

# GOFC-GOLD

Global Observation of Forest and Land Cover Dynamics



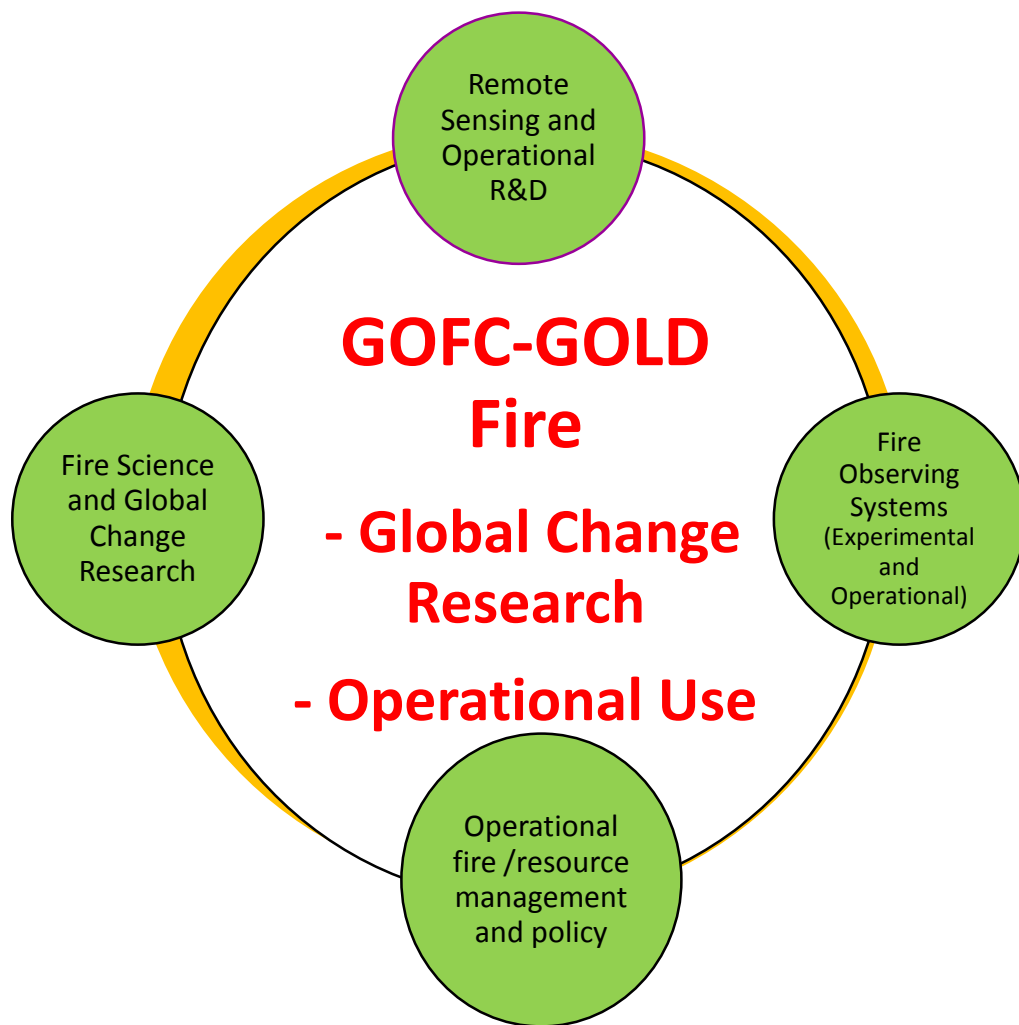
## Fire-Implementation Team (Fire-IT) Update and Future Steps

**Fire-IT Co-Chair:  
Chris Justice (U. Maryland)**

**Fire-IT Executive Officer:  
Krishna Vadrevu (U. Maryland)**



# The GOFC-GOLD Fire Community



**GOFC-GOLD**  
Global Observation of Forest and Land Cover Dynamics

**Fire Monitoring & Mapping Implementation Team**

HOME PARTICIPANTS PROJECTS RESOURCES REGIONAL NETWORKS MEETINGS CONTACT

**Welcome To GOFC/GOLD-Fire**

**Site Map**

- Background
- Implementation Goals
- Objectives
- Documents and Publications
- Related Programs

**Current News**

04/15/2013 : 04/19/2013  
Fire IT Meeting and GOFC symposium at Wageningen University, Netherlands  
For more information Click Here

**Quick Links**

- Upcoming Meetings
- Recent Meetings & Reports
- VIIRS Active Fire Team

**Fire Radiative Power products**

GOFC/GOLD (Global Observations of Forest and Land Cover Dynamics) is a project of the Global Terrestrial Observing System (GTOS) program, which is sponsored by the Integrated Global Observing Strategy (IGOS). The main goal of GOFC/GOLD is to provide a forum for international information exchange, observation and data coordination, and a framework for establishing the necessary long-term monitoring systems.

The GOFC/GOLD-Fire Mapping and Monitoring Theme is aimed at refining and articulating the international observation requirements and making the best possible use of fire products from the existing and future satellite observing systems, for fire management, policy decision-making and global change research.

GOFC/GOLD is promoting a self-organized regional networks of data users, data brokers and providers, where closer linkages and collaborations are established with emphasis on an improved understanding of user requirements and product quality. GOFC/GOLD-Fire is pursuing, in a joint effort with the Committee on Earth Observing Satellites (CEOS) Working Group on Calibration and Validation (WGCV) Land Product Validation (LPV) subgroup, the coordinated validation of fire products by standardized protocols.

GOFC/GOLD-Fire is partnering with the Global Fire Monitoring Center (GFMC), and the United Nations International Strategy for Disaster Reduction (UNISDR) Wildland Fire Advisory Group / Global Wildland Fire Network.

**GOFC-GOLD**  
GLOBAL OBSERVATION OF FOREST AND LAND COVER DYNAMICS

**NASA**

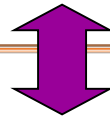
**UNIVERSITY OF MARYLAND**

Site Maintained by Krishna Vadrevu  
Website Developed by Jon Nordling

<http://gofc-fire.umd.edu/>

# Organization of GOF-C-GOLD Fire

**GOF-C – GOLD Executive Committee (Tony Janetos, Chair )**



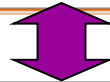
## **Fire Implementation Team**

**Co-Chairs:** Chris Justice, UMd and Johann Goldammer, GFMC

**Fire IT Exec. Officer:** Krishna Prasad Vadrevu, UMd

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**Fire IT Members:** Olivier Arino, Luigi Boschetti, Alessandro Brivio, Emilio Chuvieco Ivan Csiszar, Philip Frost, Louis Giglio, Bill de Groot, Anja Hoffmann, Eckehard Lorenz, Tim Lynham, David Roy, Jesus San-Miguel-Ayanz, Michael Schmidt, Wilfrid Schroeder Kevin Tansey, Guido van der Werf, Martin Wooster.



## **Regional Networks (w. Fire Emphasis)**

**Coordinator:** Anja Hoffman

**Regional Networks:**

Philip Frost (SAFNET), Jesus Acevedo (REDLATIF), Ionnis Gitas (BALKAN Netw.), (SEARRIN)



**International Strategic Partnerships e.g. START, UN ISDR Wildland Fire Network, CGMS, TOPC, CEOS LPV, GEO Wildfire, EARSEL SIG-Fire, ILDRCC, UN FAO**

# GOFC/GOLD-Fire IT Goals

## Promoting:

- **Data and Service Continuity and Long-Term fire data records**
  - **Operational polar orbiters (coarse and moderate resolution) with adequate fire monitoring capability**
  - **Establishment of a geostationary global fire network**
- **Assessment of Fire Product Accuracy and Quality**
- **Global Fire Early Warning Systems > operational products**
- **Use of EO in fire emissions product suites**
- **Improved fire data and information systems**
- **Enhanced user products and services**
- **Experimental fire observing systems and related research**
- **Increased user awareness of EO fire data**

# Fire IT Program Scope

- **Spaceborne Assets (Space Agencies)**
- **Derived Data and Information Products (Science Community)**
- **Data Policy, Access and Distribution (Space Agencies and Data Providers)**
- **Capacity Building for Improved Data Utilization (Users)**

# GOFC Fire IT Meeting (July 29-31<sup>st</sup>, 2014), NOAA Center



*Summary published in The Earth Observer, (Jan-Feb, 2015, 29-33 Pp).*

# Areas of Recent Attention

- **Spaceborne Assets**
  - Fire Monitoring with next generation Operational Polar Orbiters > Data Continuity (e.g. VIIRS, JPSS1, Sentinel 3 SLSTR)
  - Moderate Resolution Data Continuity (e.g. Landsat 8, Sentinel 2, ResourceSat, CBERS4)
- **Data and Information Products**
  - Regional / Global Burned Area Products Generated (NASA MODIS C6, ESA CCI)
  - Systematic Global BA product validation (e.g. MODIS CEOS LPV Stage 3 – REFINED DEFINITION)
  - Moderate Resolution (Landsat Class) derived and validated fire products
  - Multi-source fire data fusion and information integration (e.g. AFIS, MUSLI)
- **Data and Information Access and Distribution**
  - Global WildFire Information System (GWIS) (JRC/EC) – GEO TASK GI 09
  - Near Real-Time Global Daily Active Fire Monitoring (e.g. NASA VIIRS LANCE)
  - Web-based Fire and Imagery Distribution Systems (e.g. FIRMS, WELD)
- **Capacity Building for Data Utilization**
  - Regional Fire Networks – workshops and initiatives (e.g. SAFNET, CARIN, BALKAN Network, SEARRIN etc.)

# Recent Fire IT Project Office Contributions

- ❑ Currently, NASA is supporting the GOFC-Fire IT Office at UMd.
- ❑ Providing inputs for developing specific tasks – most recently
  - ❑ GEO Wildfire - GEO Workplan DI-01-C4 Component of Task DI-01: Informing Risk Management and Disaster Reduction;
- ❑ Providing inputs to international meetings and partner programs – eg IBBI (GOFC-Fire presentation; EARSEL, UNISDR meeting inputs).
- ❑ Outreach and communication through Website, Email exchange, telecons, meeting summaries e.g. Earth Observer articles
- ❑ Working with START and NIES on regional network coordination and workshops – with special editions



# Recent Project Office Contributions..

- Apart from Fire-IT meetings, project office facilitating fire-related research sessions/meetings – can assist in mobilizing funds and resources with IT members
  - **RedLatif Meeting – Satellite based fire products and their validation in Latin America (INPE, Brazil, November, 16-21, 2015)**
  - **SEARRIN-International Workshop on Air Quality in Asia (Bogor, Indonesia, 2015)**
    - Outputs – special issue for ‘Environmental Pollution’ (In press).
  - **SAFNET meeting (February, 2013; *August, 2014*)**
  - **SEARRIN Fire-Air Quality meeting with NIES, (Hanoi, Vietnam, June, 2014);**
    - Outputs – special issue for ‘Environmental Research Letters’ (Published)

# New Fire Observations

- **VIIRS Suomi NPP > JPSS1 and JPSS2**

- Improved I band capability for detection > VIIRS LANCE NRT in development
- NASA VIIRS AF product (2016) – continuity w. MODIS C6 inc. FRP
- Burned Area – continuity w. MODIS C6 (TBD)
- Evolving NOAA NDE products for fire

- **Sentinel 2 MSI**

- Current issues of data acquisition and bulk data access
- EDC Archive coming on line
- NASA/ESA L8/S2 Initiative – increased frequency - *joint science team meetings* for funded PI's and partnering on proposals – Roy et al. Southern Africa Fire.

# MODIS and LANDSAT Products

- **MODIS 6 Collection Products Refinements ongoing**
  - Improved thresholds to detect small fires, gas flares, etc.
  - Improved cloud mask
  - Updated FRP retrieval
- **LANDSAT 8 Burned Area Products**
  - Prototype Landsat resolution burned area maps are being developed by the community (Boschetti, Roy et al)
  - Exciting potential for continental to global scale, and long - term, 30m burned area products

# New Fire Observations

- **Sentinel 3 SLSTR (Sea and Land Surface Temperature Radiometer)**
  - High inclination orbit ( $98.65^\circ$ ) near-polar, sun-synchronous orbit with a descending node equatorial crossing at 1000 Mean Local Solar time
  - Dual view swath of 1400 km for nadir view and 740 km width for oblique view defined at  $55^\circ$
  - Products are available either in NRT (Near Real Time), provided to the user within three hours after sensing, or in NTC (Non Time Critical) typically within 48 hrs - NetCDF and XML metadata
    - <https://sentinel.esa.int/web/sentinel/sentinel-data-access>
  - Dual-gain, 1 km resolution, 4 channels, 2 fire (low-gain), S7 MIR  $3.7 \mu\text{m}$  vs. MODIS ( $3.9 \mu\text{m}$ ), S6 SWIR ( $2.25 \mu\text{m}$ ) channel 500 m to be used at night to improve small fire detections

# Sentinel-3 SLSTR: Active Fire (AF)

- AF detection and characterization algorithm is a 6-stage, self adapting approach **only** using the nadir facing channels (Wooster et al.)
  - ~1 day repeat cycle at the Equator (1.9 days when using nadir and oblique facing dual-view)
- Spatial filters from Geostationary algorithm (e.g. SEVIRI) used to constrain # of potential fire pixels passed to the next test.
- **Simulation study showed 36% more AF detections compared to Terra-MODIS (Wooster et al., 2012)**
- **Improved detection of small/low-FRP fires.**
  - While the contextual algorithm is similar to MODIS, spectral tests are less conservative.

# Strategic Priorities for GOFC/GOLD-Fire IT

- **Operational fire monitoring capabilities on JPSS VIIRS and METOP, Sentinel 3 SLSTR providing data and product continuity (NOAA/ESA/NASA) including - Near Real Time access to the data**
- **Global Burned Area Products and Validation (Stage 3) – Best Practices - NASA/ESA CCI**
- **Space Agency coordination of global moderate resolution data processing and access (Landsat 8, Sentinel 2 (NASA/ESA/USGS), China/Brazil, India (TBD) – MUSLI demonstration**
- **Meteorological Agency support for establishing a Global Geostationary Fire Network (NOAA/CGMS)**
- **Coordination / refinement of requirements of fire observations in support of the International Conventions and articulating implementation methods / best practices**
  - **Role of Fire in UN REDD (i.e. GOFC-GOLD REDD Sourcebook (U. Idaho w. LC IT U. Wageningen),**
  - **UN REDD + Fire Demonstration Projects (TBD)**
  - **GCOS ECV's for UN FCCC , CEOS (U. Leicester)**
- **Support for the Regional Fire Networks and developing capacity building programs on the use of satellite fire data (START, NIES, NASA)**

# Important issues being considered..

- Promoting open data policies – emphasis shifting to ground segment efficiency, product generation and interuse of data
  - Emphasis needed on Best Practices; ease of volume data access, QA metadata, documentation, validation, reprocessing, etc.
- Data records are extending but multisource Long Term Global Data Records remain challenging
  - AVHRR 1km back to 1980 – no initiatives on the horizon – strong justification needed to warrant the cost
  - ATSR 21 year record (night-time fires)
  - MODIS Reprocessing C6 > VIIRS Products and Reprocessing
  - Sentinel 2/3 Products – Standard Higher Order Products TBD
- Agricultural Burning – remains an outstanding challenge
  - Both for detection and emissions

# Forthcoming GOFC Fire-IT meeting w. GEO GWIS November 2016, Chile



14-18  
November 2016

**SANTIAGO - CHILE**

Universidad Mayor, Campus Manuel Montt, Manuel Montt 367, Providencia.

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