

Workshop Report

Wildfire Hazard Mapping and Land Cover Change in Latin America

A workshop and regional network meeting organized by the

**Global Observation of Forest and Land Cover Dynamics
Latin American Network for Remote Sensing and Forest Fires (RedLaTIF)**

October 9-11, 2018

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I. Meeting Background

The Latin-American Network for Remote Sensing and Forest Fires (RedLaTIF) is a regional network established in 2002 under the Global Observations of Forest and Land Dynamics (GOFC/GOLD)-Fire Mapping and Monitoring Theme. RedLaTIF members are composed of remote sensing specialists with emphasis on the detection and mapping of active fires and burned areas. The network's primary goals are to: (i) assess and validate global satellite fire products, (ii) promote use of remote sensing data, and (iii) bridge the gap between end users and space agencies. RedLaTIF member representation covers a wide geographic area extending from Mexico to Argentina, while also including participation from scientists in Spain and United States, among others. In order to cope with the large geographic representation, RedLaTIF members started cloud-networking activities during the 2015 workshop in Sao Jose dos Campos/Brazil using the Collaborative Virtual Environment (CVE), which allows code and expertise sharing within a common framework. Google was the platform of choice, including Google Earth Engine (GEE) as a mean to share code and explore remote sensing data from the cloud. The collaborative initiative continued via online exchange, and was the main theme of the network's 2017 workshop in Mexico City/Mexico.

The 2018 workshop was held at the NOAA Center for Weather and Climate Prediction (NCWCP) facility in College Park, MD on 9-11 October. The dates were selected strategically to

coincide with the ForestSat¹ conference, hosted by the University of Maryland and NASA Goddard Space Flight Center on 2-5 October 2018.

II. Meeting Description

Day 1 (Oct 9): Focus Area: Data Producers

Welcome message and workshop introduction was provided by Dr. Wifrid Schroeder, official NOAA/NESDIS representative. The first presentation was given by Dr. Garik Gutman from NASA headquarters. Dr. Gutman described the LCLUC program and encouraged network members to further promote regional training and capacity building, with particular emphasis on undergraduate/graduate student engagement. Previous experiences involving Argentina (INTA), Bolivia (Amigos de la Naturaleza), Brazil (INPE), Mexico (CONABIO and Institute of Geography) provided good examples of successful collaboration among network members.

A brief report highlighting previous RedLaTIF workshop achievements and network updates was presented by Dr. Jesús Anaya, RedLaTIF's coordinator. Emphasis was given to analyses performed using the GEE collaborative environment. The data analyses focused on regionally-tuned burned area detection across distinct fire-prone ecosystems in Latin America, including detailed data validation in Colombia, Argentina and Bolivia. Preliminary results were published in the peer-reviewed journal *Revista de Teledetección* (<https://doi.org/10.4995/raet.2018.8618>), and presented during the ForestSat conference and the GOFCC/GOLD Fire Implementation team meeting, both hosted by the University of Maryland in College Park the week of 1-5 October 2018.

Drs. Ivan Csiszar and Davida Streett (NOAA/NESDIS) presented material on latest developments describing satellite fire hazard and land cover mapping products, including demonstration of new data sets. Ms. Viviana Salez, a graduate student working with Professor Matthew Hansen from University of Maryland, presented some of their products, including the latest Global Forest Change product based on Landsat imagery. Ms. Salez also described ongoing projects investigating forest disturbance and aboveground carbon loss, including regional alert systems using Landsat data. Future collaborative ideas were presented in the context of the new NASA SERVIR hub in Peru, in addition to USAID and Silvia Carbon-funded initiatives.

Dr. Emilio Chuvieco, a professor with the University of Alcalá/Spain, joined the meeting via Webex to present results on the European Space Agency (ESA) Fire Climate Change Initiative (Fire-CCI) project covering the generation and analysis of a new global burned area data set. In this same topic, Dr. Louis Giglio from the University of Maryland presented the collection 6 MODIS burned area mapping algorithm. The presentation drew several comments concerning data continuity between the EOS/MODIS and JPSS/VIIRS satellite missions.

Dr. Gerardo López from Assimila/UK presented a sensor agnostic algorithm that designed to improve the estimation of surface reflectance over standard approaches. That presentation was

¹ <https://forestsat2018.forestsat.com/>

followed by a in-depth discussion of the processing steps used to derived burned area maps from Landsat imagery through the GEE collaborative environment. Preliminary results for Colombia, Argentina and Bolivia were presented.

At the end of the first day Dr. Fabiano Morelli from the Brazilian Institute for Space Research (INPE), Dr. Isabel Cruz from the National Commission for Biodiversity/Mexico (CONABIO) and Dr. Lilia Manzo from the Universidad Nacional Autónoma de Mexico (UNAM) provided an insight of their respective fire monitoring programs, including preliminary fire detection results using new GOES-16 data.

Days 2 (Oct 10): Focus: Data Users

The first morning hours saw presentations by Mr. Nicolas Mari from the National Institute for Agricultural Technology/Argentina (INTA) and Dr. Alexander Ariza from Geographic Institute Agustín Codazzi/Colombia (IGAC) describing their respective research materials on wildfire hazard mapping, including pre-fire (fire risk), active fire (fire detection), and post-fire (burned area mapping), along with those applications relating to fire weather and climate (air quality, fire ecology). Later in the morning the meeting participants experienced a guided tour of the NCWCP building, which covered areas responsible for operational weather/climate prediction and satellite fire monitoring.

The afternoon session started with Dr. Janice Coen speaking via Webex from the National Center for Atmospheric Research (NCAR). Dr. Coen described the Couple Atmosphere-Wildland Fire Environment (CAWFE) modeling framework, presenting several coupled weather-fire simulations highlighting the importance of dynamic ambient conditions that control wildfire behavior. That presentation was followed by Dr. Renata Libonatti's, who joined from the University of Lisbon via Webex. Dr. Libonatti presented on the burned area protocol according to the Committee on Earth Observation, where time series and support vector machines are highly recommended.

Dr. Jordi Brull, a new participant from the National Forest Commission/Chile (CONAF), gave a presentation on decision making tools to analyze and forecast forest fires. A round table discussion closed the second day of meeting when GEE data analysis scripts were shared among participants to help them evaluate satellite burned area product performance in different environments. In this session, each participant used the script to derive burned area maps in areas subject to fire occurrence, followed by a discussion of the results.

Day 3 (Oct 11): Focus: Future activities

Dr. Wilfrid Schroeder presented preliminary GOES-16 active fire algorithm data analyses results, in addition to summary slides describing a 2017 satellite fire data validation campaign in Brazil , emphasizing the importance for further field activity coordination among RedLaTIF members.

Meeting participants revisited existing satellite data users' requirements, and addressed new applications with attention to data qualities and limitations. Priority areas for science and data sharing were identified with a focus on latest/refined satellite data sets. Participants agreed to further promote investigations addressing the role of fires in understanding deforestation processes leading to land cover/use change, exploring state-of-the-art models/analyses tools.

III. Outcomes

Below is a short list of key take-home notes compiled during the meeting:

1. The RedLaTIF network will strive to augment regional representation in Latin America. An effort will be made to identify new members in Peru, where a new SERVIR hub is expected, while also considering under-represented countries such as Costa Rica, Trinidad, Costa Rica, Ecuador and others. Current members noted that some of those countries used to participate in RedLaTIF (e.g., Costa Rica - Luis Diego Roman, Peru - Isabel Manta, both are members of Global Wildland Fire Network [GWFN]).
2. Funding opportunities: It is important to keep the momentum of the Network as it participates in different calls. There are several initiatives including the re-submission of a proposal in response to the International Partnership Programme (IPP) funding announcement, in addition to new EO satellite missions that could be tackled by network members – Dr. Gerardo Lopez will be leading those efforts. Another initiative is the proposal lead by Drs. Alexander Ariza and Jesus Anaya and submitted to Instituto Panamericano de Geografía e História (IPGH), which might support network meetings with approximately US\$20,000.
3. Dr. Jesus Anaya agreed to track the NASA SERVIR proposal. Members will consider the possibility to involve the EU with RedLaTIF. This can be done by determining the needs of French Guyanas and other European territories in northern South America. Another alternative to help finance network meetings might include inviting general public and charging workshop fees.
4. Network members will promote joint LCLUC and RedLaTIF fire meetings, and in addition to the face to face meetings host web meetings every three months (initial agenda will be proposed by Mr. Nicolás Mari).
5. Science proposals relating active fires and land cover changes will be pursued.
6. Members will identify data requirements that can be supported by NOAA, including direct broadcast products in light of existing coverage gaps in the northern South America.
7. Online social network outreach will be promoted (e.g., Twitter)
8. Dr. Isabel Cruz volunteered to update the RedLaTIF webpage with relevant news every 3 months. Other members will contribute to that effort.
9. Members will continue to further refine the burned area mapping script in GEE, adding more scenes of interest, replacing top-of-atmosphere reflectance data with corresponding surface retrievals, and consider a new publication in higher impact journal. In addition, members will revise the GEE data analyses protocols and upload the documentation to the network's web page.
10. Dr. Jesús Anaya (UDEM), Mr. Nicolás Mari (INTA) and Dr. Alexander Ariza (CIAF/IGAC) will present a collaborative proposal to the International Development

Agencies of Colombia and Argentina, seeking to raise funding for the development of a joint fire risk product.

During an open voting session on the third day of the meeting Mr. Nicolas Mari was elected the new network coordinator – he is replacing Dr. Jesús Anaya. The latter has since communicated the name of the new coordinator to GOCF-GOLD and Global Wildfire Information System (GWIS) email lists.

IV. Deliverables

Meeting presentations and final report will be available through the RedLaTIF webpage.

V. Participant list

Below is a list of in-person and remote attendants who participated in the meeting.



Isabel Cruz (CONABIO - Mexico)*, Lilia Manzo (UNAM - Mexico)**, Jesús Anaya (Universidad de Medellin - Colombia)*, Alexander Ariza (IGAC - Colombia)**, Jordi Brull (CONAF - Chile) **, Nicolas Mari (INTA - Argentina)**, Gerardo Lopez (Assimila - U.K.)** Fabiano Morelli (INPE - Brazil)#, Viviana Sales (UMD - USA) graduate student, Andre Lima (UMD - USA) research associate, Davida Streett (NOAA - USA), Ivan Csiszar (NOAA - USA) Wilfrid Schroeder (NOAA - USA), Garik Gutman (NASA - USA)

** denotes participants receiving full travel support from START

* denotes participants receiving partial travel support from START

overseas participant using own funding

Remote Participants (Webex)

Emilio Chuvieco (Universidad de Alcalá - Spain), Federico Alonso (remote sensing consultant - Spain), Carlos Beltran (Universidad Autónoma de Sinaloa, Mexico), Patricia Silva (Mexico) Renata Libonatti (UFRJ - Brazil), Fillippe Lemos (UFRJ - Brazil) - graduate student, Luiza Narcizo, Angel Teran (CIEMAD - Mexico), Maria Eugenia (CIEMAD - Mexico), Omar Lara (CIEMAD - Mexico), Janice Coen (NCAR - USA).