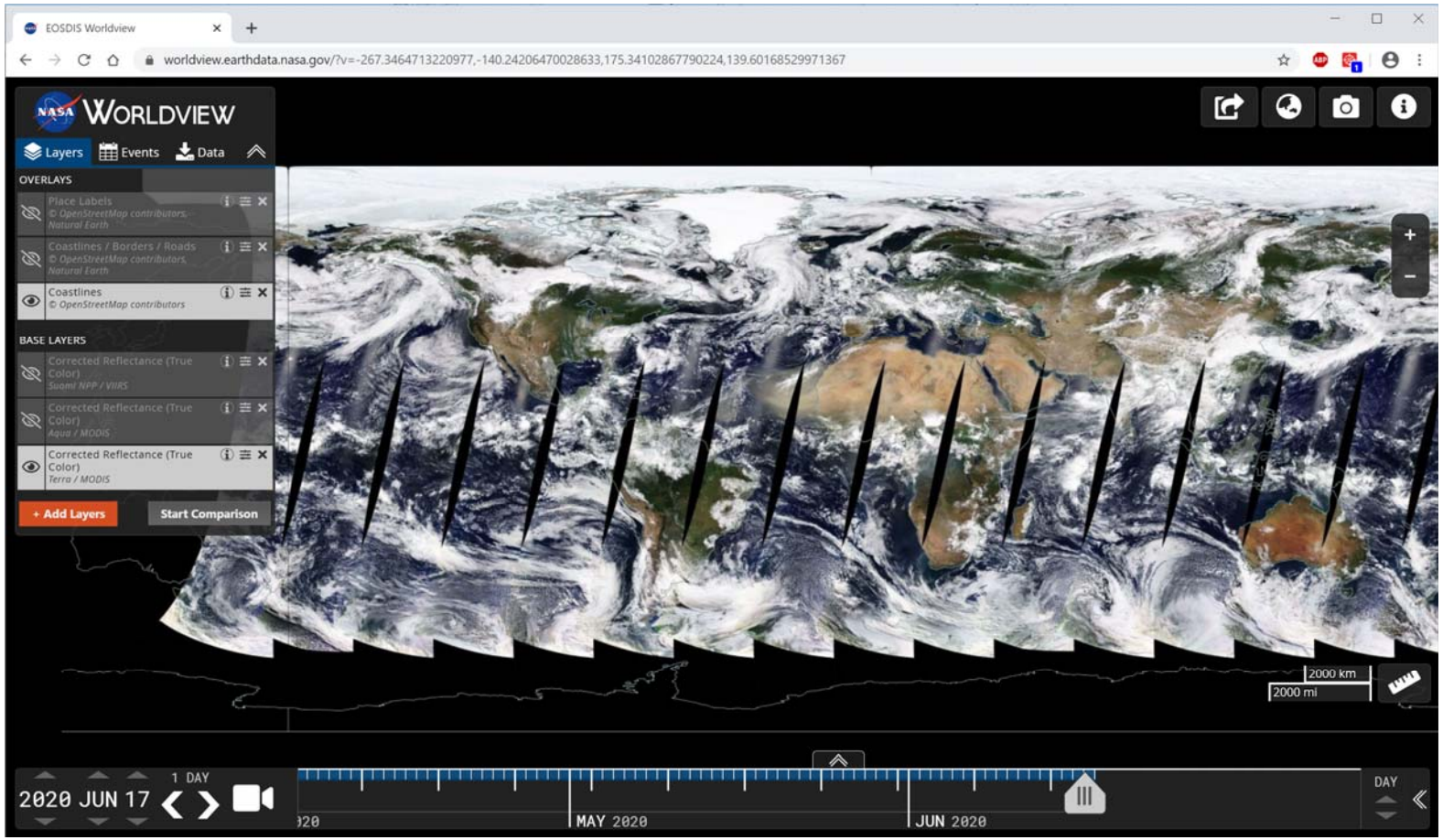
Assignment 2
Forest Fire Analysis in WorldView

NASA’ s **WorldView** tool has been developed as part of the Earth Observing System Data and Information System (EOSDIS). This is a web-based application. It allows to interactively browse global imagery provided by MODIS sensors onboard Terra and Aqua satellites overlay various products and then download the underlying data. Recently data from the VIIRS sensor onboard SNPP satellite has been added.



https://worldview.earthdata.nasa.gov/

WorldView Features

-100+ products and imagery from MODIS sensors data
- Imagery and products are at 0.5-1 km spatial resolution
- Updates available mostly within 3 hours after observation
- Base layers (true-color MODIS Terra, MODIS Aqua and SNPP VIIRS)
- Overlays
    - Static (places, coastlines, borders, roads, population , etc.)
    - Dynamic (Satellite products, e.g., temperature, snow, fires, etc.)
        - Mostly MODIS, also VIIRS, AURA, AMSR2, other sensors
- Three projections (arctic, antarctic, geographic)
- **Data since mid-2012**

Functions

- Zoom in/out
- Overlay opacity
- Color palette selection for overlays
- Color palette adjustment: Set thresholds

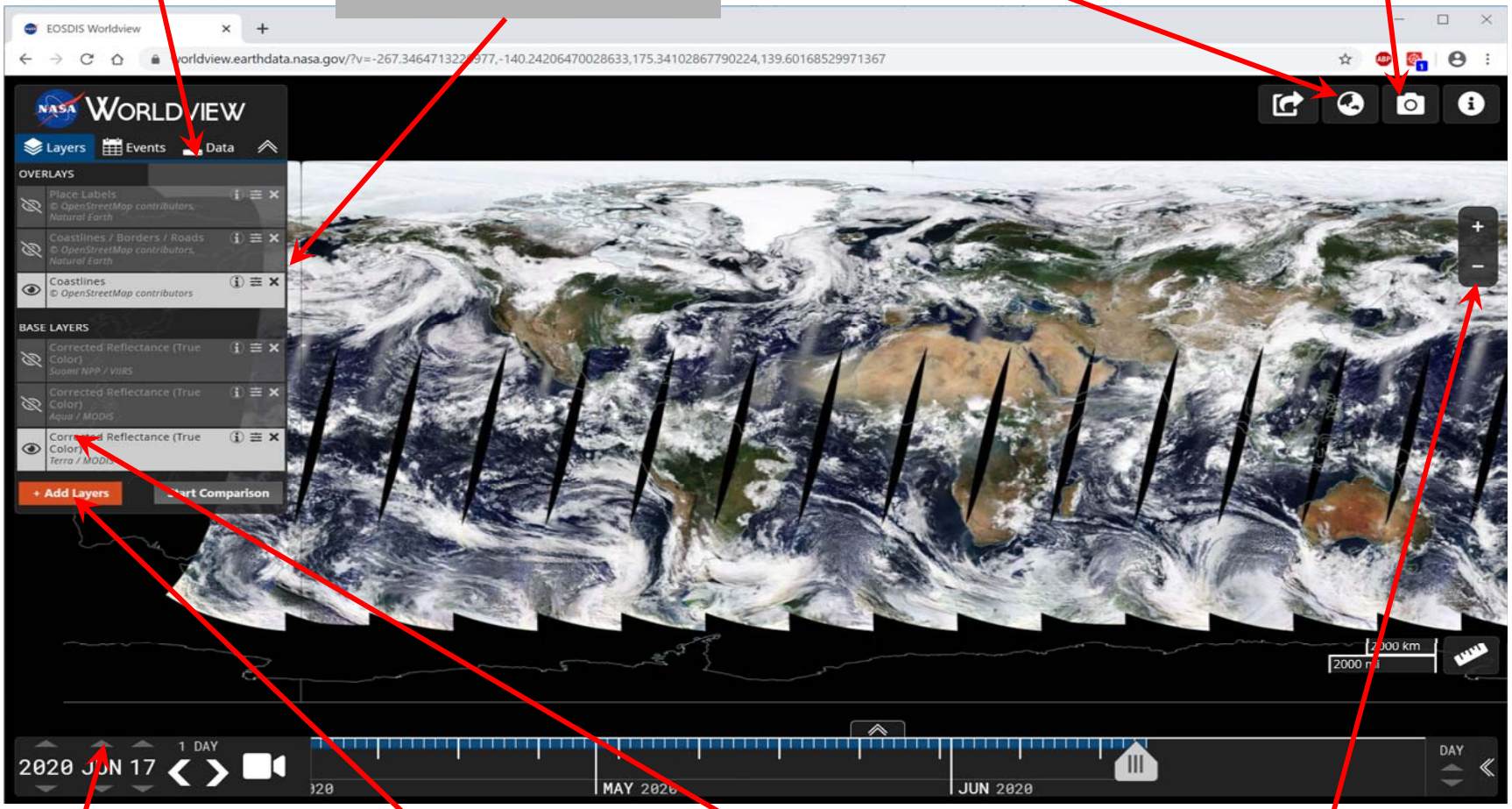
WorldView Basic Functions: very few, very simple

Image download

Overlay color control

Change projection

Take Snapshot



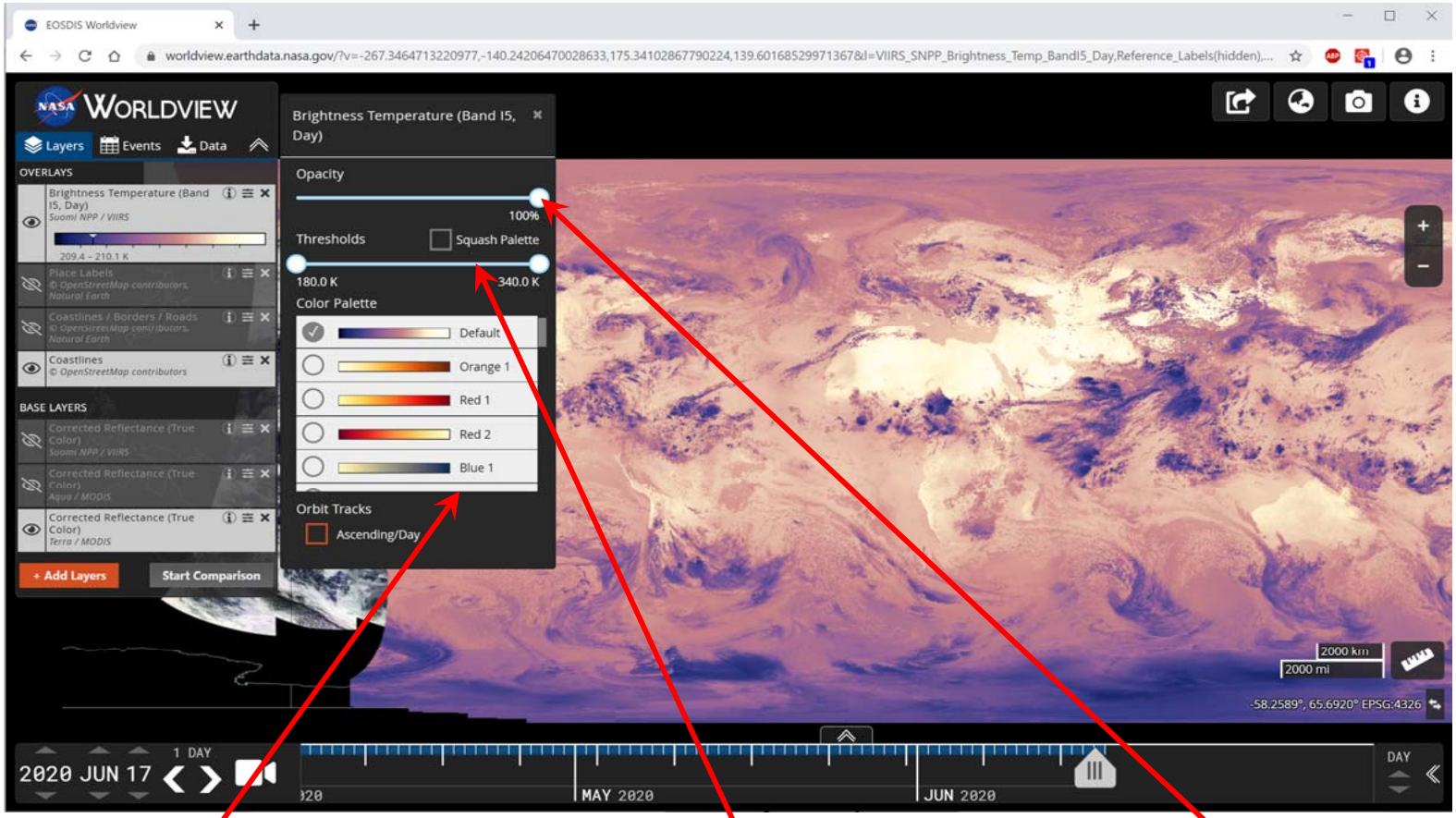
Change Date

Add Layer

Turn layer/overlay on/off

Zoom in/out

WorldView: Overlay color control

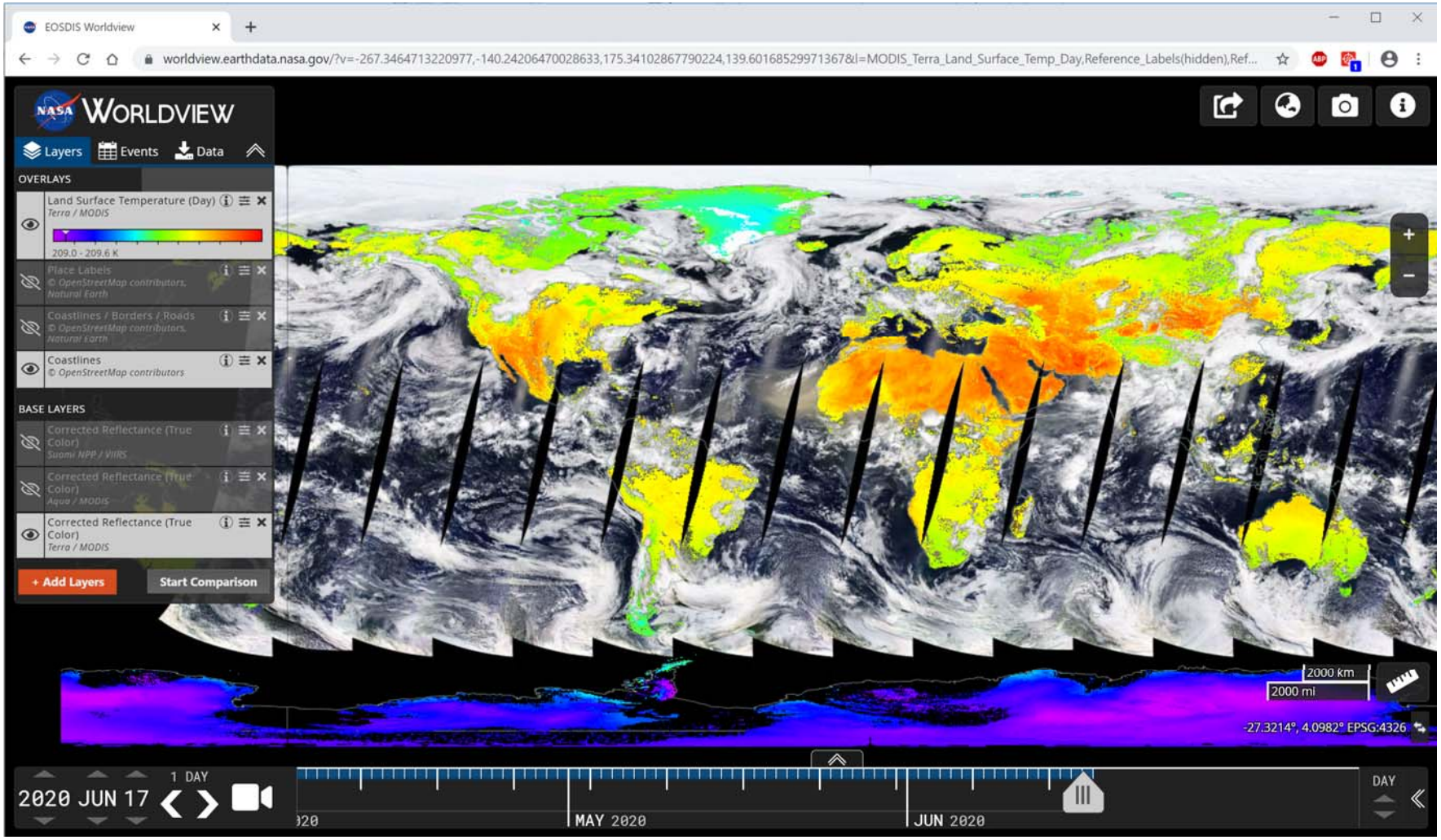


Built-in color palettes

Set thresholds for overlay color palette

Set overlay opacity

WorldView examples: MODIS true color image with MODIS land surface temperature overlaid



Land surface temperature retrievals are provided only for cloud-clear observations

Assignment II

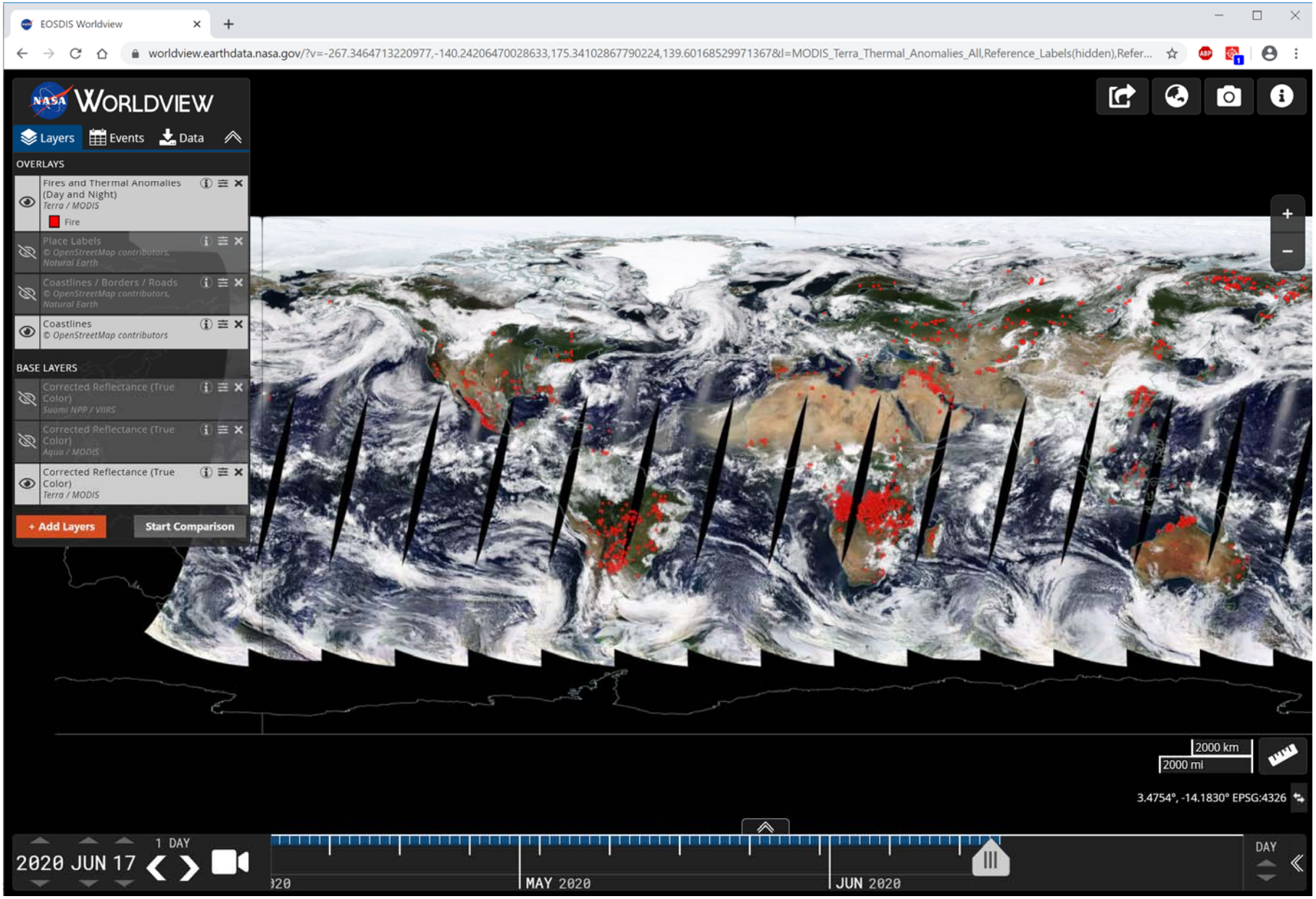
Examining fire dynamics and burned area extent using MODIS imagery with WorldView

Forest fires present a serious hazard both for the environment and for human well being. Imagery from polar orbiting and geostationary weather satellites can be effectively used to identify forest fires, monitor its development and assess damage caused. Quite often agricultural fires can be seen in the satellite imagery. Occasionally satellites capture large industrial or residential fires. Due to high spatial resolution and high radiometric depth of MODIS observations they are sensitive to and can effectively identify very small fire events. MODIS observations also provide information on the status of the vegetation cover and hence may be used to accurately delineate the burned area.

“Thermal anomalies and active fires” is an overlay available as part of the WorldView application. It can be used to study locations that were identified by the MODIS fire detection algorithm as “active fires”

In this Assignment you will identify fire events in the MODIS imagery, examine the fire dynamics and assess the burned area. WorldView web-based application will be used in this Assignment.

WorldView examples: MODIS true color image with MODIS fires and thermal anomalies overlaid



Assignment II

Examining fire dynamics and burned area extent using MODIS imagery with WorldView

Assignment:

- Use MODIS true color imagery to find/identify at least two fire events
- To make the search easier overlay MODIS fires and thermal anomalies.
- Look for smoke and some burned area
- Track the fire back to its beginning and forward to its end
- Try to approximately estimate the area burned day-by-day and the total area burned
- Estimate the nature of the fire (wild forest, agricultural, residential , industrial)
- If possible characterize the weather before and during the fire event
- Use higher resolution maps (e.g. Google) to provide a higher resolution map of the area to determine what was burning
- Look on the internet for any reference for this fire and compare your findings with the official information (day start, day extinguished, area burned)
- Prepare at least a 3-4 slides presentation describing the fire event, its development in time, estimated area burned and your other findings. Get ready for a public presentation

Assignment II

Examining fire dynamics and burned area extent using MODIS imagery with WorldView

Hints:

- Fires are most frequent in the tropics during dry season. In the middle and high latitudes they occur in summer.

- For forest fires look for densely forested areas

- When investigating the MODIS image with overlaid thermal anomalies and fires look for clusters of “hot spots” and for the smoke originating at the fire pixels

Assignment II

Examining fire dynamics and burned area extent using MODIS imagery with WorldView

Hints:

-To find a fire location you can search internet for references to large fires

- Forest fires occur every year in the Russia Far East, and in the north of Canada. Agricultural fires are abundant in South America and in the Sahel region in Africa (south of Sahara desert)

-Industrial and residential fires are usually extinguished within several hours or a day or two maximum. Most often they are not captured by polar orbiting satellites.

- Agricultural fires are typically small and do not last long, but sometimes they come out of control and result in rather large burned areas.

Assignment II

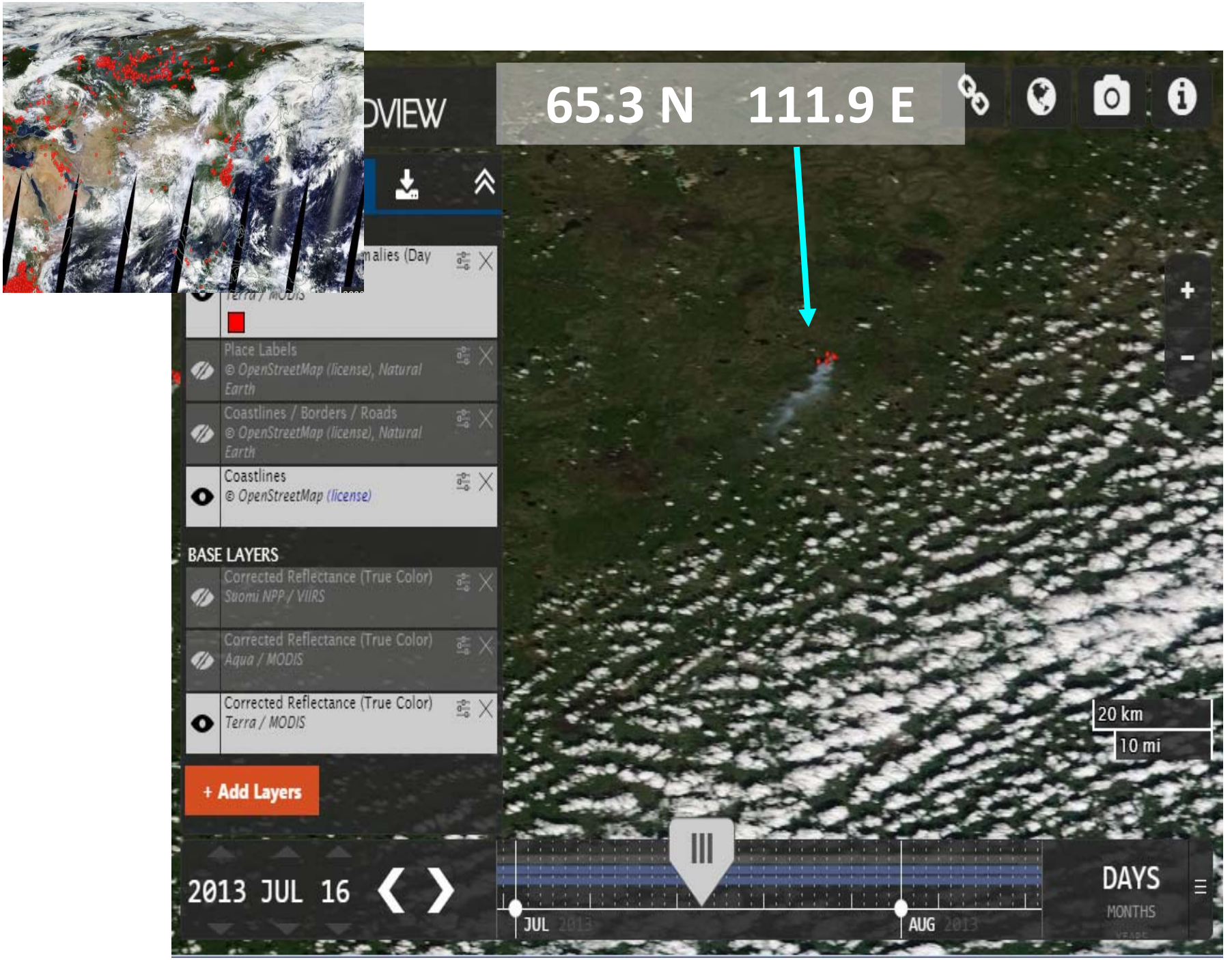
Examining fire dynamics and burned area extent using MODIS imagery with WorldView

Examples of fires:

One example of a fire:

- 67.7N 156.6E Burning seen: July 2-14, 2015. Burned area seen: Aug 08, 2015

Another example: 54.7N 125.5E, July 10, 2015: MODIS true color image with identified fires (“hot spots”) overlaid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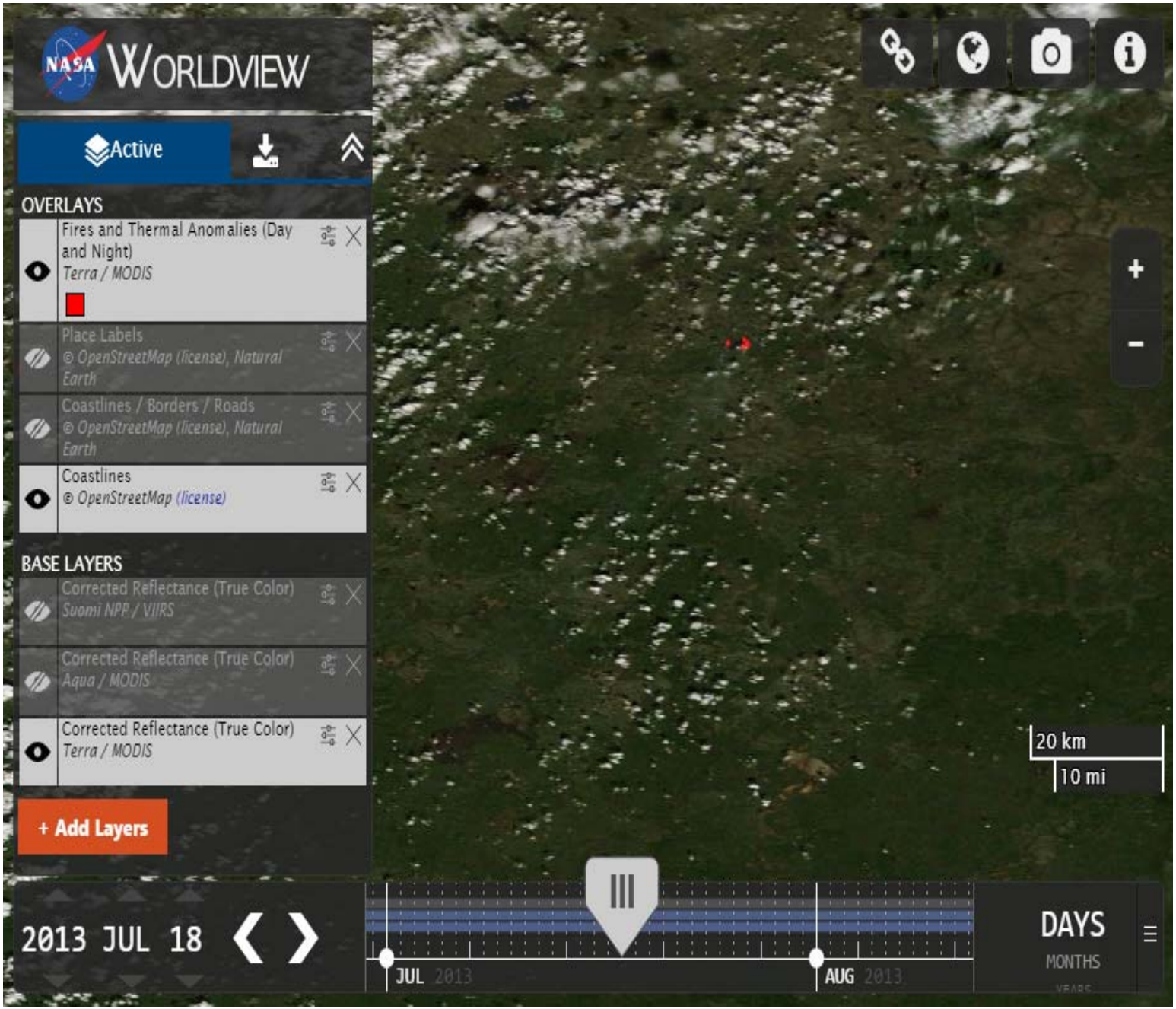
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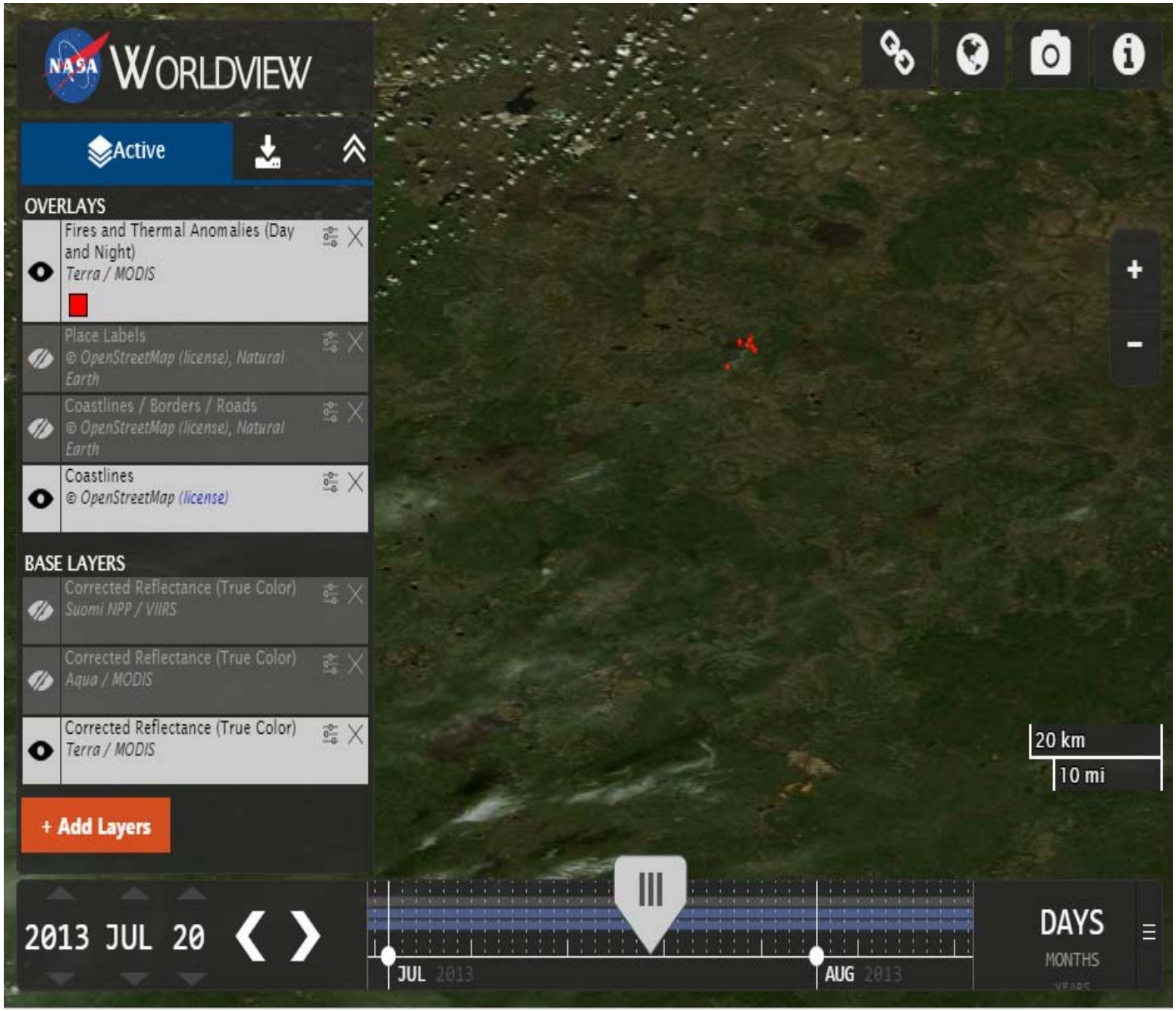
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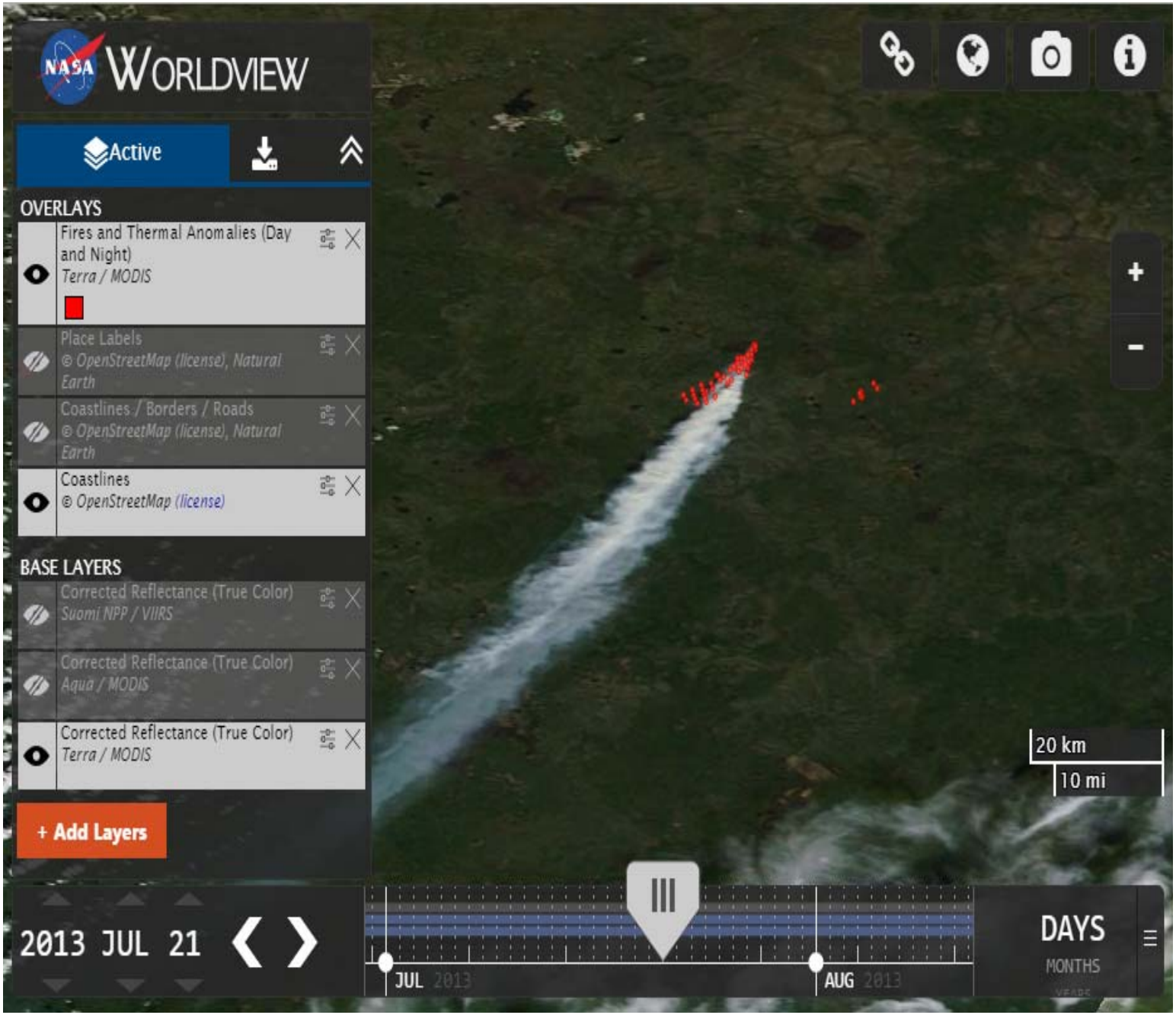
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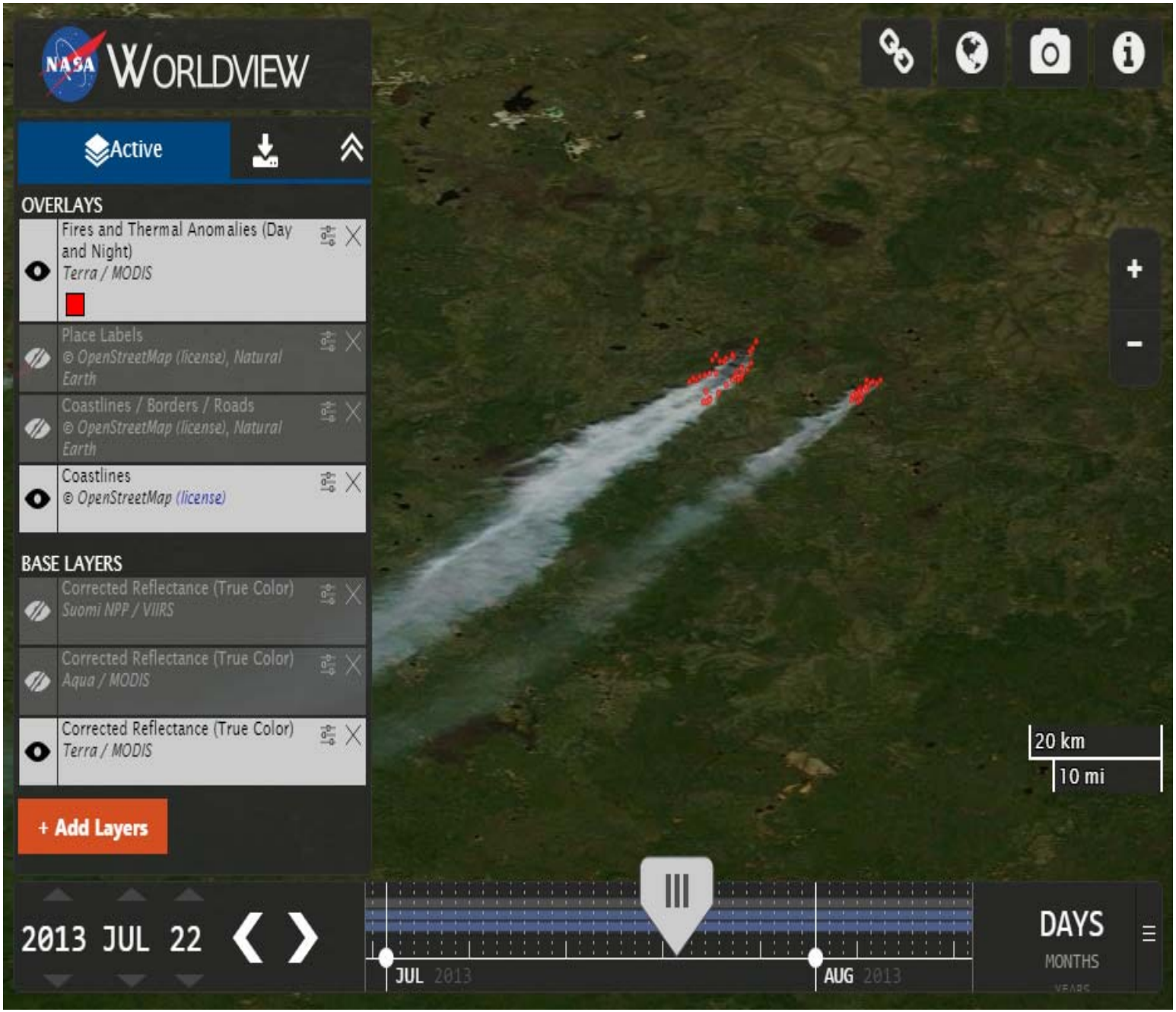
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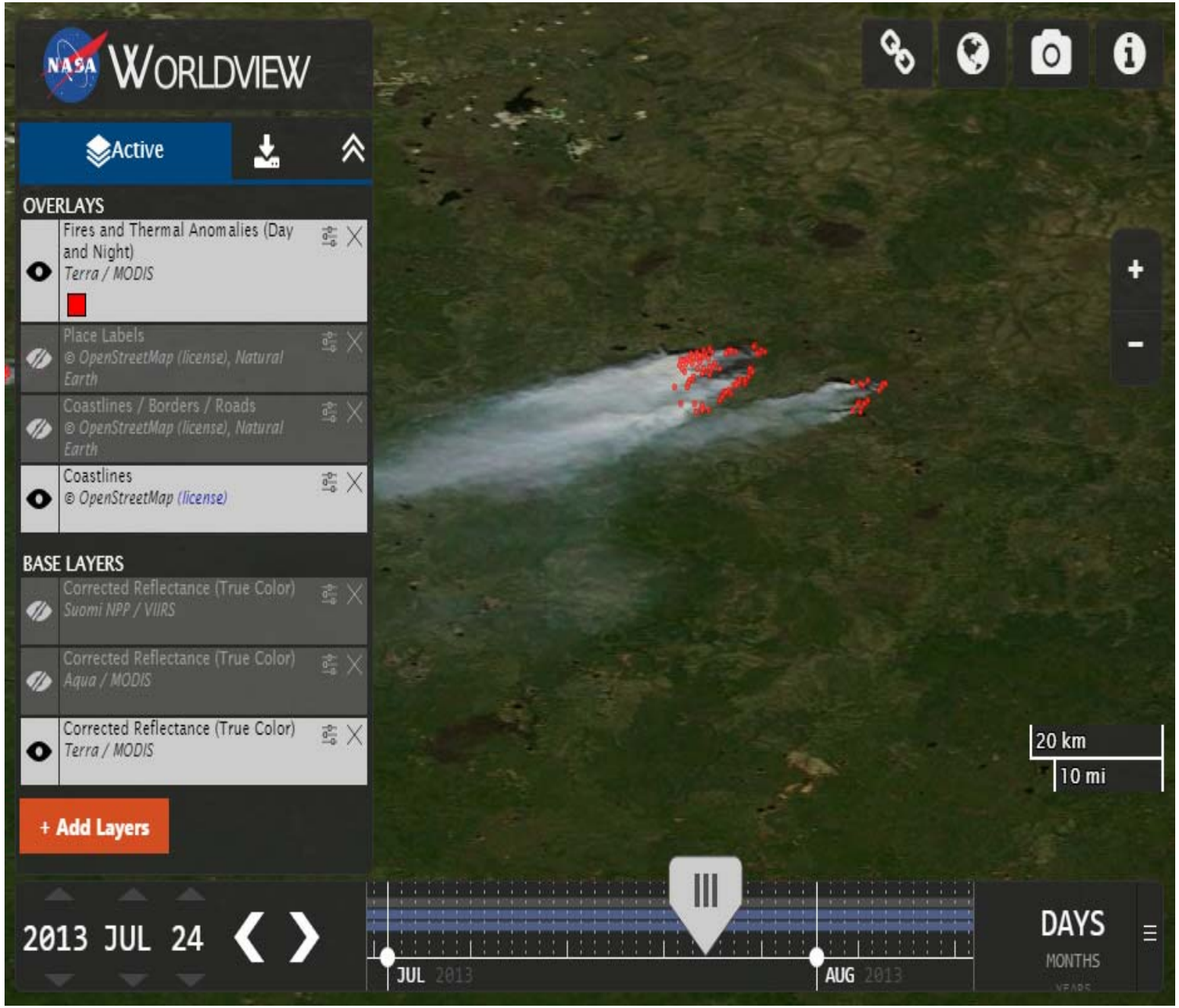
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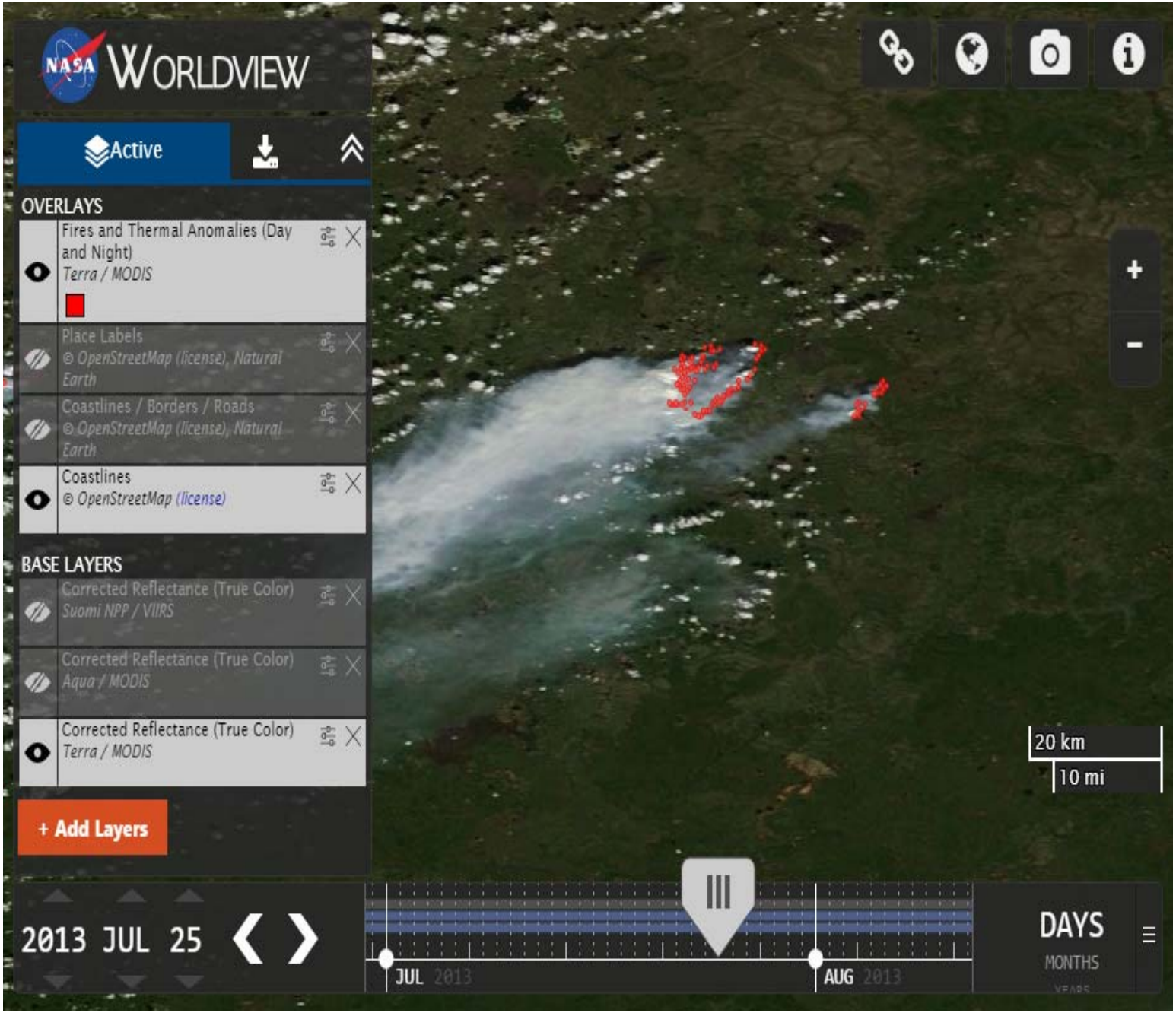
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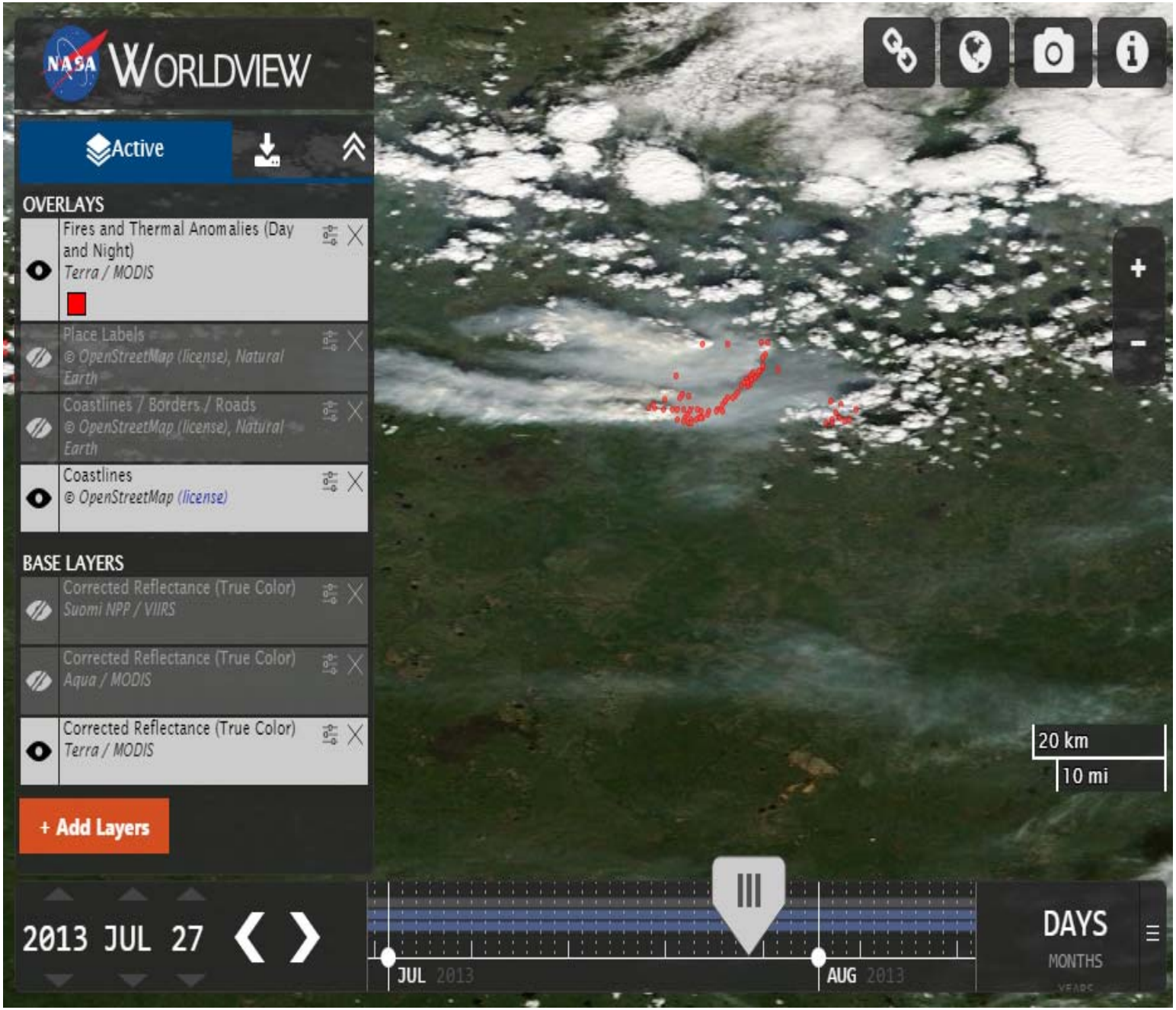
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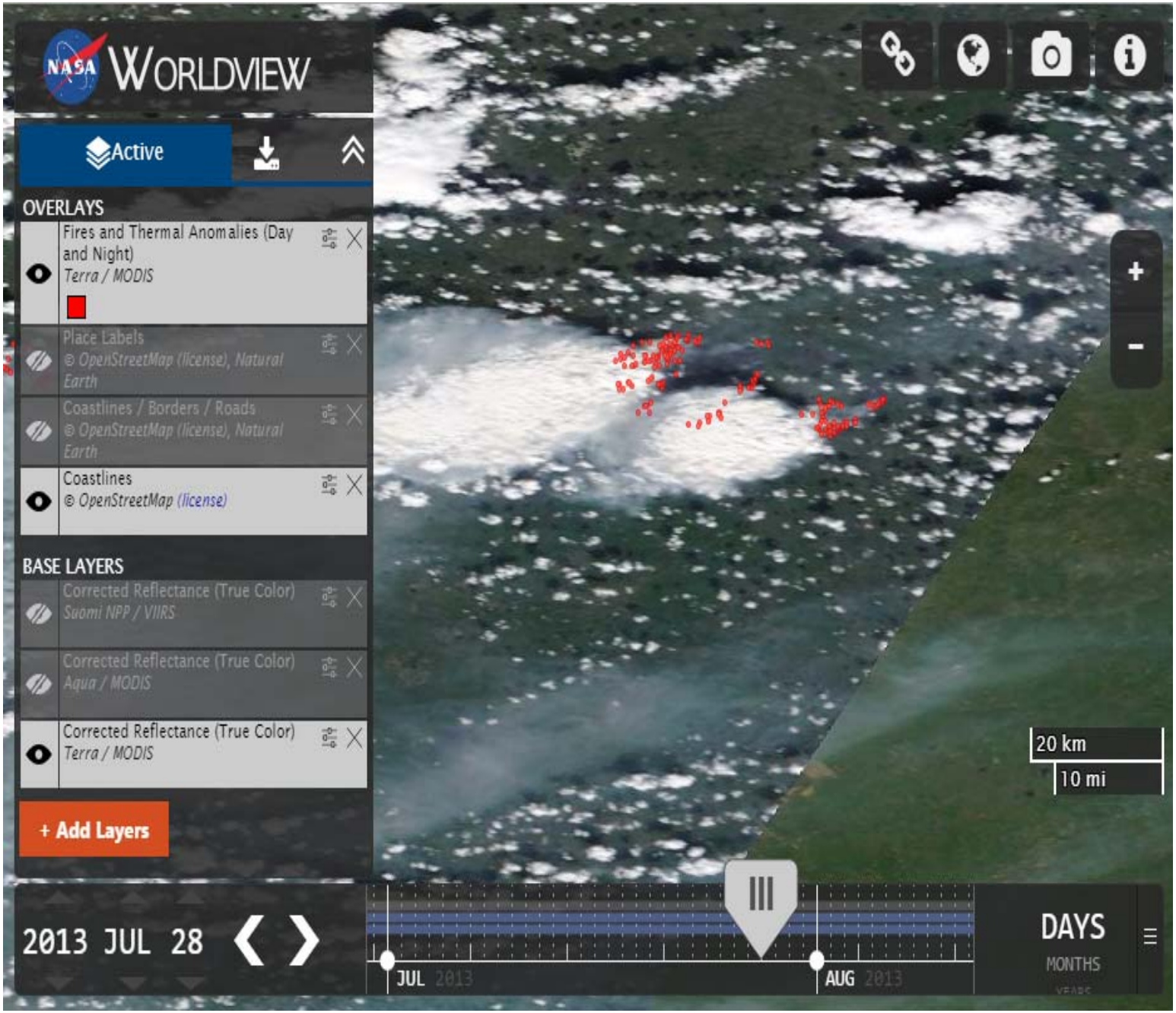
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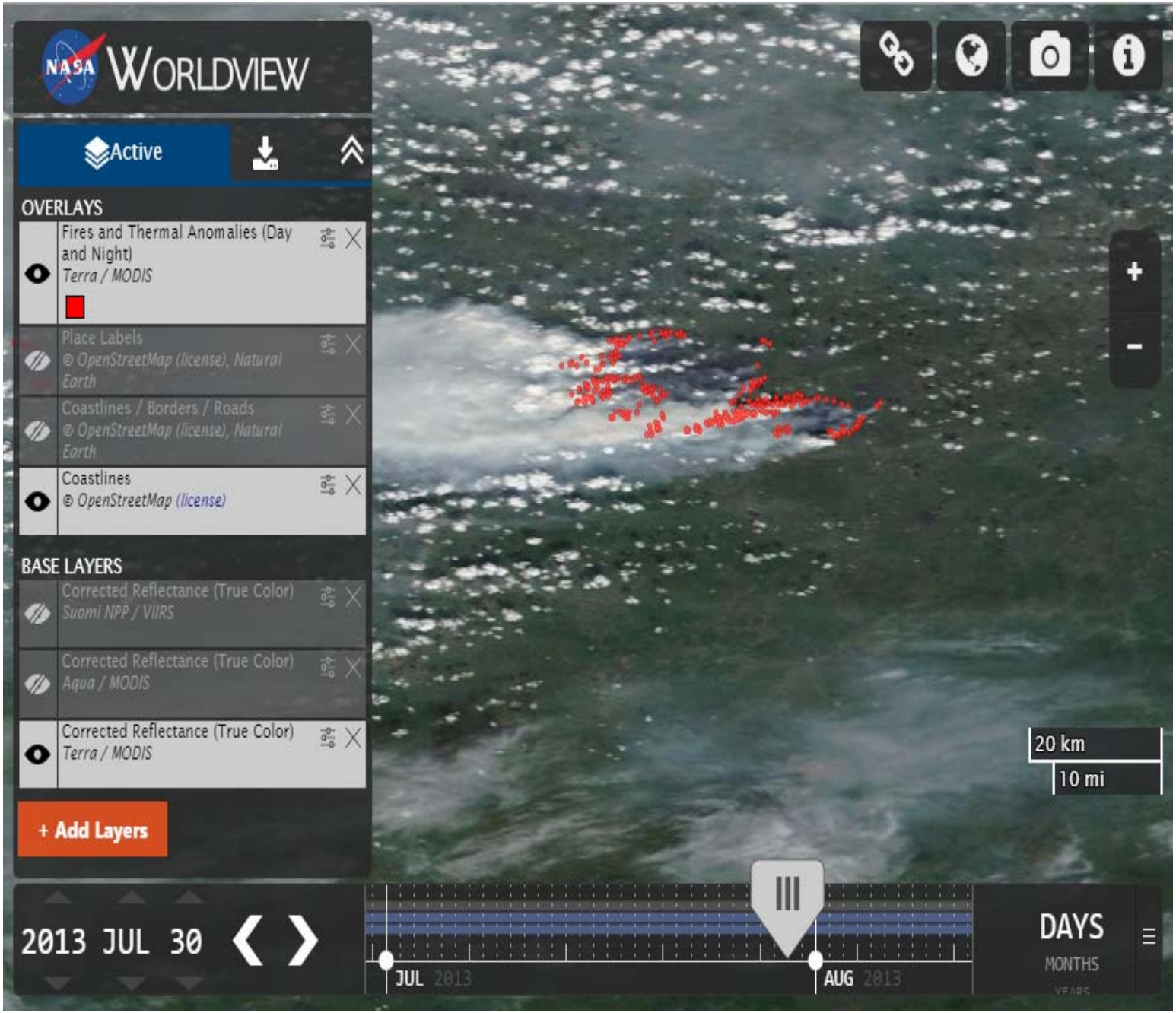
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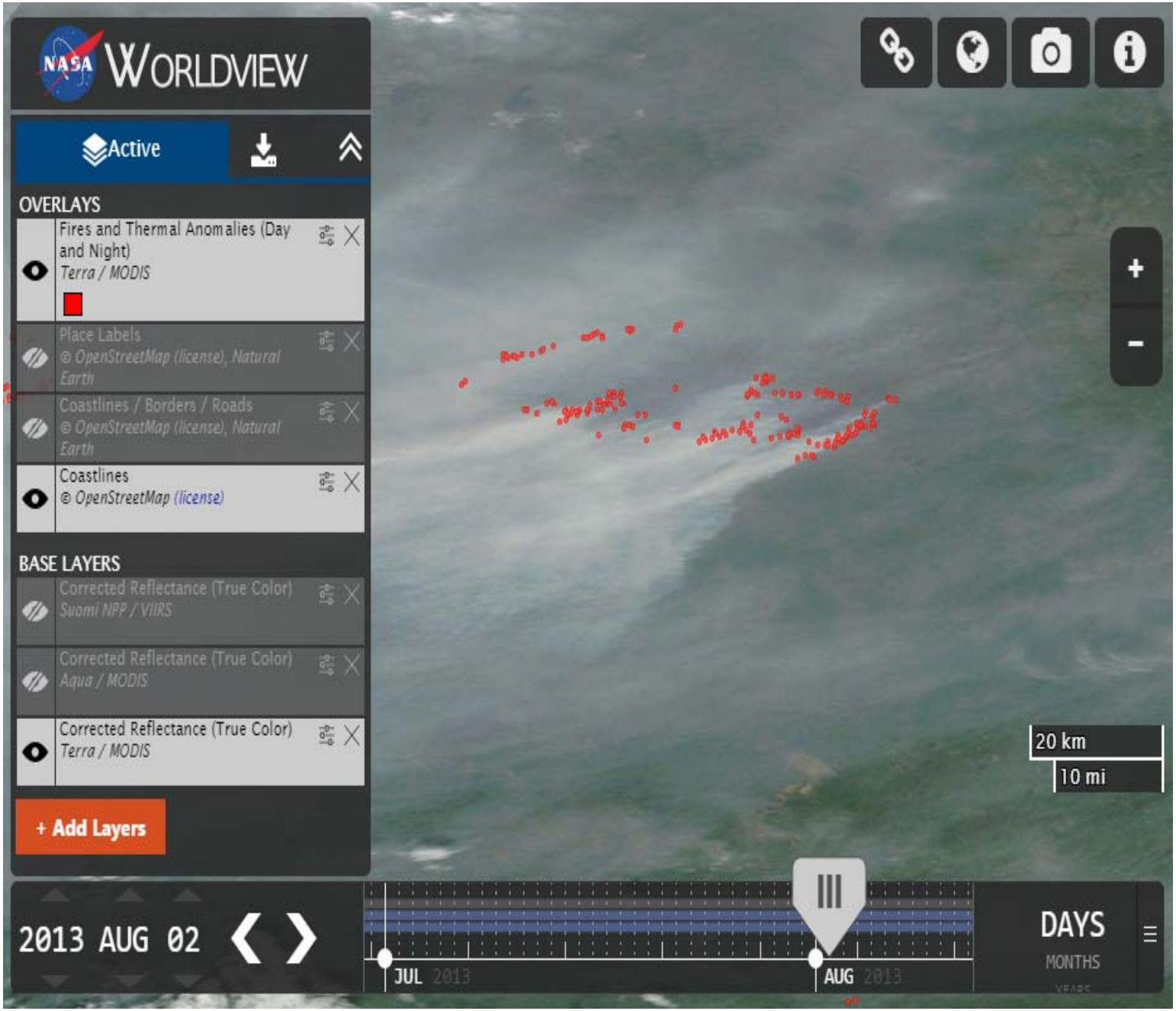
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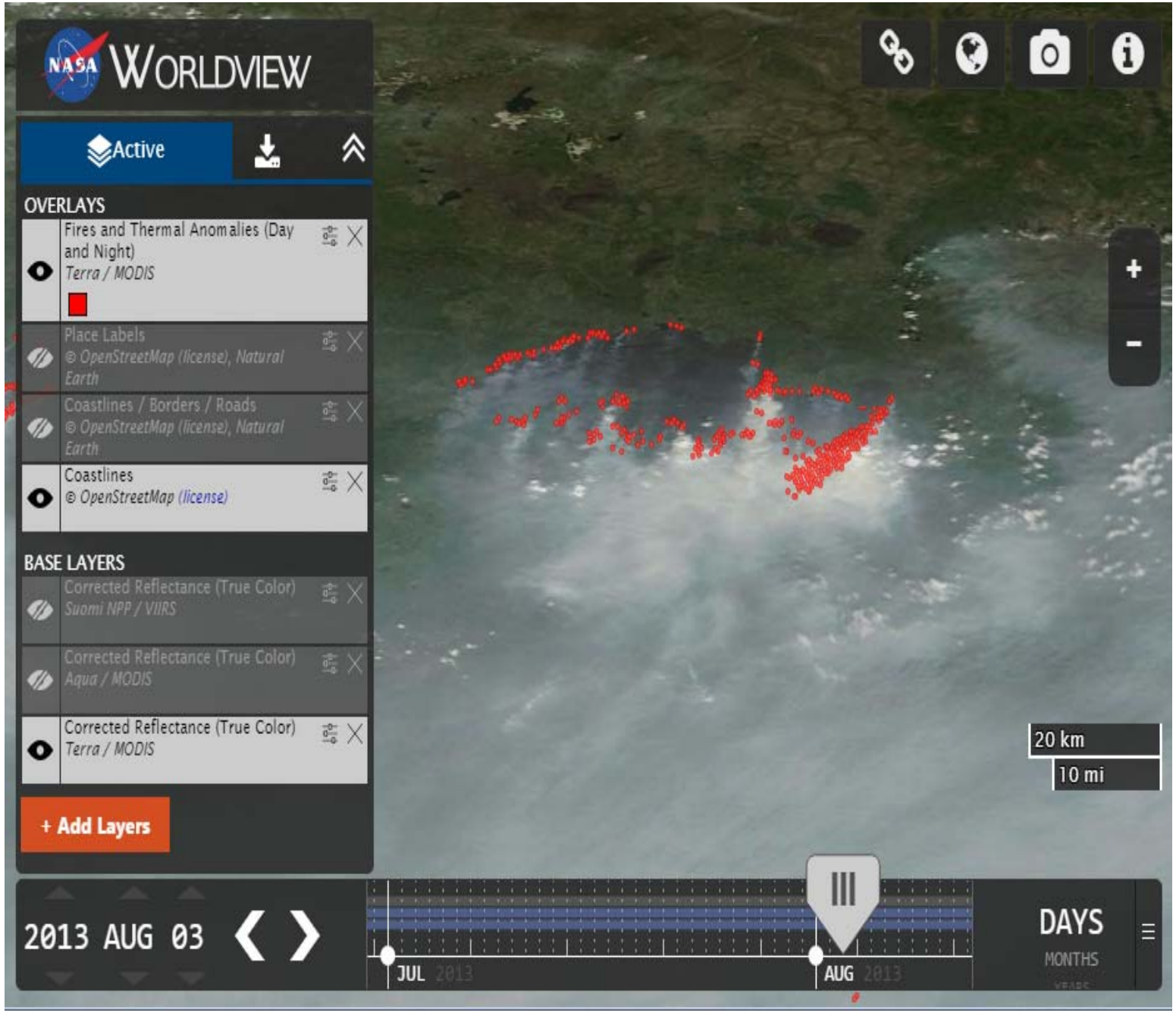
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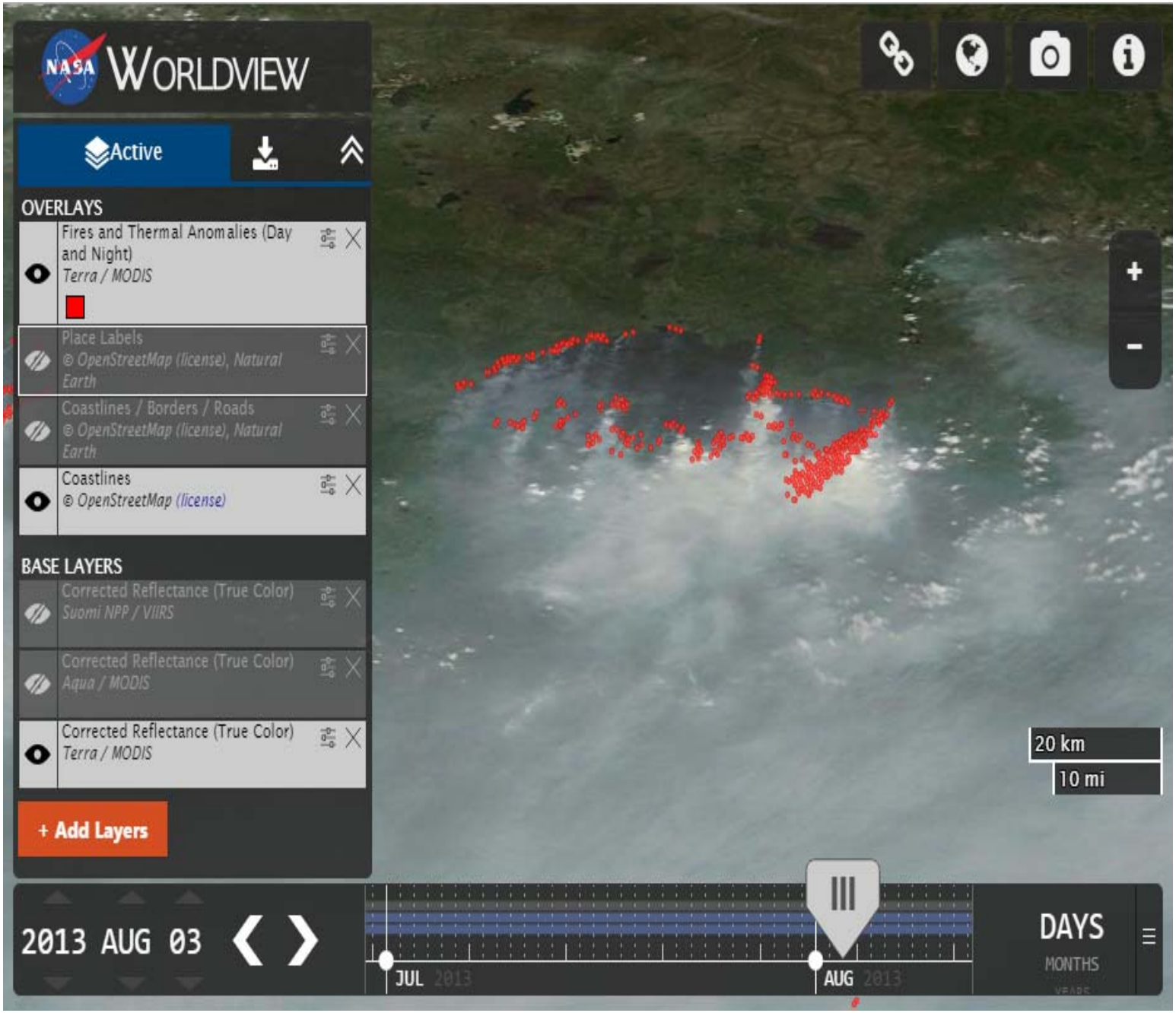
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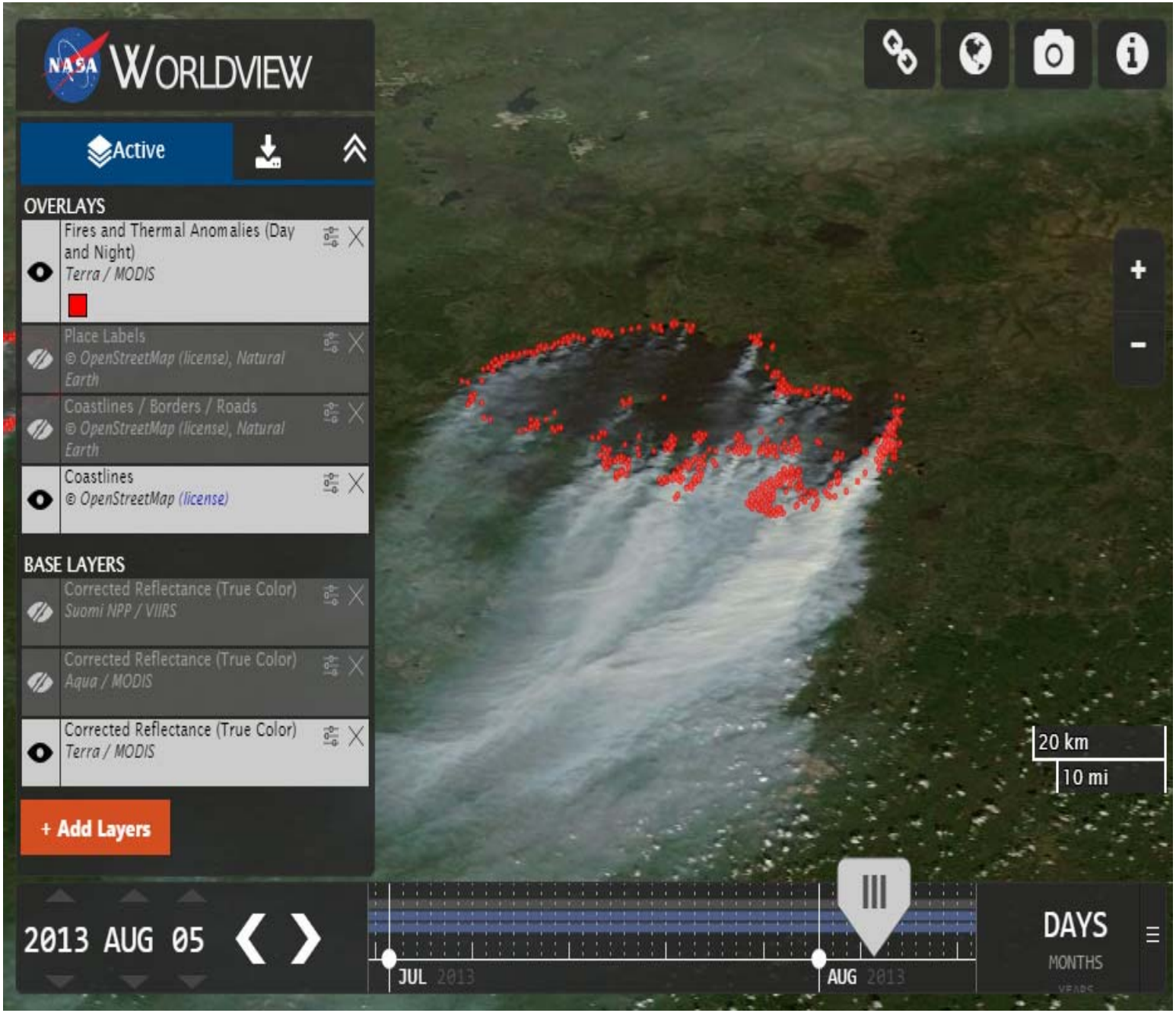
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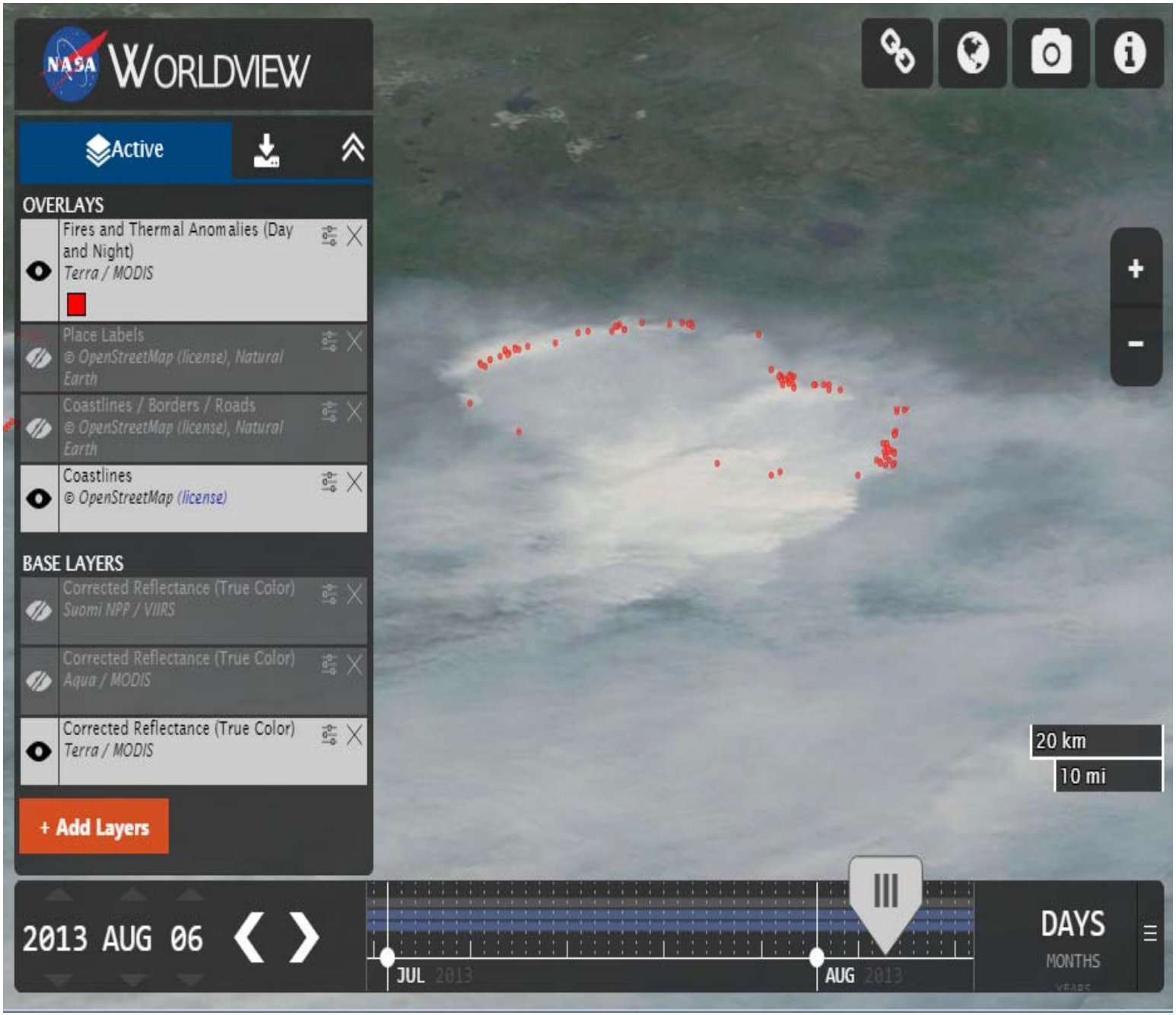
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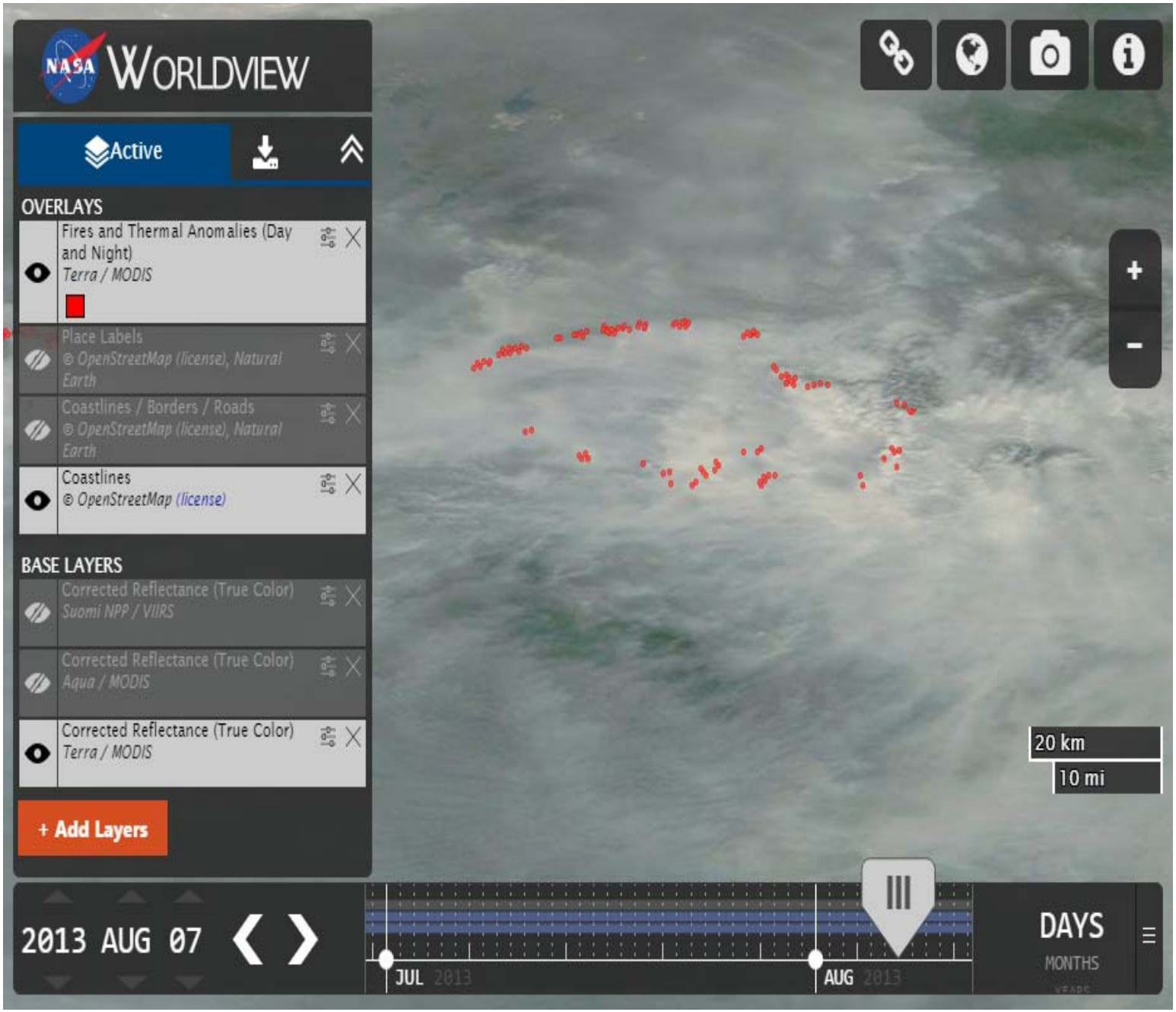
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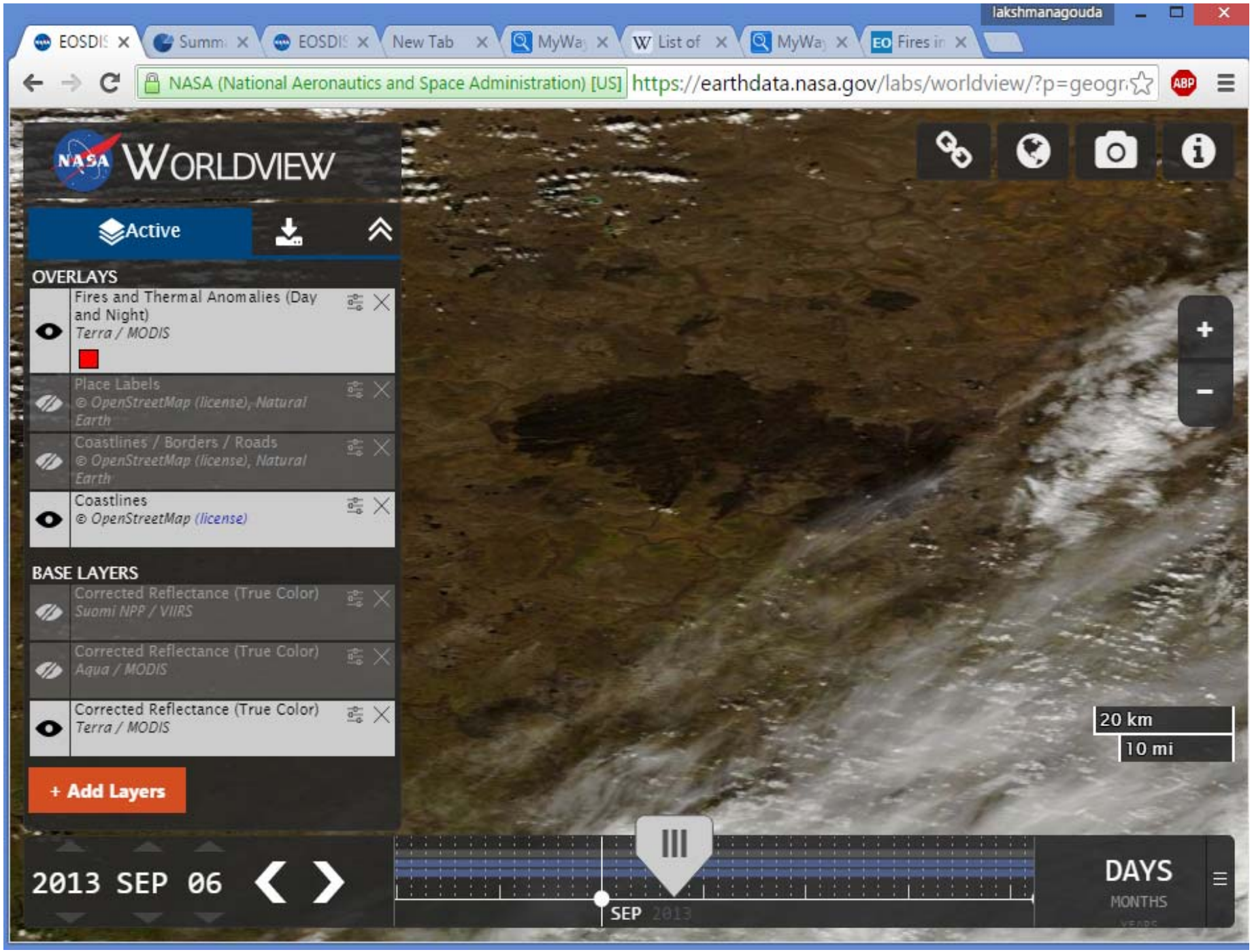
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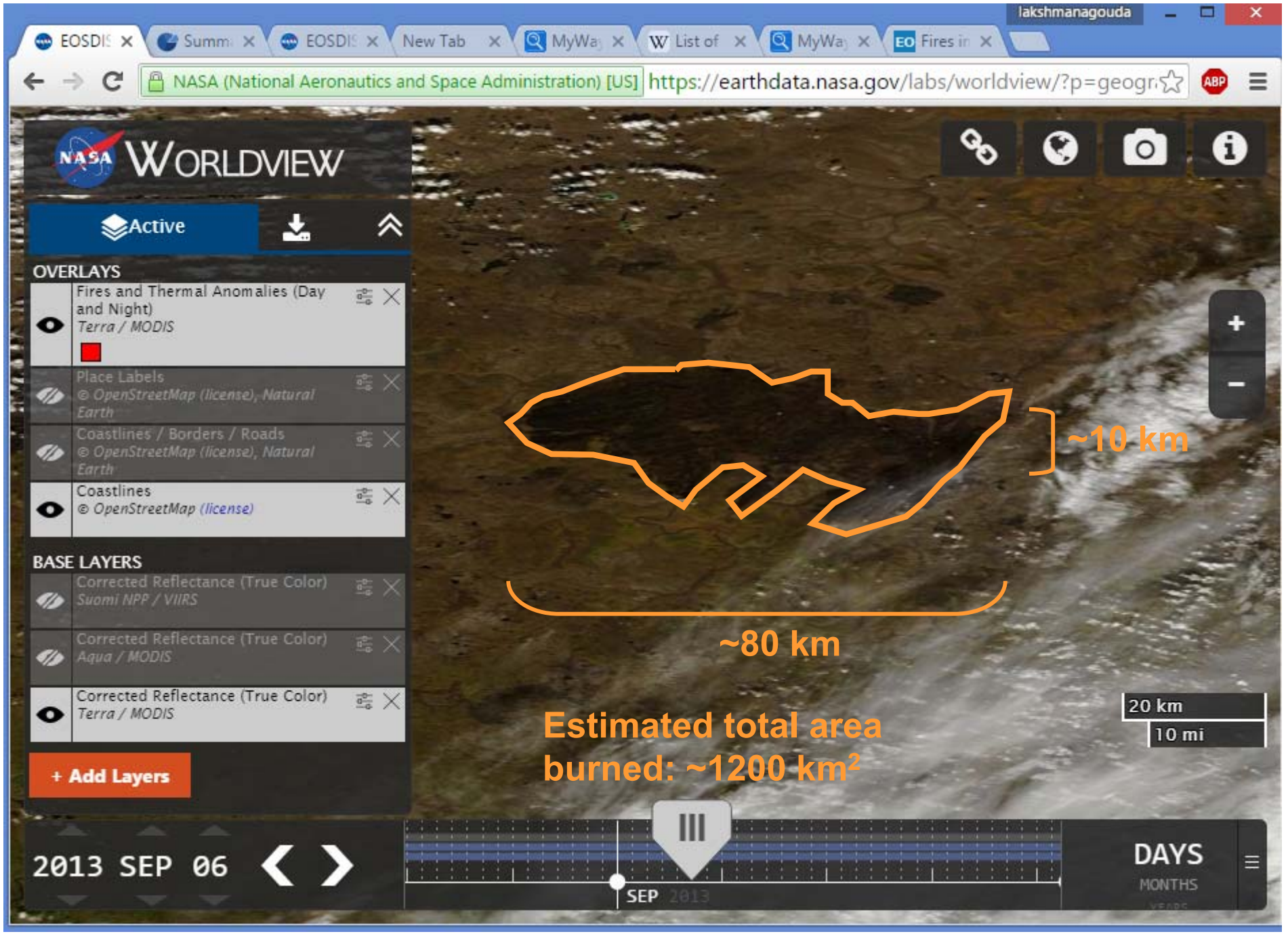
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~10 km
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Estimated total area burned: ~1200 km²
20 km
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DAYS
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