firemaps.net provides fire monitoring services to the fire management and climate mitigation communities.

Gernot Rücker
Fort McMurray wildfire estimated to be costliest disaster in Canada

About $3.58 billion in damage is expected due to the fire in May that swept through Fort McMurray, according to the Canada Revenue Agency. The United States National Weather Service said Thursday.

Huge forest fires in Portugal kill at least 60

Many died in their cars as they fled from huge blaze amid severe heatwave on Iberian peninsula

At least 60 people have been killed in huge forest fires in central Portugal, many dying in their cars as they tried to flee the flames.
Biomass burning contributes to climate change through GHG emissions (~about 6% of fossil fuel emissions).

Air pollution causes an estimated 3.3 Mio. premature deaths per year, biomass burning being the most important source in the southern hemisphere.
firemaps.net target user communities

Climate change, environmental Protection & health

- Time series on fire emissions
- Burned area
- Input to Monitoring Reporting, Verification

Fire management & Fire suppression

- fast & accurate information: risk & hazard mapping, fire perimeters, spread models, fire impact

(Re-)insurance

- Rapid damage assessment
- Analysis of fire threat
- Global analysis
- Climate change impact
Intuitive web interface
Information on each fire event
Long time series on burned area, emissions, biomass burned, etc.
Online fire behaviour modelling
Fire risk analysis and early warning
Decision support and management reports
And in the field: Mobile app
Methods: Estimating smoke emissions from fires

Emissions = biomass burned * Emission factor
“New” method: estimate biomass burned from heat

Biomass burned = Fire Radiative Energy * Sf * Cf

Sf = 0.368 MJ/kg
Cf = 1.56
Estimate biomass burned from time series of observations for each fire
Analysis of spread rates: Example from Brazil
Fireline intensity: Combining fuel consumption and ROS

MODIS FRP – derived fuel consumption estimate & higher resolution derived ROS provide first estimate of fire intensity

<table>
<thead>
<tr>
<th>ROS [m/s]</th>
<th>ROS uncertainty [m/s]</th>
<th>Fuel consumption [kg/m²]</th>
<th>Fuel consumption uncertainty [kg/m²]</th>
<th>Low heat of combustion [kJ/kg]</th>
<th>Low Heat of combustion error [kJ/kg]</th>
<th>Fire Intensity [kW/m]</th>
<th>FI uncertainty [%]</th>
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<tbody>
<tr>
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<td>0.01</td>
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<td>1000</td>
<td>129</td>
<td>42</td>
</tr>
</tbody>
</table>
Automating Rate of Spread (ROS) estimates

2857 m
9335 s
Estimating fireline intensity from fuel consumption and ROS
Fire spread model output

Landsat 8: 15.02.2016 03:43:29

Output: fire perimeter
Fuel Type: New Deciduous Forest

NPP fire detections:
15.02.2016 18:35:00

Simulation run stop time = Overpass of NPP = 15.02.2017 18:35:00

Landsat 8: 15.02.2016 03:43:29
Fire intensity model output

Output: fire intensity
Fuel Type: New Deciduous
Background: SRTM
firemaps.net: Architectural overview

- **Web Client**
- **GIS Client**
- **Mobile Client**

Security and web mapping framework

GeoServer OGC WMS/WFS Server

Firemaps web services

Modelling modules (burned area, emissions, fire behaviour, ...)

Mission-specific Connector
(Sentinel, Landsat, MODIS, VIIRS, ...)

Preprocessing module:
- Reformat
- Reproject
- Subset, Cloud mask...

Heterogeneous Data Sources provided by
Satellite data providers
Weather data

- Firemaps DB
- Raster data
The firemaps system is key for us. Using this data we can plan our management for the next fire season and we can focus our attention on emission reduction.

It is easy to use. Within less then half a day, anyone can learn to use this system.

Amara Outtara
National Park Manager
Comoé National Park (Unesco World Heritage Site, Ivory Coast)
Laufender Antrag: VIS/NIR/IR-Sensorsuite DIEGO auf Bartolomeo

Sensorsystem im Vorhaben DIEGO und Bartolomeo-Plattform am Columbus-Labor der ISS. 11 Bänder im VIS, NIR, MIR und TIR + hochauflösendes (3840x2160 Pixel) schwenkbares Kameraregister mit hohem Kontrastumfang für stereoskopische Aufnahmen am Tag und in der Nacht zur Verfügung.
Danke!

www.firemaps.net                          info@firemaps.net

Förderung/Partner

Auszeichnungen

Photo: A.A. Hoffmann

Förderung/Partner

Bundesministerium für Wirtschaft und Technologie
Zentrales Innovationsprogramm Mittelstand
Office Ivoirien des Parcs et Réserves

Auszeichnungen

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
South African National Parks

Prevenção, Controle e Monitoramento de Queimadas Irregulares e Incêndios Florestais no Cerrado

Winner The DLR Environment, Energy and Health Challenge

FINALIST 2016 T-SYSTEMS OPEN TELEKOM CLOUD CHALLENGE
Fuel consumption: sample results
(Kruger National Park, South Africa)