Proposing a Pilot Project for the Coordination of
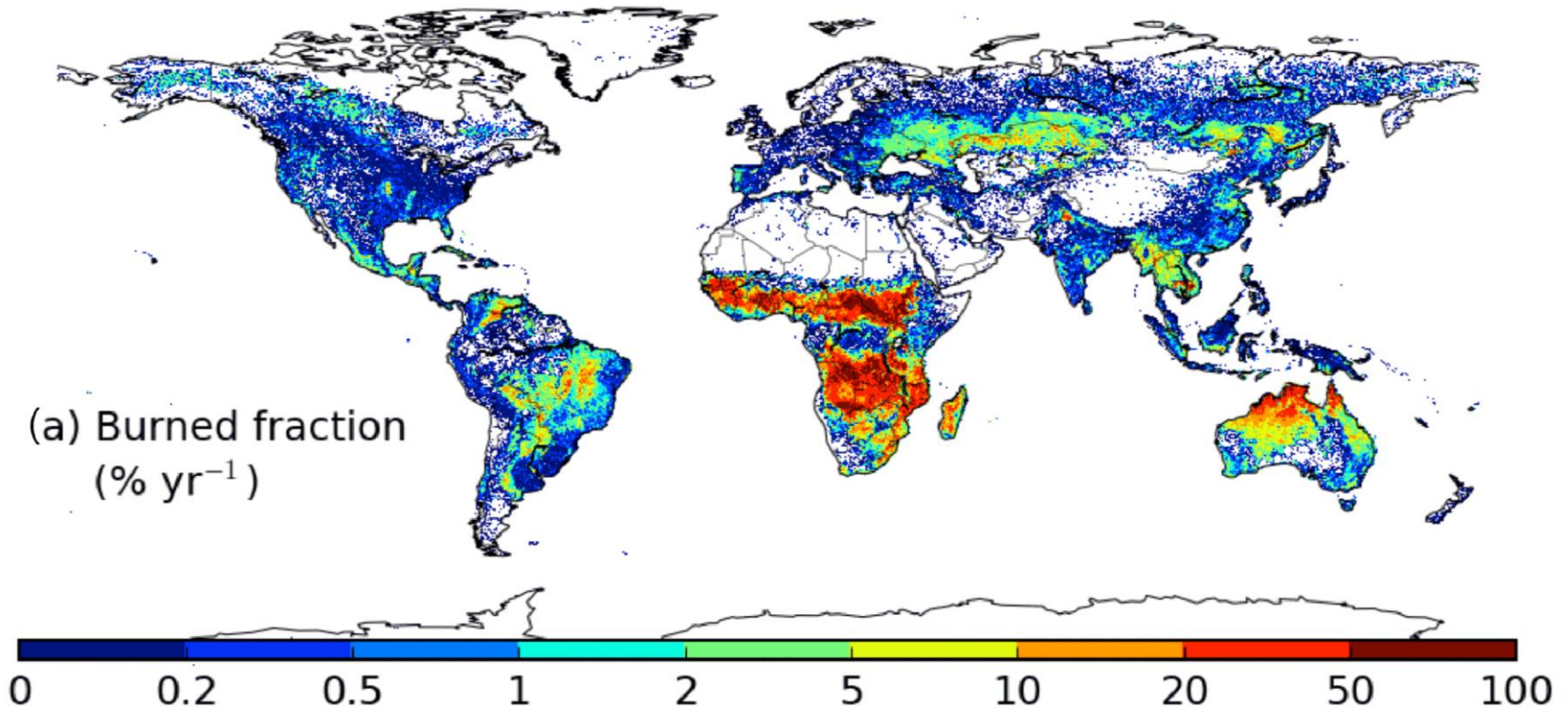# WildFire Earth Observation

Dr. Joshua M. Johnston

WildFireSat Principle Investigator,
Forest Fire Research Scientist

Natural Resources Canada
Canadian Forest Service

Natural Resources
Canada

Ressources naturelles
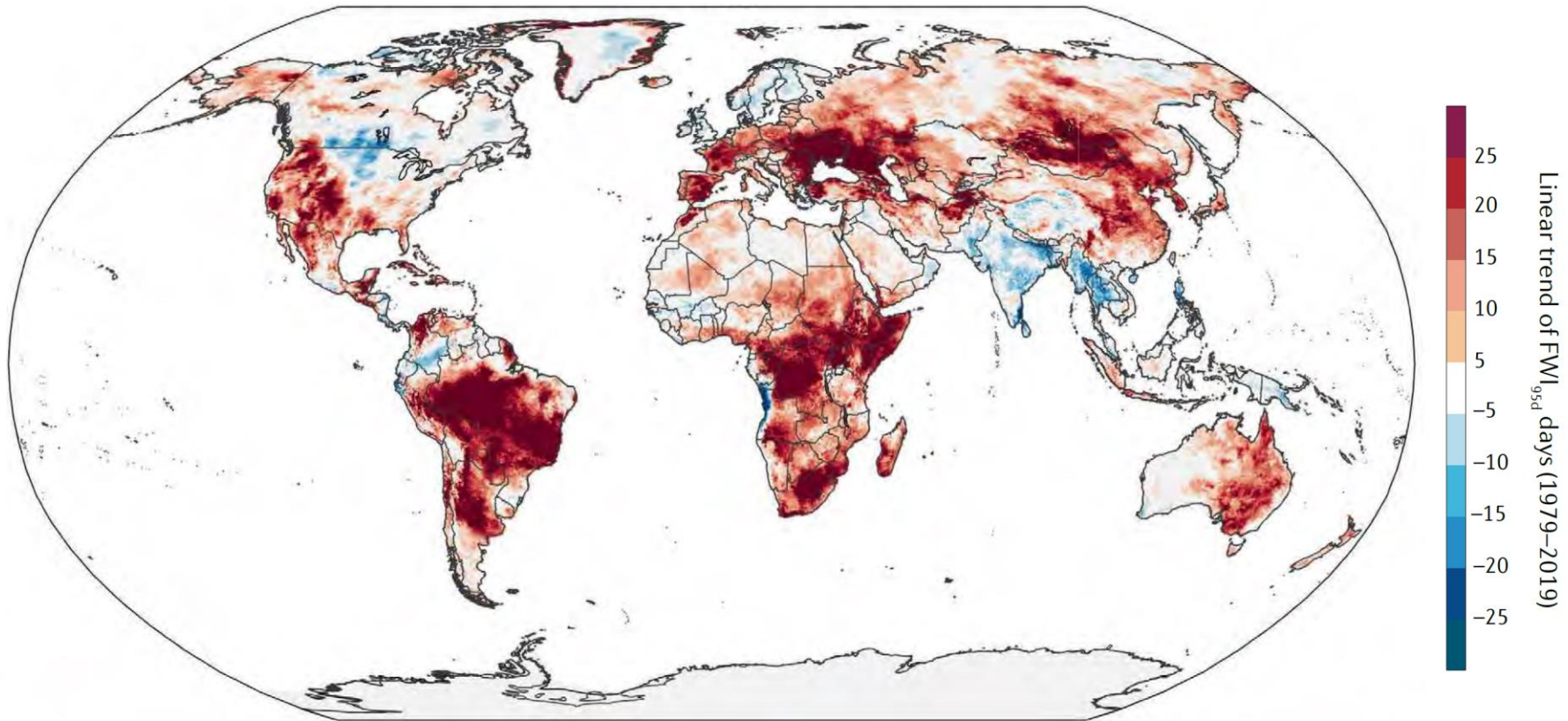Canada

Introduction
Global Wildfire Challenges

(a) Burned fraction
(% yr^{-1})

| 0 | 0.2 | 0.5 | 1 | 2 | 5 | 10 | 20 | 50 | 100 |

(van der Werf *et al.*, 2017)

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Introduction
Global Wildfire Challenges

(Bowman *et al.*, 2020)

Canadä

Introduction
Global Wildfire Challenges

Wildland-Urban Interface, Wildland-Industrial Interface, and Infrastructure Interface for Canada
Producer: Lynn Johnston / Natural Resources Canada (Sault Ste. Marie, ON), University of Alberta (Edmonton, AB)
Date: November 2016
Email: Lynn.Johnston@canada.ca
Coordinate system: Canada Lambert Conformal Conic
Datum: North American 1983
Software version: ArcMap 10.3
Note: Contains data derived from information licensed under the Open Government Licence – Canada.
Disclaimer: This data is provided as is. It is the user's responsibility to determine proper uses for the data. The data provider holds
no liability for adverse outcomes associated with use of this data and cannot guarantee the data is free of errors or omissions.

(Johnston and Flannigan, 2018)

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Introduction
Global Wildfire Challenges

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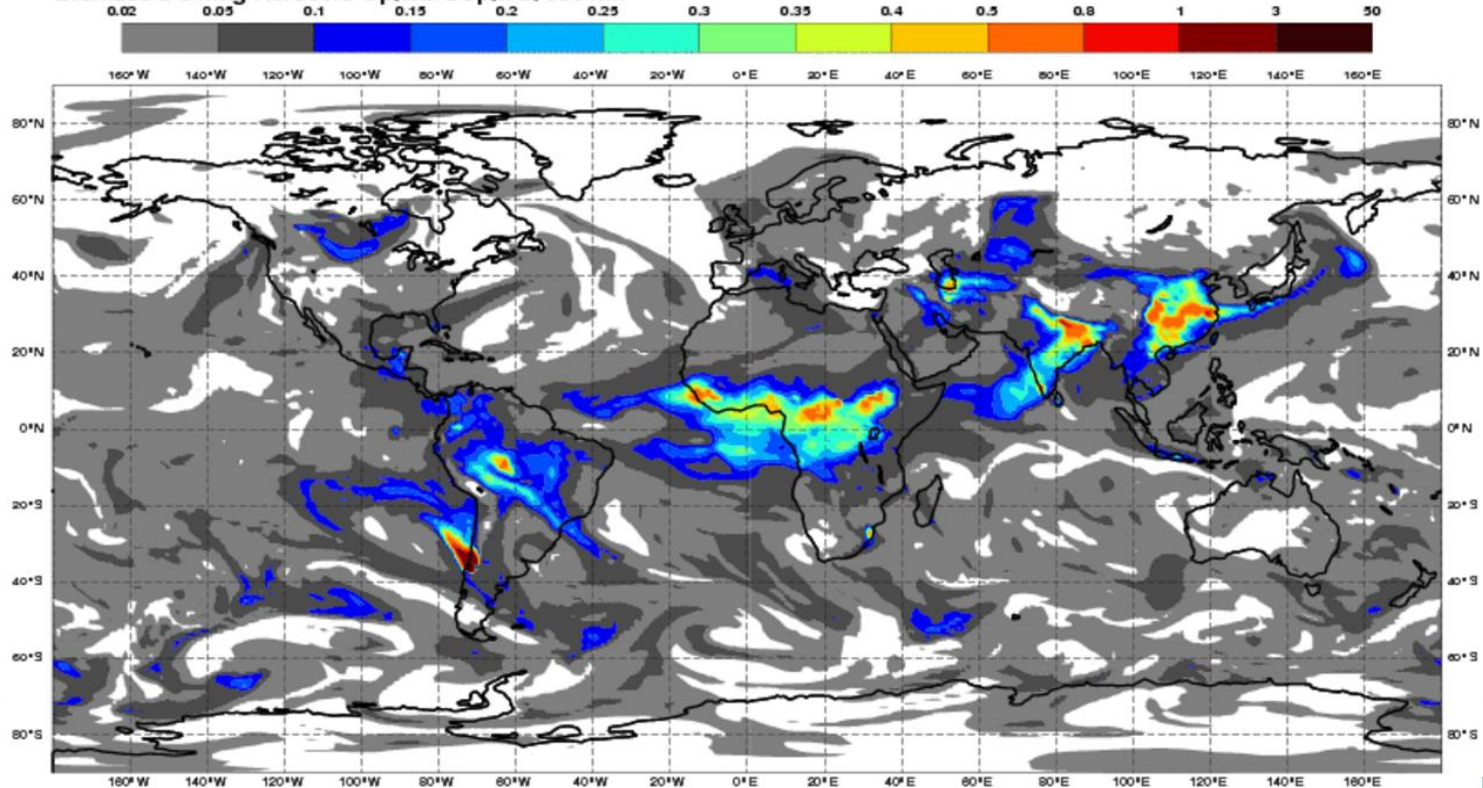
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Background
Wildfire Earth Observation

Thursday 26 January 2017 00UTC CAMS Forecast t+036 VT: Friday 27 January 2017 12UTC
Biomass Burning Aerosols Optical Depth at 550 nm

http://www.gmes-atmosphere.eu/d/services/gac/nrt/nrt_opticaldepth!36!Biomass-burning!Global!macc!od!enfo!nrt_opticaldepth!2017012600!!/

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Background
Wildfire Earth Observation

Sub-divided:

- **Pre-fire characterization** of: vegetative fuels, live/dead fuel moisture, and soil moisture

- **Active-fire observation**: new fire detection, perimeter mapping, and energy and emissions characterisation

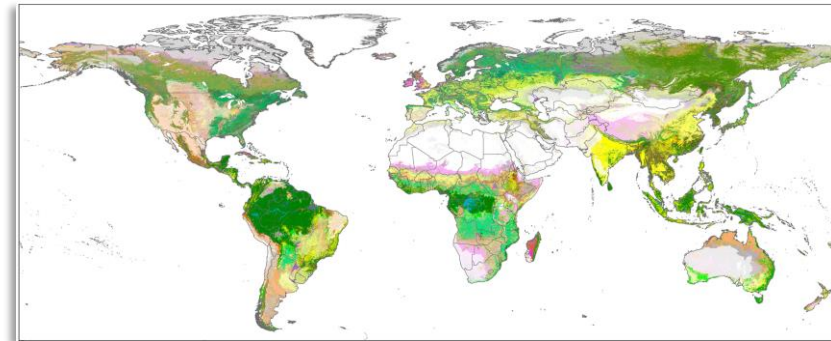- **Post-fire effects**; burned area and severity and impacts/recovery assessment

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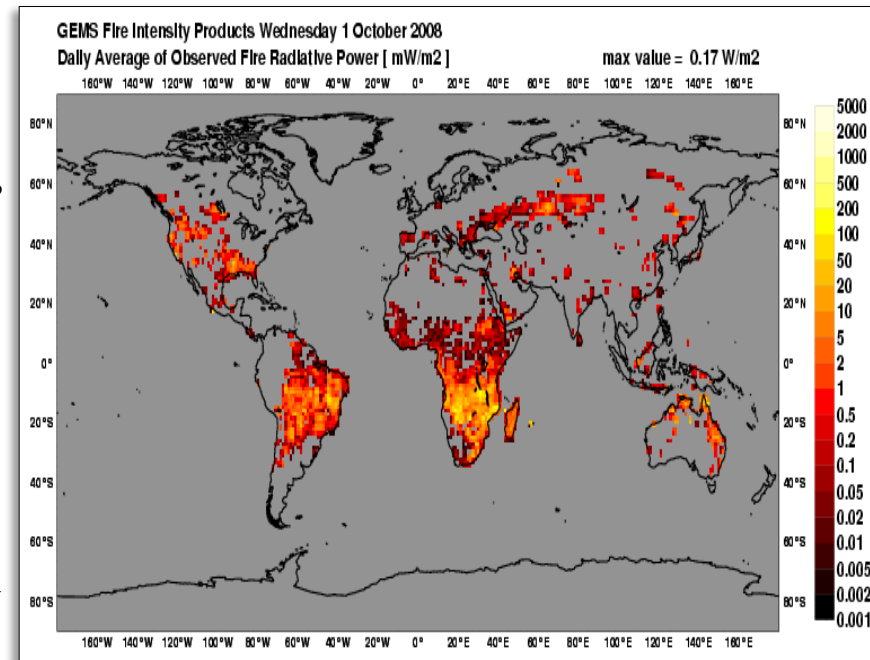
(Pettinari and Chuvieco, 2016)

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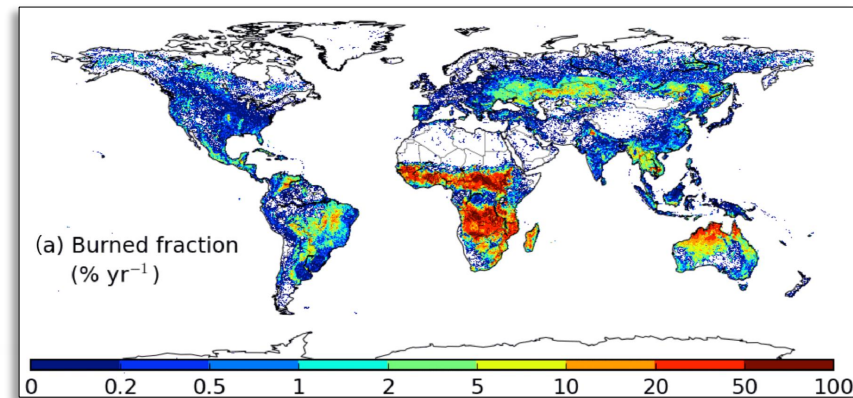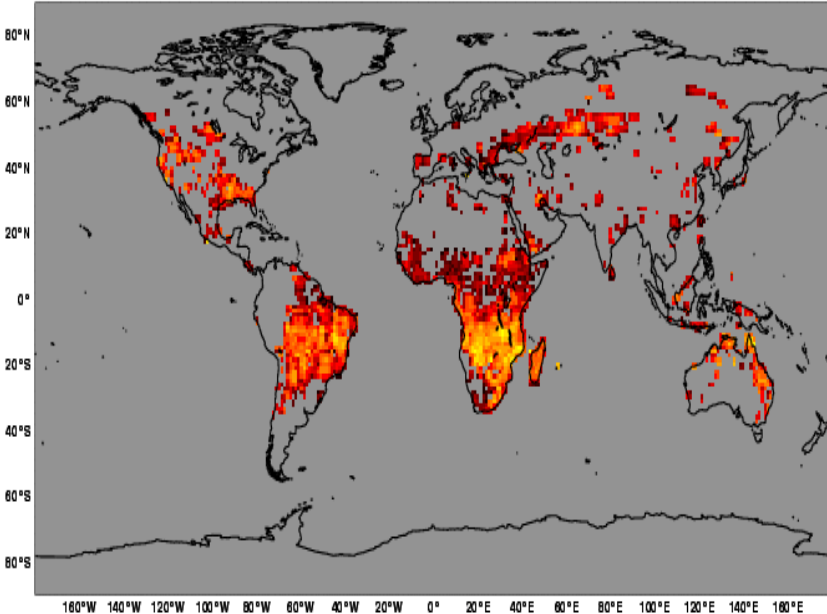

GEMS Fire Intensity Products Wednesday 1 October 2008
Daily Average of Observed Fire Radiative Power [mW/m2]   max value = 0.17 W/m2

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(van der Werf *et al.*, 2017)

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Wildfire Earth Observation
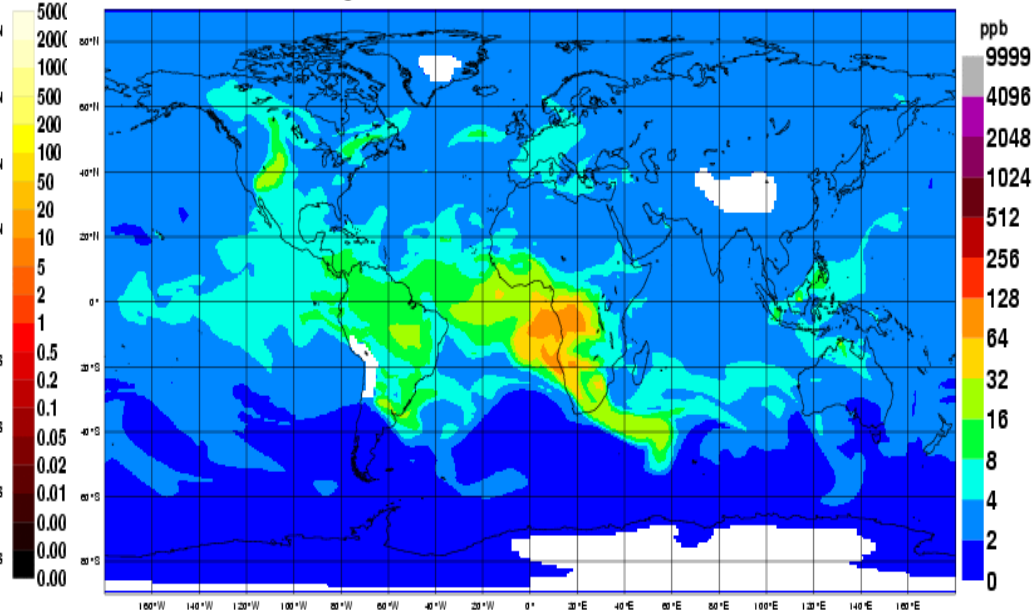
NRT Biomass Burning Impacts on Atmosphere (here CO @ 700 hPa)

CAMS GFAS
Smoke Emissions Calculations → Atmospheric Impact

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Background
Wildfire Earth Observation

Global Wildfire Information System

https://gwis.jrc.ec.europa.eu/static/gwis_current_situation/public/index.html

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Challenges
When things aren't routine…

Challenges
When things aren't routine…

COORDINATION
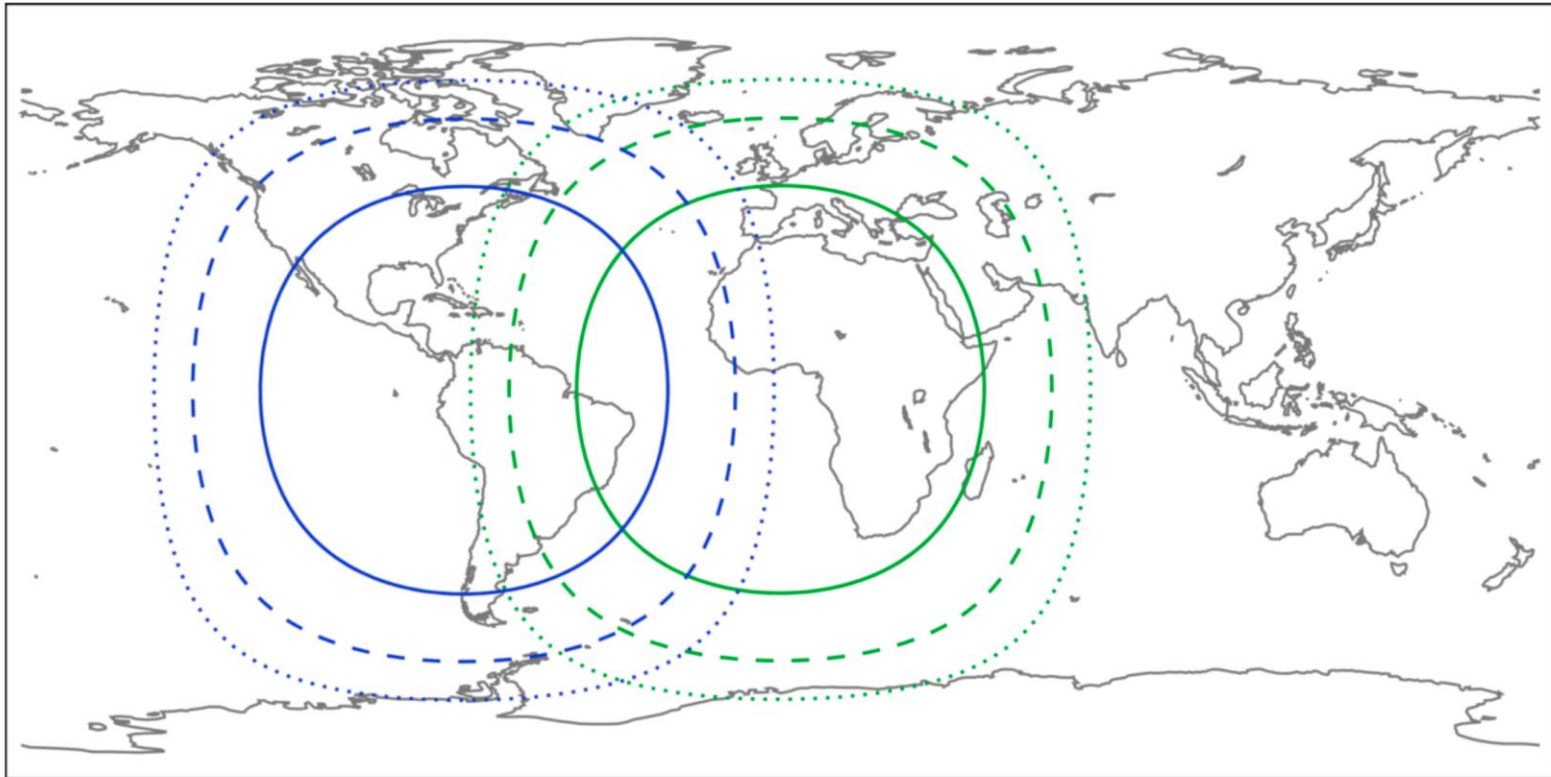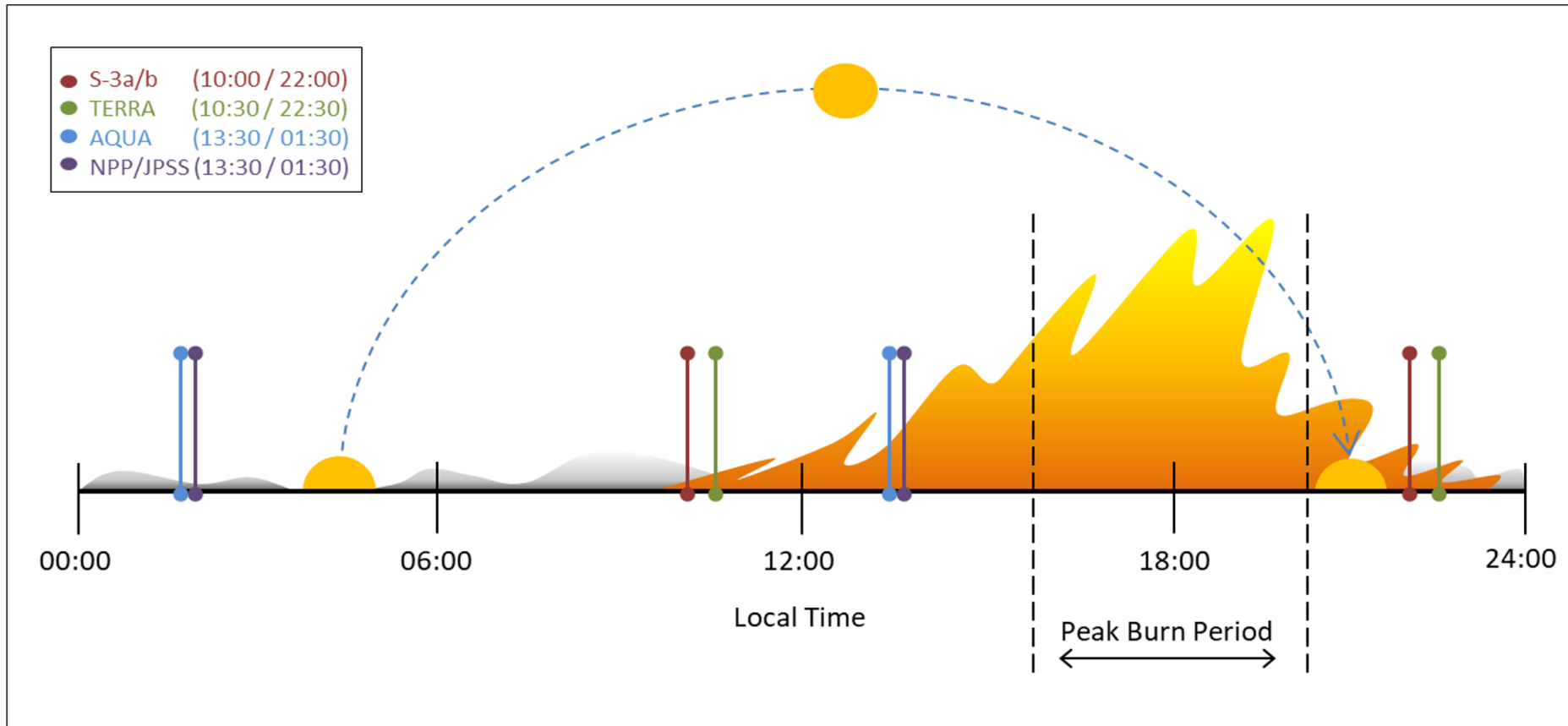
Uncertainty: *knowns*

Fig. 1. Spatial coverage of geostationary fire data from the MSG SEVIRI (dark green outline) and GOES-16 ABI (blue outline) sensors used in this study. Solid, dashed, dotted lines indicate the boundaries at which the area of the pixel footprint grows to a factor of 2, 4, and 8 times larger than at the sub-satellite point. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).

(Hall *et al.*, 2019)

Uncertainty: *knowns*

(Johnston *et al.*, (in review))

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Uncertainty: *unknowns*

Thunder Bay

Residents of Red Lake, Ont., urged to leave as fire burns toward town

Town officials say around 3,800 people have left, while about 500 remain in the community

CBC News · Posted: Aug 12, 2020 5:00 PM ET | Last Updated: August 12

Officials in Red Lake, Ont., located about 500 kilometres northwest of Thunder Bay, urged residents to evacuate Tuesday as a forest fire burned nearby. (CBC News)

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Uncertainty: *unknowns*

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Residents of Red Lake, Ont., urged to leave as fire burns toward town

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Winnipeg ●

Thunder Bay ●

Officials in Red Lake, Ont., located about 500 kilometres northwest of Thunder Bay, urged residents to evacuate Tuesday as a forest fire burned nearby. (CBC News)
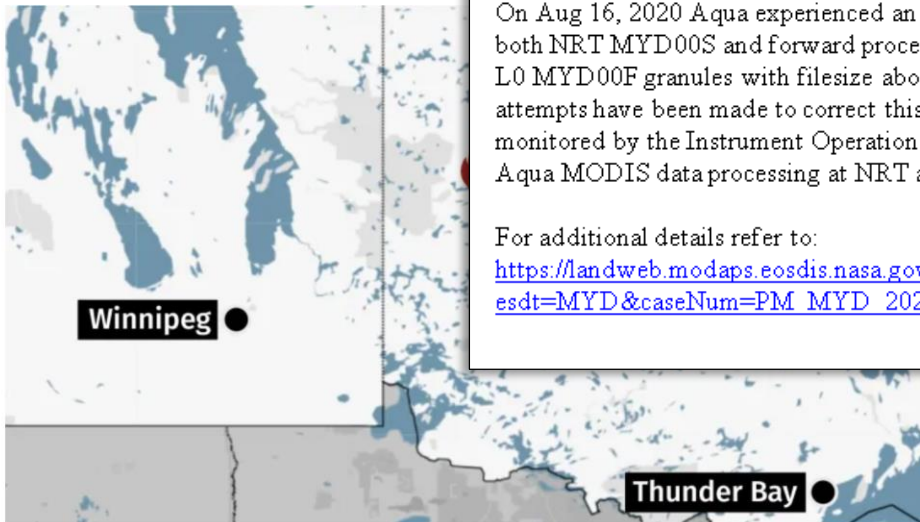
↩ Reply   ↩ Reply All   ↪ Forward

Tue 2020-08-18 15:47

lance-firms-users <lance-firms-users-bounces@lists.nasa.gov> on behalf of lance-modis--- via lance-

[lance-firms-users] [lance-modis] Aqua MODIS Anomaly

To   lance-modis@lists.nasa.gov

On Aug 16, 2020 Aqua experienced an anomaly with the Formatter-Multiplexer Unit (FMU) and Aqua L0, both NRT MYD00S and forward processing MODPML0, has quality issues causing production of five minute L0 MYD00F granules with filesize about 1% of normal size. Since the anomaly at 09:26:49 UTC, several attempts have been made to correct this but the data corruption persists. The health/telemetry is being monitored by the Instrument Operations Team.
Aqua MODIS data processing at NRT and MODAPS is on hold until further notice.

For additional details refer to:
https://landweb.modaps.eosdis.nasa.gov/cgi-bin/NRT/displayCase.cgi?
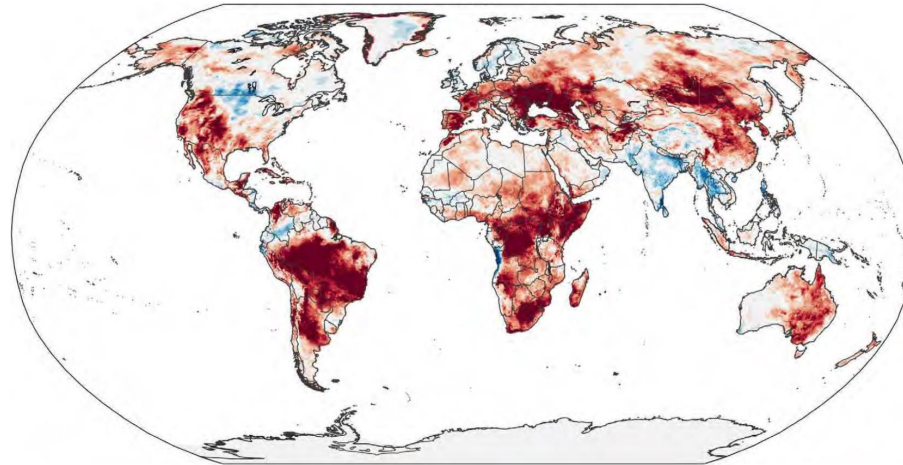esdt=MYD&caseNum=PM_MYD_20229_NRT&caseLocation=cases_data&

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Uncertainty: *unknowns*

When and where will our coverage end?

How will climate change impact our priorities?

Is anyone planning replacements?

Are we capable of supporting emergencies?

Are these plans complementary?

How do user needs compare globally?

(Bowman *et al.*, 2020)

Will these needs change under climate change?

Will the next generation of fire products meet the needs?

What's the plan?

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Way Forward
The Pilot Study

A comprehensive gap analysis for active-fire earth observation

Four specific objectives:

1. Conduct a detailed inventory and gap analysis of existing and proposed EO systems suitable for global active-fire monitoring;
   - *Considering climate change driven fire regime changes and projected mission life spans*

2. Conduct a detailed analysis of global stakeholders and end-users of near-real-time active-fire EO data;

3. Define targeted user requirements for active-fire remote sensing systems for the disaster mitigation applications;

4. Propose a way forward in coordinating global wildfire monitoring activities.

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Way Forward
The Pilot Study

A comprehensive gap analysis for active-fire earth observation

CEOS WG Disasters objectives:

1. Identify the global wildfire EO stakeholder and end-user communities;

2. Demonstrate that global wildfire disaster risk mitigation is possible through a coordinated approach to active-fire remote sensing.

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Way Forward
The Pilot Study

Key pilot outputs/deliverables:

The overall pilot project will generate a master report on the current and future state of global active-fire monitoring detailing the results of Objectives 1-4.

Additional outputs for each Objective will also include:

Objective 1: One or more peer-reviewed publications presenting the findings the projected gap analysis in the context of climate change;

Objective 2: The identification of the global community of wildfire monitoring stakeholders and end-users will enable the creation of one or more sub-groups capable of representing global user requirements for future endeavors/impact assessments;

Objective 3: One or more peer-reviewed publications will be produced describing the scientific approach to defining and adapting user requirements for active-fire monitoring for various mission types (e.g. LEO; GEO; HEO).

Objective 4: will enable CEOS to identify a global strategy for future active-fire EO and a framework for engagement for future mission coordination.

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Way Forward
The Pilot Study

Key outcomes:

1. Existing and future gaps in wildfire EO capabilities will be explicitly identified;

2. The global community of wildfire stakeholders and end-users will be identified;

3. User requirements for active-fire remote sensing will be identified;

4. A way forward to closing existing and future gaps will be identified.

The pilot project is also expected to identify the need for conducting comparable projects for the other disciplines of wildfire EO (e.g. pre-fire and post-fire monitoring).

The pilot project will also provide linkages with air- and ground measurements whenever applicable.

Thank You
Questions?

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