

# 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
  - Херсóн, Україна May 2022
  - Beaver Creek (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!

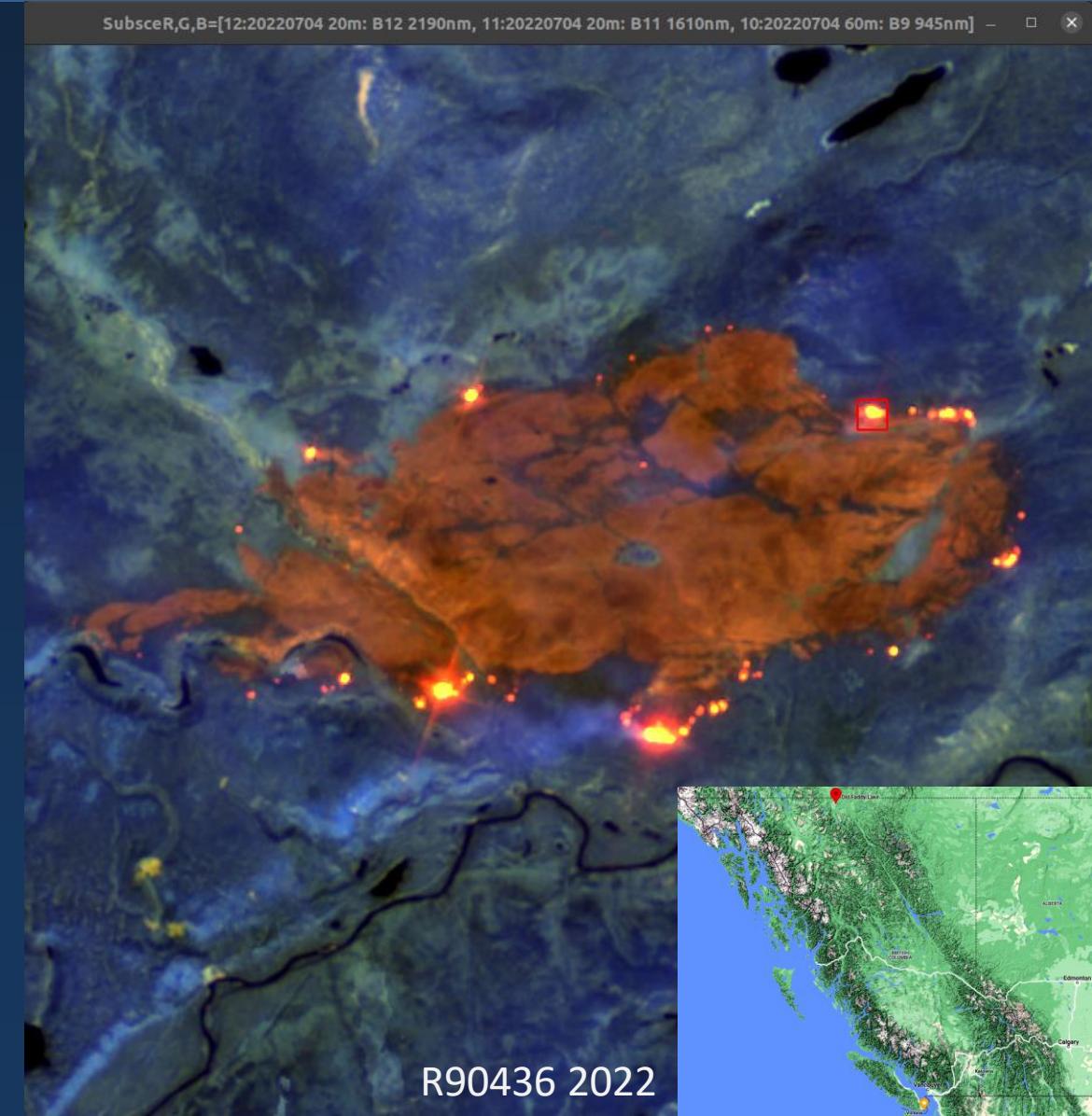
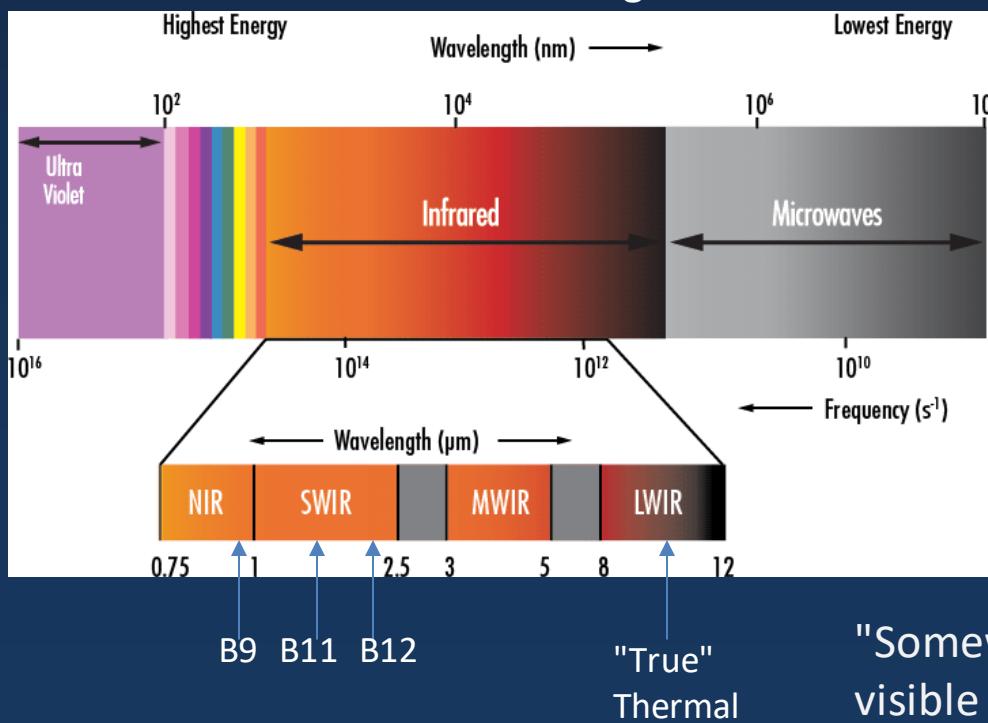
## 1. Band selection: False color coding (right)

- 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

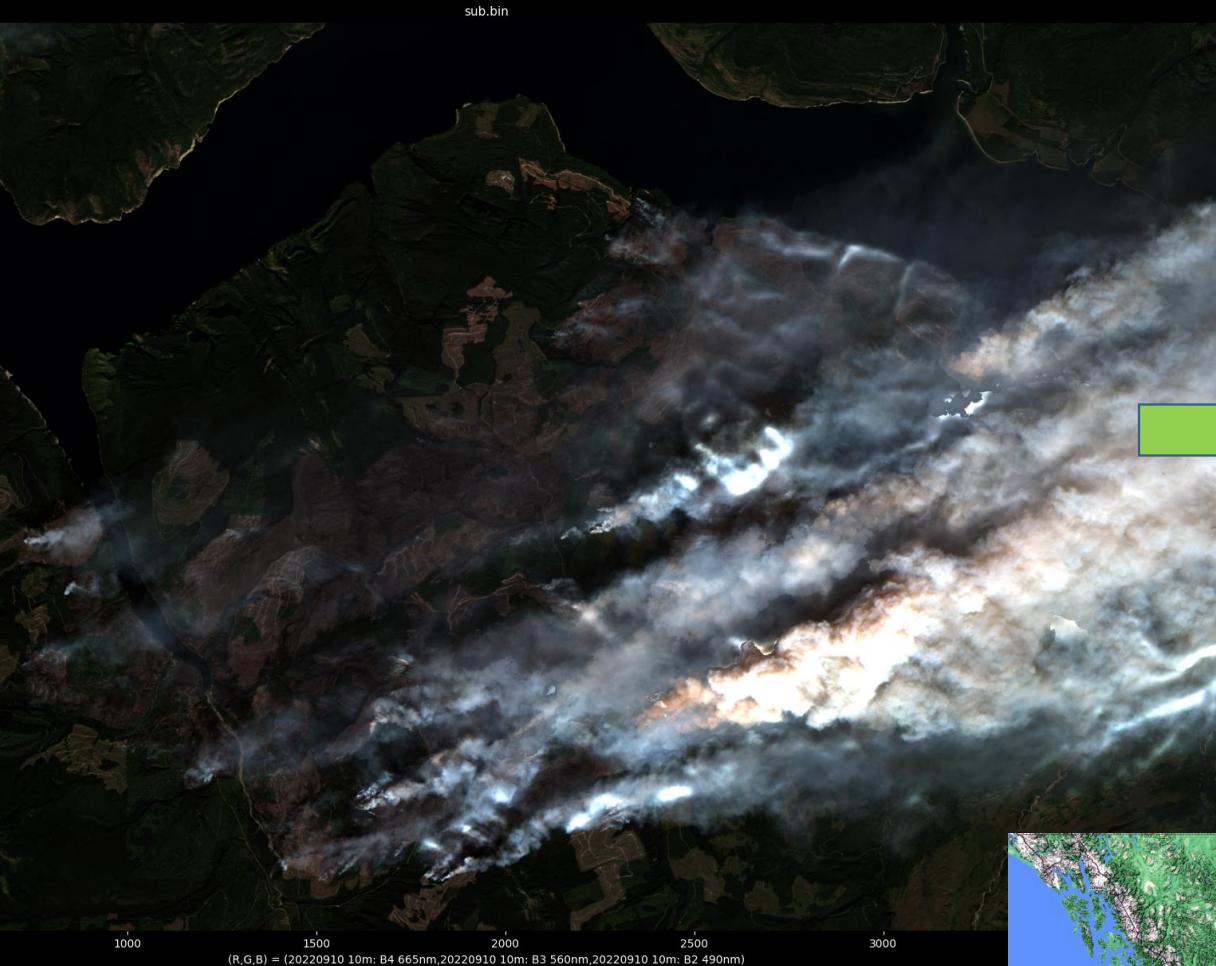


# 1) Sentinel2 data: Why use only longest-waves?

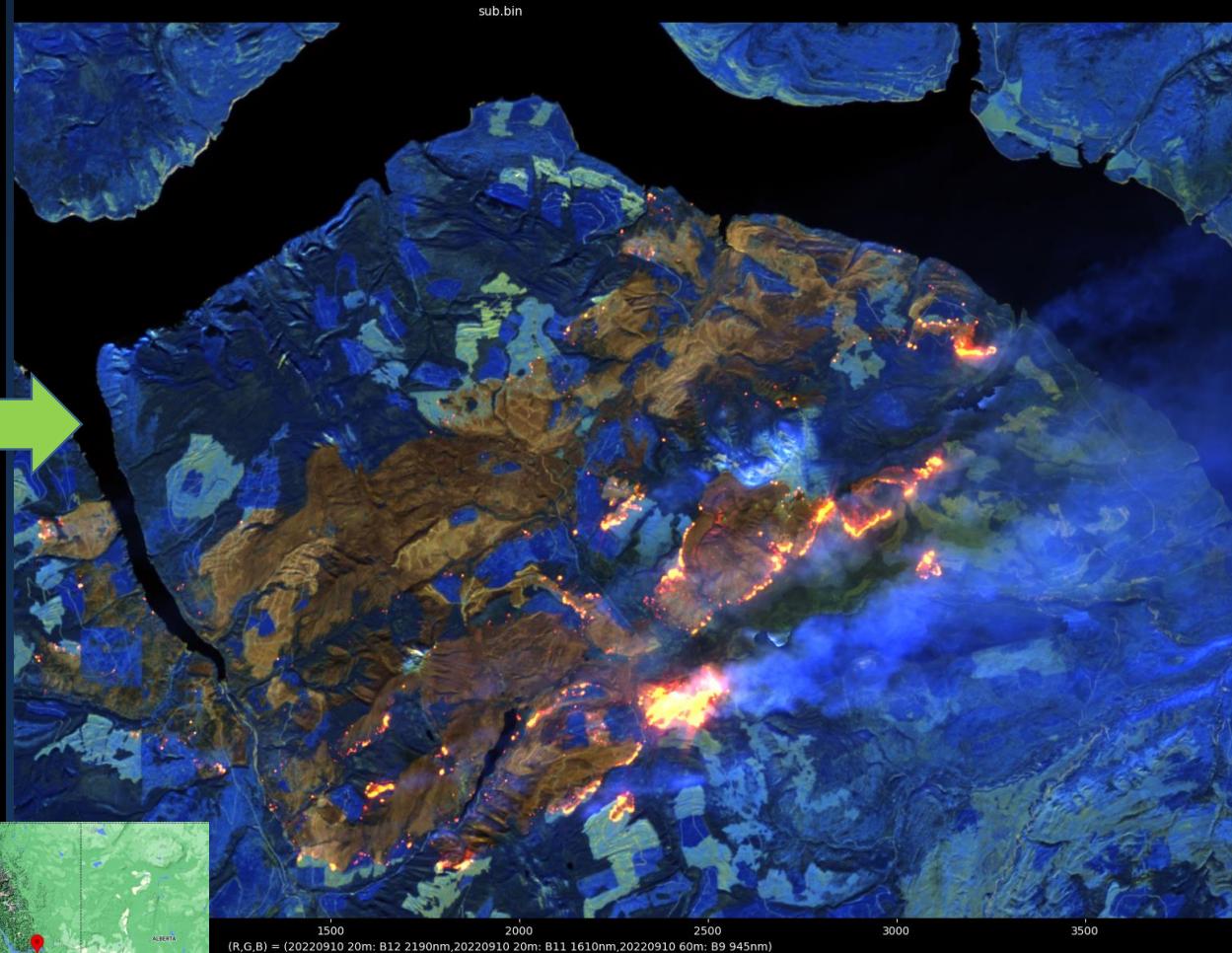


BC Wildfire  
Service

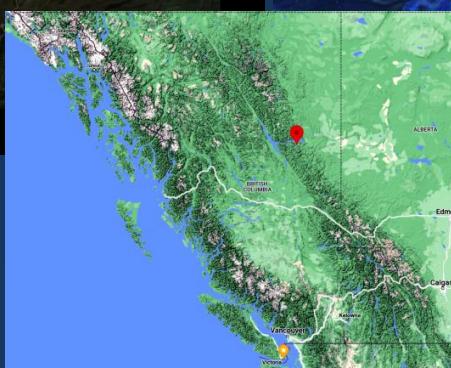
RGB = RGB (visible) Battleship mountain (G72150) 20220910



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



Battleship mountain (G72150) 20220910

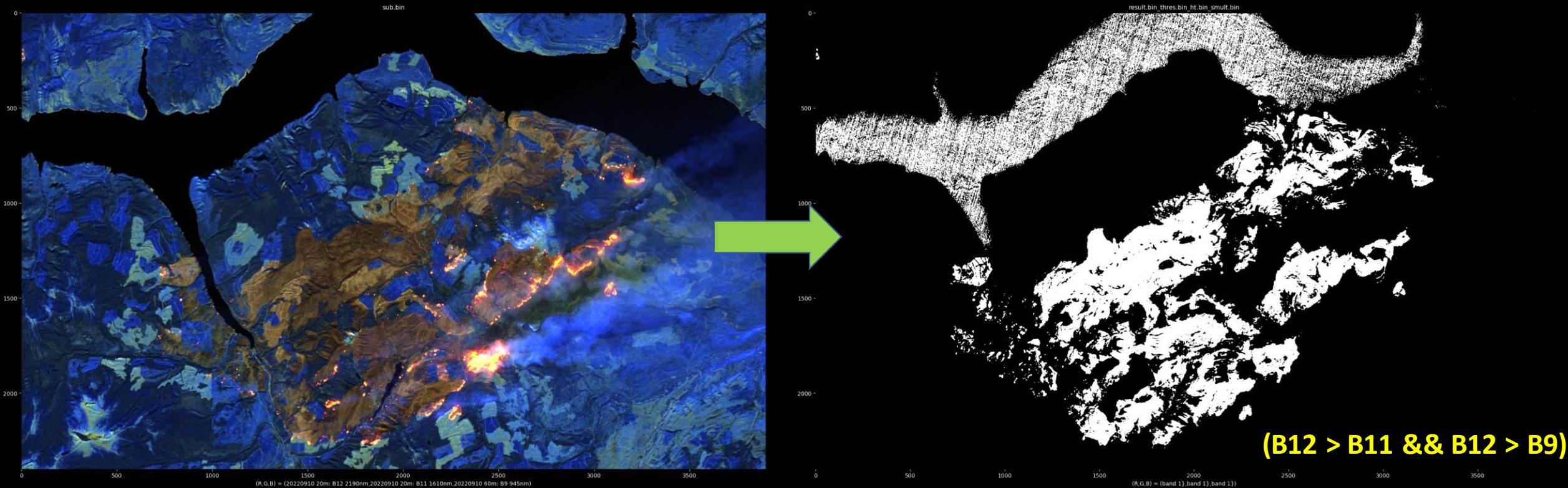


## 2) Threshold

[https://github.com/bcgov/bcws-psu-research/blob/master/cpp/sentinel2\\_active.cpp](https://github.com/bcgov/bcws-psu-research/blob/master/cpp/sentinel2_active.cpp)  
[https://github.com/bcgov/wps-research/blob/master/cpp/raster\\_dominant.cpp](https://github.com/bcgov/wps-research/blob/master/cpp/raster_dominant.cpp)



BC Wildfire  
Service

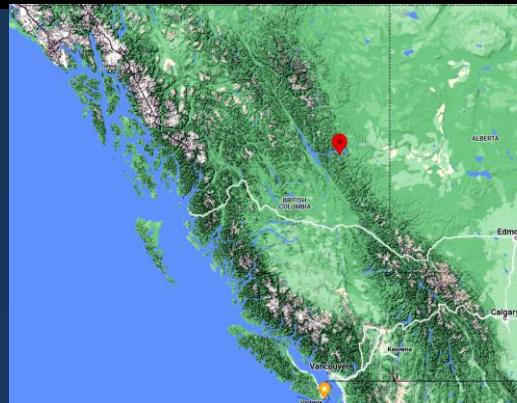
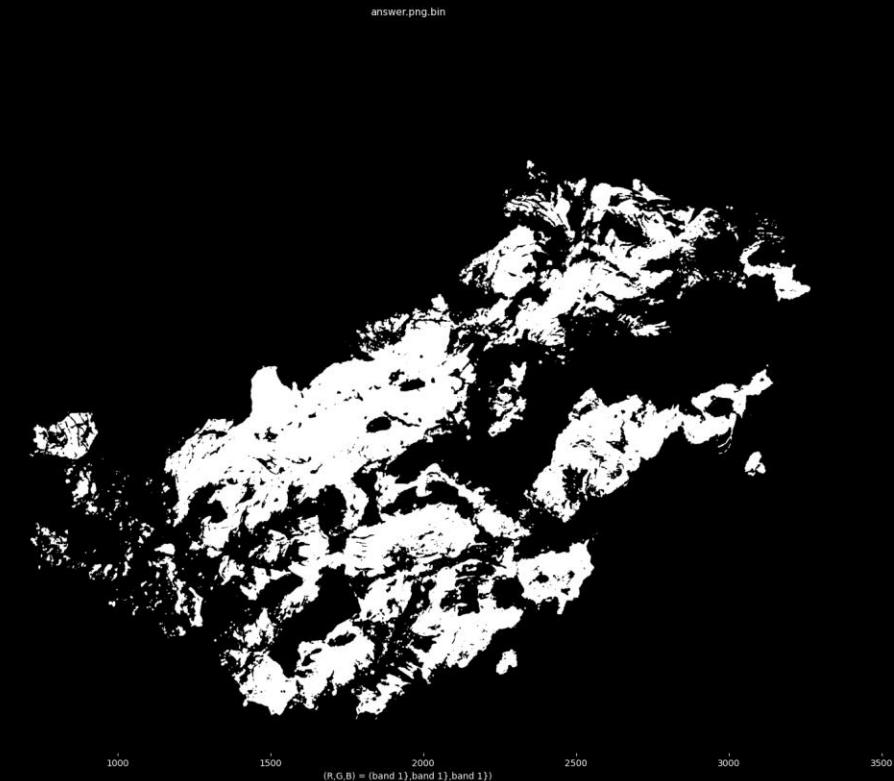
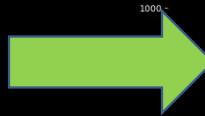
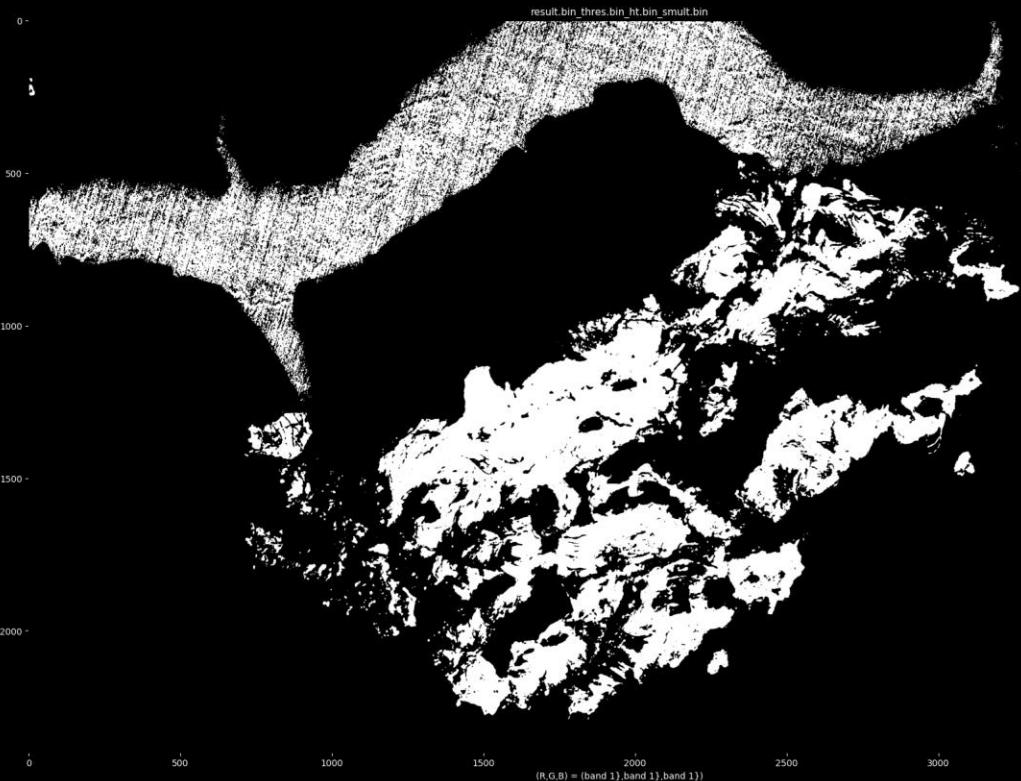


(B12 > B11 && B12 > B9)

Battleship mountain (G72150) 20220910

- 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

### 3) Scrub

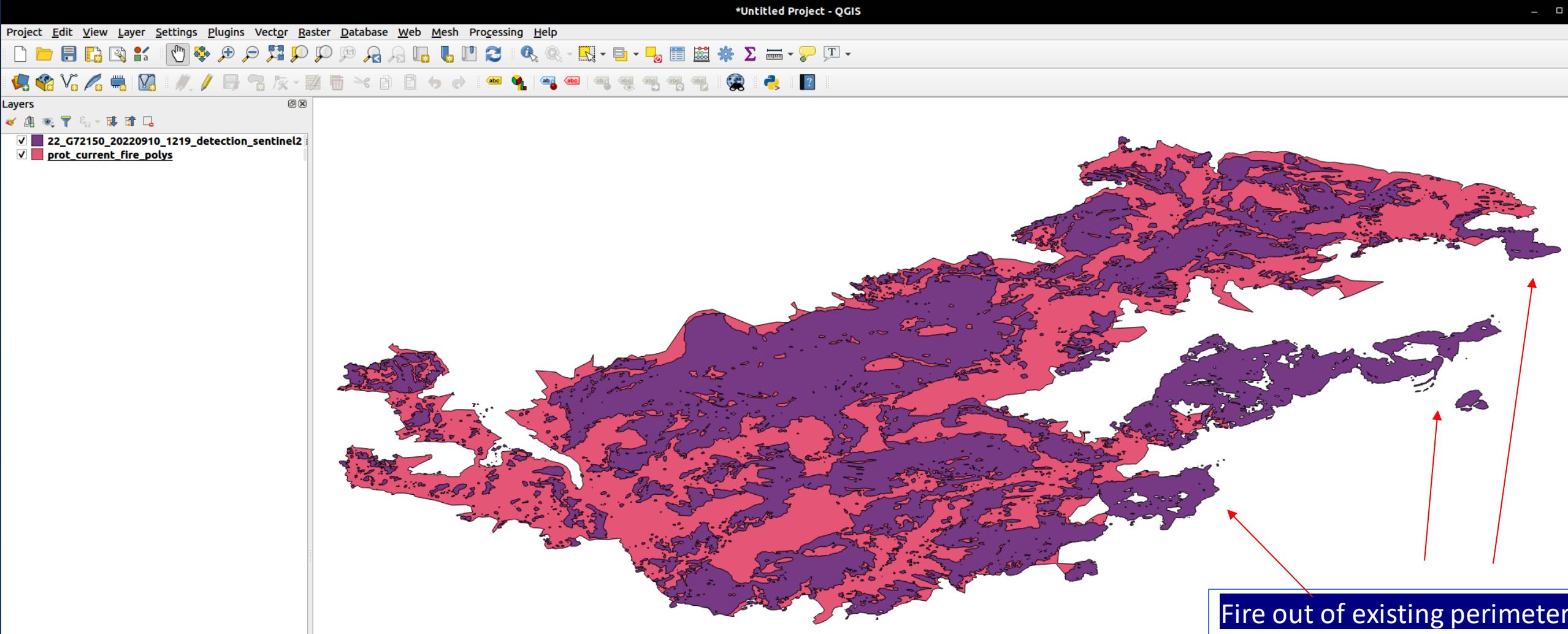


- Remove water areas etc.
- GIMP used for manual scrubbing
- Weather, illumination or other image quality issues could necessitate more scrubbing
  - Or more AI

# 4. Polygon: compare w existing data!



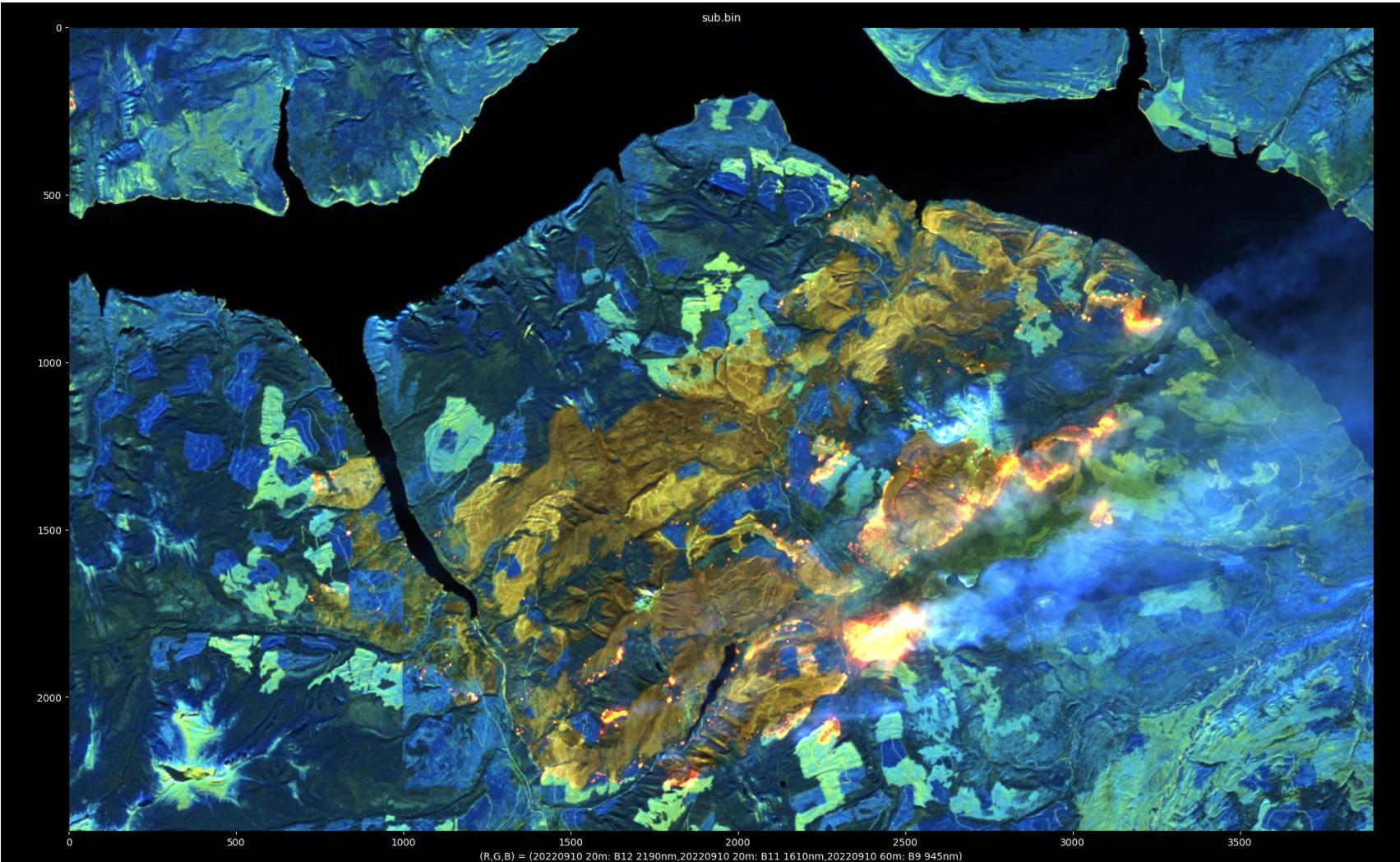
BC Wildfire  
Service



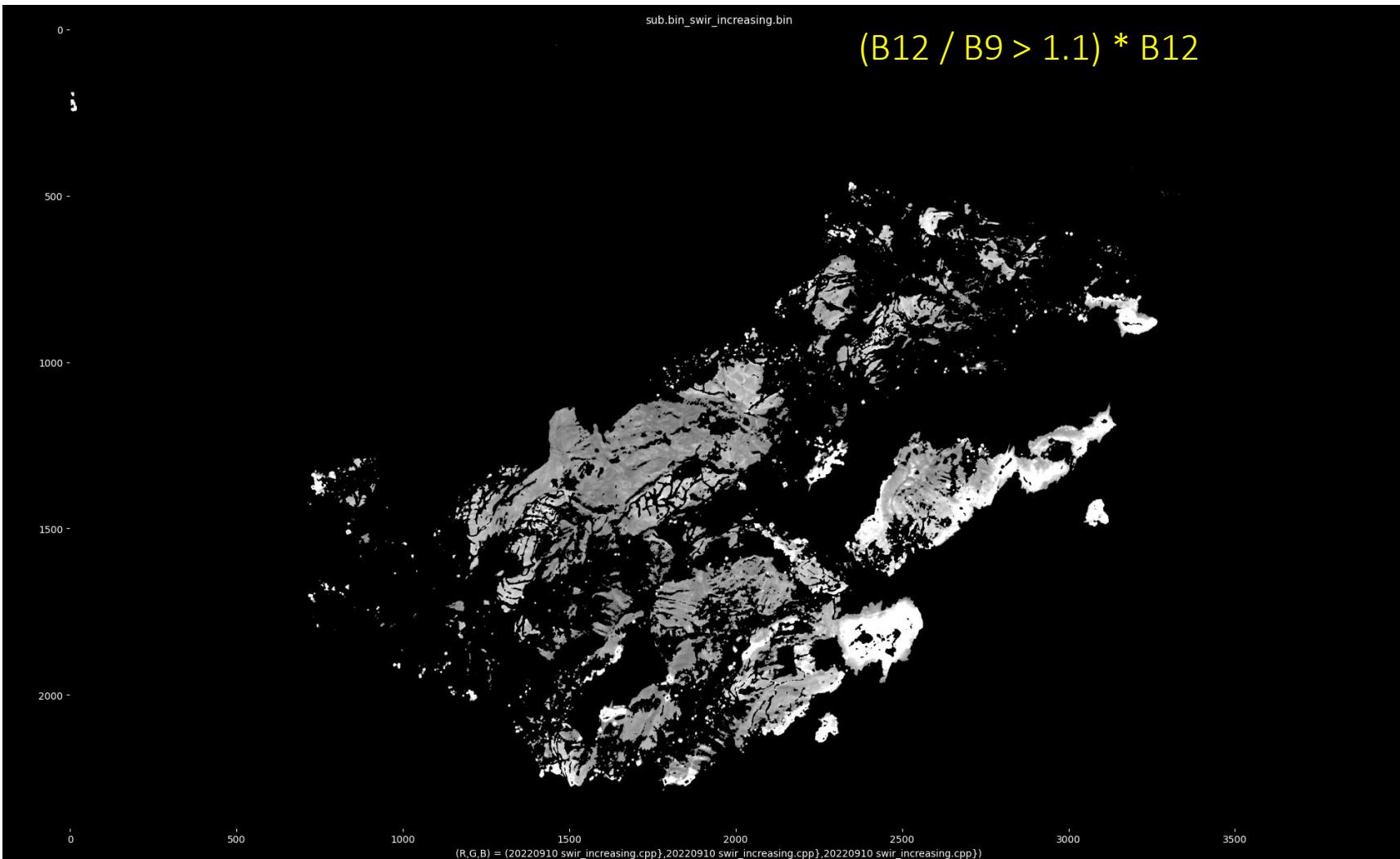
Battleship mountain (G72150) 20220910 Poly  
data 2022091021 (9-10pm)

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)

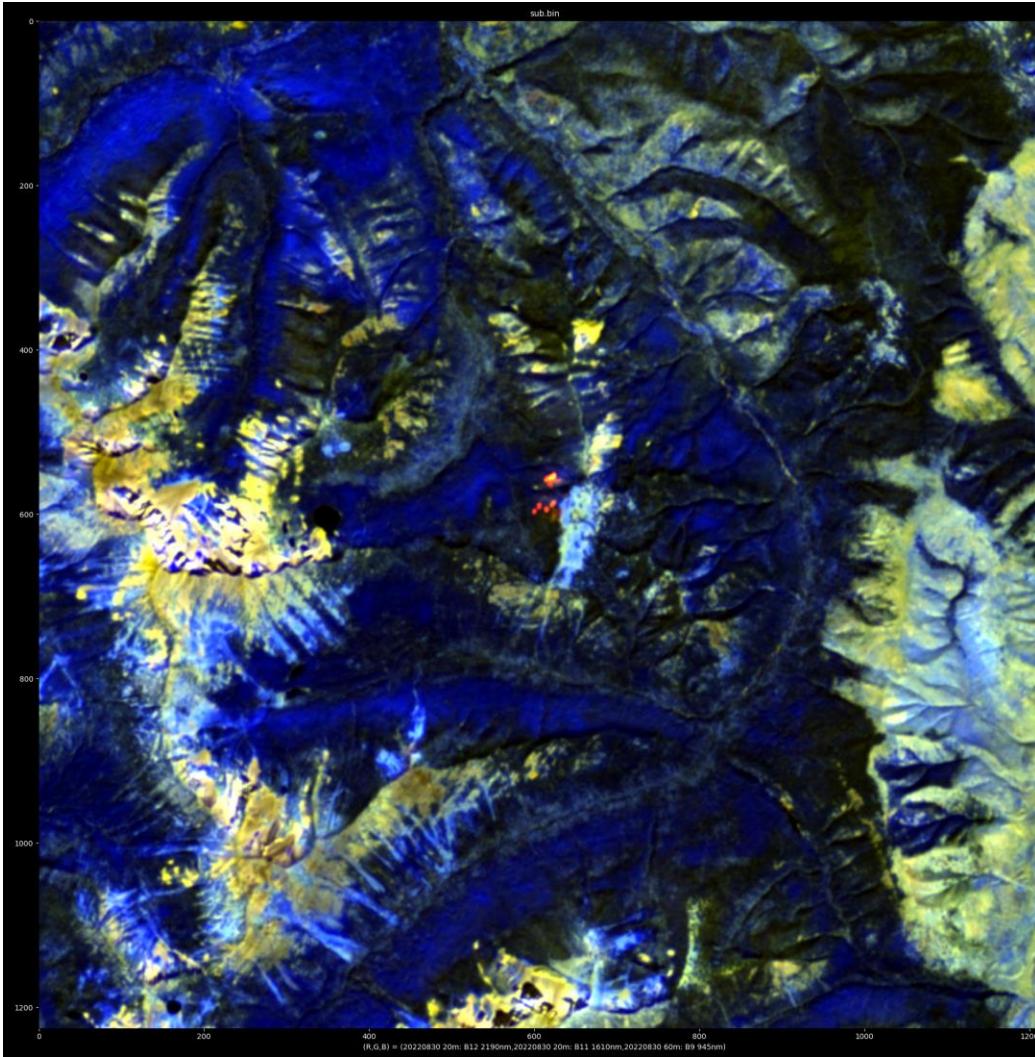
New rule: S2  $\text{rgb}=\text{b}(12, 11, 9)$



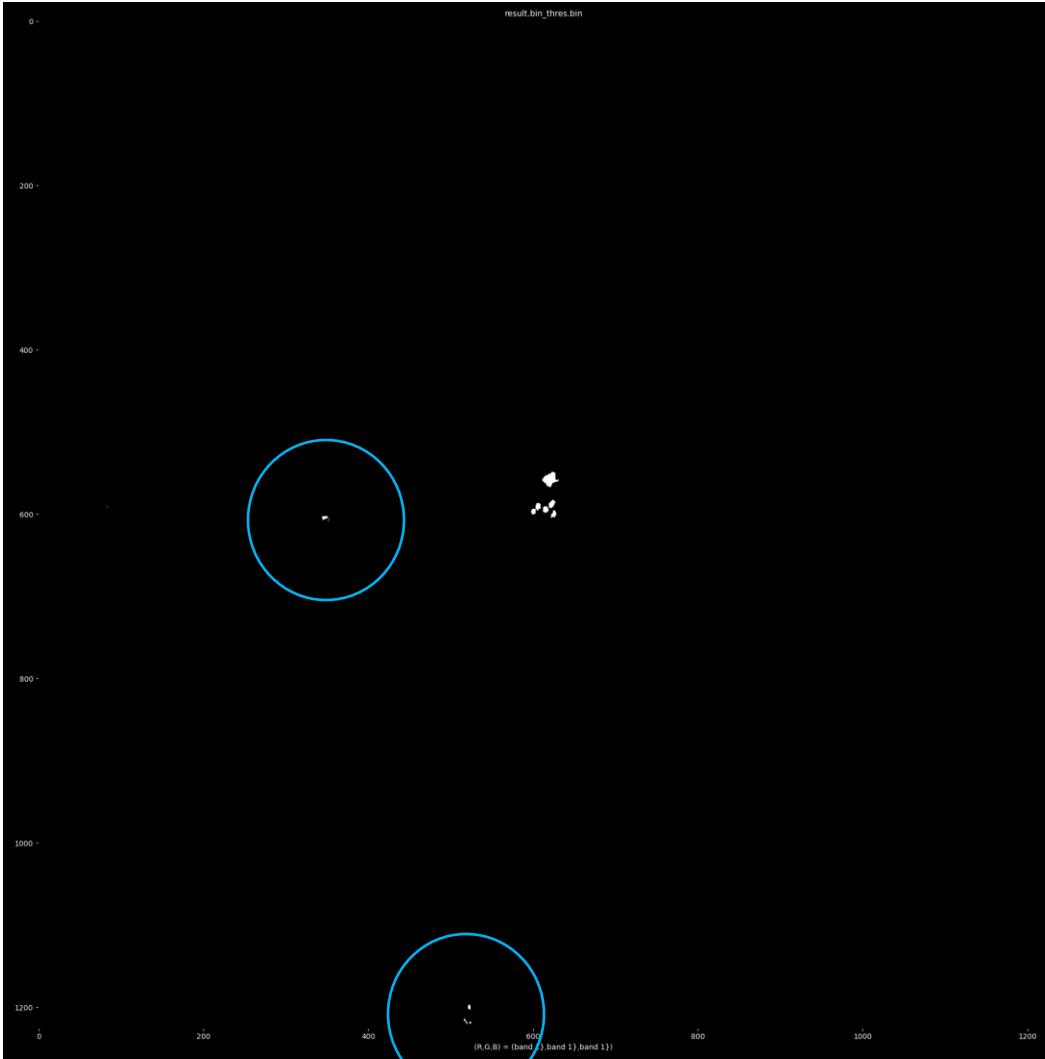
New rule: S2 rgb=b(12, 11, 9)



20220830 V11746

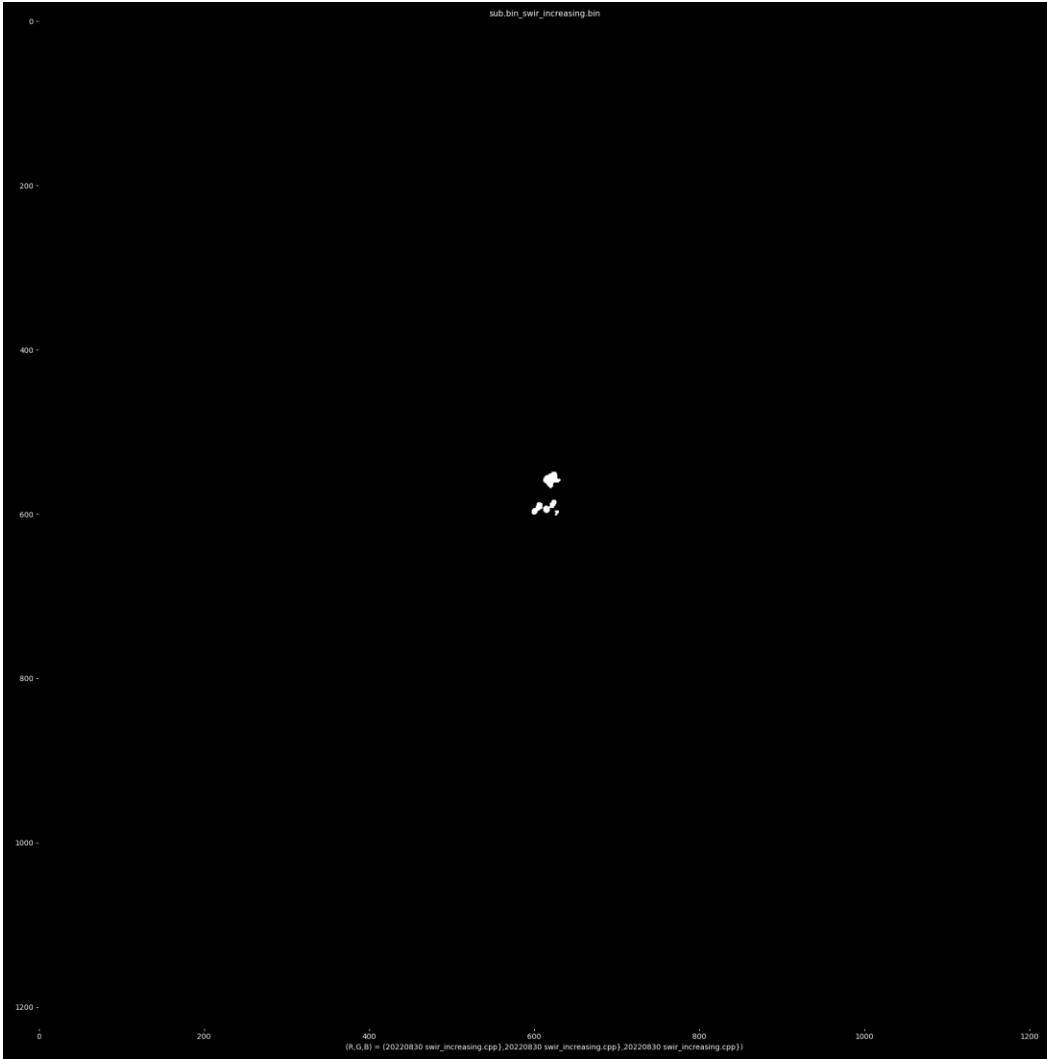


# 20220830 V11746 old rule



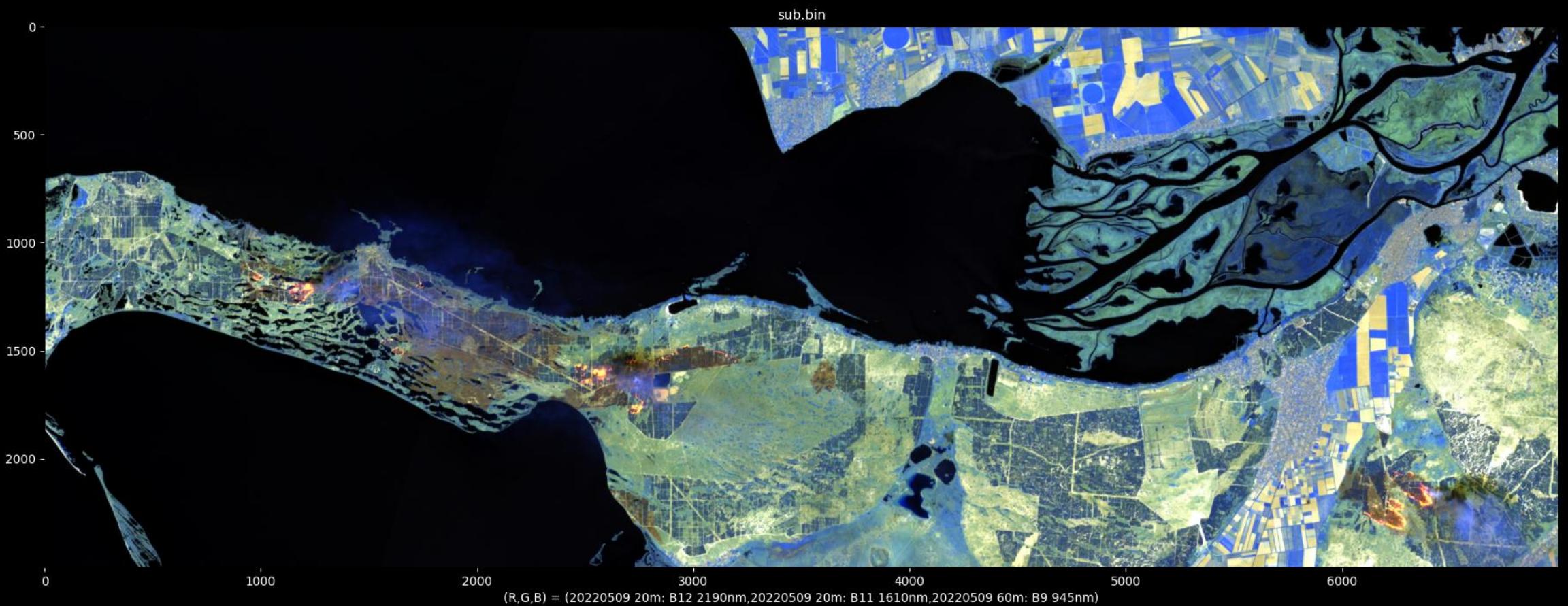
b12>b11  
&&  
b12>b9

# 20220830 V11746 new rule



$b_{12} > 1.1 * b_9$   
 $\&\&$   
 $b_{12} > 1.1 * b_{10}$

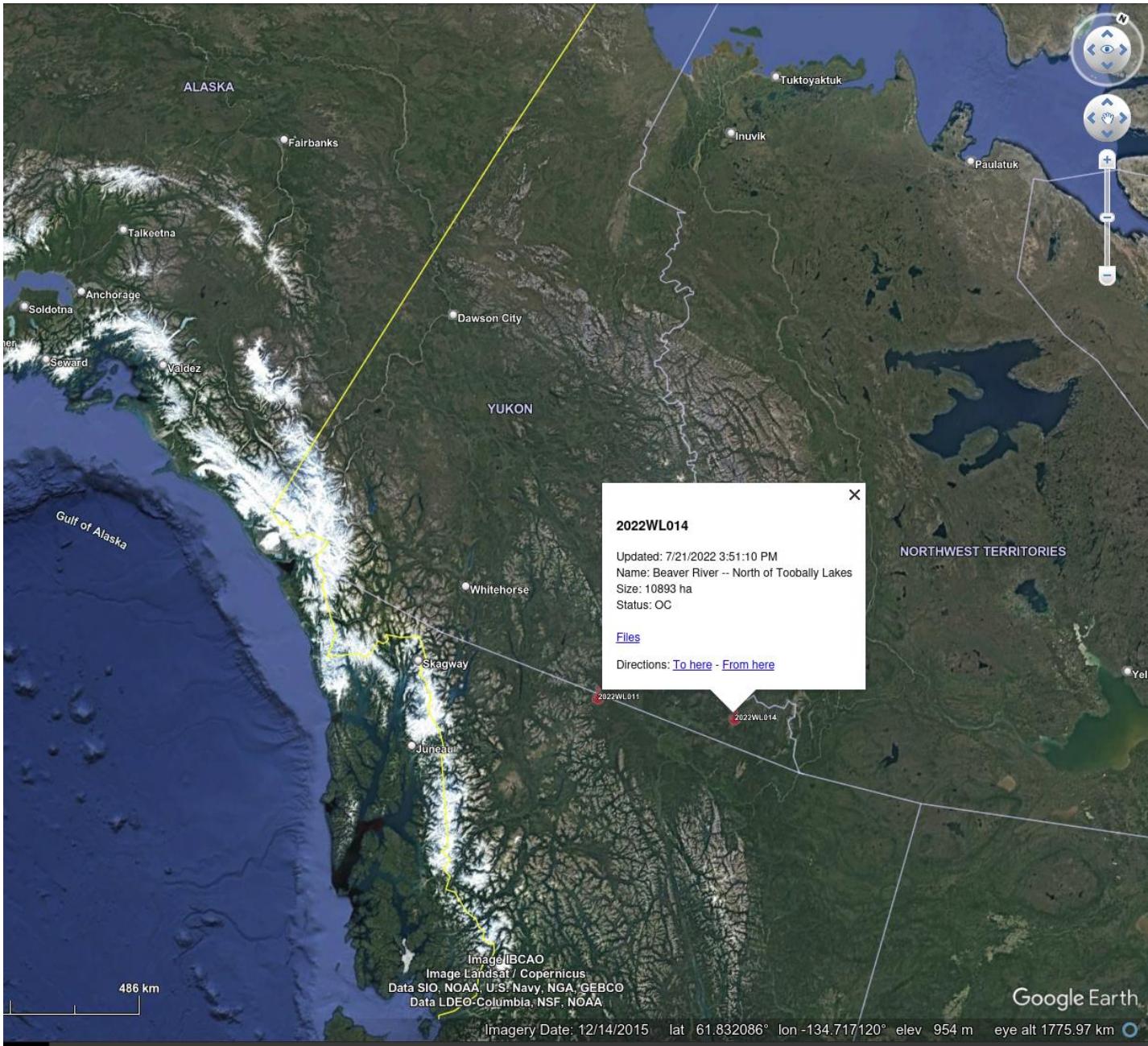
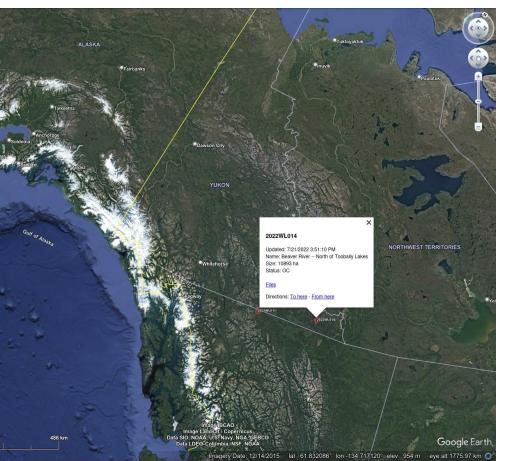
# Херсóн Україна 20220507



# Херсóн Україна 20220507 (new rule)

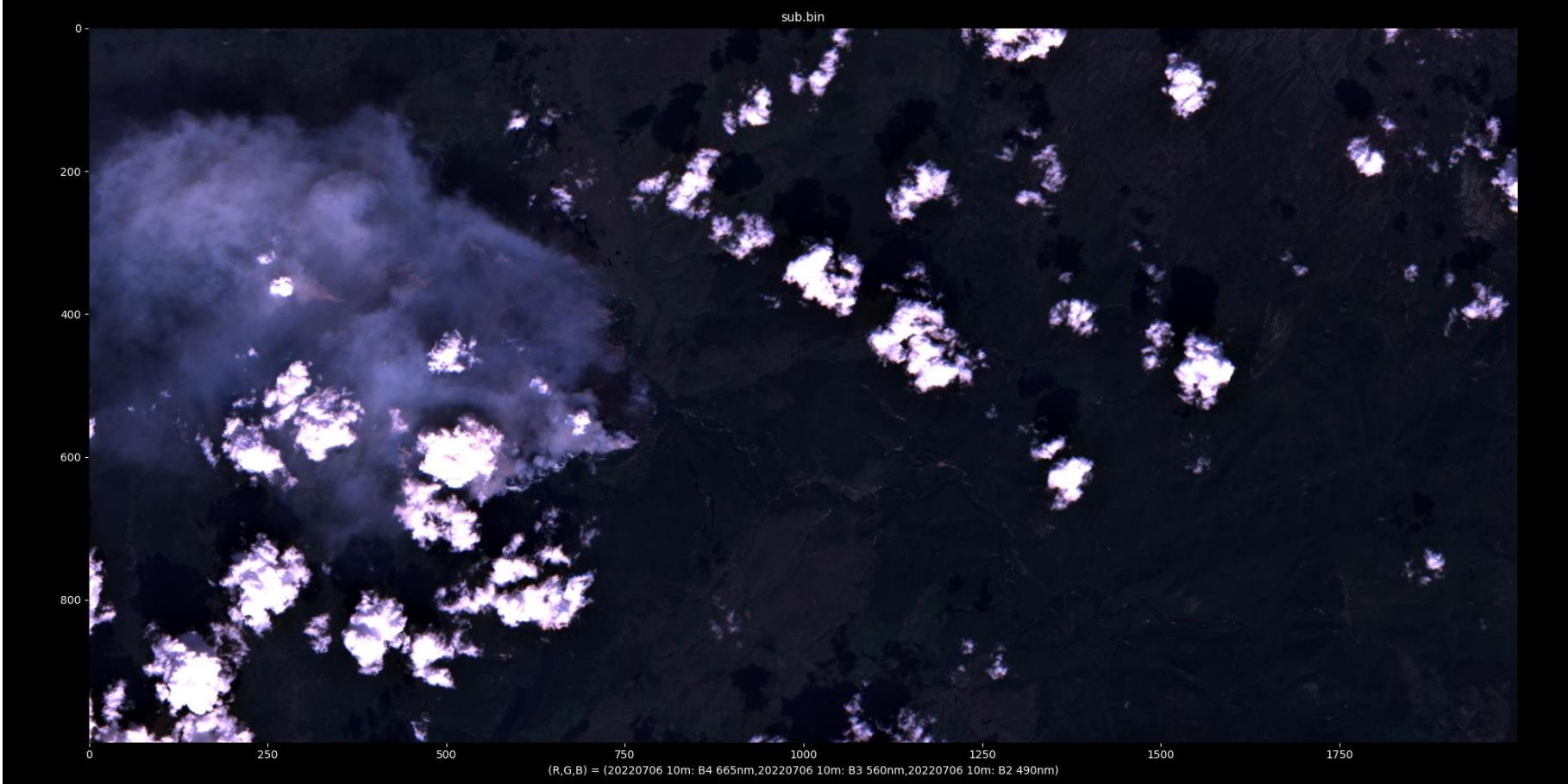


# 2022WL014 Beaver Creek YT



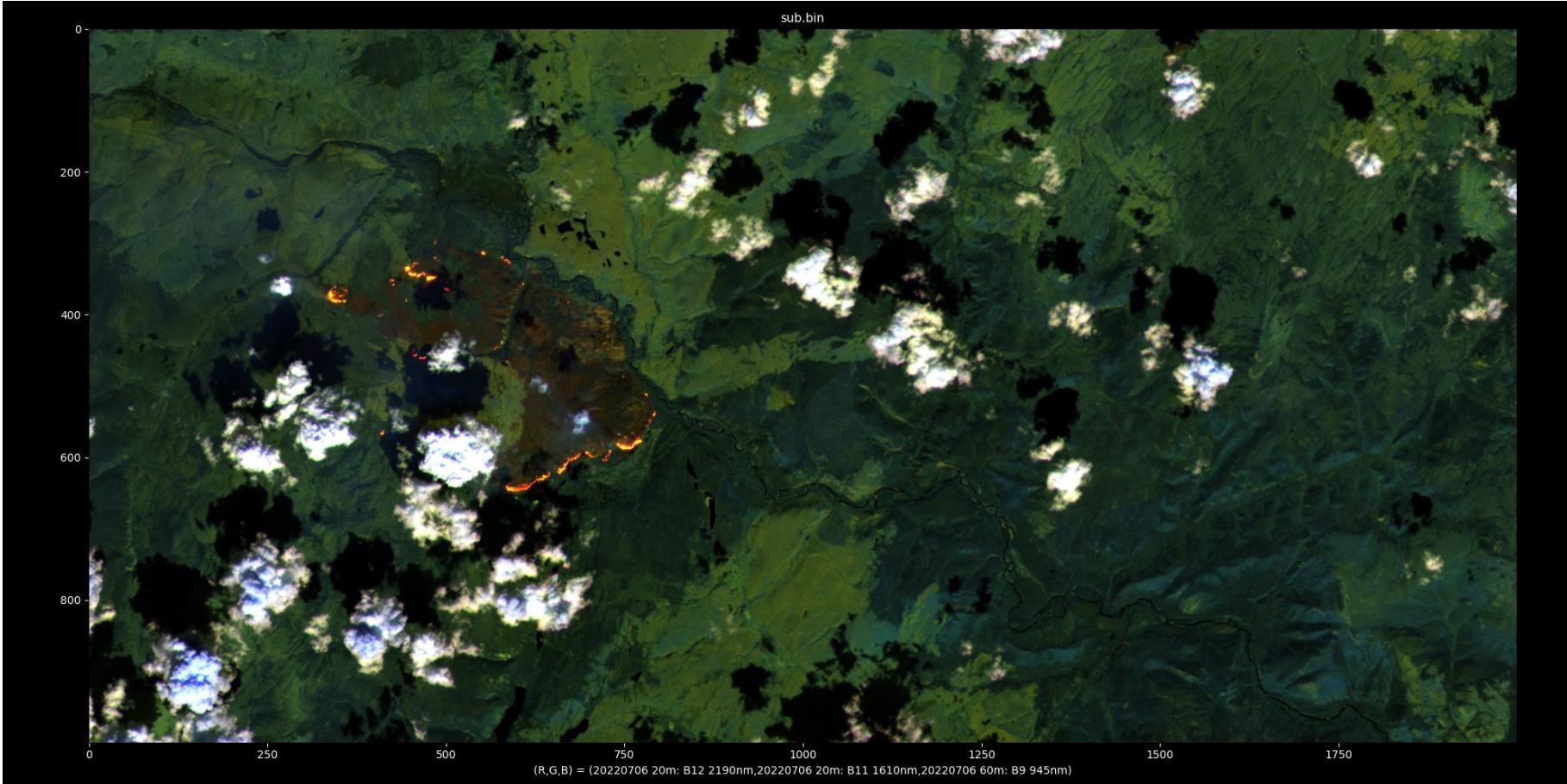
# Why we can't use the built-in cloud mask

Sentinel2 Usual RGB



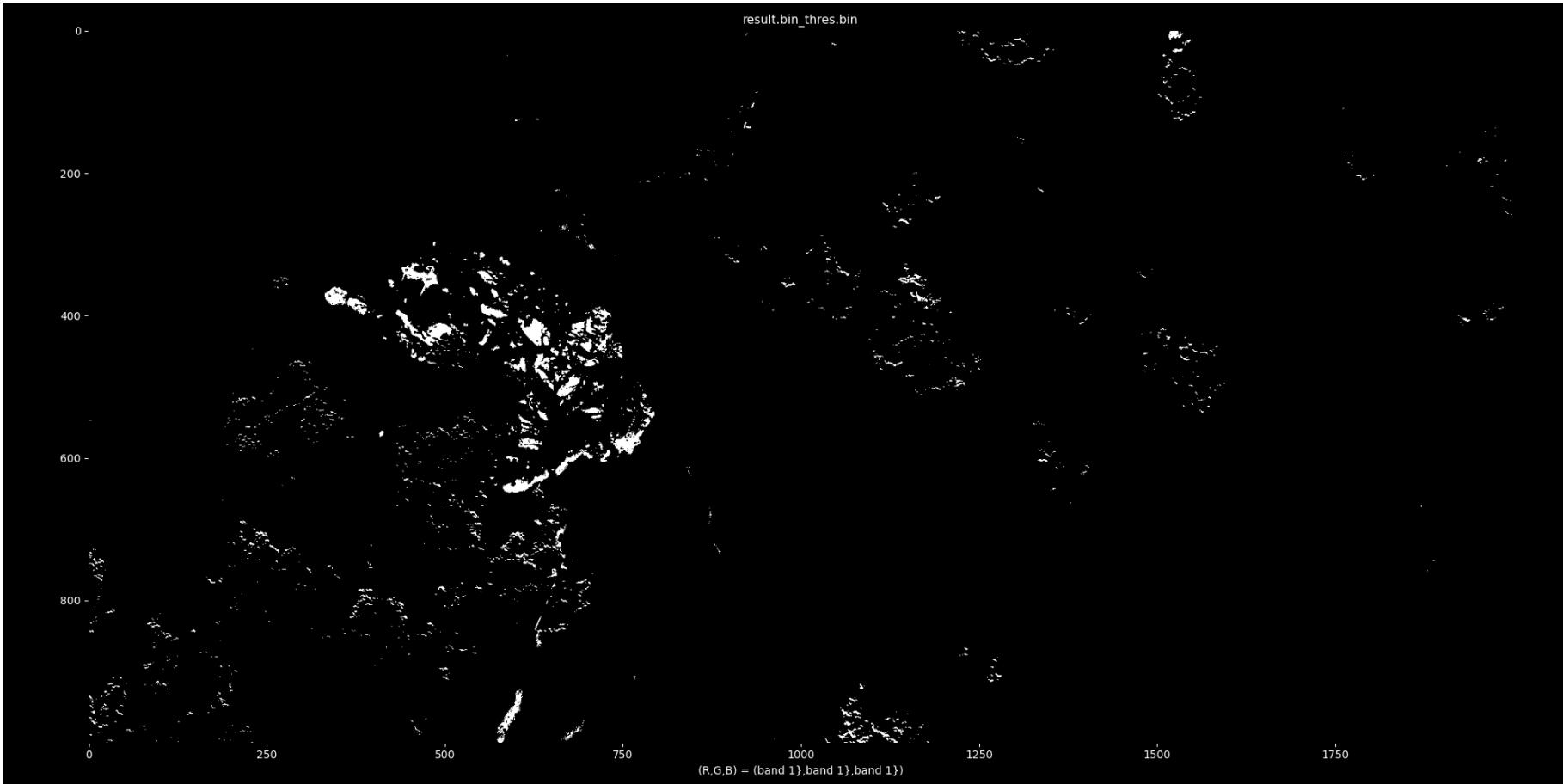
# Why we can't use the built-in cloud mask

Sentinel2 rgb=(12, 11, 9)



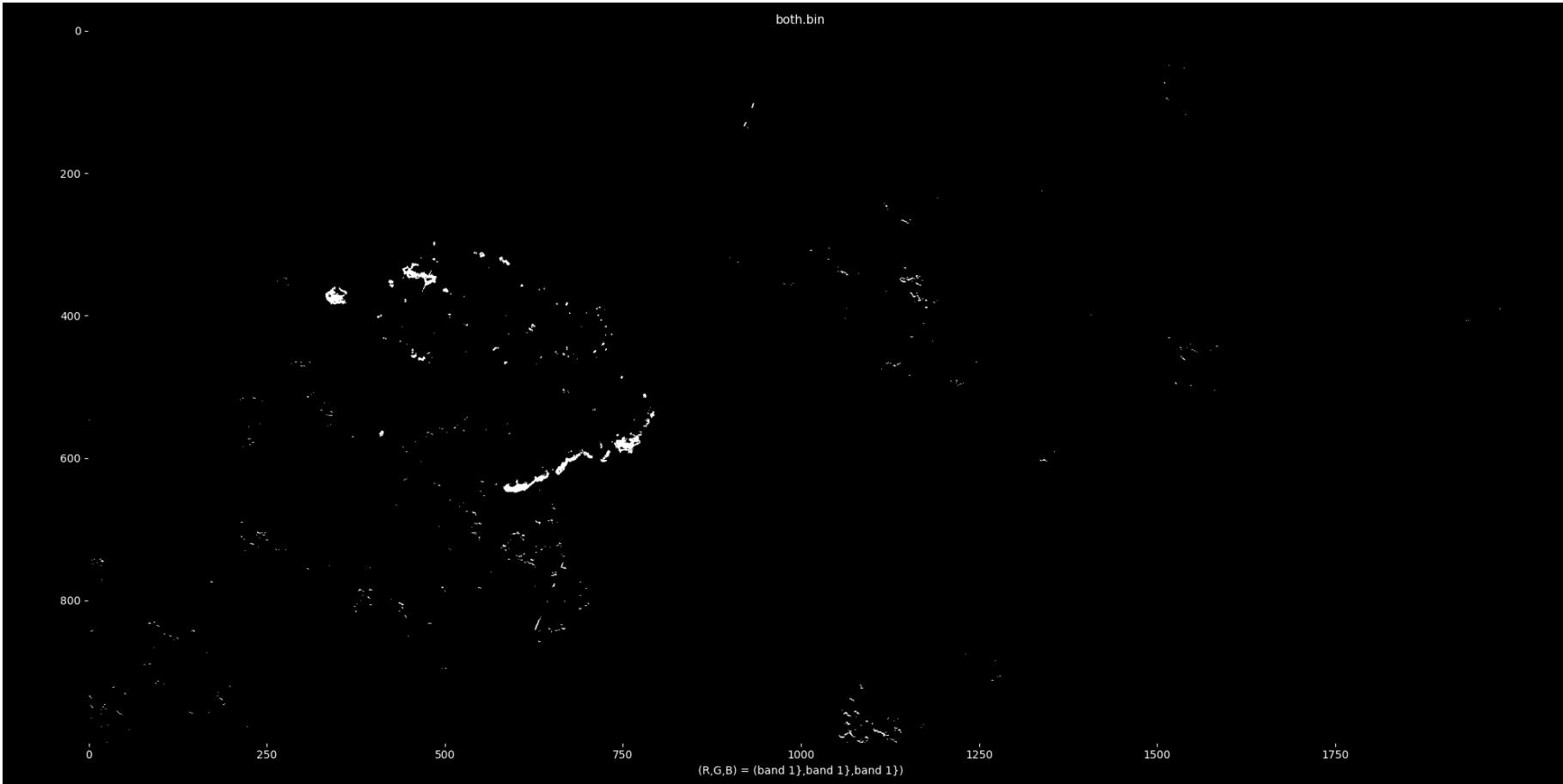
# Why we can't use the built-in cloud mask

Sentinel-2 old rule



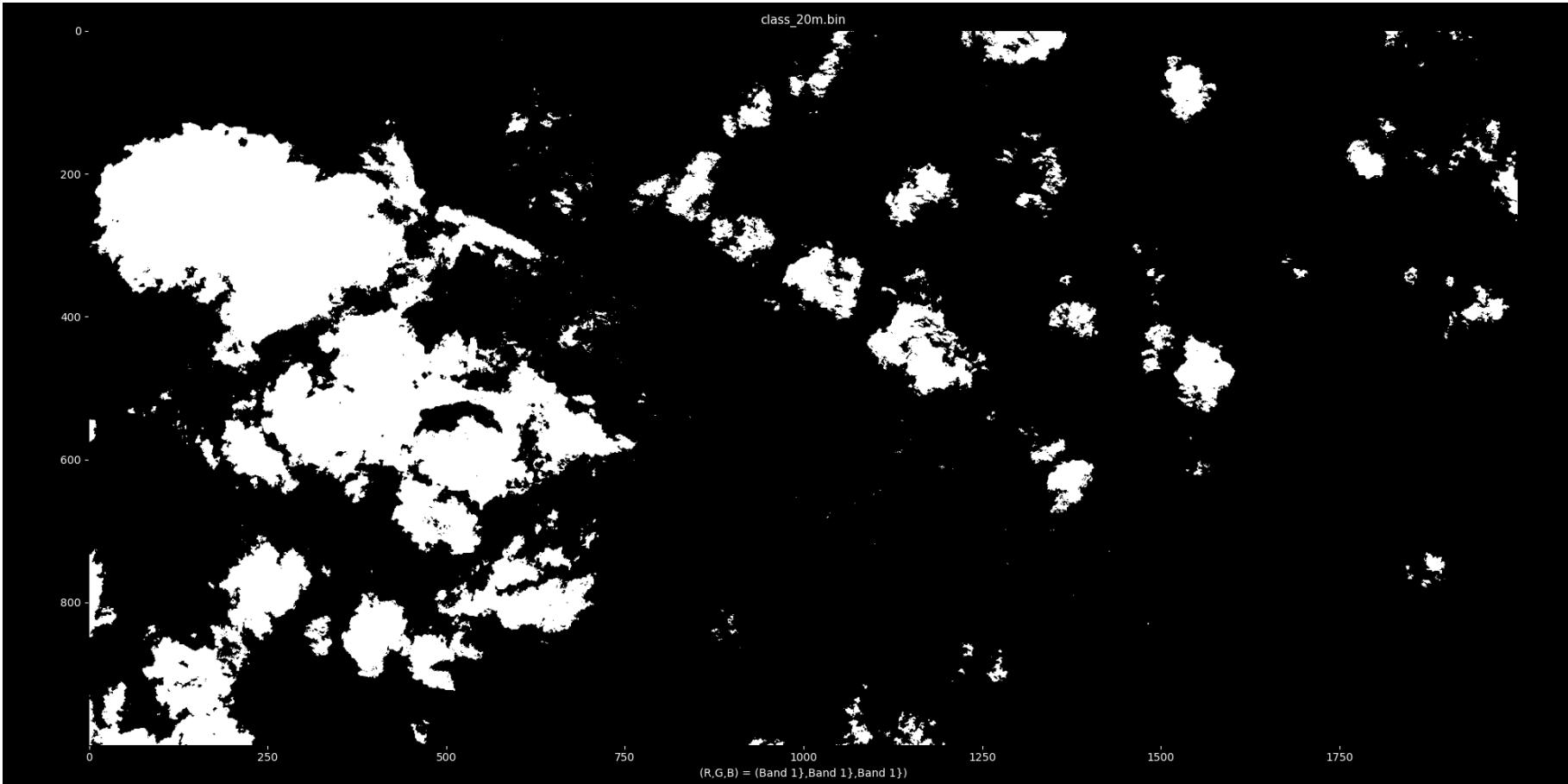
# Why we can't use the built-in cloud mask

Sentinel2 new rule (less FP)



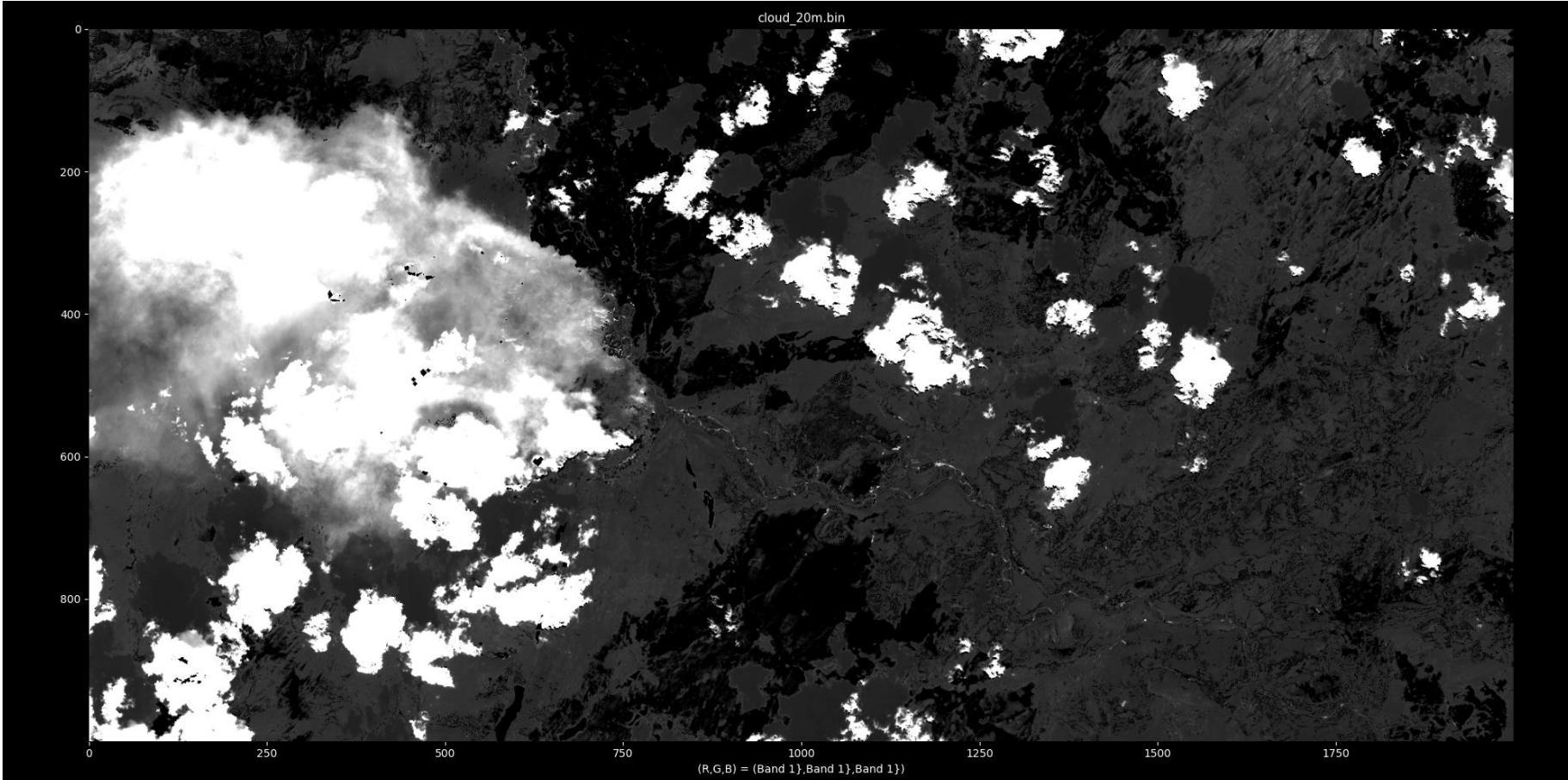
# Why we can't use the built-in cloud mask

Sentinel2 sen2cor class map



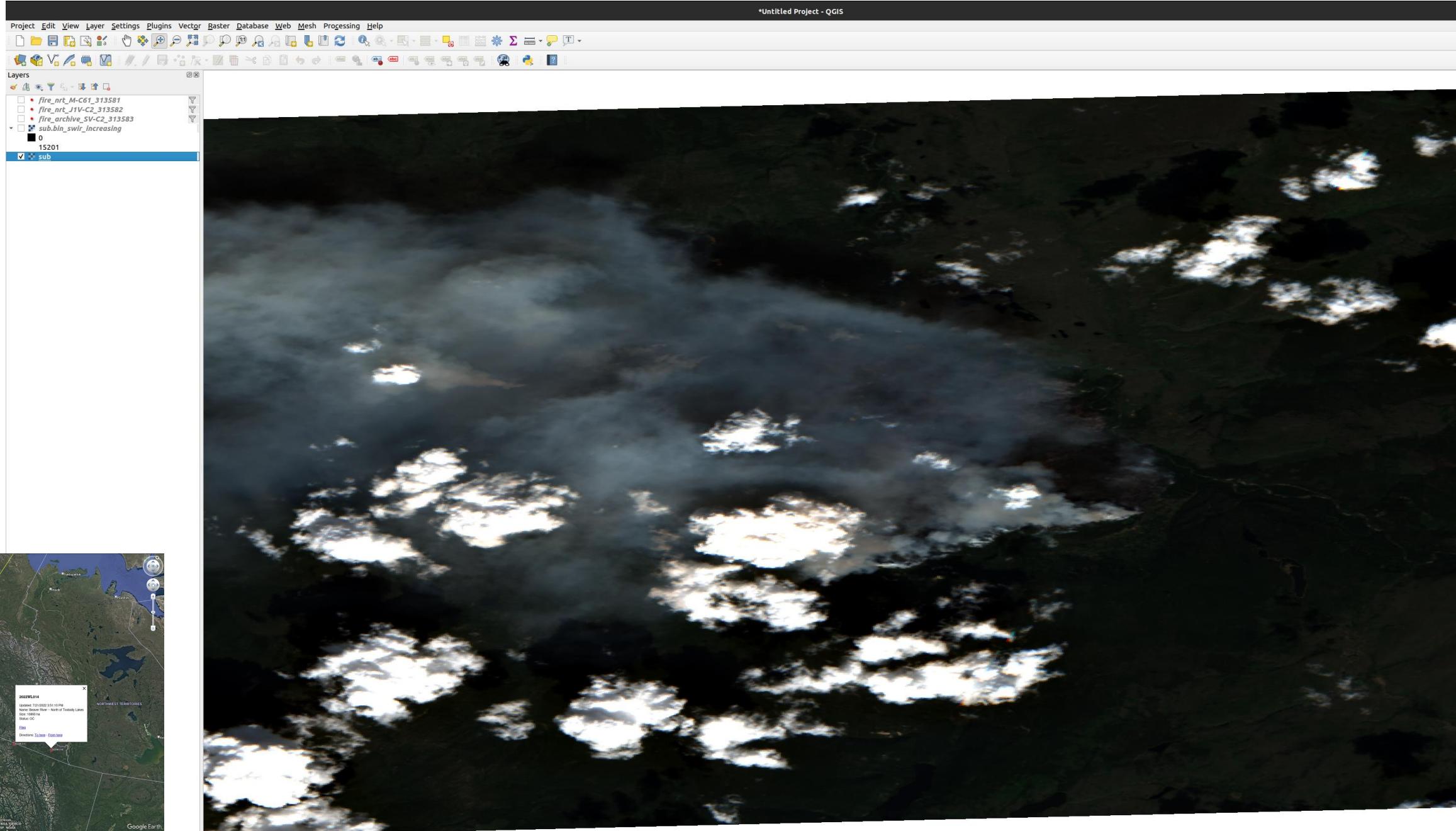
# Why we can't use the built-in cloud mask

Sentinel2 sen2cor cloud probability

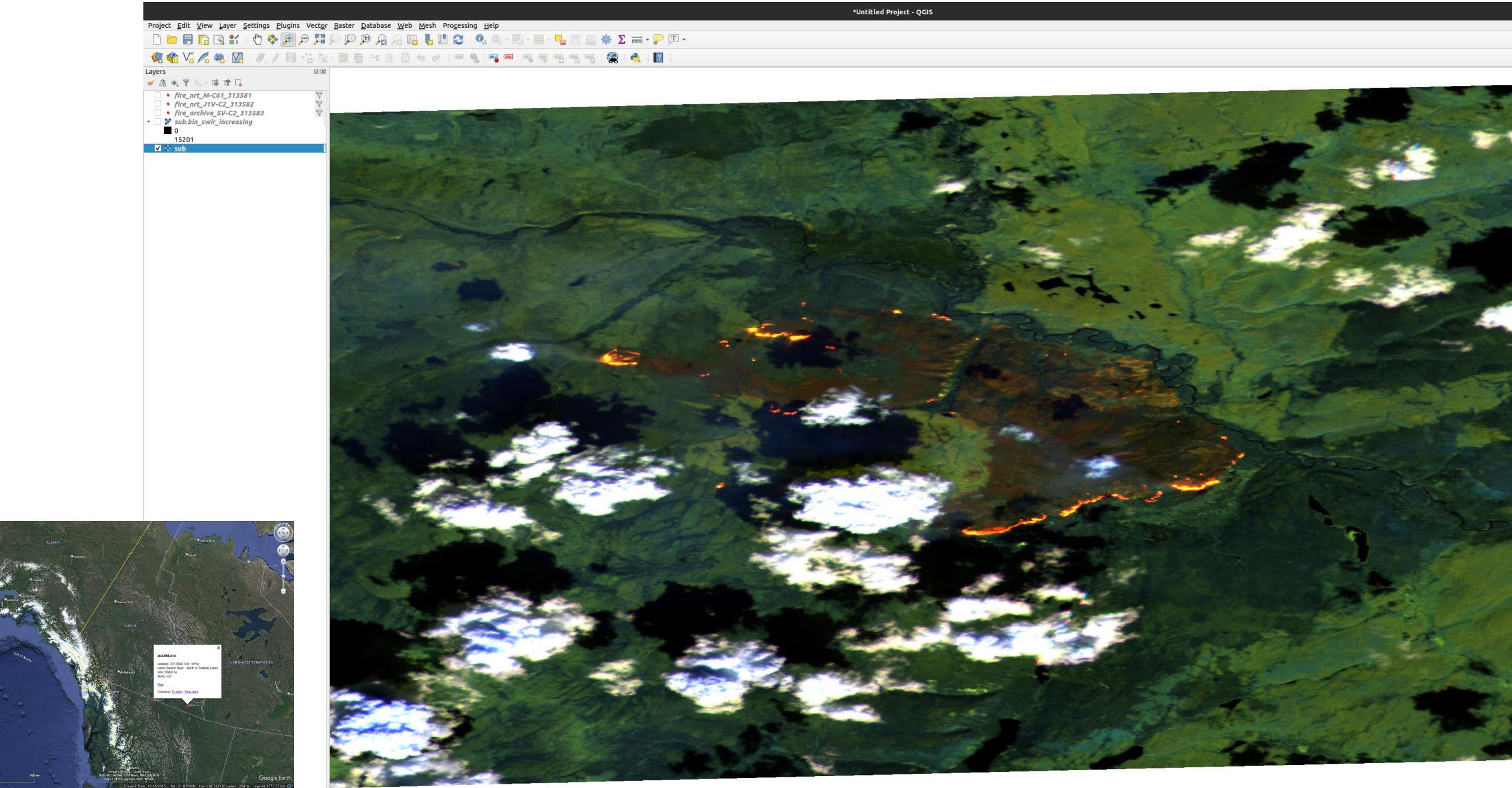


Sen2Cor L1C--> L2A tool cloud mask is not smoke penetrating, cloud/smoke/fire confused?

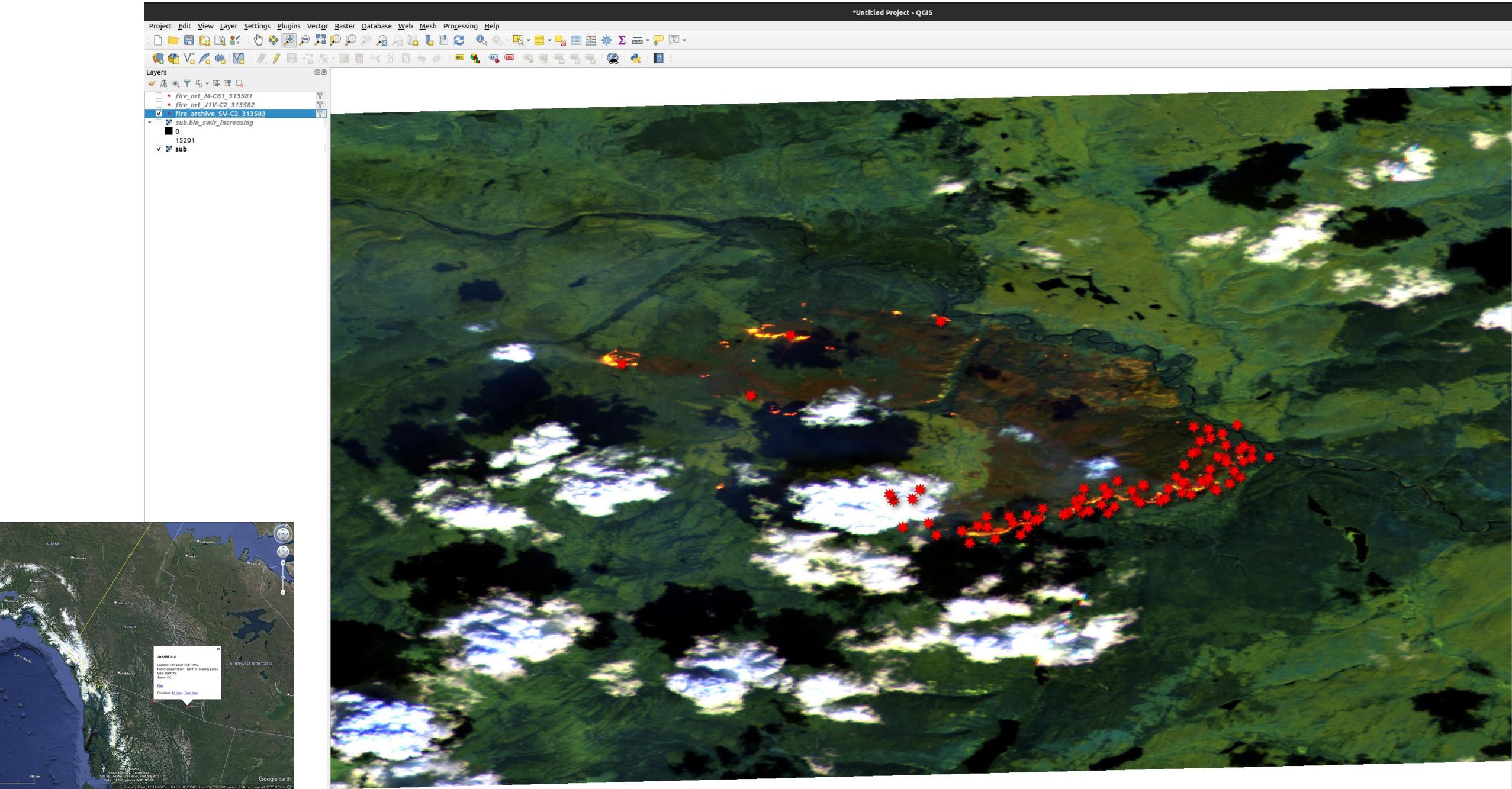
2022WL014 20220706 Sentinel-2 rgb=(b4, b3, b2)



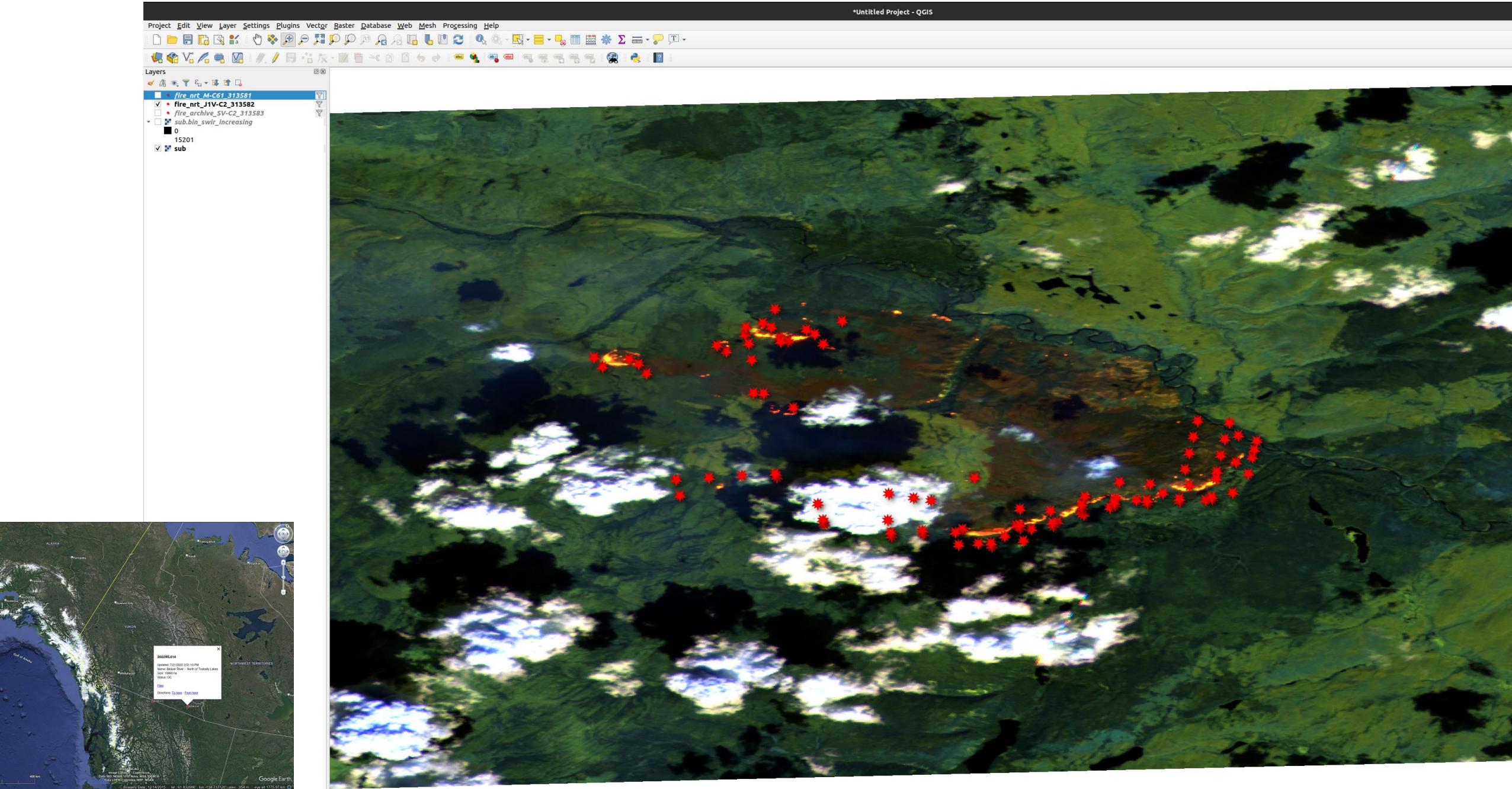
# 2022WL014 20220706 Sentinel-2 rgb=(b12, b11, b9)



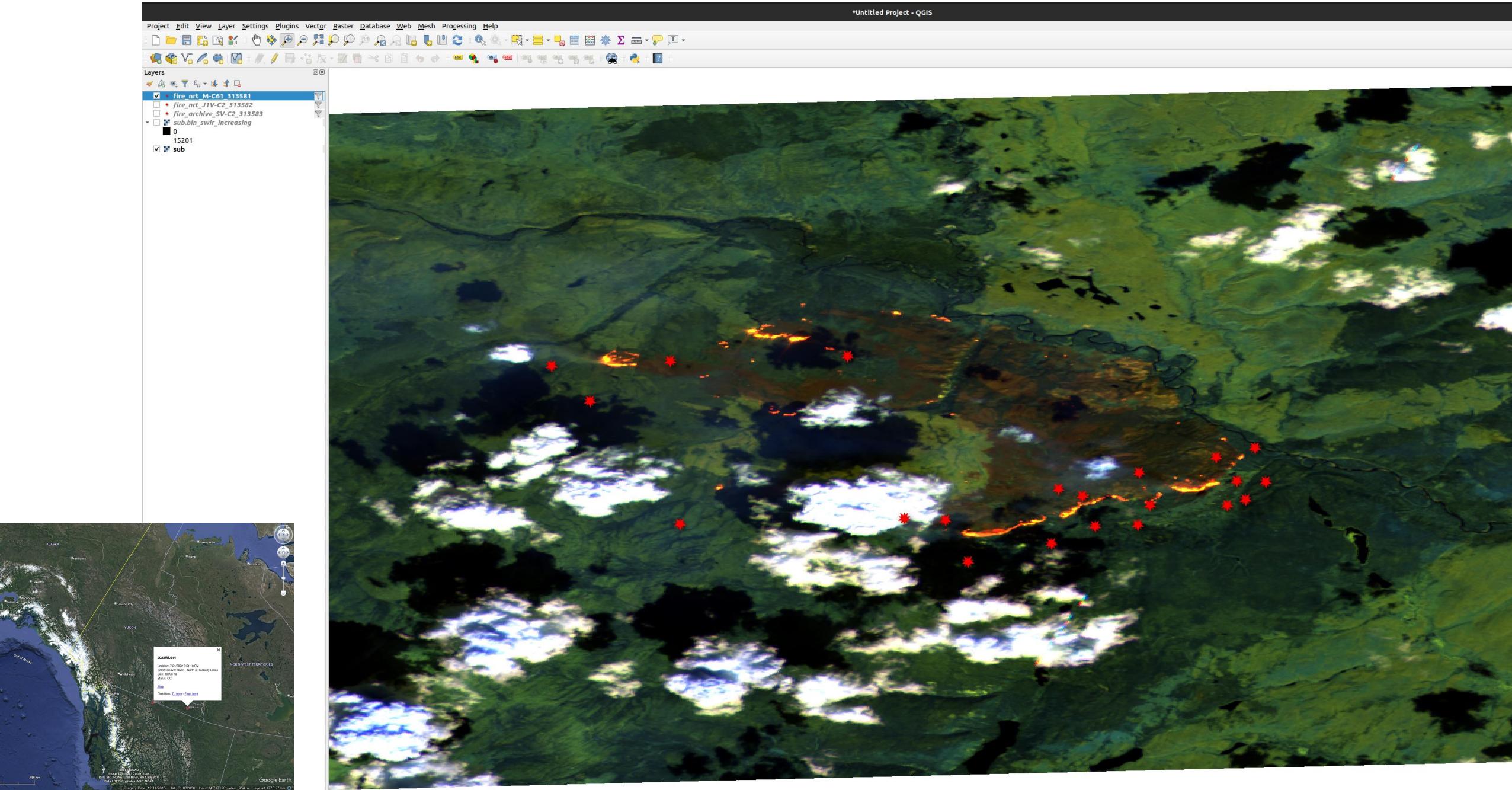
# 2022WL014 20220706 S2(b12,11,9) vs SUOMI VIIRS C2



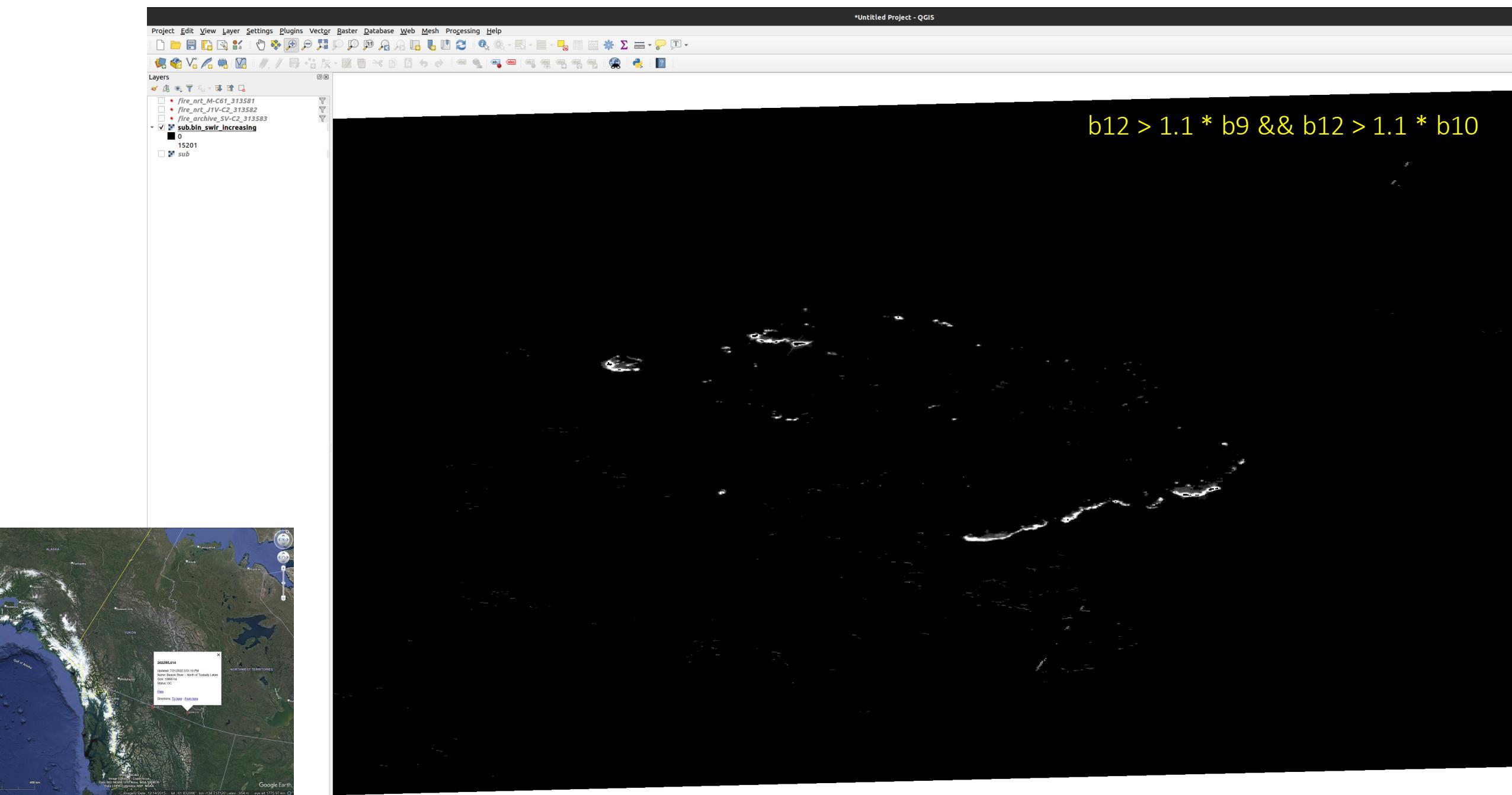
# 2022WL014 20220706 S2(b12,11,9) vs J1 VIIRS C1



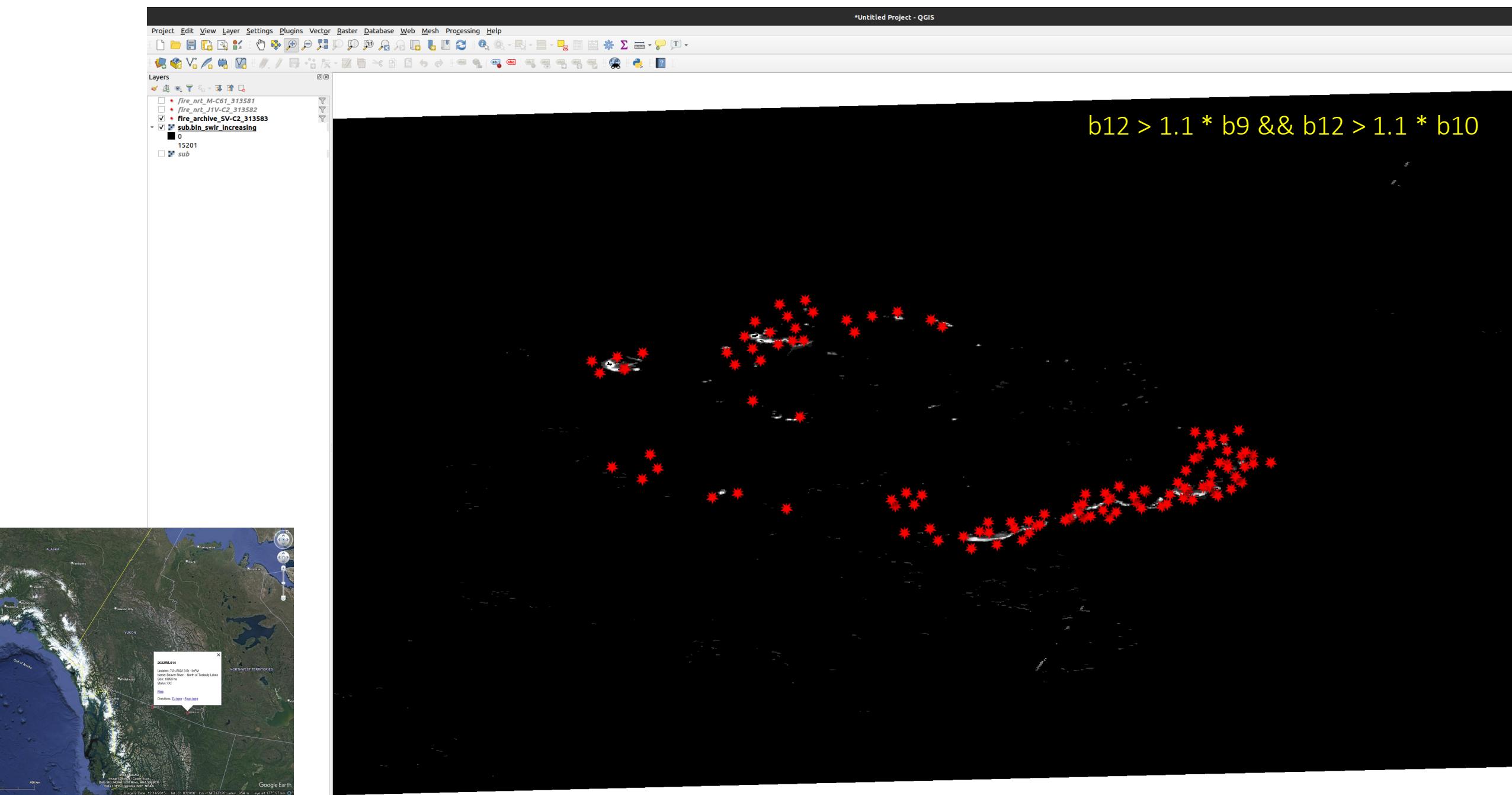
# 2022WL014 20220706 S2(b12,11,9) vs MODIS C6.1



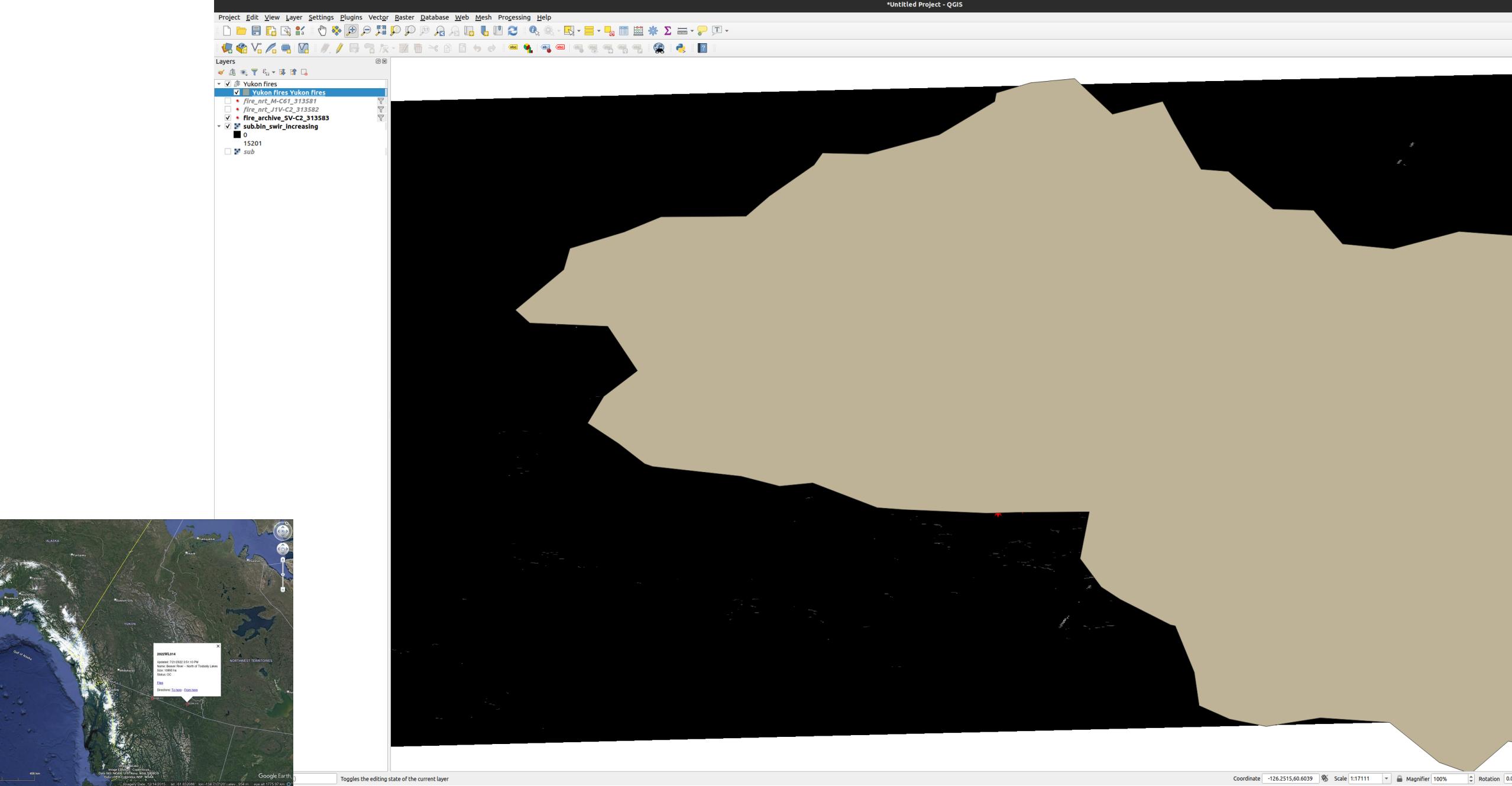
# 2022WL014 20220706 S2



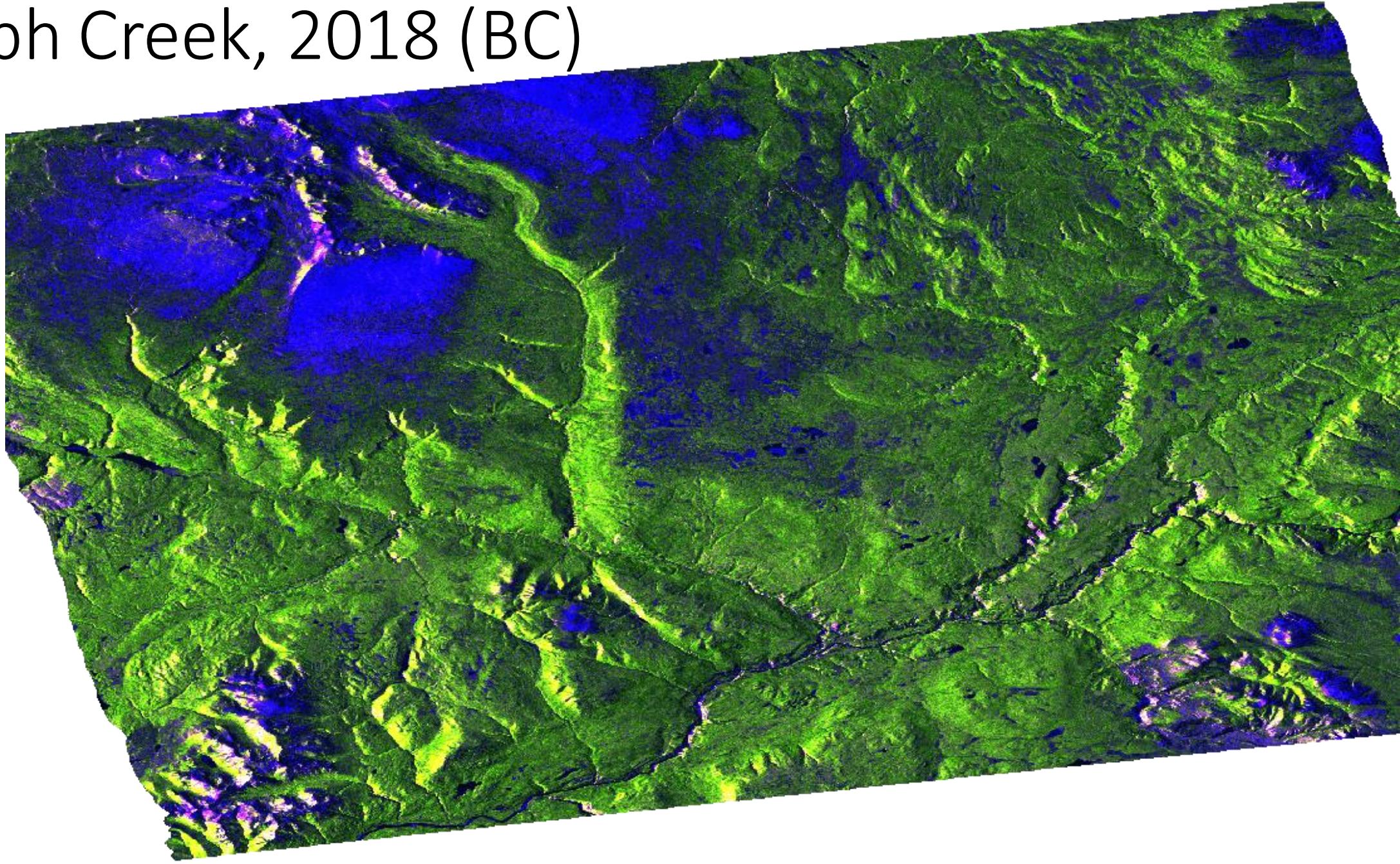
# 2022WL014 20220706 vs SUOMI VIIRS C2



# 2022WL014 20220706 GIS poly



Telegraph Creek, 2018 (BC)



Elephant Hill, 2017 (BC)

