New NOAA/NESDIS Satellite Products for Wildland Fire Applications

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Wildland Fire Products and Services Team

Also: continuous coordination with external partners and users
NESDIS Next Generation Fire System (NGFS) (Supported by the DRSA and BIL)

Single or multi-source GEO or LEO satellite data + supplemental data

NESDIS Fire Information System

NESDIS Fire Data and Information Portal

Fire Software Repository
Critical Applications

- Fire environment forecasting
- Climate monitoring
- Smoke analysis and forecasting
- Timely hotspot alerts
- Incident awareness and assessment
- Event-based data queries
NOAA GOES-R Satellite Fire Detection Capability

Commercial structure fire - Sonoma Co. (Oct 29, 2023)
The NOAA NGFS detected the heat from the fire at 7:54:29 AM PDT.

The corresponding alert was generated at 7:55:03 AM PDT.
The red box shows the region where the NGFS detected heat.
Highland Incident - Riverside County - Oct 30, 2023

GOES-18 Satellite

Initial NGFS detection: 12:48:27 pm

1 km SWIR pixel

Nominal 2 km pixel
Automated detection under cloudy conditions is needed for near continuous monitoring of intensity and spread (coarse resolution).
Oklahoma: March 31, 2023
1:30 - 2:00 pm CT
18:30 - 19:00Z
Kansas:
March 31, 2023
1:00 - 2:00 pm CT
18:00 - 19:00Z
Dashboard interface for new fire detections as a function of fire weather conditions

Users can further filter events by location (GACC, NWS, state, or country), fire weather conditions, and age.
<table>
<thead>
<tr>
<th>Location</th>
<th>NWS WFO</th>
<th>Event Age: 1 day, 14 hours ago</th>
<th>Event Type: Nominal Risk and Red Flag Warning (GOES-15 ABI)</th>
<th>FRP: 3.71</th>
<th>Alert Info</th>
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<tbody>
<tr>
<td>Laclede County, MO</td>
<td>Springfield, MO</td>
<td>1 day, 14 hours ago</td>
<td>Event Type: Nominal Risk and Red Flag Warning (GOES-15 ABI)</td>
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<td>Camden County, MO</td>
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Pre-decisional information:

No automated system is perfect, so a human expert should verify the alert.

The alert report contains detection metrics and imagery needed to evaluate the automated detection.
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Web Map Tools
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Applications for Incident Awareness and Assessment

ESRI Event Dashboards

Fire radiative power
Improved NESDIS fire detections have been integrated into an experimental fire spread forecast model workflow.

Head Fire (California) - August 15-16, 2023

Credit: Kyle Hilburn and James Haley
Colorado St. University CIRA
Towards a Dedicated Cloud-based Data Portal for NESDIS Fire Products

A beta version of the data portal will be accessible in March
<table>
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<td><strong>Timely hotspot alerts</strong></td>
<td>Experimental NGFS (v2) alerts are available <a href="#">here</a>. NOAA Fire Testbed and IAA with DOI+USFS will be used to further refine and improve interoperability.</td>
</tr>
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<td><strong>Incident awareness and assessment</strong></td>
<td>Fire Radiative Power (FRP) time series and incident dashboard tools will be demonstration ready later in 2024. Automated pyrocb detection is under dev.</td>
</tr>
<tr>
<td><strong>Fire environment forecasting</strong></td>
<td>NGFS products + WRF-SFIRE; <strong>LightningCast UI</strong> for wildland fire operations; Development of ML models for lightning ignition and fire intensity prediction.</td>
</tr>
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<td><strong>Event-based data queries</strong></td>
<td>Once the IT security review is complete, experimental NGFS fire products will be available via OGC data services</td>
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<td><strong>Smoke analysis and forecasting</strong></td>
<td>Improved satellite-based fire emissions model (RAVE) is now operational in support of the CMAQ and RRFS</td>
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<td><strong>Climate monitoring</strong></td>
<td>Ongoing and planned satellite data record re-processing; GHG monitoring</td>
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NOAA Fire Weather Request for Information (RFI)

Response Date:
February 16, 2024, 2 P.M. EST
Backup Slides
Links

NOAA Center for Artificial Intelligence
NOAA and Wildland Fire
GOES-R Satellites
JPSS Satellites
NOAA/NESDIS Hazard Mapping System
NOAA LightningCast:
   About
   Near real-time access
LightningCast: AI Lightning Nowcasting for Incident Safety

GOES-West satellite imagery + LightningCast prediction contours + GOES-West lightning mapper observations

Pinpoint LightningCast forecast for Table Mountain fire

Significant increase in LightningCast prediction

~45 minutes of lead-time

First nearby observation

Credit: NOAA/NESDIS and University of Wisconsin CIMSS
LightningCast web availability

Near real-time output is available: https://cimss.ssec.wisc.edu/severe_conv/pltg.html