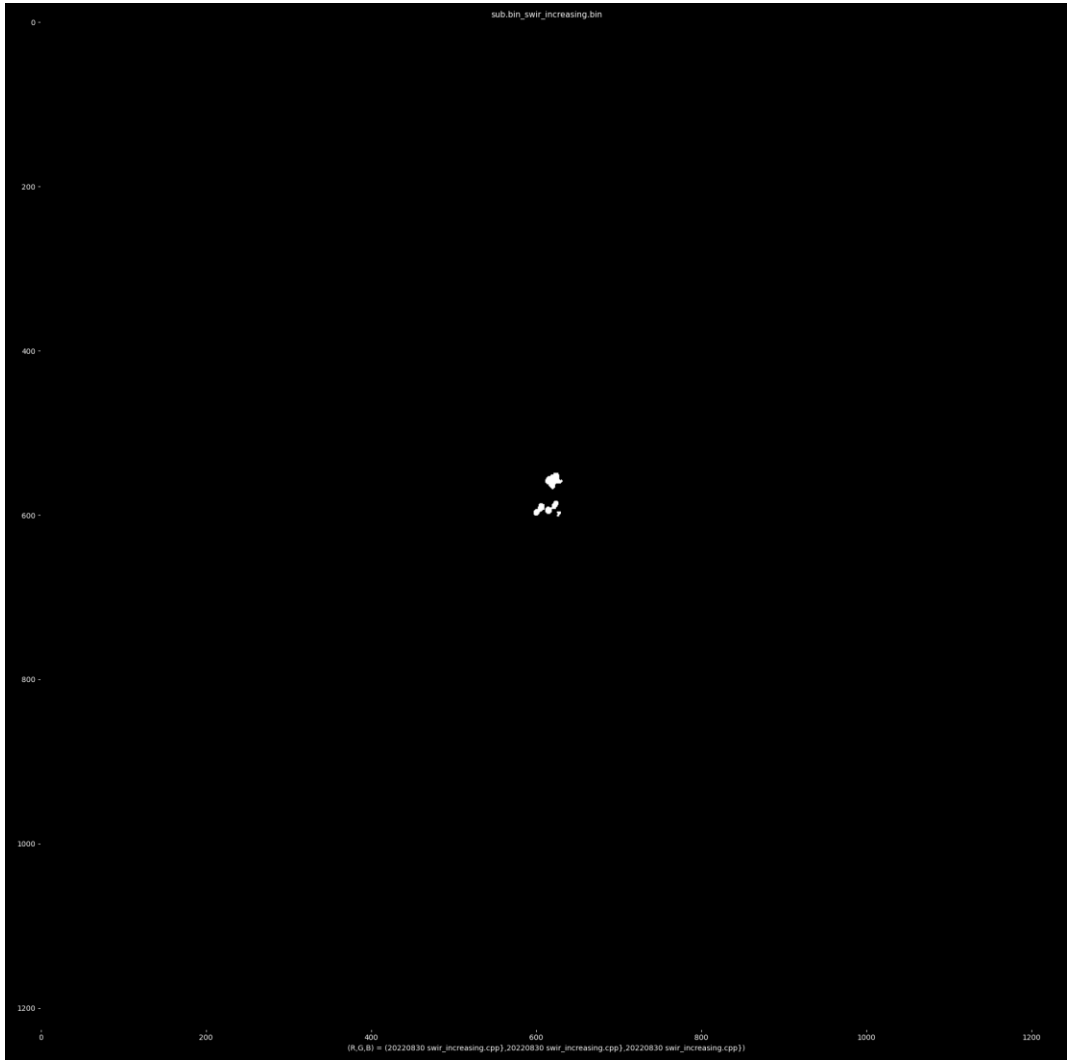


20220830 V11746 old rule



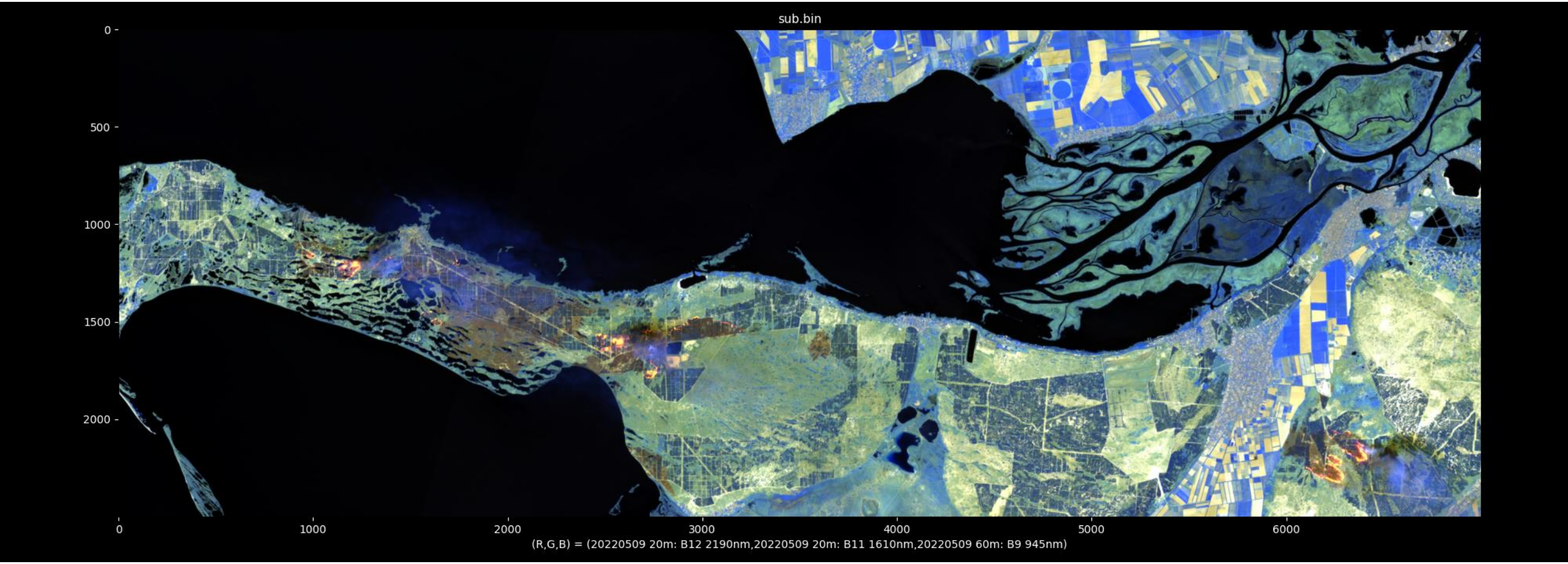
b12>b11
&&
b12>b9

20220830 V11746 new rule

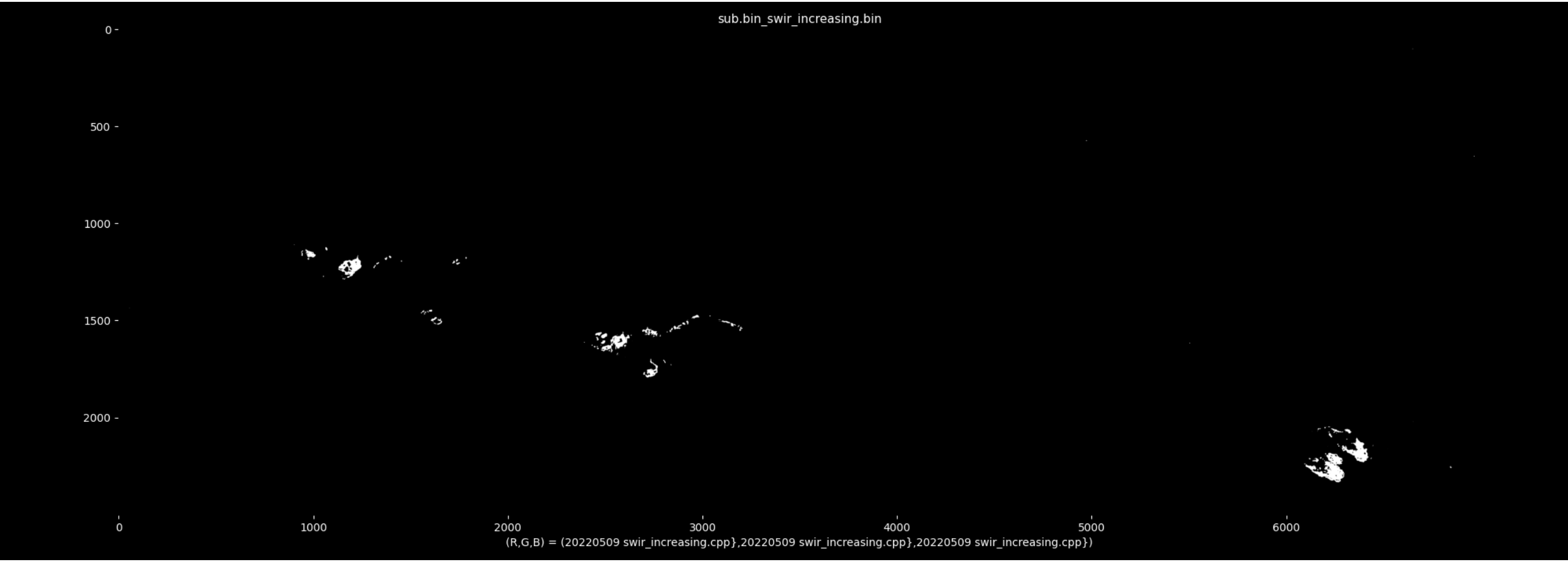


b12 > 1.1 * b9
&&
b12 > 1.1 * b10

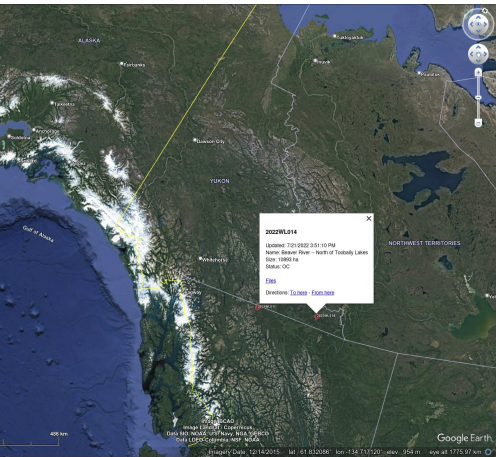
Херсо́н Україна 20220507

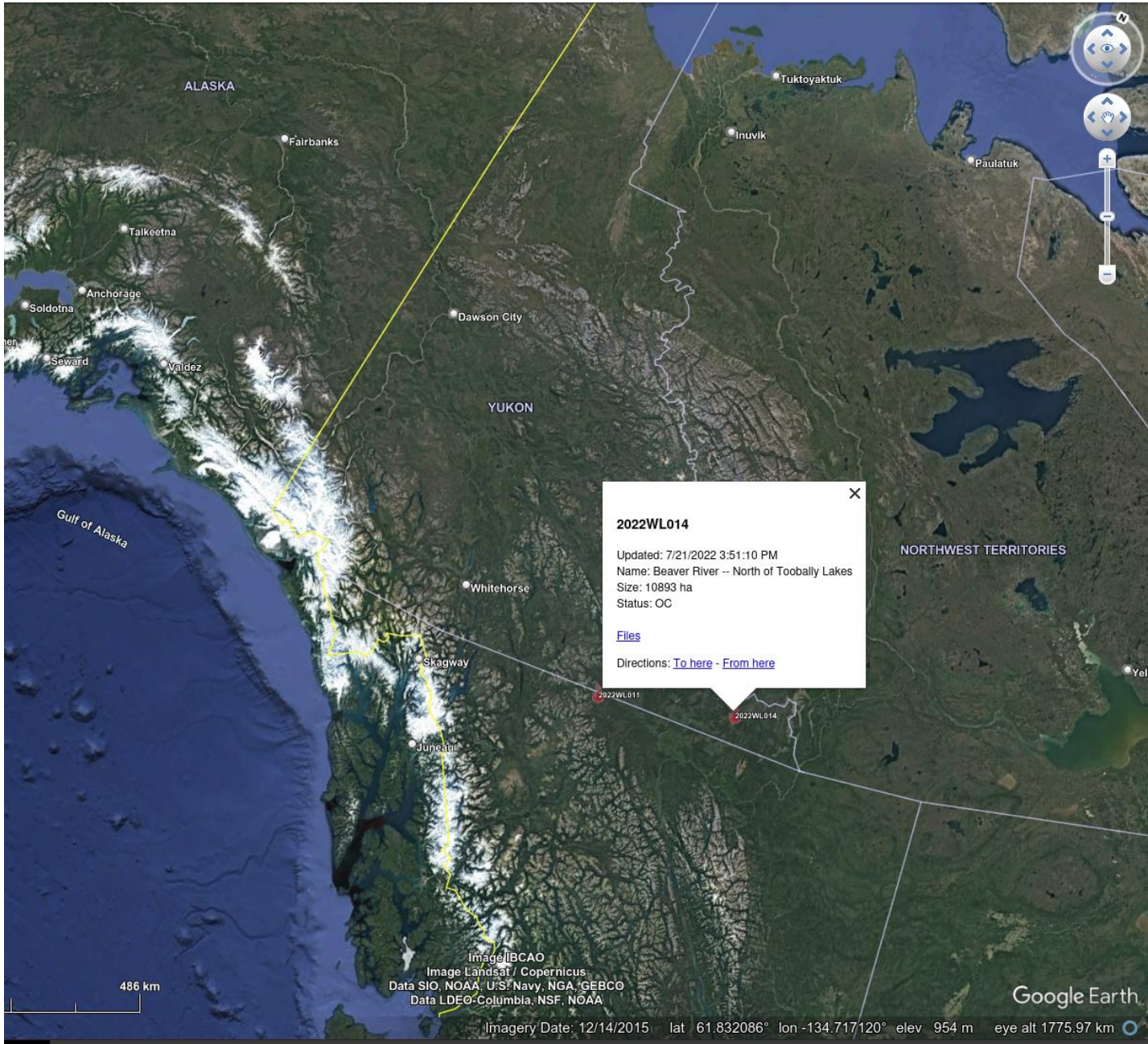


Херсо́н Україна 20220507 (new rule)



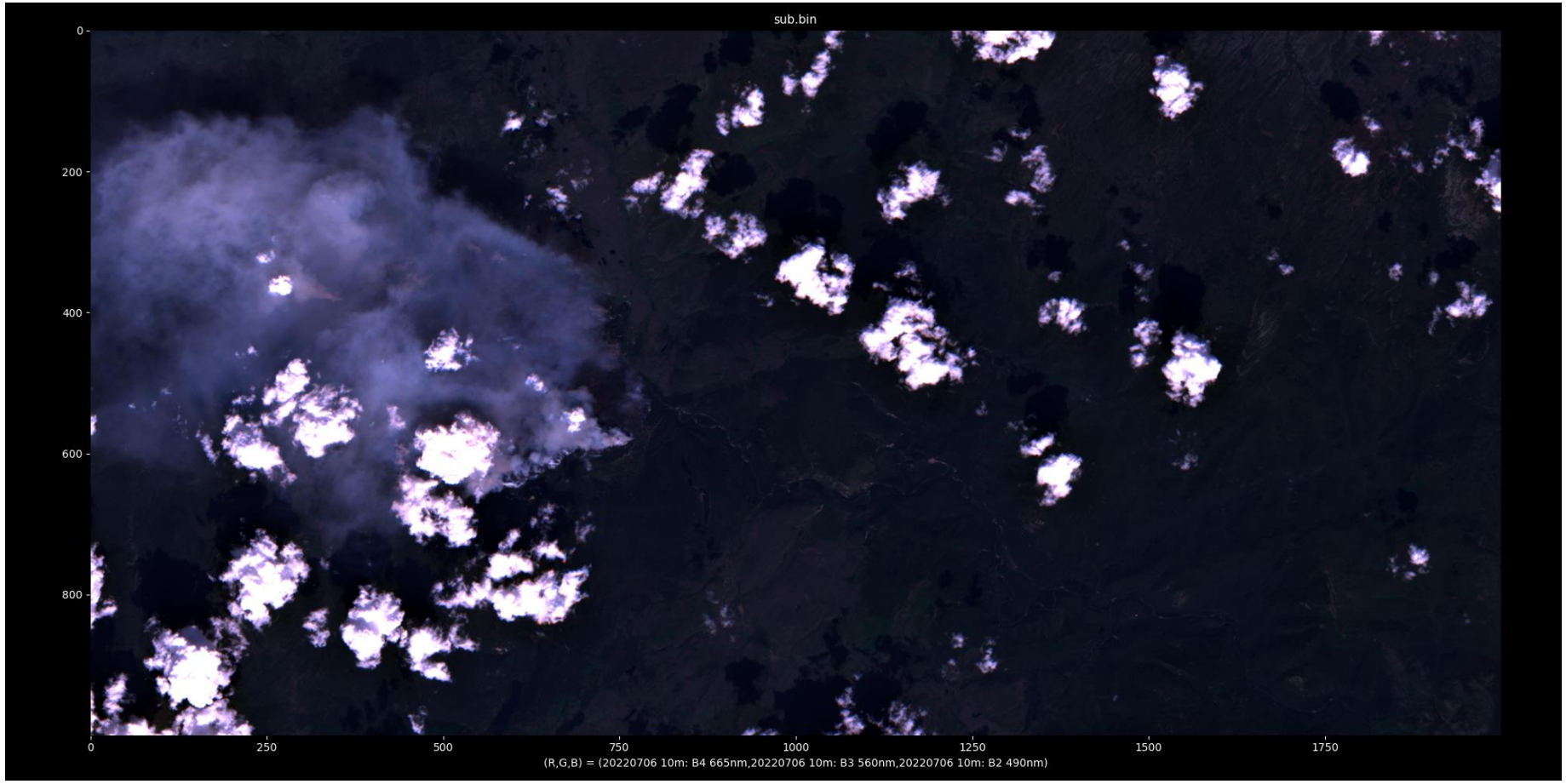
2022WL014 Watson Lake YT





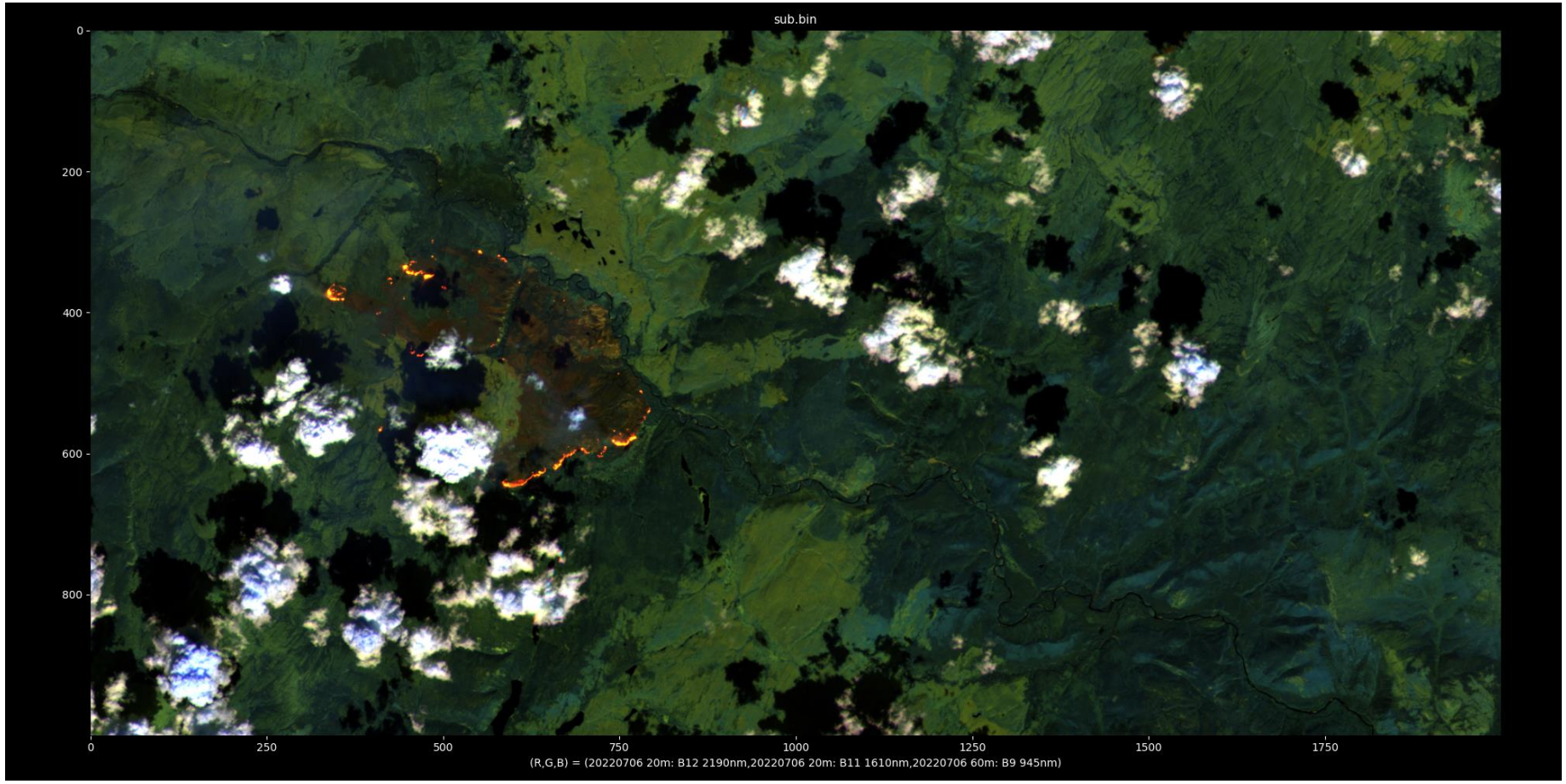
Why we can't use the built-in cloud mask

Sentinel2 Usual RGB



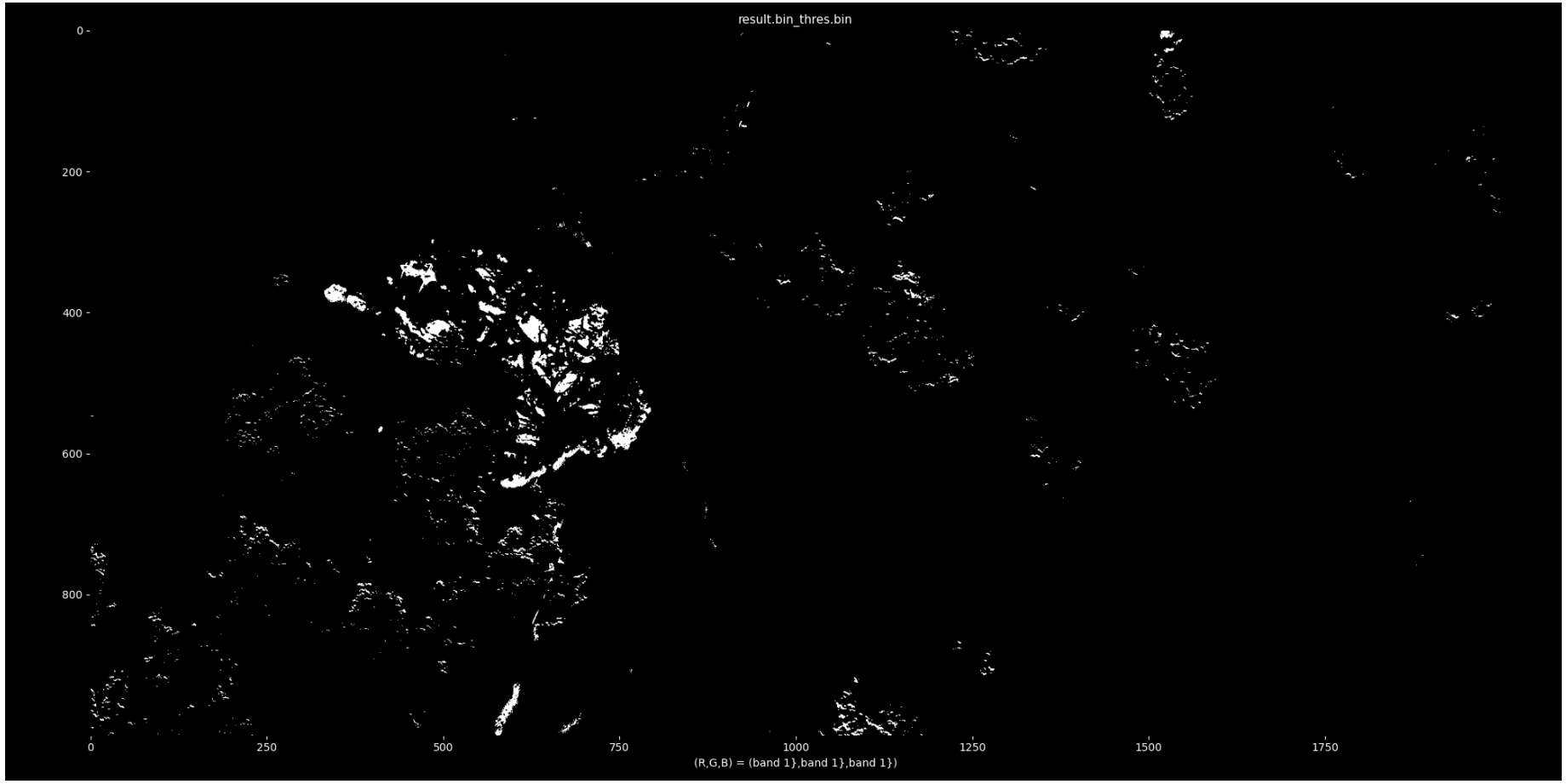
Why we can't use the built-in cloud mask

Sentinel2 rgb=b(12, 11, 9)



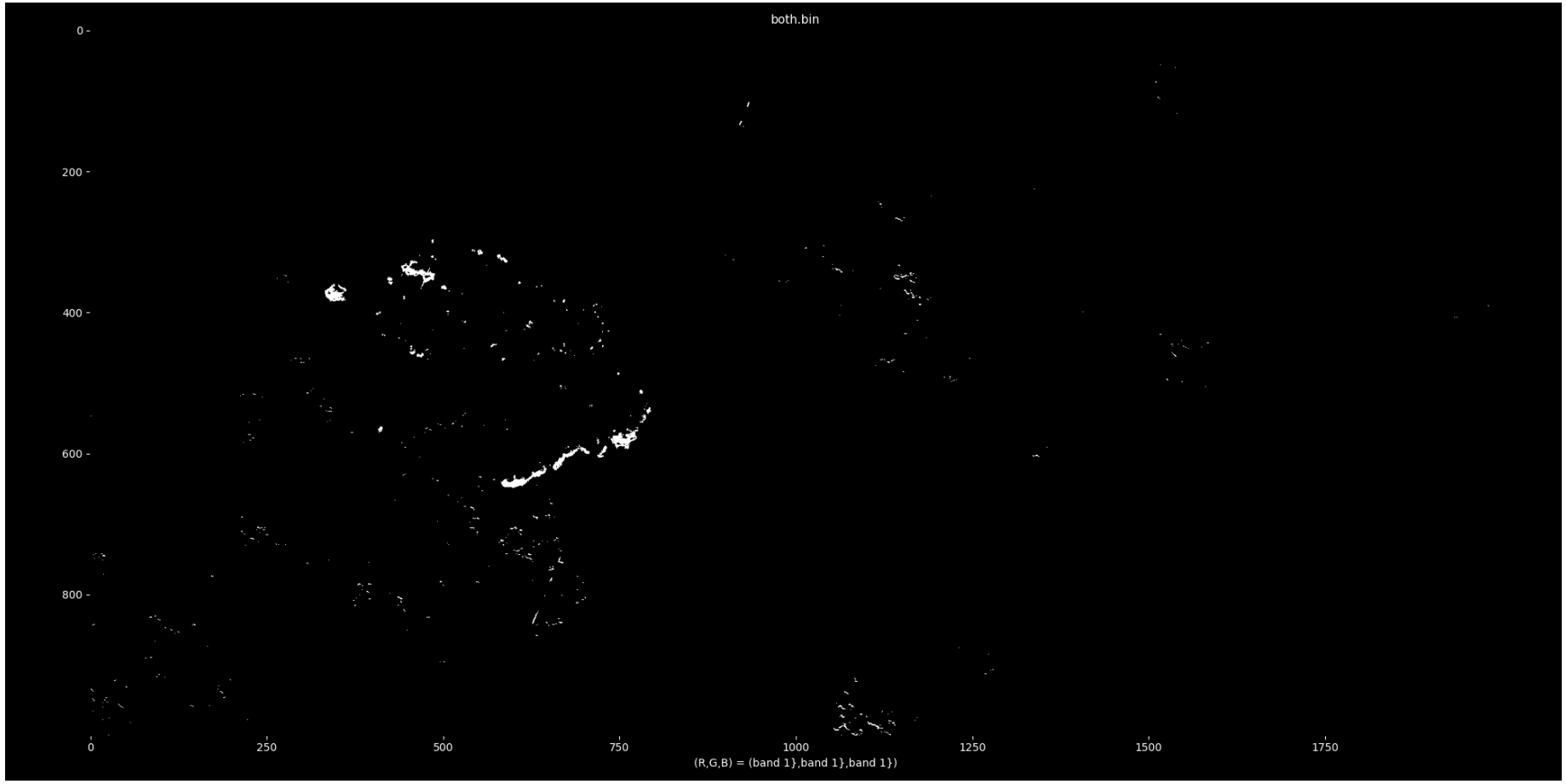
Why we can't use the built-in cloud mask

Sentinel-2 old rule



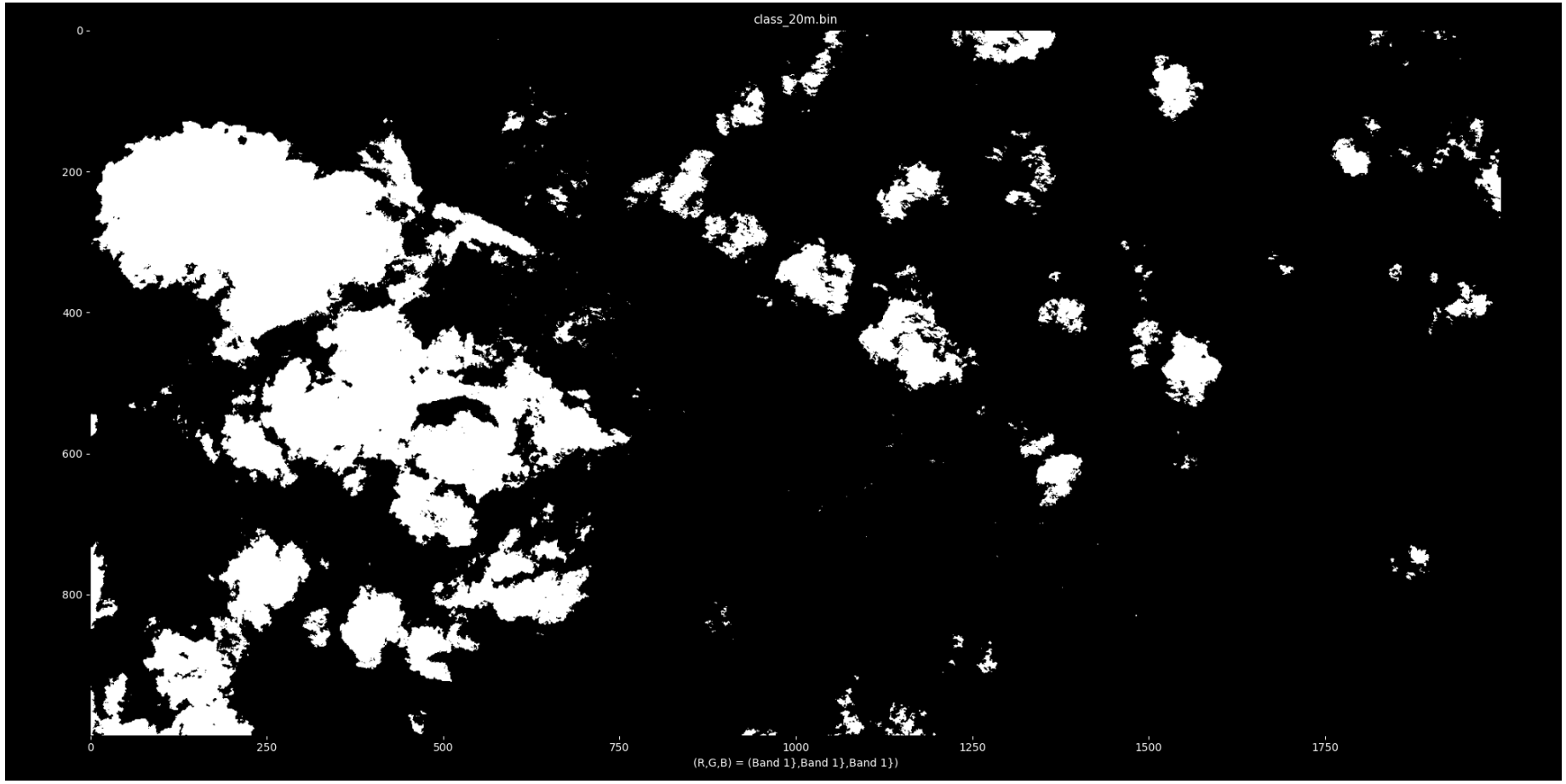
Why we can't use the built-in cloud mask

Sentinel2 new rule (less FP)



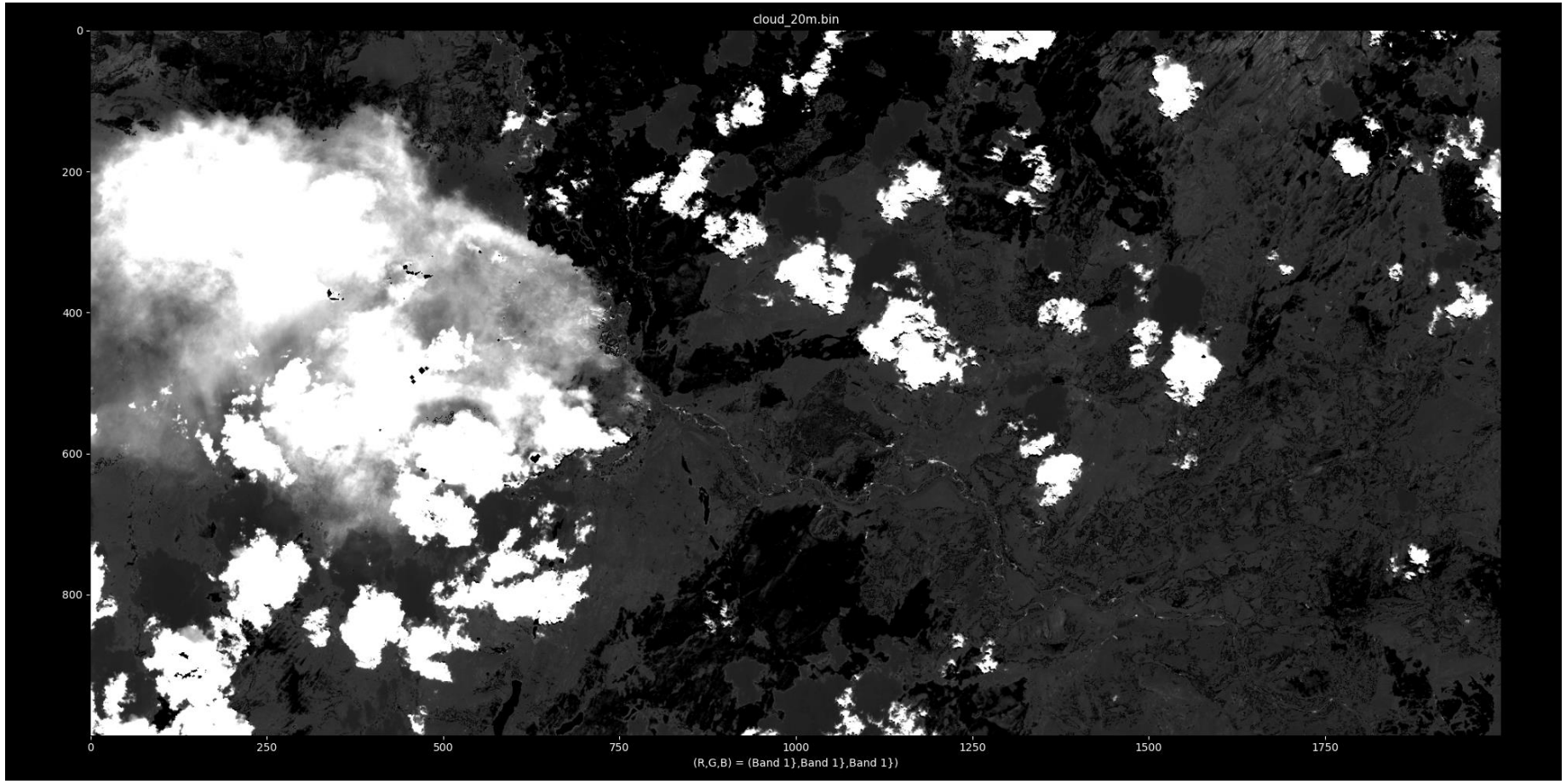
Why we can't use the built-in cloud mask

Sentinel2 sen2cor class map



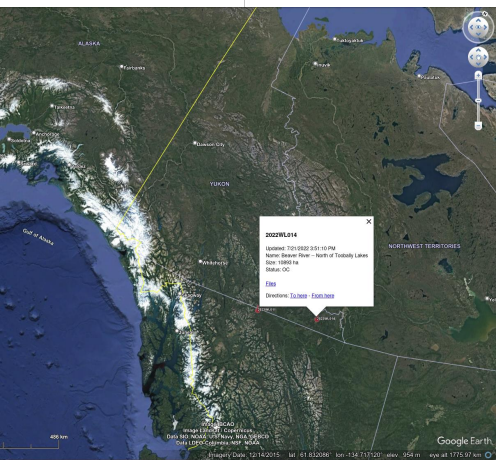
Why we can't use the built-in cloud mask

Sentinel2 sen2cor cloud probability

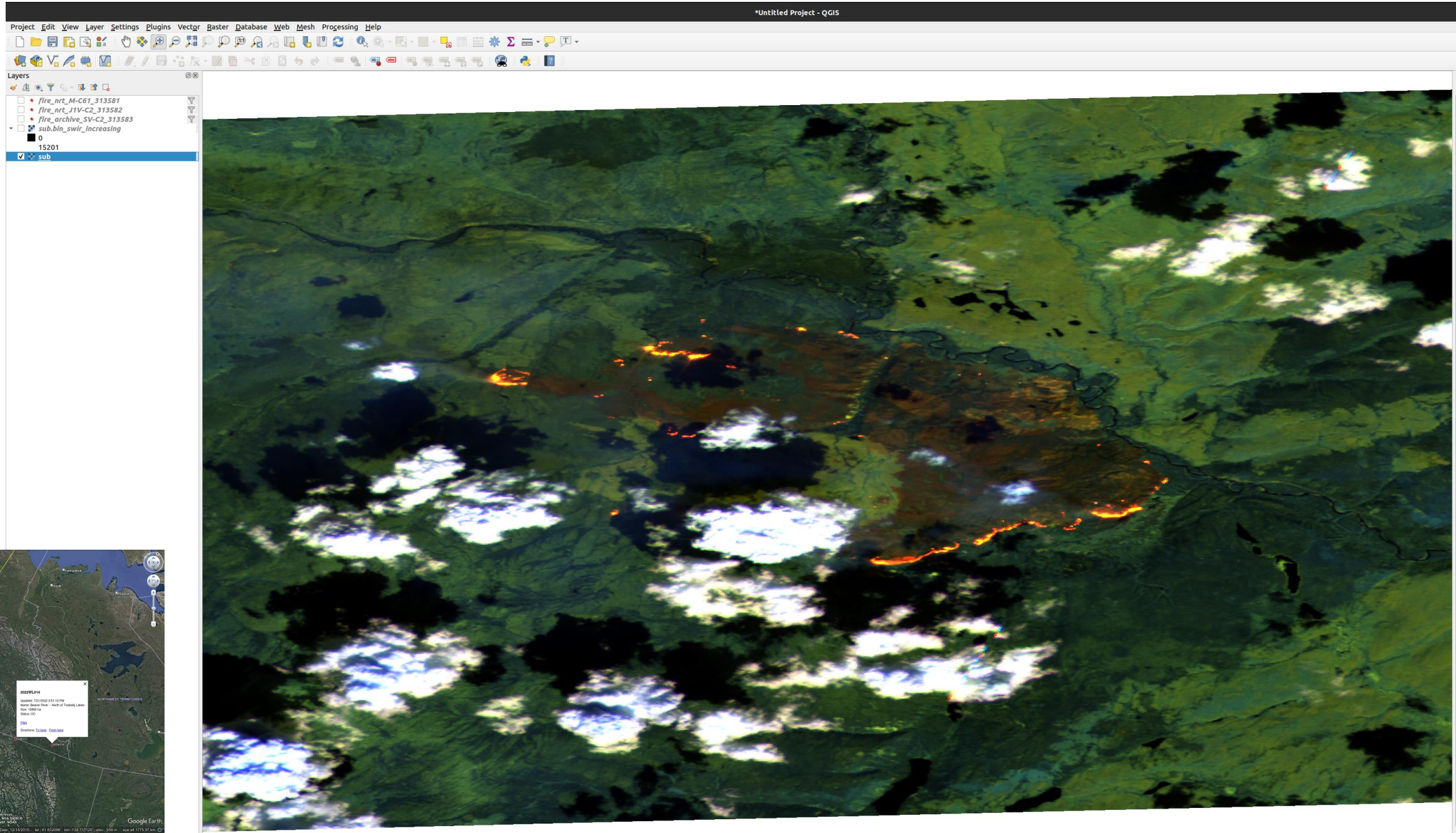


Sen2Cor L1C--> L2A tool cloud mask is not smoke penetrating, cloud/smoke/fire confused?

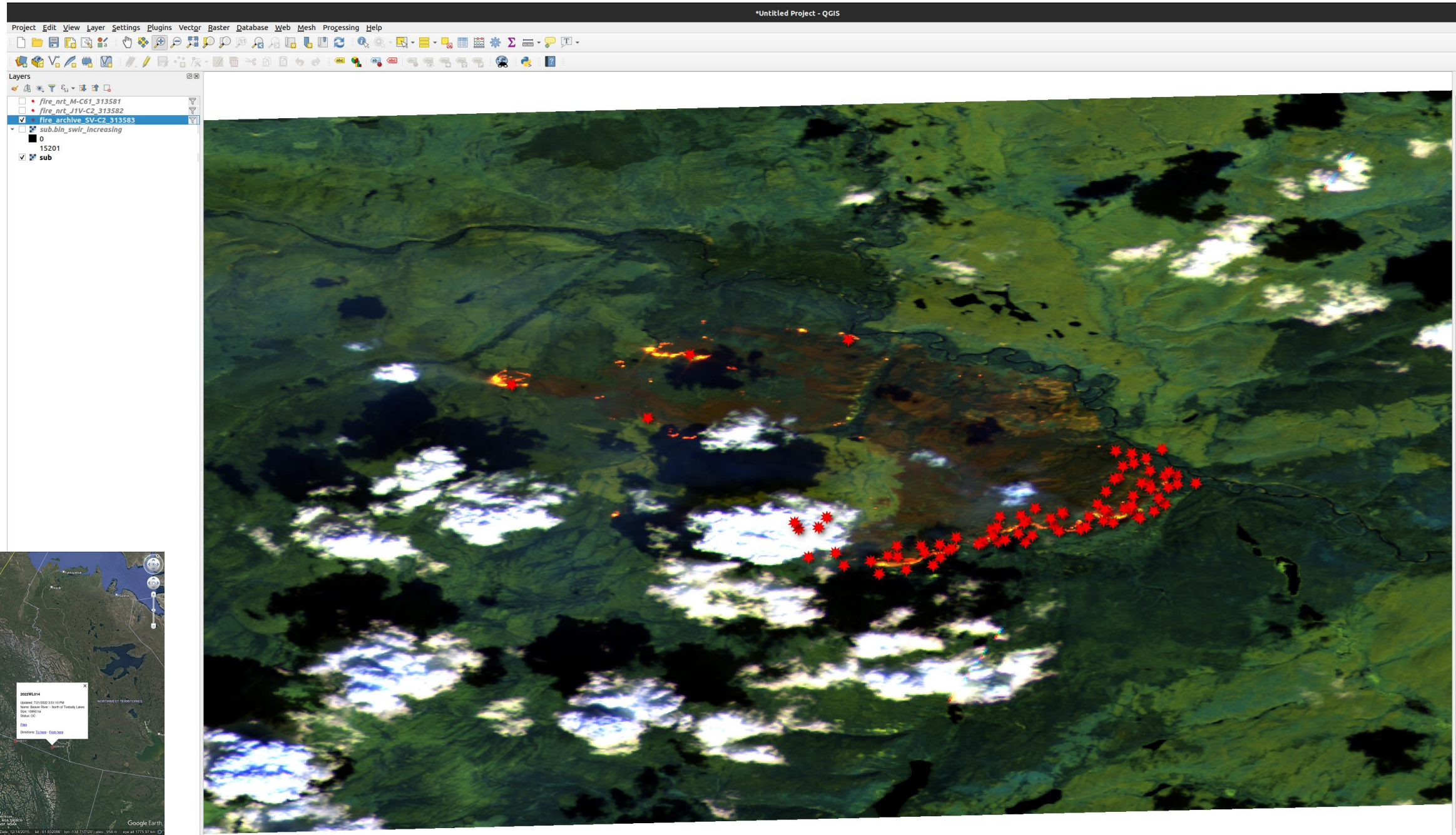
2022WL014 20220706 Sentinel-2 rgb=(b4, b3, b2)



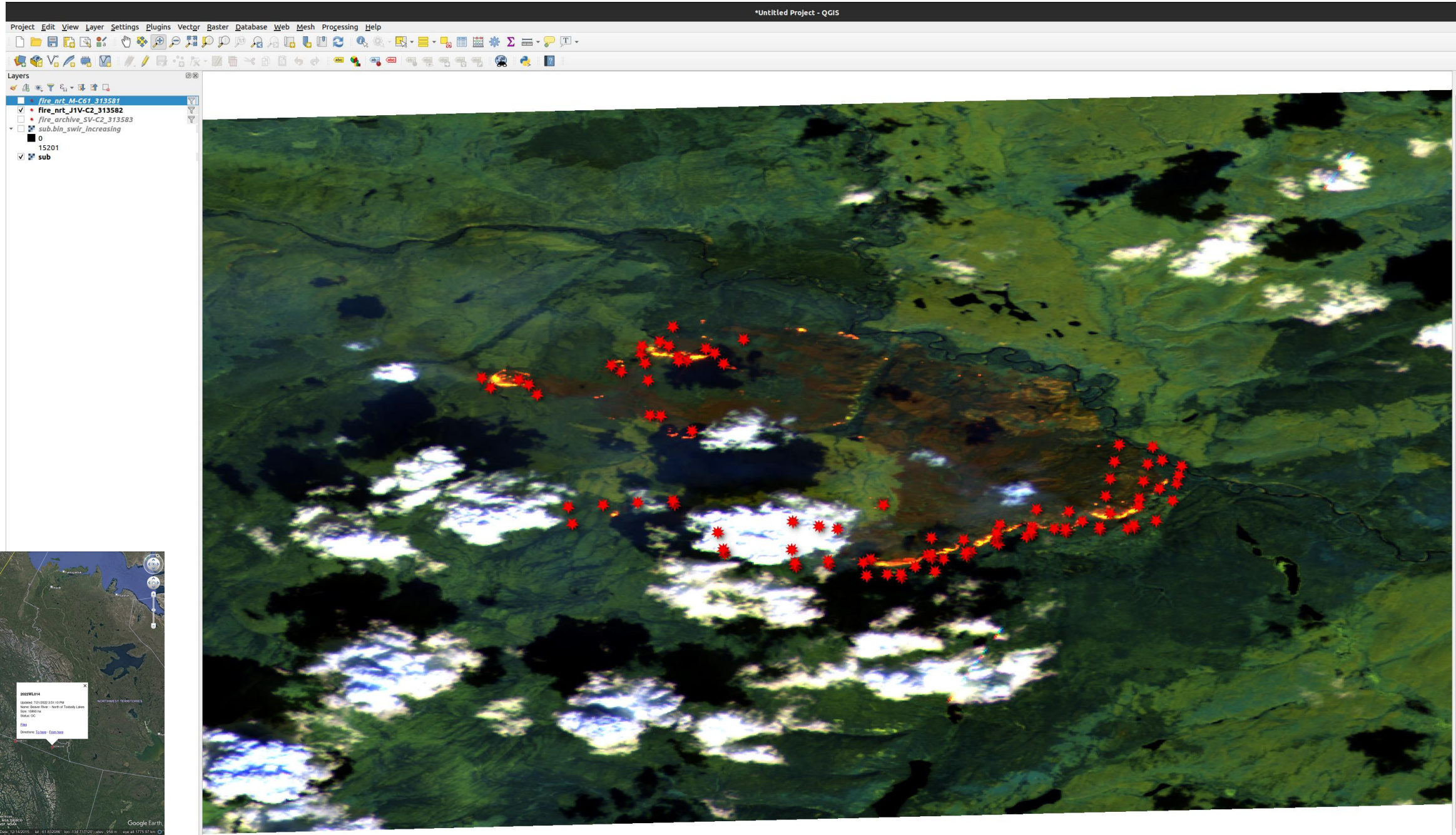
2022WL014 20220706 Sentinel-2 rgb=(b12, b11, b9)



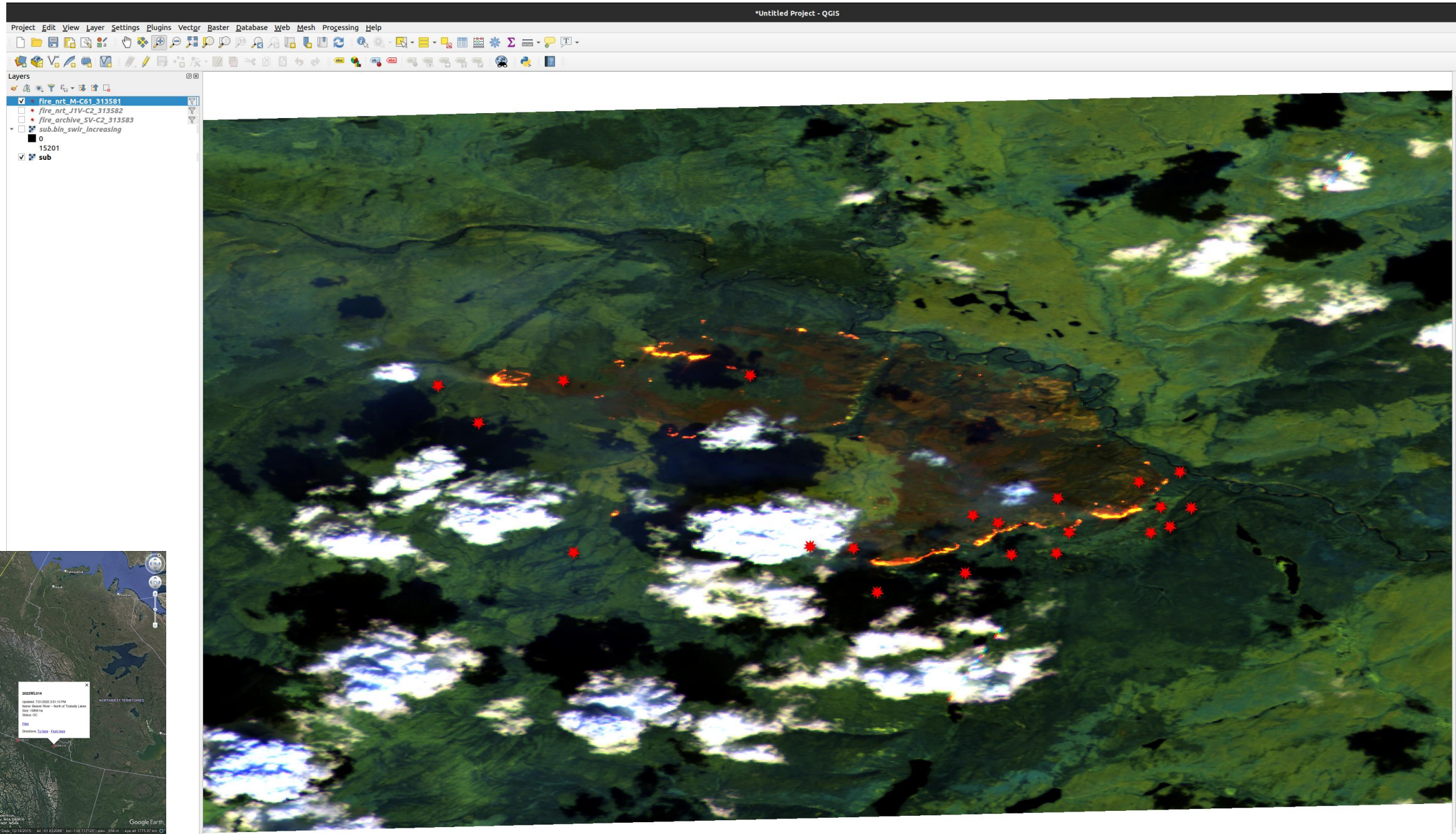
2022WL014 20220706 S2(b12,11,9) vs SUOMI VIIRS C2



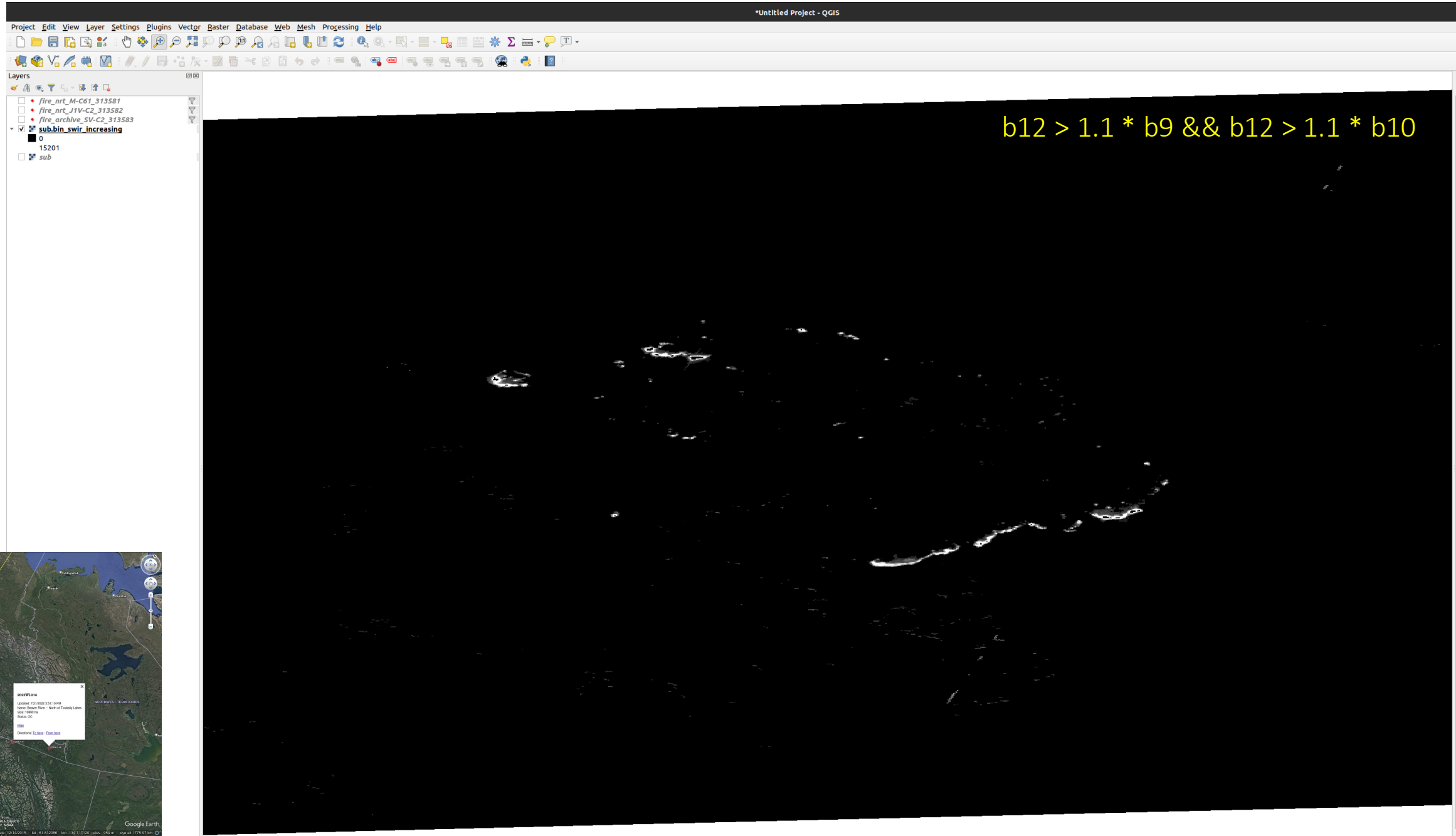
2022WL014 20220706 S2(b12,11,9) vs J1 VIIRS C1



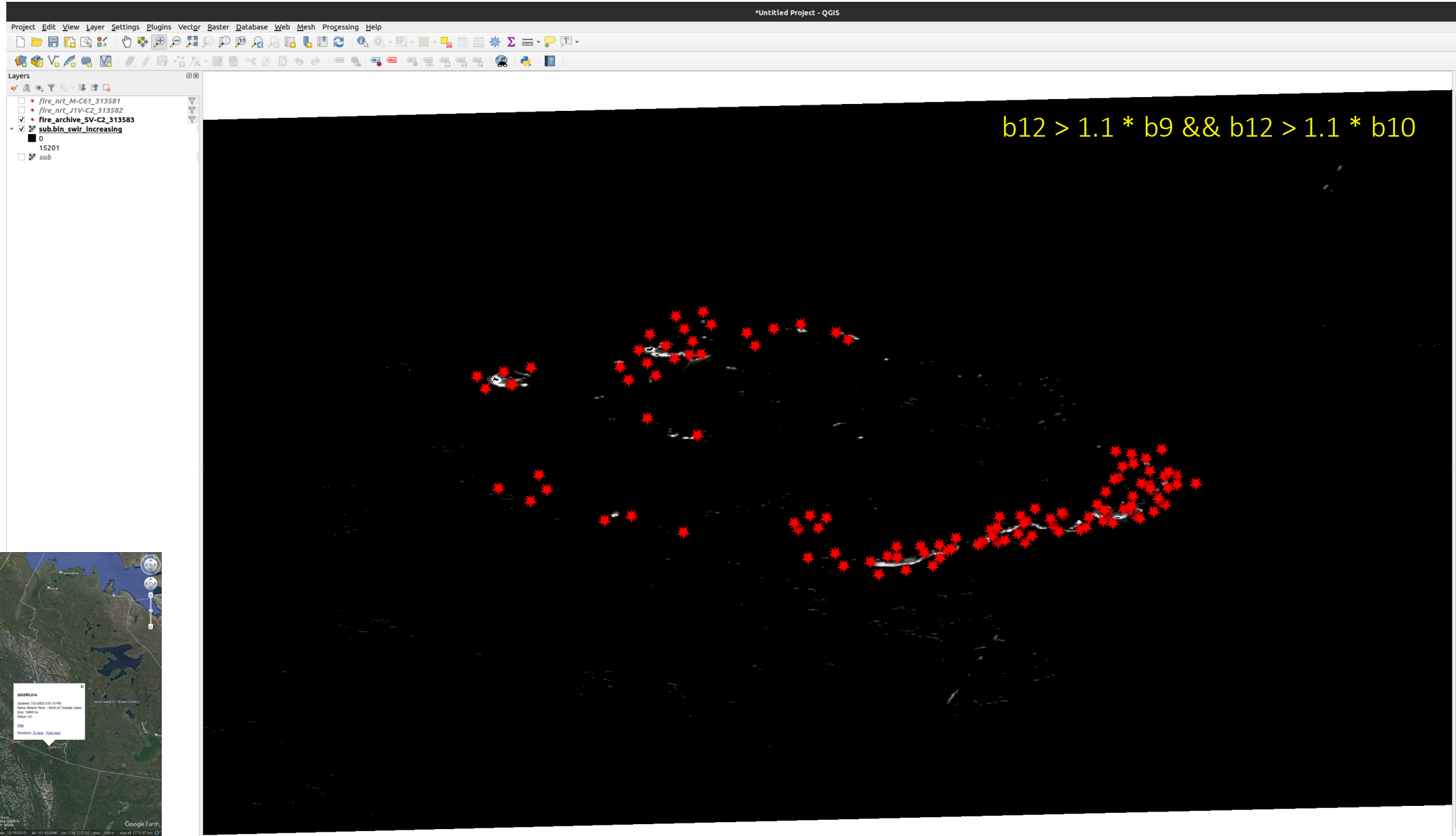
2022WL014 20220706 S2(b12,11,9) vs MODIS C6.1



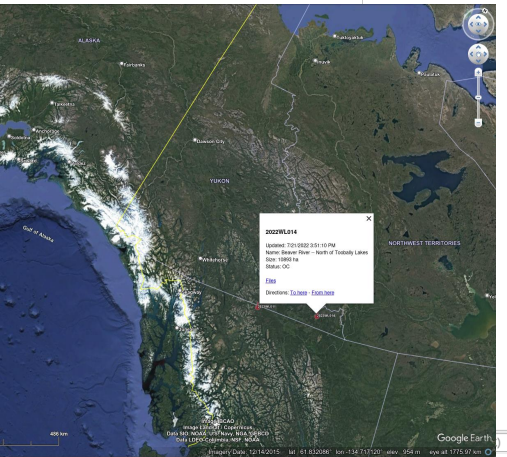
2022WL014 20220706 S2

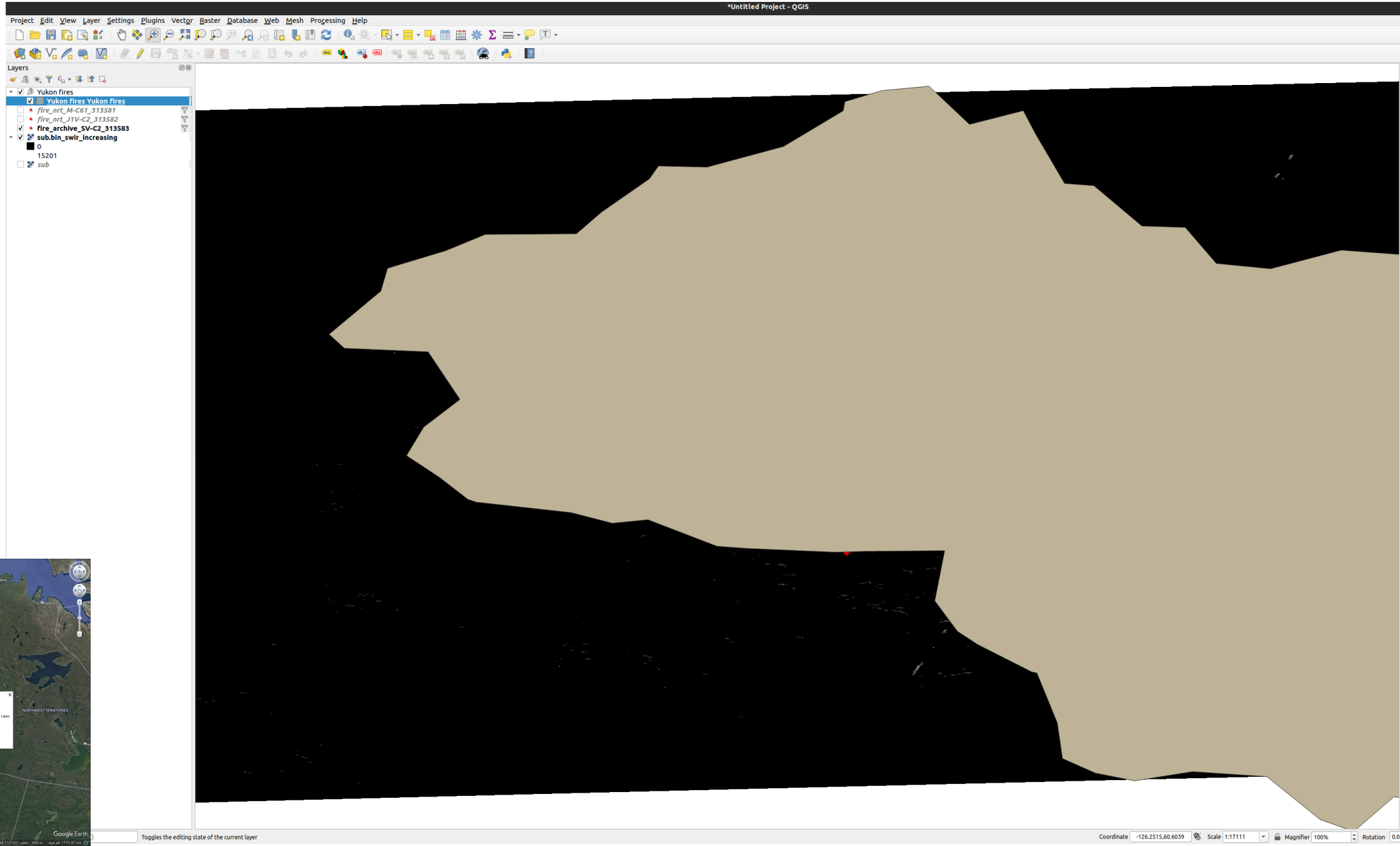


2022WL014 20220706 vs SUOMI VIIRS C2

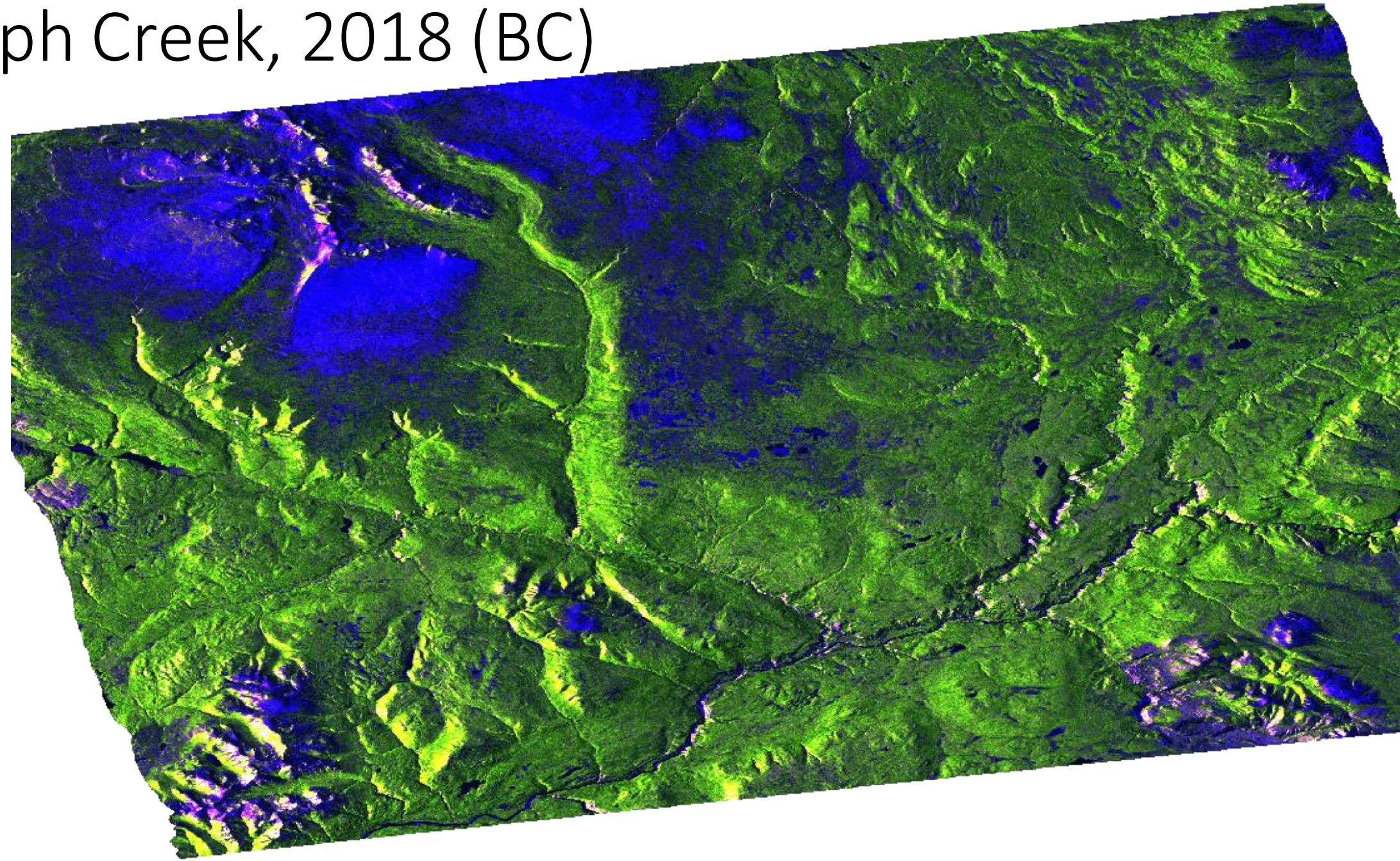


2022WL014 20220706 GIS poly





Telegraph Creek, 2018 (BC)



Elephant Hill, 2017 (BC)